



Deliverable 3.2
**Report on 14 Pilot Regions
experiments**
Second Living Lab Report

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Report on 14 Pilot Regions experiments

Second Living Lab Report

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Introduction to the Report on 14 Pilot Regions experiments

Bryonny Goodwin-Hawkins (CCRI)





1. About this compendium

This Deliverable is a compendium of reports from **Living Labs in RUSTIK's 14 Pilot Regions**. Each report presents the work undertaken in Cycle 2 of RUSTIK's Living Lab methodology, which began in January 2024. During this Cycle, each Living Lab focused on designing and delivering a '**Data Experiment**' to test new data, methods, or analytical approaches that can help better understand and support the needs of rural areas to address transition challenges.

The reports were written and revised in **November-December 2024** and describe progress to date. Each report was internally reviewed by two reviewers (one representative from another Living Lab, and one representative from a partner in another RUSTIK work package).

A guide for readers is provided below. The remainder of this introduction provides further detail on the Data Experiments and a short commentary on the reports.

A guide for readers

Reports are presented in alphabetical order by the country name of the Pilot Region. Each report begins with a short **two-page summary** and is then divided into four parts. **Part 1** introduces the Pilot Region, and the transition challenge the Living Lab is focusing on. **Part 2** presents the Data Experiment, including an analysis of preliminary results. **Part 3** reflects on learning from the Data Experiment. **Part 4** outlines the Living Lab's next steps for 2025 and plans for future sustainability, collaboration, and dissemination.

The table in Section 2 below provides a concise overview of the transition challenge each Living Lab is addressing, and the Data Experiment they have developed. Section 3 identifies commonalities across the reports and provides examples from the Living Labs.

This is a large compendium and there are several possible **pathways for readers**:

- For an **overall digest** read the individual report summaries.
- To focus on a specific **transition** (socio-economic & demographic, climate & environmental, or digital), select Living Labs using the first column in the table in Section 2 below then consult Part 1 in the reports.
- To explore a **theme** (land, planning, and natural resource management; digital innovation and social inclusion; entrepreneurship and local economic development; young people and migration), select Living Labs using the second column in the table in Section 2 then begin with report summaries.
- To learn about specific **data experiments**, select Living Labs in the third column in the table in Section 2 then consult Part 2 in the reports.
- For **insights and examples** on common issues, such as data gaps and stakeholder empowerment, begin with the short overviews in Section 3 below.





2. Introducing RUSTIK Data Experiments

Living Labs in RUSTIK’s 14 Pilot Regions bring research and practice partners together to:

1. Explore how each Pilot Region is navigating key transitions and envision the future.
2. Identify how new data and/or using data in new ways can help design better strategies.
3. Try out these ideas in practice.
4. Share learning together, both within and between regions.

The Living Lab operational phase began in May 2023. In **Cycle 1**, each Living Lab identified a specific **transition challenge** for the Pilot Region to seek to address. The results from this cycle are presented in the *First Living Lab Reports*, RUSTIK Deliverable 3.1.

Living Lab **Cycle 2** focused on experiments with new data and approaches. Each Living Lab worked to test a new information source or analytical method aimed at meeting the data gaps, needs, and opportunities identified for the Pilot Region in Cycle 1. In RUSTIK, a **Data Experiment** is defined as testing a data source, tool, or method (or a combination of these) that is **new to the transition challenge or Pilot Region context**. This can include:

- Using a new source of data, or a combination of sources that are newly brought together.
- Using a new method to collect or analyse data.
- Using a new tool to collect, analyse or apply the knowledge gained from data.

In the reports, ‘new’ is highly dependent on each Pilot Region’s own context and needs. Each report describes the participatory processes involved in developing the Data Experiment and details the intended innovation and impact at a local scale. The table below summarises the selected transition challenge and Data Experiment for each Living Lab. Living Labs are also categorised by four shared thematic foci.

Table 1 Summary list of Living Labs

Living Lab and key transition/s	Thematic focus and transition challenge	Data experiment
Austria: Nockregion-Oberkärnten Socio-economic & demographic	Entrepreneurship and local economic development Addressing demographic decline by supporting the socio-economic resilience of Small Rural Businesses (SRBs).	Mapping small rural businesses (SRBs) through spatial analysis, surveys, and workshops to understand and support their contributions to the region.
Bulgaria: Troyan-Apriltsi-Ugarchin Socio-economic & demographic	Entrepreneurship and local economic development Enhancing rural food systems to support local development and strengthen regional value chains.	Collecting and triangulating data from interviews, surveys, and public registers to analyse rural food systems and strengthen local value chains.
Finland: North Karelia Socio-economic & demographic	Young people and migration Integration and retention of immigrants through improved wellbeing and employment opportunities.	Using wellbeing surveys and business interviews to understand immigrant integration challenges and develop better policies for retention.





Living Lab and key transition/s	Thematic focus and transition challenge	Data experiment
<p>Germany: Rhein-Hunsrück</p> <p>Socio-economic & demographic</p>	<p>Young people and migration</p> <p>Aligning the needs of young people with regional employment opportunities to address labour market mismatches.</p>	<p>Conducting surveys and focus groups with youth and employers to analyse mismatches in the apprenticeship market and improve alignment.</p>
<p>Italy: Garfagnana</p> <p>Socio-economic & demographic / Climate & environmental</p>	<p>Land, planning & natural resource management</p> <p>Integrating forestry valorisation and community regeneration to address environmental and demographic challenges.</p>	<p>Integrating diverse data sources on forest resources and management to inform rural development policy, combining data collection with participatory governance.</p>
<p>Italy: Parma, Piacenza & Ferrara</p> <p>Climate & environmental</p>	<p>Land, planning & natural resource management</p> <p>Mitigating the impacts of climate change on irrigation and water governance for agricultural resilience.</p>	<p>Enhancing water governance by identifying data gaps and analysing water needs and availability under climate change scenarios.</p>
<p>Poland: Mazowieckie voivodeship – Szydłowiecki powiat</p> <p>Socio-economic & demographic</p>	<p>Entrepreneurship and local economic development</p> <p>Transitioning from a farming-based economy to a diversified production and consumption-oriented economic base.</p>	<p>Collecting primary and secondary data on entrepreneurial opportunities involving local natural resources, testing new business approaches with entrepreneurs.</p>
<p>Poland: Woj. Świętokrzyskie</p> <p>Socio-economic & demographic</p>	<p>Entrepreneurship and local economic development</p> <p>Revitalising rural tourism to diversify local economies and mitigate demographic outflows.</p>	<p>Conducting surveys and data collection on rural tourism dynamics, focusing on agritourism challenges and opportunities.</p>
<p>Serbia: Zaječar District</p> <p>Socio-economic & demographic</p>	<p>Entrepreneurship and local economic development</p> <p>Promoting local economic resilience by strengthening short food supply chains between farmers and tourism operators.</p>	<p>Mapping short food supply chains using surveys, stakeholder mapping, and network analysis to improve local farming contributions to tourism.</p>
<p>Slovenia: Osrednjeslovenska regija</p> <p>Socio-economic & demographic / Climate & environmental</p>	<p>Digital innovation and social inclusion</p> <p>Reducing food waste and fostering social inclusion through sustainable food redistribution systems.</p>	<p>Creating a data model that combines food surplus data with social impact metrics to optimise food redistribution and reduce waste.</p>





Living Lab and key transition/s	Thematic focus and transition challenge	Data experiment
Spain: Galicia Socio-economic & demographic / Climate & environmental	Land, planning & natural resource management Reducing wildfire risks and fostering rural economic activity through innovative land use management policies.	Developing a decision support system that combines spatial and non-spatial data to prioritise locations for wildfire risk reduction and foster new farming activities.
Spain: Sant Miquel de Balenyà (Osona) Socio-economic & demographic / Climate & environmental	Digital innovation and social inclusion Enhancing quality of life and social cohesion through participatory urban and territorial planning.	Developing a quality-of-life index to identify and address inequalities across neighbourhoods, integrating GIS and participatory tools.
United Kingdom: Gloucestershire Digital	Digital innovation and social inclusion Leveraging digital tools to improve rural service provision and inform local policies.	Creating a prototype data dashboard to integrate and analyse rural service data, enabling better decision-making and policy alignment.
United Kingdom: Monmouthshire Socio-economic & demographic	Young people and migration Achieving better demographic balance by retaining and attracting younger working-age populations.	Conducting comparative data analysis, resident surveys, and focus groups to understand demographic challenges and opportunities.





3. Common issues and insights from the Living Labs

This section highlights seven broad topical areas where Living Labs are working on Data Experiments that test solutions and create opportunities to collaborate, innovate, and learn from practice.

Addressing data gaps and challenges

RUSTIK Living Labs highlight critical challenges for rural actors and policy makers in accessing, using, and maintaining sufficiently granular data about rural areas. Many regions struggle with fragmented and inconsistent datasets, as seen in **Parma, Piacenza & Ferrara**, where water governance data remains uncoordinated across stakeholders. Outdated information, such as cadastral data in **Galicia**, further complicates informed decision-making. Data integration can be similarly hampered by institutional barriers, as observed in **Garfagnana**, where forestry data requires harmonising data from diverse public and private sources. Representation challenges also mean that some stakeholders, such as small rural businesses in **Nockregion-Oberkärnten** and marginalised youth in **Rhein-Hunsrück**, are poorly understood through existing data sources. In **North Karelia**, national policy changes revealed key data gaps as local authorities worked to proactively respond to new reporting requirements. For **Świętokrzyskie**, an abundance of national statistics contrasts with a lack of data targeted to local action. Across these examples, Living Labs demonstrate the need for systems that can bridge data gaps and meet evolving policy and practice needs in rural areas, bringing data innovation together with local action.

Data integration for smarter decision-making

RUSTIK Living Labs demonstrate how combining diverse data sources can help address rural challenges. **Galicia** integrates spatial, biophysical, and cadastral data in a decision support system to prioritise wildfire risk reduction, while **Parma, Piacenza & Ferrara** consolidates water management data to mitigate climate-driven water scarcity. **Osona** innovatively combines georeferenced indicators with participatory mapping to develop a hyper-local Quality of Life index which can enable more balanced territorial development. **Monmouthshire** combines georeferenced qualitative data with local-level statistical information to inform targeted policies addressing rural inequalities. **Osrednjeslovenska** develops an integrated data model combining quantitative data on food availability and logistics with qualitative insights from stakeholders, creating a holistic understanding of food redistribution systems and the potential to improve their efficiency. **Gloucestershire** aims to integrate multiple datasets into a smart dashboard to support evidence-based decisions for priorities in rural service provision and digital infrastructure development to reduce social inequalities. **Troyan-Apriltsi-Ugarchin**'s GIS platform consolidates diverse datasets, from organic farming to food markets, enabling more targeted local food system analysis and development. Together, these Living Lab initiatives demonstrate how creative data integration can enable improved place-based decision making and drive sustainable local solutions.





Exploring new data tools and methods

New tools and methods are at the heart of RUSTIK Living Labs' experiments. **Nockregion-Oberkärnten** trials web scraping to create a spatial database of small rural businesses, while **Zaječar District** uses similar techniques to map food system dynamics. **Osona** employs GIS and georeferenced surveys to map hyper-local disparities in Quality of Life. **Troyan-Apriltsi-Ugarchin** also uses a bespoke GIS platform to consolidate and visualise diverse data streams. **Gloucestershire** employs AI-driven text generation and advanced multi-dataset analysis in its smart dashboard, while **Garfagnana** develops forest ecosystem maps using Q-GIS to support sustainable management. The use of tools like GIS, web-scraping and AI illustrates how new data technologies can be tested and applied to generate actionable insights for rural areas and design locally tailored data systems.

Tackling environmental challenges

Some RUSTIK Living Labs aim to address environmental sustainability through data-driven strategies. **Galicia** supports mitigating wildfire risks by integrating land use and risk data into planning tools, while **Parma, Piacenza & Ferrara** envisions a resilient irrigation network to combat water scarcity. **Garfagnana** aligns forest ecosystem management with local governance to promote sustainable forestry. In these examples, data tools align environmental goals with economic priorities to enhance sustainability and resilience. **Osona's** Quality of Life Index incorporates environmental indicators to guide sustainable urban and territorial planning at a local scale. By aligning environmental data with governance and well-being priorities, these Living Labs look towards future targeted strategies that balance environmental sustainability with rural development needs.

Fostering participation and inclusion in rural transitions

Several RUSTIK Living Labs use participatory tools to include diverse voices in rural transitions. **Monmouthshire** and **Rhein-Hunsrück** engage younger residents to inform policies for demographic sustainability and labour market alignment, while **North Karelia** prioritises immigrant inclusion and well-being. **Mazowieckie** engages residents and entrepreneurs in participatory processes to explore how local products can foster entrepreneurship and strengthen community identity. **Zaječar District** and **Osona** both experiment with participatory mapping, respectively to connect farmers and food businesses in stronger local networks, and to validate Quality of Life indicator results with local experience. **Gloucestershire** directly addresses social inclusion in digital transitions. **Osrednjeslovenska** links food redistribution with social support to create a model for community cohesion and supporting well-being. These Living Labs explore how inclusive approaches can strengthen cohesion and address inequalities, highlighting the need to ensure that rural areas navigate transitions in equitable and inclusive ways.

Empowering local stakeholders

Engaging communities and stakeholders is central to most RUSTIK Living Labs' approaches. **Nockregion-Oberkärnten** and **Mazowieckie** focus on empowering small rural businesses and entrepreneurs, fostering their role in regional strategies. **Zaječar District** strengthens local food systems by building collaborations among farmers, restaurateurs, and SMEs, while **Troyan-Apriltsi-**





Ugarchin bridges business-to-business networks. **Garfagnana** engages forest users to co-develop governance frameworks that balance local needs and environmental stewardship. **Gloucestershire** aims to empower rural service providers through its smart dashboard, strengthening local capacity to navigate digital transitions and infrastructure challenges. By fostering stakeholder collaboration in diverse contexts, these Living Labs demonstrate how cultivating local agency is fundamental to creating resilience and ensuring that local actors can shape more sustainable futures.

Cross-sector and multi-actor collaboration

RUSTIK Living Labs incorporate multiple perspectives to generate local solutions. **Nockregion-Oberkärnten** engages with regional employers and municipality representatives to align strategies for small rural businesses, fostering networks that enhance regional resilience. **Świętokrzyskie** brings stakeholders together to diagnose barriers in tourism development and look towards coordinated approaches. **Zaječar District** strengthens regional networks by linking agriculture, tourism, and business. Similarly, **Osrednjeslovenska** works to build multi-actor coalitions to tackle food redistribution challenges and improve local resilience. **Rhein-Hunsrück** collaborates with schools, employers, and youth organisations to align local apprenticeship opportunities with youth needs, demonstrating the value of coordinated action across sectors. These examples highlight how multi-actor collaboration can help foster practical change and deliver integrated solutions to address local challenges.

4. Next steps for Living Labs

RUSTIK's Living Labs will continue with Cycle 3 in 2025. During this Cycle, Living Labs will shift focus from the Data Experiment itself to creating impact, informing policy, and sharing learning more widely. This will include plans for the longer-term sustainability of both tools and platforms developed during the Data Experiment and collaborations and networks between Living Lab partners and stakeholders. Each individual report outlines the Living Lab's current plans.

5. Acknowledgements

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Austria: Nockregion-Oberkärnten





Summary and overview

The Austrian PR Nockregion-Oberkärnten is located in the Central Alps in the southernmost province of Austria (Carinthia) and includes 17 municipalities that face a persistent challenge of population decline. The total area spans 1,324 km², with a permanent settlement area comprising only about 15% of the area. Key sectors include tourism, agriculture, forestry, trade, industry and construction.

Living Lab challenge

In Nockregion-Oberkärnten, demographic challenges such as a declining population, aging demographics, and female and youth out-migration pose a risk to the region's growth and vitality. The main challenge for the Living Lab is to foster socio-economic resilience by focusing on the unique needs and opportunities of Small Rural Businesses (SRBs) within the regional strategic aim of "becoming the best living and working region." SRBs have an important yet so far underrepresented role in regional development as they can mitigate negative socio-economic trends and support local resilience by creating diverse employment opportunities and a robust service network. By offering essential products, services, and varied job roles, these small businesses are critical to the region's stability and attractiveness for residents and potential newcomers, serving as both economic drivers and community anchors. However, SRBs are under pressure, they have to deal with weak economic development in general, labour force shortages, high administrative burden, major requirements in terms of further training, large distances and poorly developed public transportation, etc. These developments also apply for medium and large enterprises but SRBs lack economics of scale and representation. The Living Lab aims to identify and address data gaps concerning the visibility SRBs, allowing for a detailed mapping of the region's variety and current distribution of businesses and understand and address the specific needs and challenges encountered by entrepreneurs and small business owners.

Data experiment

The data experiment aims to enhance the overall visibility of SRBs for residents, other businesses and regional decision makers by mapping their current status in the region. The term "visibility" here encompasses several aspects: being easily located on a map, raising awareness about the SRBs and their role in the region, and ensuring they have a more prominent presence in regional decision-making processes. This includes generating spatial data on business locations, analysing statistical data and capturing SRB needs and challenges through a survey. The key activities were: (1) conducting an analysis of statistical data, which resulted in an informative brochure highlighting essential insights about SRBs; (2) performing a spatial analysis to localize businesses across municipalities and visualize them by sectors. Initially reliant on web scraping, this process evolved into consolidating multiple data sources when web scraping proved insufficient. Regional mapping workshops with local mayors were instrumental in this phase, resulting in a spatial visualization/map and a database of businesses categorized by sectors; and (3) conducting a survey to identify specific needs and challenges faced by SRBs. The anticipated outcomes of this data experiment include a better understanding of municipal economic patterns, insights into sector diversity and increased interest among key stakeholders, particularly municipal leaders, in SRB-related initiatives. This interest is expected to foster more collaborative support for SRBs.





Preliminary results

Our analysis of official statistical data of the Nockregion's business landscape, presented in a concise infographic distributed to relevant actors and stakeholders in the pilot region, reveals key insights into the structure and importance of SRBs. They make up 99% of all businesses in the area, yet they only account for 46% of total employment. In contrast, the remaining 1% of medium and large businesses employ 54% of the workforce, indicating an economic imbalance and dependence on a small number of larger employers. Despite this, SRBs are spread across all sectors, providing a diverse range of jobs and services. This broad distribution supports the region's stability and attractiveness as a place to live and work. Additionally, ongoing spatial analysis of business locations across the region allows for a geographic visualization of SRBs according to sectors.

Key learning to date

Key learnings from the data experiment underscore the importance of local knowledge in ensuring data quality and relevance. The insights derived from local data sources on the SRB landscape were significantly enhanced by the regional expertise of mayors, highlighting the value of leveraging local knowledge. The experiment also demonstrated the benefits of a mixed-method approach to integrating diverse data sources. While this approach was time-consuming, it provided a more comprehensive view of business locations in the region, proving its worth. At the same time, it became clear that for a small regional scale, high-quality data is essential. Without precision, the data would lack the utility needed to support meaningful decision-making. Furthermore, when working with small-scale regional spatial data, it is crucial to carefully address data protection issues. Another key takeaway was the critical role of strong regional ties and trust. Well-connected, trusted local partners proved invaluable in building stakeholder confidence in the process and outcomes. These relationships fostered a collaborative atmosphere, which was crucial to the experiment's process.

Next steps

The next steps involve finalizing the data experiment, including data consolidation and visualization of spatial business data in a map as well as survey collection and analysis. Once finalized, findings will be shared and discussed with stakeholders to ensure transparency and encourage further engagement. In Cycle 3, the focus will shift to developing strategies to integrate the insights from the data experiment into long-term support for the region and its SRBs. A key objective will be exploring how updated policies can aid the region's transition, as data alone cannot drive change without a supportive framework. The findings will be used to inform broader policy development and guide stakeholders in embracing the insights for regional transformation.



Figure 1 Scene of an art market in the municipality of Gmünd (Künstlererstadt Gmünd i.K.)





Part 1: Living Lab context

Pilot Region introduction

The Austrian Pilot Region Nockregion-Oberkärnten (see Figure 2) is located in Carinthia, the southernmost province of Austria, and consists of 17 municipalities spread across three political districts. Covering an area of 1,324 km², only about 15% is permanently settled (BEV, 2022; Statistik Austria, 2023a), emphasizing the region's expansive natural and rural characteristics. The main settlement areas include the municipalities of Spittal/Drau, Seeboden, and Radenthein. The region's population of approximately 52,500 inhabitants has been shrinking steadily by 3.5% between 2011 and 2021, with considerable differences between the municipalities (Statistik Austria, 2023a). The downward trend is expected to continue, compounding the socio-economic challenges faced by the region.

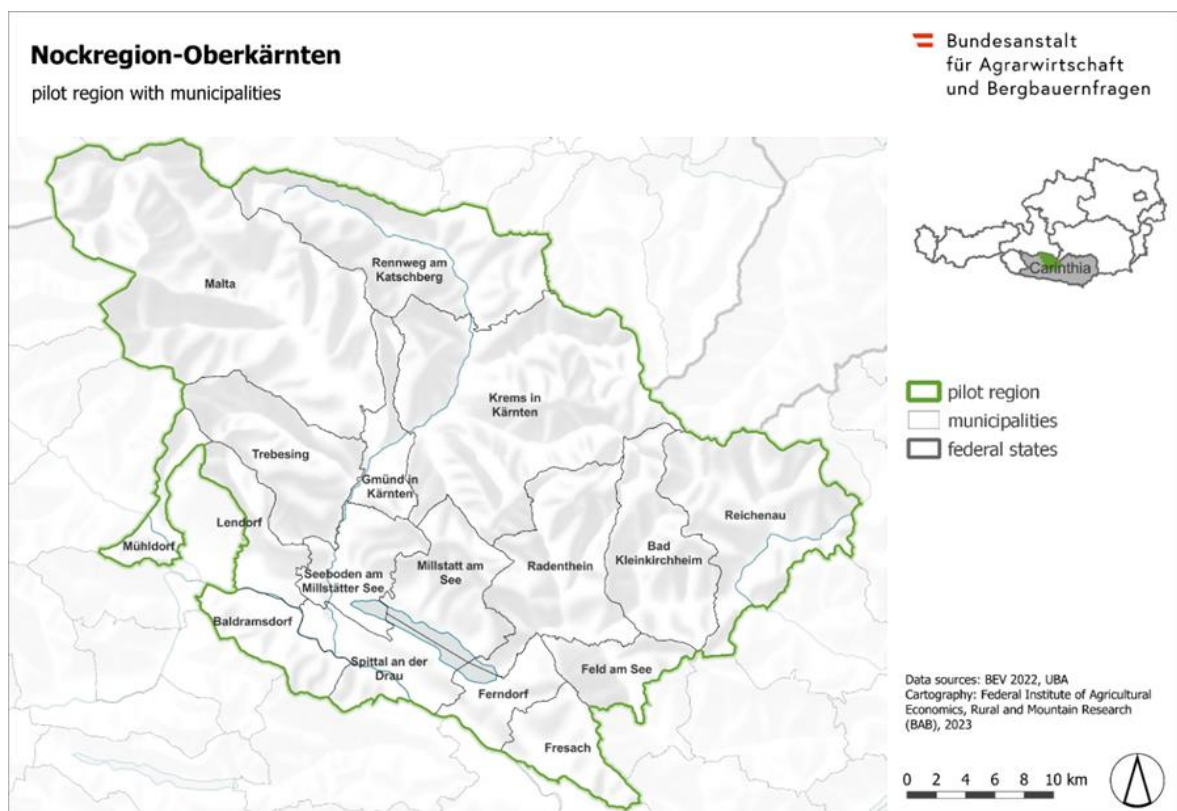


Figure 2 Map of the pilot region and its location in the regional and national context

Situated in the Central Alps, the Nockregion-Oberkärnten features a diverse natural landscape, ranging from hilly and mountainous areas to high alpine peaks and lakes. The region's mountainous terrain and protected areas (National Park and Biosphere Reserve) not only enhance its tourism appeal but also support biodiversity and sustainable practices in agriculture and forestry. Tourism is a vital economic sector in the region, with around 2 million overnight stays in the summer season and 1 million in the winter (GeDaBa, 2022). Land use in the region is dominated by agriculture (mainly permanent grassland), forestry, and mountain pasture, with





tourism playing a key role. Other important industries include crafts, trade, energy production, construction, and the wood sector. The region's central municipalities benefit from proximity to key European north-south transport routes, while more remote areas face accessibility challenges.

The region faces several challenges, in particular with regard to demographic change (low birth-rates, out-migration, especially of young people and women, aging populations) leading to labour shortages in general and difficulties to maintain workforce. Other issues include limited public transportation, the strain of over-tourism on local quality of life and the impacts of climate change, such as natural hazards.

Functions

Production functions

The region is characterized by a diverse economic landscape with several key production sectors including agriculture and forestry, crafts, trade and industry, regional energy production and construction and the timber sector, typically revolving around small enterprises (below 50 employees) and very small enterprises with up to nine employees. Employment varies across municipalities, with Spittal/Drau serving as the economic hub and a centre for in-commuting. In settlement centres and tourist areas, the service and public sectors drive high employment, while in more remote areas, agriculture and forestry remain essential, accounting for up to 16% of jobs. The region's farming consists mostly of small mountain farms (84%), focused on alpine pastures and forestry. These economic differences highlight the region's dependence on its central hubs for employment and underscore the vulnerability of remote areas where traditional sectors such as agriculture and forestry face growing pressures.

Consumption functions

Tourism plays a key role in Nockregion-Oberkärnten, accounting for 11.5% of total employment, and in some municipalities, as much as 37%, well above the national average of 6% (Statistik Austria, 2023b). The region's varied landscapes attract both summer and winter tourists. Beyond the regional capital Spittal/Drau, three sub-centres and several tourist hubs offer infrastructure and services, supporting a "polycentric spatial development" (Fischer, Zwirschitz, and Hochmaier, 2022). A major concern in the region is the high number of secondary residences, which make up 25% of all housing, compared to the national average of 16%. This trend, especially strong in tourist areas, reduces municipal tax revenue from primary residences and drives up land prices and rents. As a result, affordable housing has become a pressing issue, especially for young families. The rising costs not only push younger residents to seek housing opportunities elsewhere, but also present significant barriers for small entrepreneurs, further hindering the local economy.

Ecosystem services

Protected areas cover 49% of Nockregion-Oberkärnten, reflecting its unique mountainous landscape and extensive forests. In response to the growing impacts of climate change, such as rising temperatures and more frequent extreme weather events, the region has made climate protection and adaptation key priorities in its local development strategy. This includes the establishment of Climate and Energy Model Regions (KEM) and the implementation of a climate change adaptation strategy (KLAR!), showcasing a proactive approach to tackling environmental challenges.





Transitions

Key transition challenges

The Nockregion-Oberkärnten faces significant **socio-economic challenges** due to unfavourable demographic dynamics, notably characterized by negative birth and migration rates, prevalent across multiple municipalities. The shrinking population, coupled with an aging demographic population and diminishing numbers of young and employable adults, results in a critical scarcity of skilled workers and employees, experienced in all sectors and branches but particularly salient within the tourism sector. With regard to the **climate and environmental transition**, Nockregion-Oberkärnten is particularly impacted by climate change. Its natural features make it prone to natural hazards and other impacts of climate change. Another critical point is tourism, especially over-tourism, meaning that the number of tourists rises to such an extent that residents feel uncomfortable and compromised in their daily life, diminishing their quality of life, strain local infrastructure and increase waste generation. Thus, tourism, while a key economic driver, also presents challenges leading to environmental degradation and disruptions to social and cultural cohesion. To tackle these challenges, the region has already evolved several approaches including a climate change adaptation check and many other initiatives. The **digital transition** is aggravated by an unsatisfactory coverage with digital infrastructure in remote municipalities and a lack of digital know-how. These gaps in coverage impact the region's appeal as a business hub and residential area. However, digital development is largely influenced by external forces while regional actors perceive only limited influence of their own.

Chosen transition

The Living Lab focuses on the strategic objective of the Pilot Region Nockregion-Oberkärnten of “becoming the best living and working region”. This objective addresses regional challenges in a comprehensive way by involving all sectors and branches but has a particular emphasis on the **socio-economic transition**. The pressure of lacking work force combined with negative population forecasts led to the conviction that joined forces of all sectors are needed to attract new inhabitants (notably young families) and returnees as well as to encourage locals to stay. As this strategic objective of “becoming the best living and working region” is currently evaluated and tested by a LEADER project, and therefore of high regional importance, a focus on the socio-economic transition appears well-suited to actively support and significantly contribute to this regional strategy.

Living Lab partnership

The RUSTIK Pilot Region Partner is the Regional Association Nockregion (Regionalverband Nockregion - RVN), a non-profit organization comprising the 17 municipalities in the Nockregion-Oberkärnten area. Each municipality delegates two members to the RVN, whereby one of the members is almost always the mayor. The board is made up of mayors or their deputies and has a significant say in the development of the regional activities. Working closely with the LEADER Local Action Group (LAG) Nockregion-Oberkärnten (they share a managing director), RVN and LAG jointly support strategic development and promotes inter-municipal cooperation. They oversee regional projects focused on socio-economic development, demographic challenges, and regional well-being. Additionally, RVN leads sustainability initiatives, including three Climate and Energy Model Regions (KEM) and a Climate Change Adaptation Model Region (KLAR!).





The Austrian research partner and Living Lab Coordinator is the Federal Institute of Agricultural Economics, Rural, and Mountain Research (BAB), affiliated to the Federal Ministry of Agriculture, Forestry, Regions, and Water Management. BAB specializes in socio-economic research, with a focus on rural and mountain development, particularly analysing the impacts of regional policies on disadvantaged areas.

Living Lab challenge

The main challenge for the Living Lab is to foster socio-economic resilience by focusing on the unique needs and opportunities of Small Rural Businesses (SRBs) within the regional strategic aim of “becoming the best living and working region.” SRBs, defined here as rural businesses with fewer than 50 employees across all sectors (see Table 1), are critical to the region’s stability and attractiveness for residents and potential newcomers, serving as both economic drivers and community anchors, supporting regional cohesion and attracting potential newcomers.

Table 2 Definition of Small Rural Businesses in the Nockregion (SRBs are defined as businesses with up to 49 employees).

Business Size	Employment Size	SRB Classification
One-person Business	1	SRB
Micro Business	2 - 9	SRB
Small Business	10 - 49	SRB
Medium-sized Business	50 - 249	-
Large Business	250 +	-

Source: Inspired by the definition of the economic chamber of Austria (WKO 2024), complemented with one person businesses

In Nockregion-Oberkärnten, demographic challenges such as a declining population, aging, and female and youth out-migration pose a risk to the region’s workforce, economic growth and vitality. SRBs can help to counter these trends by sustaining and creating diverse employment opportunities and a robust service network. With 99% of all businesses in the Nockregion, SRBs make up the vast majority (a trend also reflected across Austria) and serve as the backbone of the region by offering a wide variety of products, services, and job roles. While large companies may drive significant portions of employment, smaller local businesses—such as hairdressers, craftsmen, and various service providers—are essential to meeting the everyday needs and well-being of residents. As Steiner and Atterton (2015) note, rural businesses contribute to community resilience by generating local employment and supplying products and services that sustain daily life. Access to these services, in turn, helps maintain quality of life, as a lack of essential facilities may drive residents to relocate (Leach, 2013).

Beyond local stability, SRBs also contribute to the region’s resilience by reinforcing its economic base and helping to diversify income sources. This variety may foster a more robust local economy, which is less vulnerable to external disruptions (Steiner and Atterton, 2014). However, SRBs face considerable challenges, as mentioned during stakeholder interviews, such as low awareness for regional products and services among residents, competition from online trading, intergenerational business transfers, affordable renting, difficulties in filling apprenticeship positions, and an overwhelming shortage of time, making it difficult to address the many aspects of running a SRB.





The Living Lab aims to identify and address data gaps concerning the visibility of SRBs, allowing for a detailed mapping of the region's variety and current distribution of businesses. Mapping the current status of SRBs through analysis of statistical and spatial data at the local level provides an overview of the business landscape, enabling regional stakeholders (including mayors) to improve their understanding of the role SRBs play in regional development. It also allows for a better assessment of their composition within each municipality, as well as the functions they provide (or lack thereof). This external perspective is complemented by an online questionnaire distributed to entrepreneurs across all sectors of the Nockregion-Oberkärnten, asking for their opinions on visibility, their need for cooperation and networks, and the specific challenges they face. The responses will inform the foundation of an association or network for SRBs, which is planned by the PRP for next year. Alongside the comprehensive data on the current state of SRBs, the results of the data experiment will serve as a basis for informed political decision-making processes, enabling regional stakeholders to address the specific needs of SRBs more effectively. Currently, the PRP is planning to submit a project proposal for the establishment of this association or network to the Rural Innovation Systems funding program under the Austrian CAP.

Rationale and research questions

This approach offers the advantage of addressing an area unheeded in previous projects. The absence of representation for SRB in regional development strategies was identified as a problem during focus group discussions. So far, the diverse sectors of SRBs (including agriculture) have not been collectively analysed. Instead, attention has primarily focused on individual industries, such as tourism or the industrial sector, without adopting a holistic approach that encompasses SRBs across all sectors. This is partly due to a lack of resources and limited knowledge of the data situation. Involving SRBs is resource-intensive due to the large number of different stakeholders. In addition, time resources of SRBs are very limited as they are struggling with a multitude of tasks.

Another advantage of this concept to address SRBs, is the potential to leverage the outcomes of the LEADER project "becoming the best living and working region", building upon its results and findings.

To effectively address these challenges, the following research questions have been formulated for Living Lab work in Cycle 2:

- How can the visibility of SRBs and their relevance for the region be improved?
- What data is needed to support the establishment of a SRB association or network?
- What is the current state of the Small Rural Business landscape in Nockregion-Oberkärnten concerning the number of businesses, sector and branches, as well as employment sizes?
- Which datasets indicate the spatial distribution of SRBs, how can we map this?
- What are entrepreneurs' views on their visibility, cooperation, networks, and the challenges they face?

Policy relevance

The relevance of this challenge lies in addressing the beforementioned policy gap: SRBs in Nockregion-Oberkärnten remain underrepresented within current regional strategies, particularly when compared to the focus on larger enterprises such as those in tourism. To fill this gap, the





LL work seeks to replicate the success of the region's 2014 demographic check, which raised awareness about unfavourable demographic trends and resulted in strategic actions and laid the groundwork for the LEADER strategy during 2014-2020. This study highlighted how reliable data can drive policy shifts by showing the complex interplay between shrinking populations and regional development, setting a precedent that data-driven insights can influence regional policy and action.

Similarly, the LL experiment aims to systematically collect and present data on SRBs, demonstrating their needs and highlighting their contributions to local resilience and vitality. This information is expected to increase awareness both within the SRB community and among key stakeholders like mayors, the chamber of commerce and the agricultural chamber, fostering a more comprehensive understanding of the factors affecting SRBs. This heightened awareness may lead to policy adaptations. Additionally, this data is anticipated to bolster the region's ability to apply for project funds, enhancing the likelihood of securing financial support for initiatives aimed at strengthening SRBs.

Despite the lack of a specific policy for SRB support, two key regional strategies—the Local Development Strategy (LES) and the Master Plan for Rural Areas in Carinthia—include action fields concerning the economy of the region. These strategies prioritize "value creation," which includes strengthening SMEs, advancing economic and location development, and supporting agriculture and forestry. While not explicitly focused on SRBs, these strategic points provide a promising framework that could be expanded to incorporate SRB-specific actions, particularly through collaborative projects enabled by LEADER funds. Current data gaps related to the relevance of SRBs for regional development will be addressed by providing detailed information about the regional business landscape, including the distribution of sectors and the spatial distribution of businesses. Together with better knowledge of SRB's current challenges the obtained data aims to make these businesses and their requirements more known to people living in the municipalities, mayors as well as policy makers at regional level.

Ultimately, the LL data experiment seeks to lay the groundwork for integrating SRBs more fully into policy frameworks, supporting informed decision-making and fostering the collective awareness needed to address SRBs' unique challenges and potentials within the region.

Stakeholders

The project began with twelve stakeholder interviews, including SRB owners from the Nockregion, representatives from the district's chambers of economics and agriculture, and a representative from the Austrian Public Employment Service. Actively involved stakeholders include the mayors and representatives of the 17 municipalities and the Chamber of Economics, which provided essential business data. Businesses contributed as key stakeholders by participating in the online survey. Future engagement will expand to include policy stakeholders and representatives from Land Kärnten to strengthen policy alignment and regional support.

Data relevance

By combining quantitative and qualitative local data on SRBs, a comprehensive understanding of their current state, ongoing developments, and the challenges they face in the region can be achieved. This information will not only support the overarching regional strategy of becoming the best living and working region but also provide a solid foundation for informed regional decision-





making. As one of the key objectives of the data experiment is to raise awareness among stakeholder about the importance of SRBs for regional development, a proposal to build a new network under the Rural Innovation Systems funding program of the Austrian CAP (measure 77-03) is currently under preparation and is planned to be submitted in April 2025. A main aim of this network will be to give voice to SRBs and support them with their specific needs and challenges. Additionally, robust data will be essential for new funding applications and for facilitating follow-up projects, such as establishing a new association or network dedicated to SRBs.

While statistical data sets already exist at the LAU 2 level, there remains a need to extract and prepare meaningful insights from this extensive dataset. However, significant limitations in the available data persist. Stakeholder interviews highlighted insufficient visibility of SRBs within the region. A compilation of regional businesses and their offers is missing, which would be a main asset when welcoming newcomers and showcase the region as a good living and working region. Furthermore, there is a lack of data to identify the specific needs and challenges faced by SRBs, highlighting the necessity for targeted data collection efforts.





Part 2: Living Lab Cycle 2: Data experiments

Data experiment

Developing the data experiment

The development of the data experiment was guided by the need to align with the overarching regional strategy and make use of potential synergies, while ensuring that no duplicate efforts were undertaken. The stakeholder interviews in Cycle 1 highlighted a main challenge: the lack of an overview of businesses in the region, particularly in terms of visibility and presence. Although timeliness of data is a critical issue as the nature of business demography among SRBs is fluid and continuously changing, the regional stakeholders (in particular the PRP and the mayors) identified this target group as particularly relevant for the strategic objective of the region to become the best living and working region. The data experiment aims to prepare the basis for a future association or network, where an update of data at local level with optimized actualisation procedures will be envisaged for Cycle 3.

Initially, three ideas for a potential data experiment were considered: increasing SRB visibility, monitoring SRB development, and fostering cooperation between tourism and agriculture sectors. During an exchange meeting with the PRP, these options were reviewed. The decision was made to focus on SRB visibility. Visibility thereby encompasses several aspects: being easily located on a map, raising awareness about the SRBs and their role in the region, and ensuring they have a more prominent presence in regional decision-making processes. Monitoring was deemed unfeasible due to the project's limited timeframe, while efforts in regard to cooperation initiatives between tourism and agriculture already existed in the region, making additional efforts redundant. Later, the scope of visibility was further expanded to deepen the understanding about enterprise's attitudes and actions about their needs and challenges.

Experiment description

The data experiment aims to map the current status of SRBs in the region by generating spatial data of business locations and analysis of statistical data, alongside capturing SRB needs and challenges via a Maptionnaire survey. The expected output includes a data viewer or database that integrates two types of information: (1) employment numbers and sector data derived from statistical sources, and (2) localized, spatial data, providing a sector-based visualization of SRBs in the region. Together, this will offer a comprehensive overview of the SRB landscape. The analysis of LAU2 data from Statistics Austria provides a good knowledge base about structure and development of SRBs in Nockregion-Oberkärnten (e.g. change of number of SRBs, sector distribution). In addition, the spatial mapping of businesses within the region via multi-method data collection and consolidation will spatially visualize regional businesses in a handy and easy to grasp presentation. This approach particularly aims at raising awareness for the respective product and service provision in a given municipality and in the whole region and will contribute to an evidence-based discussion about economic orientation (priorities) and functionality of the region. This database, paired with survey insights, will support informed political decision-making, enabling policymakers to address SRBs' specific needs.





The experimental nature of this approach lies in testing whether combining various data sets such as statistical data, spatial business data and survey insights can enhance regional knowledge of SRB distribution and sector diversity. A crucial part of this experiment involves testing web scraping (a novel method in this context) to see if it can accurately provide detailed information about the geolocation of businesses, as well as their sectors and branches. The effectiveness of this method will be assessed by comparing the obtained data sets with existing statistical data and verifying it during regional workshops with stakeholders.

Experiment objectives

The anticipated outcomes of the data experiment include a better understanding of municipal and regional economic patterns, insights into sector diversity and increased interest among key stakeholders, particularly municipal leaders, in SRB-related initiatives. This interest is expected to foster more collaborative support for SRBs. The key objectives of the data experiment are to:

- I) enhance the influence of SRBs and strengthen their role in regional decision-making processes and in the regional strategy of becoming the best living and working region, and
- II) raise awareness among stakeholders about the importance of this subject (with objective I and II underpinned by the assumption that the creation and presentation of pertinent data will bolster these aims). Additionally, the experiment seeks to
- III) identify key areas for the future development of SRBs and
- IV) improve the visibility of SRB in the region.

Relationship to theory of change

The following diagram shows the Theory of Change at the beginning of Cycle 2.

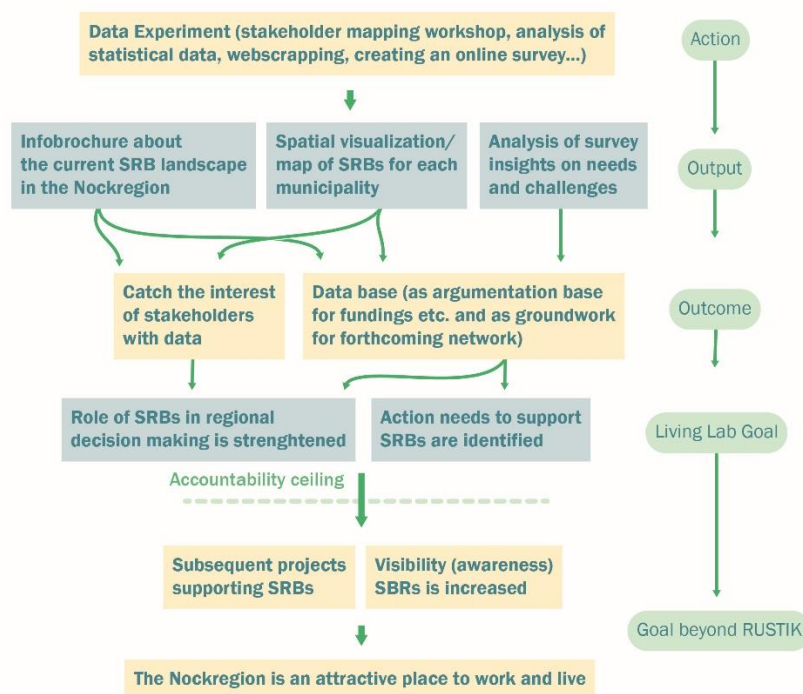


Figure 3: Theory of Change for Nockregion-Oberkärnten Living Lab





Within the data experiment, we aim to test several key assumptions:

- **Assumption 1:** The outputs of the data experiment catch the interest of stakeholders and lead to a change in attitudes towards SRBs. The data experiment delivers novel data from different sources that will support SRBs to be fully recognized and integrated in regional strategic planning.
- **Assumption 2:** Effective information dissemination is crucial. Different ways to reach out and inform regional actors and stakeholders comprise i) an information brochure summarizing key SRB findings for the Nockregion providing for an easily understandable and distributable information; ii) mapping workshops with mayors, which had not only the aim to obtain additional data at local level but to discuss the project and its aims in direct interaction; iii) presentation and discussion of findings in different settings (e.g. regional conference; workshop of other regional projects related to reach the strategic aim of being the best living and working region; living lab workshops to discuss findings, etc.)
- **Assumption 3:** Mayors' involvement is essential for three main reasons: i) they provide invaluable local knowledge and data of SRBs' presence within their municipalities, which is needed for increasing the level of coverage of the mapping of businesses within each municipality; ii) their support in survey distribution increases the likelihood of a high response, as business owners are more inclined to participate when endorsed by trusted local leaders like mayors; and iii) this engagement will foster stronger commitment to the topic across the municipal leaders/mayor who actively participated in the data experiment process. Mayors have an important role in the regional decision making processes, thus their acknowledgement of the value of SRBs for local and regional development will facilitate any further policy actions and activities.
- **Assumption 4:** Aligning the data experiment with the overarching regional strategy will enhance knowledge and awareness among all regional stakeholders and facilitate investments and projects to support SRBs. This integration aims to generate targeted actions, enable financing opportunities, and more accessible funding opportunities to support SRBs like building a network for them.

Impact: The data experiment will allow the PRP to use the findings to substantiate arguments in policy discussions, strengthen the PRP's position in negotiations with the state of Carinthia, secure project funding, and support the formation of a dedicated SRB association for the region. Success can be defined by reaching the different stages along the Theory of Change for Nockregion-Oberkärnten illustrated in Figure 3. Outputs of the data experiment (including the infobrochure, the spatial visualisation/mapping of SRBs and insights from the survey) increase interest and awareness building of stakeholders by obtaining novel evidence and place-based information of SRBs in the region. The different outputs also act as a database for further projects regarding SRBs and in particular as groundwork for a forthcoming SRB network. The role of SRBs is strengthened in regional decision making when the establishment of a new entity (network, association) is fulfilled or on its way using the data base provided by the data experiment.





Data use

Data sources and methods

During Cycle 2 of the project, data sources and collection methods were diverse and adapted over time to ensure a comprehensive profile of Small Rural Businesses in the region. The approach combined insights from stakeholders, statistical data, spatial mapping, and survey responses.

Data collection began with 12 semi-structured **stakeholder interviews** conducted during Cycle 1, where stakeholders shared insights into opportunities and challenges SRBs face, their experiences and future plans related to their cooperation efforts. The preliminary results of the interviews provided valuable qualitative context, helping shape and refine the data experiment. For analysing existing sectors and branches, data was collected through a multifaceted approach encompassing both statistical and spatial data.

First, **statistical data** was selected and queried from “Statistics Austria” – the national statistical office of Austria at the LAU 2 and NUTS 3 levels. The data was covering figures on business numbers by employment size and by sectors, closing and founding of businesses as well as commuting patterns. The data underwent pre-processing, including cleaning and integration across multiple sources, followed by descriptive statistical analysis to identify trends and patterns in the SRB profile. Excel was utilized for data processing, organization, and visualization. These results provided a comprehensive snapshot of the SRB profile in the region and were later visualized for inclusion in the information brochure in the form of diagrams, tables, maps and infographic elements.

Spatial data collection initially relied on OpenStreetMap (OSM) Points of Interest (POI) and web scraping of Google Maps via Apify, as no official public sources of local business data were available. Relevant “tags” indicating potential business activities were selected from the OSM dataset. However, due to limitations in data completeness and, to a minor extent, quality issues with these two data sources, we expanded our data sources and methods to ensure more comprehensive coverage (described in detail in Implementation). These additional sources and methods included IACS data for agricultural businesses, data from the State of Carinthia, business addresses from the Chamber of Economics, and, regional workshops with mayors and municipal representatives. These workshops played a key role in obtaining business data from sectors that were not covered by the lists of the Chamber of Economics—such as doctors, pharmacies, and architects—and leveraging local knowledge to accurately assign businesses to sectors.

To process this data, address information provided by the municipalities was geocoded using a QGIS plugin to convert it into spatial data. Spatial data from multiple sources—IACS, the Chamber of Economics, the State of Carinthia and municipal input—is currently being consolidated. This involves merging entries, removing duplicates, harmonizing data structures into a unified target structure, assigning businesses to sectors, and adding missing information based on municipal input search.

The collected business data has been categorized into eight sector groups to enable sector-based visualization of businesses in the Nockregion. For this purpose, an interactive Leaflet-Map has been developed, displaying all companies in the region as point data on an official background map. The businesses are shown and symbolized by sector, allowing users to navigate, zoom, and





view individual attributes of businesses using any internet browser. To comply with data protection regulations, only the location and sector of businesses will be published in the RUSTIK viewer, while the internal project dataset will also include company names and addresses.

Additionally, a **Maptionnaire survey** was developed to capture direct input from SRBs. The survey is divided into five sections: i) general business information, including employment size, sector, target groups, and year of establishment; ii) strategies for achieving visibility and challenges related to it; iii) participation in networks or collaborations, advantages of networking, and interest in future collaborative efforts; iv) recent business changes in the past year and their causes; and v) general information about the business owner. Initially, we were aiming for a response rate of about 200 businesses (a 5% response rate), given that there are around 4300 businesses according to Statistics Austria, however, despite different access routes and attempts to reach the businesses, the response rate is likely to be considerably lower (the survey closes before Christmas). Survey responses will be analysed using SPSS.

The following table provides an overview of the data sources, methods, and tools applied throughout the experiment:

Table 3 Overview of data description, sources, content, methods and tools used during the data experiment

Description	Source	Content	Method	Tool
Insights on challenges of SRBs in the Nockregion	Interviews	Challenges and opportunities of SRBs, cooperation, outlook	Stakeholder Interviews	Content analysis
Statistical Data (Statistics Austria)	Registerzählung	Businesses & employment by sector	Data processing, integration, visualization and analysis	Excel
	Abgestimmte Erwerbsstatistik	Commuting		
	Unternehmensdemographie	Business development over time		
Spatial Data	Google Maps	Businesses	Web scraping Google Maps, mapping workshops, geocoding of addresses, Data consolidation and visualization	Apify (web scraping), Q GIS (data processing and consolidation), Leaflet - JavaScript (data visualization)
	OpenSreetMaps	Economic activity		
	IACS	Agricultural business locations		
	Chamber of Economics	Companies that fall under the jurisdiction of the Chamber		
	State of Carinthia	Governmental services		
	Local knowledge and municipal lists	E.g. .freelance professions, members of other chambers		





Description	Source	Content	Method	Tool
Survey data	Small Rural Businesses	Basic information, visibility, networks and cooperation, innovation and transformation	Online survey	Maptionnaire, SPSS

Data innovation

This data experiment seeks to test whether combining the above-mentioned diverse datasets (semi-structured interviews, secondary statistic data, Google Maps, OSM, ICAS, Data from Chamber of Economics and the state of Carinthia, data gained via local knowledge and municipal lists and survey data) can improve regional knowledge about the presence/visibility and sectoral mix of SRBs. Due to the lack of comprehensive, freely available, and up-to-date business data in Austria, this mixed-method approach was adopted to address these gaps.

In particular, the spatial analysis and mapping of SRBs proved to be a tailored approach that leveraged various databases to achieve the most complete spatial representation of businesses, marking an innovative step in this field. In the end, the main innovation in the business map lies in the highly complex consolidation of data from reliable, complete, official spatial data sources (IACS, State of Carinthia), crowdsourced data (OSM, Google Maps), partially public data (Chamber of Economics) and regional expertise (municipal directories and local knowledge). This integration allows for a more accurate and comprehensive spatial representation of SRBs.

Beyond data consolidation, the experiment adopts a novel approach by addressing SRB visibility, challenges, and needs in the Nockregion, a perspective not previously undertaken due to a lack of resources, a lack of information due to unknown data situation and differently defined priorities in regional development. Additionally, by adopting a cross-sectoral approach that integrates agriculture with all other sectors - which are often treated separately - the experiment broadens the analysis and understanding of SRB impact to regional development.

By bringing the three approaches together (statistical analysis, spatial analysis and analysis of survey data) this approach helps reveal interconnected opportunities and challenges, fostering a more integrated and comprehensive understanding of the overall challenges for SRBs in the Nockregion. It helps to ensure that policies and strategies are aligned across sectors, ultimately supporting the overall growth and sustainability of SRBs.

Implementation

Implementing the experiment

The implementation process began with the **analysis of statistical data** and the design of the information brochure, with layout support provided by FEUGA. At the same time, sector definitions were developed to align the various classifications of economic activities from different data sources. This led to the **creation of eight distinct business sector groups** providing a clearer framework for categorizing businesses. These sectors are: agriculture and forestry, industry and manufacturing, construction, commerce, tourism (accommodation and restaurants), social services, technical and economic services, and other services.





Next, spatial data collection began. Via **web scraping** in Apify, all Google Maps entries of the region with coordinates and data fields were extracted with a ready-made script and the businesses were selected. Additionally, business data were gathered from the OSM dataset, using POI to indicate economic activity. However, a challenge arose, as the data only partially revealed whether a given facility was managed as a company or not. This gave rise to the need for local verification to assess the quality and the interpretability of the data.

To assess the quality and relevance of the spatial data, the data was **verified in a pilot municipality** by comparing it with statistical data and conducting a workshop with the mayor. The very small municipality of Malta was chosen for this purpose, as the mayor has a comprehensive overview of the local businesses. In Malta, statistical data indicated the presence of 159 businesses. The analysis of OSM data identified 92 POI as potential businesses; however, only 36 were confirmed as actual businesses. Similarly, Google Maps listed 75 entries, but only 25 of these were verified as businesses. After removing outdated entries and duplicates, and leveraging the mayor's local knowledge, 43 unique businesses were identified from OSM and Google Maps. These were supplemented by 82 agricultural businesses from IACS data and 5 governmental service entries from the State of Carinthia. During the exchange with the mayor, 21 new businesses were identified and added to the dataset, highlighting that the tested data sources alone were insufficient for a comprehensive overview of regional businesses. Additionally, the mayor contributed by eliminating entries for closed businesses, removing private cabins, adding newly established businesses, and clarifying business types and sector classifications.

The insights from the pilot municipality necessitated a **methodological adjustment** to ensure sufficiently high data quality.

The experiment's progress was then shared with the mayors through a **presentation**, which included the information brochure and spatial data from the pilot municipality. This served as a starting point for engaging the mayors and raising awareness about the importance of SRBs for local development. However, only four out of the 17 mayors or their representatives attended. During this meeting, the concept of the mapping workshops was presented, discussed and further developed with the mayors. In addition, discussions were held with the participants about what business data they have in their municipality and what data processes are established when businesses are founded or closed. We also discussed the extent to which they are interested in the spatial data and in which formats it is best usable for them. The mayors were also informed about the upcoming online survey and asked for their support in distributing it.

Based on the experience in the municipality of Malta, efforts were made **to request business data** for the entire region **from the Chamber of Economics**. The address data of the companies was given with authorization for use in the RUSTIK project. The Economic Chamber is the competent institution for a significant part of the Austrian companies, but for those with another chamber responsibility (e.g. architects, doctors, freelancers) it was necessary to find alternative data sources. The municipalities were asked to submit the specific companies in the missing sectors as tabular data with addresses within the scope of their possibilities and resources. Additionally – as the aim was a spatial data set with all companies assigned to ÖNACE sectors and sector groups, but the specialist groups of business data of the Chamber of Economics follow a different classification system – the companies still had to be assigned to the appropriate categories. This required regional knowledge and web research in some cases and the municipalities were invited to take part in individual mapping workshops in order to improve the existing data as far as possible.





In the **run-up to the workshops**, the existing data with the greatest accuracy (IACS, State of Carinthia, Chamber of Economics) was integrated into a **common data set** and the respective sector was assigned in a separate field. The municipalities were asked in advance to provide data from missing sectors using a table - which was geolocated by the LLC using a QGIS plugin. Depending on the individual database, the number of companies not assigned and the data provided in advance, priorities were set for each municipality to ensure the most efficient use of local knowledge during the workshop. The mapping workshops were taking place in September 2024, where three GIS experts from BAB (LLC) helped facilitating the process.

In the course of the **mapping workshops**, a short introduction to the project and data experiment took place, whereby each municipal representative was in personal exchange with a GIS expert for 1.5-3 hours to check and supplement the existing data. Missing assignments to ÖNACE categories were made, incorrect geolocations were corrected and data provided by the municipalities was implemented. During the workshops, data from OSM and Google Maps was used as a supporting source. The municipalities were also asked to what extent they have an overview of the local companies and which data formats they use. In order to achieve credible data quality for the region and broad acceptance and trust of the dataset, an accuracy of over 90% was targeted.

The **experience of the mapping workshops** was that few municipalities have a good overview of local businesses - especially one-person businesses are often not known unless they contact the local authority. However, no conclusions can be drawn from the data about the added value of the individual companies - only whether a company is active - regardless of the intensity with which it operates.

In parallel, the **design and distribution of the online survey** took place. The survey was distributed through various channels, including a letter of information for entrepreneurs to advertise the survey distributed by the mayors, the PRP (via a Facebook post, personal contacts), an entry in the newsletter of the Chamber of Economics' and a direct email to entrepreneurs to advertise the survey, promotion of the survey in different regional events.

Currently, the **consolidation of the spatial data** is still ongoing, with efforts to merge data from the various sources. The challenges here are: finding and removing duplicate entries, adding missing detailed information and reworking open questions that could not be clarified in the tight time frame of the mapping workshops. Finally, the data must be converted into a standardized target data format - adapted to the needs of the pilot region partner. This integrated dataset will provide a comprehensive overview, enabling the spatial visualization of the business landscape in the region according to the eight sectors.

Table 4 Gantt Chart of our Living Lab Cycle 2 activities

Month 2024	2	3	4	5	6	7	8	9	10	11	12
Statistical Data Analysis											
Design Information Brochure											
Define Business Sector Groups											
Spatial Data Collection – OSM & Google Maps Web-scraping											
Pilot Municipality Data Testing											





Month 2024	2	3	4	5	6	7	8	9	10	11	12
Mayors' Presentation											
Mapping Workshop with Mayors											
Consolidation of Spatial Data											
Online Survey Design											
Online Survey Distribution											

Adaptations

Initially, we aimed to develop a network or platform for SRBs in the region. This concept included creating a publicly accessible map or list of all participating businesses, which would be searchable by category and would include details about offered services or products, making it visible to potential customers. The idea was to allow businesses to locate themselves on the map via the Maptionnaire survey and provide additional information about their services or products if they wished to be featured on this potential platform. However, after discussing privacy concerns, we reassessed this approach. We were concerned that asking businesses for sensitive information, such as the challenges they face, could discourage honest responses if their businesses were linked to specific locations, even with their consent. Additionally, implementing this platform would have exceeded the scope of the data experiment, as it would have required individual consent from each company for publication and detailed coordination on how to present their offerings. As a result, we decided to use Maptionnaire only as an online survey tool, and to forego the more innovative map-based features. There remains, however, a possibility for the PRP to utilize the business data gathered through this experiment for the “best living and working region”, potentially creating a long-term, sustainable map or list of businesses in the region based on our “snapshot” of regional businesses. That said, it is crucial to first explore how municipalities can maintain an up-to-date overview of local businesses, as the data collected during the experiment will inevitably become outdated over time.

Since it was not feasible to include employment size in spatial data collection and preparation, we ultimately displayed all identified businesses, regardless of their size. The analyses of statistical data relate exclusively to SRBS - as these data also contain the number of employees. Unfortunately, the data used for the spatial location of the companies does not contain any information in this regard - it is therefore not possible to differentiate between company sizes and consequently SRBs cannot be clearly identified.

Another adaptation involved changes in our spatial data collection method. Since there are no complete, freely available, and up-to-date business data in Austria, our initial attempts were to combine OSM data and Google Maps data to fill the data gap of business spatial location. However, we encountered several challenges with these data. First, during a test workshop with a local mayor and a cross-check of the web-scraped data with statistical datasets, it emerged that a large number of businesses were not represented in either Google Maps or OSM data. While many businesses were missing altogether, we also observed duplicate entries for some businesses, indicating significant inconsistencies. Additionally, there were major differences in how different business sectors were represented, with certain types—such as restaurants and accommodations—overrepresented in Google Maps, while others, such as agricultural





enterprises, were largely missing. We also encountered ambiguity within the OSM data regarding business ownership or operational structure. For example, a leisure facility might be managed by a municipality, operated privately as a business, or run by an association, yet this information was only partially or not at all indicated. Another difficulty was that some OSM and Google Maps data was outdated, as there is no control mechanism to check if the listed businesses are still open or relevant, or if they have closed down. In conclusion, the datasets from Google Maps and OSM ultimately proved inadequate for representing the region’s economic activities with sufficient quality, given the many missing businesses and data inconsistencies. However, these datasets will offer insights into the visibility of regional businesses on Google Maps, even if they did not fully capture the economic landscape of the region.

As a result, we sought an alternative data source. Through a formal request, we acquired a set of regional business data from the Chamber of Economics, with rights of use for this specific scientific project. This dataset included business names, addresses, and their affiliation with professional groups within the chamber. This data is highly accurate, as companies are legally required to join the chamber, ensuring comprehensive and up-to-date information on a wide range of businesses. However, as most companies are one-person businesses with names often limited to the owner's name, identifying their specific business sector was often not possible. While the information on chamber membership provided insights into the companies’ activities, it did not align with the ÖNACE classification system, which was used to classify the results into 8 groups of business sectors. Additionally, not all businesses were covered by the Chamber of Economics' dataset. Professions such as pharmacies, farms, tax consultants, and architectural firms were excluded, as they belong to other chambers. To address these gaps, we conducted mapping workshops with mayors and municipal authority representatives to verify and enrich the information with local data and insights.

In the end, following this iterative approach allowed us to conduct quality control checks and replace unreliable OSM and Google Maps data with a combination of more accurate official datasets (e.g., Chamber of Economics, IACS, State of Carinthia) and local data and knowledge. This approach supplemented missing information, significantly improving the accuracy and comprehensiveness of our final dataset.

Other Living Lab activities and achievements

Table 5 Living Lab activities we undertook 2024 that were not part of our data experiment implementation

Activity	Topic	Stakeholders
Interviews	6 additional stakeholder interviews with stakeholders about SRBs in the Nockregion	Economic Chamber, Public Employment Service, Chamber of Agriculture, Former Trade and Industry Association, Vocational Training Expert in the Nockregion, and a business owner
Participation in external workshops	Advisory group meetings of the LEADER project: “Becoming the best living and working region”	Regional employers from different sectors and municipality representatives





Preliminary results

Results to date

Results on analysis of statistical data

Our analysis of statistical data for the Nockregion reveals critical insights into developments, sector distribution and employment structure of SRBs and the relevance for the region. According to the initial definition of SRBs (see Table 2 for specifications on employment size), 99% of all businesses in the region (with their head office located in the Nockregion) qualify as SRBs as of 2021 (see Figure 4). While they constitute the vast majority of businesses, these SRBs employ about 46% of the region's workforce (see Figure 5). In contrast, the remaining 1% of businesses, classified as medium-sized or large, account for 54% of total employment. Notably, nine large businesses alone employ 43% of all workers in the region, highlighting a pronounced employment dependency on a few large-scale employers. The high reliance on a few large businesses for regional employment may represent a vulnerability, as fluctuations within these companies could have outsized effects on local employment stability.

When comparing business growth trends in the Nockregion from 2011 to 2021, we observed a 12% increase in the total number of businesses (compared to a national growth of 16% in Austria). The growth in the Nockregion is primarily driven by a significant 35% increase in one-person businesses, coupled with a 16% decline in micro businesses. This trend may reflect an evolving business landscape in which independent entrepreneurship is growing, potentially driven by income substitution or 'necessity entrepreneurship', where local individuals, unable to rely on other employment opportunities, are compelled to create their own.

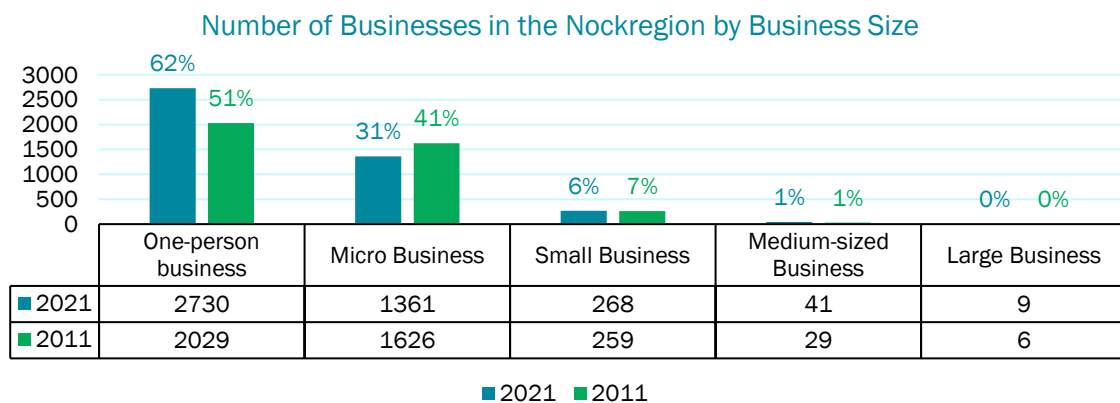


Figure 4: Number of Businesses in the Nockregion by size for 2021 and 2011 (Statistik Austria, 2024)





Number of Employees by Business Size in the Nockregion

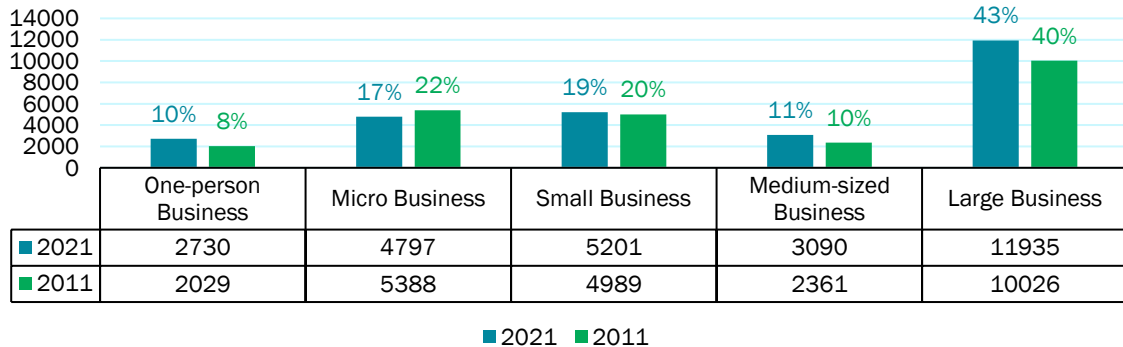


Figure 5: Number of Employees in the Nockregion by Business Size for 2021 and 2011 (Statistik Austria, 2024)

Further analysis across economic sectors and business sizes reveals a diverse job landscape within SRBs (see Figure 6). Employment provided by SRBs is relatively evenly distributed across all eight defined sector groups, though it is most concentrated in the tourism sector, underscoring tourism’s role as a key economic driver. In sectors like agriculture and tourism, businesses often cannot sustain a large number of employees and are therefore typically small in size. By contrast, employment within large businesses is predominantly centred in the construction sector, indicating a specialization in this field among larger employers.

The fact that 99% of all businesses in the Nockregion are SRBs underscores their essential role for the region and the community, providing diverse employment opportunities. Their wide distribution across sectors allows residents access to diverse services, products and job types in the region, making SRBs deeply woven into daily life and relevant cornerstones for the attractiveness as a working and living region.

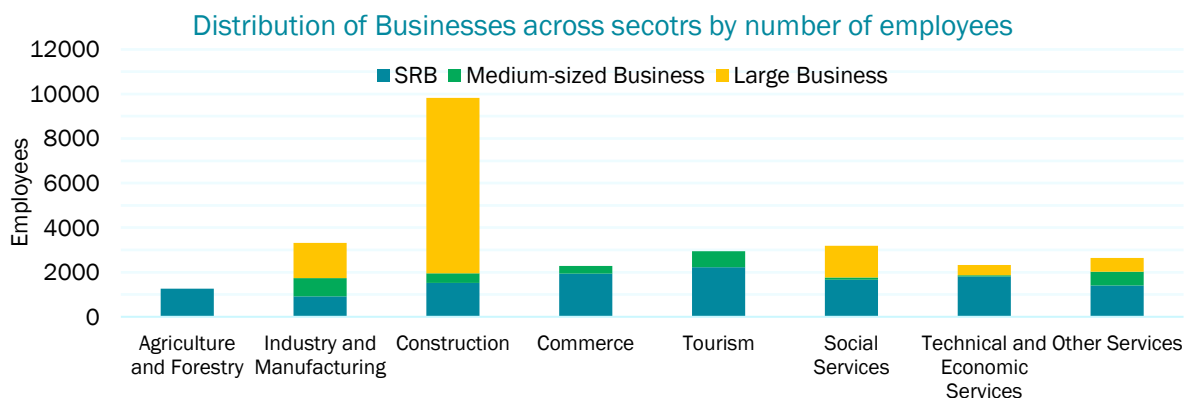


Figure 6 Distribution of Small Rural Businesses, Medium-sized Businesses and Large Businesses in the Nockregion among eight sectors for 2021 (Registerzählung, 2021)

Examining the cumulative business openings and closures from 2011 to 2021 provides additional insights into the sectoral dynamics in the broader NUTS3 region, which encompasses the entire area of Upper Carinthia (data on LAU 2 Level was not available). The sectors with the highest number of business establishments were health and social services (1,401), commerce





(830) and tourism (accommodation and food services) (729). Notably, these sectors also experienced the most closures: tourism had 913 closures, health and social services saw 769 closure and commerce had 717. Health and social services show the highest positive net difference between openings and closures, suggesting growth and stability in this sector. The high number of new businesses in this sector was also reflected in the stakeholder interviews, where the increase in self-employed personal care providers was particularly highlighted. In contrast, the tourism sector faces a negative balance, with closures outpacing new establishments. This trend may be attributed to several factors, including the lasting impact of the COVID-19 pandemic, which disrupted tourism flows, and a persistent shortage of staff.

Results on spatial analysis

As the analysis of spatial data is still ongoing, only preliminary results can be presented at this stage. The spatial data provides valuable insights into the geographic distribution of businesses in the region, and enables spatial visualization according to their classification across eight different sectors. By focusing on the municipality level, we are able to capture additional spatial context, such as the exact locations of businesses and how they relate to each other within the region, which is crucial for understanding accessibility and functional connections across municipalities.

The primary objective of this spatial analysis is to visually represent businesses on a map according to their sector categories, allowing for a clearer understanding of the regional business landscape. This representation reveals the spatial distribution and sector structure of the businesses. The data used for this analysis is a snapshot, based on a combination of data sources from 2023 and 2024. The data sources used in this analysis are diverse, each with its own methods of data collection, categorisations, boundaries and update cycles. As a result, these datasets are not perfectly aligned and may have some gaps due to slight variations in their structures.

At present, the creation of a complete spatial data set is underway, where the data from various sources will be merged for visualization and further analysis. For the pilot municipality, an exemplary map visualization has already been created (see Figure 7). The businesses are displayed on the map according to the eight defined categories and allows users to navigate and explore business locations and their distribution in greater detail. This pilot visualization provides an early indication of how the final integrated spatial data will be presented across the region.



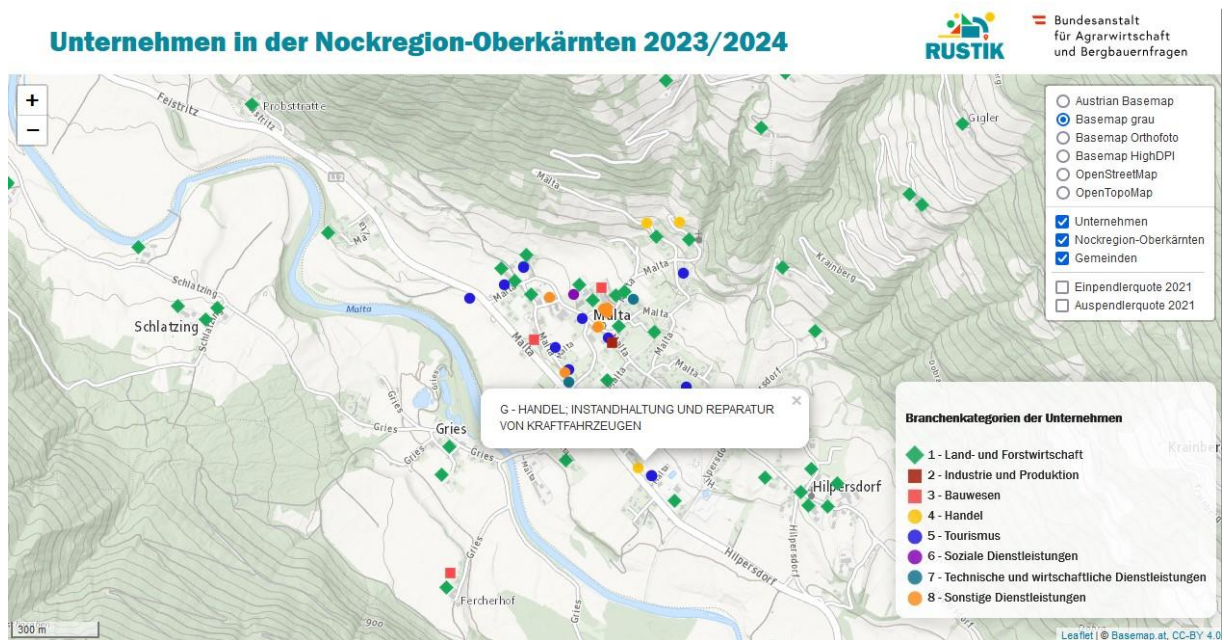


Figure 7: Leaflet Map of the spatial distribution of businesses within a one municipality

Results on online survey

The survey, which was still open at the time of writing in early November, had received 75 submitted responses at that point. The aim is to gather more responses; thus, the survey will remain open and further promoted to increase participation. Our target was a response rate of approximately 5%, which would equate to around 200 businesses, which may prove ambitious despite of extensive attempts to reach the businesses (see Implementing the experiment). To better include particularly reluctant members of specific sectors (e.g. agriculture, social services) selected stakeholders spread the word by personally advertising the survey within their networks. However, to date the response rate has remained limited.

So far, selected preliminary results include one question that focuses on challenges in business visibility and recognition, with 51 participants responding (see Figure 8). The most commonly reported issues were limited marketing budgets (30) and insufficient time due to limited staff resources (28).



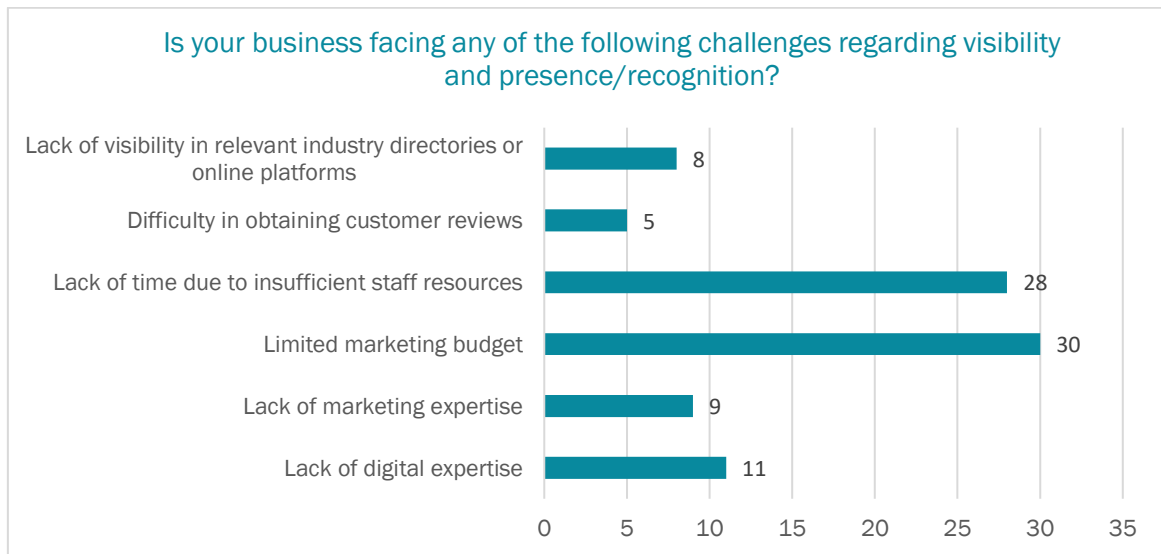


Figure 8: Survey Responses asking for challenges regarding business visibility (with possibility to choose multiple option)

Another set of questions examined business networking and cooperation (see Figure 9 and Figure 10). The majority of respondents (45) are currently active in a network, while 16 are not yet engaged but are interested in joining. These 16 participants are particularly noteworthy, as their interest suggests that a follow-up project or business network aligned with the regional strategy of becoming the "best living and working region" could resonate with them. The types of networks represented are predominantly local and regional, with high participation in regional sector-specific networks (30) and local cross-sectoral networks (27).

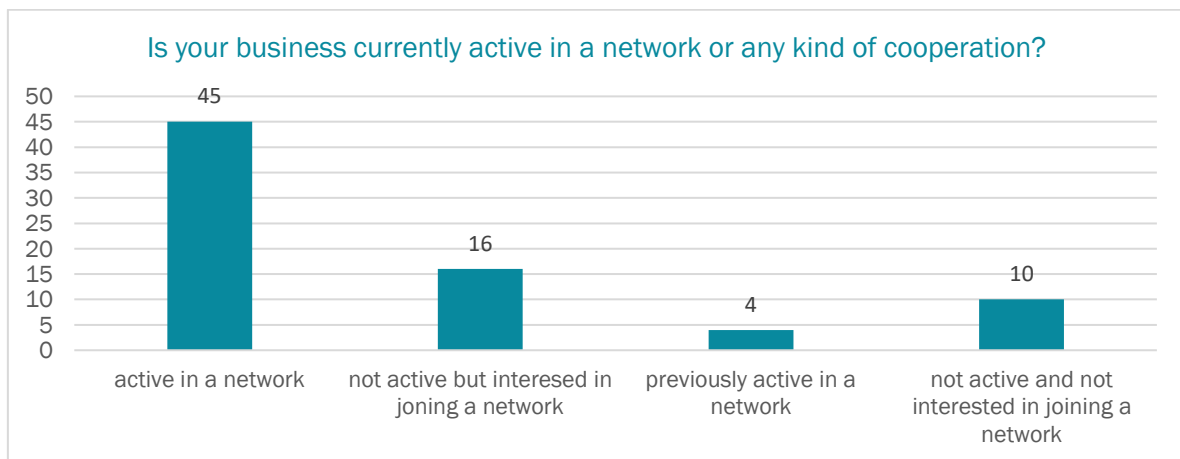


Figure 9: Survey responses in relation to network participation details



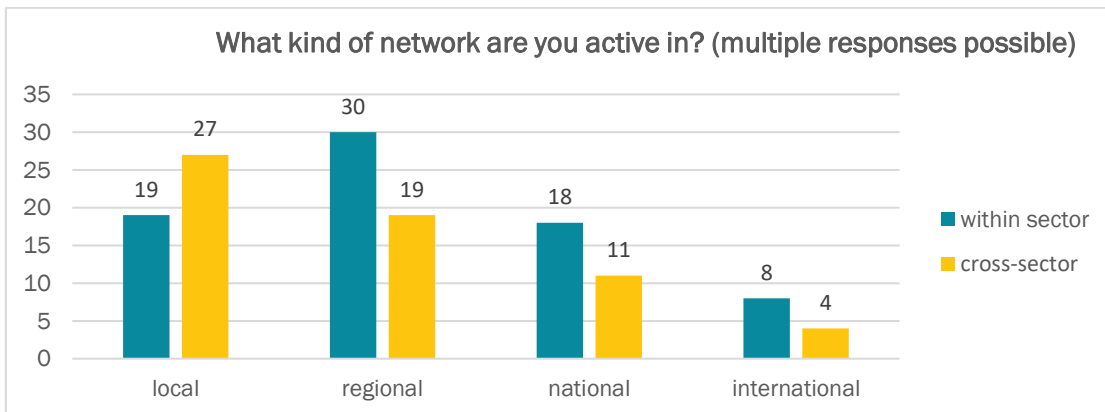


Figure 10: Survey responses in relation to the type of network within which a company participates (possibility to choose multiple options)

Relevance of results

Robustness and limitations

The results of the statistical data analysis provide valuable insights into the profile of businesses in the Nockregion, revealing a strong presence of SRBs and emphasizing their essential role in creating an attractive region. SRBs significantly contribute to local job diversity and offer a broad array of services and products, which helps sustain the region's appeal as a place to live and work. Although the statistical analysis was straightforward rather than a data experiment, it has already proven highly relevant and well-received. Stakeholders, especially the PRP, have responded positively, and the PRP is now using this data to support funding applications. Local mayors and other stakeholders have shown considerable interest in accessible formats, such as the informative brochure summarizing key findings. Additionally, during the mapping workshops, the mayors expressed strong interest in the detailed spatial insights, with some even surprised by the number of businesses they hadn't previously known about in their municipalities—making this an important awareness-building exercise as well. Preliminary results of the Maptionnaire survey give an indication of business owners' perspectives, the informative value however will depend on the response rate and completeness of the responses. These results will be highly relevant and innovative, as they will be providing a cross-sectoral perspective on the challenges faced by SRBs. This comprehensive understanding will help formulate support measures that are aligned across sectors, ultimately fostering the growth and long-term sustainability of SRBs.

The robustness of the spatial results is ensured by cross-referencing and consolidation of multiple data sources, including local data and knowledge. The spatial data used in the analysis is derived from a combination of sources from 2023 and 2024, each with different collection methods, boundaries, and update cycles. As a result, the datasets are not always perfectly aligned, and some are incomplete. While a perfect representation of the business landscape is not possible, the adjusted process—incorporating multiple sources and quality-checked with regional knowledge—**aims to provide the most accurate and complete snapshot possible at a given point of time.** However, a major limitation remains that the data is not real-time, meaning the business landscape may have already changed since the data was collected. How to deal with this issue will be addressed at the end of Cycle 2 and the beginning of Cycle 3.





A minor limitation of the spatial approach was the need to expand beyond our original focus on Small Rural Businesses. Since it was not feasible to include employment size in data collection and preparation, we ultimately displayed all identified businesses, regardless of their size. Although company coverage is estimated to exceed 90%, minor gaps cannot be entirely excluded. These primarily affect very small farms not included in the IACS data and forestry-only operations. Additionally, the coverage of certain professional groups depended on data provided by municipalities. Potential data gaps were largely mitigated through consultations with regional experts, including data requests from municipalities and mapping workshops. However, some minor data gaps may still remain.

As for the robustness of the online survey, mandatory questions on business size and sector were included to facilitate cross-checking with statistical data, helping to ensure a more robust approach and verify the representativeness of the sample. Although many access channels have been pursued the desired response rate could not be reached so far. A current announcement of the regional part of the chamber of economy and an event in the course of the project “becoming the best living and working region” as well as specific efforts of a farmer to distribute the survey within her networks will hopefully address this shortcoming.





Part 3: Reflections and learning

Reflections on data sources, methods, and tools

Data issues and obstacles during the experiment

The major challenge involved non-official data sources like OSM and Google Maps, which had limitations mainly in completeness and to a lesser extent accuracy. These platforms rely on open user contributions (crowdsourced data), making the data reliability variable and sometimes inconsistent, with different levels of detail across regions.

Another challenge in general was the inconsistency across sources in terms of data collection methods, boundaries, update cycles and classification systems. For example, statistical data adhered to the ÖNACE classification system, while other datasets categorized or aggregated business types differently. This discrepancy hindered direct comparisons and integration, as the same business could be categorized differently depending on the source, creating a fragmented view of the business landscape. Each source provided a unique “snapshot” with its own inherent limitations and biases, emphasizing the importance of understanding the origins, methods, and criteria of each dataset to gauge its reliability and suitability for our analysis.

Finally, by involving local stakeholders, we were able to further improve data quality. However, the completeness of the data still depended on the level of local engagement and knowledge of the individual municipalities.

Company names and addresses are considered semi-public data—they are accessible online on individual websites but are not part of a centralized, fully public collection. To comply with data protection regulations, only the sector will be displayed in the RUSTIK viewer. When presenting spatial data, particular attention must be paid to data protection, and publication may only be possible in a limited or restricted format.

Managing data issues and obstacles

As already described in detail, we managed the challenges primarily through an adaptation in the implementation process, which included the combination of diverse data sources, complemented by local expertise and local verification checks. A key part of this solution was the mapping workshops, where significant time and effort were dedicated to engaging local stakeholders, verifying data, and consolidating information. This multi-layered approach provided a more comprehensive understanding of the business landscape than any single source could offer. However, this process required substantial effort to align and standardize classifications across datasets to maintain consistency and accuracy, particularly given the different classifications and update cycles inherent to each source.

The consolidation process is still ongoing, meaning that additional methods or alignment strategies may further help to address remaining barriers. We are actively considering ways to refine our approach, enhancing the robustness of our data framework as the project progresses.





Pilot Region Partner's perspective on data

The data from the experiment provided highly interesting and sometimes surprising insights that were previously unknown to us and not fully realized. The various data gathered on small businesses and their distribution within municipalities are not only valuable for our future work in the region but have also provided mayors with new insights they can use to guide actions in their communities, such as creating welcome maps for new residents based on the data gained for SRBs. Even if immediate actions aren't taken, the experiment has raised awareness among them, giving them a clearer view of the structures and industries present in each municipality. Rather than being conducted as an isolated project, this data experiment is integrated into our regional planning and initiatives for becoming the “best living and working region,” supporting informed decision-making for future regional development. One key measure stemming from this effort is the planned establishment of a network for small businesses, designed to empower them and amplify their collective voice within the region.

Experiment design and implementation

Strengths and successes

One of the project's notable successes was the active engagement of municipal stakeholders/mayors in the mapping workshop. The representatives from the municipalities participated enthusiastically, contributing valuable local knowledge and demonstrating significant interest in the data being generated. This engagement helped both to fill data gaps and verify findings while also raising awareness: several municipalities were surprised by the number of businesses within their boundaries that they were not aware of. With this new perspective, many noted how they could better support residents by directing them to local services or promoting the range of offerings within their communities. Most participants expressed strong interest in the final dataset, which provides a comprehensive overview of businesses by sector—a tool they could incorporate into welcome materials for new residents. Additionally, many stakeholders showed high interest in the statistical data presented in the information brochure, with all attending municipalities during the first presentation meeting requesting similar analyses specific to their municipality. This positive feedback was reassuring for us as the LLC, showing that the data and the outcome of the data experiment can be useful for them.

Another strength was the collaborative, adaptive approach used through the Living Lab process. This iterative, participatory method allowed the team and stakeholders to explore new possibilities in data collection and sourcing while making joint decisions at crucial points. As new insights emerged, the process was refined, improving both data gathering and analysis; for example, the experiment design was adjusted to incorporate additional data sources when web-scraped data alone proved insufficient.

Finally, the project benefited greatly from strong regional connections and the support of trusted local partners. The PRP's established relationships, especially with mayors, created a foundation of trust that facilitated effective communication and collaboration, building confidence in the process and results. The region's culture of open discussion supported meaningful dialogue, and its cross-sectoral approach enabled connections across thematic areas (while at state level issues are often dealt with sectoral). Aligning the data experiment with the regional “best living and working region” strategy further strengthened engagement and relevance. This alignment





ensured that the data generated would be actively utilized and extended through the project, giving us confidence that the efforts would continue to be valuable beyond the RUSTIK project's conclusion.

Scope for improvement

Although stakeholder participation during the mapping workshops was successful overall, with nearly all mayors or representatives of municipalities attending the event, engaging stakeholders and securing their active involvement initially proved challenging. Only 4 out of 17 mayors attended the first presentation, during which we introduced the infographic and outlined the upcoming data mapping and workshop processes. However, it should be mentioned that external regional circumstances, such as local priorities and scheduling conflicts, contributed to the lack of attendance. This limited participation at the start made it difficult to establish early alignment and commitment to the project. Fortunately, thanks to the strong network of the PRP, finally all municipalities participated in mapping workshops either during the on-site workshops or afterwards during online meetings.

The acquisition, preparation and consolidation of the data took longer than expected. The process required many steps of preparing, checking and consolidating the data at different stages - also due to the necessary iterative adaptation of the experiment (verification of crowdsourced data, preparation and consolidation in the run-up to the mapping workshops, final data integration in the follow-up). This was essential to ensure the accuracy of the data, but required a considerable amount of time and effort and slowed down the overall progress. An additional challenge was that access to business data from the Chamber of Economics, which could only be obtained through a detailed formal request, granting limited use specifically for the RUSTIK project. Another issue related to data protection emerged during the design of the Maptionnaire survey. Initially, we had planned to use the mapping function to geolocate businesses. However, after discussing privacy concerns, we reassessed this approach. There were concerns about whether respondents would feel comfortable providing honest answers if their businesses were linked to a specific location, even with their consent. As a result, we decided not to include location-based data in the survey, although these results would have been very informative for our spatial mapping.

Distributing the online survey and achieving an adequate response rate presented additional obstacles. Challenges in communication, both internally between RPR and the LLC and externally with stakeholders, led to some distribution attempts not being as effective as hoped. It proved challenging to coordinate different approaches of survey distribution as well as to stay informed of recently performed actions as many regional stakeholders are used to implement their intentions in a straightforward way. There was also prolonged uncertainty regarding the most effective distribution channels, which made outreach efforts even more difficult to coordinate. The reliance on stakeholders for survey distribution further reduced our control over the process, particularly given the multiple layers of communication involved. This complexity led to information getting lost along the way.

This raises the question of whether we effectively promoted the survey to reach the intended audience. Clearly, there is room for improvement in our outreach strategies. Additionally, we noted that some responses were left unsubmitted, which suggests that the survey might have been too long for some participants to finish. To increase survey participation, especially in the underrepresented sectors, we will intensify targeted promotion of the survey.





Skill development and capacity building

Skills developed

A skill we gained was infographic and info-brochure design. We learned how to condense complex data into clear, visually engaging formats that could quickly capture stakeholder interest. This required us to identify the most relevant information and craft visuals that conveyed key insights without heavy scientific or technical language.

Web scraping was another skill area developed, enabling to gather specific business data from Google Maps and other platforms. However, we quickly learned that data acquisition is just a small part of the process: preparing data for analysis proved much more time- and skill-intensive than anticipated. In particular, working with GIS data demanded advanced expertise to ensure it was ready for analysis. Our data experiment benefited from having a GIS expert on the team. Additionally, during data visualization, a new skill was acquired: creating an HTML map using Leaflet.

We also enhanced our survey design skills in this cycle, trying to create a survey that encouraged responses while gathering meaningful insights. This process involved careful question planning to ensure that responses would contribute to both our project and the “best living and working region” project. Analysing the survey data will involve learning SPSS, another skill we plan to develop further.

Capacities

With a skilled data specialist on our team, we already had a strong foundation in locating and judging data quality and interpreting complex data sets. This expertise has been highly valuable for navigating the experiment, especially given the range of data types incorporated. Her knowledge was instrumental in ensuring data quality and guiding us through the challenges of combining and analysing diverse data sources.

As a team, we developed the ability to find a tailored combination of data and methods for addressing our transition challenge within the data experiment. This also included adapting methods when they did not work as expected, combining technical, social-scientific, and organizational approaches within the Living Lab.

Furthermore, the workshops with the mayors may have fostered connections/networks around the topic of SRBs. While a strong network was already in place through our PRP, this data experiment potentially encouraged a shared focus and informal collaboration on this issue among the municipalities.

Pilot Region Partner’s perspective on skills and capacities

From the Pilot Region Partner’s perspective, the process primarily provided valuable insights and information rather than directly contributing to the development of new skills or capacities within our team. The expertise of skills was predominantly brought in by the LLC team. That said, the experience of collaborating on this initiative allowed for gaining interesting data and data collection methods. As mentioned several times above, a way must be found to update and





maintain the data within the PRP project aim of becoming best living and working region. It remains to be seen which skills will be required or need to be developed for this purpose.

Innovation and impact

Reflections on innovation

Our data experiment was innovative in its tailored, iterative development and combination of diverse data sources and methods and to see how they could work together. By integrating web scraping, OSM, local knowledge from stakeholders and statistical data, we developed a more detailed spatial understanding of SRBs than would not be possible with any single source alone. This customized blend of approaches, along with a sufficiently high survey response rate we are aiming for, helps us address a central question: How can we increase the visibility of SRBs and better understand their unique needs within the region?

One important outcome of the experiment was that municipalities began discussing the availability and potential uses of data with the PRP, creating a new basis for dialogue. This marks a shift in how data is viewed and utilized within the region.

Another innovative aspect was the cross-sectoral approach, integrating agriculture with other industries that are typically considered separately. While this approach worked well for spatial and statistical data, we have yet to further engage agricultural businesses in the survey, meaning we have not yet fully realized the potential of this innovation in that sector.

Interestingly, a more straightforward product, the informational brochure, had a significant impact. While not highly innovative, the brochure provided clear, accessible data summaries that stakeholders found valuable. It demonstrated how even simpler methods and data can support effective communication and strategic planning, particularly for funding and advocacy purposes.

Short-term impacts

In the short term, the data experiment has provided a snapshot of the regional business landscape and profile, which can be used for funding applications, strategic planning and practical tools like inclusion in a “welcome packet” for new residents. The findings also offer data-backed evidence of challenges SRBs face—challenges that maybe were previously understood in theory but not supported by concrete data. SRBs in the region struggle with visibility; many people are unaware of what products or services are available or where specific businesses are located. This lack of visibility is a key challenge that differentiates SRBs from larger companies, which benefit from more established networks and resources. Additionally, the survey, which is still open and has not yet been analysed, may provide further insights into the specific challenges SRBs face. After the data experiment, stakeholders will have a solid foundation of figures to support their discussions. These data points providing information on the geolocation of businesses by sectors will soon be accessible on the RUSTIK viewer.

Additionally, the project has sparked interest from four municipalities, each requesting a community-specific analysis inspired by the informational brochure format, which they see as beneficial for argumentation at the municipal level. Another impact of the experiment is that it has initiated new conversations between municipalities and the PRP regarding data availability and its potential uses, setting the stage for more data-driven discussions in the future.





Longer-term impacts

An important outcome of the experiment was that the municipalities began to discuss the availability and potential use of data with the PRP, creating a new basis for dialog. A long-term impact can be achieved by creating this space for discussion. The exchange generates new impulses that trigger further action steps and creative solutions. This process strengthens the commitment of those involved and leads to processes being driven forward and concrete changes being initiated.

To create longer-term impacts from this data experiment, we must ensure that the data continues to be accessible, relevant, and updated beyond the project's conclusion. As already mentioned above, current data provides only a snapshot of the region's business profile, but to achieve lasting visibility for SRBs, we need to develop a system for maintaining and updating the data regularly. Without this, the data's impact will remain limited. To ensure these long-term impacts materialize, it will be necessary to build a sustainable framework for data maintenance, continue fostering relationships with key stakeholders, and ensure that insights from the experiment are integrated into future regional policies and practices.

A potential long-term impact could be the integration of this data into welcome packets for new residents. This would not only offer valuable regional information but also provide a comprehensive view of opportunities within the entire region, rather than just isolated municipal data. This broader approach could make the region more appealing to newcomers but also to residents and could help attract businesses or individuals looking for a connected and thriving community, and in the long run help to combat demographic shrinking. Another aspect highlighted by the municipalities is their interest in using the data to record the number of regional care staff. This could enable the development of strategies and projects to address the growing demand for care staff in light of demographic changes. Overall, these examples demonstrate how making data accessible can inspire a wide range of ideas and opportunities for its use—referred to as data potential or the leverage effect of data. In other words, data can generate unforeseen added value once it is made available and accessible. Its availability encourages innovative applications and new approaches that were often not anticipated during data collection.

Beyond the data itself, another potential longer-term impact stems from the connections established through the RUSTIK project. A key outcome was the introduction of the PRP to a member of the RUSTIK General Assembly, who advocates for rural communities in Brussels. This connection led to the invitation of the representative by the PRP to present insights on rural areas and EU funding opportunities to local mayors and Land Kärnten representatives. Although separate from the data experiment, this engagement has sparked renewed interest in rural issues, particularly within the EU Department of Kärnten, and could lead to future policy and funding support for the region.

Potential for sharing learning

The data experiment offered several valuable learnings that can be shared and potentially adapted in other similar rural areas:

- **Regional Ties and Trust:** One key learning is the importance of strong regional ties and trusted, well-connected local partners. These relationships helped the stakeholders build trust in the process and outcomes of RUSTIK, fostering a collaborative atmosphere.





- **Local Knowledge and Data Quality:** Another important learning is the significant role local knowledge plays in ensuring data quality. The accuracy of the insights derived from our data sources was heavily influenced by the regional familiarity provided by local stakeholders. Their expertise was vital in contextualizing the data and ensuring its relevance to the specific challenges faced by the region. We also learned that for a small regional level, high-quality data is essential, as anything less would lack the precision needed to be truly useful.
- **Methodological Innovation and Data Integration:** A key learning from the data experiment is that while integrating different data sources (e.g., web scraping, GIS, local insights, and traditional statistics) is time-consuming, it can provide value. The diverse data mix allowed us to capture a comprehensive view of the region. The effort invested in integrating these sources demonstrated the importance of clear communication and accessible tools for stakeholders. For other areas, this mixed approach could be adapted, but it would require dedicated time and effort for proper data integration and validation. Early engagement with stakeholders also proved essential for success.
- **Effective Communication Tools:** The experiment highlighted the importance of clear or accessible communication tools. Simple yet effective approaches, such as the informational brochure, received positive feedback. It became clear that providing stakeholders with digestible summaries of complex data is crucial for making information actionable.
- **Survey Dissemination:** A learning for future improvement is the challenge of disseminating online surveys effectively. In our case, reaching the targeted number of responses proved difficult. This highlights the need to carefully plan and execute survey distribution strategies and not underestimate this task to ensure sufficient engagement and data collection. For a future online survey, we should consider a more personalized approach, such as assigning a specific individual to promote the survey and incorporating survey promotion during events.





Part 4: Future steps

The next steps for finalizing the data experiment in late 2024 and early 2025 include several key actions. First, we will present the RUSTIK project and SRB findings at the Regional Conference on November 25, where officials from Land Kärnten will be attending. This event provides an opportunity to connect with state representatives, which will be valuable for Cycle 3.

To increase survey participation, we will intensify promotion of the Maptionnaire survey, especially targeting agricultural stakeholders, where response rates have been lower. Afterward, data analysis and evaluation will follow.

Simultaneously, we will consolidate the spatial business data into a standardized format. This process includes conducting mapping workshops with two remaining municipalities, assigning unclassified businesses to ÖNACE categories, removing duplicates and automatically assigning missing address data. The data will then be prepared and formatted into the appropriate data format for the respective further use, taking into account the applicable data protection concerns and usage rights as well as target group-oriented visualization: For internal use within the Living Lab, we will use formats tailored to stakeholder needs and skills (e.g., leaflet, geojson, Excel). An anonymized version will also be prepared for the RUSTIK viewer, displaying only location and sector information (shapefile, metadata, symbology) to comply with data protection regulations.

Cycle 3 plans

For 2025, our next steps in Cycle 3 focus on developing strategies to integrate the insights from the data experiment into long-term support for the region and its SRBs. One main objective will be to explore how new or better targeted policies could help support the region's transition, as data alone will not drive change without a supportive framework. We will consider how our findings can feed into broader policy development and support regional growth. To kick off Cycle 3, we will hold an on-site meeting in February with the PRP and LLC, to discuss these points in depth and finalize detailed plans and objectives.

A central goal for Cycle 3 will be to present the data experiment results to local mayors to facilitate discussions on how these data can best serve them and how the RUSTIK viewer might support ongoing regional efforts. This meeting could also serve as an opportunity to introduce additional data tools (alongside the RUSTIK viewer) and to assess their potential utility for the region's municipalities. The aim is not only to showcase the data but also to start a dialogue on creating consistent data management practices across municipalities to keep an up-to-date overview of local businesses, especially since our current spatial data will soon become outdated. From our mapping workshops, we observed that municipalities have varying levels of data management and differing data routines; thus, this meeting offers a chance to coordinate a unified approach which could be adapted by all municipalities with the support of RVN.

Additionally, the data experiment results will be further integrated into the best living and working region project. Specifically, these results will inform stakeholders and highlight the importance of network building and support for local businesses. While large companies may drive employment (1% of businesses employ 54%), smaller local businesses—such as hairdressers, craftsmen and various service providers—are crucial to the everyday needs and well-being of residents. To advance this regional strategy, a proposal will be prepared by the PRP by mid of 2025 for





submission to the Rural Innovation Systems funding program, with a focus on strengthening business networks within the Nockregion. Relevant results of the data experiment will feed into this proposal and build the foundation for building a network or platform for SRBs.

Future collaborations

As discussed above, a critical next step will be to integrate insights from the data experiment into a stable, supportive policy framework. Engaging with representatives from the federal state of Carinthia could be an essential part of this, as their involvement could expand the network and enhance support.

Additionally, our PRP has expressed interest in further exchanges with the Living Lab PRP from Rhein-Hunsrück, who work on their regional strategy “Gelobtes Land.” Although the German Living Lab’s focus is more on location marketing and differs somewhat from our PRP goals, the strategic insights they offer may provide valuable ideas. The same applies to the Living Lab of Monmouthshire. Additionally, the RPR expressed strong interest in future collaborations on upcoming HORIZON projects, particularly those focused on functional areas, demographic change, or the economy.

Our PRP also highlighted the importance of maintaining the connection with a RUSTIK advisory board member who advocates for rural communities in Brussels. This relationship has been beneficial for Carinthia’s regional strategy, allowing Carinthia’s voice to be heard more widely within the EU. Plans will probably be made to invite him back to the Nockregion for further dialogue and support.

To secure the long-term sustainability of the Living Lab, the focus is on establishing a continuous data management and updating plan for the region. Developing a regional network of SRBs and creating mechanisms for regular data updates in the region – both as outlined above – are crucial steps for the Living Lab’s continued relevance and utility for municipalities across the Nockregion.

Communication and dissemination

Plans for Communication and Dissemination include:

- Presentations of data experiment findings to stakeholders in the Nockregion in coordination with the PRP
- Presentation of findings in scientific conferences, e.g.
 - Participation and presentation in working group for ESRS in Riga, July 2025 (working group proposal submitted) – Working title: Learnings from Implementing Living Labs (and Similar Research Approaches) for Rural Transitions,
 - Joint session of RUSTIK Mountainous Living Lab at the International Mountain Conference in Innsbruck, September 2025 (still being explored) – Working title: Mountain Diversities for Shared Solutions: The Experience of Small and Medium Enterprises
 - Joint presentation at EUGEO 2025 Congress in Vienna (proposal submitted)
- Contribution to a scientific paper with focus on SRBs in rural development
- Future collaboration between LLC and PRP in upcoming programme calls





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Bulgaria: Troyan-Apriltsi-Ugarchin

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Summary and overview

The Pilot Region (PR) of Troyan-Apriltsi-Ugarchin (TAU) is situated in Bulgaria, on the mid-northern side of the Balkan Mountains (Stara Planina). TAU covers the territories of three neighbouring municipalities – Troyan, Apriltsi, and Ugarchin – and is located about 150km northeast of the capital, Sofia. The main route linking Sofia with the Black Sea crosses its territory. All three municipalities are classified as rural, except for the city of Troyan, and face depopulation in different ways.

Living Lab challenge

The challenge identified in the TAU pilot region (PR) is **the underexplored potential of the rural food system** as a resource for local development. While food production is a defining feature of the area's economy, it has not been fully leveraged to stimulate broader (neo)-endogenous socio-economic benefits or to support demographic processes. This challenge ties directly to the three core rural functions identified in RUSTIK: production, consumption, and ecosystem services.

Data experiment

The experiment aims to provide an in-depth analysis of the rural food system in the PR and to suggest data-driven solutions to develop local food policy. The data experiment is based on the *triangulation of data* collected from different sources and through different methods such as in-depth interviews, observations, surveys and secondary data. The data experiment is also based on the *transformation of data* from one type to another to extract different types of data from a single source. For example, public register data were transformed into spatial data, and visual qualitative data were coded and transformed into quantitative data. The experiment also uses *participatory action techniques* to conduct real-time collaborative experiments between restaurants, their networks of local food suppliers and their clients.

Preliminary results

The experiment involved 55 in-depth interviews with food producers (farmers, food processors, restaurateurs) and 426 questionnaires with visitors to local restaurants to explore their knowledge and attitudes towards local food. Weekly data were collected from two restaurants on their sales of local and non-local foods of the same category over six months. A GIS platform was created with eight thematic maps based on data from publicly available registers. The maps made it possible to locate the different categories of local food producers (organic farmers, beekeepers, registered and unregistered livestock farms), commercial outlets, professional food schools at the local level, markets and food festivals. In addition, visual data has been collected from three food festivals and local shops.

Key learning to date

There is insufficient support for local cooperation in food-related activities. While agricultural development (e.g., payments per hectare and investment in agricultural machinery) is supported, food-related initiatives are not a specific priority. There are several bottlenecks here. Existing food production facilities have limited capacity, and many food producers are hesitant to expand due to anticipated administrative burdens. Informal food practices are therefore widespread across the region. Well-known local food brands are losing authenticity due to disruptions in the local value chain, e.g., plum brandy, a unique product for the region, is now made from alcohol and imported fruit distillates. Similarly, a local sausage is made of imported meat. There is a lack of food-related production facilities to strengthen cooperation between local producers, such as





small-scale or mobile slaughterhouses. Additionally, food traceability initiatives are lacking, making it difficult to connect local food to sustainability efforts. Consumer awareness regarding food origin and sustainability is critically low. Taste and culinary experience are important to consumers, but there is a lack of awareness about food origin and the nutritional quality of food. Administrative barriers hinder the use of fresh, seasonal, and sustainable local food. For example, restaurants are not allowed to make their own minced meat and must use pre-made products, and bakeries can sell sandwiches with legumes but not salads in boxes.

Next steps

The next steps we will perform during Cycle 3 of the experiment (January – November 2025) relate to the three commitments set out for the experiment.

1. To analyse the recorded data.
2. To update data collected during the experiment (including developing three new layers in the GIS to locate other specific for the area food actors) and gathering feedback from the actors in the Living Lab.
3. To disseminate project results to both wider public and professional audiences.



Figure 11 Pastoralism in Central Balkan. (Petya Slavova, July 2024)

The photo illustrates the pastoral practices in the Central Balkans. Pastoral practices are essential for the conservation of biodiversity through the maintenance of high mountain pastures and for preserving the traditional way of cheese making. This practice provides a livelihood for four families and their descendants and has also become a tourist attraction. Many visitors see the sheep for the first time and learn how cheese is made.





Part 1: Living Lab context

Pilot Region introduction

The Pilot Region (PR) of Troyan, Apriltsi and Ugarchin (collectively, TAU) includes three neighbouring rural municipalities located in the North-Western NUTS2 region within the Lovech district (NUTS 3). Each municipality represents one of the three types of rural areas in Bulgaria: agriculture-dominated (Ugarchin), industry-dominated (Troyan), and tourism-dominated (Apriltsi). Together, these municipalities cover a total area of 1,650.2 km² and have a combined population of 33,858 residents. The three municipalities are situated in predominantly mountainous and semi-mountainous areas; this geographical position reflects the land use structure of the area. Forests cover 76% of the area, 21% is used for agricultural activities, and only 22% represents built-up areas. There are three natural reserves in the area, one of which – Central Balkan National Park – is part of the UNESCO network of biosphere reserves.

Population and Demographic Context

The three municipalities have experienced significant population decline over the last decades, driven by outmigration, an ageing population, and limited economic opportunities. According to our calculations of time series population data, in Troyan (the largest municipality by population and land area) the population has decreased by approximately 25% over the last twenty years. Apriltsi (2,700 residents), the smallest of the three municipalities both in terms of population and territory, is closely linked to Troyan and showing signs of catching up in its developmental progression but has also faced rapid depopulation, with a 33% reduction over the same period. With its large Roma community, Ugarchin's population is younger but nonetheless declining. During the last twenty years, the municipality lost 45% of its population. Troyan and Apriltsi have attempted to counter depopulation and the COVID-19 pandemic with tourism and food-based strategies, while Ugarchin's development remains constrained by a lack of clear strategy, infrastructure and external investment. According to the demo Functional Rural Area Map¹, in the TAU pilot region, Troyan and Apriltsi are described as rural cities, but Ugarchin as a rural town.

Economic Challenges

The region's economic activities reflect its diverse rural typologies. Troyan has a strong industrial focus, while Apriltsi leverages its scenic landscapes to support a growing tourism industry, and Ugarchin remains largely agricultural. Despite this diversity, the region faces common challenges. Population decline is due to the impact of traditional industries employing mainly low- mid-level qualified workers and offering low wages in comparison to the average wage in the country. Youth out-migration is another contributing factor, as young people seek educational opportunities outside the area. Concerning the agri-food sector, there are unexplored opportunities for collaboration among local businesses. Moreover, informal economic practices are typical for the local economy and hinder the area's development (Slavova et al. 2021). These informal practices, coupled with the lack of support for food-related entrepreneurship, hinder the development of a cohesive local food sector that could support broader regional development.

¹ <https://observatory.rural-vision.europa.eu/thematic-analyses/functional-rural-areas?lng=en>





Functions

According to RUSTIK Deliverable 1.1., rural functions are defined in three main categories: production, consumption, and ecosystem services. According to this typology, TAU's data experiment is mainly related to the production function. "The analysis of production function indicates what type of local economic specialisation (or not) characterises rural territories, following the assumption that rural areas are far from being predominantly agricultural oriented." (D 1.1., p.20). Indirectly, TAU's data experiment is also linked to consumption (through tourism) and to ecosystem functions (biodiversity and land preservation). These functions are discussed in more detail below.

Production function (transition from agriculture to food production)

The data on TAU show that the industrial sector has the highest number of employees and the highest turnover in the PR, followed by the service sector. The agri-food sector ranks third in terms of turnover and number of jobs (except in Ugarchin, where it ranks first). These data confirm what is already known from the literature: that agriculture does not always have the greatest weight in rural areas in terms of employment but remains important as a provider of food security, family-based entrepreneurship, additional income and social activities (Creed, G. 1998). The implementation of the Common Agricultural Policy (CAP) during the last two periods (2007-2013; 2014-2022) has not changed this trend. It might seem self-evident that support for agriculture through the CAP should promote agricultural employment and stimulate rural jobs. However, it has proven difficult to document a positive relationship, and indeed, many studies find the opposite (Ministry of Finance, 2019; Schuh et al., 2016) and note the limited positive correlation between CAP subsidies and increased agricultural employment. At the same time, according to these studies, agricultural income has risen, but it has done so for a shrinking workforce, with an average gross added value of 5-10%, falling short of initial expectations.

Through the experiment, we found that when agricultural activities are combined with food production and food service activities (different from primary agricultural production), employment opportunities may increase and be perceived as more appealing to residents, offering more diverse job types and attracting wider interest. In other words, focusing policy implementation predominantly on agriculture creates problems that could be solved by reversing policy support, which should be food-oriented rather than agriculture-oriented. The link between food and agriculture should be taken into consideration in a more specific way by policies to help rural areas perform the transition from exogenous to (neo)endogenous development (Gkartziou and Lowe, 2019).

Service sector and gaps in agri-food support services

In the TAU region, services are the second most important sector in the regional economy, but mainly concentrated in sectors like trade, transport, and other personal and recreational services (e.g. cosmetics, hairdressing, gambling/casino games). Agri-food related services such as food delivery services, food brand promotion, education, training, and facilitation are almost entirely missing in the territory. According to the official data, food production is not yet a dominant sector despite the aspirations of local communities. This is largely due to undeclared income within food production activities, which in turn leads to less revenue for municipalities and low official wages for employees, masking the sector's actual importance to the local economy.





Informal economy in agri-food and tourism sectors

The informal economy has a very important role in all three sectors, particularly in agri-food and tourism, due to sectoral characteristics like person-to-person relationships, family-run businesses, and traditional inherited models (Schneider et al. 2021). According to the same authors, informalities in EU agriculture are also tolerated to some extent (p.4). Existing statistical data describing the agri-food sector is compromised due to non-declared production, jobs and wages. Existing research on informalities in EU agriculture explores data that quantitatively describe the situation in the EU15 states (Schneider et al. 2021). The situation in the new member states remains unknown, since data on informal practices remains largely undocumented, but it is estimated to be much higher than in the EU15.

Current focus: Understanding agri-food production and informal networks

To explore the agri-food production function within the TAU region, the project team is focusing on mapping food production and location data as well as the cooperation mechanisms and networks among local agri-food actors. Through a mixed methods analysis of informal practices in the agri-food sector, we aim to understand barriers and opportunities to develop socio-economic activities in the sector.

Consumption function (developing a local food brand through cooperation)

The TAU data experiment focuses on local food as an instrument for neo-endogenous or nexogenous territorial development (Gkartzios & Lowe, 2019; Bock, 2016), including the exploration of tourists' interests in local food. The TAU experiment aims to collect data to understand whether local food brands could be created with the help of local agri-food networks and be promoted as a distinctive local feature.

Ecosystem functions (promoting sustainable food practices)

Organic farmers, beekeepers and livestock farmers practicing pastoralism are in focus in the TAU experiment as sustainable food producers whose practices contribute to the preservation of biodiversity and ecosystem health. In Apriltsi, pastoralism is a traditional way of maintaining pastures and producing food, while in Ugarchin and Troyan, the number of organic farmers is increasing. However, these food producers experience different barriers related to their operations. How they overcome these challenges, adapt their methods, transform these barriers into solutions to produce food sustainably, and cooperate with the other agri-food actors in the area to promote local food within a framework that supports biodiversity and minimises environmental impact are the focus of the interest in TAU PR.

Transitions

Depopulation is the most challenging aspect of rural life in Bulgaria, and the PR is no exception. However, depopulation is the result of the ongoing processes in the pilot region discussed above, related to the informal economy, limited job diversity, and instances of ethnic segregation. Furthermore, each municipality has its own specific problems and economic profile. The data collected during the first cycle of the Living Lab's work showed that the three municipalities share a common potential for development rooted in the local food sector. The experiment, therefore, explores socio-economic and demographic transitions through the lens of the agri-food sector as a local development mechanism.





Living Lab partnership

The Bulgarian PR Partner is the Local Action Group Troyan, Apriltsi, Ugarchin (LAG-TAU). Established in 2009 as an NGO to implement the LEADER approach, LAG-TAU acts as a secondary funding distributor of EU funds provided by CAP and Cohesion Policy. LAG-TAU operates according to five-year multi-funded strategies for community-led local development. Each programme period sets specific priorities, allocating budgets that LAG-TAU distributes to local organisations, following open-call application procedures. The LAG does not independently define the area's priorities but follows guidance developed by the central state administration and by the respective ministries responsible for funding. However, the LAG can develop 'design measures' to fund activities that they identify as locally important.

During the last four years, LAG TAU identified that local food production, preservation, and distribution are important for the local population, as they help to preserve local identities, create jobs and promote social cohesion. Furthermore, food has the potential to increase collaboration among local businesses. Currently, LAG-TAU relies on four full-time employed experts: Veselin Stoykov, an executive director of the LAG, Hristina Marinova and Iskrena Nenova, rural development experts, and Steliyana Boshnyakova, an office assistant.

The coordinator of the research experiment is Associate Professor Petya Slavova, PhD from the Department of Sociology at the Sofia University St. Kliment Ohridski (USOFIA). Petya brings to the project expertise in agri-food and rural studies acquired through publications and active participation in EU-funded RIA and CSA Framework projects like LIAISON, COOCREADO, EFUA, and the ESPON ESCAPE project. Nina Denisova, PhD is supporting the coordination of the experiment. Nina holds a PhD in Sociology from USOFIA, where she acquired extensive research experience in understanding craft food and beverage consumption in Bulgaria. Kalina Tseneva and Iva Kalcheva are students in the Bachelor programme in Sociology at USOFIA. They were invited to join the RUSTIK team because of their academic achievements. In short, the USOFIA team is composed of representatives of three generations of sociologists, bringing expertise and striving to understand how to support agri-food socio-economic transitions in TAU PR.

Geographer and GIS specialist Nikolay Staykov, from Mandarb Ltd, is subcontracted by LAG TAU to develop the GIS system "Pathways of Local Food in Troyan, Apriltsi and Ugarchin". This GIS initiative will map and analyse the local food linkages, providing valuable spatial insights for enhancing regional food networks and fostering sustainable agri-food practices.

Living Lab challenge

The main challenging opportunity identified in the TAU pilot region is focused on *the underexplored potential of the rural food system* as a resource for local development. While food production is a defining feature of the area's economy, this function has not been fully leveraged to stimulate broader socio-economic benefits or to support demographic processes. This challenge ties directly to the three core rural functions identified in the TAU PR: production, consumption, and ecosystem services. Food production underpins these functions and, when viewed through the lens of rural transitions, presents promising pathways to boost local development. Specifically, the TAU LL partners aim to understand how to:





1. Sustain food-related cooperation (different types of short food supply chains that minimise intermediaries, promote local food brands to increase product visibility, and strengthen ties among various food-related actors).
2. Help the transition from agricultural to food activities (diversification and multifunctionality). Expanding beyond traditional agricultural practices into food-related entrepreneurship can offer local businesses the opportunity to diversify and increase resilience. This transition involves encouraging multifunctional activities within agriculture, where farms engage in food processing, direct sales, or agri-tourism to diversify traditional farming income.
3. Attract people (visitors and residents) to the territory through food-related entrepreneurship. Agri-food entrepreneurship has the potential to develop, albeit in different ways, in all three municipalities covered by the TAU PR as a measure that can have a positive impact on socio-economic and demographic transition. Encouraging food-related businesses can help position the TAU region as a destination for culinary tourism while fostering a community where local producers feel motivated to remain and invest.

Rationale and research questions

During Living Lab Cycle 1, we found that the food sector has emerged as a promising avenue to support economic diversification and to strengthen the regional economy and culture by attracting more visitors and residents alike. In addition, entrepreneurship in the agri-food sector is increasing, and different innovative approaches to food have been developed. However, despite the sector's potential, significant barriers remain. There is:

1. A lack of strong local food brands (the existing ones appear to have lost their quality and authenticity).
2. Weak agri-food sector cooperation.
3. A lack of policy support to transform food into a 'regional force' in addition to natural and cultural heritage.

Furthermore, informal economic practices play a dual role. Whilst they facilitate accessible, traditional food production, they also pose obstacles to sectoral growth, cooperation, and official recognition. As a result, local food is not promoted as an additional tourist attraction and business opportunity. We found out that the functioning of the rural food system in the PR has never been explored through a specific study. Therefore, local policy actors, including LAG TAU, cannot apply data-driven solutions when developing specific measures to implement their local strategies. This need for comprehensive data and analysis on the rural food system's dynamics, challenges, and informal practices forms the basis of the Living Lab's data experiment in Cycle 2.

The key research questions that drive our experiment are:

- How are informal economic practices both an obstacle to promoting cooperation in the local agri-food sector and an opportunity to produce fresh, seasonal and traditional local foods?
- What are these informal economic practices, and how can they be transformed so that they do not lead to a reduction in local food production and quality?
- Which policies could best address the complexity of informal practices in the agri-food sector?





Understanding these practices is crucial to formulating targeted policies that address the informal sector's strengths without undermining local producers.

Another important question for the data experiment focuses on agri-food entrepreneurs and how they find resources for development through food. More precisely:

- How do agri-food entrepreneurs perform the transition from agriculture to food, and how do they choose the food products they develop?
- Why do they consider these food products important, and for whom?
- How and to what extent are these food products and practices linked to the region?

Finally, we are focusing on identifying data gaps:

- What specific data gaps exist in the TAU food system, and how does this hinder the opportunity to develop policy solutions?

Policy relevance

Local food policy is a new and under-researched issue in Bulgaria and the pilot region. At the local level, food policy is mainly operationalised through the organisation of weekly local markets in different settlements, the organisation of an annual food festival and the organisation of social support initiatives such as community kitchens and school meal programmes. The Municipality of Troyan is an exception at the national and regional levels, with its municipal vegetable and orchard garden providing food for social and kindergarten kitchens.² However, the lack of coherent local policies aimed at developing food brands, strengthening cooperation between agri-food actors, providing more seasonal food, and promoting local food as cultural heritage reflects a gap in policy frameworks. We assume that these types of policies could reduce food-related informalities by recognising local food as a tool for local development.

Stakeholders

We developed a 'multiple circles of engagement' methodology to implement a robust, inclusive approach to stakeholder involvement as part of the Living Lab experiment in TAU PR. During Cycle 1 of the experiment, we tried to involve highly diverse stakeholders representing a wide range of businesses, the public sector, and NGOs. The purpose of this approach was to identify and refine the scope and objectives of the data experiment.

During Cycle 2, we narrowed down the profile of the stakeholders and selected three distinct stakeholder groups, given their relevance and potential contributions to the food data experiment. In the core circle, we have the LAG partner, which is the main policy actor we are targeting as its role aligns with the experiment's objective of improving data-driven decision-making and local food policy development (core circle). Then, in a larger circle, we have a small network of restaurants and their local food suppliers, as we see them as 'focal food points' (see Part 2). This network serves as a practical interface between food producers and consumers, making it an ideal setting to examine food sourcing practices, supply chains, and consumer preferences. The third and largest circle of stakeholders (the outer circle) includes all the respondents interviewed

² More details in English here: <https://www.efua.eu/sites/default/files/2023-05/Troyan.pdf>





during the experiment. They have provided us with data, but we have also shared with them ideas for further development of the experiment and consulted them on the development of the GIS platform. This broad group includes individual farmers, small business owners, and community members whose experience and perspectives give depth to our understanding of the region's food-related challenges and opportunities. Members of each circle have specific roles, rights and duties, and inter-circle mobility will be encouraged in the next steps.

Theory of change

The TAU PR partners (the core circle of the LL) are conducting an experiment that aims to pave the way for a new local food policy. We are trying thus to conduct an ex-ante assessment of the local agri-food sector at the PR territorial level following the rural proofing approach, aiming to anticipate possible challenges and negative impacts but also enhancing developmental opportunities. As rural proofing is suitable to be applied in every sphere that is a subject of policy design and implementation in rural areas, we assume that food represents a specific sphere that could be designed through targeted local policy and could be implemented by our local partner LAG TAU through their Local development strategy. As Nordberg (2016) points out, the geography of rural areas and participation are the two main pillars for implementing rural proofing. By assessing food-related policies through the lens of rural proofing, the experiment aims to ensure that these policies are sensitive to rural dynamics, prevent unintended negative impacts, and identify areas with significant development potential. Our LL's multi-circle methodological approach goes hand in hand with inclusive participation in local policy design, while the data experiment provides granular data at a PR territorial level about the possible failures and opportunities that need to be anticipated or supported. By creating a dedicated local food policy grounded in the principles of rural proofing and bolstered by data-driven insights, the TAU Living Lab seeks to facilitate the transition from traditional agriculture to diversified food production, enhancing socio-economic transition in the TAU's PR. The figure below illustrates our theory of change for the data experiment.





Figure 12 Theory of change diagram

Data relevance

To transform food into a local development policy ready for implementation, data is needed to identify local agri-food actors and networks, the types of food they produce, and the way they cooperate. We also need to know the actors' willingness to go beyond this, such as working together to develop an authentic food brand that locals and visitors trust and recognise or make the transition from agriculture to food. As Ray (2001, p.4) points out, actors may express their needs, but these can differ from their ability to drive self-improvement and change. We need data on barriers that actors experience but are willing to overcome, and any barriers they consider as insurmountable structural traits. This second type of barrier needs to be further considered by policies. In addition, data about the knowledge and practices of visitors regarding local food in general are needed. Who are the visitors who are interested in food origin and traceability? Understanding the connection between agri-food producers and consumers is essential for identifying the profile of potential local food brands that can be developed. Finally, we need data on the potential for local agri-food actors to cooperate and produce together "relational rents" (Cao and Zhang, 2011) that extend beyond the individual financial benefits.





Part 2: Living Lab Cycle 2: Data experiments

Data experiment

Developing the data experiment

The experiment aims to provide an in-depth analysis of the rural food system in the pilot region and to suggest data-driven solutions to develop local food policy, e.g. to identify specific activities and types of actors to be supported to promote further local development through food-related entrepreneurship and cooperation.

To plan and design the data experiment, three two-day meetings were organised in January, February and March 2024. At the first meeting in January, USOFIA and LAG TAU partners decided to focus the experiment on the assessment of rural food production and cooperation. After the first meeting, the USOFIA team developed a preliminary design for the experiment based on the discussions between the partners,

At the second meeting in February, the design was discussed with LAG TAU. Partners decided that to analyse the functionality of the local food system and its potential for local development through entrepreneurship, multifunctionality and cooperation, different sources of data are needed. Partners also decided that the USOFIA team would oversee the data collection, and LAG TAU would help with the organisation of the fieldwork activities. LAG TAU would also support the USOFIA team by coding, verifying and updating part of the collected data. The diverse types of methods, sources and data collection techniques that were discussed as relevant to the experiment are outlined in Table 6 below.

At the second meeting, USOFIA and LAG TAU also decided that a GIS platform would be developed to transform registers and observational data into spatial data to enable the extraction of further insights. This platform would facilitate the analysis of local food production, mapping locations of key food producers and distribution networks across the region. This decision was also discussed with RUSTIK partner MCRIT, with the view of checking possibilities to integrate the GIS platform on local food data within the RUSTIK Viewer. At this point, it was decided that part of the budget for sub-contracting would be used by LAG TAU to hire a company to develop the GIS platform using open-source tools like QGIS. Furthermore, it was decided that another part of the sub-contracting budget would be used to conduct participatory real-time experiments in collaboration with two restaurants and their networks of local suppliers. Respectively, meetings were organised in March and April 2024 with local restaurants, technological companies and food producers to select partners and to discuss the subject matter of the contracts. Three contracts were signed by LAG TAU: one contract with a technological company to develop the GIS platform and two with local restaurants for collecting data and participating in the real-time collaborative experiment. The Maptionnaire online platform provided by RUSTIK partner Mapita was also used for designing data collection questionnaires from different sources.

At the third meeting in March, the USOFIA team presented the primary data collection instruments (guide for in-depth interviews and questionnaires). Both LL partners agreed to prepare a timetable for fieldwork activities. Partners decided that the primary unstructured self-reported data collection would start in April and finish in July 2024. Secondary data from registers, repositories





and other existing sources that were accessible and needed to be uploaded into the GIS would be collected simultaneously.

The first round of primary data collection was organised in Apriltsi between the 24th and 28th of April 2024. The second round in Troyan took place between the 15th and 19th of May, and the final round in Ugarchin between the 9th and 12th of June. During these three rounds of primary data collection, minor adjustments to the initial plan were made to accommodate the availability of local actors. Observations of local shops were also performed during the same periods. Observations of local food festivals were conducted in Apriltsi in February, coinciding with the organisation of the local Beacon and Plum Brandy Festival. Observations of two other local food festivals were also performed: one in Troyan (Plum Festival) between the 20th and 23rd of September and one in Ugarchin (Truffle Fest) between the 20th and 23rd of September. LAG TAU collected visual data from the festival in Ugarchin, while at the same time (both festivals coincide), the USOFIA team did the same in Troyan. Real-time experiments in the two selected restaurants were launched in July when interviews with their local food suppliers were performed. Booklets with data from these interviews were designed digitally and on paper by the USOFIA team, together with questionnaires for visitors and e-dairies for restaurants to record local food sales.

The three meetings between USOFIA and LAG TAU were pivotal for planning, designing and implementing the data experiment. During the fieldwork activities in April, May, June and July, both partners took the opportunity to meet and discuss the implementation and the process of data collection. Between January and October 2024, the USOFIA team spent 21 working days in the Pilot region doing fieldwork activities and meeting with the LAG TAU to access and adjust the data collection process in response to emerging needs.

Experiment description

The data experiment is about the structure, dynamics and functioning of the rural food system with a focus on the cooperation of agri-food actors and their readiness to make the transition from agricultural activities to food-related activities. Specifically, it investigates how agri-food actors embed themselves within both local and external agri-food networks, how they engage in entrepreneurial and multi-functional activities, and the system's readiness to foster local development through food-based initiatives. To deliver the experiment, a three-step approach was developed.

Step one aimed to identify and categorise key rural food actors and to select those specifically related to the transition from agriculture to food through cooperation and collaborative networks (entrepreneurship and multi-functionality). A map of rural food actors was developed, and eight actor groups were identified:

1. Farmers and food producers.
2. Food processors (including restaurants and guesthouses serving food) and traders.
3. Consumers (residents and visitors).
4. Food safety and quality control.
5. Storage, packaging and transport/logistics.
6. Food waste activities
7. Research and education.
8. Agri-Food policy related actors.





USOFIA and LAG TAU decided to focus the experiment on the activities and relationships of four specific groups: 1, 2, 3 and 8. The rationale behind this selection was that new data is needed to better understand the relationships and practices linking food producers, processors, traders and consumers together with policy actors. Insights gathered from these core groups will help to design policies that encourage the transition from agriculture to food-related activities and bring additional social and economic value to the area. Furthermore, these four groups are at the heart of the food system and could also provide data on the others not directly involved in the experiment. Moreover, the rural food system in TAU, and indeed, in other areas in Bulgaria, remains largely unexplored. In the TAU PR, in particular, the issue of how production, consumption and cooperation practices link key actors into the system remains opaque and obscure.

Step two focused on selecting *new sources of data and methods to explore* the relationships between the selected groups of actors. To explore the local food system in depth, a triangulation approach was needed, requiring a combination of different types of data collection techniques from various sources to ensure robust and multi-dimensional insights. Data sources and methods are listed in the table below.

Table 6 Summary of data collection sources and methods

Self-reported methods	In-depth interviews (qualitative) Questionnaires (quantitative)	Individual food producers, processors, traders, restaurants. Consumers/ Visitors
Unobtrusive methods	Structured data from the following publicly accessible registers: <ol style="list-style-type: none"> 1. Organic farmers. 2. Livestock registered farmers. 3. Household farms. 4. Beekeepers. 5. Restaurants & accommodation. 6. Vocational schools (food). 7. Markets and food festivals Statistical data	Registers are operated by: MAF Bulgarian food safety agency (BFSA) Ministry of tourism. Ministry of education and science Municipalities National statistical office (NSI)
Participatory methods)	Real-time participatory experiment stimulating forms of cooperation between local food producers and two local restaurants	Data related to: Restaurant sales of local and non-local food; consumer knowledge of and interest in local food options. Benefits of food producers and restaurants to work together
Observations	Visual methods	Local festivals, markets and shops

To conduct this experiment, four types of methods and data sources³ were triangulated (Denzin and Lincoln, 2011):

³ Typology of methods based on Cycle 2 guidance typology, p.21-22.





1. **Participatory methods** (White et al.1991) to engage individuals and communities directly in the data collection and interpretation process. For this purpose, two key “rural food focal points” were selected. The area’s most-visited restaurants were selected⁴ for a real-time collaborative data experiment.
2. **Self-reported methods**, both qualitative and quantitative, involving individuals, representing at least one of the four groups of actors identified in Step 1.
3. **Unobtrusive methods** that do not require researchers to interact directly with the data subjects, enabling the collection of existing structured data from publicly accessible registers. This data was integrated into the Local food GIS system to analyse the spatial distribution and concentration of different rural food actors on the territory and to identify specific data gaps.
4. **Observational methods**, aiming to collect visual data from local food festivals, supermarkets, weekly markets and shops.

Step 3 aimed to develop and test different tools for data collection derived from the methods and sources identified in Steps 1 and 2. This step also focused on engaging the four actor groups from Step 1 and testing their willingness to participate in the experiment. Step 3 was critical for the execution of the experiment as it tested the feasibility of each tool through implementation.

Experiment objectives

Primary objective (informalities in the agri-food sector)

According to the data collected during Cycle 1, the agri-food sector is one of the key economic sectors in the pilot region area. However, a significant part of the practices in this sector are conducted informally. While existing research shows the potential benefits of local food systems to enhance community economy and quality of life, there is a critique that these studies overlook the contribution of informal, non-market food access practices, especially in rural places (Massengale and Hendrickson, 2024). The reasons for developing these informal economic practices are not always due to local actors evading taxes or concealing income. Rather, informal practices are also due to *insufficient policy support* and *confusing regulations*. The primary objective of the data experiment is hence to understand the origin of agri-food informalities and identify the barriers that the actors encounter in complying with existing policies and regulations.

Secondary objective (agri-food networks in rural context)

Although food choices and networks in urban contexts have been widely studied, far less empirical information has been gathered from rural settings (Scarpello et al. 2008). The objective is to understand agri-food cooperation mechanisms in rural areas and how these can be supported. This experiment aims to understand whether local agri-food networks could steer the development of the pilot region toward a more neo-endogenous direction (Gkartzios & Lowe, 2019; Bock, 2016). Specifically, this objective will explore both the loss of authenticity of traditional local foods (such as plum brandy and local sausages) because of disrupted local supply chains and the reinvention of local food and re-establishment of local agri-food chains to develop

⁴ Each can accommodate between 40 and 65 guests, depending on the season. One has a long history rooted in local cultural heritage and family traditions, while a food technologies teacher from the school created the other in 2019. One focuses on tavern culture and rural folklore, objects and food, while the other recalls old urban contexts from the period between the two world wars (porcelain, furniture) and experiments with new recipes and locally produced ingredients.





new local food brands. Unfortunately, we found that data from food-related public registers in Bulgaria are neither linked nor machine-readable and could not be explored by web-scraping techniques (for the list of registers, see Table 66). Our experiment seeks to integrate existing data into one platform, identify data gaps and demonstrate how these new data could be used to design policy measures at the local level to support local agri-food networks and short food supply chains, including the identification and creation of new local food brands.

Further objectives (cultural and sociotechnical aspects of cooperation)

An additional objective of the experiment is to engage agri-food actors in data collection by adjusting certain practices to test how real-time food-related changes affect their work. These real-time experimental adjustments aim to foster local collaboration between the agri-food actors (e.g. by making local food suppliers visible to restaurant visitors). This objective is grounded in the assumption that local agri-food actors find it difficult to change their practices even when they have good ideas and that an external actor and factor (i.e., the RUSTIK Living Lab) can facilitate this change. In other words, when exploring cultural aspects of rural agri-food networks, we aim to explain why local actors cooperate with some partners and refuse to enter cooperation with others. Until now, in the literature, this willingness and cooperation activities are explained mainly through the theory of social capital and network analysis (Crespo et al., 2014). We assume that other cultural aspects that are more closely linked to food-related socio-technical networks may provide a deeper understanding of agri-food cooperation dynamics.

Relationship to theory of change

Through the data experiment, we are testing two policy-related assumptions illustrated in our theory of change diagram (Figure 12 above). First, our experiment seeks to demonstrate how the design of specific data-driven policy actions could be performed and implemented at the municipal or regional level (LAG TAU area). While it is well known that access to data and mitigation of data gaps could improve local actors' capacity for policy decision-making, this is not as evident in the Bulgarian context. Corruption and state capture perturb the policy decision-making process (Fazekas et al. 2023) in Bulgaria, and political instability (7 parliamentary elections held over the last three years) causes delays in policy implementation. For example, the development of the legal framework regulating the implementation of the LEADER approach was delayed by two years. An additional element that makes the policy decision-making process in the agri-food sector more difficult is the fact that Bulgaria is one of the EU countries with the highest concentration of land property, due to the implementation of CAP direct payments in the country. 87% of the land is controlled by fewer than 20% of farmers. These contextual factors underscore the challenges in establishing a data-driven policy process.

Second, the data experiment allows us to understand how targeted support for cooperation among local agri-food actors could help decrease the level of existing informalities in the sector by supporting more collaborative efforts. The need for cooperation, as well as the various forms of cooperation between actors in the agri-food sector, are underexplored, and therefore, actors do not receive adequate policy support to diversify their activities and create sustainable entrepreneurship. Overall, we aim to test the potential for creating a local food brand that could serve as an additional territorial asset.





Data use

Data sources and methods

As described in Table 1, four types of methods and different data collection tools were used to develop our objectives (Experiment objectives.) and Theory of change assumptions (Relationship to theory of change).

Self-reported methods

The identification of actors, relationships and networks within the rural food system, as well as their experience with agri-food policies, was achieved by conducting in-depth interviews with food producers, processors, and traders. These included farmers (both officially registered and unregistered), processing enterprises, some of which also operate their own farms, and restaurants (beyond the two engaged in the participatory methods). The interviews were conducted following a thematic guide focused on their business activities, social and cultural food-related practices, forms and practices of food cooperation, actors' experiences with short food supply chains and food-related opportunities and barriers (PESTEL) (Rastogi et al. 2016). During the interviews, we also discussed actors' perceptions of local food, opportunities for future development and their socio-demographic profile. In total, 55 interviews were conducted, amounting to 73 hours of recordings, with an average length of 86 minutes per interview. Some respondents held multiple roles within the food system. In Table 7, respondents are reported with their multiple roles, so the number of roles in the table exceeds the total number of conducted interviews. Informed consent declaration following GDPR rules was signed by respondents to acknowledge their understanding of the RUSTIK project and how their data would be registered, saved and used during the project. All interviews will be coded with Atlas.ti 24 software for qualitative data analysis according to tailored coding procedures to extract data to address our objectives and assumptions.

Table 7 In-depth interviews of agri-food actors per category

Location	Farmers	Restaurants	Food processors and traders
Troyan	17	4	17
Apriltsi	10	4	5
Ugarchin	8	2	3
Total per category:	35	10	25

Unobtrusive methods

To identify gaps in the food system and local food networks, we needed to understand the spatial distribution of food producers and the availability of different types of food across the TAU PR. We also needed to identify data gaps in the information collected by public institutions, to compare existing food-related data and to explore ways to better connect local food actors. For this purpose, we created a Local food [GIS platform, "Pathways to Local Food"](#), where food-relevant





data for the territory of the three municipalities composing the PR territory were integrated. Data from eight registers were integrated into the [GIS](#).

- **Register of organic farmers** (location, type of food produced, certified land, estimated production). Although this register is public, the data is not machine-readable. Therefore, the USOFIA team manually extracted information from the publicly available registration certificates as scanned pdf files. We also created a data-coding matrix to enable LAG TAU to update these data yearly,⁵ supporting longitudinal analysis of organic food production trends and enabling a closer look at changes in organic farming practices.
- **Register of livestock holdings/farms** (ungulates and non-ungulate animals). This register provides comprehensive data on all types, numbers and locations of livestock farm animals on the territory.
- **Register of household farms** that are not registered as farmers. This register might support the analysis of gaps in official agricultural data, providing insights into informal food economy structures within the region.
- **Register of beekeepers**. Integrating beekeepers' data into the GIS provides insights into local honey production and biodiversity support.
- **Register of places to eat** (restaurants and others) and **places to stay** (accommodation). This register is useful both for mapping tourism-food actors and for identifying opportunities to promote local food within the tourism sector.
- **Register of slaughterhouses and meat processing establishments**. This provides an overview of local meat processing infrastructure, which is useful for accessing the capacity of local meat supply chains.
- **Register of vocational schools** related to the agri-food sector.
- **Register of weekly markets and food festivals**. This helps to identify patterns in local food production, cooperation and marketing.

Additionally, data collected through observations and desk research has been integrated into the GIS system. These include data on specific marketplaces offering local food, food festivals and weekly markets organised in different settlements in the PR, as well as data on vocational schools training students to work in the food sector. The GIS platform is hosted on the LAG TAU website and is publicly available. Additionally, information about the system is disseminated through booklets distributed by the two restaurants participating in the experiment (see the Participatory method section below).

Beyond its function as a spatial data tool, the GIS system is also used as a tool for data collection. We integrated a pop-up Maptionnaire-based questionnaire within the system to ask users to share their experiences with local food. The system was developed in an open-source platform (QGIS), and we are collecting Google analytics data on the number of visitors and engagement metrics such as time spent on the platform. The data integrated into the system were provided to MCRIT to be integrated into the RUSTIK Viewer, expanding the system's potential for broader regional analysis and policy integration by identification of underrepresented areas and visualisation of patterns in food-related services.

⁵ To make public these data we have created a [thematic brochure](#) on organic farming in the TAU PR.





Participatory methods: real-time collaborative experiment

Restaurants are understood within the experiment as ‘food focal points’ that naturally bring together different agri-food actors. Restaurants are also seen as actors practicing and promoting both formal and informal socio-economic and food production practices. Restaurants are furthermore innovative actors exploring different food-related techniques (specific culinary methods, food origin/traceability, chef’s reputation) to attract new audiences and engage with different networks.

Because of the ‘focal’ position that the restaurants occupy in the local agri-food chain, they were selected for the experiment as a specific source of data that could help us to disentangle the networks of actors and relationships in the rural food system. Two local restaurants were selected to participate in the experiment and to collect data from their operations (including their network of food suppliers, number and type of sales of local and non-local food, culinary practices and other type of data related to everyday restaurant practices) and from their customers (food practices and attitudes toward local and non-local food, socio-demography). The following methods for data collection were used by the two restaurants:

- Restaurants complete the **Questionnaire-based e-diary** to log weekly data, tracking the sales of specific local dishes (selected from their à la carte menu) and overall dish sales per week. Restaurants code these quantitative data based on the specific information systems they use to organise their food supply activities. The questionnaire was tailored to each restaurant’s menu, breaking down food items into ingredient categories, with each ingredient coded for its origin (local or non-local). Five dishes were selected representing different categories of food included in the menus (salad, soup, starter, main course, drink or dessert). These items were selected because they are comprised mainly of local products (up to 70% of the ingredients). The restaurants were then asked to fill in data on the number of sales of the selected local dishes and the number of sales of the whole category. This data captures both customers’ interests in local food and the market dynamics around local versus non-local food preferences.
- **In-depth interviews.** Through their engagement in the participatory methods, the restaurants also helped to identify their network of local and non-local food suppliers and to get in-depth insights on the functioning of the local food system from the restaurants’ perspective.⁶ We conducted three in-depth interviews with each of the restaurants at different phases of the experiment. Each interview covered different topics (including restaurant profile as a food focal point, supply process and network of suppliers, customer profile, regional food system and food-related practices, young workers and their training and interests to work in the food sector). A final interview will be conducted after the end of the experiment in November 2024 to get the restaurants’ reflections on their participation and whether the experiment has provided new knowledge or inspired future operational changes.
- **Customer-facing booklets and GIS platform integration.** Participating restaurants have also agreed to disseminate booklets⁷ among their clients, presenting their network of local food suppliers. The information published in the booklets is based on data from the interviews. This participatory real-time experiment aims to make visible the cooperation between

⁶ In the whole text food supplier means food producers. Food supplier does not refer to an intermediary in the food chain but to the producer who is also carrying out trade activities.

⁷ The two booklets are accessible [here](#) and [here](#).





restaurants and their local suppliers and to give visibility to local food producers. The purpose of the booklets is also to introduce the customers of the restaurants to the GIS platform "Pathways of Local Food". The GIS platform itself integrates an e-questionnaire through a pop-up window, designed to collect data from the customers of the restaurants on their habits, preferences and practices regarding local food. The booklet also invites opinions and impressions about local food. In this sense, the booklet is an artefact that initiates collaborative change in the practices of the restaurants and their local food suppliers in an experiential way. It also serves as a data collection tool and presents some of the key interim findings of the project to a wider audience.

- One of the restaurants has also agreed to buy a small, refrigerated display case and to sell at a cost price some of the products delivered by its local food suppliers that the restaurant is using to prepare specific dishes (including items like white cheese, snail pâté, naturally dried fillet). The restaurant records the customers' interest towards the products (number of sales) and also the food suppliers' satisfaction levels (quantity of loaded products), generating data on customer responses to local food products when offered directly.
- Another part of the collaborative experiment was to develop a seasonal menu together with the restaurants, using locally sourced ingredients to prepare five different categories of dishes (salad, soup, starter, main course, drink or dessert). The seasonal menu items were selected because at least 70% of the ingredients used in their preparation are local and supplied by local producers. The menu also highlights information about the use of local ingredients and includes a questionnaire in Bulgarian and English. When customers visit the two restaurants, they receive the seasonal menu and the booklet with information about local producers. Waiters are trained to draw customers' attention to the fact that the restaurants support small food producers and use their products. During the experiment (July-October 2024), waiters also encouraged customers to fill in the questionnaire via a QR code. The purpose of the questionnaire is to collect data on customer awareness and interest in local food. After the customers leave, the waiters place the questionnaires in a RUSTIK-branded box and hand them over to the LAG team to code the data into the e-questionnaire. 426 questionnaires were collected on the Maptionnaire platform by the 15th of October. The experiment ended on 30 November.

The e-diary, the booklets, the seasonal menu, the questionnaire and the display case collectively represent a specific real-time participatory, collaborative shift in how the restaurants and their local suppliers engage with local food. Before the experiment, the participating restaurants did not inform their customers about the food origin or actively promote their food suppliers or differentiate between local and non-local products in their offerings. They were not used to thinking about the food they were selling in terms of its origins. The experiment prompted new awareness, encouraging restaurants to reflect on local food promotion. The restaurants told us that they never thought to initiate such a specific local food promotion policy. They explained this attitude as follows:

"Promoting each other is not typical of our culture, our business or our region. It is more typical here to say who is not working well, not to show who you are working well with. What you are asking us to do is very "western type culture", but let's try." (TAU restaurant)

Observation (primary visual data)

During the last 15 years, many rural areas have started to (re)invent food festivals to give visibility to tangible and intangible elements of cultural heritage and attract tourists while also





strengthening local community networks (Medarov and Marinov, 2022). However, due to the communist legacy in Bulgaria, many rural areas have lost their specific food traditions, and these food festivals are not related to authentic food heritage but to other cultural objects, newly created cultural symbols, or ‘eventification’ (Sala, 2015).

With our experiment, we want to understand the extent to which food festivals in the TAU PR promote local food and identify the types of local food which become part of the ‘eventification’ process. For this purpose, the USOFIA team conducted observations to collect visual data during two local food festivals – the Bacon and Brandy Festival in Apriltsi (24-25 of February 2024) and the Plum Festival in Troyan (20-23 of September 2024). Our LAG partner also gathered visual data at the Truffles Fest in Ugarchin (21-22 September 2024). We collected data about the municipalities’ policy of organising food festivals and promoting local producers. This included identifying features that distinguish local products from non-local ones, such as specific branding, labelling, specific stands, arrangement of stands, traditional attire or other unique identification objects. We also collected data on the type of food sold during the festivals, food origins and numbers of stands, customers’ interest in local food, types of customers (organised groups of visitors and family and friends visits) and their engagement with local food options, local food producers’ festival experiences, exploring their perspectives on market opportunities and challenges within these events.

In addition, we also conducted observations in local supermarkets in the three key rural towns in the TAU area and two villages (Vrabevo and Lesidren) to understand the presence and types of local foods available. Based on this data, we elaborated a list of 25 marketplaces that offer local food in the area. The data from the list has been integrated into the GIS platform.

Data innovation

The methodology of the experiment is an innovative triangulation of four types of data sources: spatial data (GIS), qualitative perspectives (interviews and questionnaires), field observations, and real-time change (collaborative experiment). This approach facilitates development of a novel framework for food systems analysis. In this section, the innovative element in each of the data sources and data collection methods used during the experiment are explained.

The thematic GIS platform “Pathways of Local Food in TAU” is innovative because it allows for the following:

- Transforming structured registers of data into spatial data.
- Consolidating different datasets in one platform to enable additional analysis.
- Identifying agri-food actors in the region.
- Identifying data gaps.

Developed in this way, the platform is a valuable analytical tool to identify agri-food activities and actors that need to be supported, as well as to reveal data gaps. The GIS platform will be used by the LAG to locate and invite potential beneficiaries and to inform decisions on supporting specific food-related actors and activities when developing different measures under their Strategy for local development. The platform will be further developed to add additional food-related layers.

The real-time collaborative experiment with the two restaurants is an innovative approach both for the area and for the country, providing access to new types of data. This experiment also offers specific ideas to local actors for changing their practices through collaboration, creating what





supply chain management literature terms “relational rent” (Cao and Zhang, 2011). The impact of the collaboration cannot be reduced to a win-win market situation, but generates additional value in the form of local food produced by local ingredients.

Although self-reported data collection methods and data are considered in the RUSTIK context as traditional and with low potential for innovation, they remain, from our perspective, invaluable. Traditional methods for data collection, when they are systematically and carefully used and triangulated, bring value that cannot be extracted from other innovative sources. Value and innovation do not always go in the same direction.

Finally, in terms of citizen and community engagement, the experiment provides opportunities for locals and visitors to learn about the local food system and to apply this knowledge for their own purposes, such as identifying potential food supplier partners or knowing where to buy local food. Beyond its scientific and policy implications, this experiment offers a tangible societal impact.

Implementation

Implementing the experiment

A chronological summary of the key implementation steps is set out in Table 88. Further detail on specific practical aspects, such as the meetings held and decisions taken, is described in Section Developing the data experiment.

Table 8 Timeline of the experiment

Period (2024)	Activities	Results
January	Mapping agri-food actors	Map of actors
February	Draft data experiment agenda	Data experiment agenda
March	Identifying sources of data and data collection methods	Data collection and Fieldwork plan
April	Fieldwork in Apriltsi, GIS development	First version of the GIS, questionnaire integrated into the GIS and 16 interviews
May	Fieldwork in Troyan, GIS development, engaging restaurants to participate in the experiment	GIS improvements, 26 interviews, 2 selected restaurants and interviews with them, development of materials describing the fieldwork published on the RUSTIK website
June	Fieldwork in Ugarchin, GIS development, preparing the experiment with restaurants	GIS improvement, 2 booklets of restaurants' local suppliers, 2 local food menus, 2 e-dairies, one questionnaire and 13 interviews
July	Launching the experiment with restaurants, GIS development	Training the restaurants' staff how to use local menus, booklets and how to present the project to their guests





Period (2024)	Activities	Results
August	Transcription and review of interviews, guiding the experiment with restaurants, GIS development	13 transcribed and reviewed interviews, 4 weekly calls with restaurants; development of materials describing the fieldwork activities published on the RUSTIK website, coding data from questionnaires
September	Transcription and review of interviews, guiding the experiment with restaurants, GIS development	42 transcribed and reviewed interviews, 4 weekly calls with restaurants, translation of the GIS into English, coding data from questionnaires
October	Coding methodology, selection of data coding software, end of the experiment with restaurants, GIS development	Final set of transcripts, 2 meetings to discuss coding methodology, 4 weekly calls with restaurants, coding data from questionnaires
November	Reporting	D 3.2 Report on the implementation of data experiment

Adaptations

The only element that has not been discussed in this report is related to the decision regarding data sources and methods we chose not to explore. As previously mentioned, the first step of our data experiment was to define a map of agri-food actors. In the first draft version of the map, households were mentioned as specific food-related actors. Households in Bulgaria are very important food producers, a legacy of the communist era (Creed, 1998), and this role remains vital even today in the form of the so-called ‘economy of jars’ (Smollett, 1989). Our initial idea was to include rural households in the experiment to get data about family gardens and home-made foods that are used to feed the domestic economy but also for social purposes (exchange, donation). However, during the third meeting in March 2024, the LAG TAU partner suggested not to include them because of the high likelihood of the households refusing to fill in diaries about their food-related practices. Another argument for excluding them from the experiment was that it is difficult to define the specific local food-related policies that directly address households in rural areas. Table 88 summarises the activities and milestones of the experiment.

Other Living Lab activities and achievements

The TAU partners made extensive efforts to communicate information about the experiment and share some interim observations and fieldwork findings. We started with the publication of the [booklet on organic operators working in the territory of TAU](#). We found that many people in the area are interested in developing organic farming activities but are unable to access information about other organic farms and their activities because the register of organic operators is not machine-readable nor searchable by settlement.

To build trust with the local population, we needed to publish information about the experiment before analysing the collected data. We consecutively developed three information materials dedicated to our fieldwork activities in the three municipalities: [Troyan](#), [Apriltsi](#) and [Ugarchin](#). We then prepared an information sheet about the [GIS platform](#) and the experiment with the [restaurants](#). Additionally, we also published the [two booklets](#) developed together with the





[restaurants](#) and their networks of local suppliers on the TAU webpage within the [RUSTIK site](#). These eight communication activities were noticed by the Bulgarian Telegraph Agency's (BTA) regional bureau, which contacted us to request an interview with the LL coordinator to publish an article dedicated to RUSTIK activities in the TAU area. The BTA material is accessible [here](#).

In April 2024, the TAU partners, in collaboration with RUSTIK partners from Serbia, organised a joint regional workshop in the Zaječar pilot region, Republic of Serbia. The visit entailed discussions and testing of different research materials and possible joint analysis.⁸

Preliminary results

Results to date

Figure 1313 below illustrates the data we collected using the sources and methods described in above. In this results section, we focus solely on the topic of informality, as it is among the primary objectives and research questions of our experiment. This objective is in line with the production function aiming to further develop the local food sector and with the policy assumption that local food policy needs to be developed in the PR area to achieve the transition from exogenous to neo-endogenous development. The purpose of this stage is to demonstrate how the triangulation of different data sources helps to better understand the local food systems.

Our primary research question and objective are related to the analysis of informalities (informal practices) in the agri-food sector both as barriers to further develop actors' activities but also to sustain local food networks and promote regional food quality.

Informalities: Triangulating data from interviews, observations and registers

The first step of our experiment was to create a map of actors to identify different groups of agri-food actors, to recognise them as distinct entities, and to select potential respondents to be interviewed and invited to participate in the experiment. The main criterion for selecting the interviewees was to capture the widest possible range of agri-food activities. For example, within the group of farmers who do not formally process their products, we selected those involved in vegetable and red fruit production, orchards, sheep, cattle, snail farming, etc. The aim was to maximise the diversity in agri-food practices as much as possible while identifying common and shared elements. Farmers who processed their products were selected separately, also following the diversity criterion. Among the food processors, both those with and without their own farms were chosen. For the processors, the criterion of diversity of agri-food activities was also applied. Thus, they included producers of bread, meat products, wine and spirits, snails and others. For the food retailers and restaurants, the criterion of diversity was also applied, selecting those that offer products from local producers and those that do not.

⁸ Information about this regional workshop is available on the RUSTIK website: <https://rustik-he.eu/2024/05/enhancing-rural-development-through-innovative-data-experiments-collaborative-efforts-of-rustik-living-labs-on-the-balkan-peninsula/>



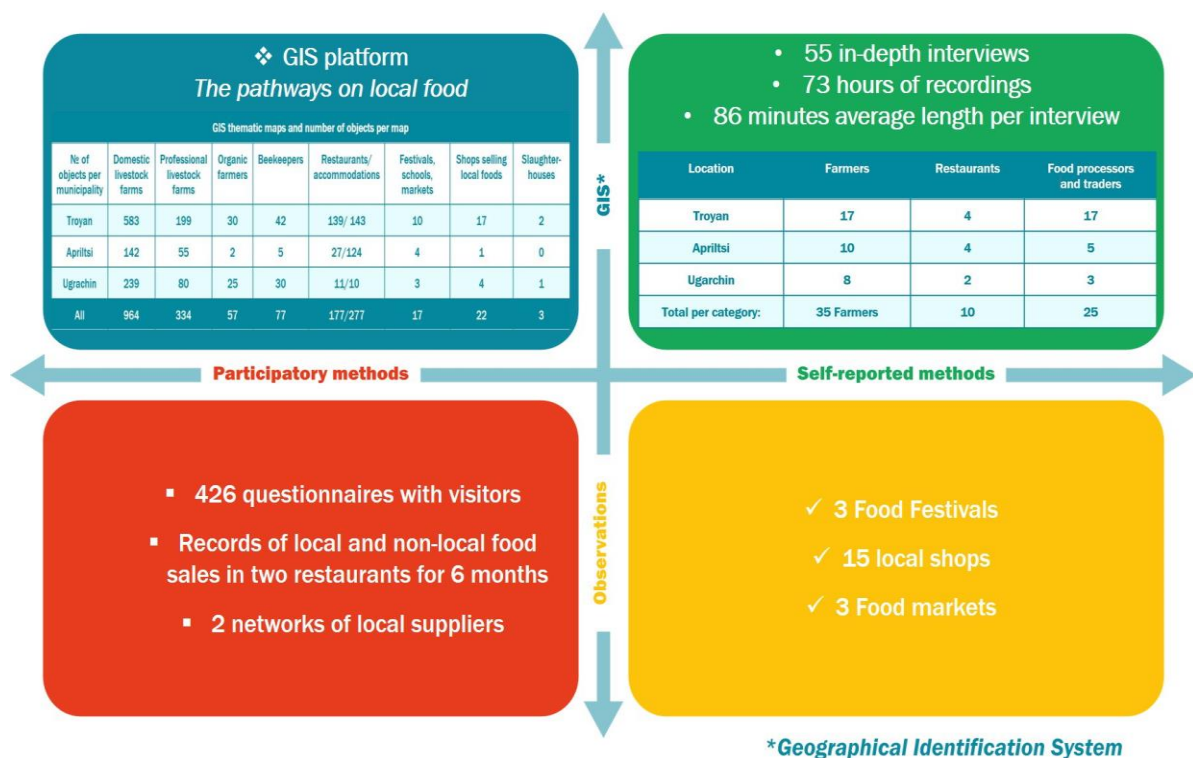


Figure 13 Methodology and results of the experiment

Informalities as barriers to boost local food cooperation

Informality and local cooperation are common issues for all these different agri-food producers. Informality is primarily associated with the inability to legally offer high-quality local products, creating a need to achieve better quality through informal means. Most food producers (whether farmers, processors or traders) have entered the agri-food business because they want to provide a quality product. Many have prior experience in food production and are disappointed by the low-quality standards. Others have school-age children and are dissatisfied with the quality of food offered in schools or frustrated that the fresh and seasonal primary agricultural products they produce (e.g. milk) are used to produce lower-quality packaged food by the local branches of multinational companies. Many see a specific market niche in the production of high-quality, fresh food that is as close as possible to natural and traditional production methods and is linked to the territory. However, when they start their business, they often encounter various barriers that prevent them from achieving the quality they want. So, the local relevance of the experiment is seen as an opportunity to find a data-driven solution on how to unlock this food-related potential.

Example 1:





A young family investing in meat products, highly trained in food technology, decides to revive an old recipe for traditional sausages using local ingredients. They prepare documentation to apply for the registration of products with proven geographical origin (PDO – protected designation of origin and PGI – protected geographical identification),⁹ but face opposition from the meat producers' trade association and the Ministry of Agriculture. A major meat producer is advocating for a TSG - Traditional Specialities Guaranteed registration - that would allow all meat processors in the country to use the regional brand and recipe to produce the same product. This undermines the family's opportunity to develop a locally protected product with a registered label, establish sustainable cooperation with local suppliers of primary agricultural products, and support the registration of a territorial food brand. (Interview with food processor)

Example 1 is an illustration of how EU food quality policies are implemented in the pilot region in a way that does not support short food supply chains within local food networks but rather complicates them. Food producers aiming to achieve quality often do so without any specific registration or label, relying on their name and social reputation. Thus, quality food in the territory is a matter of social reputation and locally established food networks rather than a result of the implementation of a specific policy. This situation limits the visibility of these local actors outside the territory, restricting their ability to fully benefit from their products and to bring additional benefits to the PR territory.

Informalities to produce premium quality local food

We have not found in the interview data a food producer that does not use informal practices to achieve a better-quality product offering. However, these practices are most visible in restaurants. To offer traditional food made from local produce, they work with networks of informal suppliers, who are mostly not registered farmers but grow a variety of produce in their home farms. The restaurants trust these producers, and they supply them regularly with fresh produce in small quantities. There is no legislation in the country to regulate the market of home-grown produce. This creates barriers to short food supply chains and encourages the informal economy. Restaurants prefer to pay fines for unregistered food rather than to get produce that does not satisfy their quality standards. Yet, it is also important to note that data from the weekly bulletins of the District Health Inspectorate and the District Food Safety Administration reveals no identified cases of food safety violations.

Example 2:

A restaurateur mentions that his favourite dish is a rooster soup, but roosters are either not commercially available, or if they are, they are not of the breed that provides the desired taste and qualities. For this reason, the restaurateur buys 3-4 roosters a month from an unregistered farmer. These purchases are made without any invoice/documentation and to justify this expenditure, the restaurateur either pays a fine or uses a fake invoice from a friend. (Interview with restaurant owner)

Local food networks are sustained thanks to the types of informalities illustrated in example 2. In one of the restaurants selected to participate in the experiment, it was challenging to identify

⁹ https://agriculture.ec.europa.eu/farming/geographical-indications-and-quality-schemes/geographical-indications-food-and-drink_en





registered food producers and suppliers for inclusion in the restaurant's information booklets because most of the suppliers are not officially registered as food producers. This ambiguity both sustains local food networks through informalities and prevents them from becoming visible and forming together a cohesive local food brand that could add value through cooperation. This is one of the puzzles found in the experiment.

The register data that was transformed into spatial and was integrated into the GIS platform confirms that there are many unregistered domestic farms among the suppliers of restaurants, guest houses and food processors. Solely in Apriltsi, there are 142 farms, but only 58 are officially registered as farms, while the rest operate under the control of the Food Safety Agency (domestic holdings). The number of these domestic farms may be even higher as the GIS data on domestic holdings provided by the Food Safety Agency has significant gaps – about 20% of all declared farms in the registers could not be identified.

Having these figures and findings in mind, we expected that many local farmers would sell their produce at the Beacon and Brandy festival in Apriltsi. However, we were surprised to find only 12 local food producers among the 144 stands. At the same time, outside the official festival area, we observed many food producers selling their products. These unregistered local food producers were afraid to become subject to regulatory control and thus preferred not to be officially presented at the festival, instead selling their food informally. It seems, however, that informalities are not perceived as barriers. Instead, they are seen as practical solutions for small-scale food producers, as food production is often not their primary occupation. Among these informal producers, we found individuals with varied professions - a policeman, a worker in an industrial plant, a worker in a local water supply company and various other profiles – meaning that food production is an auxiliary activity for many. This is a typical and traditional characteristic of families living in rural areas. At the same time, of the 58 registered farmers, only four chose to pay to have their own stand at the festival. The phenomenon of missing local farmers during local food festivals could be explained by the fact that some of them practice agriculture but do not produce market-ready products, while others do not need festivals to sell their produce. All these observations suggest that local food policies are missing or are not well-articulated, and food is not perceived as an instrument for territorial development, either in terms of taxes or as a specific territorial asset that could bring additional value to local food networks. Missing or non-articulated food policies lead to the “normalisation” of such informalities, since they are interpreted as a reasonable solution.

The data that we have collected indicate that local food should be a specific topic in the local policy agenda and with the potential to further support local development. This observation is in line with the above-mentioned theory of change diagram.

Robustness and limitations

A limitation of our research is related to the fact that we cannot measure the share of the informal sector within the local food system. This is probably unnecessary as it is continuously changing and may not contribute directly to the formulation of policy solutions. We believe that qualitative data is more robust if the purpose is to understand different types of informalities and identify ways to address them in a way that will not prevent actors from cooperating or to produce local food but will encourage them to become more visible to the external public (market) as well as for the local tax system.





Part 3: Reflections and learning

Reflections on data sources, methods, and tools

Data issues and obstacles during the experiment

Regarding data access and registration, we encountered three main issues. First, some of the public data registers maintained by institutions such as the Ministry of Agriculture and Food are not machine-readable, preventing the use of machine-based methods. For these sources to be used by local policymakers, considerable research skills are required. For example, if the LAG is interested in knowing more about the development of organic farming in the TAU area, LAG employees will not be able to find this information in the register of organic operators. Significant additional research efforts are needed to identify relevant data, extract it and make it usable.

Second, data from the registers of livestock holdings maintained by the Bulgarian Food Safety Agency proved challenging to geolocate objects due to the incorrect geographical coordinates for about 20% of the sites. Converting registered data into spatial data using the GIS system allowed us to identify and exclude erroneous sites, retaining only those whose coordinates matched.

Third, working through the subcontractor created certain technological difficulties. Mandarb, the company subcontracted for GIS development, has experience in creating such applications, but this experience has been gained mainly by working in commercial platforms and creating maps to locate uniform objects in urban environments with clear coordinates that are easy to verify. Working with open-source platforms like QGIS proved to be a challenge for the subcontractor. The need to adapt off-the-shelf solutions delayed the launch of the system by two and a half months.

The data problems we have experienced do not interfere with our work on the experiment, but the opposite. Our work has tried to fill some of the gaps and provide new knowledge to local policy actors.

The two restaurants collecting data, as well as some of the respondents we interviewed, have identified new partners thanks to the information we provided. For some of them, the data was challenging to process because it was not positive for certain aspects of their performance (e.g. one of the meat processing entrepreneurs was disappointed to learn that his products were not as highly ranked in the region as his competitors' products). This kind of learning is very important for us, as it gives an idea about data gaps. For example, we found that at the local level, there is a lack of data on the agri-food sector and that actors often rely on word of mouth produced by their local networks rather than official information. Accepting the data findings of the experiment is often one of the most challenging issues for the local actors. This is especially true for those who feel that they are doing a lot for the region and that they are doing their job in the best possible way. We learned from their reactions that good marketing and financial results, together with executing community support initiatives, do not always go hand in hand with the production of high-quality, sustainable food. Therefore, we found that food is a topic that helps us learn a lot about the intersections between subjective perceptions of community support and food quality.





Managing data issues and obstacles

We found different solutions to address the above-mentioned data issues. To resolve the issue with the data from the register of organic operators, we created a matrix for data coding to extract relevant data. This matrix will be used by the PR partner to update the data annually, providing a closer look at developments in the organic sector at the regional level. This matrix could be shared with other LAGs and other types of organisations to collect data from this register. Regarding the inaccurate GIS data about the livestock holdings, we decided not to locate these sites and instead report the issue to the Bulgarian Food Safety Agency. Regarding the GIS platform development, the subcontractor managed to solve the technical problems encountered, and we were able to provide a link with all data integrated into the platform to be added to the RUSTIK Viewer by the MCRIT team.

Pilot Region Partner's perspective on data

The pilot region partners learned a lot about their region from a food perspective. For example, the organic sector was unfamiliar to them, as well as the operation of local agri-food networks that supply the local restaurants. Additionally, the data on the importance of the agri-food sector for the region was new to them, together with the insights provided by local food actors during the interviews. At the time of writing the second LL report, all the data collected by the USOFIA team had not yet been transformed into an accessible format to the PR partner. This will be done during Cycle 3. The main concern of the PR partner is how to use this data in practice, as their LEADER local development strategy has not yet been approved by the MAF (the strategy was submitted at the end of 2022) due to the unstable political context previously explained.

Experiment design and implementation

Strengths and successes

The data experiment conducted at TAU PR is very complex. The design took two months of preparation and almost seven months to be executed. We would certainly not have been able to carry out this experiment in all its complexity without the synchronisation of actions between the two partners, a clear allocation of tasks, adherence to deadlines, flexibility in decision-making and clear objectives. Good planning of the fieldwork was a key milestone in our work, leading to successful data collection.

Skill development and capacity building

Skills developed

The LAG TAU partner learned and applied different skills to locate and access data, particularly data from public registries, to develop and programme questionnaires, code data in the Maptionnaire platform, transform visual data into numeric data, register and verify spatial data in a GIS platform, and transform registry data into spatial data. The partners used SONIX, a data transcription software, and the USOFIA team is, at the time of writing is starting to code qualitative data in ATLAS.ti 24.





The skill of conducting in-depth interviews should also not be underestimated, as it allowed local agri-food actors to express their perspectives on the functioning of the food system. Finally, the ability to engage restaurant partners in a real-time collaboration data experiment proved extremely valuable and useful for them as they have learned to analyse data from their own sources and to make decisions based on this analysis. Most of the skills mentioned above were acquired during the development of the experiment. These include, for example, working with the Maptionnaire platform, as well as working with the GIS platform and transforming data from registers into spatial data.

USOFIA and its Department of Sociology are known for their practice-oriented training of students through participation in ongoing research projects. The two undergraduate students have had the opportunity to participate in the implementation of the experiment from the beginning and will continue to be involved in the activities of Cycle 3. They have been trained on how to design a research experiment, how to collect data from different sources, and how to process and analyse data. They have also been trained to use participatory techniques and to work with practitioners, which is extremely rare and valuable. Finally, they were trained to distinguish between academic research and policy research.

Capacities

The thematic focus on food also contributed to capacity building in the field, offering insights into the sector and its specific characteristics. The location of the pilot region in a mountainous and semi-mountainous area further provided an understanding of the challenges and impact of the natural features of the region on the agri-food sector. Additionally, the partnership with the LAG allowed USOFIA to gain insights into the functioning of this type of organisation and better align the experiment with local policies that fall within the scope of the LAG's activities and LEADER approach.

Innovation and impact

Reflections on innovation

As innovations require time to demonstrate their effectiveness and impact on different communities, it is difficult to talk about innovation in the strict sense at this stage. However, the following elements can be highlighted as having the potential to become innovations. First, the process of collaboration between the LAG and the academic researchers is beneficial because it has enabled the LAG to go beyond its usual daily tasks and become part of a data experiment with practical applications for its work. For USOFIA, the project required researchers to adapt research interests and support local partners and their policies. The partnership as a working model could be multiplied in new and different projects and promoted as a specific working model within the LAG network across the country.

Second, the GIS platform is the most significant new contribution, as it can be used by the LAG internally but also by external individuals and actors who can benefit from the information it provides. The platform and the data collected are the basis for the partners to apply for further funding to potentially develop and scale the platform as a product or service to third parties and other regions.





Third, the platform can easily be extended to other areas to work at NUTS 2 and 3 levels. Partners presented the platform during the World Food Day celebrations in Bulgaria in 2024, raising discussions about its potential for broader application. The GIS platform was awarded by the [SMARTOURISM](#) annual conference on 27 November 2024, organised on behalf of the Ministry of Tourism as providing new tourism-oriented services by identifying and locating places where local food could be accessed by tourists both to taste and to buy. oriented services by identifying and locating places where local food could be accessed by tourists both to taste and to buy.

Finally, the restaurant experiment is also an original approach in that it is already bearing positive outcomes, such as more consumers connecting with the restaurant suppliers and, as such, extending the benefits through the short food supply chains. The model and the instruments developed to promote small local food producers could also be multiplied in other areas. By registering the last data in their e-diaries, the two restaurants and a couple of their suppliers asked us: “So, what’s next?” These reactions, received from the partners engaged through the LL approach, give a clear indication of the usefulness of the experiment.

Short-term impacts

The restaurants have been recognised in the region for their unique approach to local food, and the experiment has further increased their popularity. The network of local restaurants’ suppliers for these restaurants has expanded their customer base thanks to the increased visibility they have acquired. Some of the interviewed respondents took the opportunity to learn more about the local food system by asking for details about the specific types of data they were exposed to.

Longer-term impacts

A long-term impact of the experiment may be the design and development of a targeted local food policy within LAG TAU’s local development strategy. The policy could include at least four specific initiatives, aiming at supporting:

1. Collaborative activities among the agri-food actors, helping them to make the transition from agriculture to food-related activities. Collected data has helped to identify groups of agri-food actors that could perform such transition either individually or as collective bodies.
2. The establishment of a “local food promoter” contest and a label for restaurants that give visibility to their networks of local suppliers.
3. Further support for sustainable food-related activities, such as organic farming and pastoralism.
4. Support local food brands based on three criteria: food origin, sustainable food production practices, and traditional culinary techniques. The design of such local food policy would itself be an innovation directly influenced by the RUSTIK data experiment.

Potential for sharing learning

Different elements of the data experiment could be directly applied in practice with the potential for a broader territorial scope. For example:

- Agri-food-related data registers are available for other parts of the country, and they can be integrated into the GIS platform.





- The data matrix used to extract information from the register of organic operators can be shared with other LAGs in the country so that they can extract comparable data and support organic food production.
- The methodology for promoting collaboration between local restaurants and their supplier networks can be shared with other LAGs to support collaboration among agri-food actors.
- Opportunities to replicate each other's tools and idea exchange with the FoodScapes team from the Granular project are to be tested, as well as with two other labs (one RUSTIK, one Granular) working on the topic of rural food systems.
- Opportunities to cross-replicate instruments among other RUSTIK partners.

Other tools developed in the experiment hold potential for academic and scientific transfer rather than direct practical application (see next section).





Part 4: Future steps

Cycle 3 plans

The next steps relate to the three commitments for which the experiment was designed and carried out as described. The first commitment is about the analysis of the recorded data. The analysis should lead us to two concrete, practical outcomes:

1. To present findings at conferences, to gather feedback on the innovation of the experiment, and subsequently to prepare analyses for publication in academic papers.
2. To extract insights from the analysis to design concrete measures and actions that would benefit the work of the pilot region actor.

The activities under the first priority will support the design of measures to implement local food policies. The second commitment requires updating the data collected during the experiment (including developing a new layer in the GIS) and gathering feedback from the actors in the Living Lab, particularly from those who constitute its second and third circles of stakeholders (see Stakeholders.). The third commitment concerns the dissemination of the project results to a broader audience. During the implementation of the experiment, considerable effort went into disseminating information about the experiment process. The next step is to disseminate results, ideas and recommendations derived from the experiment.

Future collaborations

The experiment has produced specific collaborative processes and also tangible products in the form of data registration methods, a GIS platform and tools for creating experimental collaborations. All these products and processes were developed for the first time, and preliminary feedback indicates that they are useful with a potential for further improvement. The challenge for the partners in the project, but also for the stakeholders involved in the process of implementing the experiment, is now to seek new and additional funding to further develop the GIS system so that it functions as a decision-making tool, and a citizens' platform where agri-food actors can express opinions and discuss proposals. The platform could also be developed to function as a market platform, but new stakeholders should be engaged to develop this endeavour.

Communication and dissemination

As highlighted above, disseminating the results will involve reaching different audiences and using different genres and formats. In terms of scientific conferences and publications, we plan to participate in at least two international conferences - the European Society for Rural Sociology conference in Riga in July 2025 and the International Mountain Conference in Innsbruck in September 2025 - as well as to publish at least two papers with data from the experiment. In terms of wider dissemination of the results, we are planning two publications in national media with a specific interest in agricultural policies and rural areas, the weekly *Capital* and the specialised platform *Agrozona*. *Agrozona* is also a media partner in the CAP Green Zone Rural Up project, co-funded by the European Commission.





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Finland: North Karelia

Antti Tiilikainen & Timo Leinonen





Summary and overview

North Karelia, situated in eastern Finland, is the easternmost region within the continental EU, positioned approximately 450 km away from the capital city, Helsinki. With a population of 162,540 individuals, North Karelia has a sparse population density of 7.1 inhabitants per km². About 50% of North Karelia's population resides in rural areas, highlighting the region's predominantly rural character.

Data experiment

The data experiment seeks to help companies and policymakers to enable North Karelia to retain its foreign migrants, thus reducing population decline. Accordingly, its Theory of Change is based on a two-pronged approach. On the one hand, it assumes that by helping companies develop their skills to integrate foreigners into the workplace, we can encourage more foreigners to stay in the region, and on the other hand, it is assumed that with better and more accurate information, municipalities can alter their policies to retain foreigners more effectively. The North Karelian data experiment has focused on understanding the situation of immigrants living in North Karelia, namely in the municipalities of Joensuu, Kitee and Tohmajärvi, through an immigrant well-being questionnaire, and by examining the challenges that companies face when trying to recruit and integrate immigrants into workplaces. These two strands of inquiry will help municipalities develop more suitable and effective policies and companies to improve their capacity to hire immigrants. Both actions seek to keep immigrants in North Karelia in the long run.

Preliminary results

The well-being questionnaire produces data that has policy implications and can help local policymakers make more suitable policies. It complements the data municipalities will receive from the new immigration-related databases starting from 1.1.2025 and enhances their knowledge of the needs and requirements of the immigrants living in the abovementioned municipalities. Company interviews and best practices are still 'work in progress' and have not yielded any tangible results yet.

Key learning to date

The networking effort has been very strong. There are several relevant actors in North Karelia in the field of immigration, and cooperation with them has been crucial. Coordination in the field of immigration has room for improvement, as the number of relevant actors is large. Employment is the key factor in immigrants' decision to stay or move out of North Karelia, and the region remains an attractive destination, especially for international students.

Next steps

The living lab will continue conducting business interviews and compiling the data package for companies to foster improved integration of foreign workers into local businesses. The immigrants' well-being questionnaire will be offered to additional municipalities to receive further feedback about how to possibly develop it further or adapt it to specific purposes.





Part 1: Living Lab context

Pilot Region introduction

North Karelia is a NUTS3 region located in eastern Finland, 450 km from the capital city Helsinki. It has a total area of 22,903 km². North Karelia has a 300 km frontier with Russia, and it is the easternmost region of the continental EU. The population of North Karelia was 162,540 as of 31.12.2022. North Karelia consists of 13 municipalities. Joensuu is the main regional centre and a university town with a population of 77,513 (48 % of the regional population). All the other municipalities are considered rural according to the DEGURBA classification.

The population of North Karelia is declining, and since 2010, it has declined from 169,000 to 162,000. At the same time, the amount of foreign language speakers in the region has grown considerably from about 4,000 to 9,300, and their share of the total population has grown from 2.4% to 5.7%. In 2022, the net migration of foreign nationals to North Karelia was +1,063 individuals, but 560 foreigners moved to other regions of Finland in the same year. Russian (4,596), Ukrainian (586) and Arab (422) were the three largest foreign-language groups in North Karelia in 2023.

Functions

An overall depiction of all functions in North Karelia is found in the first living lab report, whereas this report is focused on the functions most vital for the chosen transition.

Even if the population of North Karelia keeps decreasing, the number and share of foreigners in the region will keep growing. Therefore, the presence and retention of immigrants are crucial in maintaining population numbers.

The most important characteristics of the Pilot Region related to this phenomenon are closeness to Russia and the presence of Russian speakers already living in the region, high-quality education institutions in the region, and the consideration of Finland as a safe country with a highly regarded education system. The number of foreign-language speakers in North Karelia has more than doubled since 2010, and so have the students with foreign backgrounds in North Karelian education institutions. Their share has doubled from 5.3% in 2010 to 11.5% in 2022. This share is probably even higher as of 2024 due to the Ukraine war and Ukrainian refugees in North Karelia. The figures follow a national trend, and North Karelia does not stand out from the average, but the variation between Finnish regions is considerable.

Immigrants, much like the population in general, are unevenly spread in North Karelia. Joensuu has by far the highest number of immigrants in the region, with over 5,700 of them living there in 2023. Kitee (757) and Lieksa (587) are second and third in terms of the presence of immigrants. In other municipalities, immigrants are very few, such as Polvijärvi and Rääkkylä, hosting only 63 and 85 immigrants, respectively.

The share of immigrants per municipality ranges from 1.6% in Rääkkylä to 7.8% in Kitee. Tohmajärvi, the third municipality where the immigrant well-being questionnaire has been submitted, has about 240 immigrants, accounting for 5.9% of the population.





Resources that municipalities can devote to immigrant services and integration vary greatly between municipalities. International House Joensuu, the immigration service of the City of Joensuu, has 12 staff members, while Kitee and Tohmajärvi have a shared immigration coordinator. In small municipalities, it is common for one person to have several duties, and immigration might represent only a small percentage of their work time.

Transitions

Of the identified transitions, socio-economic transition, and especially immigrant retention, was chosen to be the focus of the North Karelian living lab. This transition was selected partly because the Regional Council of North Karelia is already engaged in addressing the other two transitions and principally because immigration and integration were matters that have not received the attention they deserve. Immigrants are overrepresented in outmigration figures, which is also a brain drain because North Karelian education institutions attract large amounts of foreign students to the region. Focusing on this transition allows the region to retain not only more young people but also skilled people.

Living Lab partnership

The Pilot Region Partner is the Regional Council of North Karelia. It is a public body that is under the political guidance of the municipalities of the region. By law, regional councils perform ten different tasks, the most important of which, regarding RUSTIK and the chosen transition, are planning and executing a long-term regional plan, enhancing the operational environment for local businesses, promoting smart specialisation and improving cooperation between municipalities and within the region. Other notable tasks include making the regional land use plan, lobbying, and directing funding. Municipalities fund and guide the regional council, and it promotes their interests nationally and internationally, such as lobbying at the Finnish government and the European parliament.

The research partner is the Karelia Institute from the University of Eastern Finland (UEF). UEF is a multidisciplinary university that operates on two different campuses, Joensuu and Kuopio and has over 16,000 students. The Karelia Institute is situated in the faculty of social sciences and business studies, and it focuses on three research areas: regional and rural studies, ethnicity and culture, and borders and Russia. Researchers from regional and rural studies are involved in the RUSTIK project.

Living Lab challenge

The North Karelian Living Lab (LL) seeks ways to retain a larger portion of immigrants in the region. They are overrepresented in outmigration, and they are also often professionals educated in local institutions. The challenge for companies is their ability to employ and retain foreigners, and for municipalities, the lack of knowledge about immigrants' needs and requirements.

Rationale and research questions

The decision to choose this transition is based on the changing demographic situation in North Karelia. The population is getting older, the worker shortage is growing, and it is getting severe in some trades, especially in social and healthcare work. Immigrants are twice as likely to migrate





out of the region compared to Finns. The geopolitical situation has compounded the effect, and several businesses have suffered consequently. For the future and livelihood of the region, it is important to be able to retain as many as possible of the immigrants that are arriving in the region.

In the North Karelian transition narrative, the following research questions were laid out:

- What is the status of immigration and integration promotion services in the North Karelian municipalities?
- How can the introduction of new forms of data into the policy process support targeted integration promotion in the municipalities?

The first question has since been altered. After going through immigration programmes from all municipalities, having conducted talks with key stakeholders, and gaining a deeper understanding of the operational environment and the new Integration Act, it became evident that just having a description of the status of immigration and immigration services in North Karelia would not be a sufficient course of action to achieve the desired outcomes as laid out in the North Karelian LL Theory of Change. This line of enquiry initially meant to finish with the analysis of the immigration programmes, was integrated with the following question:

- How can municipalities be supported in their attempts to fulfil the demands of the new Integration Act?

The new Integration Act demands that municipalities report back to the regional Centre of Economic Development, Transport and Environment at least every two years on the following themes:

- Employment
- Education
- Wellbeing and health
- Accommodation
- Participation
- Equality
- Maintenance of culture and language
- Good population relations

The immigration programmes revealed that currently, municipalities have virtually no record-keeping or indicators to follow integration and are thus poorly prepared to face the requirements of the new law.

Policy relevance

The only new major piece of policy to come out since the LL developed its transition narrative is the government programme for Petteri Orpo's government (2023). It promotes work-based immigration, especially for highly educated social work and healthcare professionals, export businesses and seasonal labour and looks at ways to keep them in the country.

The LL transition challenge will help municipalities fulfil their new duties as per the Integration Act, and at the same time, the tool developed in the data experiment should be feasible for municipalities with greatly varying levels of resources for integration work. The transition challenge also addresses several work-related policies (A New Direction for Eastern Finland Vision





and Action, The North Karelia 2040 Strategy, The Regional strategic programme for North Karelia 2022-2025) by enhancing companies' capacity to recruit and retain workers with foreign backgrounds.

Stakeholders

Key stakeholders to date include the North Karelian Centre for Economic Development, Transport and Environment, International House Joensuu, immigration coordinator for Kitee and Tohmajärvi, City of Joensuu, Jomoni (NGO focusing on integration), Talent Hub Eastern Finland project and its informant companies. Important future stakeholders are other municipalities in North Karelia and further informant companies. All these actors are related to immigration and integration in some way.

Theory of change

The Theory of Change is based on a two-pronged approach. On the one hand, it assumes that by helping companies develop their skills to integrate foreigners into the workplace, we can make more foreigners stay in the region, and on the other hand, it is assumed that with better and more accurate information, municipalities can alter their policies to retain foreigners more effectively. With these two actions, it is assumed that the region can retain a larger share of current immigrants in the long run.

Data relevance

As previously identified, there is a wealth of statistical data on immigration, but at times, this data is old or does not cover the municipal level. More qualitative data is required to better understand the causes of success in affecting the chosen transition. Previous data lacked North Karelia-specific figures in many places, and immigration programmes of municipalities had no indicators to show how effective integration in North Karelia was. Official statistics about migration and employment were the best proxies for evaluating integration, but they do not show causation. New data with better granularity is needed to cover the municipal level and to better understand the experiences of immigrants in North Karelia. The immigrant well-being questionnaire's preliminary results have already impacted the living lab's plans and actions and have gathered interest from the city of Joensuu.





Part 2: Living Lab Cycle 2: Data experiments

Data experiment

Developing the data experiment

The demanding demographic situation of North Karelia is a well-known issue in the region. The regional development director of the Regional Council of North Karelia (RCNK) steered the living lab to choose the socio-economic transition. RCNK is already engaged in digitalisation and environmental issues in many ways, but immigration has had less attention so far. In talks with key stakeholders during spring 2023, it was found that socio-economic development has overlapped with other transitions, such as (increasing) elderly populations' digital skills or the workforce available for the renewable energy industry. Periodically, this decision also coincided with legislative changes that changed responsibilities regarding integration and employment. Municipalities will receive new responsibility to arrange employment services starting 1.1.2025, and at the same time, the new Integration Act will require municipalities to gather more detailed data about immigrants and their situation.

Preliminary talks with key socio-economic, digitalisation and environmental stakeholders were conducted in the spring of 2023, and the decision to focus on immigration was made after that. In the autumn of 2023 and early winter of 2024, several discussions were had with International House Joensuu (immigration services of the city of Joensuu), North Karelia Centre for Economic Development, Transport and Environment, The Centre of Expertise in Immigrant Integration and KEHA-centre (developer of the new integration and employment digital systems). These talks were instrumental in understanding immigration and integration in Finland and finding the challenges the actors face. Analysing North Karelian municipalities showed how poorly prepared they were for the new Integration Act and its reporting demands. They will report to the regional Centre for Economic Development, Transport and Environment and in talks with the North Karelian centre, the living lab coordinator raised the issue of data compatibility. International House Joensuu tried to conduct a questionnaire survey to gather data from its customers, but its content was not up to standard for the new Integration Act. From these discussions, it was decided to design an immigrants' well-being questionnaire for North Karelian municipalities, and this was done in close cooperation with International House Joensuu and the North Karelian Centre for Economic Development, Transport and Environment. Later, the well-being questionnaire pilot was extended to Kitee and Tohmajärvi, of which Kitee has a sizeable immigrant population.

In late August 2024, it was found out that municipalities will fulfil their new reporting duties with register data that the new KotoDIGI system gathers. This means that the well-being questionnaire will play a supplementary role in reporting needs, and its primary role would be to support policymaking.

Preliminary results of the questionnaire showed that employment is the key factor that keeps immigrants in the region, and from this, it was decided to branch out to develop an information package for companies. The package will be a concise description of the best practices that North Karelian companies utilise and of different services available for companies to help integrate foreign employees into the workplace. This package is aimed at improving companies' capacity to hire foreigners and, through this, positively impact the demographic situation in the region.





Experiment description

The data experiment attempts to build a tool that municipalities can use to gather data for reporting purposes and policy development. As revealed by the municipal immigration programmes, they do not gather comprehensive or detailed data on immigrants. The questionnaire will gather both qualitative and quantitative data to be combined with existing statistical data, and this will enable municipalities to perform analysis previously impossible. At this pilot stage, only one local municipality was involved in the design. If municipalities want, the questionnaire can also be modified to suit other categories of the population because it covers themes that are not immigrant-specific. The questionnaire has three themes: services, well-being and location. The service's theme asks about the use and usefulness of several different public and private services. Well-being is about the integration of immigrants and how they feel about their new home. The location asks whether the informants see themselves living in that location in the future and what are the best and worst aspects of their current place of residence.

The data experiment attempts to bring new data sources to a context that has previously had very few measuring practices and indicators. International House Joensuu, which would be the largest end-user for the well-being questionnaire, brought up the need for such a tool in one of the discussions in January 2024, so it is evident that there is demand for this tool. The contents of the questionnaire combined the geographical outlook (location theme) with themes that municipalities need to report back on (services and well-being). This combination allows municipalities to use the data for better place-based policy development.

The other strand of the data experiment is to gather best practices about recruiting foreigners into North Karelian enterprises and to combine this with other knowledge that can help improve companies' capacity to hire foreigners. Business Joensuu reported that there was no data collection from their client companies about this issue, and the city of Joensuu's employment office reported that there is significant room for improvement in companies' capacity to hire foreigners, especially when it comes to workplace orientation.

These two strands of data collection and their synthesis provide a novel source and composition of data not existing in immigration work before. The living lab coordinator has collected and compiled the data for different actors to put into action.

Experiment objectives

The most important objectives for the data experiment are:

- Develop a tool for municipalities to gather data on immigrants for more detailed decision-making and reporting.
- Increase employer awareness of integration processes and the support they can receive for it.

Relationship to theory of change

The data experiment and the theory of change are very closely related. Data collected with the immigrants' well-being questionnaire has impacted and verified the assumptions that underlie the theory of change. It verifies the key role of employment in immigrant retention, and so the bridge from action to results can be said to be based on empirical data and not just on





assumptions or theoretical knowledge. It also partially backs up the second pathway in the theory of change that seeks to address the demographic situation in North Karelia. The things that immigrants find the most desirable in their environment, according to the well-being survey (safety, education possibilities, nature), are factors on which municipalities can have an impact. Therefore, municipal policy actions can have an impact on the demographical situation.

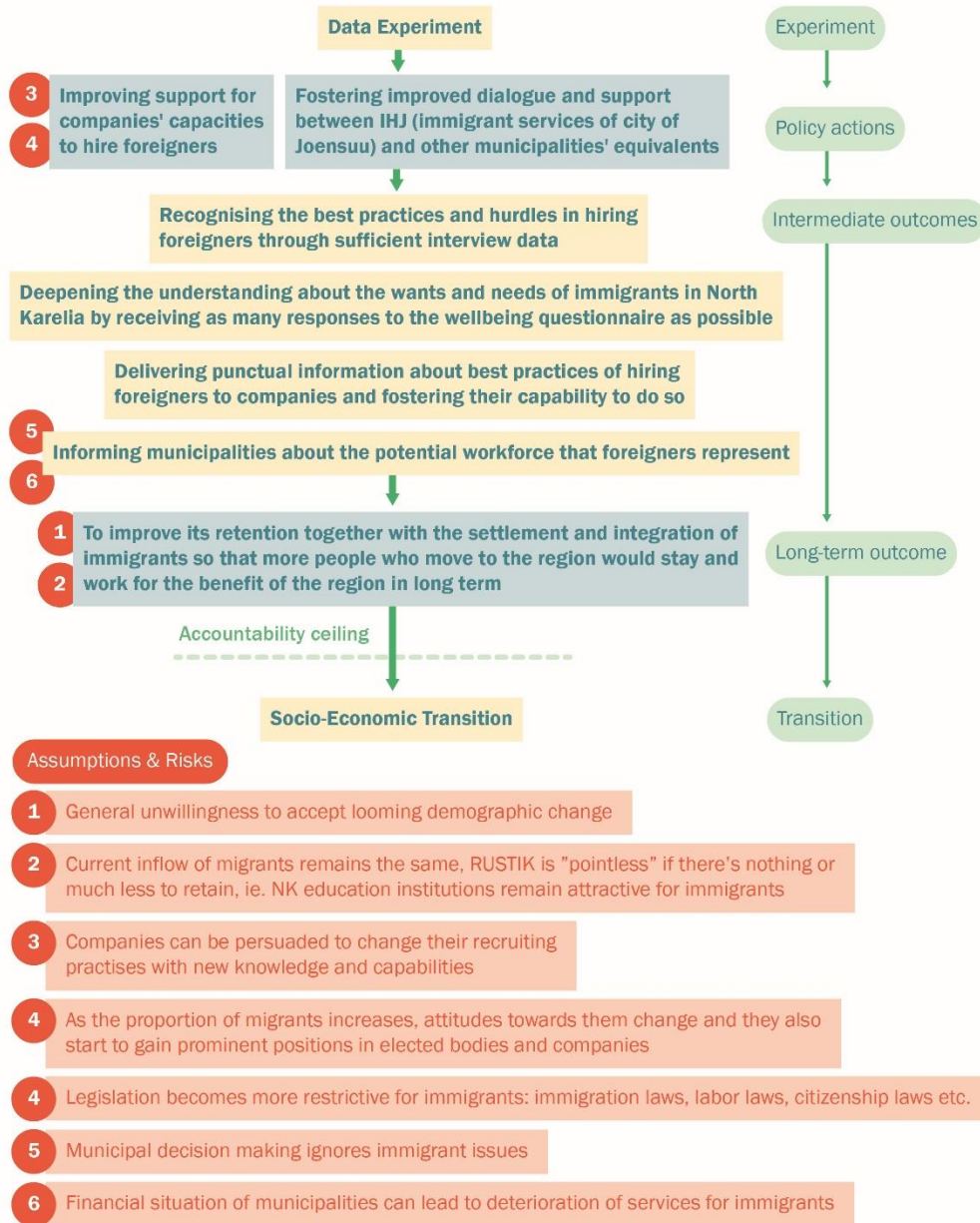


Figure 14 North Karelian Theory of Change





Data use

Data sources and methods

In preparation for the data experiment itself, expert interviews with immigration specialists were conducted to better understand the topic and transition challenge the living lab was facing. In the first phase, the idea was to prepare the well-being questionnaire tool, analyse municipal immigration programmes and consider other countries' best practices in integration. The latter line of enquiry was deemed secondary in importance when compared to living lab targets and preliminary findings of the well-being survey.

The results of the survey showed that employment is the key factor that makes immigrants stay in the region, and many respondents said that they would love to stay in the region, but unemployment is forcing them to move elsewhere. This led to the idea to focus on businesses and their capacity to hire foreigners and thus conduct interviews with businesses to find out what problems they face with hiring foreigners and how they solve them.

Table 9 Living lab data collection table

Source	Data type	Tool
Experts	Qualitative	Interview
Immigrants	Qualitative & Quantitative	Survey
Businesses	Qualitative	Interview

Data innovation

None of the previously listed sources of data has been used before at the municipal or regional level in North Karelia. The survey provides detailed data about the situation of immigrants in each municipality (three in the pilot phase), and the exact survey questions reflect the concern for the outmigration of immigrants and are specially tailored to help municipal policy work to better retain them. The business interviews, which focused on best practices to integrate foreigners into the workplace, are also a data source that, according to Business Joensuu, has not been tested before.

Implementation

Implementing the experiment

The data experiment started with expert interviews and going through the plans the previous coordinator had made for the data experiment. Afterwards, it was decided to undertake the immigrant well-being survey, planned in cooperation with the North Karelian Centre of Economic Development, Transport and Environment and International House Joensuu. The pilot survey was launched in March 2024 in Joensuu, and small changes have been made along the way. The pilot





was extended to Kitee and Tohmajärvi during the summer of 2024. The results of the pilot in Joensuu showed how important employment was for keeping immigrants in the region. This decision led to conducting interviews with companies about their best practices for hiring immigrants. This data is intended for writing a guide for companies to improve their capacity to hire foreigners. This guide will be finalised in 2025. The data experiment has leveraged the previous work done at the regional council in the well-being group, and the existing networks have been instrumental in the experiment's success.

Adaptations

Based on the responses from the well-being survey, the original plan to analyse foreign immigration programmes for best practices was abandoned due to new information and how the original plan was thus reassessed. The living lab coordinator deemed it more important to focus on data that can be gathered locally and that could feed more directly into the Theory of Change. Focusing on companies helps address the main issue of why immigrants find it difficult to stay in the region: employment.

Other Living Lab activities and achievements

The living lab has been helping the North Karelian Centre of Economic Development, Transport and Environment and the city of Joensuu to be better prepared to face the new Integration Act. The talks with experts have revealed actionable information that has been passed down to local actors, for example, information about data systems that had not been used before. The well-being questionnaire and its results have been presented to the Participation and Attractiveness Board of the city of Joensuu. The living lab coordinator participated in the cooperation lab for the regional immigration and integration projects and stakeholders. At this event, several new connections with other similarly aligned projects were made, and this can yield faster or improved results for the parties involved.

Preliminary results

Results to date

As of 13.8.2024, 131 respondents had started answering the Joensuu pilot survey, and 47 had sent the full form. Therefore, each question has a different number of responses. Results from unsent forms are still available for analysis, and informants have given consent to use their data at the beginning of the survey. Parts of the survey cater for the reporting needs of the municipalities; other parts are more directed towards fulfilling the theory of change and helping municipalities' policy work. Most respondents feel welcome and accepted in Joensuu (46/58), and some experiences of racism are reported. Half have spent time with a Finnish friend in the past 12 months, and 58% have a hobby that they pursue. The most relevant answers for the theory of change are that while 70% see themselves living in Joensuu in two years, only 56% see a future in Joensuu in ten years. Over 78% see themselves living in Finland after ten years, though. Slightly over half of the respondents said that work possibilities are considered one of the worst parts of living in Joensuu, and many of the open answers about what affects their decision to stay or move out of Joensuu indicate that employment is the most important factor. By and large, the best parts about living in Joensuu are nature (87%), pedestrian traffic (81%) and safety (80%).





Three business interviews as of 13.8.2024 and expert interviews with Joensuu City employment services have shown that there is a considerable language gap in companies' ability to orient foreign workers into the workplace in a safe way. According to the expert interviews with the Joensuu city employment services, some companies state that they cannot safely orient foreign labour because their orientation material is only in Finnish, this is especially prevalent in factory and machinery businesses.

Judging by the demographic figures and predictions for North Karelia, business interviews and expert interviews, it is inevitable that more and more immigrants are needed to keep North Karelia's regional economy and services afloat. The share of immigrants in North Karelia has grown four-fold in the 2000s, and it remains to be seen what the threshold is by when they are seen as an integral part of the region. According to expert interviews, bakeries in North Karelia owe their growth to the propensity to not discriminate against immigrant labour. With the worker shortage increasing, more and more businesses are likely to widen their potential recruiting pool if they wish to grow. The longer this shift takes, the more detrimental it is for the region. Finnish Public Service Media Company reported on 13.8.2024 (Pantzar, 2024) that of foreign engineers and technical experts currently working in Finland, only 14% would recommend Finland to other immigrants. According to the news article, Finland's image as an immigrant-friendly country has been severely damaged. If Finland's ability to attract foreigners decreases, it can be harmful to North Karelia especially.

Data relevance

The well-being survey matches the themes listed in the new Integration Act, and the exact wordings for the questions seem to be easily understandable. City of Joensuu and International House Joensuu have expressed their interest and satisfaction with the survey. Despite new information that the reporting needs due to the new Integration Act will be met with register data, the well-being survey works as a supplementary tool for measuring and gauging the effectiveness of integration work and the general attractiveness of the municipality for immigrants, which can feed into policy design.

Local relevance

This new data answers the need for municipal-level data that can be leveraged locally, and that is produced locally. With the ownership of tools, municipalities have immediate and unlimited access to timely data.

Policy relevance

Preliminary results show that there is still much room for improvement in the policies listed in Policy relevance. and if Petter Orpo's government programme is to succeed in North Karelia. While especially healthcare companies and wellbeing services in the county are actively recruiting workers directly from abroad, for workers in other fields, it is difficult to find a job in North Karelia. The data experiment has indirectly shown that there is a need for better coordination in immigrant work and integration, as actors are still unaware of some of the key tools at their disposal. This can hamper effective integration work.

Robustness and limitations

The data experiment has been so far about testing the tool and the questions. The survey did not ask about respondents' age or other personal information, so we cannot check the demographics of the respondents, i.e. how representative the data is. Collecting personal information could have





reduced the number of respondents as immigrants from certain countries are careful in giving their personal information in surveys. The pilot was about testing the questions and the tool to see if the data was what was intended. From the answers gained so far, we can see that the questions themselves do work and provide the right kind of data. The end-users can ask about background information as they see fit, and as the reporting requirements will be met with register data, they can target certain groups at certain times for information.

To receive more comprehensive data, the living lab will continue conducting business interviews and compiling the data package for companies to foster improved integration of foreign workers into local businesses.





Part 3: Reflections and learning

One of the key insights is how complicated the issue of immigration is and how many actors are involved. The issue goes across all levels of government and community, from national-level policymaking to local NGOs. This means that the living lab coordinator had to contact several different actors who could have an impact on immigration and integration. Another key finding was how poor the data municipalities have about immigrants and how their decision-making must have suffered as a result. Perhaps municipalities with only a few immigrants have done the bare minimum to fulfil laws. Joensuu, which has the most immigrants in North Karelia, has extensive indicators in place and in total, there are 25 different indicators for integration and determining how immigrant-friendly Joensuu is. The third key finding has been the polarity of attitudes towards immigrants in the region. A lot is being done to help them integrate, but there is also possibly quiet racism and hiding behind processes that slow down integration. The inevitable demographic change might bring more attention to this issue.

Reflections on data sources, methods, and tools

Data issues and obstacles during the experiment

The quality of existing data about immigrants living in North Karelia is variable. On the one hand, there is very accurate and reasonably timely data, mainly demographic. On the other hand, there is hardly any qualitative data, and this qualitative data was available only about Joensuu or aggregated at the regional level. This left the remaining 12 municipalities without accurate data. This was the case with the MoniSuomi survey that contained data about the well-being, health, employment, etc., of immigrants living in Finland, but it only had Joensuu and the whole of North Karelia as options from the region. In general, the municipal immigration programmes had no data or indicators, and integration work was supervised through money spent, not results achieved.

Businesses have been somewhat difficult to reach for interviews, but having the Regional Council in the Living Lab team has helped. It appears that businesses which have done more work to integrate immigrants into the workplace are also more willing to talk about the issue. As of 15.8.2024, 15 companies had been contacted; only three have been interviewed, nine companies have not responded to emails, and three companies refused.

When the well-being questionnaire was advertised, it received a lot of answers, especially when it was promoted in different Russian and Ukrainian WhatsApp, Telegram and Facebook groups. Since the questionnaire is also available in Russian, it has allowed informants to answer in their native language, and many have done so.

Managing data issues and obstacles

Neither the well-being questionnaire nor company interviews have a definitive endpoint, and they can be continued into 2025. Thus, the current issue of getting enough answers and informant companies was not a major issue as of 15.8.2024.





Pilot Region Partner's perspective on data

From the Regional Council of North Karelia's perspective, this data is important regarding their current and future policy work. It is a strategic decision to create an environment in the region that favours immigrants' integration into the local economy and society to combat the increasing worker shortage. The data reveals areas which require more attention in the future that can help with improving the livelihood of the region. It can also be of help in directing financing to projects that deal with immigration to leverage the data collected.

International House Joensuu and the North Karelian Centre of Economic Development, Transport and Environment have expressed the opinion that the immigrant well-being survey is an important addition to the tools at their disposal. It was disclosed that the mandatory reporting will be done with register data and that the tool will not be used for that purpose, but also that it will be useful to supplement the register data.

From the NGOs, Jomoni (an NGO focusing on integration) was contacted. However, associations are not a target group, as it is municipalities and companies which have the greatest impact on the retention of immigrants in the region. The enlargement of target groups for using the questionnaire is also limited by resources.

Experiment design and implementation

Overall, the data experiment has been successful so far. The data collected shows causality in the theory of change, and relevant stakeholders can leverage this information. The experiment still needs to further develop the data and tools available for the stakeholders to utilise. Personnel changes in the living lab postponed some of the results by about 1-3 months.

Strengths and successes

The data experiment and theory of change have been closely related, and this has made the experiment easy to plan and conduct. In hindsight, it is easy to see how important the work done in 2023, especially the institutional map, has been for the design of the experiment. Talks with experts in immigration and integration were instrumental in understanding the issue. The cooperation with the most important stakeholders has been fruitful, and the data experiment could not have been successful without those connections. This highlights the need to be able to work with different types of stakeholders, be they NGOs or government offices.

Scope for improvement

There is still much work to be done, but because of personnel changes in the project, the work plan for the autumn must be reworked. The original idea was to collect interview data from companies about their best practices and then have an event where this data package would be launched. This does not seem to be possible in the original timetable and must be postponed to 2025.

Even though parts of the original plan had to be discarded, it was not because they were bad but because new information showed better avenues of approach. Subcontracting money could have been spent on company interviews, but this idea came too late and is still a viable option in the future. The idea was to conduct the interviews in person to build up the networks and to have





knowledge of what else was happening in the data experiment. Being able to refer to other stakeholders or policy programmes has been an asset. This is why it did not occur before for the LL team to resort to subcontracting to do the company interviews.

Skill development and capacity building

Skills developed

Practical skills that have been needed during Cycle 2 include designing surveys in cooperation with stakeholders, scheduling and arranging meetings, planning and conducting interviews and compiling data into presentations.

Capacities

The most important capacity that the data experiment seeks to enhance is companies' capacity to hire foreigners, but that is still work in progress as nothing has been published yet. Capacities that have been developed include increased networking among immigration stakeholders, although this topic has several existing networks and projects in North Karelia, so the value added is not easily defined.

Pilot Region Partner's perspective on skills and capacities

Much of the skills and capacities will have to be transferred to other members of the regional council when the current living lab coordinator steps down. The work done during the data experiments builds on previous work done in the regional council and should be easily absorbable.

International House Joensuu (IHJ) receives a tool that they would not have had time to design, test and implement themselves. This will help not only them but also other actors who might receive feedback about their services through this survey. When going through the results with IHJ and the Centre of Economic Development, Transport and Environment, it was found that there is also relevant feedback for social and healthcare officials. It appears that several actors can be helped by this one survey.

Innovation and impact

In general, the data experiment hopes to make an impact in the medium and long term, and the results can be observed in a few years at the earliest. Even then, we cannot be sure that it was the data experiment that caused the impact and no other factors. The impact that the data experiment hopes to deliver is more immigrants staying in the region.

Reflections on innovation

The well-being questionnaire has been greeted well among immigration experts in North Karelia, and there is demand for this sort of tool. The innovative part is not the tool itself but the context in which it is applied and the breadth of themes it covers while also being understandable for immigrants from varying backgrounds. It was also considered that the survey could be filled with an immigration officer's aid if the informant is illiterate.





Short-term impacts

Short-term impacts possibly include increased awareness of the issue in the companies that have been interviewed and have expressed their best practices. This has made them reflect on their situation. The project has shared ideas with other projects and actors that deal with immigration and integration. In the short term, this can make the work easier for several partners and reduce unnecessary overlap between projects with similar goals and methods. Sharing data with partner projects can help them receive results faster than they would have alone.

Longer-term impacts

The long-term impact, lowering the outmigration of foreigners, can only succeed if policymakers and companies start using the new data and tools. The Pilot Region Partner can try to persuade relevant stakeholders of the need to apply them, but it cannot force them to do so. Cooperation with other projects and actors in the region can improve the possibility that the impacts are delivered, and so far, this seems plausible. Some projects are interested in cooperation with RUSTIK and whose work is parallel with RUSTIK's aims.

Potential for sharing learning

The immigrant well-being survey in the context of municipal immigration work has the potential to be shared with other regions and municipalities. In North Karelia, other municipalities look to Joensuu, for example, since they have the most resources and practices generally trickle from centre to periphery. If Joensuu were to adopt the tool, then other municipalities are likely to follow suit. Other regions and municipalities can also learn from the tool even if they do not adopt it as a whole or adopt parts of it.





Part 4: Future steps

Cycle 3 plans

For Cycle 3, the North Karelian living lab will continue with company interviews and aims to deliver the information package about best practices for North Karelian enterprises to leverage in their recruiting efforts by the end of 2025. The well-being questionnaire will also be offered to other municipalities for use in its current form during the first half of 2025.

Future collaborations

Once the information package has been finished, it will become obsolete in some parts over time. To combat this, it is important to be able to get one of the regional partners to take the responsibility of updating the package whenever there are changes in the operational environment and services. TE-services region (responsible for employment services in North Karelia starting from 1.1.2025) has a leading role in the region and, as such, would be the most suitable candidate for taking responsibility for the package. The information package will most likely be delivered together with the Talent Hub Eastern Finland project, which has similar goals.

Communication and dissemination

The project has been in close and continuous contact with IHJ and the North Karelian Centre for Economic Development, Transport and Environment throughout the entire project and has already shared the bulk of the results and lessons with them. The results of the questionnaire have been presented to the Participation and Attractiveness Board of the City of Joensuu. Another major way to communicate and disseminate the results will be the information package for companies and their launch event. This event will likely be advertised in regional business outlets to maximise the coverage of relevant audiences. The project will also be shared at the Rural Parliament, which is a major event where rural actors and issues are present.





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Germany: Rhein-Hunsrück

Svea Thietje and Achim Kistner





Summary and overview

The Rhein-Hunsrück pilot region is a predominantly rural district of 99,107 ha with a population density of 107.3 inhabitants/km² in the state of Rhineland-Palatinate, in the west of Germany. The population is ageing rapidly, indicated by a severe increase in the Ageing Index from 2000 to 2021. The district is home to 4,568 enterprises. The majority - just under 4,430 - are small businesses with fewer than 50 employees; only 21 businesses employ more than 250 people.

Living Lab challenge

The Rhein-Hunsrück district, although economically stronger than many other rural regions in Germany, faces ongoing challenges related to a shortage of skilled labour and unfilled apprenticeship and training positions. These long-standing issues are becoming increasingly pressing as the baby boomer generation approaches retirement, further increasing the demand for young workers. While the 18–24 age group is declining, stakeholder exchanges and focus group insights in Cycle 1 suggest that some young people in the region are interested in staying and pursuing apprenticeships or further education locally. However, a mismatch remains evident between the needs and expectations of young people and regional employers, with the latter often struggling to effectively communicate or present their apprenticeship opportunities in a way that resonates with young people. To explore this 'mismatching problem' in greater depth, the Rhein-Hunsrück Living Lab conducted a data experiment aimed at gathering detailed insights into the perspectives and challenges of both young people and employers regarding the training market. The focus was on gaining a deeper understanding of young people's preferences and the factors influencing their choices, identifying the difficulties employers face in filling vacancies, and exploring ways to improve and sustain information flows between the two groups. These insights are intended to establish a robust foundation for fostering new networks, strengthening stakeholder collaboration, and developing innovative projects and policies to better align apprenticeship offerings with the aspirations of young people in the region.

Data experiment

The data experiment aims to gather new data on the regional training market and combine it with secondary data to explore the reasons behind the disconnect between apprenticeship seekers and employers in the Rhein-Hunsrück district. It is centred around two main surveys: one targeting young people (completed with 290 participants) and the other targeting regional employers (in preparation). These surveys are complemented by expert interviews, events, and focus groups, which provide additional qualitative insights. The findings from these activities are analysed alongside existing secondary data, creating a comprehensive understanding of the regional training market. This approach aims to uncover the reasons behind the disconnect between apprenticeship seekers and employers while establishing new information channels among young people, employers, and other stakeholders to better align local needs and opportunities.





Figure 15 Integration of the youth survey in the regional app, the pilot region partners and RUSTIK in the regional press and a focus group with young people and educational stakeholders

Preliminary results

The preliminary findings provide first insights into the perspectives of both young people and employers in the Rhein-Hunsrück district regarding apprenticeships. The assumption that there are young people who wish to stay in the region and pursue training or apprenticeships was confirmed, with most respondents expressing an interest in remaining in the region. This preference is primarily driven by a desire to stay close to family and friends. When it comes to their needs, young people prioritise social aspects, such as respectful treatment and a positive workplace environment, over financial aspects, working hours or career-related factors. This indicates that an employer will have to qualify themselves as good for young people in the long term in a different way than simply offering a good training salary. Employers confirm that they face challenges in attracting suitable candidates, as many young people do not fully meet the qualification requirements or expectations for available positions. Smaller companies in particular report difficulties in reaching potential apprentices due to limited recruitment resources. Barriers for young people include high academic requirements, limited accessibility to workplaces, and a lack of awareness about opportunities in smaller local businesses.

Key learning to date

Key learning to date highlights the importance of combining quantitative findings with qualitative data to gain a more comprehensive understanding of the regional training market. Active involvement of young people in the participatory survey design and a pre-testing process proved highly effective, ensuring that the data collection was target group orientated and reflected their priorities. High participation and response rates were achieved, largely due to the strong network of the PRP, which facilitated stakeholder engagement and trust. Flexibility in adapting timelines and methodologies to regional constraints was critical for overcoming logistical and regulatory challenges. While the experiment did not introduce new data collection methods, it successfully fostered social innovation by enhancing information flows and strengthening connections between young people, regional employers and other key stakeholders, laying the groundwork for long-term collaboration.





Next steps

The next steps for the Rhein-Hunsrück Living Lab focus on finalising Cycle 2 and preparing for Cycle 3. The employer survey, set to be launched at an event in February 2025, will provide deeper insights into employer challenges and complement the findings from the youth survey. This will be followed by an in-depth analysis combining survey results, interviews, and secondary data to develop actionable strategies. Cycle 3 will centre on a dialogue event in autumn 2025, fostering collaboration among stakeholders and strengthening engagement with policymakers to ensure findings are integrated into regional strategies. Plans for long-term sustainability include repeating the survey after the implementation of initial measures and collaborating with LEADER regions to exchange insights. Communication efforts will include scientific publications, a brochure designed to present the results in an accessible and engaging format, and the strategic use of regional and national networks and platforms to disseminate findings broadly.





Part 1: Living Lab context

Pilot Region introduction

The Rhein-Hunsrück district is a NUTS3 region located in the federal state of Rhineland-Palatinate in the west of Germany. The region lies between Luxembourg and the metropolitan area of Frankfurt. It reaches from the Upper Middle Rhine Valley as its eastern border to the Hunsrück upland in the west. With 105,566 total inhabitants and only three towns between 5,000 and 20,000 inhabitants, the region is sparsely populated and rural in character. Traditionally, forestry has been an important sector of the local economy, especially in the uplands. Today, the Rhein-Hunsrück district hosts mainly small and medium-sized businesses. Key sectors for employment are manufacturing, processing and construction industries, handicrafts, public service and education, as well as trade and tourism. During the last decade, population development has been stable and is expected to decrease only very slightly in the next two decades while ageing overall. Nevertheless, the region is confronted with challenges of demographic change. This has effects on the workforce and hence regional value creation. A shortage of skilled workers is already evident in some occupational groups and is presenting employers with rising challenges to close these gaps. The Rhein-Hunsrück district is largely located in the area of the LAG Hunsrück, which has been addressing these issues through its LEADER Local integrated rural development strategy (LILE) for several years. The other part of the region belongs to the LAG World Heritage Upper Middle Rhine Valley.

Functions

A comprehensive overview of all functions (related to production, consumption and ecosystem services) in the Rhein-Hunsrück district is presented in previous reports. This report will delve into the production functions which are most relevant for the selected transition.

In recent years, the region has developed a positive economic dynamic, which has led to a comparatively strong supply of jobs. In terms of economic indicators such as GVA, GDP and household disposable income, the Rhein-Hunsrück district has seen stable development over the past two decades. At present, the region exceeds state averages for GDP and disposable income. GVA is mainly generated in the services sector: in 2020 agriculture and forestry made up 1.6% of GVA, manufacturing 37% and services 61.4% (Statistics RLP 2023). In the manufacturing sector, the construction industry contributes 11.4% of GVA. In the service sector, GVA breaks down as follows: trade, transport, hotels and restaurants, information and communication (15.7%); financial, insurance and business services (20.7%); and public and other services, education and health (25%) (Statistics RLP 2023). In 2022, the unemployment rate for the civilian labour force in the Rhein-Hunsrück district was at 3.6%, lower than the state average of 4.6%. This makes the Rhein-Hunsrück one of the districts in Rhineland-Palatinate with the lowest unemployment rates (Statistics RLP 2023b).

In 2020, the State Statistical Office registered 4,568 businesses in the Rhein-Hunsrück district, 124 of these employed between 50 and 249 people, and 21 businesses employed more than 250 people. The business landscape is heavily influenced by small and medium-sized enterprises (SMEs), especially small companies, which made up 96.8% of all registered businesses in 2020. 587 businesses employed between 10 and 49 people and 3,863 employed only 0-9 people





(Statistics RLP 2021). While the commuter ratio is negative, the employment rate in many sectors - including manufacturing, services, financial, insurance/business services, real estate and public, education and health services - is increasing. As the Rhein-Hunsrück district has the highest job density of all districts in Rhineland-Palatinate, one of the central goals of regional development is to attract people to move or return to the region.

Transitions

Due to the network and the responsibilities of the Pilot Region Partner, it was decided at the beginning of Cycle 1 that the socio-economic/demographic transition processes are the most relevant for the Living Lab. Though the region is in a good economic position, it faces a shortage of skilled workers across various industries, with the additional challenge of **unfilled training and apprenticeship positions**. 745 open apprenticeship positions were listed with the employment agency in the last statistical year (October 2022 - September 2023) in the Rhein-Hunsrück district, while 413 persons were registered as seeking apprenticeships in that time (BA 2023a-d). The number of apprenticeship seekers is, however, probably higher, as for young people just finishing school there is little incentive to register with the employment agency unless they have difficulty finding an apprenticeship or further education opportunity.

Demographic change is further exacerbating this problem. The demographic shift anticipates a significant ageing population and an **outmigration of young people**. While the external migration balance of the pilot region in 2020 was net positive, there was net emigration in the age group 18-24 (StaBuL 2023). The likely reason is young people seeking tertiary education, as no universities are in the pilot region. However, it should be noted that commuting to several universities in neighbouring regions is possible, depending on an individual's exact location and means of transport. In addition, some employers in the Rhein-Hunsrück region offer the option of a 'dual study programme'. These factors are decisive when considering the challenge presented in the following sections.

Living Lab partnership

The Pilot Region Partner (PRP) Regionalrat Wirtschaft Rhein-Hunsrück e.V. (Regional Council for Economic Affairs) is the central institution for economic and regional development in the Rhein-Hunsrück district. Founded in 1995, the association acts as a contact point for companies, institutions, and municipalities. It offers support for businesses, maintains a large network and actively pursues regional development. The PRP is also responsible for promoting the location and image of the Rhein-Hunsrück district. The focus is on the image and skilled workers campaign 'GELOBTES LAND' ('PROMISED LAND'), the training and career orientation campaign 'WILDWUCHS' and the promotion of rural areas with funds from the European LEADER approach. Over 240 members from industry, trade, crafts, banks, restaurateurs, farmers, and public administration make the association an important regional partner for all relevant institutions in politics, government, economy, and society. The most important goal is to increase and publicise the attractiveness of the Rhein-Hunsrück district in economic, social, cultural, and other areas. The association is financed by public funds from the EU, the state of Rhineland-Palatinate, municipalities, and private companies.

The Living Lab Coordinator (LLC) is the Institute for Rural Development Research (IfLS), which is a research institute in the field of sustainable development of rural areas. IfLS has long-standing experience as a coordinator and partner in international research. IfLS has been involved in





different projects focussing on how rural areas are shaped by relevant policies, especially agricultural and food policy as well as structural, regional, and environmental policy. Furthermore, monitoring and evaluating the effectiveness of policy instruments in the second pillar of the CAP are core tasks of the IfLS. The focus of IfLS is on measures for the environmentally friendly development of agriculture and the promotion of rural development.

Living Lab challenge

As mentioned above, the Rhein-Hunsrück district is in a good economic position compared to other rural regions in Germany. However, the shortage of skilled labour and unfilled apprenticeship and training positions are a long-term problem in the region and urgently require further solutions. While the age group 18-24 is the only group that is declining, findings from focus groups and exchanges with different stakeholders suggest that there are young people who want to stay and start an apprenticeship or further education in the region. Both the experience of stakeholders and statistical evidence (see Policy relevance) indicate that young people and local employers 'do not come together', suggesting that most employers are not successful in publicising their apprenticeship and training offers or making them attractive for young people. Since the baby boomers will gradually retire in the coming years, the need for younger skilled workers will continue to increase. However, we do not have data on the concrete needs, challenges, and opportunities of regional employers when it comes to filling training positions, nor do we know the requirements of the different groups of young people in the region. In our data experiment, we took a closer look at this 'mismatching problem' with the aim of strengthening the links between the different target groups.

Info box: The training system in Germany

The German training system offers various paths to vocational qualification. The *dual training system (apprenticeship)* is particularly well known: It combines practical work in a company or institution with lessons at a vocational school and usually lasts 2 - 3.5 years. In contrast, there is *school-based training*, which takes place exclusively at technical colleges, particularly in areas such as social services or healthcare professions. A third option is the *dual study programme*, which combines academic learning at a university (B.A. / B.Sc.) with practical phases in a company. This variety enables a close integration of theory and practice, which is a speciality in international comparison.

Rationale and research questions

As stated above there are several uncertainties about why the needs of young people and regional employers in terms of apprenticeships and training positions do not seem to match. More well-founded information and (qualitative) data can bring great added value for different regional stakeholders (e.g. employers, high school graduates, schools and vocational schools, regional development stakeholders, different stakeholders in training and further education) and could serve as an impetus for the establishment of new network structures in the region and project ideas for better matching between training companies/institutions and trainees. As part of our work in Cycle 1 (see LL Report 1), we therefore identified the following research questions which only underwent slight adjustments in the course of the further work in Cycle 2.

- What needs/perceptions do young people in the region have regarding their further education and training as well as for an apprenticeship? What factors (beyond the control





of the employer) influence young people's decision in favour of a particular training position?

- What challenges do regional employers in the Rhein-Hunsrück district face when filling training/apprenticeship vacancies? What requirements and offers do they have for potential applicants and how are the target groups addressed?
- How can the flow of information between young people and employers and other stakeholders in the region be ensured in the long term so that comprehensive information/data is available to:
 - a) employers about the needs of young people and
 - b) young people about the opportunities for vocational training in the region?
- How can these be consolidated with improved networks/projects/policies?

Policy relevance

Several key policies and strategies in the Rhein-Hunsrück target the identified transition challenge:

1. **Regional Campaigns and Career Guidance:** The image and skilled workers campaign 'GELOBTES LAND' and the training and career orientation campaign 'WILDWUCHS', both led by the PRP Regionalrat Wirtschaft, directly address the issues of the shortage of skilled workers by increasing visibility of the region, highlighting professional and private benefits of living there and providing platforms for apprenticeship and job listings. The skilled workers' campaign is co-funded by the district, municipalities and more than 100 companies, which demonstrates that there is already a coalition of public and private actors that have identified their common interest in this issue. Furthermore, the district administration, secondary schools, the job centre, the employment agency and the PRP have developed a concept for career guidance called "Concerted Action / Youth Conference". It provides information on how career guidance can succeed in schools.
2. **Support Programmes:** The JOBfux programme offers career guidance in schools. The programme is administered by the Department of Youth Affairs in the district administration and co-funded by the district, the state of Rhineland-Palatinate and ESF+. Furthermore, the publicly funded JobAction programme provides coaching and job placement for youth facing significant employment challenges.
3. **District Development Programme:** A new district development programme is currently being drawn up. Securing a skilled workforce and promoting young people are central themes of the programme. The PRP is involved as a member of the steering group in the development process and will ensure that the transition challenge is adequately addressed and findings from the Living Lab can be integrated.
4. **LEADER Strategies:** The local development strategies of the LAG Hunsrück and the LAG Upper Middle Rhine Valley emphasise securing skilled workers and fostering connections between education and local employers to keep youth attached to the region.
5. **State-Level Policies:** The *Third Rhineland-Palatinate Strategy for Skilled Workers (2022-2026)* outlines 63 action points to combat worker shortages and adapt to market changes. The *'Jes!' Youth Strategy* promotes a liveable region for youth through holistic education, integration, and participation, supported by targeted funding programmes and the *State Youth Plan* details state funding for youth education and activities, aligning financial resources with educational and recreational support.





It has become clear that various policies can support the chosen transition challenge. They provide a solid framework that can be leveraged to advance workforce development and regional appeal. Additionally, these policies stand to benefit from the new insights and knowledge generated through the Living Lab data experiment, with the potential of enhancing their effectiveness and adaptability.

Stakeholders

To answer our research questions, the involvement of multiple stakeholders like the labour market, education and youth care stakeholders plays a major role. The key stakeholders (in addition to the PRP) and their involvement in the LL are presented in Table 10. Stakeholders who have already been involved (and the formats through which they were involved) are shown in black. Stakeholders who haven't been involved so far but will be involved in the future, as well as formats that are planned, are shown in blue. As can be seen, there are plans to involve political stakeholders (ministries at the state level) more closely. This is planned for the end of Cycle 2 and for Cycle 3.

Table 10 Key stakeholders in the Living Lab Rhein-Hunsrück

Stakeholder group	Further information	Involved through
Regional employers	Companies in the Rhein-Hunsrück district and other institutions that provide training / apprenticeship positions	<ul style="list-style-type: none"> • Expert interviews • Data experiment preparatory session • Employer survey • Employer and multiplier event • Dialogue event
Young people	Young people in the age group of 14 and 25	<ul style="list-style-type: none"> • Youth survey • Focus groups • Data experiment preparatory session • Dialogue event
Secondary¹⁰ and vocational schools	17 in total: 6 Realschulen plus, 3 Gymnasien (High Schools), 3 Integrated / cooperative comprehensive schools, 3 Special schools, 2 Vocational schools	<ul style="list-style-type: none"> • Expert interviews • Data experiment preparatory session • Employer and multiplier event • Dialogue event • Youth survey (indirectly)
District and regional development	Different departments in district administration, 2 LAGs	<ul style="list-style-type: none"> • Expert interviews • Focus Groups • Employer and multiplier event • Dialogue event

¹⁰ In Germany, secondary schools build on each other in terms of the increase in learning and the opportunities students have after graduation. There are 'Hauptschulen', 'Re-alschulen' and 'Gymnasien'. Since 2009, 'Hauptschulen' and 'Realschulen' in Rhine-land-Palatinate have increasingly been merged to form the so-called 'Realschulen plus'. The 'Gymnasien' (High Schools) are schools that prepare students for university studies.





Stakeholder group	Further information	Involved through
Job placement and promotion	Federal Employment Agency, Job Centre	<ul style="list-style-type: none"> • Expert interviews • Employer and multiplier event • Dialogue event
Training, qualification and career guidance	Rundum Meisterservice Bildungsträger, JobFux (both offer training and placement services for young people)	<ul style="list-style-type: none"> • Focus groups • Expert interviews • Employer and multiplier event • Dialogue event
Youth organisations and institutions	Youth welfare office, youth café, youth centre, Café international	<ul style="list-style-type: none"> • Expert interviews • Focus Groups • Employer and multiplier event • Dialogue event
Ministries in Rhineland-Palatinate (NUTS1)	Ministry of labour, social affairs, transformation and digitalisation (MASTD), Ministry for family, women, culture and integration (MFFKI), Ministry of Economic Affairs, Transport, Agriculture and Viticulture (MWVLW)	<ul style="list-style-type: none"> • Employer and multiplier event • Dialogue event • Youth survey (indirectly, partly)

Theory of change

Our initial theory of change (ToC) is based on our two main target groups. On the one hand, it assumes that by revealing and communicating the needs of young people looking for an apprenticeship to the regional employers, they will (at least partly) adapt their training and recruitment offers accordingly. On the other hand, by better informing young people of the requirements of the regional employers (through their improved information and recruitment activities), young people can better prepare themselves for job interviews and thus meet the employers' requirements. The ToC works on the overall premise that by bringing together and coordinating the needs of the employers and young people the long-term outcome of filling apprenticeships, training and job vacancies in the region can be reached. During the data experiment (see following sections), it has once again become clear what an important role the different labour market and education stakeholders, multipliers as well as other external factors play and the need to consider these in the ToC.

Data relevance

Our transition challenge relies on many basic assumptions that have emerged from discussions with regional stakeholders and focus groups but have not yet been substantiated with data. Even existing statistical data on job seekers, apprenticeships, and vacancies is limited and probably not always accurate. Employment agencies provide data, with apprenticeship figures at NUTS 3 and job seeker data mostly at NUTS 2 level due to anonymity concerns. Open position data at NUTS 3 needs aggregation for clarity and linking job seekers to vacancies is feasible only at NUTS 2 level due to regional job flows. Employment agency data may not fully capture all openings, as





some businesses recruit independently. Overall, qualitative and survey data are vital for understanding why employer needs and young people's expectations do not align. Such data provide insights into motivations and challenges that quantitative data cannot, highlighting the importance of including qualitative methods in the planned data experiment.





Part 2: Living Lab Cycle 2: Data experiments

Data experiment

Developing the data experiment

We started developing our data experiment at the end of Cycle 1. Due to the PRP's capacities and network, we decided in favour of the socio-economic transition early in Cycle 1. As the region's LEADER strategy has an important focus on young people, this topic was also discussed at an early stage. A decisive step in developing the transition challenge was a focus group meeting in November 2023 with various stakeholders from the education and youth sector as well as representatives from district development. In this context, we discussed the relevance of data in a participatory manner by addressing the following questions: What do we know? What do we want to know? How do we get answers? Data collection methods such as the youth survey and the survey of regional employers were the results of this focus group session. Work then continued in a smaller group for more detailed planning of the data experiment. A 'data experiment working group' was set up for this purpose which met for the first time in March 2024. The working group is made up of PRP employees and a representative of the 'GELOBTES LAND' campaign (representing regional employers), an employer from the social sector, a teacher, a young person and the LLC. At the meeting in March, it was decided to bring forward the survey of young people (the initial plan had been to start with the survey of employers, see more detail on the adjustments in Implementation). Fundamental aspects for the development and distribution of the youth survey were discussed, the survey steps and methods were defined, and a timetable was drawn up. The working group supports the PRP and the LLC throughout the data experiment in the development of questionnaires and other survey materials, monitors the data experiment and plays an important role as a multiplier in the distribution of the materials. In addition to the working group, regular jour fixe meetings (every 2 weeks) between the PRP and the LLC play an important role in the development and readjustment of the data experiment.

Experiment description

The LL Rhein-Hunsrück aims to collect new data on the training market in the district and analyse it alongside existing secondary data. This experimental approach tests whether a comprehensive analysis of diverse data sources can help us understand why matching between apprenticeship seekers and employers is falling short. The aim is to develop solutions for this problem and to establish new information channels among young people, employers, and other relevant stakeholders to better align local employer needs with those seeking training positions. Figure 16 visualises the key data collection and analysis steps (explained in further detail in Data sources and methods) of our data experiment. The two main pillars are the survey of the young people and the survey of the regional employers (in preparation, yet to be executed). These surveys were supplemented by a series of expert interviews as well as events and focus groups. In addition, the findings are placed in the context of previously analysed statistical labour market data.



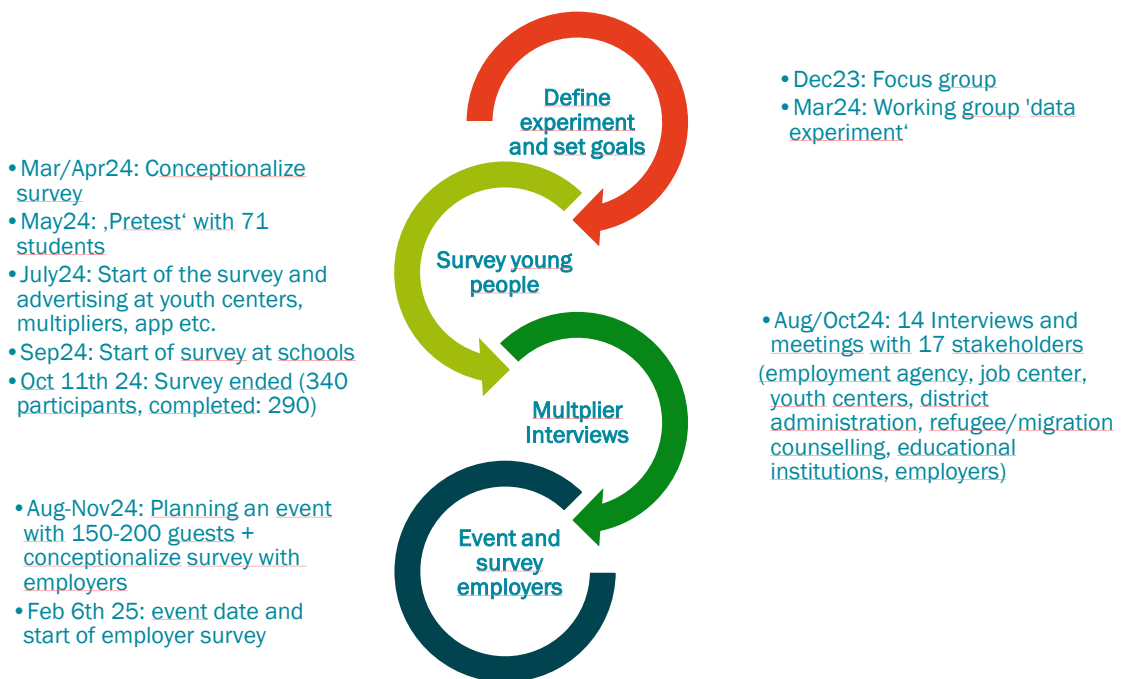


Figure 16 Data experiment and data collection methods Living Lab Rhein-Hunsrück

Experiment objectives

The objectives of the data experiment align with our research questions and are as follows:

- To understand the challenges faced by regional employers in the Rhein-Hunsrück district when filling training and apprenticeship positions, including their requirements for applicants and the opportunities they offer.
- To investigate the expectations of young people regarding apprenticeships and identify the factors influencing their choices, including external elements beyond employer control.
- To understand which measures employers should implement in a meaningful way to facilitate the onboarding of young people and counteract the risk of training dropouts.
- To establish a foundation for sustained information exchange among young people, employers, and regional stakeholders, and explore methods to strengthen this through enhanced networks, projects, and policies.

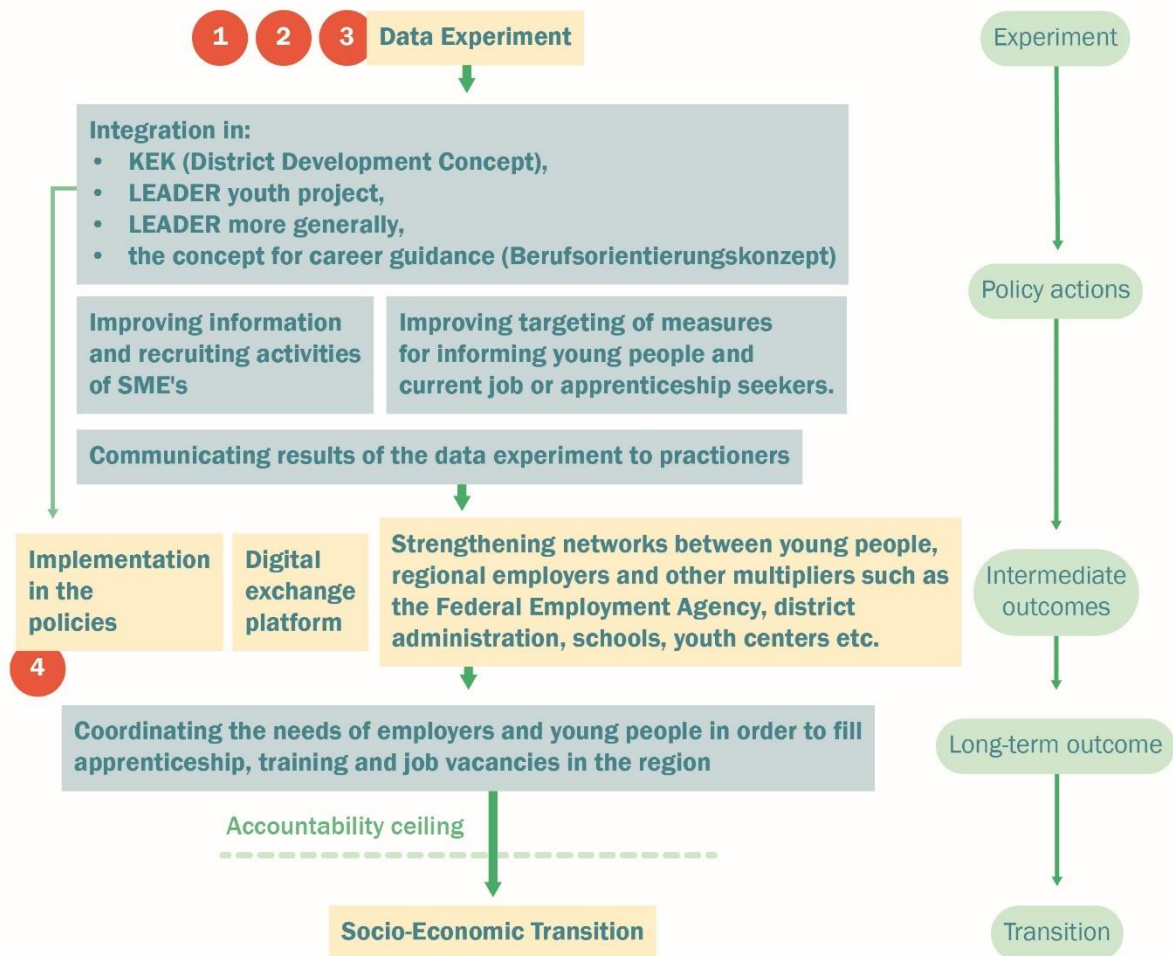
Relationship to theory of change

The relationship between the data experiment and the theory of change (ToC) is integral, as the experiment serves as a practical test for the assumptions embedded in the ToC (see Figure 17). The data experiment also provides us with an answer to previously identified risks, such as the possibility that young people in the Rhein-Hunsrück district are not interested in staying and working in the region. The data experiment also aligns with the ToC by aiming to uncover and communicate the needs of young people and employers in the Rhein-Hunsrück district. The experiment contributes to medium-term goals by fostering improved information flow and networking between employers and youth, as well as involving other relevant stakeholders. The experiment also lays the groundwork for long-term information channels and partnerships that





can evolve into sustained networks and policies (see Policy relevance), helping bridge the gap between training supply and demand.



Assumptions & Risks

- 1 Information shortage regarding the needs of employers and young people respectively might lead to non-optimal allocation of apprenticeship position
- 2 Results confirm information shortage as well as substantial information that can be used to better “bridge the gap”
- 3 The data experiment proceeds harmonically so that networks deepen
- 4 Actors beyond the RWRH involved in formulating policies and practitioners in the relevant fields are amenable to and have the necessary resources for integrating findings.

Figure 17 Figure 3: Theory of Change Living Lab Rhein-Hunsrück





Data use

Data sources and methods

The most important data sources and data collection tools used are shown in Figure 16. As mentioned above, the focus of the data collection is on the two surveys a) with young people (290 completed questionnaires) and b) with regional employers (in development, expected to start in February 2025). The youth survey was aimed at young people aged between 14 and 25 who live in the Rhein-Hunsrück district or go to school there and will finish school in no more than two years, or have recently graduated and are still looking for further training. In addition, various available labour market and demographic data were analysed in Cycle 1. Originally, an in-depth analysis of the advertisements for apprenticeships was planned to be carried out. The starting point for this was the analysis of the 'Wildwuchs' database which shows the regional employers who offer apprenticeships/training places and their requirements for applicants. An initial analysis of a total of 447 entries was carried out, however, it was not taken further, as information in the database was vague and not comparable. As the conceptualisation and distribution of the youth survey took longer than expected and the regional stakeholders' expectations of the results were very high, it was decided to focus on this instead.

Data innovation

The data experiment is innovative in that it collects new, comprehensive data from employers, young people and other stakeholders and combines them with existing secondary data. The main data innovation is seen in the survey of different groups of young people. While young people have been involved in isolated cases, such as in LEADER workshops, there has not been a systematic survey to assess their needs in terms of future education/job possibilities. In addition, no attempt has yet been made to address the different groups of young people (e.g. different levels of education, school-leaving qualifications, marginalised groups). Experience from previous formats has shown that surveys and events tend to attract participation primarily from students with higher levels of education (i.e. students taking their A-levels or university students). As a result, the findings may not fully represent the experiences and perspectives of different groups of young people, limiting the ability to make generalised or representative conclusions. With the data experiment, a first step was taken to address this problem through purposeful sampling and distribution of the survey through various channels and multipliers. The direct involvement of young people in the survey design is also seen as innovative. The youth questionnaire was developed and finalised in close cooperation with young people through a pre-test in which a total of 71 students tested the questionnaire and provided feedback.

Implementation

Implementing the experiment

The implementation process of our data experiment is still ongoing and the most crucial steps for a successful implementation will be taking place in the following months (see Part 4). However, some steps have already been taken to disseminate and implement the data experiment in the region:





- Integration of the youth survey into various regional platforms and apps (e.g. GELOBTES LAND App, Newsletters) and distribution through various channels and multipliers (e.g. schools, youth centres, meeting places for young migrants, youth parliament)
- Public relations work via regional press and social media
- Presentation to the committees of the PRP
- Recruitment of a LEADER-funded youth project position, which can also be linked to the work of the Living Lab in the future
- Informing the 'Concerted Action' about the survey results and the project
- Informing and inviting political representatives (e.g. ministries of the state of Rhineland-Palatinate) to upcoming RUSTIK events

In addition, awareness about the urgency of the topic has been highlighted among regional stakeholders through various discussions and interviews.

Adaptations

One of the main adjustments that became apparent at the beginning of the data experiment concerned the data collection procedure. The initial plan was to first survey the employers and then survey the young people. However, the data experiment working group decided to reverse the order of the surveys by starting with the survey of young people - a group that is often overlooked and not sufficiently involved. The survey was designed in such a way that the young people had the opportunity to address questions and include requests for the regional employers (in a section at the end of the survey). It is planned to cluster these questions and pose them directly to the employers (either through the survey or through the employer event), thus laying the foundations for a dialogue.

Another significant adjustment was the alteration of the schedule, particularly regarding the timing of the surveys. The original plan was to complete the youth survey before the summer holidays of 2024 and begin the employer survey in the autumn of 2024. However, due to various factors (see Data issues and obstacles during the experiment), the timeline had to be revised. As a result, the youth survey was not completed until October 2024, and the employer survey is now scheduled to begin in February 2025.

In addition, some data sources (e.g. apprenticeship platform) proved to be inconclusive and were therefore not considered further in the analysis (see Data sources and methods).

Preliminary results

Results to date

Hypothesis and general assumptions

The youth survey (n=290) and 14 semi-structured expert interviews with 17 stakeholders have been completed, and an initial analysis of the results has been conducted. The youth survey validated the key assumption that young people are interested in staying in the region with 77% of respondents expressing a desire to stay (or potentially stay) in the Rhein-Hunsrück district after finishing school. Previously, this assumption has been based on information inferred from discussions with teachers and regional stakeholders. The desire of young people to stay in the region is a crucial factor in addressing vacant training and apprenticeship positions. When asked





why they would choose to stay, 43% cited proximity to friends, family, or partners as the main reasons, while preferences for living in a rural area, pursuing local apprenticeship or training opportunities, and general appreciation for the region were each mentioned by 17-18%. Regarding future education and job plans, 28% indicated an interest in pursuing an apprenticeship, while 25% preferred university education, which is not available within the district. Notably, the analysis shows that a large number of the young people surveyed (>50 %) are interested in the available opportunities for training or apprenticeships in the Rhein-Hunsrück district (see blue columns in Figure 18). This is also an important finding and confirms our hypothesis that young people are not fundamentally disinterested in training or apprenticeships, but that the respective needs of the employers and young people in the region are not aligned.

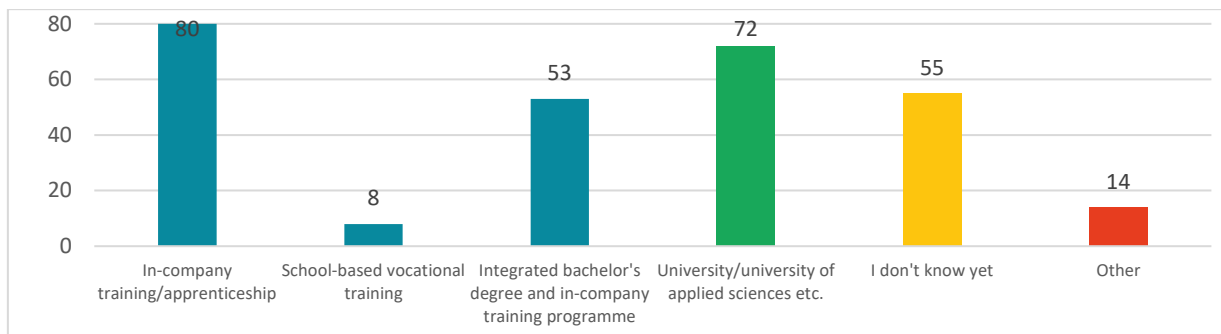


Figure 18: 'What would you like to do most in the future?' (n = 282)

RQ1: What needs/perceptions do young people in the region have regarding their further education and training as well as for an apprenticeship? What factors (beyond the control of the employer) influence young people's decision in favour of a particular training position?

The survey results and the interviews provide important insights regarding our first research question. Among other things, young people were asked what would be important to them when choosing an apprenticeship, a dual study programme or similar. In addition to an open-ended question, various factors were assessed. The analysis shows that social aspects in particular – and, above all, respectful treatment and enjoyment of work – play an important role for young people (Figure 19). This is consistent with the results of relevant scientific and statistically representative youth studies such as the SINUS Youth Study (Calmbach et al. 2024), the Shell Youth Study (Albert et al. 2024) or the McDonald's Education Study (Hurrelmann et al. 2019), all of which (albeit in different contexts) emphasise the increasing importance of social values among young people in Germany (respect, altruism, tolerance). Later career opportunities and future income are also important to young people, while income during the training itself is not so important (Figure 20). It is striking that the relevance of the factors relating to pay, working hours and career prospects is generally rated as less important than non-material factors. This is also confirmed by findings from the interviews, which indicate that employers will in future need to qualify themselves to young people as good employers in a different way than simply offering a good training salary.



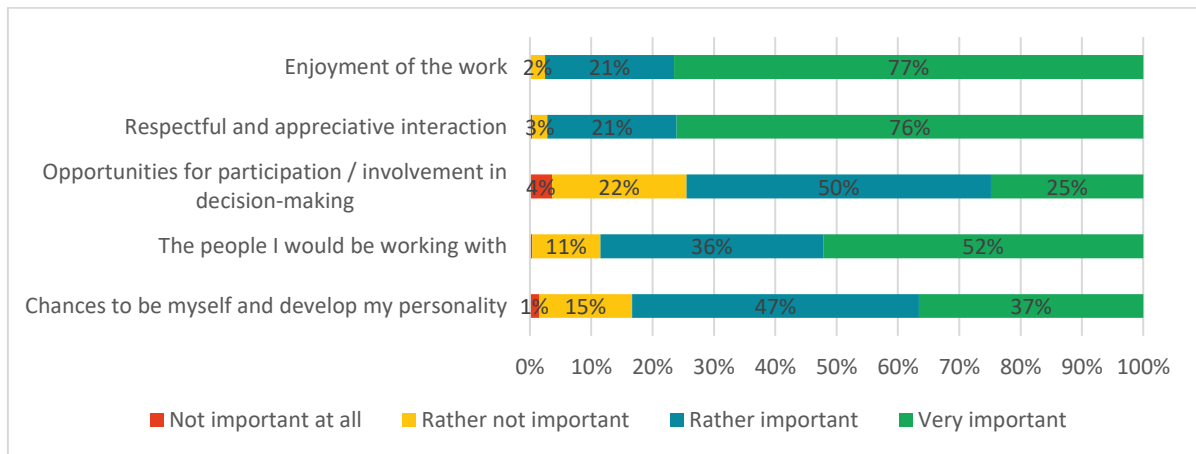


Figure 19: 'What would be important to you when choosing vocational training/apprenticeship/integrated degree programme or similar?' – Social Aspects (n = 280)

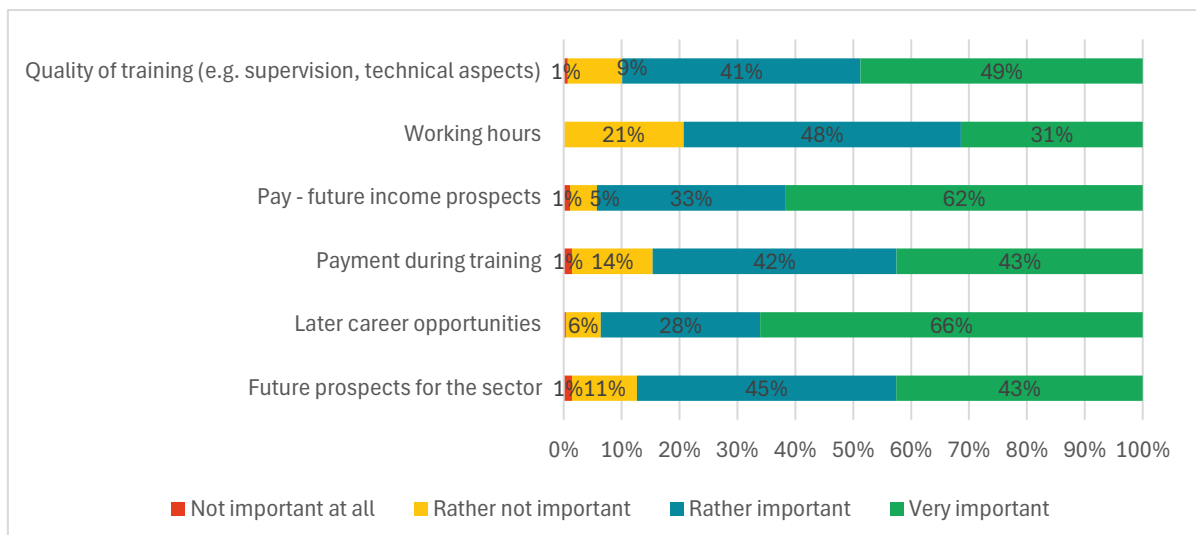


Figure 20: 'What would be important to you when choosing vocational training/apprenticeship/integrated degree programme or similar?' – Payment and career prospects (n = 280)

Surprisingly, the possibility of working from home was deemed as the least important factor among the surveyed young people, with 60% indicating that it was either not important at all or rather not important to them. Additionally, over 30% of respondents also regarded workplace equipment as unimportant. Regarding factors outside the influence of the employers, almost all interviewees in the expert interviews confirmed that parents or the family in general have a major influence on young people's decisions when choosing further education or training positions. Companies that offer training programmes, but also labour market actors and other actors involved in vocational training, emphasise that parents often promote studying at a university and thus minimise the value of training or apprenticeship programmes.

Obstacles that deter young people from applying for apprenticeships and training positions in the first place are important factors and can be reasons why training positions remain vacant. Young people report several barriers, in particular stringent grade and qualification requirements, limited accessibility to workplaces, complex and lengthy application processes, and high levels of





competition (see Figure 21). Many young people also emphasise that information, especially about small companies, is difficult to find. Interviews with teachers and labour market stakeholders, including the Federal Employment Agency and the Job Centre, indicate that many companies in the region continue to have high expectations regarding basic skills and general knowledge, often reflected in school grades. Social and societal barriers, particularly language barriers and the fear of job interviews, as well as insufficient career guidance are also identified as major obstacles. Recently, initial steps have been taken to address these challenges through projects like the ‘Blinddate’ programme. This initiative allows young people to spend a day in a company without the need for a CV, grades or an application at all, providing an opportunity for employers to engage with potential candidates beyond formal qualifications.

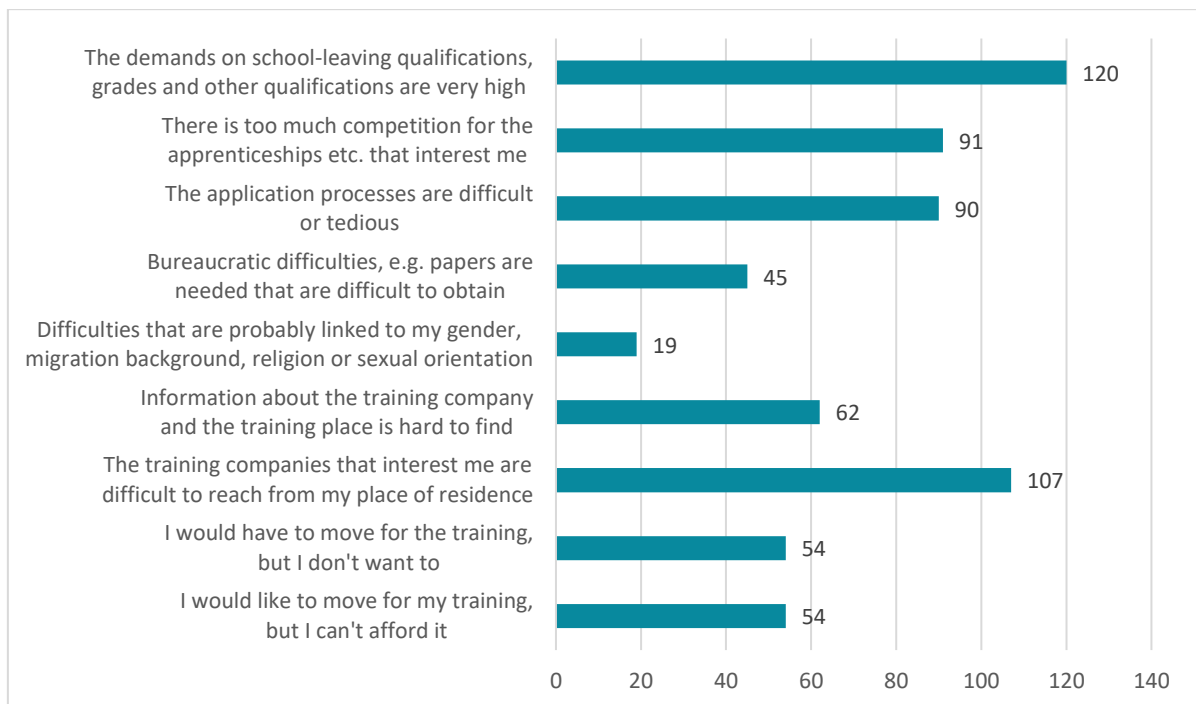


Figure 21: ‘What obstacles do you expect to encounter when looking for an apprenticeship?’ (n = 290, multiple answer)

RQ2: What challenges do regional employers in the Rhein-Hunsrück district face when filling training/apprenticeship vacancies? What requirements and offers do they have for potential applicants and how are the target groups addressed?

Valuable insights for addressing the second research question are expected from the upcoming employer survey. However, preliminary conclusions can be drawn from the exploratory interviews conducted with regional employers and labour market actors. These interviews suggest that the labour market situation has undergone significant changes over the past 10 to 20 years. While there is currently a high number of training positions available, the pool of suitable applicants remains relatively small. As a result, companies often face limitations in selecting trainees. Many now recruit individuals who might not have met their criteria 5-10 years ago and offer additional internal support, such as tutoring, while others may choose not to hire at all. The interviews also highlight that small companies in particular experience significant difficulties in adapting to these conditions. They often lack the resources to a) present their company at relevant events or through appropriate media and b) provide supplementary training, such as language instruction, for apprentices. This limitation poses a considerable problem, as it leads many companies to





exclude the possibility of training young migrants with limited or no German language proficiency. Consequently, there is widespread recognition of the need for more targeted financial support through funding programmes (e.g., the European Social Fund, ESF) and a call for a reduction in associated bureaucratic barriers.

Data relevance

Preliminary findings indicate that insights have already been drawn from both the youth survey and the interviews, aligning with the identified data needs. More detailed results will be gained through the upcoming bivariate and trivariate analyses. Overall, the survey results demonstrate a balanced distribution across various school types. The intentional goal was to ensure broad representation across different school types and stakeholders, aiming for a degree of representativeness through purposeful sampling. While we successfully included young migrants (with limited or no German language skills), their representation was somewhat lower than initially hoped for, although the survey could also have been conducted in English.

Local relevance

At this stage, the results are especially interesting for regional employers, as the focus has primarily been on young people and their needs. Many employers, particularly smaller ones who do not participate in programmes or promote their training opportunities in schools, often have limited or no direct contact with young people. Preliminary findings suggest that the expectations and conditions for young people regarding training have shifted significantly in recent years. As a result, employers can derive valuable insights from the survey about the actual needs and preferences of different groups of young people and how to address these.

Policy relevance

In addition to offering valuable insights for regional employers, the findings to date also provide important perspectives for local policymakers and district development stakeholders. For instance, the topic of ‘working in the region’ is one of the key components of the district development concept currently under development, with the training situation playing a central role. The perspective of young people is often only marginally considered in the strategy processes. We will therefore recommend integrating the results of the RUSTIK youth survey into the district development concept to integrate the perspectives of different¹¹ young people on the topic of training into the concept. Furthermore, the findings from the data experiment present new tasks and opportunities for the October 2024 established and LEADER-funded youth project at the PRP and can be included in the future adaptation of existing strategies such as the career orientation concept.

Robustness and limitations

The youth survey was able to involve students with different levels of education and from different types of schools. While students from the ‘Gymnasien’ (grammar schools) and ‘Realschule Plus’ (secondary modern schools) were predominant, this is reflective of the higher prevalence of these school types in the Rhein-Hunsrück district. Notably, 26% of respondents reported growing up speaking at least one additional language alongside German, and nearly 5% indicated that they do not speak German at all. The youth survey conducted as part of the data experiment focused

¹¹ in terms of age, gender, education or languages spoken (indicating migration background)





exclusively on young people residing in or attending school in the Rhein-Hunsrück district, due to pragmatic reasons such as the distribution of the survey through local schools and institutions. Consequently, young people living outside the district were not included in the survey. However, as employers offering training opportunities often look beyond the district's borders for recruitment, the findings cannot (or can only partly) be used to draw conclusions about how to better engage and address young people from outside the region. Conversely, employers in neighbouring districts may also be interested in training young people, especially those who live on the outskirts of the district.





Part 3: Reflections and learning

One of the key insights from the data experiment is the complexity of the apprenticeship and training situation in the Rhein-Hunsrück district, which involves numerous actors and (external) factors at various levels. We learned that to gain a comprehensive understanding of the situation, it is crucial to consider the diverse needs and opinions of all relevant groups at the same level. This includes not only the young people and regional employers (our primary target groups), but also the labour market actors, career guidance professionals, youth support organisations, institutions working with marginalised youth, and, of course, (regional) policymakers. A key step in our upcoming Living Lab work will be to address these often differing needs and to facilitate collaboration among all the stakeholders.

The involvement of the Regionalrat Wirtschaft (ReWi/RWRH) as the PRP was essential to the success of the Cycle 2 data experiment. Serving as a trusted intermediary, ReWi fostered confidence among participants and effectively leveraged its established network for broad stakeholder engagement. Regular exchanges between the LLC and the PRP facilitated consistent communication and alignment, ensuring that data collection was both coordinated and attuned to local needs. This collaboration allowed the experiment to address challenges more effectively, highlighting the importance of a well-connected regional partner in building trust and securing stakeholder involvement. The Living Lab approach itself proved especially beneficial in Cycle 2, as its transdisciplinary framework supported a more integrated and impactful process than traditional methods. By engaging stakeholders from multiple sectors on a regionally relevant challenge, the LL approach provided unique leverage to drive meaningful change locally, positioning the experiment as not only a data collection effort but also a catalyst for sustained, regionally grounded impact.

Reflections on data sources, methods, and tools

Data issues and obstacles during the experiment

The experiment encountered various data-related challenges, especially concerning the conceptualisation and distribution of the youth survey. The process required significantly more time than initially anticipated. This was partly due to the extensive pre-testing conducted in schools and the iterative coordination within the 'data experiment working group', which included multiple feedback loops that were underestimated in the initial timeline. However, the primary reasons for the delays were related to various bureaucratic and data protection requirements. For example, the questionnaire underwent multiple revisions to comply with specific data protection regulations applicable to surveys in schools within Rhineland-Palatinate. Original plans to incentivise participation through a prize also had to be abandoned due to these restrictions. Additionally, obtaining approval from the Rhineland-Palatinate Ministry of Education to conduct the survey in schools introduced further delays, preventing the finalisation of the survey before the summer holidays in 2024. As a result, given that access to young people would have been limited during the holidays, the survey period was extended by more than four months.

The data experiment in Cycle 2 also faced challenges related to the quality and availability of labour market data, particularly for apprenticeship and recruitment information. Existing (and available) datasets often lacked sufficient detail and granularity, especially at the regional level,





making it difficult to draw reliable conclusions. Apprenticeship databases used as secondary sources frequently contained vague or non-comparable entries, which reduced their utility for in-depth analysis. Initial expectations for more robust data access were unmet, and it remained unclear whether this limitation stemmed from the restricted access or an inherent gap in data availability. As a result, the experiment placed greater emphasis on qualitative data, which aligned with stakeholder interests and offered valuable insights that quantitative data could not provide.

Managing data issues and obstacles

To manage the data challenges encountered during Cycle 2, adjustments were made to the original plan. While shifting the timeline of the youth survey was not ideal, because this resulted in the postponement of the employer survey, it was feasible due to the flexibility provided by the Living Lab approach. It is also important to mention that alternative data collection methods were considered in the planning stages of the data experiment, particularly as a contingency in case of a low response rate to the youth survey. Options included using the pre-test results or conducting an alternative survey with participants of the 'Blinddate' programme (see Results to date). However, due to the high response rate, these alternatives were ultimately not needed.

To address the insufficient labour and training market data, 14 qualitative interviews with labour market stakeholders were conducted. These interviews provided valuable insights into the regional employment and apprenticeship market, compensating for the lack of comprehensive quantitative data and enriching the experiment with stakeholders' assessments of the current labour/training market situation.

Pilot Region Partner's perspective on data

Based on frequent discussions with the employers, the PRP was already aware of some of the problems related to the filling of vacant training positions. For example, it was suspected that the requirements for the applicants were often too high and that the changes that had occurred in the labour market in recent years were not always adequately addressed. The data experiment confirms some of the assumptions but also provides new valid data for improving the application process for training places and a better consideration of the needs and demands of young people for training and employment purposes.

The increased complication and delay of processes due to the ever-increasing bureaucratic requirements, which are increasingly perceived in various areas and by various stakeholders, was also evident in the survey.

Experiment design and implementation

Strengths and successes

A primary success in the Cycle 2 data experiment was the active engagement with young people through the survey, which enabled a comprehensive understanding of their perspectives on local apprenticeships. Actively involving youth in the design phase, particularly through pre-testing (71 students tested the questionnaire), ensured that the data collected captured their priorities and concerns. Another strategic decision was to gather data from young people before engaging with





the employers, which enhanced insights into the expectations of the youth prior to analysing employers' perspectives.

Overall, the high level of stakeholder participation was a significant achievement in Cycle 2. This includes not only the youth survey but also the interviews and focus groups with nearly all invited individuals agreeing to engage. This strong participation can be linked to the regional relevance of the topic and was facilitated by the extensive network of the PRP. Acting as the central communicator, the PRP ensured seamless coordination and effective outreach across all relevant groups, fostering collaboration and responsiveness and ultimately enabling a smooth and efficient data collection process.

Scope for improvement

Despite valuable findings, the timeline was impacted by delays in survey distribution and data collection. Consequently, data collection is still ongoing with the employer survey rescheduled for early 2025. Lessons for any future data experiment include streamlining the data collection process and improving the survey deployment efficiency (e.g. by reducing feedback loops or by planning the timing so that it does not overlap with vacations).

Additionally, the PRP offered to present the survey directly on-site at the schools. However, this offer was not taken up by the schools. Such a presentation could have potentially boosted participation even more while at the same time increasing awareness of the topic. The initial plan also included additional transdisciplinary formats, such as focus groups with young people to discuss the collected data, aimed at achieving more comprehensive and well-rounded insights. However, these could not be implemented due to time constraints. Nevertheless, this should be reconsidered in the future continuation of the Living Lab work.

Skill development and capacity building

Skills developed

Through the data experiment, the team developed key skills, particularly in designing surveys tailored for a specific target group: young people. This required a distinct approach compared to surveys designed for academic or general audiences, with careful attention to elements that would resonate with and engage youth participants. Collaborating with young people on survey development strengthened skills in participatory research methods and understanding of data nuances relevant to the youth demographic. Additionally, team members gained experience navigating complex data protection requirements, a crucial skill in conducting compliant research with minors. In general, the team developed a deeper understanding of the German and regional training and apprenticeship system, an area that had not previously been a focus in the LLC's active work, enriching their understanding and capacity to address regional workforce challenges.

Capacities

The data experiment strengthened the team's capacity to align research efforts with the Theory of Change (ToC) framework. This also includes conducting the institutional mapping and the analysis of the broader policy landscape and integrating the findings into this framing. This process provided valuable insights into the realistic impact the experiment could achieve, helping





us to understand the ‘accountability ceiling’ – the point at which our influence ends and broader systemic factors take over. This understanding is essential for setting achievable goals, assessing impact, and defining the scope of future efforts.

Pilot Region Partner’s perspective on skills and capacities

The survey of young people has significantly increased the PRP’s understanding of the needs of the target group. However, the constraints and obstacles faced by some stakeholders, especially schools (like high demands on bureaucracy and data protection as well as too many requirements from politics and administration), also became clear. Furthermore, the different perspectives of young people and employers on training were interesting. Employers recognise the training requirements for young people and have potential future skilled workers in mind. Young people, often entering the workforce for the first time, typically have only a rudimentary understanding of everyday working life, the skills required and the activities to be carried out. The trainers are usually much older and find it difficult to empathise with the views of young people.

In addition, the PRP has now better access to schools and other relevant institutions. It could be interesting to interview young people who have already started an apprenticeship or a dual study programme and have gained initial experience to find out how their views may change and whether expectations have been met.

Innovation and impact

Reflections on innovation

While the data experiment introduced some innovative elements, such as targeting young people and involving them directly in the survey design process (participatory survey design), it did not utilise a novel data collection or analysis method. Instead, traditional surveying was chosen as the most appropriate approach due to the specific nature of the transition challenge - understanding the alignment (or mismatch) between youth expectations and regional apprenticeship opportunities. Surveying was seen as the best fit to address this challenge comprehensively, providing structured and comparable data on youth perspectives and needs. Thus, the data innovation lay primarily in the survey’s design and target audience, with the participatory approach ensuring the survey was tailored effectively for young people. While this provided valuable insights aligned with the transition challenge, it limited the experiment’s capacity to explore more innovative data collection techniques.

One of the desired (future) outcomes from the data experiment lies in the establishment of new information flows and networks between young people and regional employers. Creating a ‘platform’ to identify and align the needs of both groups is a new approach for the region and has been recognised as highly relevant by local stakeholders. Future innovations could build on this foundation, establishing channels/projects/events for ongoing dialogue and collaboration between young people, employers and other relevant stakeholders.

Short-term impacts

In the short term, a central step will be to communicate the results of the data experiment to practitioners, including employers, educators, and career counsellors, to build awareness and





enhance their understanding of the needs and expectations of young people. The resulting discussion could lay the foundation for influencing local policies and practices, especially those that the PRP can directly influence, like the district development concept or the regional LEADER strategy and its projects. Another crucial aspect in terms of influencing policies will be the use of the PRP's established networks like the 'Concerted Action / Youth Conference' in the Rhein-Hunsrück district. This formalised network, involving the district administration, secondary schools, the job centre, the employment agency, and the PRP, has developed a coordinated career guidance concept. Schools across the district, alongside the 'JobFux' career counselling programme, are instrumental in implementing this guidance. Leveraging these networks will not only raise awareness of the experiment's findings but also strengthen regional collaboration.

Longer-term impacts

As previously mentioned, the data experiment could lead to the establishment of stronger information channels between young people, regional employers, and other key stakeholders. This can be achieved by enhancing information access for both youth and employers. The Living Lab activities aim to initiate and strengthen regional networks, paving the way for new projects and policies that connect employers with trainees and job seekers more effectively. Over time, these efforts should foster a constructive regional dialogue, resulting in concrete solutions to address the 'mismatching problem' and potentially filling apprenticeship vacancies (see Figure 16 Data experiment and data collection methods Living Lab Rhein-Hunsrück). Ideally, this will lead to increased investment and support for proactive policies, creating a collaborative environment where removing obstacles identified in the experiment becomes a priority.

Potential for sharing learning

There is potential for sharing the findings from the youth survey with other rural areas facing similar challenges. Many rural regions in Germany encounter comparable issues concerning the training market. Furthermore, the focus on young people is becoming increasingly relevant in regional development. Given the PRP's role as a regional manager within the LEADER framework, the LEADER network offers a promising platform for further dissemination and sharing as well as discussing these results. Other regions might benefit from the experiences in the Rhein-Hunsrück district if they plan similar surveys. It is important to acknowledge, however, that education and training systems vary significantly across European countries. Consequently, the data experiment's applicability is primarily limited to contexts comparable to Germany, such as Austria or the Netherlands.





Part 4: Future steps

Cycle 3 plans

Finishing Cycle 2

The final stages of Cycle 2 will focus on gathering data from the employer survey which aims to provide deeper insights into the needs, challenges, and expectations of regional employers in filling apprenticeship positions. This survey will complement the youth survey results, enabling a comprehensive understanding of the mismatching issue. The survey will be launched at an event with the regional employers and multipliers on February 6th, 2025. The event aims to present and discuss preliminary findings, share insights, and encourage dialogue among employers about potential solutions to attract and retain apprentices. This event will also serve as an opportunity to raise awareness of the data experiment and foster collaboration among employers and other stakeholders.

Additionally, an in-depth analysis of all collected data will be conducted, combining results from various sources, including youth surveys, employer surveys, qualitative interviews and secondary statistical data. This integrated approach will ensure a holistic view of the apprenticeship landscape in the Rhein-Hunsrück district, laying the groundwork for actionable strategies and recommendations.

Plans for Cycle 3

Building on the findings from Cycle 2, the next phase of the Living Lab will focus on fostering dialogue and collaboration among key stakeholders. A central activity will be a dialogue event planned for autumn 2025, bringing together young people, employers, educators, and policymakers. This event aims to facilitate direct exchanges between youth and employers, addressing their respective needs and expectations while also identifying common ground for improved alignment.

Engagement with policymakers will also be a priority in Cycle 3. Efforts will focus on strengthening relationships with regional and state-level policymakers to integrate findings from the Living Lab into both existing and emerging strategies. This aligns well with the ongoing development of the district development concept, set for completion by 2026. By connecting Living Lab activities with policy frameworks, the LL Rhein-Hunsrück seeks to ensure that its insights contribute to sustainable changes in workforce development and apprenticeship matching in the region.

Future collaborations

Future collaboration plans and the sustainability of the Living Lab are strongly supported by its integration into the core activities of the PRP Regionalrat Wirtschaft. Since the topics addressed by the Living Lab align closely with the PRP's mission, the PRP will continue to engage with these issues and maintain the collaborations established during the RUSTIK project beyond the project conclusion. Additionally, the establishment of the youth project, running from August 2024 to December 2028, guarantees that youth-related topics will remain a priority on the regional agenda. Looking ahead, repeating the online survey in a few years, particularly after the implementation of initial measures, is a feasible step to evaluate progress and further refine





strategies for aligning youth and employer needs in the region. These efforts collectively ensure the long-term impact and continuity of the Living Lab's initiatives.

Plans also include collaboration with other rural regions, particularly LEADER regions, where strong connections already exist, to exchange insights into different approaches to addressing challenges in the training market.

Communication and dissemination

Plans for communication and dissemination include a range of activities to ensure the findings of the Living Lab are effectively shared with key stakeholders and the broader community. As mentioned before, two major events are planned: an employer event and a dialogue event. To complement these events, a brochure summarising the main results of the data experiment is currently in development and will be distributed at the employer event to ensure accessibility of insights. It is also possible to organise a third event/working group with young people to discuss and refine the results even more.

In the coming months, further steps in communication and dissemination will be planned in more detail to ensure the findings from the Living Lab Rhein-Hunsrück are effectively shared with various audiences. A key objective is to publish the results from a scientific perspective in German journals and potentially also in collaboration with another Living Lab addressing similar challenges to enable comparative insights. The LL Monmouthshire presents an interesting example, as it also faces challenges related to the outmigration of young people and is exploring strategies to encourage them to stay and work in the region. Additionally, various networks will be utilised to disseminate the findings. Alongside the already mentioned regional networks, the nationwide LEADER network and the 'Deutsche Vernetzungsstelle Ländliche Räume' (German CAP Network) will play a significant role in sharing results broadly. The latter, as a long-standing partner with a range of communication media, provides an ideal platform to reach a national audience.

Dissemination formats will vary to suit different stakeholders. Alongside traditional written outputs, such as articles in professional journals, local newspaper articles, newsletters, conference presentations, or contributions on online platforms, more engaging formats are also being considered. For instance, a short film could effectively present the key findings and their implications to a broader audience. These diverse approaches, combined with the strategic use of networks, will ensure that the insights from the Rhein-Hunsrück Living Lab are disseminated and contribute to broader discussions on addressing apprenticeship challenges in rural areas.





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Italy: Garfagnana

Francesco Mantino, Brigida Marovelli, Massimo Rovai, Daniele Matteucci, Mirta Sutter, Barbara Forcina, Stefano Stranieri





Summary and overview

Living Lab challenge

The Living Lab (LL) identified two main transition challenges:

- a) valorising the multifunctional role of forestry as part of the broader climate-environmental transition;
- b) community regeneration in the context of the demographic decline of mountain areas.

Multifunctional forestry and community regeneration are strongly interlinked. Both transitions must be jointly considered and designed in a synergic way. The LL integrates the two challenges by developing an approach based on partnerships of different actors working on forest valorisation. Community regeneration goes hand in hand with developing the multi-functional role of forestry.

Data experiment

Our data experiment addresses the fragmented and incomplete information on forest resources and their management in the MontagnAppennino Pilot Region. By integrating diverse data sources – including management plans, funding applications, and stakeholder surveys - it aims to provide a comprehensive understanding of the forest supply chain and ecosystem services. This experiment combines innovative data integration with participatory governance; engaging stakeholders to ensure local insights shape policy and planning.

Preliminary results

The work completed in Cycle 2 yielded three fundamental results:

- Identification of local challenges in forest resource management due to limited innovation, fragmented governance, cultural distrust and the difficulty of recognizing forests as commons
- Involvement and engagement from people involved with forest supply chains considered in a broad sense (including tourism and social activities)
- Strong participation and cooperation from regional and local administrations.

Under a more operational point of view, we should consider results coming from the collection of new and unexplored information, which include: a) the stakeholder survey; b) data on forest areas in the Pilot Region; c) local databases on timber and firewood production and forest management plans; d) public funding records.

Key learning to date

The data experiment has provided valuable insights into addressing fragmented and incomplete data while highlighting key challenges. The lack of systematic regional databases called for an integration of diverse and often inconsistent data sources. Collaboration between the Local Action group (LAG) and academic partners proved essential, combining local knowledge with analytical tools to fill critical gaps. However, variability in data quality, particularly in forest management plans and harvesting records, underscored the need for standardisation and improved methodologies. Stakeholder engagement revealed strengths but also areas for improvement, particularly in involving private actors in social uses of forests. The experiment also pointed to broader cultural and institutional challenges, such as overcoming individualistic attitudes and fostering trust and collaboration among stakeholders. These lessons emphasise the importance





of refining data collection processes, enhancing stakeholder participation, and promoting a cultural shift toward cooperation to ensure long-term sustainability and impact.

Next steps

In 2025, efforts will focus on improving forestry data systems and analysing forest characteristics for policy design. A January workshop will present preliminary results to local stakeholders, discussing carbon credits, social uses of forest, forest management plans, and policy scenarios, with the goal of developing an updated territorial information system. Data collection will include analysing harvesting applications, mapping forests and investments by February, and assessing production and carbon credits by mid-April, alongside completing analysis for other forest uses.



Figure 22 Picture from our Living Lab workshops with stakeholders from different institutions.





Part 1: Living Lab context

Pilot Region introduction

The Pilot Region is in the northern part of Tuscany and includes the territory of Garfagnana, Media Valle del Serchio, Alta Versilia and Appennino Pistoiese, part of the provinces of Lucca and Pistoia in the northwestern part of Tuscany. The territorial size is 2,110 km² (of which 1,872 is mountainous) and encompasses 27 municipalities.

This territory is covered by the Local Action Plan of the LAG MontagnAppennino. The territory is almost entirely covered by forest (88%, 2020 data). These are mostly mature forests (86%), continuing to grow over the past years (+15% between 2013 and 2020).

Population decline is one of the significant challenges in the area, with a population density of half the regional average and a dependency ratio of 57% of the population. The total population in the area in 2020 was 88,343, while in 2001, it was 96,556. These data confirm the steady trend of population decrease. From 2011 to 2020, there was an overall decrease in the area's total population of -7.58%.

In 2019, the population aged over 65 accounted for 29% of the total, up more than one percentage point from 2014, which stood at 27.81%. This value marks a consistent deterioration from the figure eight years earlier, in 2001, where the percentage was 24.8%. In 2019, the population aged over 85 represented 5% of the total in the province of Lucca and 6.74% in the province of Pistoia, still up from the 2014 data, where some municipalities already had an even higher percentage.

Functions

Woodland in the LAG area has multiple functions beyond forestry, such as touristic-recreational function, biomass for heating (production of firewood and biomass), productive function (timber for construction and furniture), food production function (chestnut groves and undergrowth products), social function (civic use), and last but not least many eco-system functions (including landscape, maintenance of balanced hydrologic regime, soil protection function, biodiversity and climate regulation). LL meetings and focus groups highlighted that it was highly important to consider not only the ecological and environmental dynamics of woodland, but also the economic, historical and cultural functions for the local population, and that the forest management should also contribute to its productive use and maintenance of the territory.

Most forests are privately owned (80%, according to some regional estimates), the remaining 20% owned by the regional authorities (10%) or are civic/municipal properties (10%).

Promoting the sustainable use of forests for productive purposes contributes not only to supporting local livelihoods but also defends the area from the uncontrolled spread of the forest due to abandonment. There is a serious problem with encroaching forest (+15% between 2007 and 2020). The recovery of traditional productions from chestnuts (chestnuts flour protected by PDO certification) and the forest-wood supply chain are among the main economic sectors of the Pilot Region. The cultivation of chestnut has ancient origins, and it is widely present in the mountains of Garfagnana, Serchio Valley and Appennino Pistoiese at an altitude of up to 1,000





metres due to the favourable climate. There are very old and large chestnut trees (600 years and 10 metres in circumference) and many varieties according to the altitude and the place (there are around 100 varieties in the province of Lucca alone). This incredible biodiversity is a key factor for chestnuts to survive in the face of climate change.

The functions of woodland in the pilot region are summarised below:

1. Direct economic function: production of wood for multipurpose uses and chestnut for food use.
2. Indirect economic function: maintenance of landscape and recreational uses for local population and tourism activities
3. Direct eco-system functions: landscape, maintenance of balanced hydrologic regime, soil protection function, biodiversity conservation. All these functions are crucial not only for the woodland area but also for the lowlands not covered by forests.

Local added value generated by direct economic functions is relatively low compared to the other activities of the Pilot Region. As far as the forest-wood supply chain is concerned, working operations on wood are now mainly limited to the production of firewood and other related products (such as woodchip). However, they can be potentially increased if woodland was managed more rationally, and the forest supply chain was better organised and structured. Conversely, local added value associated to indirect economic functions (for example, nature tourism) is relevant. Finally, value added related to direct ecosystem functions is hard to estimate but the LL have tried to capture at least part of it in the data experiment phase.

Transitions

The LL identified two main transition challenges:

- a) valorising the multifunctional role of forestry as part of the broader climate-environmental transition;
- b) community regeneration in the context of the demographic decline of mountain areas.

Multifunctional forestry and community regeneration are strongly interlinked. Both transitions must be jointly considered and designed in a synergic way. The LL integrates the two challenges by developing an approach based on partnerships of different actors working on forest valorisation.

Community regeneration goes hand in hand with developing the multi-functional role of forestry, because the latter can be effectively addressed through a collective approach. LAG MontagnAppennino was used to adopt collective approaches, under different forms, to involve as many of the local population as possible. In the case of forests, there is a variety of stakeholders who need to be involved in the initiative, from foresters to tourism operators. Multifunctional forestry must be associated to social cohesion in the region and needs a community approach to be properly promoted and developed. Operationally, community approaches can take different forms (for example, community projects such as those set up for social services to local populations, smart villages, public-private partnerships) which are still being defined within the Local Development Strategy 2023-27. The ultimate objectives are to determine potential solutions in the design of LAG's interventions addressed to the forest sector in Local Development Plan, to be implemented in 2025. Furthermore, given the role of LAG as the manager of other national/regional policies in the coming years, an additional objective is combining various





sources and policy instruments, to strengthen policy synergies and complementarities in forest initiatives.

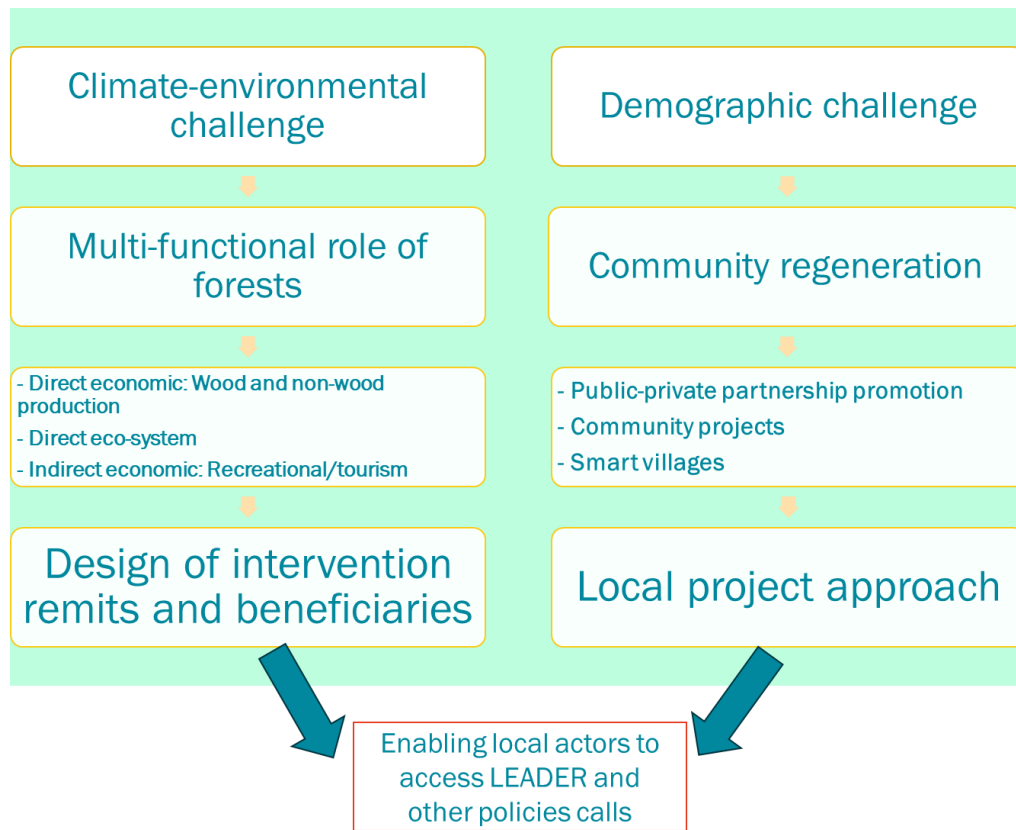


Figure 23 Transition challenges: Multifunctional forestry and community regeneration

Living Lab partnership

Table 11 Living Lab partnership

Name	Organisation	Role/expertise
LAG MontagnAppennino	LOCAL ACTION GROUP	Designing and implementing LEADER approach and local development policies
CREA- Policies and Bioeconomy	Public Research Institute	CAP; Rural development and regional development policies; Promotion of networking activities
University of Pisa	Department of Civil and Industrial Engineering Public University	Economy of Forest sector; Rural development; Participative approaches in local development





Living Lab challenge

Rationale and research questions

The questions we identified in cycle 2 remain valid. Based on the importance of forestry for the local economy and the need for designing well-tailored policy instruments, we raised two research questions:

- How to promote the sustainable use of the forest for productive and environmental purposes, to support local added value and reduce uncontrolled spread of the forest due to abandonment?
- What role can community projects have in fostering cooperation, strengthening social capital and building synergies between local initiatives promoted by rural population?

To be answered, these two research questions need to be supported by adequate information systems at the local level.

Policy relevance

The policy relevance of this experiment is twofold:

- **Enhancing Knowledge for Policy Uptake:** Improving the state of knowledge on the forest supply chain for several policy uptakes by local beneficiaries: the design of animation activities and calls for applications in LEADER 2025-27 and Inner Areas Strategy 2024-27; better policy design by Unions of Mountain Municipalities; the assessment of potential carbon credits by Forest Consortia and Municipalities for selling to private buyers
- **Engaging Local Stakeholders in Policy Development:** By actively involving local stakeholders in the knowledge acquisition process, the LL ensures that their feedback shapes policies crafted by the LAG and Unions of Mountain Municipalities. This inclusive approach lays the groundwork for effective policy adoption and long-term community alignment with the forest management and sustainability objectives.

Stakeholders

We have involved a wide range of actors in LL activities, including public agencies; agricultural and forestry enterprises; commercial, tourism and craft enterprises; third sector entities and other associations; educational institutions; community cooperatives and citizens.

The area of the LAG includes four Unions of Mountain Municipalities - 1) Garfagnana; 2) Media Valle del Serchio; 3) Appennino Pistoiese; 4) Alta Versilia - and these public bodies participated in all LL activities in 2023. We also involved the main actors involved in forestry activities in the area, namely the three Forestry Consortia, voluntary private law associations of owners of private plots of land and forest-related businesses : 1) the Forestry Consortium of Villa Basilica operating between Lucca (Villa Basilica, Capannori) and Pescia (Pistoia province) managing around 400 hectares of forest; 2) the Agroforestry Consortium of Colline Lucchesi operating in the area of Lucca (Pescaglia and Borgo a Mozzano); 3) the Forestry Consortium of Cerbaie, operating between Lucca, Pisa and Florence (from Altopascio to Fucecchio).





In addition, representatives of the community regeneration projects directly involved in forest management have been involved, including members from forestry consortiums, farm unions, voluntary associations, public agencies, community cooperatives, social enterprises, consultants and planners.

In the next phases of LL activity, we aim to engage new actors, who were not sufficiently involved in the previous phases. These include representatives of social inclusion enterprises/associations, tourist operators, forest therapy operators, and experts in forest management. They will be involved in LL meetings, workshops, thematic and/or territorial discussions, spaces for consultation, and pooling of relevant experiences and skills.

Theory of change

A Theory of Change approach asks us to indicate the possible linkages between transition challenges, actions to implement through concrete policy instruments, and results planned in the short, medium and long term.

Figure 24, below, delineates these linkages, starting from the necessary collection of new and unexplored information related to the forest supply chain and policies implemented in the pilot region. This set of relevant information is utilised to design appropriate interventions and local project approaches. Improved policy design should bring several effects. We assume that the intense work of combining different data sets at the local level will improve the design of more targeted interventions addressed to forest operators' and territorial stakeholders' needs. We also assume that participatory approaches will allow us to reach hard-to-reach populations and zones; ensuring a sufficient coverage of people working in the forest eco-system. These two circumstances will improve the possibility of the success of LAG interventions for the forest eco-system.

In the short-to-medium term, better policy design will involve reaching out to the most vulnerable populations, improving people's access to LAG and other policy calls, and creating new forms of partnership and collaborations among the forest operators. We anticipate that these short-to-medium term effects will be visible in 2026, given that LAG calls will be issued in late 2025.

Possible longer-term effects will be an increase in the value added to forest eco-system services at the territorial level, since better integration of the different phases of wood and timber production will translate into higher shares of the final production value for the local population. Furthermore, interventions promoted by LAG can increase labour opportunities for the local population.

Risks of failure are associated with the difficulty of ensuring adequate integration and coherence of policy interventions along the forest supply chain. Integrated projects can be more complex to implement than financing individual applications. Furthermore, the Smart Village approach is a relatively new method in the rural development framework, necessitating some experimentation at the local level. However, LAG MontagnAppennino has sufficient experience in implementing integrated projects and a high capacity to overcome risks of failures.



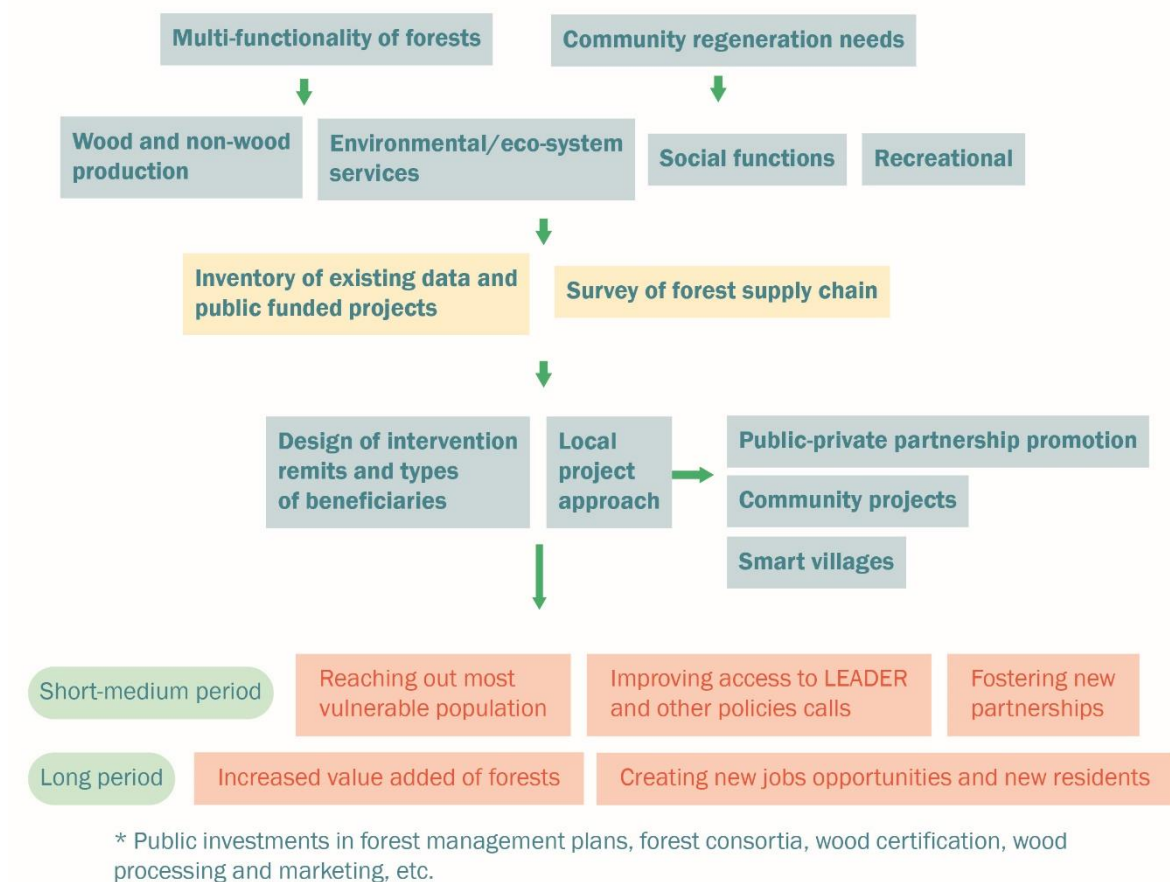


Figure 24 Theory of change in MontagnAppennino Pilot Region

Data relevance

Inadequate knowledge exists about the forest stock regarding both forest type and ownership structure. There is a wide range of collectively owned forests (civic uses), but even in this type of forest, little is known about forest management plans.

Hence, in-depth qualitative and quantitative information on the characteristics of forest resources and their ability to provide different mixes of ecosystem services (regulation of forest management, production of wood, environmental conservation, cultural and social benefits) in different territorial contexts is needed to proceed with effective participatory planning. Knowledge gaps also exist regarding the organisation of the forest supply chain, including the number of operators, distribution of public and private forests, systems of wood processing and market outlets. Filling these gaps in knowledge of the forest system will enable appropriate strategies to improve the organisation and institutions governing the forest sector and its relations with the local economy. Considering that 88 per cent of the pilot area's territory is covered by forests, any transition strategy can only start from a thorough understanding of one of the main components of the local land heritage.





Part 2: Living Lab Cycle 2: Data experiments

Data experiment

Developing the data experiment

The experiment was discussed and agreed with LAG's partners. It was designed after the one-day workshop with main stakeholders at the local level (see Data sources and methods for a full description of the workshop and related findings). Based on the LL workshop results and discussion with forest experts, a series of objectives and data needs were defined. Other elements were considered, such as:

- potential risks and failures;
- ongoing strategic process of LAG and other public and private local institutions;
- practical benefits for concrete policy design, overcoming costs of data collection and processing.

Experiment description

The experiment in this Pilot Region is based on two fundamental approaches:

- a) Combining different sources of information to provide a significant improvement in the knowledge of forest functions (structure of the supply chain and needs for interventions) and complementing existing information with local information provided by regional and local actors
- b) Feeding a database on forest resources not available elsewhere

Figure 25, below, summarises the functions of the forest supply chain we aimed to identify and analyse, starting from the production of wood and non-wood, and including social/recreational factors, and carbon credits as proxy of ecosystem services. In the same figure, different sources and types of information needed to be provided to carry out the function analysis. The data experiment design tried to cover the differentiated data needs related to functions and combine them in a data set at LAU level (municipality). In fact, there is no common data source available for all types of function. The information needed to explore each function is fragmented at regional and local levels. Furthermore, for some crucial functions (for example, wood production or social uses) there is no information at all and a specific effort in gathering data at local level needed to be undertaken. Finally, regarding carbon credits, a specific analysis was required based on the forest management plans of collective bodies (Union of Mountain Municipalities, Forest Consortia, etc.). Figure 25 also includes forest investment as a component of the forest system, which needed to be explored through data collection and analysis.



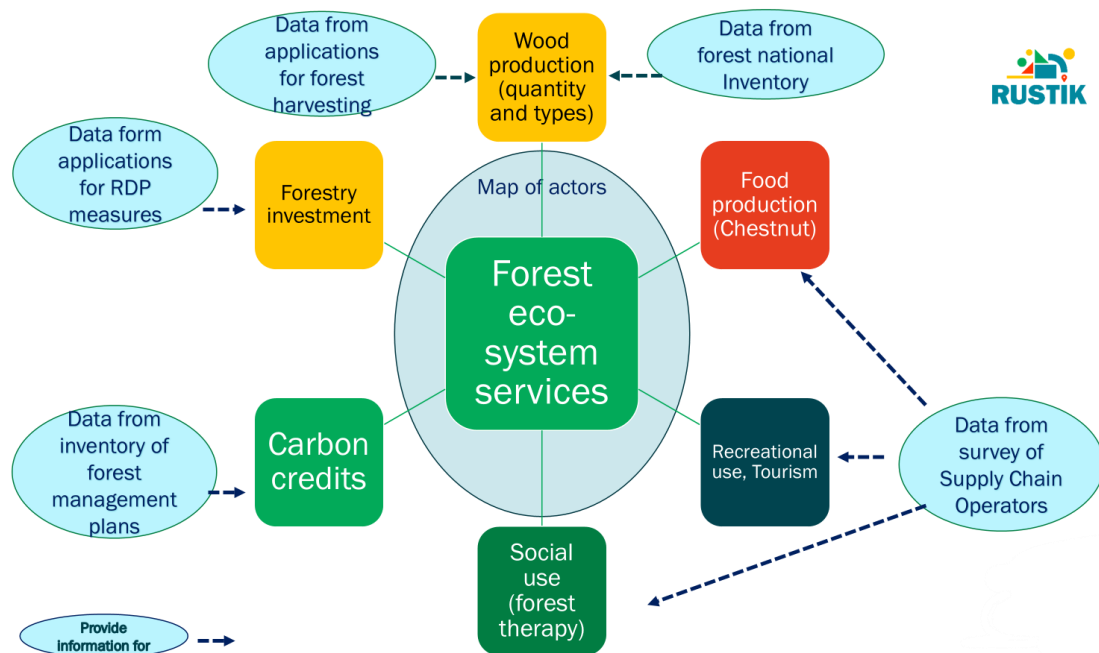


Figure 25 The functions of the forest eco-system services that we aimed to identify and analyse in MontagnAppennino Pilot Region

Experiment objectives

The experiment objectives in this Pilot region are connected to the selected transition challenges:

- Exploring the main functions of forest management and the needs of forest operators in the supply chain
- Integrating the different sources of information on forest uses in the region
- Making an inventory of the projects implemented in the pilot region, related to forestry and social and recreational initiatives linked to the forest sector
- Providing a map of forest characteristics and functions to inform policy design
- Discussing outcomes with stakeholders to define consistent options in policy implementation

To achieve these objectives, involving local stakeholders and regional administrators in a living lab process is a fundamental factor to determine the success of the experiment.

Relationship to theory of change

Since the Theory of Change assumes a linear relationship between policy actions and medium-to-long term impacts, knowledge of the institutional and policy environment surrounding our LL is crucial to avoid simplistic analysis of causes and effects. In this regard, the collection of information on past and current policy measures relating to the forest is relevant for understanding the likely impacts of initiatives promoted by the LAG.





Data use

Data sources and methods

Participatory methodology: stakeholder mapping and involvement

We conducted a mapping of local stakeholders and compiled an inventory of already funded projects related to forest management. At this stage we agreed that it was necessary to engage stakeholders more actively and to facilitate horizontal communication among them to promote collaborative interaction and shared understanding within the network.

The stakeholder mapping across the forest supply chain was conducted to identify and categorize key actors involved in forest management, production, and conservation. This mapping was carried out using multiple data sources

1. **Web Scraping:** Data was gathered by systematically scraping public information online to capture a broad list of stakeholders; particularly those with a digital presence related to forestry, environmental and touristic services.
2. **Local Databases:** We accessed regional and municipal databases that track businesses and organisations operating within the forestry sector, including those engaged in eco-tourism, recreational use, and firewood and timber production.
3. **Public Funding Records:** To further refine our mapping, we reviewed records of enterprises receiving public funding for forest management and related projects.

The stakeholder mapping provided a greater understanding of the network within the forest supply chain, helping to ensure that the survey and future engagements addressed the needs and priorities of all involved parties.

Based on this work and discussion with stakeholders, several data sources were identified to implement the experiment. Table 12 summarises them and describes their content.

Table 12 Main data sources and methods used in the experimental phase

Analysed Datasets		
Management Plans of State-Owned Forests	Union of Municipalities of Garfagnana – Union of Municipalities of Appennino Pistoiese - Union of Municipalities of Media Valle del Serchio	Creation of a Geographic Information System (GIS) in Q-Gis to acquire knowledge on the spatial diffusion of the areas under management
Forest Management Plans of Common land	ASBUC Barga ASBUC Villa Soraggio ASBUC “Sillano Storica”	
Forest management plans of Municipalities	Municipalities: Minucciano - San Romano in Garfagnana – Molazzana-Fabbriche di Vergemoli – Careggine-Gallicano	





Analysed Datasets		
Management Plans of Forest Consortia	Consorzio forestale di Villa Basilica (Forest Consortium of Villa Basilica)	
Private Forest Area under management forms	Union of Municipalities of Appennino Pistoiese - Union of Municipalities of Media Valle del Serchio	Comparative tables in Excel to improve knowledge on the spatial diffusion of the areas under management
Funding applications for silvicultural interventions with indication of the surfaces and type of forest	Tuscany region and Artea (Regional paying agency)	Creation of a GIS in Q-Gis to acquire knowledge on the spatial diffusion of the areas under management.
Funding applications for Rural Development Programmes (RDP) 2013-2023 on forestry measures	Tuscany region and Artea (Regional paying agency)	Comparative tables in Excel format. Distribution of funding across territory mapping in Q-Gis
Characteristics of wood and non-wood production, other uses of forests, market outlets for forest production, etc.	Survey at the local scale	Comparative tables in Excel format. Qualitative mapping of macro-areas (Garfagnana, media Valle del Serchio, montagna pistoiese, montagna Versilia)

The datasets described above, currently being processed towards the creation of a Territorial Information System using Q-GIS software, will serve to improve knowledge on the geographical distribution of public areas (public property and common lands) that are currently subject to a Forest Management Plan, as required by Regional Law in Tuscany, along with additional information on the types of forests managed and the silvicultural activities planned. The spatial identification has two applications: a) it allows the quantification of potential carbon credits in forest zones included in forest management plans; b) it enables the development of a comprehensive overview of possible intervention strategies and/or projects to promote the spread of Management Plans and sustainable management practices (for example, sustainability credits) in adjacent privately owned areas, to increase the forest areas covered by a Management Plan. At present, 80% of the forested area in the region does not have a Management Plan, which is undoubtedly a weakness for the area.

The processing and analysis of data related to authorizations for silvicultural practices (for example, forest harvesting) will identify areas where interventions are concentrated, the types of forests involved, and the types of operators performing these interventions. These types of data are under the responsibility of the Tuscany Region.

Finally, the processing and analysis of RDP funding data will provide a comprehensive view of the financial resources allocated to forest management and the types of operators (both public and private) who have accessed these measures.





Regarding chestnut production, data provision is under the responsibility of Chestnut Associations, grouping all landowners specialised in this type of farming (chestnut production is considered a farming activity according to the Italian regulations).

Survey addressed to local operators to understand the structure of supply chain

Based on the findings from the workshop, a tailored survey was developed to further investigate the structure of the forest supply chain within the LAG MontagnAppennino area. The survey aimed to gather insights from local operators across various sectors, with the goal of understanding key aspects of forest resource management and identifying areas for sustainable development.

Survey Structure and Objectives

The survey was designed to address several core components within the forest supply chain, including:

1. Processing Firms: covering primary and secondary wood processing operations.
2. Wood and Non-Wood Production: encompassing both timber and non-timber products sourced from forests, such as firewood and chestnuts.
3. Recreational Uses: examining forest-related tourism, including eco-tourism, forest therapy and wellness tourism.
4. Social Uses: exploring community-oriented applications such as forest therapy, common land management, and cultural initiatives.
5. Market Outlets: assessing the available channels and demand for both wood and non-wood forest products.

The objective was to provide quantitative and qualitative data on needs and priorities within the forest sector to inform sustainable management strategies and local economic development.

Data innovation

This experiment is innovative in the data sources, methods of collecting information to provide relevant indicators of forest management, and in mixing different data sources to measure the various dimensions of the forest system. We aimed to achieve a comprehensive understanding of the forest economy through innovative data collection and analysis methods. By integrating diverse sources of information – such as stakeholder surveys, focus groups, and mapping techniques – this approach facilitated a holistic view of the complexities in forest management. Engaging local communities and integrating their feedback into the analysis emphasizes participatory governance, which is crucial for sustainable forest management. This innovative blend of methods not only enhances data accuracy but also promotes active stakeholder involvement, leading to more effective and sustainable solutions for the forest economy. The focus on participatory governance must be further developed in the next stages.

Implementation

Implementing the experiment

Table 13 summarises the main steps and internal components of the data experiment, after the workshop with stakeholders (May 2024). The workshop was fundamental to exploring data needs, possible sources and realistic possibilities to obtain necessary information on the forest system.





Data collection and processing has since been the main activity of the LL and research group. This activity has also included testing the data quality and providing solutions in case of data quality failure. Geospatial information on the size and typology of forest areas in the Pilot Region have been collected, but this needs to be continued. Management plans have been collected by private and public bodies and applications for forest harvesting have been obtained from the regional administration. The survey started in June 2024 and is ongoing to capture as many responses as possible from local actors. Public funds related to RDP measures targeting forest investment have been collected and processed, and provide an interesting picture of the fund distribution in the Pilot Region. Information on food production in the forest area is still missing and requires further investigation.

Table 13 Timeline of the different data experiment components in 2024

2024											
Step 1 – Focus groups with stakeholders											
Step 2 – Data collection											
Forest area and characteristics											
Survey (forest functions)											
Survey (social and recreational uses of forest)											
Management plans of public and private forests											
Forest harvesting applications											
Public funds to forest investments (RDP measures)											
Other sources (food production in forest area)											
Step 3 – Data processing and mapping											

Adaptations

Information gathered to assess the wood production (quantity and typology) and carbon credits (from data available in forest management plans) are currently insufficient.





Information drawn from forest harvesting applications do not allow us to calculate the actual volume of timber harvested and its distribution. This requires a revision to the calculation method by applying standard coefficients to the information on the different categories of timber harvested, adapting the methodology to the available data.

The methodology for calculating the potential carbon credits that a forest can generate is based on carbon storage annually achievable from the forest management plan against carbon storage achievable under baseline practices. This methodology is only feasible in forest areas under management plans, which occupy a marginal share of the total forest area. In this case the methodology was adapted to application in representative areas of the Pilot region.

Other Living Lab activities and achievements

The collection of data related to the forest RDP measures spent in the Pilot Region responds to the need to explore the whole set of policy measures addressed to the transition challenge. RDP measures represent a major share of policies implemented in the area for the forest sector. This will also be helpful in cycle 3 for the rural proofing analysis, where a deeper investigation of the policy environment will be necessary.

Preliminary results

Results to date

One-day workshop with forest supply chain representatives covering wood processing, forest food production, and social use of forest

On May 24, 2024, we held a workshop to discuss sustainable management and multifunctionality of forests in the LAG area. The workshop's aim was to gather local stakeholders' perspectives to shape sustainable forestry management strategies which addressed their needs, within the forest ecosystem.

Participation and Structure: Seventeen stakeholders attended the workshop, representing sectors including forest management, tourism, environmental protection, and local governance. Moderated by researchers from CREA and the University of Pisa, the discussion was organized into three thematic sessions, each exploring distinct forest functions to support the transition towards sustainable economic, environmental and social management:

1. **Session 1 - Productive Functions:** This session examined the region's forest-based economic activities. Firewood remains the primary forest product, but prices have dropped due to increased pellet imports and competition from foreign markets. Timber production is underdeveloped, primarily due to the absence of a downstream supply chain. Even wood that could be effectively used for higher-value purposes ends up being sold as firewood. While innovative certifications (FSC and PEFC) are rising, issues such as small-scale enterprise limitations, high fragmentation of forest ownership, insufficient mechanization, and challenges in production standards, hamper certified timber's impact on economic sustainability. Discussions also highlighted the value of non-timber products (chestnuts, mushrooms, truffles) and the need for formal data collection in this sector, especially around the quantities collected.





2. Session 2 - Tourist, Recreational, and Social Functions: The focus shifted to Garfagnana's role as a destination for forest-related tourism, with 295,000 annual visitors contributing approximately €22 million. Stakeholders noted the popularity of wellness and 'slow tourism' and forest therapy, which studies have shown to reduce stress and improve mental health. Challenges include the maintenance of accessible trails, environmental education for local communities, and promoting a collective sense of responsibility for forest upkeep. Canyon Park, an outdoor adventure park in the forest, located in Bagni di Lucca, was cited as an innovative example in balancing visitor impact with environmental protection.
3. Session 3 - Environmental Functions: This entailed a discussion on forest ecosystem services, from carbon sequestration to water regulation and biodiversity. The participants explored the potential of Payments for Ecosystem Services (PES) as a framework to financially support environmental preservation efforts, particularly through sustainability credits. Sustainability credits are a specific form of the more widely known carbon credits. While the latter certify only CO₂ storage, sustainability credits certify a broader management of forest ecosystem functions (such as biodiversity preservation and accessibility for recreational purposes). Issues discussed included the need for broader implementation of forest management plans and the possibility of using sustainability credits to incentivize both local municipalities and private forest owners to maintain forest health and ecological balance.

General Findings and Recommendations: Three major themes emerged from the focus group:

- **Governance and Collective Responsibility:** There is a pressing need for inclusive governance models that see the forest as a public asset. This would involve multi-stakeholder engagement and strategic long-term planning to sustain forest resources as a community benefit.
- **Fragmentation and Associative Models:** Successful forestry management often involves associations or consortia that can overcome the limitations of the fragmented property ownership common in the region. Collaborative models like forest communities and consortia were seen as key to sustainable management.
- **Innovation and Entrepreneurship:** Economic sustainability and local development require both technical and social innovation. Examples like Canyon Park and forest therapy demonstrate that sustainable business practices can drive economic growth while conserving natural resources.

Proposed Actions: The group outlined several priorities:

- **Community Engagement and Education:** Integrate environmental education in local schools and encourage civic engagement, inspired by Emilia Romagna's "baratto amministrativo" (administrative barter) model, which allows tax reductions for community services.
- **Promotion of associationism / cooperation:** Raise awareness and encourage forms of associationism, such as land consolidation associations, forestry cooperatives or forestry consortia to enhance productivity and improve management of forest resources.
- **Investment in Innovation:** Foster an entrepreneurial mindset that values sustainability and circular economy principles to address issues like depopulation and strengthen the local economy.





The workshop participants called for stronger collaboration among local actors to build a sustainable forest economy that benefits both the environment and local communities. LAG has also committed to researching and analysing all available data sources - such as data on funding for RDP measures, data on forest management interventions, and on chestnut production - with the aim of building a Territorial Information System (SIT) to improve knowledge on the use of forest resources.

Following the workshop, a structured follow-up was conducted to ensure the consolidation of key insights and to facilitate horizontal communication among participants. All attendees received a comprehensive report summarizing the workshop's outcomes, along with access to a shared folder containing the presentations and all related workshop materials. This approach was implemented to promote shared knowledge and support ongoing collaboration.

The work undertaken in cycle 2 yielded three fundamental results:

- Better identification of local challenges in forest resource management. Key challenges include limited innovation, fragmented governance, cultural distrust and the difficulty of recognising forests as commons
- Involvement and engagement from the range of actors involved with the forest supply chain in a broad sense (including tourism and social activities)
- Strong participation and cooperation from regional and local administrations.

From a more operational viewpoint, cycle 2 resulted in the collection and analysis of new and unexplored information, including:

- a) Data from the stakeholder survey
- b) Data on forest areas in the Pilot Region
- c) Local databases on timber and firewood production and forest management plans
- d) Data on public funding applications.

The survey

We distributed the survey across all sectors involved in the forest economy, targeting public institutions, civic groups, associations (especially those focused on the chestnut supply chain), forest consortia, local cooperatives, consultants, forestry companies, and other businesses. "Other businesses" primarily includes farms that also manage forest resources, especially chestnut forests, as well as companies providing tourism-related services.



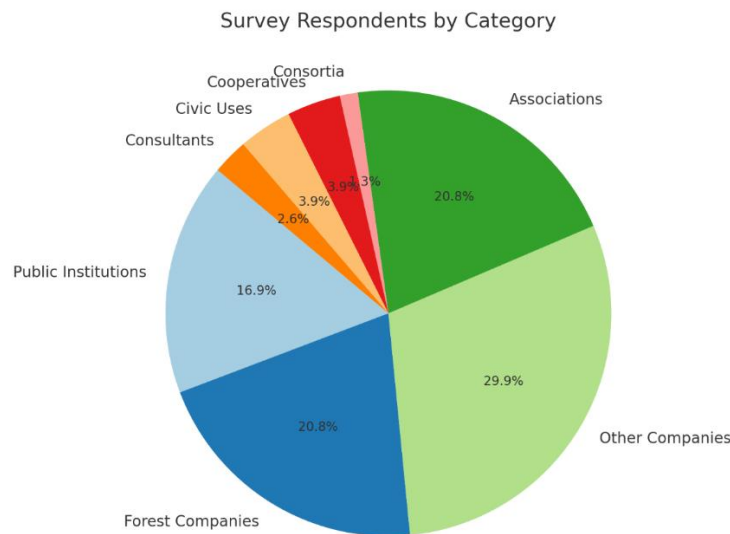


Figure 26 The percentage of survey respondents per category.

Private sector groups included forest companies, other companies, cooperatives and consultants and represent 57.1% of all survey respondents (44 out of 77). This suggests that the survey topic is of considerable interest to private entities, particularly those within general and forestry-related businesses. Among public institutions, all local Unions of Municipalities answered the survey.

Preliminary results allow us to track main features, challenges and opportunities of the local forest supply chain.

Processing Firms: Many firms focus on traditional wood products like biomass and firewood. While there is interest in expanding into certified and sustainable timber, operators face barriers such as limited mechanization and complex certification processes. Investment priorities include equipment upgrades and certification programmes to improve market access.

Wood and Non-Wood Production: Firewood remains the primary product, but operators note the potential of food products such as chestnuts and mushrooms to diversify income. Challenges include limited data on non-timber resources and difficulties accessing public funding due to bureaucratic requirements. Investment needs were identified in infrastructure (for example, road and soil management) to support both firewood, timber and food production.

Recreational Uses: Forest tourism, including sports, wellness and nature therapy, contributes significantly to the local economy. Operators identified high visitor interest but also challenges in maintaining trail accessibility and expanding educational services. Improved infrastructure for recreational activities and environmental education for local communities were cited as priorities.

Social Uses: Forest therapy and community land management were recognized for their positive social impacts, particularly in mental health and community engagement. Sustainability credits were noted as a valuable tool to support these social uses, along with greater public awareness and community involvement.

Market Outlets: While there is a strong local demand for forest products, operators face competition from imported wood, and fluctuating demand for non-timber goods. Respondents





expressed interest in strengthening local and regional markets to enhance profitability and resilience.

In summary, the survey reflects a strong commitment to sustainable forest management among local operators, underscoring the importance of certifications, community engagement, and diversified market opportunities. However, challenges such as limited access to funding, administrative complexity and market competition must be addressed to support the long-term viability of the forest economy in the region.

Official information on forest areas in the Pilot Region

Information of this type was drawn from the Italian Forest Map (Carta Forestale Italiana, SINFOR, 2024), including forest surfaces and forestation index, thematic maps for forest categories and management modes. The Italian Forest map is based on georeferenced data, integrated with regional surveys. In the whole Pilot Region, the forest surface is 168,136 hectares - 74% of the total area. The region's unforested area is mainly at the top of the Apennine mountains and in the Serchio Valley, where we can find the most urbanised zone. The most forested municipality has 95% forest coverage of its total area, compared with the least forested municipality at 38%. 27 municipalities out of 35 within the Pilot Region are above the average (74%) and only 8 below the average.

Among the forest categories, chestnut trees have the largest coverage (55% of the forest area), followed by beech forests (20%) and oak trees (8%).

Information on forest management modes from the Italian Forest Map overestimate the surface under management. This implies that we should integrate this information through the analysis of available forest management plans.

Databases on timber and firewood production and forest management plans

The data on forest areas authorised for harvesting provides a clear snapshot of the current state of the forestry sector and its production. Looking at the harvest composition, we can observe that firewood and wood chip are the predominant product for coppice forests aged 20-40 years, with comparatively less production from older forests with the longer (40+ years) rotation cycles required by law for these stands.

Furthermore, harvesting firms, a crucial operator in the forest supply chain, are characterised by a strong dualism: data collected tell us that, on the one side, many small firms work on tiny forest surfaces, and, on the other side, a few big operators are cutting most of the forest area. Unfortunately, the available data does not provide any information on the origin of these operators (whether they are locally based or not).

Information from forest management plans is very helpful in the experiment, and in the coming months, to estimate carbon credits' provision. The collection of plans is ongoing, since we have not yet been provided with relevant documents by all local institutions, and those documents that have been provided vary in their form.

Data relevance

The data outlined above offers new and valuable information. As mentioned above, results are not yet fully exploited since different sets of data are still incomplete and need to be complemented by additional research. Data from the survey need to be integrated and additional





respondents sought, and forest management plans need to be complemented by other information.

Local relevance

The results to date align with LAG needs for understanding potential and barriers within forest development strategies. Furthermore, they can be potentially exploitable by several institutions in their planning procedures: including the three Unions of Mountain Communities present in the Pilot Region and one Mountain Forest District in Pistoia Province, created in 2011.

Policy relevance

Preliminary results allow us to build understanding of the policy environment surrounding the forest eco-system in the Pilot Region. The analysis identifies the most relevant policies in the region, the level of financial resources devoted to the forest system in the last programming period and, finally, a need to evaluate policy instruments set up over the past years.

Robustness and limitations

The data available for the forest system was sometimes outdated and fragmented among different sources and institutions. The LL is trying to involve local and regional stakeholders to stimulate effort to coordinate and improve data provision. To do so, we need to fully explore the potential and the limitations of the data currently available. The analysis we have carried out allows us to draw preliminary conclusions: a) forest management plans are an unreliable means of estimating carbon credits, which poses an issue in the assessment of forest ecosystem services. Through the data experiment, experts within the LL team have worked to overcome this methodological challenge; b) there is a need to further assess the social benefits of the forest eco-system, to support the development of relevant initiatives in the Pilot Region. To avoid overlooking this aspect, we intend to enlarge the survey by involving more actors operating in this field.





Part 3: Reflections and learning

As mentioned in previous paragraphs, the data experiment faced two main challenges:

- a) collecting information unavailable at the regional level since databases have been never created in a systematic way;
- b) combining data derived from separate sources.

Consequently, the working group (consisting of the Pilot Region partners and CREA) have tried to overcome the specific gaps related to data sources.

Data issues and obstacles during the experiment

Varies issues arose for the different types of data and should be discussed separately according to the data source. Most of the difficulties were found with data collection and insufficient quality of data:

- a. The survey
 - Good participation rate, but we need to increase the number of respondents to increase confidence in the results
 - Relative lack of respondents in the field of social uses of forest, partly due to the lack of relevant private initiatives in this field in the region
- b. Inventory of forest management plans
 - Work is ongoing to complete the collection of management plans in the Pilot Region, due to the fragmentation of public and private actors applying management plans
 - Variability in the quality of information provided by management plans, concerning mainly the level of information on annual production from the different categories of forest
- c. Applications of forest harvesting
 - Lack of information on the quantity of harvested timber and firewood in the data set provided by regional administrations
 - Unavailability, in some cases, of information in a GIS format
- d. Applications of forestry support measures
 - Lack of information on the typology of forest investment in the dataset provided by regional administration
- e. Social and recreational use of forests
 - Little information on private initiatives on the social use of forest (to be integrated in the survey)

Managing data issues and obstacles

The stakeholder survey

At present, a significant sample has responded to the online survey, but we intend to keep the response collection open and actively encourage participation, especially with regard to private promoters of social uses of the forest. This includes leveraging other events organised by the LAG, even those not directly related to the RUSTIK project, as long as they engage relevant stakeholders.





Inventory of forest management plans

Work to collect the outstanding management plans and transfer available data into the GIS map is ongoing. An additional task will involve standardising the information provided.

Applications of forestry harvesting

This set of data is quite rich but needs to be explored to estimate the quantity of timber and firewood production, assuming standard coefficients of conversion from hectares of surface to standard production, by following a similar approach to the Farm Data Network applied in European countries.

Social and recreational use of forests

The limited information on private initiatives must be complemented by more detailed information provided by associations or representative case studies, through individual interviews and secondary literature analysis.

Pilot Region Partner's perspective on data

The data collected through the experiment proved highly relevant for understanding the forest economy and its multifaceted dynamics, particularly in terms of forest management practices and their alignment with the multifunctionality of forests. This relevance was amplified by the diversity of the LEADER territory, which exposed variations in forest use, management priorities, and stakeholder needs across different areas.

The perspectives of local stakeholders, particularly forestry consortia, cooperatives, and consultants, proved invaluable during the experiment. Their input highlighted the practical challenges they face, such as navigating regulatory frameworks and balancing economic viability with sustainable forest management. The pilot also revealed the significant role of public institutions in managing and providing data but also underscored the need for improved coordination and accessibility of such data.

Experiment design and implementation

Strengths and successes

The collaborative and cordial atmosphere among participants fostered a positive environment that encouraged open communication and respect for diverse viewpoints. This dynamic was key in creating a space where all participants felt comfortable sharing their insights and experiences. Additionally, participants were highly engaged during discussions, with contributions from nearly all attendees. This high level of involvement ensured that a wide range of perspectives were considered, enriching the dialogue and providing a solid foundation for more inclusive solutions. One of the most impactful outcomes was the convergence on key issues affecting the forestry sector. Through open discussion, participants were able to diagnose these issues effectively, with consensus on the primary challenges and opportunities within the sector. This shared understanding is a testament to the thoroughness of the diagnostic process, and it laid the groundwork for actionable steps moving forward. Lastly, providing a broad vision of the forestry system played an educational role for all involved. By encouraging a deeper understanding of the forest and its multifaceted impacts on the local population (in terms of value added, employment and eco-system services), the experiment helped participants to consider the broader





implications of their work within the forestry sector. In summary, the combination of a collaborative atmosphere, active participation, consensus on critical issues, and an educational approach to understanding the forestry system contributed significantly to the success of the design and implementation.

Scope for improvement

Several challenges became apparent throughout the process. One notable issue was the difficulty in broadening participation to include “new” stakeholders from the local area, particularly forestry businesses whose engagement at the table proved complex (since they are generally very small businesses and unused to collaborating with each other). Additionally, although diagnosing issues within the sector was successful, progressing beyond this diagnosis to develop concrete, actionable projects to address the identified problems or pursue common objectives remained challenging. Moreover, a substantial effort is required to systematically organise all essential information, which has rendered the process labour-intensive, and time-consuming.

Skill development and capacity building

Skills developed

During Cycle 2, members of the Living Lab team have developed several key skills. They have gained valuable knowledge in forest resource management and have become more familiar with new stakeholders operating within the local area, enhancing their understanding of the regional landscape. Additionally, they have learned new methods for engaging local stakeholders more effectively, broadening their capacity for meaningful community involvement.

The team has also developed skills in evaluating ecosystem services, building a collective knowledge base that, while still evolving, is beginning to provide a robust foundation for future work. Furthermore, they have strengthened their technical abilities by advancing towards the creation of a GIS for forest resources. This involved overcoming challenges related to the integration of data from diverse sources, showcasing their growing proficiency in data management and systematisation.

Capacities

A capacity is developing to select the most relevant information and combine it in a way that represents the complexity of the forestry system (such as through the creation of maps) though there is still considerable work to be done.

Engaging with European partners has had a particularly positive effect on the regional partner, fostering the development of communication skills and exposing them to innovative approaches and methodologies. Events like the Annual RUSTIK Meeting have provided invaluable opportunities for exchanging ideas, learning from other regional contexts, and exploring diverse methods for addressing shared challenges. This collaboration has been instrumental in driving innovation and strengthening internal capabilities.





Pilot Region Partner's perspective on skills and capacities

For the LAG, participation in the activities represented an opportunity to enhance its understanding of territorial dynamics, particularly in the forestry sector. It allowed the acquisition of data and insights that strengthen its capacity to design actions better suited to the realities surrounding the multifunctionality of forests. From a professional perspective, the research and data organization improved the skills of the involved staff, while the living lab provided a platform for direct interaction with key stakeholders in the sector.

The diversity of the territory highlighted significant differences among the various areas within the LEADER region, leading to an awareness of the need to develop local responses and strategies. The methods and principles for data acquisition, management, and processing emerged as areas where the LAG staff require further skill enhancement.

The LAG believes that continuing these activities could lead to the development of strategies and ideas that empower local stakeholders to play a central role in addressing the challenges related to forest multifunctionality.

Innovation and impact

Reflections on innovation

The gaps in knowledge about the forest stock, including forest type, ownership structures, and management plans, presented a significant initial hurdle. The challenge was particularly pronounced in the context of collectively owned forests, where management plans were often incomplete, entirely absent, or not accessible. Gathering qualitative and quantitative data on the forest's characteristics and its ability to provide a range of ecosystem services (regulatory, productive, and cultural) in diverse territorial contexts required innovative data collection and analytical methods. These gaps underscored the need for novel methodologies to generate actionable insights for participatory planning.

One of the most significant process innovations is the constructive collaboration created between the LAG and the core group's academic partners. The LAG brought an intimate knowledge of the territory, including its stakeholders, challenges, and opportunities, while the academic partners contributed advanced tools and methodologies for data analysis. This partnership proved invaluable in overcoming the fragmented and incomplete nature of existing data.

The LAG's understanding of the local context has ensured that data collection efforts remain relevant and targeted, while the academics continue to provide expertise in designing and refining analytical frameworks to extract actionable insights from the data. This synergy is still evolving, progressively enhancing the quality of the data collected and strengthening engagement among stakeholders. This ongoing effort is critical to the long-term success of the experiment.

Short-term impacts

We expect several short-term impacts from the data experiment and the Living Lab activities. The development of a territorial information system that integrates the data collected during this





research can make funding calls more accessible and might encourage a better alignment of local initiatives with available resources.

The improved data and methodologies are also expected to result in more focused and targeted interventions that address local needs more effectively.

Longer-term impacts

Overall, we expect that the Living Lab will pave the way for potential partnerships to emerge, such as those linked to Smart Villages initiatives or community regeneration projects. These partnerships could provide innovative opportunities for collaboration among local stakeholders, advancing sustainable development and enhancing the forestry sector's contribution to the local economy and community well-being.

The need to build partnerships and move beyond private interests or isolated initiatives was a recurring theme during our meetings with stakeholders. However, this challenge is tied to a deeper, long-term change required in the area: a cultural shift. Overcoming individualistic attitudes and the prevailing distrust in collaboration and institutions is essential to promote a more cooperative environment.

Potential for sharing learning

Given the shared characteristics of many inner areas and Apennine regions in Italy – such as depopulation, reliance on natural resources, and the need for improved forest governance – methods and tools such as those described in Reflections on innovation are likely to resonate and prove effective with minimal adaptation. Scaling efforts could be facilitated through national-level programmes or collaborations, such as those aligned with the Inner Areas Strategy, to provide a framework and resources for transferring these innovations to other territories.





Part 4: Future steps

Cycle 3 plans

In 2025, the process of improving the data system related to forestry, and analysis and mapping of forest characteristics for policy design will continue. Table 14 summarises the main steps to be undertaken in 2025.

The first objective (to take place in January 2025) is the presentation of preliminary results to the local stakeholders, and discussion of the state of the art of the forest system in the Pilot Region and the potential and limitations of the experimental work. This workshop will be organised into discussion tables around four key topics: 1) carbon and sustainability credits; 2) perspectives of social and recreational uses of forest; c) management plans and their uses for data provision; d) policy scenarios for the forest system under regional and national policy schemes. The workshop will also serve as a mechanism to gather constructive feedback on the proposal to set up a territorial information system that is constantly updated and fed by local institutions under the LAG's supervision and coordination.

Other objectives are related to data collection, and include completing the survey and analysing applications for forest harvesting by the end of January 2025, defining maps of forest areas and forest investments by February 2025, and calculating production and carbon credits potential by mid-April 2025. The processing and mapping of the full dataset is planned for completion by the end of April 2025. These deadlines will be compatible with the complementary work to be done for the rural proofing exercise and other tasks to be implemented in cycle 3.

A final workshop with stakeholders to assess the results of the experimental phase will be held in the Pilot Region in May 2025. The workshop will include discussion of the development and maintenance of a territorial information system, under the coordination of the LAG. June and July 2025 will be used to write a report on the work, including the proposal of a territorial information system and implications of analysis for local and regional policies.

Table 14 Timeline of the different data experiment components in 2025

Cycle 3 steps	2025							
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Step 1 – Workshops with stakeholders								
Step 2 – Data collection								
Forest area and characteristics								
Survey (forest functions)								
Survey (social and recreational uses of forest)								





Cycle 3 steps	2025							
Management plans of public and private forests	█	█	█	█	█			
Forest harvesting applications	█							
Public funds to forest investments RDP measures	█	█						
Other sources (food production in forest area)	█	█	█	█	█			
Step 3 – Data processing and mapping	█	█	█	█	█			
Step 4 Writing final report						█	█	

Future collaborations

Opportunities for the long-term sustainability of the network that has been strengthened at the local level under the coordination of LAG MontagnAppennino depends on the creation and the maintenance of a Territorial Information System over time. The set of data explored, collected and organised within RUSTIK activities will need to be updated periodically. Policy tools to support this process can be found within the LAG Local development Strategy or other funding programmes.

Furthermore, the LAG will undertake the role of managing the Forest District of Pistoia province and will use the information tools and knowledge developed in RUSTIK to support policy decisions and new intervention design for the forest sector. In particular, the creation of a reliable data system on the forest sector will support the setting up of new cooperative initiatives in March 2025 based on the Pistoia Forest District.

Communication and dissemination

Results will be communicated, firstly, through the two workshops with local stakeholders described above. Furthermore, we have tentative plans to organise a regional conference on forest policy in Tuscany, in collaboration with Tuscany Region, in 2026, when the analysis of data will be fully exploited. This event represents the opportunity to stimulate more general reflections on forest policies in the regional context.

Furthermore, two different papers will be presented in the International Mountain Conference – IMC, which will be held in Innsbruck, 14-18 September 2025 and the XVIII Congress of the EAAE (European Association of Agricultural Economists), which will take place in Bonn from August 26th to 29th, 2025.

Articles drawn from the analysis of the dataset will also be prepared and submitted to local newspapers and to scientific journals, including the Italian Bio-Based and Applied Economics journal, but this opportunity will strongly depend on the quality of data gathered in cycle 3.





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Italy: Parma, Piacenza & Ferrara

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Summary and overview

The transition identified in the Parma, Piacenza and Ferrara Pilot Region (PR) is the climatic and environmental transition, with a specific focus on irrigation water availability and management. Climate change and global warming are altering natural water distribution patterns, producing extreme events that cause considerable damage. The focus here is on how these events impact water availability and management for production and irrigation purposes.

Living Lab challenge

The Living Lab (LL) focused on improving the functioning of water management governance in the PR (particularly in times of crisis) and understanding key problems resulting from the lack of an appropriate monitoring system of water availability and potential solutions. Water management at the local level requires managing a large amount of data. To develop appropriate models to estimate water needs and to plan water distribution in different areas of the region according to productivity potential, a significant amount of information is currently needed, such as weather conditions and technical information about the water need of different crops.

Data experiment

The objective of the data experiment in the Living Lab is to analyse how climate change influences water resources and management, highlight the crucial issues, and identify appropriate solutions to enable more effective action in future. Coordinating and integrating water needs with water availability and management is of utmost relevance. To do this, the current information system for water management must be enhanced by combining different sources and understanding the peculiarities and needs of different water districts. The data experiment aims to address two different issues connected with the challenge:

- Developing an integrated monitoring system for geographical data about water needs in the area.
- Improving the local water management system to increase the effectiveness of water management in the area, considering the needs of different local stakeholders.

The data experiment is, therefore, targeted to:

1. Identify the main information gaps and failures in the water governance system by highlighting the territorial differences between and within the different irrigation districts and the most vulnerable areas/districts under the effects of climate change.
2. Provide a comprehensive picture of the water management governance system and critical issues in water management, tracking the main mitigation and adaptation strategies adopted by stakeholders on the ground and reflecting on transferability to other districts in the PR, and making an inventory of needs for targeted public investments.

Preliminary results

The role of the local stakeholders involved in the LL was crucial for understanding the main effects of water shortages and the water management adjustments made and needed (mitigation and adaptation). This synthesis allows us to draw the following conclusions:

- Climate change effects on water shortages are differentiated across the territory.
- The most vulnerable districts are those served by typically torrential flows farther from the Po River and those with problems of soil salinity and salinity wedge.





- Rising costs of pumping water in irrigation channels are additional crisis factors for most irrigation districts.
- Vulnerability is linked to the importance of water-demanding crops in each district.
- Water management adjustments differ from district to district. Investment programmes and adaptation strategies are in place, but apparently more slowly than necessary in districts requiring water reservoirs. (This aspect will be analysed further in Cycle 3.)

Key learning to date

The primary lesson learned from the experiment is that the real challenge for the ecological transition of water management is bringing together all available data and information. Different sources are not linked nor integrated with the actual management of water for irrigation. This experiment has made an important step in understanding the structure of available information and identifying missing data and organising these to better comprehend the current situation.

Next steps

The next step is to present preliminary results to local stakeholders and discuss the state of the art in the PR and the potential and limitations of the experimental work (January 2025). The definition of adequate indicators will be completed by March. By this date, the completion of data gathering and analysis is foreseen, with the processing and mapping of the whole dataset expected by the end of March. In May 2025, a final workshop with stakeholders to assess the results of the experimental phase will be held in the PR. June and July will be used to write a report on the work, including the proposal of a territorial information system and implications of analysis for the local and regional policies.



Figure 27 The Living Lab focus groups with the Land Reclamation Consortia of Piacenza, Parma and Ferrara.





Part 1: Living Lab context

Pilot Region introduction

The Pilot Region (PR) is in the North of Italy and includes three NUTS3 areas of the Emilia-Romagna region, namely the provinces of Piacenza, Parma and Ferrara, representing the core territories of the processing tomato supply chain of Northern Italy and among the leading areas in Italy and Europe for agriculture, agroindustry and food processing equipment. The PR's agricultural sector is well developed and organised, thanks to the presence of important food production and the high use of innovative and advanced cultivation techniques.

Since the region is characterised by the importance of tomato processing production, the data experiment is specifically framed on this crop. Processing tomatoes is, in fact, the main Italian agricultural product and represents the most important Italian and European supply chain. Italy is the third globally and the first European producer of tomatoes for processing (processing tomatoes) and the lead global exporter of processed tomato products.

There are two well-organised interregional production and processing areas, one in the North and one in the South, distinguished by a complex governance setting and respectively coordinated by two overarching Interbranch Organisations. The Northern Italian supply chain includes Emilia-Romagna (where 60% of the production is based), Lombardy, Piedmont and Veneto and accounts for more than 50% of Italian production. Northern processing tomato production involves c.2,000 producers cultivating 36,000 hectares of land and belonging to 12 Producers' Organisations (private or cooperative) and one Association of Producers' Organisations (Consorzio Interregionale Ortofrutticoli – CIO). Tomato processing is carried out in 25 processing plants owned by 20 companies mainly associated with the National Association of Fruit and Vegetables Industries (Associazione Nazionale Industriali Conserve Alimentari Vegetali – ANICAV). In 2022, the three provinces of Piacenza, Parma and Ferrara harvested 83% of the total regional product and accounted for nearly 60% of the tomato surface of the supply chain in Italy.

Considering other agricultural production, the high presence of forage and protein crops (i.e. corn, alfalfa, permanent grass), as well as pastures, is linked to the great importance of animal breeding and the dairy sector in the region, especially in the provinces of Piacenza (where Grana Padano PDO is produced) and Parma (Parmigiano Reggiano PDO). Concerning the dairy sector, almost 50% of the regional dairy cattle population is farmed in the Pilot Region, totalling 234.6 thousand head and 1,413 farms in 2022. Most dairy cattle are reared in the provinces of Parma (148.8 thousand heads in 2022) and Piacenza (80.3 thousand heads), while in Ferrara, beef cattle have more comparative importance. There are also some differences in pig production, since Piacenza and Parma have important high-quality production in the cured meat sector. Prosciutto di Parma PDO, Culatello di Zibello PDO, Coppa di Parma PGI and Coppa piacentina PDO are among the recognised protected designations. In 2022, there were 300,000 reared pigs in the Pilot Region, accounting for almost a third of the total regional number. Piacenza and Parma together represent 84% of this number, while the pig population in Ferrara was 49.2 thousand heads.





Functions

The PR is characterised, on one side, by a high degree of anthropization and productive activities, by intensive livestock farming and irrigating cultivations requiring a large amount of water and, on the other, by increasingly frequent and prolonged drought periods occurring especially in summer (endangering the ripening cycle) but also in spring (putting the transplant process at risk).

Climate change and global warming are altering the natural water distribution patterns, producing a continuous alternation of extreme events causing considerable damage. Drought causes land degradation through increased soil erosion, and soil erosion increases hydrogeological instability that makes flooding and landslides more frequent following abundant rainfalls, as has recently occurred.

The effects of climate change and the water crisis are pushing stakeholders towards technological evolution and supply chain integration to enhance their capability to respond rapidly and more efficiently to threats. All local actors in the tomato supply chain are already taking relevant steps to adapt to the new climatic and environmental challenges and changing circumstances. However, the policy and technical solutions adopted hitherto are not sufficient to meet water management needs. Moreover, the diversity of the core geographical areas for the tomato supply chain in Emilia-Romagna requires an innovative strategy comprising different approaches that can better meet the complex and multifaceted challenge of water availability and efficiency that the PR is facing.

Transitions

The transition identified in the PR is the climatic and environmental transition, with a specific focus on irrigation water availability and management. The main transitions affecting the processing tomato chain and the territory of the PR have been identified by combining the results of desk analysis with interviews with key stakeholders.

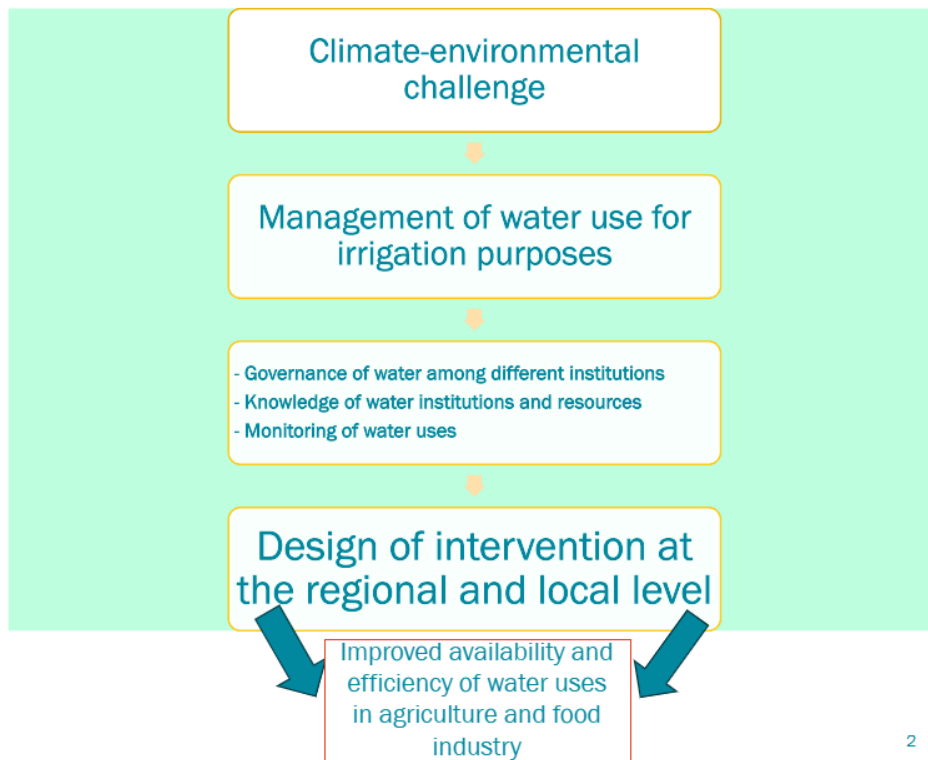
Initially, three transitions were identified and then examined with stakeholders during three focus groups dedicated, respectively, to the effects of:

1. **Demographic** transition on the labour market.
2. **Climate-environmental** transition, with specific emphasis on water management issues.
3. **Digital** transition, with specific attention to diffusion of technological infrastructure for precision agriculture.

The discussion between stakeholders and researchers was useful in better defining the key challenges for the tomato supply chain and the territory, and it emerged that, while the climate transition was already under scrutiny by the stakeholders, the two other transitions were less clear for stakeholders and the Pilot Region Partner.

After careful consideration and discussion with stakeholders and the Pilot Region Partner, it was agreed that the climate and environmental transition was the most urgent and critical topic, particularly water management for irrigation purposes. Irrigation is vital for the tomato crop, and the increasing occurrence of frequent dry seasons alternated with heavy rains and floods is a cause of great concern in the PR. Furthermore, water is a common good used for different purposes, and its management at the local level requires complex governance structures.





2

Figure 28 Climate-environmental transition challenge

Living Lab partnership

The core Living Lab team includes researchers and key local stakeholders, representing CREA Research Centre for Agricultural Policies and Bioeconomy (CREA PB), the coordinator of the LL, the Interbranch Organisation (IBO) for processing tomatoes of Northern Italy and the company Vsafe Srl.

CREA PB is a national public research centre dealing with rural and agri-food policies, forestry and fishery systems. Research activities are focused on conjunctural and structural analyses and the impact of policy instruments in different thematic fields. Research mainly utilises quantitative and modelling analytical tools for impact analysis at territorial, sectoral and company level to develop evolution scenarios for the two CAP Pillars at sectoral and territorial level, to assess the impact of public interventions on natural resources and territories, the impact of globalisation on the Italian agri-food system, and the needs and impact of innovations. A major topic of research is the sustainable use of natural resources to combine the three pillars of sustainability, economic, social and environmental, while considering both the diversity of contexts and the complexity of relationships and the compatibility of sustainability with production needs.

IBO, headquartered in Parma, includes all producers and processing companies operating in the area, represented on an equal basis (50% production, 50% processing) and coordinated as regards supply and demand planning, reference price, relations with local, regional, national and international stakeholders, political and economic lobbying, and other relevant issues. Producers and processors are ordinary members of the IBO, belonging to first and/or second-level organisations and cooperating within the IBO based on common shared rules and framework





contracts for tomato quality, quantity, and price standards. Whenever necessary, local Chambers of Commerce and research centres are also involved as advisory members in the activities of the IBO to discuss and define specific enhancements and development goals.

Vsafe Srl is a local private company operating at national and international levels that offers economic consultancy services in global sustainability, market intelligence and strategic consulting aimed at promoting competitiveness and sustainability of the agri-food sector. It is a spin-off of the Catholic University of the Sacred Heart in Piacenza, created to provide a professional outlet for graduates with academic expertise in agri-food and agri-environmental economy and management.

Table 15 Core team members

Name	Organisation	Role/expertise
CREA Research Centre for Agricultural Policies and Bioeconomy	Public Research Institution	CAP, rural development, agri-food supply chains
IBO Interbranch Organisation for processing tomato of Northern Italy	Association of economic actors of the processing tomato supply chain of Northern Italy	Mediation, coordination and cooperation between and within key stakeholders of the supply chain. Political and economic lobbying
Vsafe Srl	Private company	University spin-off dealing with competitiveness and sustainability of the agri-food sector

Living Lab challenge

The climate and environmental challenge selected is the most urgent for the PR since its implications impact water availability and management for production and irrigation purposes.

The Living Lab focused on deepening the functioning of water management governance in the PR (particularly in times of crisis) and understanding key problems and possible solutions arising from the lack of an appropriate monitoring system for water availability. Water management at the local level requires managing a large amount of data. To develop appropriate models to estimate water needs and to plan water distribution in different areas of the region according to productivity potential, a huge amount of information is needed, such as the evolution of weather conditions over time on a daily and hourly basis (e.g. temperature, amount of rain) and technical information about the water needs of different crops, including tomatoes (e.g. evapotranspiration).

The agri-food sector occupies a central position in Emilia-Romagna, and the introduction of new technologies, processes and services has always been considered vital. Over the years, various remote sensing and monitoring systems have been designed, implemented and made available to optimise the use of water resources for agricultural purposes and to increase the efficiency of production systems. However, these modelling and monitoring systems need to be coordinated. To move in this direction, both new and existing data are needed, and the governance of these





data needs to be developed and implemented for the benefit of the environment and the agri-food sector.

Rationale and research questions

As already underlined, irrigation water availability and management are essential for tomato production and processing, and there are still critical unsolved issues related to water resource variability, allocation and distribution requiring appropriate monitoring, management, and governance. Considering this and the necessity to find solutions to the effects and challenges posed by climatic and environmental changes, the main research questions identified for the Living Lab work are the following:

1. How do we take stock of the existing information and geographical data about water availability and needs in the area to improve collective awareness and knowledge about the effects of climate change on irrigation practices in the Pilot Region?
2. How do we assess critical issues in the local water management system and represent them through practical and easily understandable tools to identify appropriate mitigation and adaptation strategies against the negative effects of climate change?

Policy relevance

The challenge of water resource availability and management deserves a central place since watersheds are subject to multiple uses, and it is important to reduce the risk of water deficit and competition for water resources. Therefore, the policy relevance of the LL experiment lies in clarifying the differentiated aspects and needs of irrigation water supply and demand in the areas and sub-areas of the PR to design tailor-made policy measures and investments at regional and local levels.

Water abstraction at the regional level is 70% from superficial bodies and 30% from underground. Agriculture is the sector that requires the largest quantity of water resources (two-thirds), and water saving is even more vital under changing climatic conditions causing increasingly scarce and erratic rainfalls and rising temperatures. In the PR, extreme weather events are becoming more frequent and severe. Periods of temperatures above normal season average, increasingly frequent and prolonged drought periods occurring especially in summer and spring, alternate with massive floods are posing new challenges that must be addressed jointly at a local level.

Parma and Piacenza are the provinces using more underground water pumping, whereas the province of Ferrara has the greatest use of Po River water. Between 2014 and 2019, the quantitative status of regional underground water showed an improving trend in comparison with the period 2010-2013, except for some areas mainly located in the eastern part of the region (corresponding to the areas of Piacenza and Parma), where the 2022 drought reduced the recharge process and further affected water table levels and superficial water availability. In the Ferrara area irrigation water instead comes almost entirely from the Po River through different modes (use of existing water canalisation or irrigation distribution with separate channels), and the main problem caused by extreme weather events is the decrease of river flow, sea level rise and groundwater salination, and floods following intense and violent rainfalls.

The water supply shortage is increasingly becoming a serious threat to the processing tomato supply chain. Specific policies, measures and planning processes are already in place at national,





regional and local levels, such as rules to control water vital outflow and water pricing (national and regional regulations derived from the EU Water Directive), investments in infrastructures and use of ICT to increase water management efficiency (national R&D Programme and Recovery and Resilience Plan), support and investments for water reuse in industries (ERDF regional Operational Programme), small reservoirs and precision agriculture to improve water management at territorial and farm level (regional Rural Development Programme), and also specific local governance initiatives to increase collaboration among different stakeholders (IBO). However, the challenge posed by climate-environmental changes requires further steps towards enhanced coordination and integration between policies, programmes, strategies and actors.

Stakeholders

There are several stakeholders involved in the governance of the supply chain and water management. Water saving does not stem from single actions but from different strategies and operative measures put in place by different actors and integrated with each other.

Agri-food practices are extremely relevant in the efficient and effective management of irrigation water, and many water-saving investments and activities have been made in the Pilot Region by a plurality of public and private actors. Both producers and processing firms made substantial investments to increase the resource efficiency of water, not only introducing innovative irrigation technologies (micro-irrigation systems, probes measuring the humidity of the soil, drones to monitor the growth stage and water needs of the crop, etc.) but also using decision support systems to improve water management practices made available from the Producers' Organisations, the Region, and processing firms. However, since the effects of climate change and the water crisis are pushing even more towards technological evolution and supply chain integration to enhance the capability of responding rapidly and more efficiently to threats, the IBO is a focal point in this regard.

The IBO plays a prominent support and coordination role in several activities, such as agreements between primary producers and private/cooperative agrifood industries, adoption of environmental practices and certifications, monitoring of production and processing data, promotion and coordination of the participation of local key actors to several research and innovation projects and partnerships, among others.

The regional administration of Emilia-Romagna provides financial incentives for water optimisation interventions and projects addressed to renovating or upgrading irrigation infrastructures and promoting sustainable agri-food practices (integrated production, precision agriculture, precision irrigation soil moisture sensing, etc.). Experimental and research centres, farmers and Producers' Organisations and individual private and cooperative agro-industrial firms invest in research and technology, support the adoption of sustainable practices and make investments in innovative, productive processes along this path.

Regarding water management, superficial and underground water bodies are managed by Emilia-Romagna Region through the Regional Agency for Prevention, Environment and Energy (Agenzia Regionale per la Prevenzione, l'Ambiente e l'Energia - ARPAE), which assesses and monitors environmental conditions and the effectiveness and efficiency of water-saving systems, and manages the use of underground water resources from private individuals, plus a complex system of first- and second-tier Land Reclamation Consortia (in charge of artificial drainage canals, retention basins, dams and draining/pumping stations). The regional reclamation system is





organised in eight territorial areas managed by local first-tier consortia (all associated with ANBI, the regional branch of the National Association of Land Reclamation, Irrigation and Land Improvement), some of which belong to a second-tier consortium (Canale Emiliano Romagnolo – CER), which is a pivotal stakeholder since it is also a research and experimental centre dealing with technical assistance and dissemination to farmers of water-saving irrigation tools and methodologies. Three first-tier Reclamation Consortia belong to the Pilot Region: Land Reclamation Consortium of Piacenza (*Consorzio di Bonifica di Piacenza*), Land Reclamation Consortium of Parma (*Consorzio della Bonifica Parmense*) and Land Reclamation Consortium of Ferrara (*Consorzio di Bonifica Pianura di Ferrara*).

Most of the abovementioned key stakeholders have already been actively involved in the Living Lab (representatives of Producers Organisations and processing firms, Interbranch Organisations, the three first-tier Reclamation Consortia and CER). Other actors (the regional administration and ARPAE) will be involved shortly, when further progress on the data experiment enables us to clarify the needs of the PR and elaborate possible solutions concerning new projects and policy interventions. Something fundamental about water resources management still must be grasped: the role and weight of water withdrawals from private wells for non-domestic use remains an unknown element requiring specific in-depth investigation.

Theory of change

The main challenges, as mentioned above, concern the reduction of water reserves and the degradation/erosion of soils as direct effects of climate change. To tackle these challenges, the LL agreed to develop better learning tools, consisting of defining governance solutions in water management, water institutions, and the private sector's use of water resources. In concrete terms, this requires collecting information about the most critical issues in water management among the Land Reclamation Consortia and other stakeholders involved in using irrigation infrastructures. This requires deepening the knowledge about water institutions and resources by analysing:

- The governance patterns, structures, and mechanisms of local water management public institutions and the different features within and between them.
- The availability and variability of water resources throughout the year and over the years and the differences between and within the three areas of the PR.
- The distribution and extent of private water withdrawals for non-domestic use.

This information is partly unknown (i.e. the governance system in the single consortium) and partly dispersed among different stakeholders, implying the need for integrating different sources and actors. This fragmentation represents one of the significant issues to tackle in the LL activity.

The experiment's main output provides a methodological tool for analysing the territorial differences between water districts based on a series of variables representing structural characteristics and intervention needs. This methodological tool will consist of a system to classify the irrigation districts based on different degrees of vulnerability to water scarcity. The system could provide a diagnostic of vulnerability and help design more appropriate interventions at regional and local levels.

In the short-medium term, the methodological tool will provide a series of results, such as a map of the vulnerability of the different water districts to climate changes and a geo-localised



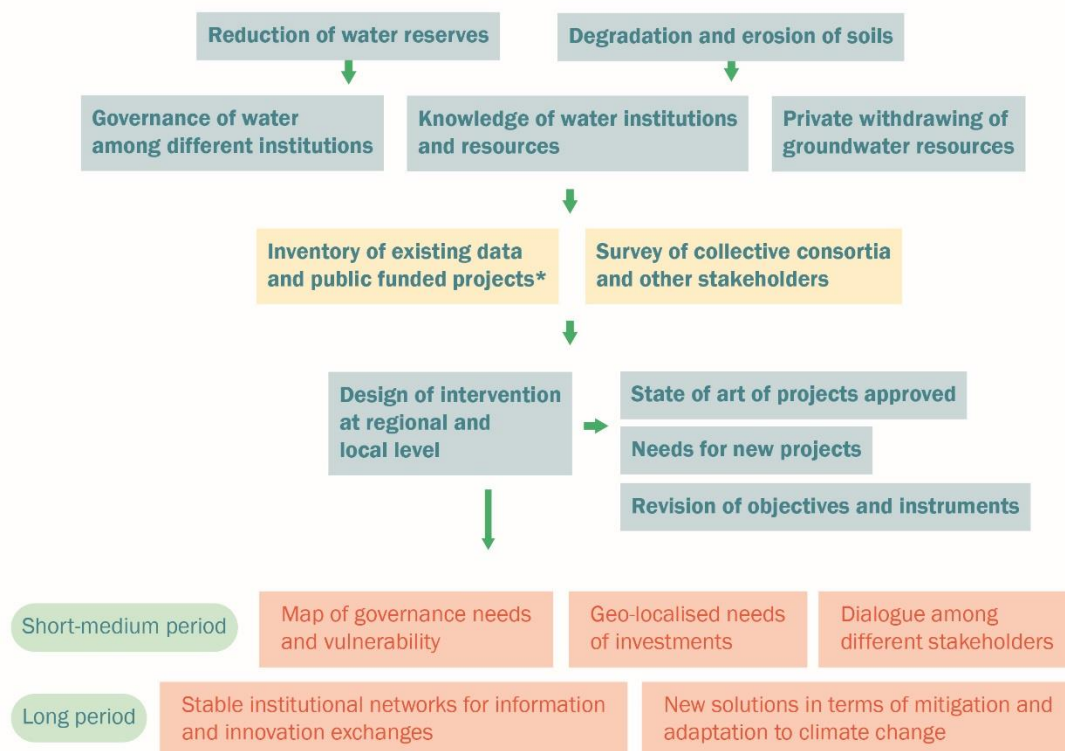


distribution of principal investments supporting water infrastructures and irrigation systems (including research and experimentation in the field of irrigation). As a direct short-term result, the LL activity will also increase stakeholder dialogue.

This LL activity assumes that better knowledge of the state of the art of water management in the PR will strengthen the capability of Land Reclamation Consortia and other stakeholders to share information, collaborate, and act on appropriate solutions to water scarcity. Furthermore, this activity will make the limitations and failures in the public irrigation system and related data provision at the level of irrigation districts more visible.

In the longer term, the anticipated effects will be stable institutional networks for information and innovation exchange among farm associations, agro-industrial associations and Land Reclamation Consortia. In other words, the LL aims to improve relationships among meso-institutions operating in the PR. Furthermore, the LL aims to identify new solutions, even among those already existent, for climate mitigation and adaptation strategies. These long-term effects will require more time to deploy and require regular animation activities, which goes beyond the RUSTIK time frame. However, the LL will give methodological indications on how to proceed.

Besides data fragmentation, another risk factor is in collecting quantitative information to define the vulnerability of the different districts and making comparable analyses at the appropriate level of granularity. Data collected up to now need to be complemented by qualitative information through interviews and focus groups that will be conducted in early 2025.



* Public investments in water reservoirs, collective networks, new irrigation systems at the farm level and support to farm decisions.

Figure 29 Theory of Change





Data relevance

As previously discussed, water management at the local level requires managing a large amount of data regarding weather conditions and other technical information about the water needs of crops. These data are also needed to develop appropriate models to estimate irrigation needs and to plan water distribution in the different areas according to production potential.

In the PR, there is already a well-developed network of weather data collection stations, but the actual monitoring systems need to be coordinated and integrated. Moreover, data and models have recently been developed, using EU research funds, to model crop development and production using satellite data. However, these models still need to be evaluated and integrated into a tool that could become useful for water management purposes.





Part 2: Living Lab Cycle 2: Data experiments

Data experiment

Developing the data experiment

Considering the background illustrated in Part 1 and the discussions with local stakeholders in the LL focus groups, it emerged that the existing water resources monitoring systems lack coordination and that there is a need to develop a new tailor-made data modelling. To move in this direction, both new and existing data are needed, and new governance of these data must be designed and implemented.

For a full integration of all the information and data, it will be necessary to devise a specific project in Cycle 3. Data must be analysed, processed and integrated to become useful and to allow improved management of water scarcity, doing the most to consider also the great diversity of the different core geographical areas of the tomato supply chain in Emilia-Romagna.

Experiment description

The Cycle 2 data experiment consists of two steps articulated in three different activities (see Table 16 for timeline):

1. Detail water supply/demand characteristics and differences between and within the three areas of the PR (**Step 1** – Focus group stakeholders).
2. Trace the functioning of water management governance and understand how the different stakeholders involved are organised and interact (**Step 2** – Focus groups with Land Reclamation Consortia).
3. Build up a comprehensive database combining and integrating existing information aimed at improving the monitoring of water use and optimising the matching of water resources supply and demand in the event of a crisis (**Step 2** – Collection of irrigation indicators and GIS rendering).

The activities above are directed towards identifying stakeholders involved in water management and the interdependencies between them and improving knowledge of governance needs and gaps. Information and data collection methodology includes an in-depth investigation of collective consortia and other stakeholders relevant to water management, an inventory of existing data on water resource availability and variability (performed in Cycle 2), and an inventory of publicly funded projects aimed at improving water availability and management (water reservoirs, collective networks, irrigation systems, decision support systems) to be implemented in Cycle 3.

Experiment objectives

Finding solutions to water crises is of paramount importance for the PR. To face climatic change, and in particular dry summers, it is crucial to develop a timely tool able to monitor daily water availability in water basins, rivers and groundwater and to match this with water demand from different crops and other civil and industrial uses.





The objective of the data experiment is to analyse how climate change influences water resources and management, highlight the crucial issues and identify appropriate solutions for more effective action in the future. It is of the utmost relevance to coordinate and integrate water needs with water availability and management. To do so, the present information system on water management must be enhanced by combining different sources and understanding the peculiarities of the different water districts.

The three activities carried out in the data experiment (listed in Section Experiment description and detailed in Section Implementing the experiment) aim to pursue the following specific purposes:

1. Identify the main information gaps and failures in the water governance system.
2. Provide a comprehensive picture of the water management governance system (public Land Reclamation Consortia and private consortia/associations) and critical issues in water management to highlight the territorial differences between and within the different irrigation districts; identify the most vulnerable areas/districts under the effects of climate change, based on the analysis of critical issues and governance system.
3. Track the main mitigation and adaptation strategies adopted by stakeholders on the ground and reflect on the potential scalability of such strategies to other districts in the PR. Make an inventory of needs for targeted public investments (reservoirs, collective networks, farm irrigation and decision support systems).

The data experiment is innovative since it analyses water needs, availability and management, acknowledging not only the characteristics of the Land Reclamation Consortia but also the distinctive features of the different water basins within them and enabling the identification of the peculiarities of water demand/supply at the water basin level and the related specific strategies, investments, and policies that this entails. Furthermore, the data modelling to be designed in Cycle 3 will try to bridge the gap between available and missing data at the water basin level, offering a new tailor-made governance tool aimed at simplifying the match between water demand and supply and improving the efficiency of water uses and management by combining, implementing and geolocating data related to water availability, supply and demand and to investments funded, in progress, and needed.

Relationship to theory of change

The outcomes of the data experiment are meant to contribute to improving the availability and efficiency of water resource use by singling out the vulnerabilities characterising the three areas (and sub-areas within them) of the PR. The experiment will result in the creation of a map of governance needs, enabling the determination of localised solutions for governing water shortages and a map of geo-localised needs for investments in the different water districts.

The identification of governance and investment needs is crucial for effective policies and practices. Specifying different governance needs will enable the design of tailor-made water management strategies in the PR by different authorities (within a specific discussion table) and provide a more efficient allocation of water in times of water shortage. At the same time, the provision of a comprehensive framework of investment needs could be streamlined by regional authorities in the coming programming period through RDP and Cohesion funds.





Data use

Data sources and methods

The data experiment started with thorough web scraping and data source identification and analysis, followed by in-depth data collection. This was followed by online and in-person validation with the organisations that have first-hand knowledge aimed at assessing the progress made and deciding whether and how further investigation and analysis was needed. After desk and field investigation, further online follow-ups with Land Reclamation Consortia of Ferrara, Parma and Piacenza took place to check understanding and supplement the information from analysed documents and websites.

On this basis, additional adjustments were made to better outline the differences between and within the three areas of the Pilot Region and build up a more complete picture of collective irrigation in terms of the organisation and structure of bodies responsible for irrigation, the territorial surface managed distinguished by challenge typology, water abstraction sources, irrigation networks, irrigated surface, water demand for crops and other uses, irrigation volumes, infrastructures (existing and in progress) and investments needs.

Regarding investments, the LL experiment includes an inventory of projects and funds for water reservoirs, water networks, research and technological development in the last decade to be further developed in Cycle 3. The data experiment will conclude in Cycle 3 with the design of a tailor-made data model combining the different sources of data and information and geolocate both water resources availability and irrigation needs and investment and infrastructure projects existing, in progress, and needed.

Table 16 List of sources and analysis methods.

Dataset	Source	Analysis methods
Infrastructural and management data on irrigation systems	National information system for the management of water resources in agriculture (SIGRIAN)	Creation of a dataset to improve knowledge on water management, surfaces (total, infrastructured, irrigated), irrigation volumes, withdrawal source and method, typology of cultivation
Rainfall geodata and thematic maps	Regional Environmental Agency ARPAE	Creation of a dataset on effects of climate change on rainfalls (cumulative rainfall quantity, days of rainfalls)
Temperature and rainfall data	3B Meteo	Creation of a dataset and graphs showing data trends
Management plan of the Po River Basin District, Drought management plan of the Po River Basin District, website	Po River Basin District Authority	<ul style="list-style-type: none"> • Mapping of area covered and identification of Land Reclamation Consortia and irrigation districts





Dataset	Source	Analysis methods
		<ul style="list-style-type: none"> • Mapping of Land Reclamation Consortia governance system at macro-basin level
Statute, website	National Association of Land Reclamation Consortia (ANBI)	<ul style="list-style-type: none"> • Mapping of area covered in Emilia-Romagna region and identification of Land Reclamation Consortia and irrigation districts • Mapping of Land Reclamation Consortia governance system at regional level
Statutes, Classification Plans, Drought Management Plans, websites	Land Reclamation Consortium of Piacenza	<ul style="list-style-type: none"> • Mapping of area covered and identification of Land Reclamation Consortia and irrigation districts • Mapping of Land Reclamation Consortium governance system in ordinary and crisis conditions • Identification of specific territorial and irrigation peculiarities within the LRC lowland area • Inventory of funded, in progress and future investments
	Land Reclamation Consortium of Parma	
	Land Reclamation Consortium of Ferrara	
Agricultural cultivations	Italian National Institute of Statistics	Creation of a dataset on main agricultural cultivations of the LRC irrigation areas, with particular focus on the more water-demanding ones
Field investigation	Land Reclamation Consortia of Parma, Piacenza, Ferrara and CER	Information and data verification and implementation in terms of area covered, governance system (ordinary and in times of water crisis), territorial and irrigation peculiarities at water-basin level, investments/projects
On-line follow up	Land Reclamation Consortia of Parma, Piacenza and Ferrara	

Data innovation

The key innovation introduced consists in the enhancement of the information system on water management by combining different sources and the understanding of governance peculiarities and specific investment needs of the different water districts.





The **combination of information sources** is urgently needed to cover gaps in knowledge about the water management needs of the different water authorities operating in the PR, as well as necessary investments and infrastructures. Furthermore, the objective of identifying a map of the most vulnerable irrigation districts under the effects of climate change (i.e., drought) could be innovative both for communication and for policy purposes. This should be possible by combining qualitative and quantitative information collected through different methods.

In this regard, the **mapping and geolocation of critical issues and investment needs** represent an extremely important innovation since it enables better design initiatives at the regional level in case of water crisis, defines more targeted interventions in terms of public investments by regional administration and Land Reclamation Consortia, inform Consortia and associations about potential opportunities to design and implement new investment plans.

Implementation

Implementing the experiment

The implementation of the data experiment followed different steps. Table 16 summarises the main steps and internal components of the data experiment.

Initially, preliminary workshops with stakeholders were fundamental to focus on the water system and climate challenges as a crucial and complex topic for the Pilot Region. In April 2023, three half-day online **focus groups** about, respectively, water management (April 20), labour market and digitalisation (April 27) were organised. All key local stakeholders were involved, namely, representatives of Land Reclamation Consortia, processing tomato Producers' Organisations and processing firms. These meetings enabled the LL to identify major challenges at stake, discuss the main contents of the survey to prepare for future steps, and explore in detail data availability or lack at a local level. In particular, the discussion dealt with the following issues:

1. Impact of climate change on water resources in the last decade, other impacts on the processing tomato supply chain, availability of information and data on water use, possible alternatives to save/retain water supply and enhance water management, possible alternatives to reduce water consumption (in agriculture and processing industries).
2. Demographic trends in the PR, with specific attention to labour recruitment in agriculture and agro-industrial industries and possible alternatives to better match skills and labour supply to demand.
3. The state of digital infrastructures and issues related to access to digital services in the areas where tomatoes are cultivated and processed, with specific attention to farms, processing firms and households, and possible alternatives to improve access to digital services (in agriculture and processing industries).

As a result, it emerged that the most pressing issue was water resource scarcity, and the LL decided to centre the experiment on this single topic.

Once the field of work for the LL was defined, all available **data sources** concerning water resources and management were detected (Step 2) by scraping the web. Relevant information was collected on indicators and then systematised to drill down into the data and get a clearer understanding of the scale of the presence or absence of data and better target the experiment.





Table 17 Timeline of the different data experiment components in 2024

Steps in the LL data experiment	2024											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Step 1 – Focus groups with stakeholders												
Step 2 – Data collection												
Irrigation indicators from different existing available sources												
GIS rendering of irrigation networks and irrigated areas (public and private)												
Focus group with Land Reclamation Consortia												
Individuals interviews with officials of land Reclamation Consortia												
Focus group with second order Consortium (Canale Emiliano-Romagnolo-CER)												
Inventory of projects funded for water reservoirs, water networks, research and technological development in the last decade												
Other sources (cropping systems, climate changes indicators, etc.)												
Step 3 – Data processing and mapping												

Preliminary data analysis allowed the identification of the irrigation indicators from different existing available sources, in particular:

- The National information system for the management of water resources in agriculture (SIGRIAN)
- The websites and documents of:
 - National Association of Land Reclamation Consortia (ANBI).





- Second-tier Land Reclamation Consortia of Piacenza, Parma and Ferrara.
- First-tier Land Reclamation Consortium Consorzio Emiliano-Romagnolo (CER).
- Regional Environmental Agency ARPAE.

After a more thorough data collection and analysis process, in July 2024, the LL team conducted **field visits** in the PR. Four half-day focus groups on water resources and management with representatives, respectively, of the four local Land Reclamation Consortia (Ferrara, Parma, Piacenza, Canale Emiliano Romagnolo) were held to verify and integrate information gathered with local stakeholders. During the meetings, the LL team addressed a **series of questions** to Land Reclamation Consortia aimed at an in-depth exploration of:

- Management strategies and choices put in place in times of water shortage (mainly, mode of water withdrawal/abstraction and allocation among farmers).
- Water resource availability (especially for small consortia/associations using groundwater resources).
- Needs in terms of regional/basin governance.
- Needs in terms of public support to investments and advice/knowledge exchange/technical assistance.

At a later stage, between September and October 2024, the Land Reclamation Consortia of Piacenza, Parma and Ferrara were contacted again online or by telephone for more detailed interviews concerning unclear points and to supplement missing data and information.

Finally, to spot the presence and the extent of constraints in water resources in times of crisis in the different irrigation districts, information and data collected in the different steps were processed and systematised, resulting in:

1. An inventory of available data on water resource uses and availability.
2. An inventory of research and investments related to water resources.
3. The understanding of potential and limits in water resources availability and management, especially in extreme weather conditions.

Georeferenced data concerning the surface of the three Land Reclamation Consortia and of lowland irrigation areas within their territory were used to prepare a preliminary set of maps on irrigation systems in the three provinces of the Pilot Region (see Section Preliminary results). These maps function to represent the different irrigation districts underpinning the organisation of the Land Reclamation Consortia.

Finally, other sources of information related to climate changes in the last decade and trends in types of farming systems have been explored to contextualise the changes in weather patterns against the prevalent cropping systems in the area. These data resulted in an analysis and elaboration of meteorological and climatic trends (temperature and rainfall referred to the processing tomato campaigns in 2022-2023-2024 in the most significant areas for tomato production in Northern Italy and cumulative daily precipitation in Emilia-Romagna) and of the most water demanding crops in the three provinces.

An inventory of the main investment projects funded in water resources networks and organisations has been conducted since September 2024 but has not yet been fully exploited.





Adaptations

Quantitative data collected were, in some cases, not homogeneous between the different areas or even unavailable. Therefore, it was not always possible to completely deepen the understanding of water governance and availability and, most importantly, compare the different water districts belonging to the three areas of the Pilot Region.

Therefore, in some circumstances, quantitative analysis has not always been possible. To overcome these difficulties, it has been necessary to adapt the experiment by introducing qualitative information from focus groups and interviews in a triangulated process. Notably, the early objective of clustering irrigation districts based only on a certain number of indicators had to be revised, and we proceeded to use qualitative information on the effects of the water crisis on variables like water distribution, changes in cultivation patterns and salinity control, alongside quantitative indicators on irrigation characteristics. The experiment will also include the identification of water supply governance mechanisms and the geo-localisation of investment needs (by typologies) in the different water districts.

Preliminary results

Results to date

The analysis and elaboration of data and information collected (see Table 16 for sources and methods) have yielded relevant preliminary results in terms of the impact of climate change on water availability for irrigation purposes and specific arrangements, measures and investments put in place in the different irrigation districts belonging to the three Land Reclamation Consortia to tackle water crisis periods. The main results achieved may be summarised as follows:

- Climate change is causing a **pronounced polarisation in local climatic conditions**, shifting towards extremes of either water scarcity or water excess, particularly during the industrial tomato production season.
- The drawbacks of **altered rainfall patterns** on agriculture are particularly relevant in the PR, especially in the areas with a prevalence of water-demanding crops, the most relevant of which in terms of production and value is processing tomatoes.
- The three **Land Reclamation Consortia** of the PR are characterised by distinctive features, challenges and management procedures in times of water scarcity.
- There are considerable differences within the **Land Reclamation Consortia**, depending on the specific characteristics of the irrigation districts, water source, and infrastructures.
- Distinct critical issues characterise the different **irrigation districts** within the Land Reclamation Consortia, and each requires specific solutions, measures, and infrastructures.
- The Land Reclamation Consortia put in place significant **investments in maintenance or improvement works and new infrastructures**, and more are in progress or planned, with public funds (mainly National Recovery and Resilience Plan, Development and Cohesion Fund, Rural Development Programme, own funds).
- Due to the frequent weather and climate adverse conditions and the length of time required for infrastructures to be designed, financed and realised, **infrastructural measures** are inadequate to meet water demand in the short run.





- Therefore, **new governance arrangements** were adopted to work towards better integration and coordination in times of water crisis.

Detailed information on each of the above key points is provided in the following pages, with specific attention to the different challenges and solutions characterising the three Land Reclamation Consortia of the Pilot Region.

Analysis of meteorological and climatic trends and prevalent crops

The LL team conducted a study on rainfall data (rainy days and millimetres of precipitation) recorded in the study area during 2024, with a focus on the key months of the growing season, from transplanting to harvest, i.e., from April to October. That highlighted an increased magnitude and frequency of rainfall during May, September and October compared to the same months of the years 2023 and 2022,

Then, the analysis focused on ARPAE (Regional Environmental Protection Agency) official data on annual cumulative daily rainfall. By examining these data, the anomaly of the year 2024 became even more evident, with values consistently above the climatic norm (cumulative value on October 23 of 1,057.1 mm, higher than the historical maximum value 1991-2020).

A further analysis was carried out on the trend of cumulative rainfall from 2012 to 2023. Each year, the trend either exceeded or fell below the climatic normal range, defined as the range encompassing 50% of the most frequent values of daily cumulative rainfall for the reference period (1991–2020). This indicates an annual surplus of rainfall, while in the latter, it points to a year marked by drought. These findings highlight a pronounced polarisation in local climatic conditions, shifting towards extremes of either water scarcity or water excess, particularly during the industrial tomato production season, and provide clear evidence of the impact of climate change on rainfall patterns in the Emilia-Romagna region. In both 2023 and 2024, the region, and especially its central and eastern areas, experienced significant flooding events. These caused extensive damage not only to agriculture but also to the wider economy, regional infrastructures, and residential areas.

The drawbacks of altered rainfall patterns on agriculture are particularly relevant in the PR, especially in the areas with a prevalence of water-demanding crops.

The three Provinces are very different from one another in terms of cultivated crops (Table 18). In **Ferrara**, there is a significant presence of water-demanding crops, among which maize (including waxy maize) and horticultural crops stand out. In Ferrara, peas, carrots, apples, and pears are widely cultivated. Rice and sugar beet are also important. Water-demanding crops account for over half of the total cultivated area in open fields (based on the sum of all open-field crops, according to ISTAT data). **Piacenza** follows in terms of the prevalence of water-demanding crops, with 32.2% of the cultivated open-field area, where maize and waxy maize are the two most important crops, alongside processing tomatoes, which account for over 9% of the total area. **Parma** differs significantly from the other two areas. Most of the cultivated area is dedicated to winter cereals and forage crops (alfalfa alone accounts for 34% of the total area), which benefit from irrigation but can also be grown without. Processing tomatoes represent almost 3% of the total open field cultivated area. Parma is home to some of the most famous tomato processing industries. Maize for grain also holds some importance (2.1%), but there is no presence of silage crops, which are prohibited under the Parmigiano Reggiano production regulation.





Table 18 Water demanding crops* in three territories expressed as a % of the total (2021-23 average)

	Piacenza	Parma	Ferrara
Soybean	1,4%	0,9%	14,7%
Corn	7,8%	2,3%	12,1%
Waxy corn	9,8%	0,1%	5,3%
Fruit crops	0,1%	0,0%	5,1%
Horticultural crops	2,2%	0,5%	4,7%
Tomato (industrial use)	9,1%	2,8%	3,9%
Rice	0,1%	0,0%	2,5%
Sugar beet	0,1%	0,3%	2,1%
Sunflower	1,6%	0,7%	1,3%
Water-demanding crops on total cultivated area	32,2%	7,6%	51,7%
Total cultivated area (in hectares)	110 311	149 336	189 722

* The total area with crops in open fields was calculated as the sum of the total area of all the crops listed by ISTAT and does not represent the effective agricultural land. The calculated area covers the entire provincial territory and not just the areas under the jurisdiction of the Consortia.

Source: LL team elaboration on Italian National Statistics Institute data (annual data on cultivations)

Structure and governance of Land Reclamation Consortia

The Emilia-Romagna Region is entirely crossed by the River Po and is home to various rivers, streams and artificial channels. Therefore, the structure and governance of Land Reclamation consortia is very complex. The regional reclamation system (Figure 30) is organised in eight homogeneous territorial areas managed by as many local first-tier consortia (all associated with ANBI, the regional branch of the National Association of Land Reclamation, Irrigation and Land Improvement), some of which belong to a second-tier consortium (Canale Emiliano Romagnolo - CER), that is also a research and experimental centre dealing with technical assistance and dissemination to farmers of water-saving irrigation tools and methodologies.



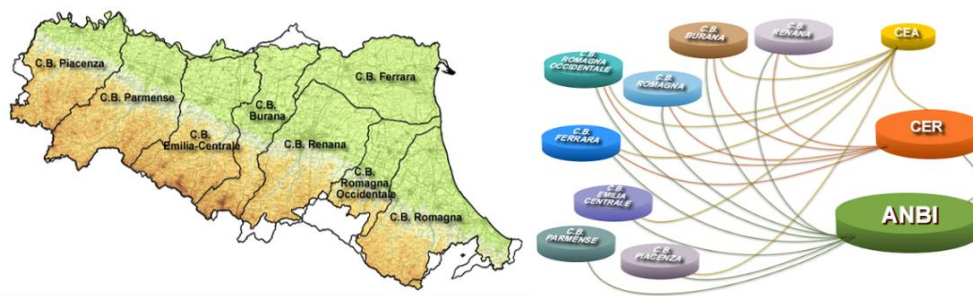


Figure 30 The system of Land Reclamation, Irrigation and Land Improvement Consortia in Emilia-Romagna

Source: ANBI Emilia-Romagna (www.anbiemiliaromagna.it)

The three second-tier Land Reclamation Consortia of Piacenza, Parma and Ferrara belonging to the PR are illustrated in Figure 31. Irrigation areas and irrigation districts managed by the three Land Reclamation Consortia of the PR. They cover the entire territory of the three provinces (red borders), but the LL experiment is performed in the irrigation areas highlighted by light blue stripes.

All the Consortia have an associative character, and each member pays an annual fee for the benefits received. This fee is calculated to cover all the operating costs. They have two main purposes: 1) to guarantee the excess rainwater runoff to prevent overflow and flooding in the plain and hydrogeological protection in the hilly and mountainous areas during wet and rainy seasons, and 2) the water supply both for population and agriculture (irrigation). However, the implementation of these tasks implies different activities according to the specific characteristics of water districts and infrastructures managed.

The data experiment showed that the three Land Reclamation Consortia irrigation areas are characterised by distinctive features, challenges and management procedures in times of water scarcity. Moreover, the comparison of data and information revealed considerable differences also within them depending on the characteristics of the different irrigation districts and infrastructures available, as described in more detail in the following pages.

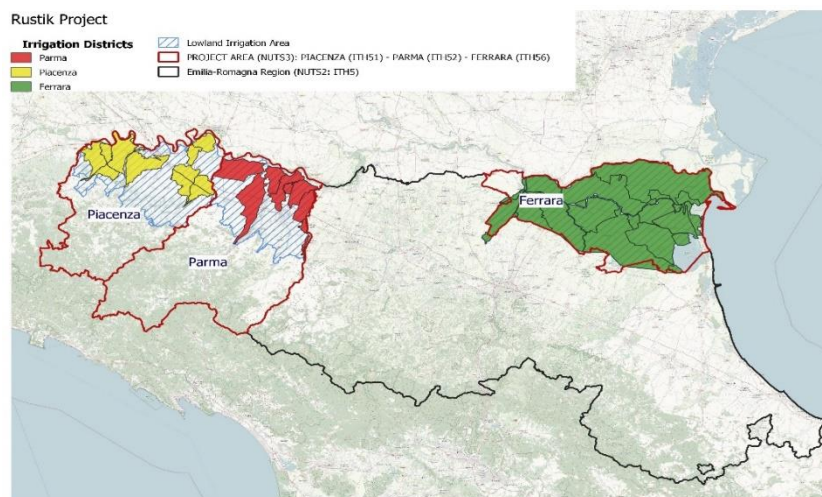


Figure 31 Irrigation areas and irrigation districts managed by the three Land Reclamation Consortia of the PR



Source: LL team on Sigrian data

Land Reclamation Consortium of Piacenza

The Land Reclamation Consortium of Piacenza operates in 46 municipalities of the province and covers about 260,000 hectares, 169,000 of which are in mountain areas and 91,000 in the plains. The Consortium manages a complex network of 2,400 km of channels, two dams (Molato and Mignano), five plants for drainage, two plants for drawing water from the Po River and three flood retention basins. There are four different irrigation districts (Arda, Arda Po or Basso Piacentino, Trebbia, and Tidone), each different from the other based on water supply source.

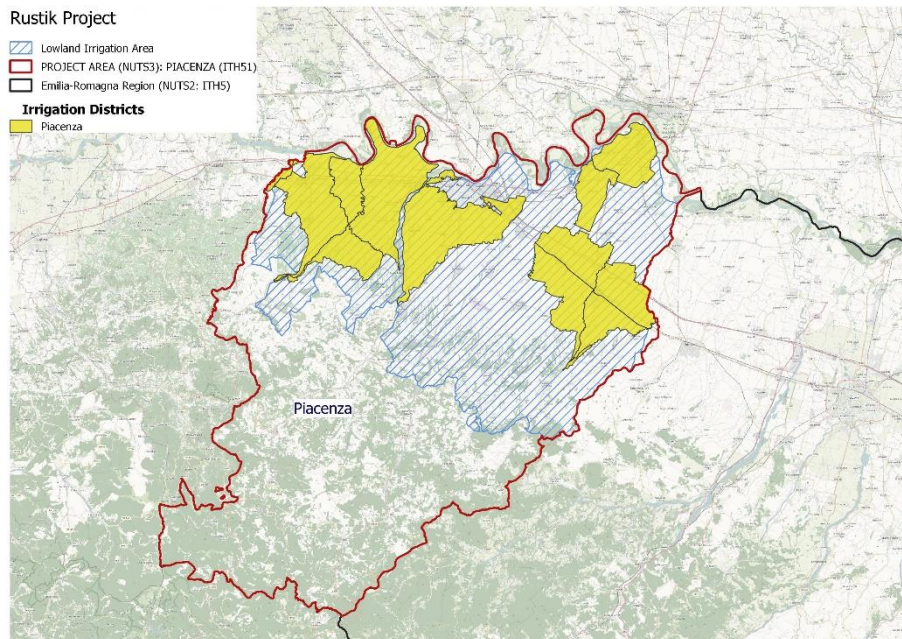


Figure 32 Irrigation districts of the Land Reclamation Consortium of Piacenza

LL team on Sigrian data

The water management in Piacenza LRC encounters technical problems related to the **source of water** (dams, wells, Po River) and the system used for its collection and distribution, climate change, and farm structure evolution. From a technical point of view, major problems with **dams** are high levels of water losses due to infiltration and evaporation, especially during summer; maintaining the minimum vital flow limit for water collected during drought seasons; the high dependence of water availability on precipitation and weather trends; the priority of drinking water supply limiting the availability for irrigation. **Wells** are usually used to cover locally limited water demand or in drought seasons to meet demand for irrigation. The use of pumps has a high operational cost and has an impact on groundwater levels, which take a long time to restore, and collapses of well walls can happen. Water withdrawal from the Po River requires lifting systems and is therefore costly (energy, pump failures, etc.) compared to dams or streams in which water flows by gravity. Moreover, part of the water lifted is lost by infiltration or evaporation. In the Tidone area, water withdrawal from the Po depends on the hydrometric levels of the river, and when it is low, there is a high risk of silting up the abstraction system.

Also, **climate change** has different impacts on water management. In the past, a shift distribution system was used. This was an efficient way of distribution that lowered the water losses by



infiltration. Due to climate changes – specifically, more drought periods - the Consortium was forced to shift to a distribution system known as “by call”. The water is released only if the farmer demands it. This type of distribution has higher losses. This problem can be addressed by investing in channel modernisation. For the moment, there are four types of channels or water conducts in the area: 1) earth-bottomed, 2) concrete-bottomed, 3) free-flowing stream pipes and 4) pressurised pipes. To lower the losses by infiltration, a huge amount of work is needed to modify the channels' structure, such as changing the bottom with concrete to increase stream speed and reduce infiltration. Another problem that has been addressed and requires more effort is the need to stock water close to where it is needed, i.e. creating reservoirs that help increase the water availability for irrigation when needed. This also allows for a more rapid answer to the call and fewer losses.

Farms' structural changes are another challenge to good water management. In this decade, a clear declining trend is seen in farm numbers. On the other hand, farms are getting bigger. This has led to a higher concentration of cultivated crops in the same area, which implies an increase in water demand in the same area. The actual structure of the distribution system was not built for this type of distribution. The maximum flow rate is not enough to satisfy higher demand from a single farmer.

To address the issues, the Consortium has initiated a series of infrastructure works, both for maintenance and to improve the overall structure, with significant investments financed through the National Recovery and Resilience Plan (NRRP) and other forms of public funding. In total, including recently completed projects and those expected to be completed within the next 3–5 years, the total expenditure is estimated at €88 million, distributed across the Consortium's four districts. Among the others, the main investments concern the construction of reservoirs and basins, the improvement of water intake and distribution systems, and the functional reorganisation of irrigation channels.

Land Reclamation Consortium of Parma

The Land Reclamation Consortium of Parma is interregional and includes 48 municipalities in three provinces (46 in the province of Parma in Emilia Romagna; and 2 in the provinces of La Spezia and Genova in Liguria). In Emilia-Romagna, it manages drainage and irrigation of 213,178 hectares of land, 188,040 of which is in mountain territory and 25,138 in the lowlands, where it is in charge, respectively, of prevention of hydrogeological risk and irrigation of agricultural land and hydraulic defence. The Consortium manages a system of more than 1,500 km of channels, more than 20 pumping stations and about ten wells. In 2023, it provided 10 million cubic meters of water to more than 5,000 hectares of cultivated area, 1,625 of which were processing tomatoes.

The lowland area managed by the Land Reclamation Consortium of Parma is characterised by hot summers and little rainfalls. Therefore, good availability of irrigation water is essential. All available water resources of the territory are exploited: water supply comes primarily from streams coming from the Apennines but also from withdrawals from the Po River (using pumping plants) and wastewater treatment plants from urban areas and industrial facilities. Water is then distributed for irrigation and hydraulic purposes through a dense network of channels.

The Land Reclamation Consortium has an efficient water management system. Water is mainly derived from streams (Taro, Enza, Parma and Ongina) from the Apennines using the force of gravity, while only a very small amount comes from the Po River. The total catchment area of the





four streams covers an area of about 3,800 km². The irrigation area lies in the plain (light blue in Figure 33, left), part of which is served by water infrastructures managed by the Consortium of Parma (red in Figure 33, left). The infrastructure area is organised into four main irrigation districts (Figure 33, right) according to the water source:

1. Enza-Parma (light green)
2. Parma-Taro (orange)
3. Taro-Stirone (blue)
4. Stirone-Ongina (light blue)

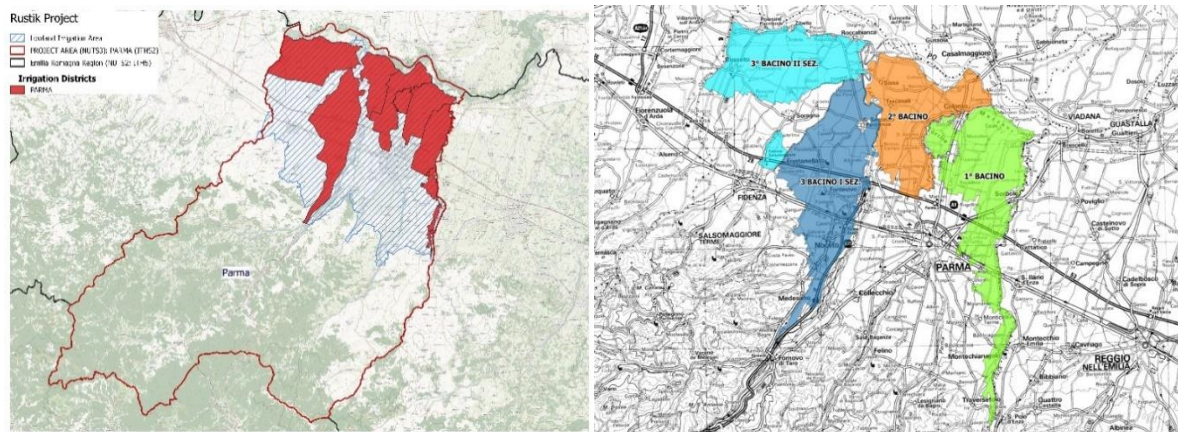


Figure 33 Irrigated area (left, light blue stripes) and irrigation districts (left, total area in red; right, the four districts) of the Land Reclamation Consortium of Parma.

Source: LL team on Sigrián data (left); LRC of Parma (right)

Recent irrigation seasons are characterised by difficult water shortages that pose great challenges for the Land Reclamation Consortium of Parma. Summer 2022, for example, was the driest in seventy years, but the previous and following seasons were no less problematic. Drought negatively influences crop productivity and the strong local agricultural vocation, and as the risk of drought increases, irrigation water demand increases as well.

A severe challenge is represented by the serious repercussions of prolonged and severe drought periods on cultivations in the areas south of Via Emilia due to the low rate of streams coming from the Apennines. Prolonged and severe drought periods particularly affect the areas south of Via Emilia (black line crossing the areas of the districts in Fig. 7 right) due to the torrential nature of streams coming from the Apennines and to the need to respect the limit of minimum in-stream flow.

In the areas to the north, water availability raises minor concerns since they can rely on water resources from the Po River, wastewater from urban areas and groundwater withdrawals. Nevertheless, water scarcity has pushed many farms and firms to build private wells for self-supply. This currently poses the greatest issue in Parma: private wells cover almost one-third of the irrigated area of the province. There are around 30 private irrigation consortia (owned by landowners, a great number of which cultivate processing tomatoes) that withdraw underground water resources beyond the control of public institutions. The presence of numerous private wells and irrigation consortia is, therefore, a major problem, not only because these withdraw groundwater without any control but also because tackling water scarcity needs





investments well beyond their reach. Emilia-Romagna Region penalises private consortia with an increase in concession fees, but they are still very present. Recently, the Land Reclamation Consortium of Parma initiated an expansion policy aimed at taking up these private consortia over time, starting with those with the worst state of hydraulic infrastructures. The first absorption of a private consortium (based in Noceto, near Parma) occurred in January 2024, but the process ahead is long, difficult, and expensive.

Specific attention is also reserved for the control and preservation of reclamation and irrigation works, as well as for water use. The Land Reclamation Consortium exercises “water police” powers through a Regulation that requires the release of a concession, licence or authorisation to use reclamation works or intervene in them and an authorisation for wastewater discharge.

In response to water resource instability, a series of measures have been adopted. Unlike Piacenza, in Parma, there are no dams, and to overcome irrigation water shortage in the lowlands, some reservoirs have been made to retain water from multi-purpose drainage channels. Besides reservoirs, the irrigation system is improved by replacing open-air channels with pressurised underground pipelines, enabling the avoidance of leakage and control of water use and consumption on farms. Additionally, the Consortium has around ten large-scale wells to supply the area in times of surface water shortage. Furthermore, to increase management efficiency and water saving, different infrastructural projects have been made, are in progress or are being designed with public funding. There are several projects in various stages of development included in the public works triennial programme 2023-2025 of the Land Reclamation Consortium of Parma (63 million Euros, 2.7 of which is private funding). These include upgrading and extraordinary maintenance work on obsolete irrigation canals with underground pressurised pipelines, the renovation and upgrading of remote monitoring systems and pumping stations, the realisation of four basins, and the development of a new well and a dam.

All these projects and works to tackle the water crisis have great relevance for the area. However, due to the frequent adverse climate conditions and the length of time required for infrastructures to be designed, financed and realised, these projects are proving inadequate to meet water demand in the short run. Considering this, new governance arrangements were also adopted to work towards better integration and coordination in times of water crisis. Arrangements include the establishment of a permanent Discussion Table to design and implement strategic and innovative projects and measures, the preparation of Drought Management Plans (DMP), monitoring systems and an Operational Plan (the SicciDROMETRO), which was devised by the Po River Basin District Authority in 2021 and tested in the Parma area before drafting Guidelines to be used by all the other Land Reclamation Consortia of the Po River Basin.

Land Reclamation Consortium of Ferrara

The Land Reclamation Consortium of Ferrara is the main institution in charge of water management in the province of Ferrara, both for drainage and irrigation. The agricultural area overseen by the Consortium covers 256,733 hectares. The Consortium controls 88 infrastructures for irrigation, 78 plants for drainage and removal of excess water from rainfall, and the whole system can pump 780 cubic metres of water per second into the irrigation system.

Irrigation districts cover about 201,000 hectares of irrigable area and 101,000-105,000 hectares (variable over years) of irrigated area, fed by about 500 million m³ of water per year on average. Figure 34 shows the different districts of the Land Reclamation Consortium of Ferrara, which differ in many aspects (source of water, position concerning the withdrawal points, land altitude,





and closeness to the Adriatic Sea). Most irrigation is ensured by public sources, while private wells feed a marginal share of the surface (about 1,000 hectares).

94% of the water used by farmers comes from the Po River, delivered through a complex network of open-air channels to the four districts from north-west to north-east (Po-CER, Po-Capodargine, Po-Pilastrese/Pontelagoscuro, and Po-Guarda, Contuga, Berra, Garbina). These four districts are coloured in different green tones in Figure 34. Irrigation water is withdrawn through a series of pumps and delivered mainly by gravity, with a minor share by pressure.

Three additional smaller districts are water-fed by the Reno River (the southern districts in red colour), whose size reflects the Reno's low capacity to provide irrigation water. These districts suffer from the Reno's torrential nature, which is highly variable from winter to summer season, when water flow is much lower and inadequate.

Finally, there are two other districts in the northeast area (Po di Goro and Volano Est) receiving water from the Po River. They are also fed by drainage water coming from rice fields located in nearby districts. These two districts need to reuse drainage water to hold back the intrusion of salinity wedge from the nearby coast in the summertime (Po di Goro district) or keep lower levels of soil salinity over the years (notably in Volano Est district and Po-Pilastrese-Pontelagoscuro).

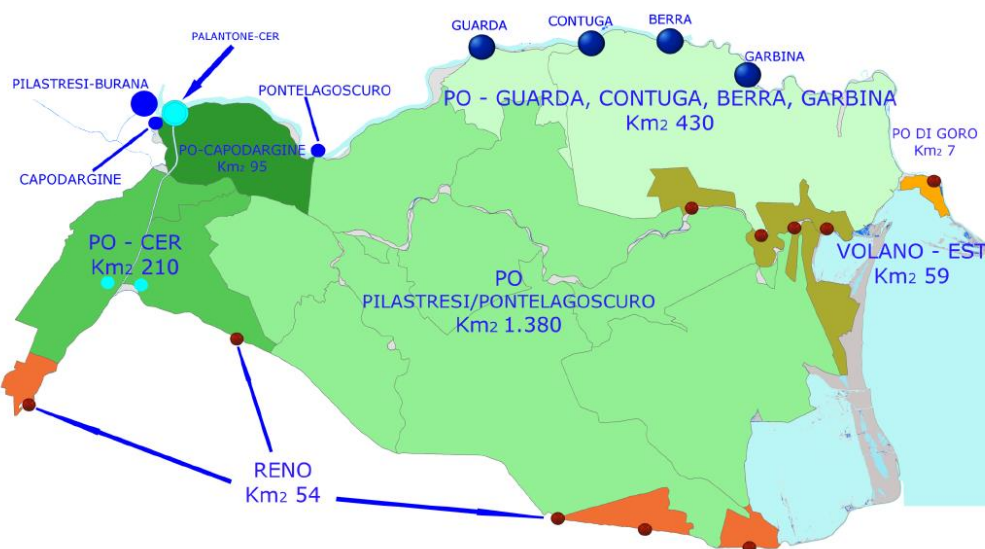


Figure 34 Irrigation districts of the Land Reclamation Consortia of di Ferrara

Source: LL team on Sigrian data (above); LRC of Ferrara (below)

Water shortages in drought seasons have had negative impacts on water resources for irrigation. In the last two decades, Ferrara districts suffered from a remarkable water shortage for several years (2003, 2005, 2006, 2007, 2022) due to the impossibility of water withdrawal from the Po River. When the hydrometric level in the Po River falls below a threshold (2.3-2.5m), pumping water in irrigation channels becomes impossible. Furthermore, national and regional environmental regulations on the minimum vital threshold mandate refraining from water withdrawal in critical conditions of water shortage, and there are increasing power costs charged to the consortia to pump water in irrigation channels.





According to stakeholders interviewed in focus groups, major issues are represented by the decreasing water flow trends in the Po River over the years. Considering trends means taking average values over a long period. Based on the water flow trends, the Consortium managers explained the need for having renovated pumps in 2004 to withdraw water at a deeper level of the river course. Additional negative impacts on soil salinity occur when Po River streams fall below critical levels. Responding to these soil changes requires the reuse of drainage water in the most eastern districts. This mitigation practice has arisen over the years and is a successful one.

The effects of water shortage: the three territories at a glance

Table 19 summarises the main results of the analysis of the diverse districts in the three provinces of Parma, Piacenza and Ferrara. The role of the LL is crucial in understanding the main effects of water shortage (general effects, effects on specific crops, and more vulnerable districts affected over the years) and water management adjustments (mitigation and adaptation adjustments). This synthesis allows us to draw the following conclusions:

- Climate change effects on water shortage are differentiated across the territory, depending on the water sources, the position, altitude and soil features of irrigated districts.
- The most vulnerable districts are those served by typically torrential flows farther from the Po River and with problems of holding back soil salinity and salinity wedge.
- Rising costs of pumping water in irrigation channels are additional crisis factors for most of the irrigation districts, which in turn are partially translated into higher irrigation costs for farmers.
- Vulnerability is linked to the importance that water-demanding crops share in each district, implying that Ferrara and Piacenza's districts suffer more in years of drought.
- Water management adjustments also differ from district to district. Relevant investment programmes implemented or in process in the districts show that adaptation strategies have been occurring everywhere, although more slowly than necessary in those districts in need of water reservoirs. However, this aspect needs to be analysed more in-depth.

Table 19 Summary of main water shortage effects in three territories

Land Reclamation Consortia		Parma	Piacenza	Ferrara
Effects of water shortage	General effects	<ul style="list-style-type: none"> • Water shortage in districts water-fed by Apennines streams • Over-pumping in areas fed by private wells 	<ul style="list-style-type: none"> • Water shortage in districts water-fed by Apennines streams • Over-pumping in areas fed by private wells • Silting up of the pumps with low hydrometric levels in the Po River 	<ul style="list-style-type: none"> • Saline wedge intrusion • Increasing soil salinity
	Crops mostly affected	<ul style="list-style-type: none"> • Processing tomatoes • Corn • Sunflower 	<ul style="list-style-type: none"> • Corn (and waxy corn) • Processing tomatoes • Sunflower 	<ul style="list-style-type: none"> • Horticulture in the eastern area • Rice • Processing tomatoes • Corn and waxy corn





Land Reclamation Consortia	Parma	Piacenza	Ferrara
			<ul style="list-style-type: none"> • Sunflower • Soybean
Irrigation districts with major impacts ("sensitive" areas)	<ul style="list-style-type: none"> • Most southern areas, water-fed by torrential streams from Apennines • 1/3 of irrigated area mostly by private wells (30 private irrigation consortia) 	<ul style="list-style-type: none"> • Arda and Trebbia districts are more sensitive in drought conditions • Districts that can lift from Po River are costly to use 	<ul style="list-style-type: none"> • Most eastern districts (Po di Goro and Volano Est), closer to the Adriatic coast • Districts close to the Reno River
Water management and structural adjustments			
Short-term adjustments (mitigation strategies)	<ul style="list-style-type: none"> • Pump water from 10 large-scale wells 	<ul style="list-style-type: none"> • Transition to concrete-bottomed channels to reduce water losses • Small water reservoirs for more water reserves and more efficiency in water distribution 	<ul style="list-style-type: none"> • Re-use of drainage water in drainage channels to stabilise groundwater levels
Medium-long term structural changes (adaptation strategies)	<ul style="list-style-type: none"> • Replace open-air channels with pressurized underground pipelines • Water reservoirs to increase water reserves 	<ul style="list-style-type: none"> • Replace open-air channels with pressurized underground pipelines • Water reservoirs to increase water reserves • extraordinary maintenance of dams to increase water stocks and reduce losses 	<ul style="list-style-type: none"> • Replace open-air channels with pressurized underground pipelines • Renovate the lifting plants in some withdrawal section of the network

Source: LL team elaboration

Data relevance

Data collected and analysed are extremely important to assess the water supply capacity of the PR area and correctly frame possible solutions and investments needed to guarantee constant water availability and correctly meet local water demand, especially in summer.

The data experiment conducted is relevant for two interconnected reasons. On one side, it shows that critical meteorological conditions are causing rising temperatures and heat waves, reduced stream flows, long periods of reduced rainfall and drought alternated with heavy rains and floods and that existing measures and infrastructures proved to be insufficient to save/retain/stock water resources and hardly allow to meet water demand during seasonal crisis. On the other, it evidences the water-demanding nature of main cultivations, especially processing tomatoes, as well as their water-saving adjustments/solutions/arrangements urged by the increasingly critical water scarcity and the struggling water supply.





Local relevance

Climate change is heavily impacting the PR, and in the near future, the water crisis could further endanger the region, especially those areas less endowed with infrastructures guaranteeing constant water supply during the transplanting and growing periods of agricultural cultivation. In such severe conditions, it is vitally important to identify any potential issues and bottlenecks on the water demand and supply sides and find both rapid responses for the short-term and more structured and innovative long-term collective solutions, to comprehensively address current challenges and prepare for those ahead.

The various stages of the LL data experiment work enabled us to grasp the relevance of the issues and difficulties at stake from very different perspectives (distinctive features of water demand and supply, characteristics and difficulties in the three PR areas, measures taken and in progress). The intent was to address the growing concerns related to water resources at the PR level by covering every possible aspect and grasping the nuances of complex local needs. Positive feedback and collaboration from all stakeholders involved prove that actions taken within the LL were necessary. Further progress is, therefore, expected to assist stakeholders to better understand how to prevent or overcome similar issues in the future through more targeted proposals.

Policy relevance

Water supply insecurity introduces considerable uncertainty and distortions in the strategic decision-making process of farms and processing firms, endangering the PR's whole agri-food sector. On the demand side, individual measures taken to make improvements in water saving cause a significant financial burden, which is added to all the other burdens deriving from rising costs of inputs, international instability, and competition on world markets. Moreover, these solutions can be insufficiently immediate in times of crisis.

On the supply side, collective governance arrangements sharing operational strategies and investments in infrastructure projects with a medium-long-term vision prove crucial for a more effective and long-lasting impact on water resource availability. However, this demands cohesion and unity of purpose on the part of all the relevant stakeholders involved in financing, design and implementation, including Land Reclamation Consortia and other institutions, such as local and regional administrations and universities. Therefore, the potential implications of climate change for water availability and impact on the agri-food sector must be specifically taken into consideration when planning policies and support measures, and more favourable conditions for governance tools and infrastructural investments should be created.

Robustness and limitations

The choice to focus our attention on the role, functions and governance system of Land Reclamation Consortia gives robustness to the analysis of water availability for irrigation and water crises since Consortia are among the key players in acting to find solutions to combat the effects of climate change on water resources. Moreover, the comparison of three different irrigation areas united by a shared element (the same leading water demanding agricultural production, that is, processing tomato) and the identification within them of different specific characteristics linked to equally distinct supply conditions (waterway flows, infrastructures, etc.) enables us to showcase a comprehensive range of challenges and solutions. Finally, thanks to the interest and the collaboration of relevant local stakeholders, data and information collected





and analysed were double-checked for data gaps, contradictions, and potential misunderstandings.

Limitations mainly arise from difficulties related to data availability and comparability. Relevant data are scattered in multiple databases from different institutions and bodies, each of which pursues a plurality of purposes, and it is hard to ensure the appropriate integration and harmonisation needed to analyse the phenomena under investigation. Data gaps make it difficult to have a suitable time series to accurately compare the multifaceted territorial reality. Furthermore, whereas data and information are easily available or retrievable from public institutions and organisations, in the case of private parties (namely owners of private wells and private land reclamation consortia), information and data cannot be found, and it is necessary to find alternative data solutions (obtained by difference, with estimates, and so on).





Part 3: Reflections and learning

The experiment has been very useful both for the project and for the Pilot Region Partner. Most information is available from different sources regarding the key issue of climate change and the necessary ecological transition. However, most of this information is partial, not integrated, and not organised to help stakeholders identify the key issues and to support analyses that help them adapt to the changing environment. The experiment has helped to collect many data available from different sources and to organise them in a more rational and integrated way. Part of this information has already been used by the Partner for its internal discussion with stakeholders to define new policy initiatives concerning water management (for irrigation but also to reduce the risk of floods) with local authorities.

The most important lesson from this experiment is that the real challenge concerning the ecological transition of water management is to be able to integrate all available information. Different sources are not connected nor integrated, yet this is the first need for the actual management of water for irrigation. An important step has been made with this experiment towards understanding the structure of the available information and the missing data and to organise this knowledge for an improved understanding of the present critical situation.

Reflections on data sources, methods, and tools

Data issues and obstacles during the experiment

With reference to water use for irrigation, a national database (SIGRIAN) has been developed in Italy and is now available to regional administrations, researchers and, to some extent, stakeholders. This was the first data source that the experiment used.

However, the statistical information available is incomplete and often imprecise. Data are collected at the end of the cropping year, meaning they are not available during the year as a potential management tool. Data collection is quite approximate regarding the crops that require irrigation, and therefore, evaluating the quantity of water used in different cases is almost impossible using this data. Moreover, data are of relatively good quality when obtained from well-structured and organised Land Reclamation Consortia but of low quality, if available at all, when provided by small private consortia or when water for irrigation is obtained from private wells. In the latter case, no precise data are collected and available. Therefore, the data collected cover only a part of the geographical area of interest since data are lacking for districts out of the responsibility of Land reclamation Consortia. Fortunately, most of the area of interest is covered by these Consortia. Regarding the other areas, broad information is available concerning water needs connected with cultivated crops.

Managing data issues and obstacles

Most of the data available have been collected from public databases and through interviews with technicians and the Directors of Land Reclamation Consortia in the region. To gather data about water use for irrigation in areas not covered by these public Consortia, two strategies have been developed. First, since these areas are under the formal control of small private consortia, we plan to meet them all in future to directly collect information about water sources, the amount of water used for irrigation and the number of investments made in the last decade to improve water





transportation, reduce water losses and increase the overall water distribution efficiency. This activity, however, is time-consuming, and is expected to return only a limited amount of data.

Pilot Region Partner's perspective on data

The data collected and the analysis made have been very useful for the IBO and for all stakeholders. In fact, the IBO has decided to invest more effort in this direction: they applied for funds from the regional Rural Development Programme to do a further project with the aim of completing the data collection and developing new tools to keep these data updated during the cropping season to provide information to improve and rationalise water management by Consortia and farmers.

Experiment design and implementation

The organisation of the experiment has been quite efficient and effective. The IBO has long experience in collaboration with Land Reclamation Consortia, and this has significantly helped in the organisation of activities. Data about irrigation have been collected first from public databases, and then this quantitative information has been integrated with more qualitative information obtained directly by the Land Reclamation Consortia. These meetings have been very useful in understanding how these structures manage water distribution and what kind of problems they face in their activity.

Strengths and successes

The data collection and analysis, supported by results obtained from in-person interviews between the research team and Consortia technicians, have been very relevant and useful. In each case, the meetings required 2-3 hours, allowing for sustained discussion of all major issues. Moreover, more information and data have been exchanged in online follow-ups. The data and information collected have been organised to illustrate and examine the different conditions in the three provinces and in different areas of the same province.

Overall, the good relationship between the IBO and Consortia has been a strength of the experiment, and this relationship has been further developed thanks to the Living Lab. Additionally, the experiment has significantly improved the knowledge of many aspects of irrigation water management in the three provinces, and more data are now available to all stakeholders, especially those in the processing tomato value chain.

Scope for improvement

The major problem faced during this experiment concerns the fact that detailed, complete and integrated information about irrigation water management is not available, even in a very well-developed region with a good administration. Clearly, the LL experiment has been concentrated on a key issue that needs to be addressed and will require more attention in future.

Data available from public sources are important but incomplete, and there is no way to connect water supply and irrigation water demand information at the territorial level, nor even at an aggregated level. The most important problem, therefore, regards data limitations and data availability. Given time and financial constraints, it has not been possible to do more to date.





However, since the data need is now clearer, new opportunities could help the agri-food chain to take steps forward in the near future.

Skill development and capacity building

Skills developed

During Cycle 2, members of the Living Lab team have developed several key skills. They have gained valuable knowledge in water resource management in the three Land Reclamation Consortia, local specificities in water shortage factors, and the mitigation and adaptation strategies adopted concerning these factors. Furthermore, the LL team has become more familiar with stakeholders operating within the local area, enhancing the understanding of their roles in the whole management system.

The LL team has also gained awareness of the potentials and limitations of available data and tried to formulate a strategy to deal with this, combining qualitative and quantitative approaches to design a preliminary map of territorial differences in the three provinces. This process involved overcoming challenges related to the integration of data from diverse sources, demonstrating the LL team's growing proficiency in data management and systematisation.

Capacities

The experiment enabled us to develop the capacity to select the most relevant information and combine this to better map the complexity of the local water system, though there is still considerable work to be done. Notably, the capacity to look at a diverse range of characteristics of the local water system has been reinforced within the team. The difficulties of combining fragmented and heterogeneous information pushed the team to cluster the different water systems qualitatively. This could be considered a preliminary step to a more rigorous clustering process through quantitative-qualitative indicators in the research stages to come.

Engaging with European partners has had a particularly positive effect on the regional partner, fostering the development of communication skills and exposing them to innovative approaches and methodologies. Events like the RUSTIK project meetings have provided invaluable opportunities for exchanging ideas, learning from other regional contexts, and exploring diverse methods for addressing shared challenges. This collaboration has been instrumental in driving innovation and strengthening internal capabilities.

Pilot Region Partner's perspective on skills and capacities

For the IBO, participating in Living Lab activities provided an opportunity to grow understanding of stakeholders' needs in the Pilot Region. This enabled the acquisition of data and insights that strengthen the IBO's capacity to design actions better suited to the realities surrounding processing tomato production. From a professional perspective, the research and data organisation improved the skills of involved staff, while the Living Lab activities consolidated networks with key local stakeholders.

Despite the significant differences among the various areas within the three provinces, there is a need for a common strategy to develop better governance and better data system building. The





methods and principles for data acquisition, management, and processing emerged as areas where IBO staff require further collaboration with local Land Reclamation Consortia. The IBO believes that continuing to improve the data system could lead to the development of strategies and solutions that empower tomato producers, who are highly dependent on an efficient irrigation governance system, to design their yearly production plans in a less risky environment.

Innovation and impact

Reflections on innovation

Gaps in knowledge about the irrigation system, including irrigated areas, volumes of water delivered, and private sources of irrigation, presented a significant initial hurdle. The challenge was tough in the context of private irrigation sources, where information is unreliable or inaccessible. Gathering qualitative information on the governance of the irrigation districts in diverse territorial contexts required innovative data collection and analytical methods. These gaps underscored the need for methodologies to generate reliable and comparable information on irrigation management.

One of the most significant process innovations is the constructive collaboration between the IBO and Land Reclamation Consortia. The IBO brought a strong knowledge of the territory, including its stakeholders, challenges, and opportunities, while the academic partners contributed advanced tools and methodologies for data analysis. This partnership proved productive in overcoming the fragmented and incomplete nature of the existing data.

Short-term impacts

We are beginning to see some impacts among the short-term ones we indicated in the theory of change the PR (see Figure 29). First, as a result of the data experiment, the LL team designed a preliminary map of vulnerability. Second, the LL functioned as a helpful tool to promote dialogue among different stakeholders in the field of water management. The improved data and methodologies are also expected to result in more focused and targeted interventions that can effectively address local needs.

Longer-term impacts

Overall, we expect that the Living Lab will pave the way for strengthening potential partnerships between farmer associations, tomato industry associations and Land Reclamation Consortia under the promotion and coordination role of the IBO. This ambition emphasises the role of the “meso-institutions” operating at the territorial level. These partnerships could provide innovative solutions for setting up a system of information exchange during climate crises (e.g., drought) and planning common interventions for mitigation and adaptation to climate change.

The need to build partnerships and move beyond private interests or isolated initiatives was a recurring theme during our stakeholder meetings. However, this challenge is tied to a more profound, long-term change required in the Pilot Region: a stable institutional network among meso-institutions operating between the regional administration and the entrepreneurial system. Overcoming individualistic attitudes and the prevailing distrust in collaboration and institutions is essential to promote a more cooperative environment.





Potential for sharing learning

Given the shared characteristics of many intensively developed agri-food regions in Italy – such as relatively higher production intensity, technological advances, irrigation infrastructures, and networks – these methods and tools will likely resonate and prove interesting and helpful with minimal adaptation. Scaling efforts could be facilitated through national-level programmes or collaborations, such as those aligned with the CAP Strategic Plan and National Recovery and Resilience Plan, to provide a framework and resources for transferring these solutions to other territories.





Part 4: Future steps

Cycle 3 plans

In early 2025, the Living Lab's activities will be presented to the Council of the IBO to inform all stakeholders about the activities and the main results obtained up to this point. In the following months, we will continue to improve the data system and related analysis/mapping for policy design. Table 20 summarises the main steps to be undertaken in 2025.

The first objective is to present our preliminary results to local stakeholders and discuss the state of the art in the PR and the potential and limitations of the experimental work (January 2025). This workshop will be facilitated in the form of discussion tables around four key topics:

1. how to improve the information system through the integration of different information.
2. Mitigation strategies for water shortages.
3. Adaptation strategies and revised management plans.
4. Policy scenarios for the water system under regional and national policy schemes.

The final purpose is getting constructive feedback to the LL on policy strategies.

Other objectives are related to data collection and include completing the definition of adequate indicators by March 2025. In this timeline, we also anticipate completing both the data gathering and analysis processing and the georeferenced mapping of the whole dataset by the end of March. These deadlines for the different steps must be compatible with the complementary work to be done for the rural proofing exercise and other tasks to be implemented in Cycle 3.

In May 2025, a final workshop with stakeholders to assess the results of the experimental phase will be held in the PR. The remaining months of June and July will be used to write a report on the work done, including the proposal of a territorial information system and implications of analysis for the local and regional policies.

Table 20 Timeline of the different data experiment components in 2025

Steps of LL data experiments in 2025	2025						
	Jan	Feb	Mar	Apr	May	Jun	Jul
Step 1 – Workshops with stakeholders							
Step 2 – Data collection							
Irrigation indicators from different existing available sources							
GIS of irrigation networks and irrigated areas (public and private)							
Focus group with Land Reclamation Consortia							





Steps of LL data experiments in 2025	2025						
	Jan	Feb	Mar	Apr	May	Jun	Jul
Individuals interviews with officials of land Reclamation Consortia							
Focus group with second order Consortium (Canale Emiliano-Romagnolo-CER)							
Inventory of projects funded for water reservoirs, water networks, research and technological development in the last decade							
Other sources (cropping systems, climate changes indicators, etc.)							
Step 3 – Data processing and mapping							
Step 4 – Final report on data experiment							

Future collaborations

The need to improve the database on water availability and water needs in the area has led the IBO to present an innovation project to the Region to request EU funds. The project TOMATO WATER was submitted by the IBO at the end of April 2024 to obtain funds from the Rural Development Programme of the Emilia-Romagna region. At the beginning of September, the IBO received formal approval of the project and funding. The three-year project will commence in January 2025, focusing on the organisation of all available data for monitoring water availability for irrigation in the different hydrographic valleys of the provinces of Piacenza, Parma and Ferrara and, additionally, to estimate the water needs of the crops cultivated in these areas. The main goal is to build a tool to monitor the balance of water (availability vs potential demand) in these areas with specific emphasis on potential effects on the cultivation of processing tomatoes.

This project can clearly be considered as a follow-up to the RUSTIK Living Lab. Indeed, the evidence, data, and analysis made available by the data experiment will be the starting point for the new project. Many data are still needed to fully describe and monitor the availability of water in these areas, but this activity can be completed thanks to the funds made available through the new project.

The challenge addressed by the Living Lab is crucial for the ecological transition of the processing tomato value chain, which is so important for the economy in the three provinces. Fortunately, the two projects, RUSTIK and TOMATO WATER, represent an opportunity to support all stakeholders in facing the meteorological challenge. Of course, this opportunity will be considered when planning the next activities for the Living Lab.

Communication and dissemination

Results will be communicated, first, through the two workshops with local stakeholders foreseen in the timeline mentioned above in 2025. Further events will be organised in Parma, with





representatives of the IBO and other farmer and industrial organisations, to explore the agri-food sector's preferences in terms of mitigation and adaptation strategies on water resources.

A policy brief containing the summary of main results and policy implications will be prepared for local stakeholders and the regional administration to put forward ideas and proposals for mitigation and adaptation strategies and to sensitise local actors to climate change effects in a key sector of the local economy.

One scientific paper has already been published in the *Review of Agricultural Economics*, providing a comparison of the governance of irrigation in the PR and the Extremadura region in Spain to assess differences and similarities and explore appropriate indicators of governance. A preliminary version of this paper was presented at the 10th European Association of Agricultural Economists (EAAE) PhD Workshop held in Budapest in June 2024.

Additionally, one paper will be proposed for the XVIII Congress of the EAAE (European Association of Agricultural Economists), which will take place in Bonn from August 26th to 29th, 2025. The Congress invites contributions on two topics related to this LL activity: Resilience (Building systems that can withstand and adapt to climate change and shocks) and Environmental Sustainability (Implementing agricultural and food processing practices that reduce environmental impacts, such as reducing greenhouse gas emissions, conserving soil and water, and preserving biodiversity). Another opportunity is the RSA Annual Conference on Navigating Regional Transformation in Porto (PT), 6-9 May 2025, ideally in a session on Sustainability Transitions and the Environment.

Further articles informed by the analysis of the full dataset can be potentially prepared and submitted for local newspapers and scientific journals, but these dissemination opportunities will highly depend on the quality of data gathered in Cycle 3.





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Poland: Mazowieckie voivodeship – Szydłowiecki powiat

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Summary and overview

The Pilot Region, Szydłowiecki powiat (district), is situated in the south-west of the NUTS 1 Mazowiecki macro-region. The area is composed of five municipalities – the urban-rural municipalities of Szydłowiec and Jastrząb, and the rural municipalities of Chlewiska, Mirów and Orońsko. The geographical location of the area is very beneficial as it lies on the S7 express road running from Warsaw through Radom to Kraków. With its 450 square kilometres, the Pilot Region comprises 1.27% of the Mazowieckie voivodeship and is home to a population of over 40,000 inhabitants. The selection of the five municipalities which form the powiat is related to the concomitance of their potential, in an environment that is predominantly rural but situated in close proximity to, or well-connected to, urban and urbanised areas. The municipalities also share development challenges related to the functional transition of the economic base, structural unemployment and deficiencies in technical infrastructure. The use of natural resources, in particular, mineral ones, such as sandstone, iron ore or chocolate flint extracted in the Orońsko municipality, are believed to be a chance for economic and social development in the region.

Living Lab challenge

The main challenge identified in the Pilot Region is related to the socio-economic transition - the functional transformation of the rural area from a farming-based to a production and consumption-oriented economy, and the increase of spatial mobility. The development of the area is affected by unemployment, specifically, a lack of job positions for the well-educated population and deficiencies in technical infrastructure. In line with the challenge, the Living Lab (LL) team seeks to reverse a trend through the development of entrepreneurship, specifically through the use and exploitation of the area's natural resources, supported by the awareness of and knowledge about the local cultural heritage and traditions, and the strengthening of local ties and networks between and within population groups of rural areas.

Data experiment

The core of the data experiment involves the collection of primary data on the potential for entrepreneurs representing the services and production sectors to (directly or indirectly) use chocolate flint (and its story), as well as other natural resources in the development of their businesses, contributing to the transformation of the region, and its placemaking. Secondary data on businesses operating in the Radomski subregion in particular, including those branches that could directly and indirectly use chocolate flint, as well as other natural resources in developing their offer, will also be collected. The experimental aspect is based on an activity consisting of a group of entrepreneurs testing out such services for a specified period of time. The activities selected are based on the results of a survey conducted with residents of the subregion. Other methods applied include the collection of secondary data via web scraping, as well as a survey with non-governmental organisations (NGOs) concerning territorial capital. The primary objective of the experiment is to explore and evaluate the opportunity of using a local natural resource to create a local product that boosts entrepreneurship, contributing to the transformation of the Radomski subregion and its place-making. Other essential objectives are to learn about how entrepreneurs collaborate, and how the networks can be strengthened, to engage residents and NGOs in a data collection process that enhances their agency awareness, and finally to prescribe solutions for transition and transformation.





Preliminary results

Based on the results of two surveys, as well as the collection of data on registered firms operating in the Radomski subregion through data-scraping, a group of entrepreneurs have implemented activities that involve the use and promotion of chocolate flint and other natural resources. A display case containing examples of products or services involving chocolate flint, that have resulted from the experiment, has been created. The case is displayed alternately by entrepreneurs, and also currently by the municipality of Orońsko (Figure 35). The action is aimed at boosting entrepreneurship and developing or strengthening networks between firms through a co-creative process of data collection. The key findings are as follows:

- The residents are aware of the potential that the local product can offer in boosting local entrepreneurship
- NGOs and entrepreneurs find that the Radomski subregion can profit from its identification with the local product
- There is a multitude of businesses that could use the local product, and other natural resources as a new activity

Key learning to date

An important aspect of the work is the networking opportunities created for the businesses operating in the subregion. The LL activities, and especially the experiment, have already strengthened the connections between entrepreneurs, fostering collaboration and the sharing of resources. During the process, various difficulties and challenges were encountered, in particular regarding the involvement of entrepreneurs, or the changing interest of local authorities due to personal and political changeover at the head of the local government. The LL team also encountered some difficulties that were directly related to the data collection process, and is steadily working on finding ways to overcome them.

Next steps

The next steps for the coming months are related to the second phase of the experiment, as well as wrap-up activities (as presented in section Implementing the experiment). The essential task is to collect data on existing entrepreneurial networks from the entrepreneurs, and in parallel with this, to research the needs and expectations of residents on economic development in the area. Additionally, in-depth interviews with the entrepreneurs participating in the experiment will provide knowledge on how the actions taken have contributed to the intermediate outcomes of the project, and what impact they may have on policies and processes leading to the long-term objective: the socio-economic transition of the area.





Figure 35 Display case featuring examples of products and services involving chocolate flint, and other natural resources, developed by entrepreneurs during the experiment phase. Photo by Foundation for the Development of Polish Agriculture (FDPA)





Part 1: Living Lab context

Pilot Region introduction

The Pilot Region, Szydłowiecki powiat (district), is a NUTS4 level unit situated in the NUTS3 level Radomski subregion, which constitutes a part of the NUTS2 Mazowieckie Regionalny region, which belongs to the NUTS 1 Mazowiecki macro-region. The Pilot Region is situated in the south-western corner of the area and is adjacent to the Świętokrzyskie voivodeship. It is mostly of rural, partly peri-urban, type, with its northern section lying near to the city of Radom. The region is characterised by a considerably multifunctional economic profile and the availability of both natural and cultural resources. Administratively it is composed of five municipalities – the urban rural municipalities of Szydłowiec and Jastrząb, and the rural municipalities of Chlewiska, Mirów and Orońsko. The geographical location of the area is very beneficial as it lies on the S7 express road running from Warsaw through Radom to Kraków. With its 450 square kilometres, the Pilot Region comprises 1.27% of the Mazowieckie voivodeship and is home to a population of over 40,000 inhabitants.

The region is characterised by diverse landforms – the mountainous Kielce-Sandomierz upland in the south and the Radom plain in the north, with numerous nature reserves and protected landscape areas. The area is also characterised by a rich cultural heritage. It holds the potential for multifunctional development including sustainable agriculture and activities related to the acquisition and use of mineral resources and agricultural produce (land-based resources). However, the area is also situated in a subregion of the voivodeship that is characterised by a loss of economic functions and an outflow of younger, well-educated population groups. According to a study by Śleszyński (2017), the GDP per capita of the Radomski subregion, as a share of the macro-region's average, had been falling since 2001, achieving 45 percent in 2012, which was the smallest among all subregions in Poland. This was a symptom of the Radomski subregion's economic downfall when compared to the economically successful central subregion of Warsaw. The unemployment rate of the Szydłowiecki powiat is currently the highest in Poland, at 24.4% in September 2023 (GUS 2023).

The selection of the five municipalities which form the powiat is related to the concomitance of their potential, in an environment that is predominantly rural but situated in close proximity to, or well-connected to, urban and urbanised areas. The municipalities also share development challenges related to the functional transition of the economic base, structural unemployment and deficiencies in technical infrastructure. Local authorities and other stakeholders believe that the use of natural resources, in particular, mineral ones, such as sandstone, iron ore or chocolate flint extracted in the Orońsko municipality, is an opportunity for economic and social development in the region. The work within cycle 1 of the Living Lab (LL) has confirmed this opinion.

Functions

The Szydłowiecki powiat is part of the external zone of the urban-rural region of Warsaw, with the regional centre, Radom, and small towns performing essential central-place functions for the surrounding rural areas. The last decade has accelerated the transformation from an agriculture-based economy and employment structure to a production and service-oriented one, focusing on using land-based products and the region's cultural heritage. The market for local produce is





expanding, and the economy is increasingly focused on non-local recipients. Since 2013, employment in the Pilot Region's agricultural sector (including forestry and fishery) has decreased from 45% to 19.2%, indicating a significant shift in the area's economic and social development. However, the number of people employed in the manufacturing sector (26.1%) has risen, including the processing of primary agricultural produce and natural resources. Additionally, some branches of the services sector are starting to use this potential (catering services, for example). Therefore, it can be assumed that the area's agricultural character is not disappearing, but that land-based production is diversifying (across agriculture, forestry, mineral resource extraction, orchards, and vineyards) in line with changing patterns of consumption, including in leisure, culture, and tourism.

Table 21 Leading sectors/branches (according to the number of people employed) in the Szydłowiecki powiat

Production	Consumption	Ecosystem services
Construction	Tourism	Organic agriculture
Extraction of minerals/stone-cutting trade	Culture, recreation, entertainment	Agrotourism
Other land-based production	Education	Leisure, provision of green areas

The work within the Pilot Region's LL relates to the functions presented in the table (Table 21). As the transition challenge refers to boosting local entrepreneurship while using land-based products and services, predominantly related to chocolate flint, the functions that are depicted below specifically apply to this category.

Production functions

The area is distinct for its stone-cutting trade, which is based on locally extracted minerals. Some resources, especially limestone, have been mined and processed since the Stone Age and have contributed to the economic potential of the Old Polish Industrial Region. Moreover, the region, particularly the Orońsko municipality, is known for exploiting a rare mineral, chocolate flint. According to the National Base of Topographic Objects, the Szydłowiecki powiat takes second place in the macro-region in terms of the total surface of mining areas (7.67%)¹².

Consumption functions

The key consumption functions of the district are education, culture, recreation & entertainment, as well as tourism that builds on the former functions. The area's cultural heritage, geographical location, and availability of varied accommodations and dining options make it an attractive tourist destination. With their unique morphological features, the sandstone quarrying sites serve as an educational tool to exhibit both natural phenomena and human activity. The Archaeological

¹² All mineral resources in Poland are property of the State Treasury, and both their extraction and management are controlled by the state and supervised by the Ministry of Climate and Environment, which has competence for resources policy, granting licences for exploration and evaluation of assets, as well as control over their exploitation. In the case of the minerals mined in the Szydłowiecki powiat, the process requires obtaining a licence from the Marshal of the Voivodeship.





Park, set to open in the municipality of Orońsko, is an example of a project that brings together all the functions mentioned and constitutes an attractive tourist site that will showcase Palaeolithic mining culture. The tourist sector encompasses public institutions and NGOs, as well as 74 firms (RSPS 2021). Due to the proximity of urban centres, especially Radom city, there is a growing need for commuting and service provision.

Ecosystem services

The Pilot Region's land use and functional structure provide opportunities for developing and providing ecosystem services such as organic agriculture and agrotourism. The latter is replacing traditional farming and diversifying the rural landscape. The area offers attractive green spaces to the local population and residents of adjacent towns and the city of Radom.

Transitions

The Szydłowiecki powiat is situated in one of the most challenging areas of the voivodeship, the Radomski subregion, characterised by a loss of economic functions and an outflow of younger, well-educated population groups due to a lack of employment opportunities matching their preferences. The average annual population growth rate of all subregions of regional Mazowieckie voivodeship is negative, with Żyrardowski (-0.1%), Siedlecki (-0.2%), Ostrołęcki (-0.3%), and Ciechanowski (-0.3%) subregions presenting low values. However, the Radomski and Płocki subregions had the lowest values at -0.4% in 2020 (SRWM 2022). While transitioning from agriculture to a production and consumption-based economy, the region faces the challenge of identifying its development direction.

Living Lab partnership

The Pilot Region partner of the Mazowieckie LL is the Foundation for the Development of Polish Agriculture (FDPA), an organization that has been active since 1988 in two fields: lending, as well as educational campaigns and publications. The mission of the Foundation is to support sustainable rural development, in particular, entrepreneurship and creating non-agricultural jobs, and to ensure equal opportunities for women, the unemployed, and young people. Its educational activities include environmental protection, sustainable agricultural production, promoting renewable energy sources, and adaptation to climate change.

The research partner is the Institute of Geography and Spatial Organization of the Polish Academy of Sciences. IGSO PAS is an important, internationally acknowledged research centre that specialises in two disciplines: physical geography (geomorphology, climatology, and environmental protection) and socio-economic geography and spatial economy (urban geography, rural studies, regional and local development). The Institute has participated in numerous national and international research projects on fundamental and applied research, focusing on urban, peri-urban and rural areas.

Sylwester Różycki is an invaluable member of our LL team, whose passion and years of commitment to promoting regional heritage have contributed significantly to the development of Orońsko. With experience in running his own business in the field of automotive mechanics and designing protective structures for racing cars, Sylwester combines technical skills with a deep understanding of local resources. He has been actively engaged in the local community for many years as a member of the Volunteer Fire Brigade in Orońsko, focusing his social activities on promoting one of the region's most treasured assets — chocolate flint. Now, as the mayor of





Orońsko, Sylwester Różycki remains a vital figure in our team, though his involvement in the project is limited due to his new responsibilities. His long-term, strategic efforts and effective promotion of chocolate flint have opened new funding opportunities for Orońsko, supporting the development of road and tourism infrastructure. Through his vision and dedication, the municipality of Orońsko has gained a strong position in the region, and his contributions to the LL are foundational for advancing sustainable development and promoting local heritage.

Roman Woźniak has engaged extensively, combining years of local government experience and an understanding of community needs with his work in the RUSTIK LL project. Although he no longer serves as the director of the Public Library in Orońsko or as the Szydłowiec district governor, his past roles and his subsequent work as the secretary of Orońsko have positioned him as a key representative of the older generation in the region. Following the 2024 elections, despite his reduced involvement in social activities, Woźniak continues to contribute immense value to the LL, serving as a bridge between the project and older residents.

Emil Gawin has a versatile role. In addition to actively contributing to the community of Orońsko as a municipal councillor (for the period of 2024-2029), he is also a dedicated beekeeper. He represents the interests of his constituents with a strong voting result of 82.35% in his electoral district. Alongside his role in the local government, Emil Gawin is a passionate beekeeper who operates his own apiary in Orońsko, producing a variety of honey and bee products, including beeswax, pollen, and propolis. Notably, his honey is featured in the project display case (Figure 35), showcasing his work and dedication to the local community. He is the creator of the chocolate flint logo, a symbol central to the project's mission of celebrating and leveraging this unique regional resource. Additionally, he developed the website dedicated to chocolate flint (Krzemień Czekoladowy z Orońska), helping to increase awareness of this cultural and economic asset.

Beata Prokop-Gos, serving as the director of the Józef Brandt Public Primary School in Orońsko, plays a significant role in the LL project by supporting initiatives aimed at promoting chocolate flint among students and teachers. Through her engagement and collaboration with local authorities, she actively involves both youth and teaching staff in learning about this unique regional resource. Her presence at events, such as the formal summary of the training cycle for culture and sports workers, demonstrates her strong support for educational and cultural initiatives within the Orońsko community. As a school director, Prokop-Gos oversees educational and administrative processes, enabling her to effectively integrate activities related to local heritage into the daily life of the school. Prokop-Gos also collaborates with other institutions, which strengthens her efforts to promote local values, such as chocolate flint. Her support in promoting this resource among students and teachers makes a valuable contribution to the LL project, fostering local identity and enhancing cultural awareness among younger generations.

Table 22 Stakeholders of the Mazowieckie LL

Name	Organisation	Role/expertise
Sylwester Różycki	Orońsko municipality	Mayor, local leader
Roman Woźniak	Orońsko Academy of Personal and Social Development	Local leader





Name	Organisation	Role/expertise
Sylwester Różycki	Association for the Renewal and Development of the Orońsko Community	Local development organisation
Katarzyna Kołodziejczyk	Architekci ogniska domowego	Local leader, entrepreneur
Emil Gawin	Orońsko municipal council	Local leader, entrepreneur, councilman
Beata Prokop-Gos	Józef Brandt Primary School in Orońsko	Local leader, director
Anna Muszyńska	Clubroom in Orońsko	Local leader
Izabela Falińska	Orońsko municipality	Inspector
Beata Gajewska	Christiani Public Primary School in Guzów	Teacher
Milena Szymańska	Orońsko municipality	Inspector

Living Lab challenge

The Pilot Region is undergoing a transformation from a farming-based to a production and consumption-oriented economy, which is also characterised by an increase in spatial mobility. The area's development is hampered by unemployment, specifically, a lack of job opportunities for the well-educated population, and deficiencies in technical infrastructure. In line with the Pilot Region challenge, the LL explores an opportunity to reverse this trend through developing entrepreneurship, specifically using the area's natural resources, supported by local cultural heritage and traditions, and strengthening local ties and networks between and within rural populations. It is believed that a more socially cohesive community and a diversified entrepreneurial sector will boost local development, while successfully facing the transition challenge.

Rationale and research questions

The selected challenge connects the area's deficiencies with its development potential. It reflects the needs expressed by local stakeholders and builds on earlier actions undertaken by the Foundation for the Development of Polish Agriculture (FDPA) in the Radomski subregion. The local natural assets can be leveraged to create a place branding campaign and a development strategy aimed at boosting economic growth. The actions taken by the LL can contribute to local networking between entrepreneurs and other population groups and raise local interest in the region's development opportunities.

In cycle 2 the research questions for the LL have been slightly modified in line with the aims of the experiment and further activities. The focus has been put on the use of local natural resources in boosting services and production-based entrepreneurship in the wider Radomski subregion, to highlight the opportunity this presents, rather than the challenge. The use of natural resources is





considered mainly in the subregion's exogenous (creative) functions, in particular tourism, catering services, promotion, and educational activities:

- How can the components (such as social capital or the availability of unique natural resources) of local development potential support economic performance in the region?
- Can entrepreneurship based on local natural resources contribute to place-making, and strengthen the identity of the subregion? How?
- How can data be used to develop knowledge about local territorial capital?
- How can the co-creation of data and information strengthen local ties between residents and entrepreneurs, as well as entrepreneurial networks?

Policy relevance

According to the Development Strategy of the Mazowieckie Voivodeship, the Szydłowiecki powiat, part of the Radomski subregion, is an area characterised by a concentration of socio-economic problems. Policy intervention aims to boost the local economy and increase social activation, including social mobility, combating long-term unemployment, restructuring the production sector, and improving living conditions for the local population. Strengthening entrepreneurial competitiveness is a strategic development opportunity, which has also been selected as the focus for Mazowieckie LL. The actions taken, and the analyses carried out during cycle 2, will provide evidence for new development directions in the Radomski subregion in the next Development Strategy of the Mazowieckie voivodeship.

During cycle 1, focus groups discussed various strategies for facing the Pilot Region's transition challenge. These included direct and indirect approaches. Direct approaches involved organisational, financial, or educational support, such as policies regulating the tax burden and financing entrepreneurship (EU to local level funds and loans), providing education and skills, and assistance to create business activity. The activities should be treated as priorities for national and EU level interventions. The indirect approaches discussed involved promoting the region's assets through projects to develop local products, networking activities to bring together entrepreneurs, and improving access to any data and information required. These approaches reflect some of the ideas highlighted in EU, national, regional, and local policies, but are possible to implement at local and sub regional level based on appropriate strategies and actions.

Cycle 2 of the Mazowieckie LL is designed to support indirect approaches to facing the transition. Through increasing entrepreneurship, the experiment aims to reverse a trend in the Radomski subregion. It will improve its economic performance and identity, thus changing the current evaluation that the subregion is one of the Mazowieckie voivodeship's problem areas. This follows Domański's (2000) suggestion that regions "which expand as a result of changes in their macrostructure can move up in the hierarchy of the settlement system", and consequently "their functions grow in scope".

Stakeholders

The stakeholders actively engaged in the LL's work are:

- **Local Entrepreneurs** – The primary audience consists of small and medium-sized businesses that can benefit from initiatives promoting local resources, such as chocolate flint. Entrepreneurs are encouraged to engage in projects that highlight unique regional





- assets, which can lead to business growth, attract tourists, and brand building tied to local heritage.
- **Teachers and Educational Institutions** – Education and awareness of local natural and cultural resources are essential elements of the project. Teachers and schools are key recipients of educational initiatives, such as demonstration lessons on chocolate flint and regional history. Integrating these topics into the curriculum can enrich the education of children and youth and increase regional awareness among younger generations.
 - **NGOs** – Local NGOs play a vital role as partners in social and educational efforts. Their involvement in the RUSTIK project helps strengthen social bonds, promote local initiatives, and support sustainable development. NGOs can assist in community mobilisation, promote ecological initiatives, and support educational and cultural activities that reinforce local identity. One of the NGOs engaged is the Radom Scientific Association, which explicitly stresses the importance of defining the subregion's identity through specific actions.
 - **Local government** (of municipality and powiat level) – Their collaboration with other stakeholder groups enables the planning of integrated development activities, including support for entrepreneurship, infrastructure investments, and regional promotion. Local governments can support the project by initiating partnerships and supporting local businesses, while involved in supporting the transition from an agriculture-focused economy to a production and service-oriented one, with emphasis on mineral resources, including chocolate flint.

The main stakeholders to be contacted in the last stage of cycle 2, and in cycle 3, are Tourism Industry Representatives, Broader Business Associations and Regional Development Agencies, the Center for Contemporary Art in Orońsko, Rural Women's Groups (Koła Gospodyń Wiejskich), Youth Organisations and Community Groups, Media Outlets and Digital Platforms, NGOs and The Local Action Group (LAG) "Razem na Piaskowcu.

Theory of change

The goal of the activities undertaken within cycle 2, that shape the core of the experiment, is to explore and evaluate the opportunity of using a local natural resource to create a local marketing product (brand) that boosts entrepreneurship, contributing to the transformation of the Radomski subregion and its place-making, and to prescribe potential solutions. The policy actions supported by the data experiment include the engagement of selected local entrepreneurs in introducing new/innovative services or solutions; involving residents in choosing measures and solutions to be implemented; and, the inclusion of entrepreneurs in mapping the existing and potential entrepreneurial networks of the subregion. The intermediate outcomes related to the policy action include a selection of activities that can improve economic performance in the subregion through the implementation of specific services and solutions. These include capturing the knowledge of local business networks and opportunities to strengthen them, and incorporating residents and local authorities as actors in promoting and using natural resources as local brands. The success of fulfilling the outcomes depends on local engagement, awareness, and trust in the actions' purposefulness. If successful, the experiment can lead to a general socio-economic and demographic transition of the Radomski subregion from a 'dull' (lacking identity) problem area to a well-defined, active urban-rural region performing specific symbolic functions (Korcelli-Olejniczak, 2015) that uses the potential of its core and periphery.





Data relevance

In cycle 1, Mazowieckie LL introduced activities to collect data and information that diagnose the factors responsible for the existing challenges and future trends. The surveys and data exercise on the potential for entrepreneurship development identified a list of components for local economic development. It has been found that calculating the entrepreneurship development index¹³ requires further information on the profitability of selected business activities, the quality of professional skills (especially in the craft sector), school graduates' professional activity, unemployment according to the Polish Classification of Activities (PKD), numbers affiliated with NGOs and other organizations, information on cooperation between entrepreneurs and other industries and the share of firms deploying mineral resources, as well as outlays on the unemployed against the number of jobless in the region.

Promotion, including channels which reach residents and those outside the area, was a recurring theme in the survey. Therefore, before starting cycle 2, LL participants were provided with information on ways to promote the region and to use the resources available to boost local entrepreneurship. Setting the scene of the data experiment involved the following components: engaging with residents to collect data and information on the use of the area's natural resources; ascertaining the willingness of local entrepreneurs to undertake activities, and/or introduce new services; and collecting data on business entities in the Radomski subregion.

¹³ As an exercise during a cycle 1 stakeholders' meeting, the LL team worked on identifying the components of the so-called entrepreneurship development index that defined local potential and deficiencies.



Part 2: Living Lab Cycle 2: Data experiments

Data experiment

Developing the data experiment

The indirect policy actions identified during cycle 1, in particular through the stakeholder workshops and survey results, involved promoting the region's assets through projects to develop local products, networking activities to bring together entrepreneurs, and improving access to any data and information required. Cycle 2, therefore, started with a creative workshop for the LL team including stakeholders, led by an expert on product and services promotion. The workshop served as a knowledge base and inspiration for the data experiment (Figure 36).



Figure 36 Expert-led stakeholder workshop (25.03.2024, Orońsko). Photo: FDPA

The expert presented different ways of engaging local actors in activities related to the use and promotion of chocolate flint. The workshop set the scene for concrete initiatives and policy actions taken during the experiment phase. It was decided that the experiment would be centred around the use of the local natural resource by local entrepreneurs, while the information and data on the actions to be taken would be collected from residents of the Radomski subregion, representing different professions and age groups. A survey consisting of a checklist that included



the arrangements identified during the two meetings, as well as open-ended questions on other solutions, was designed. This was based on the evidence collected in cycle 1, specifically the study tour in the Świętokrzyskie voivodeship¹⁴, and the ideas from the expert workshop referred to above. The data obtained in the survey has framed the core of the experiment.

Experiment description

The data experiment involves:

1. The collection of primary data on how entrepreneurs can (directly or indirectly) use chocolate flint (and its story), as well as other natural resources, in the development of their businesses, contributing to the transformation of the region, and its place-making - survey 1 with residents.
2. The collection of primary data on the assessment of the conditions of using natural resources in strengthening territorial capital - survey 2 with NGOs in the Radomski subregion.
3. The collection of secondary data on businesses operating in the Radomski subregion, in particular including those branches that could directly and indirectly use chocolate flint, as well as other natural resources, in developing their offer.
4. The collection of primary data on the networks of businesses in the subregion that operate in the above branches, and on the types of barriers they encounter - survey 3.

The experimental aspect is based on an activity consisting of a group of entrepreneurs testing such services for a specified period, and then assessing whether and how the activity contributed to economic performance.

Experiment objectives

The primary objective is to identify, explore and evaluate the opportunity of using a local natural resource to boost entrepreneurship, contributing to the transformation of the Radomski subregion and its place-making. Another essential objective is to learn about how entrepreneurs collaborate, and how their networks can be strengthened. Still another objective is to engage residents and NGOs in a data collection process that enhances their agency awareness. A final objective is to prescribe potential solutions for transition and transformation.

Relationship to theory of change

The experiment can be treated as a test of how an exogenous impulse (i.e. the activities taken up by the selected entrepreneurs due to our LL actions) can cause qualitative change in a system. If some policy actions succeed to evoke minor changes, such as the implementation of new services, or the strengthening of local business networks, or improvements in residents' awareness of their agency in promoting and using natural resources as local brands, the solutions generated can then serve as long-term directions for the entrepreneurial development of the

¹⁴ The area in which the so-called striped flint has been discovered and promoted, so as to become Poland's national gem.





subregion. The experiment can be replicated by other urban-rural regions with similar socio-economic and demographic challenges, and tailored to geographically-specific opportunities.

Data use

Data sources and methods

As a first step, a checklist with potential ways of using chocolate flint and other natural resources of the Szydłowiecki powiat was developed during the expert workshop held in Orońsko in March. A two-part survey (referred to as survey 1) was then designed. It included the reworked checklist, i.e. solutions that could be implemented by local entrepreneurs, as well as open-ended questions in which respondents were asked to propose other services and products that could make use of different natural resources available in the area. In line with the aim of the experiment, a decision was made that the survey would be distributed among residents of the Radomski subregion, and not solely the Szydłowiecki powiat (Figure 38). The survey was released in May with the majority of responses collected through the summer months. The below chart shows the professional background of the respondents by age group (Figure 37).

Professional Background by Age

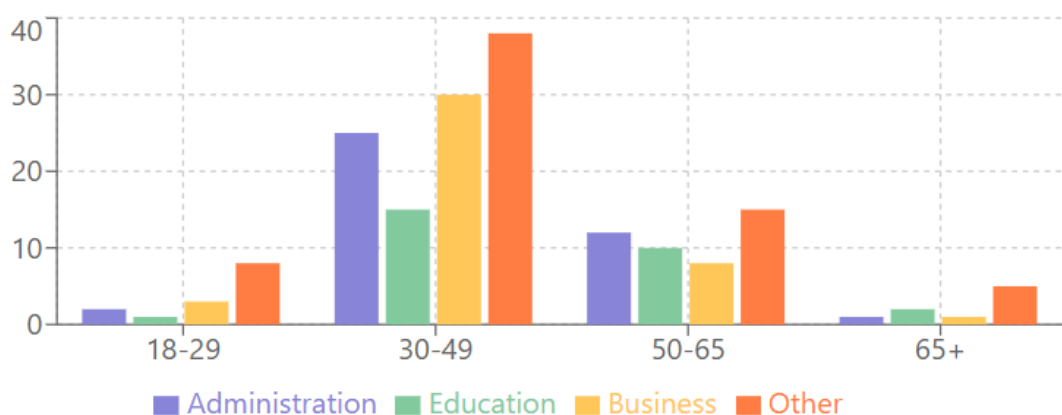


Figure 37 Work area of respondents by age group. Source: Graph created by Claude AI based on data from survey 1.



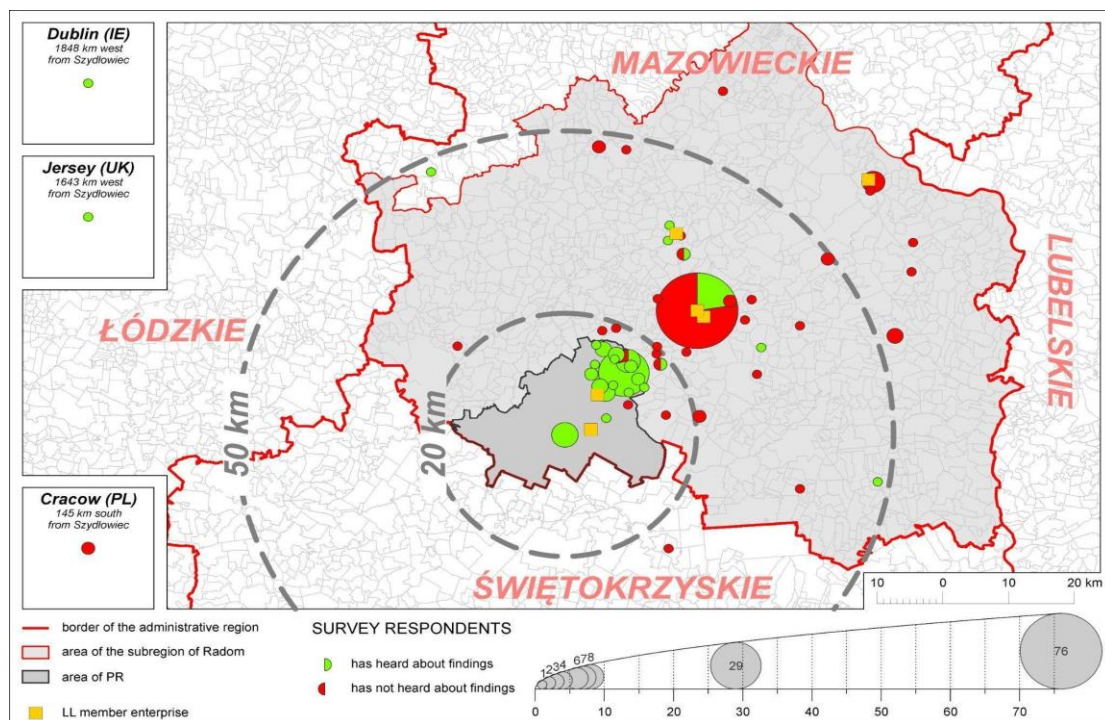


Figure 38 Location of respondents within the Radomski subregion. Source: Map produced by M. Mazur based on data from survey 1.

A second survey (referred to as Survey 2) was released in parallel to Survey 1. Survey 2 asked local NGOs to assess the conditions for the use of chocolate flint and other natural resources in strengthening territorial capital in the Radomski subregion. Alongside this, secondary data on businesses registered in the whole of the Radomski subregion were collected from websites and available online resources using web scraping, and other methods described below:

- Existing databases - FDPA's field office employee developed a database of local entrepreneurs and NGOs by utilising available administrative data, such as business and NGO registries. Leveraging local knowledge allowed for the selection of genuinely active entities.
- On-site visits - Visits were conducted at the headquarters of businesses and NGOs to confirm their existence and assess their operations. Observations on-site enabled us to evaluate the infrastructure and the potential for collaboration within the core of the experiment, while also establishing direct contact with representatives.

The data sources and methods used so far, as well as those planned are presented in the below table:





Table 23 Methods and data sources in cycle 2

Data sources	Methods of collection	Description
Primary: quantitative and qualitative; semi-structured	Survey 1	Survey with residents of the Radomski subregion (aged 18-65) concerning the use of chocolate flint and other natural resources in boosting entrepreneurship
Primary: qualitative; structured	Survey 2	Survey with NGOs of the Radomski subregion to assess the conditions for the use of chocolate flint and other natural resources in strengthening territorial capital
Secondary	Web scraping	Collecting data from websites, and other online sources
Primary, quantitative	PLANNED: Survey 3	Google forms surveys with entrepreneurs representing four selected categories (see Figure 43) on their business networks, and barriers to economic performance
Primary, qualitative; semi-structured	PLANNED: Group in-depth interview or interviews with entrepreneurs involved in the core of the experiment	Interviews on the effects of the activities carried out, reflections on short and long-term impact

Data innovation

The innovative aspect lies in the way data or knowledge collected from the residents is practically tested out by local entrepreneurs. The entrepreneurs willingly introduce new products or services that have been selected as top solutions. The experiment prioritises the input and needs of the local community. By involving residents in identifying solutions, the experiment ensures that the resulting initiatives are directly aligned with community needs, fostering a sense of ownership and collaboration. Another aspect is co-creation: the experiment can innovate by facilitating a co-creation process where entrepreneurs and residents collaborate to develop and refine solutions.

Implementation

Implementing the experiment

Figure 39 Experiment Timeline shows the timeline for the experiment, with the first activity - the expert workshop - organized in March 2024, and the end of the core experiment expected in April 2025.



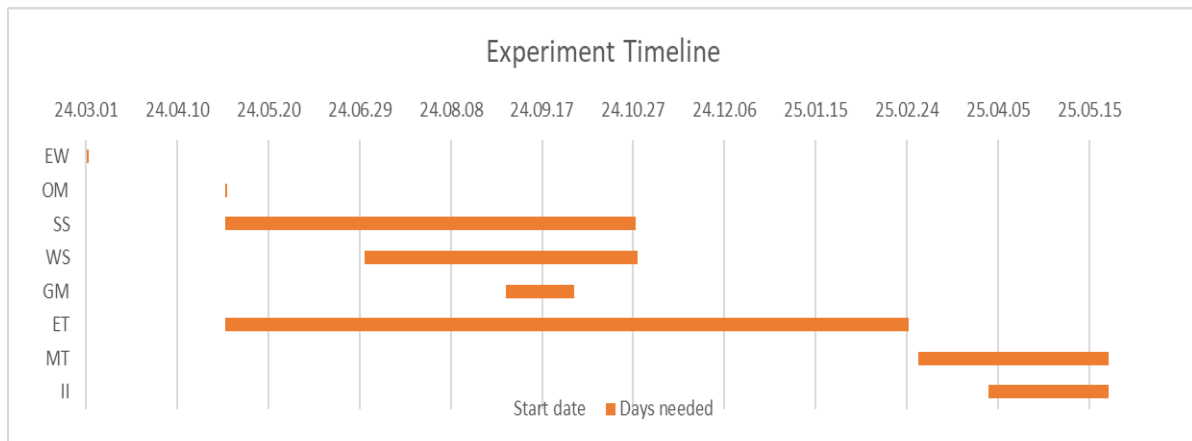


Figure 39 Experiment Timeline

Abbreviations legend:

EW - expert-led workshop

OM - online meeting with entrepreneurs

SS - release of Google forms surveys 1 (with residents) and 2 (NGOs)

WS - web scraping data collection

GM - elaboration of google maps

ET - entrepreneurs performing activities

MT - survey with entrepreneurs on business networks - survey 3

II - wrapping-up in-depth interviews on activities with entrepreneurs

Based on the preliminary results of survey 1, in May 2024, a group of six entrepreneurs (see Table 24) took up activities related to the direct or indirect use of chocolate flint. The activities involved the performance of new services, the launching of new products, and the provision or promotion of the mineral. Some activities resulted from the responses most frequently marked in the checklist in Survey 1 (see Figure 40). The rest were ideas suggested in the responses to the open-ended survey question: *How can entrepreneurs utilize other local natural resources (forests, sand mines, beekeeping, vineyards, etc.)?* (Figure 41).

The entrepreneurs' engagement was fully voluntary, with each partner promoting chocolate flint in a way which aligned with their business profiles. A stone craft business supplied chocolate flint for activities conducted by the Home Hearth Architects. The company's owner, inspired by the mineral, developed various initiatives such as workshops featuring the stone, the production of chocolate flint bookmarks, and the use of educational and promotional materials incorporating the chocolate flint symbol. Emil, the owner of a local beekeeping business, designed a logo symbolising chocolate flint. This logo was then featured on labels for honey products sourced from the Orońsko region, highlighting the connection between the product and the region's heritage. Artefacts created during the experimental phase, including jewellery, stone pouches, chocolate flint samples, labels, and other promotional items, were displayed in a display case. The display case was placed in the lobby of the Europejski Hotel in Radom, near the reception area, to inform guests about the unique mineral and the initiatives associated with it. Elements of the display case, such as the jewellery and stone pouches, were also used by Architekci Domowego Ogniska (ADO) during educational activities within the project. Inspired by the chocolate flint, Lucky Grill & Bar introduced chocolate waffles into their restaurant menu, creatively linking the project with modern culinary practices. The activities were coordinated by an employee of the Field Office in





Radom, who supervised their implementation, arranged meetings with entrepreneurs, and ensured the effectiveness and coherence of the initiatives. The display case will be part of a traveling exhibition, to be displayed at other local businesses, further promoting chocolate flint and fostering socio-economic activation in the subregion.

The table below shows the specific undertakings of entrepreneurs engaged in the experiment:

Table 24 Entrepreneurs engaged in the experiment

Entrepreneur	Idea from survey	Type of activity	How the activity was monitored
Katarzyna Kołodziejczyk, Moon Silver and Architekci Domowego Ogniska (Stonecraft, Home and Hearth Architects) (ADO)	Conducting business activities by engaging in and supporting initiatives related to chocolate flint/workshops for adults and children	Use of flint in art therapy, production of small gadgets by participants of therapeutic workshops; organisation of social integration events	Tracing posts, number of views and shares, interview with the organiser
KAMIENIARKA Sp. z o.o	Obtaining chocolate flint as a byproduct from a sand mine	Provision of mineral	Tracing posts, tracing users of the mineral, interview with the organiser
Pasieka Prowincjonalna	Labels with the symbol of chocolate flint	Production of labels promoting chocolate flint; development of a logotype; launch of website devoted to activities promoting the local product	Tracing posts, interview with the organiser
Lucky Grill & Bar Kozienice	Introducing regional dishes inspired by flint into the menu	Promotion, launching of a culinary recipe inspired by the local product	Tracing posts, interview with the organiser
Hotel Europejski, Radom	Creation of a display case with chocolate flint/tourist information	Promotion - display case with products created as part of the experiment	Tracing posts, interview with the organiser

Adaptations

A slight adaptation to the experiment was necessary due to the withdrawal of one of the key stakeholders the LL team had planned to engage in the activities. The LL team did not succeed in finding a jeweller who would be willing to produce a piece of jewellery from the mineral provided. There was initial interest from two entrepreneurs, but they have failed to complete the task. Interestingly, as shown on the diagram (Figure 40), this specific idea was most popular among the survey respondents. As a means of promotion, the display case features a product made of chocolate flint, but not one that was created specifically for the project. A question arises that





pertains to the feasibility of some ideas, whether they are related to the product per se, to the specific task, or if they result from the general mistrust in solutions originating from sources other than of the entrepreneurs' own choice.

Other Living Lab activities and achievements

- As part of the LL work, participants were encouraged to create a website dedicated to chocolate flint at <https://krzemienczekoladowy.pl/>, with the chocolate flint logo designed by a LL participant. Thanks to this initiative, the chocolate flint logo has already appeared on some products, including honey labels and notebooks.
- An additional achievement of the LL activities are networking opportunities created for local businesses. Our initiative has strengthened connections between entrepreneurs, fostering collaboration and the sharing of resources.

Preliminary results

Results to date

Survey 1, on the use of chocolate flint and other natural resources, has provided 201 responses. The options in the checklist related specifically to chocolate flint (Figure 40).

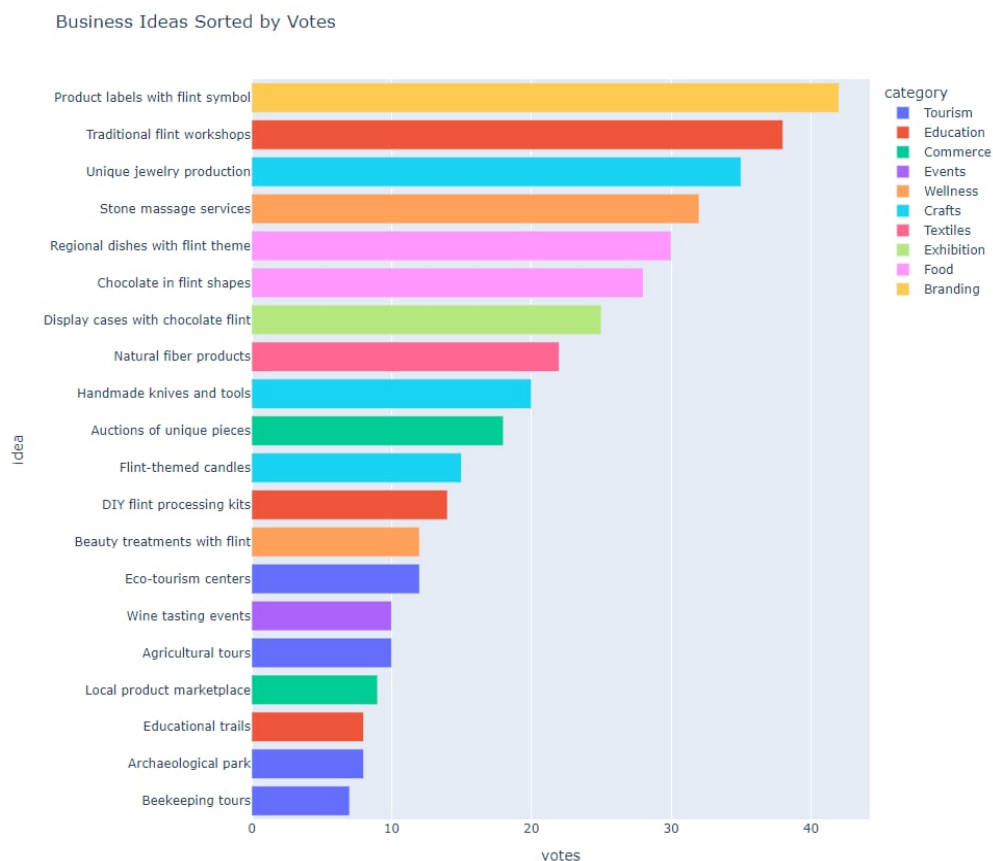


Figure 40 How can local entrepreneurs use the story of the chocolate flint to promote their region? Please mark the best ideas. Source: Survey 1



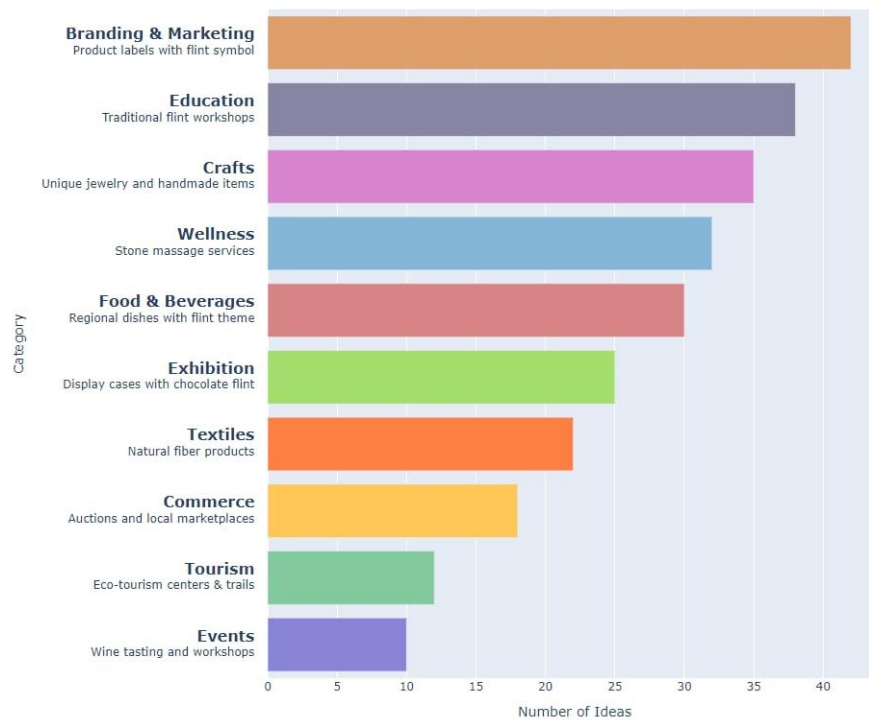


Figure 41 Selected ideas of respondents by category. Source: Survey 1 - open-ended question

Development Ideas for Chocolate Flint

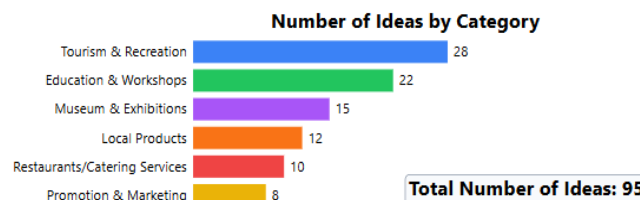


Figure 42 Ideas for using chocolate flint and other natural resources in entrepreneurial activity (by type of activity)





These responses were then used to create the Google Maps document (Figure 43).

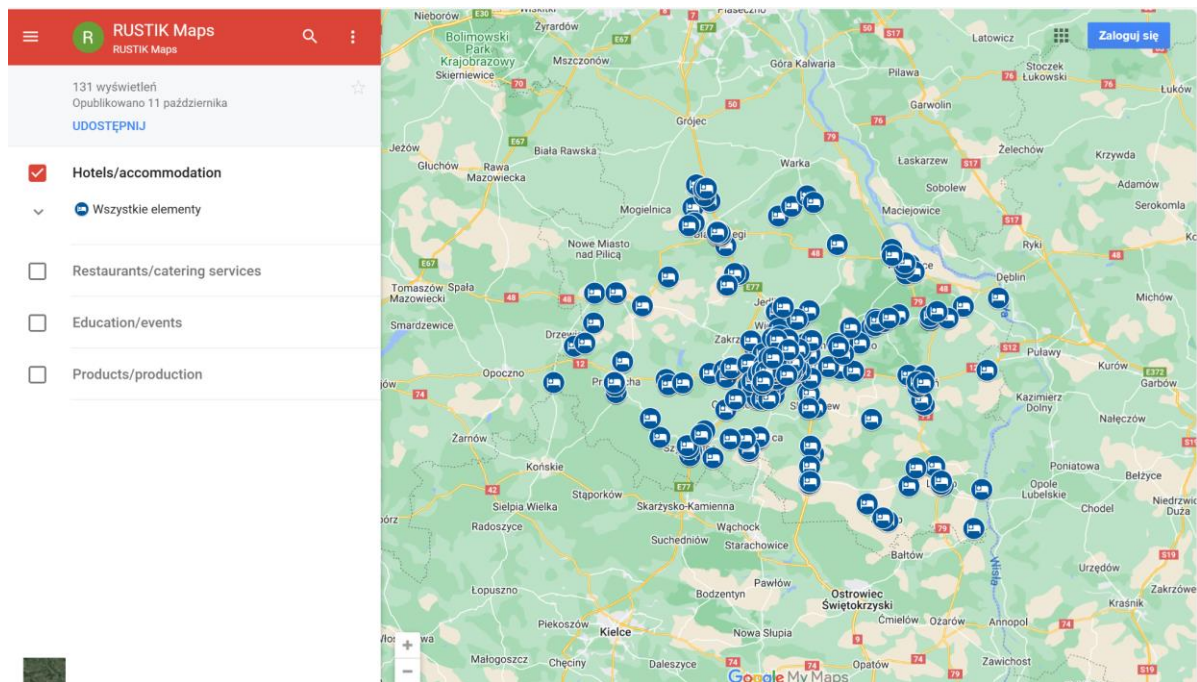


Figure 43 Location of businesses in the Radomski subregion by category. Source: authors' own map based on secondary data.

Data on all business entities in the five districts of the Radomski subregion, including the city of Radom, was collected via web scraping. Following the categories used in the Polish Classification of Activities, types of firms that could potentially use chocolate flint and other natural products in their activity, either directly or indirectly, were selected. Figure 42 shows how the activities that respondents suggested in the open-ended question of survey 1 are divided into categories. The location of the businesses by four branch categories was then mapped out (see Figure 43). Survey 2, completed by NGOs functioning in the subregion, was also released at this time. The survey concerned NGOs' assessment of the conditions required for using natural resources. The survey received 15 responses and was important in evaluating the area's territorial capital. The opinion of the organisations on the potential for collaboration between actors in the subregion is shown in Figure 44.



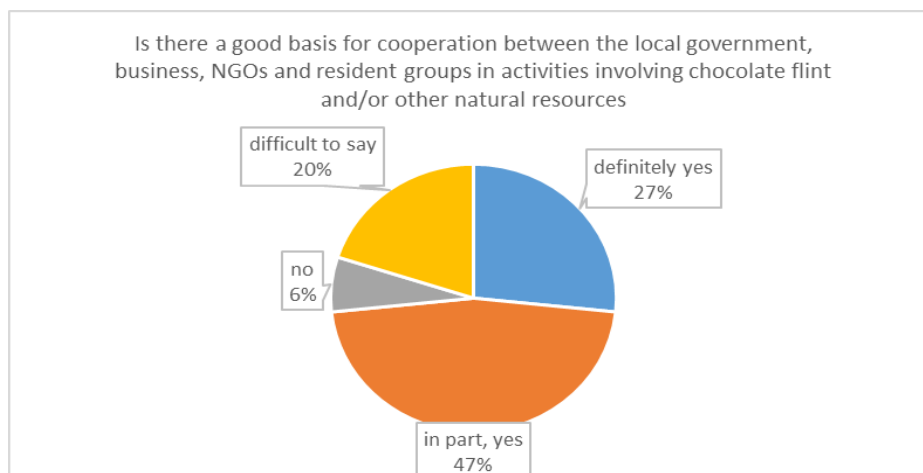


Figure 44 Assessment of cooperation potential based on natural resources in the Radomski subregion Source: Survey 2 (with NGOs)

26.7% of the respondents stated that the foundation was solid, 46.7% claimed that it was partly solid, 6.5% thought it was weak, and the rest weren't sure. While a further step involves a Google Forms survey with entrepreneurs on the range and quality of their business networks, the findings so far can be formulated as below:

- The residents are aware of the potential that the local product can offer in boosting local entrepreneurship.
- NGOs and entrepreneurs find that the Radomski subregion can profit from its identification with the local product.
- There is a multitude of businesses that could use the local product, and other natural resources, in a new activity.

Networking opportunities created for businesses operating in the subregion were also found to be an important aspect. The LL activities, and especially the experiment, have already strengthened the connections between entrepreneurs, fostering collaboration and the sharing of resources.

Data relevance

The design of the experiment has slightly modified the initial data needs. Instead of focusing on the different components of the potential for economic performance, the idea is now centred around data on opportunities and perceived solutions for boosting entrepreneurship within the area of nature-based products and cultural heritage. The data collected so far responds to the questions posed, while further research will allow for deeper insight into entrepreneurial networks, and residents' needs and expectations with regard to the area's economic performance.

Local relevance

The activities introduced by the selected entrepreneurs, as well as the data collected in the surveys and through web scraping, were the key elements evaluated at this stage. Further analysis may reveal intermediate and long-term results that could support the area's transition in the future. For example, solutions that prove effective (where a business's turnover increases, it





attracts new clients, and develops collaboration with new actors) might find sources of financing, or win special attention from local authorities.

Policy relevance

Local authorities will be encouraged to engage more in supporting the branches that prove to have development potential. This information can inform strategic decision-making, resource allocation, and investment strategies to maximise the area's development potential. The analyses carried out will identify and recommend development directions for the next Development Strategy of the Mazowieckie voivodship.

Robustness and limitations

The results obtained so far correspond to the objectives of the experiment and provide a picture of opportunities available to business entities in the Radomski subregion. The benefits of the experiment are that entrepreneurs learn how to use chocolate flint and other natural products to boost their business; they become aware of others with whom they may cooperate, and, therefore, learn to collaborate while using the local product; and entrepreneurs co-created the Radomski subregion businesses' map, which allowed them to identify certain gaps and economic niches.

From a long-term perspective, this work may see the subregion gain a new identity. This could replace residents' and non-residents' current perception that the subregion is a "dull and unspecific" area and overcome its identification as "a problem area" in the Strategy of the Mazowieckie voivodeship.

The limitation to this analysis is related to the willingness of the entrepreneurs to step out of their comfort zone, and to take up the challenge while recognising the opportunity it may bring for the subregion.





Part 3: Reflections and learning

Cycle 2 focused on designing the concept and scope of the experiment. The main assumption was that it should follow the objectives of the LL that are embedded in the challenges and opportunities of the Pilot Region and would lead to its transition from a 'problem' area, one lacking local or regional identity, to a rural-urban region with a well-defined role and functions. The design of the experiment consisted of pre-experiment activities, including an expert workshop in which stakeholders shared ideas on how chocolate flint and other nature-based products could be used to boost local entrepreneurship.

The core experiment included collecting different survey data on these ideas, and an activity with selected firms implementing services or launching products according to the solutions proposed by survey respondents. A Google Maps document, which groups firms by category and shows their location, was created by merging survey responses with secondary data on registered businesses in the area. The maps will be used as a template for further surveying. Two more steps are planned - a survey on business networks that addresses all officially registered firms within the four categories; and qualitative semi-structured interviews with the entrepreneurs participating in the core of the experiment.

During the process, various difficulties and challenges were encountered, in particular regarding the involvement of entrepreneurs, or the diminishing interest of local authorities due to personal and political changeover at the head of the local government.

Reflections on data sources, methods, and tools

So far, the experiment has involved collecting primary and secondary data using Google Forms (Surveys 1 and 2), and a web scraping method. The next steps in the experiment include a survey of all registered businesses on their networks, and barriers to economic performance (Survey 3), as well as interviews with entrepreneurs to learn about the results of the experiment from their perspective.

Data issues and obstacles during the experiment

The first data issue was the initially low survey response rate. It took time and effort to reach a sufficient number of respondents. The survey with NGOs is still considered a problem, with only approximately 10% of the actors having responded. The web scraping method proved to be effective when it comes to officially registered businesses, in particular if seen as a starting point for further verification.

Managing data issues and obstacles

To increase the survey response rate, a decision was made that the survey should be distributed in the whole of the Radomski subregion, including the city of Radom, which significantly raised the chance of response. Following this decision, the first survey received 201 responses, and the response rate of the second one improved by a further 10 percentage points. We have so far been basing our distribution on the existing contact base of the FDPA, and our LL stakeholder group, and a snowball effect through these contacts. In survey 3 we aim to get direct support from the





municipality of Orońsko, and use the networks of entrepreneurs participating in our experiment activity.

Pilot Region Partner's perspective on data

From the Pilot Region Partner's perspective, working with data during cycle 2 provided valuable insights, though it also highlighted certain challenges that are specific to the region. The data gathered through the experiment was both relevant and engaging, offering a clearer picture of local service exchanges and entrepreneurial needs, particularly in terms of leveraging unique resources such as chocolate flint.

However, the analysis revealed that the potential for utilising chocolate flint in the small and medium-sized enterprise sector remains limited, and knowledge about its possible applications is still lacking. This points to a need for education and promotion of chocolate flint's uses, so businesses can better understand its potential in the context of local products and services. There were also challenges with incomplete data and inconsistencies in data sources, which are ongoing issues in the Pilot Region. The above underscores the need to improve data collection processes and achieve a better integration of local systems.

Additionally, the perspectives of other stakeholders, particularly local authorities, proved to be essential. The LL team actively worked toward the project's initial objectives, aligning efforts with conclusions from stakeholder workshops. However, further involvement from local authorities is necessary to validate these directions and ensure alignment with regional goals. As mentioned in Part 4, continued collaboration with local authorities will be crucial for refining the project goals and effectively addressing the region's needs. Further engagement of the local authorities is needed to verify these directions.

Experiment design and implementation

As described earlier, the design of the experiment was meant to follow the transition logic - starting off with the pilot region's opportunity (endogenous potential), applying a co-creation approach to data collection, carrying out practical activities, developing a product that is at the same time created 'by' the residents and entrepreneurs, and 'for' them. Short-term outcomes were expected during the experiment and intermediate effects in the months following the process. The core of the experiment was to be actionable, and kept as simple as possible, with entrepreneurs assigned concrete tasks. The tasks directly resulted from responses to the resident survey. In parallel to this, data on firms registered in the pilot region were collected. The merging of survey and secondary data on businesses allowed for the identification of business types. These were subsequently categorised into groups, such as services and production businesses.

Strengths and successes

The main strength of the experiment design process was the creative collaboration within the LL team, the way in which all partners succeeded in finding a common language, and agreed upon a common path to be taken. Another success was the team's ability to cope with temporary failures.





The main strengths of the implementation process were the entrepreneurs' engagement, their willingness to collaborate, and launch new services or products; and the satisfactory return rate of the residents' survey, which resulted from the extension of its geographical scope to the whole of the Radomski subregion. The latter corresponded with the assumption that the diffusion of functions to the wider region is expected.

Scope for improvement

The team has been developing numerous ideas that involved using the Maptionnaire platform as an innovative data collection tool but failed to merge these ideas with the current objectives of Survey 3. Using Maptionnaire would be reasonable if it were possible to get data directly from most of the entrepreneurs in our Google database which revealed their exact location. Instead, we aim to avoid disclosing sensitive information, rather to obtain data on approximate location and industry, so it is possible to process entrepreneurs' responses with information on their networks.

Skill development and capacity building

The pre- and actual experiment phase has brought tangible benefits both to the LL team, and the stakeholders. The team has learnt to apply new software, how to convert data between platforms, or use AI in graphic design. All LL participants have profited from the study tour to the adjacent Świętokrzyskie voivodeship, or the expert workshop that inspired, and supported creative thinking. The team has learnt how to develop and use methods and tools within an LL approach, how to structure the tasks, and reflect upon their strengths, weaknesses and the failures within the process. Some skills related to data transfer and collection are yet to be developed.

Skills developed

During the LL activities, participants had the opportunity to explore various possibilities and proposals for entrepreneurial development in the neighbouring region, based on similar local resources. This experience allowed them to encounter diverse forms of regional product promotion and to enjoy numerous tourist attractions that highlight the uniqueness of striped flint. These insights enabled participants to compare their ideas and actions for their region with solutions from "next door," inspiring reflection on the potential and directions for developing their area.

Additionally, brand promotion training conducted during one of the LL sessions equipped participants with valuable knowledge on how to develop local entrepreneurship. A discussion with the facilitator, following a targeted analysis of the region, helped to identify the region's strengths and weaknesses and outlined specific steps needed to stimulate entrepreneurship focused on promoting chocolate flint. This hands-on approach provided participants with actionable insights and strategies for enhancing the visibility and appeal of this unique regional asset.

Selected entrepreneurs were invited to collaborate and co-create the brand; some of them became involved by preparing the project's website, designing the chocolate flint logo, and promoting chocolate flint as part of their business activities.

Subsequently, selected participants were allowed to implement specific solutions in their businesses to assess the extent to which these actions generated interest, and to examine how





tourists engaged with the products. This initiative also aimed to gauge local awareness of chocolate flint. Through these efforts, entrepreneurs gained a better understanding of audience reactions and the promotional potential of chocolate flint, marking an important step in the further development of their offerings and in strengthening the region's identity.

Capacities

During the implementation of cycle 2, the team and participants acquired a range of valuable skills that are essential for effective project management, fostering collaboration, and promoting local resources. Below are the key competencies developed during this phase:

1. The ability to conduct constructive dialogue

- We learned how to effectively engage in conversations with various stakeholders, including entrepreneurs, local authorities, and community members.
- We enhanced our skills in identifying participants' needs and adapting strategies to their expectations, enabling a better understanding of the local community's specific characteristics.
- We gained experience in creating spaces for open idea exchange, leading to innovative solutions.

2. Building networks of cooperation

- We developed competencies in initiating and coordinating collaboration between the private, public, and non-governmental sectors.
- We mastered the ability to strengthen local partnerships, contributing to social integration and the effective realisation of project goals.

3. The ability to analyse and evaluate

- We improved our capability to conduct surveys and opinion polls, enabling the identification of strengths and weaknesses in the activities undertaken.
- We gained experience in monitoring progress, analysing outcomes, and adjusting strategies based on collected data.

4. Planning and implementing experiential activities

- We learned how to plan and execute experiments supporting local businesses, considering the specific nature of their operations and the region's potential.
- This knowledge was applied in initiatives based on local resources, such as using the chocolate flint in jewellery, promotional labels for honey, and culinary inspirations - a creative approach to utilising local resources. Project participants developed and implemented innovative solutions for promoting and utilising chocolate flint. For instance, a stone craft company collaborated with Home Hearth Architects to design workshops and educational materials based on this unique mineral.

Pilot Region Partner's perspective on skills and capacities

The LL provided an opportunity for meaningful dialogue across divides and allowed participants to encounter diverse approaches to the topic at hand. This setting fostered an initial phase of collaborative groundwork, where shared understanding and joint initiatives began to take shape. However, this effort was not sustained independently by the participants, who now look for continued support in coordination efforts and in obtaining independent evaluations of their projects.





In the Pilot Region, there is a noticeable lack of organisations and leaders willing to further develop existing initiatives and use them as a solid foundation for expanding local resources and potential. Although some groundwork has already been laid—such as the website dedicated to chocolate flint—there is a shortage of individuals and institutions ready to fully commit to its ongoing development and promotion. The website could become a hub for local entrepreneurs, showcasing ways they incorporate chocolate flint into their businesses and positioning it as a unique feature of the region.

Another key aspect is the need to widely promote the chocolate flint logo, especially within the municipality's marketing efforts. This logo could become a symbol that makes the region recognisable throughout the country, and potentially beyond, as an area of unique cultural and natural resources. Broadly integrating the logo into municipal promotional materials would not only strengthen local identity but also attract tourists and investors interested in the region's unique resources and cultural heritage.

To fully capitalise on this potential, it is essential not only to engage local leaders but also to develop an organisational structure that would enable coordinated actions. Further work on popularising the website and the chocolate flint logo could create a cohesive and recognisable image for the region, grounded in its unique resources, contributing to economic revitalisation and strengthening the region's position on the cultural and economic map.

A cohesive educational and information sharing effort involving the municipality, NGOs, entrepreneurs, and schools is crucial for shaping the image of the region as one that can develop based on its local resources, including the unique chocolate flint. Such a collaborative approach would strengthen the regional identity and showcase its potential for sustainable, heritage-driven growth.

However, a significant challenge lies in political divides and the lack of willingness to collaborate across institutions. These divides often hinder efforts to promote the region effectively and prevent the establishment of a unified vision for development. Overcoming these barriers requires fostering a culture of cooperation that transcends political and institutional boundaries, allowing all stakeholders to work collectively towards the shared goal of elevating the region's visibility and economic potential.

Addressing these divides would pave the way for a consistent and coordinated branding of the region, highlighting local assets like chocolate flint and other unique resources. This collaboration could bring tangible benefits to the entire community, creating a more recognisable and attractive profile for both residents and visitors.

Innovation and impact

The innovativeness of this approach to collecting and using primary data is that local residents' knowledge is tested out by local entrepreneurs, which means that the experiment prioritises the input and needs of the local community. By involving residents in identifying solutions, the experiment ensures that the resulting initiatives are directly aligned with community needs, fostering a sense of ownership and collaboration. The experiment has also innovated by facilitating a co-creation process where entrepreneurs and residents collaborate to develop and refine solutions.





The innovation related to secondary data collection and use lies in the way that Google software is used to create a product that can be co-developed by its users. The maps will be shared with the municipality of Orońsko, and made available for entrepreneurs who declare willingness to develop products or services that use chocolate flint or other natural resources of the subregion.

Reflections on innovation

The most difficult part of the experiment was developing the logic of an innovative process that would flow from the challenge and opportunity of the Pilot Region to find an outlet in the selection of activities that can improve economic performance in the subregion. The process will ultimately lead to a socio-economic transition of the subregion through the implementation of specific services and solutions, as well as the knowledge of local business networks and how they may be strengthened, in addition to incorporating residents and local authorities as actors in promoting and using natural resources as local brands. It was not difficult to identify data needs, and data gaps, but it was challenging to find innovative ways of data collection that would correspond to the objectives of Cycle 2. Therefore, the logic defined was that data collection and use would be a co-creative process, and that the ideas identified would actually be tested out in practice, which was the most important process in terms of innovation for the LL.

As reflected upon in part 2, the experiment's activities are to be treated as a flux of energy that establishes a nonequilibrium condition, in which macroscopic relations between distant parts of the (area's entrepreneurial) system occur, which dissolve the prior homogeneity. As assumed here, this (potentially) results in the development of entrepreneurship that allows for new functions to emerge. The success of fulfilling the outcomes is dependent on the level of local engagement, awareness and trust in the purposefulness of the actions taken. If successful, the experiment can lead to a general socio-economic and demographic transition of the Radomski subregion.

Short-term impacts

The short-term outcomes include actions taken by the entrepreneurs, including both production, services or promotion, as well as the establishment of a network between some of the firms engaged in the experiment. An example of such collaboration is the partnership between the firms Kamieniarka and ADO involving the transfer of chocolate flintstones. As pointed out earlier, inspired by the history and local significance of this unique mineral, ADO prepared promotional materials referencing chocolate flint. These materials are distributed during various educational activities organised by the firm. Also, the participants were encouraged to create a website dedicated to chocolate flint at <https://krzemienieczokoladowy.pl/>, with the chocolate flint logo designed by a LL participant. The chocolate flint logo has already appeared on some products, including honey labels and notebooks (Figure 45).





Figure 45 Experiment activities with chocolate flint. Source FB, Photo: FDPA

Longer-term impacts

Based on the character of the experiment, and its short-term effects, some intermediate outcomes may be anticipated, such as stronger collaboration between the firms that are engaged, the interest of new entities to follow in the steps of the former, and the introduction of new services or products. The chocolate flint website as a communication platform may further enhance collaborative activities, and the consequent use of the logo can lead to the development of a network of businesses and their service recipients, that support place-making through local branding.

Longer-term impacts are very much related to the role of local authorities and whether they consider the idea behind the experiment as an opportunity to overcome the challenges of the Pilot Region. Socio-economic transition requires the willingness to build partnerships across different stakeholder groups (local communities, businesses, research institutions, and public administrations). This ability is embedded in the region's social capital which plays a crucial role in economic life. In this respect, the success of local innovation-related activities, and the transition process in the context analysed, is very much related to entrepreneurial social infrastructure (ESI), a research construct (Flora & Flora 1993) that focuses on local community properties, such as intra-community norms and social ties, as well as vertical social networks.

Potential for sharing learning

The experiment conducted in the Mazowieckie LL is transferable and can be replicated in other rural areas or small towns, and possibly in urban neighbourhoods. There are a few main conditions for implementation, all related to the availability of knowledge about local agency and capacities. The first condition is that the area's entrepreneurial sector must be engaged – this will require developing an understanding of the businesses operating in the area and 'tapping





into' the network to develop relationships with selected firms. Another requirement is to centre around an endogenous development potential component that is both unique, and locally accepted. The data collection process will then focus on strengthening local awareness of the asset, and interest in its use. Another essential condition is collaboration with local authorities.





Part 4: Future steps

Cycle 3 plans

The next steps for the coming months are related to the second phase of the experiment, as well as the wrap-up activities presented in section Implementing the experiment. The essential task is to collect data on existing entrepreneurial networks, as well as barriers to improving the economic performance of the subregion. The survey with the entrepreneurs is expected to provide data that, together with the data gathered so far, can be further used as input to prescribe solutions for the strategic development of the subregion.

Another objective is to finalise the core of the experiment, that will be wrapped up via in-depth interviews with the entrepreneurs, and an overview of media posts disseminated by the businesses. The preparation for cycle 3 has already started, with the LL team revisiting the local authorities in Orońsko municipality. This will continue with visits in the Szydłowiecki powiat. Their engagement in this stage is crucial both for the intermediate and long-term outcomes of the experiment and project.

Future collaborations

In light of the leadership changes affecting Orońsko and other surrounding municipalities in April 2024, an essential step is to organise further meetings to resume existing connections and to establish fresh relationships. The meetings will allow for a re-engagement with local stakeholders and ensure that our objectives align with the evolving priorities of the region. Through such steps, we aim to strengthen our partnerships with local leaders, fostering alignment with updated regional policies and creating a strong foundation for cooperative, sustainable development in the region.

We plan to continue to inform the authorities on the effects of the project so far, and receive feedback on the local needs related to our further research, including the use of tools, and data challenges.

Other stakeholders to connect with in the last stage of cycle 2, and in cycle 3, are Tourism Industry Representatives, Business Associations and Regional Development Agencies, the Center for Contemporary Art in Orońsko, Rural Women's Groups (Koła Gospodyń Wiejskich), Youth Organisations and Community Groups, Media Outlets and Digital Platforms, and NGOs, such as the Local Action Group (LAG) "Razem na Piaskowcu", an organisation operating within the European LEADER program that supports the development of rural areas within the designated municipalities. This association supports various local initiatives, including entrepreneurs and individuals residing in these municipalities, by offering funding opportunities for a range of projects. The activities of LAG "Razem na Piaskowcu" cover several municipalities in the region, focusing on promoting local development and engaging rural communities.

Communication and dissemination

Two academic publications are planned - one based on Mazowieckie LL's work and one in collaboration with other LL partners. The papers will broadly focus on the area's territorial capital,





as well as the transition challenge. A session proposal on the relevance of diverse information collection in research on transition of rural areas was accepted for the European Association of Geographical Societies' Congress 2025. The papers presented might be published in a special issue of a high-quality journal. Aside from academic dissemination, the experience of the Mazowieckie LL shall be shared in local newspapers, and/or on local radio stations, such as Radio Radom.

As part of the initiatives in this region, entrepreneurs have access to various forms of support, including participation in webinars on topics such as AI and automation tailored for small and micro-businesses. These activities, carried out by FDPA as part of other projects, are also targeted at similar regions and benefit from the involvement of the Radom regional office, which provides on-the-ground support and resources.

A webinar focusing on AI and automation for small and micro-businesses is scheduled for November 19, 2024. To promote this event effectively, we are utilising entrepreneur databases that were initially developed as part of the research in the RUSTIK project. This approach ensures targeted outreach to businesses in the region, enabling greater awareness and participation.

In addition, selected entrepreneurs will have the opportunity to receive coaching support on setting up their own websites, creating Facebook profiles, and implementing basic promotional strategies. This tailored assistance is designed to equip local business owners with essential digital skills and tools, empowering them to enhance their online presence and engage more effectively with their customer base. Through these initiatives, FDPA and its Radom regional office aim to strengthen the digital competencies of regional entrepreneurs, supporting sustainable development and growth within the local business landscape.

Additionally, the region would benefit from a promotional campaign focused on chocolate flint, with active involvement from local schools. We have proposed a competition to the municipal authorities which would see students from all schools in the region create a legend about chocolate flint. This initiative aims to raise awareness of this unique regional asset, fostering a sense of pride and knowledge among local residents. Engaging schools and students in this way would not only bring attention to the cultural significance of chocolate flint but also encourage young people to connect with and celebrate their local heritage.





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Poland: Woj. Świętokrzyskie

Jerzy Bański and Wioletta Kamińska





Summary and overview

Living Lab challenge

The Świętokrzyskie region is very attractive for tourists and is located close to several large agglomerations. However, rural areas in this region are characterized by a large migration outflow and a lack of jobs. The aim of LL Świętokrzyskie is to diagnose the state of and prepare assumptions regarding the development of rural tourism for the future Tourism Development Strategy of the Świętokrzyskie Voivodeship. It is assumed that the primary goal will be achieved, which is to stop unfavourable demographic processes in rural areas of the Świętokrzyskie region and diversify their economic development through promotion and creation of new tourist products.

Data experiment

Analyses concerning tourism in rural areas of the Świętokrzyskie region are difficult due to the lack of adequate statistical materials and other data about rural tourism. The project provides stakeholders (including, primarily, the owners of agritourism farms) with data and information that will enable the recognition of needs related to the development of rural tourism (including the needs of tourists, development barriers, and trends in the perspective of the next decade) and will provide knowledge and good examples. The data obtained will also be used to prepare a strategic document.

Preliminary results

Data on 160 entities in the field of tourism services ("tourism entities") in rural areas were identified and collected. Surveys were conducted among owners of 34 agritourism farms and 288 tourists visiting 12 agritourism farms. Model farms were selected, where study visits were held to familiarize participants with good examples. The first conclusions from the research identify three most challenges: 1) promotion and marketing, 2) expanding the offer and identifying new attractive elements of the offer, 3) cooperation of entities involved in rural tourism.

Key learning to date

In the assessment of stakeholders involved in LL activities, the Świętokrzyskie region has very high tourism potential. The potential impact of tourism on the development of rural areas was assessed at 4.5 points on a five-point scale. However, the current impact of this sector on the economy of rural areas was assessed at only 3.1 points. Surveys in agritourism farms and with tourists visiting the Świętokrzyskie region confirm this assessment and identify in detail the challenges and barriers to development (see the next part of the study). This data should be the basis for preparing recommendations for the Tourism Development Strategy and information material for owners of agritourism farms.

Next steps

The next stage of work by the LL team will consist of detailed processing and analysis of data obtained as a result of social research and study visits to model agritourism farms. Information material for agritourism farms will be prepared with particular emphasis on opinions and assessments of tourists and examples of good practices from model farms. In the final phase, recommendations for the planned Tourism Development Strategy will be developed.





Figure 46 An example of the rural landscape of the Świętokrzyskie region



Figure 47 A model agritourism farm "Czarownica".





Part 1: Living Lab context

Pilot Region introduction

The Świętokrzyskie voivodship (NUTS 2) is in southeastern Poland. It is one of the smallest regions of the country, covering 3.7% of its area with 3.2% of the population. The region is less densely populated than the national, with 99.8 people per 1 km² compared to the national average of 119.9 people per 1 km². The northern and central parts of the region are upland. Here, you can also find the oldest mountains in Poland - the Świętokrzyskie Mountains with the highest peak - Agatha's Rock - 614 m above sea level. The southeastern part of the region is a lowland area. 54.8% of the region's population lives in rural areas, compared to the national average of 40.1%. The settlement network of the region consists of 48 cities and 2,482 rural localities. Most cities are small units with up to 20,000 inhabitants. In turn, there are 270 inhabitants per rural locality (293 in the country).

Table 25 Selected statistical data for the Świętokrzyskie region.

Category	Data of SWIETOKRZYSKIE region	Data of POLAND
Area size (square KM)	11,709	312,720
Population	1,187,693 (2021)	37,907,704 (2021)
Population change rate	2010-2021 population decline 8,4 (94,853 people)	2010-2021 decline 1,6% (622,162 people)
Population in the main urban centre	Kielce 185,478 (2021)	Warszawa (Capital) 1,860,000
Population in the rest of the area	1,002,215 (2021)	36,047, 423 (2021)
Total Agricultural area (hectares)	499,349	14,952,885
Total Forestry area (hectares)	338,766	9,467,500
Area under national or regional park, reserve, etc. (hectares)	760,414 (all forms under protection) (64,9% of total area of the region)	10,109,100 ha (32,3% of total country area)
% of employment in agriculture and forest sectors	16,8% (67,581 people) (2021)	7,6% (1,137,800-2021)
% of employment in industry and constructions	27,9% (111,787 people) (2021)	28,5% (4,276,800 -2021)
% of employment in services and public administration	55,3% (222,067 people) (2021)	63,9% (9,588,000 -2021)

Source: Central Statistical Office

The region has an industrial and agricultural character with a clear division into the industrial north and the agricultural south. Industrial activity was shaped based on mineral resources (iron





ore deposits: limestone, dolomites, etc.). In economic terms, the Świętokrzyskie region ranks low in the country. In 2022, the region's GDP was 2.3% of Poland's GDP, and per capita it was 69.7% of the national average. The unemployment rate was 7.8% (5.1% nationally). The number of business entities per 1,000 inhabitants is one of the lowest in the country and amounted to 101 (126 nationally).

The best conditions for the development of agriculture occur in the southern and eastern parts of the region. The central and north-western parts of the province are in areas with unfavorable economic conditions with natural constraints. The region also includes areas with specific limitations related to the presence of foothill areas. Agricultural land in the region constitutes 40% of its area (35% nationally). A characteristic of agriculture in the region is the strong fragmentation of farms and a significant percentage of farms producing only for their own needs. The average area of an individual farm with an area of over 1 ha of agricultural land is 5.8 ha (9.6 ha nationally). There are many protected areas in the region occupying 65% of its area. This indicator was twice as high as the national level, which was 32.6%. The region includes 1 national park, 72 reserves and 9 landscape parks.

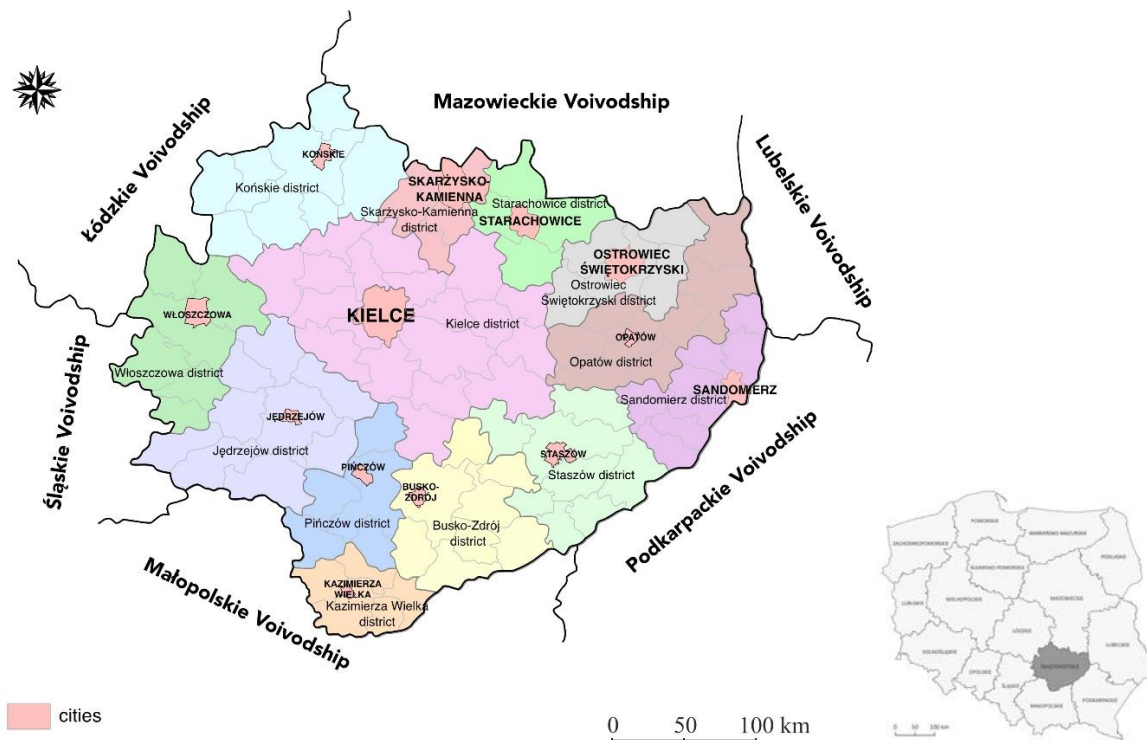


Figure 48 Location of the Świętokrzyskie region in the country and its administrative division (coloured units = counties divided into municipalities)





Functions

In the rural areas of the Świętokrzyskie Voivodeship, it is difficult to identify a single dominant function. Individual municipalities tend to develop according to a multifunctional model. The spatial layout of the region shows a clear division into a northern part - with non-agricultural functions, and a southern and eastern part, with a dominant agricultural function.

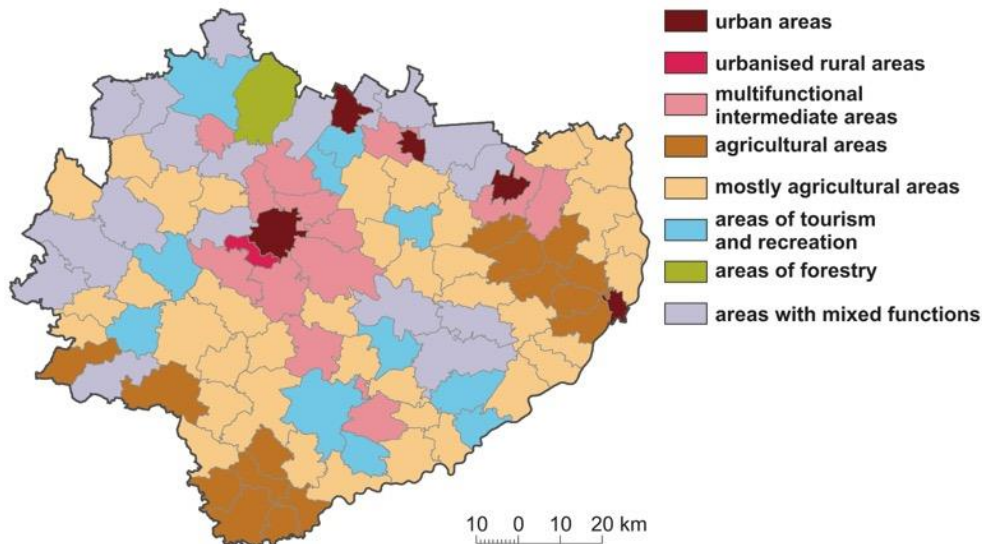


Figure 49 . Functional typology of municipalities (Bański, Mazur 2016)

Industrial activities are based on mineral resources (concrete plants, aggregate mines) and are connected to machines and mechanical devices production, concentrated in several urban centres (Kielce, Starachowice, Ostrowiec Świętokrzyski, Skarżysko Kamienna, Suchedniów, Końskie). In agricultural production, small farms focused on plant production (crops, sugar beets, canola, vegetables, fruits) dominate. Świętokrzyskie's agriculture is characterised by low yield of marketable agricultural output, with many small farms producing mainly for their own needs.

Świętokrzyskie Voivodeship is characterised by a large territory and several protected areas (protected areas cover 65% of the region). Attractive environmental conditions and large and unique cultural values constitute a significant potential that can shape the development of tourism in rural areas. Unfortunately, this potential is not realised. In current strategic documents, the tourist function is perceived as one of the key functions of Świętokrzyskie rural area development.

There are many sites of cultural values in the region, including 10 sites with the status of a historical monument (the highest national form of protection for monuments) and 1 site inscribed on the UNESCO World Heritage List - *Krzemionki Opatowskie* - an archaeological reserve protecting a complex of Neolithic striped flint mines. Despite this, tourism, especially rural tourism, is not developing very dynamically. According to data from the Central Statistical Office, in 2023 there were 1,549 overnight accommodation facilities in the entire province (2.2% of all overnight accommodation facilities across Poland), and the number of tourists using overnight accommodation was 16,000 (1% of all overnight stays in Poland in 2023).





Transitions

Socio-economic and demographic transition

Socio-economic transition creates the biggest challenges in the region's rural areas. The Świętokrzyskie region faces a serious demographic challenge. In the years 2000-2023, the number of inhabitants of the region decreased by over 10% (in the country by 1.6%). This was caused by the migration outflow of younger people and the decreasing natural increase. The average migration balance in the entire Świętokrzyskie province in the years 2003-2023 was minus 1.88% (nationally this figure is minus 0.16%). In the rural areas of the province, outwards migration of the population was even greater. In the years 2003-2023, only one third of rural and urban-rural communes (rural areas) recorded a positive migration balance. These were mainly areas located in the immediate vicinity of the capital of the province. In the remaining rural areas, a migration-related decline has been recorded over the last two decades. The average migration balance in the period 2003-2023 ranged from minus 0.10% in the Chmielnik commune to minus 6.11% in the Połaniec commune. The migration-related decline was accompanied by a natural decline. In the years 2003-2023 in the Świętokrzyskie province, the natural increase rate was below 0 and averaged minus 2.94% (compared to minus 0.75% nationally). Only in a fifth of the communes was the natural increase positive, with a natural decrease observed in four out of the five communes.

Long-term negative demographic phenomena have influenced the aging of the region's population. The percentage of people of post-working age (60+ women; 65+ men) in the years 2002-2023 increased from 16.7% to 26.1% (compared to a national increase from 15.1% to 23.3%). In 2023, the median age of the inhabitants of the region was 44.8 (nationally 42.8). Therefore, actions are necessary to limit the negative effects of demographic imbalance. Among these activities is the development of the tourism sector, which will increase the attractiveness of working in rural areas, contribute to the development of tourism-related activities and reduce the outflow of young and enterprising rural residents.

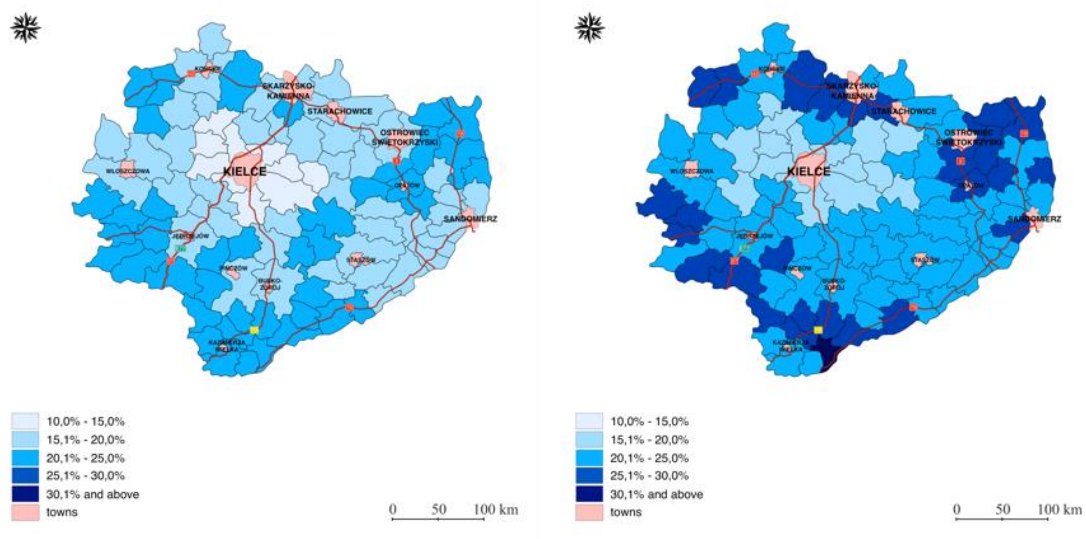


Figure 50 Share of population in post-working age in Świętokrzyskie region, A - 2002, B - 2021





Living Lab partnership

The partners in the project are the Jan Kochanowski University in Kielce (UJK) and the Regional Tourist Organization of the Świętokrzyskie Voivodeship (RTO). UJK is the flagship institution of higher learning in the Świętokrzyskie Region. It consists of 6 faculties and approximately 12,000 students. A variety of fields of studies are offered, including pedagogical sciences, arts, exact and natural sciences, humanities, economical sciences, medical and health sciences, law, and physical sciences.

The Regional Tourist Organization of the Świętokrzyskie Voivodeship is a non-governmental organization that supports the development and promotion of tourism. The institution brings together tourism companies, local governments as well as associations and foundations working for the development of tourism. The main goal of RTO is to promote tourist attractions of the Świętokrzyskie region, and the tourist offer created by the members of the organization.

The research coordinator of the Living Lab Świętokrzyskie is Jerzy Bański. He is a full Professor of Human Geography in the Institute of Geography and Spatial Organization, Polish Academy of Sciences (IGSO PAS). His main research interests include rural and agricultural geography, land use, regional policy, spatial organization and local development. The research coordination work is carried out in cooperation with Professor Wioletta Kamińska, who represents Jan Kochanowski University in Kielce, which is the main regional partner. Wioletta Kamińska is a full Professor of Social Sciences in the Institute of Geography and Environmental Sciences at the Jan Kochanowski University in Kielce. She is a director of this Institute. Her scientific interests include social and economic geography, rural areas, local development and tourism.

Name	Organisation	Role/expertise
Jerzy Bański	Institute of Geography and Spatial Organization, Polish Academy of Sciences	Coordinator of the project
Wioletta Kamińska	Jan Kochanowski University of Kielce	Coordinator of the LL Świętokrzyskie
Małgorzata Wilk -Grzywna (until 2023) Anna Szczawurska (from 2024)	Regional Tourist Organisation of Świętokrzyskie Voivodeship	Tourism experts

Living Lab challenge

Unfavourable demographic changes are one of the most important problems within rural development. One of the leading challenges identified in the current development strategy of the Świętokrzyskie region is to halt and reverse unfavourable demographic processes, especially in rural areas. It indicates the need to increase the attractiveness of the region, especially for young people, by stimulating processes that improve the overall quality of life, employment conditions and access to public services and facilities and culture, as well as creating conditions for attracting new residents. The tourist function is perceived as one of the key functions of rural development in addressing negative demographic processes. The development of tourism promotes the development of other higher-order services and social and technical infrastructure. Thanks to this, the quality of life increases and conditions on the labour market improve. Tourism also requires higher professional qualifications from employees, which will improve the overall





education structure of rural residents. These are only selected elements that should contribute to improving the demographic structure in the Świętokrzyskie countryside.

The challenges for LL Świętokrzyskie Region are as follows:

- identifying the needs of tourists (there is currently a lack of reliable and complete data);
- identifying the barriers to the development of rural tourism in the region and problems in managing tourist facilities in the countryside (this is a significant gap in statistical data - qualitative and quantitative);
- identifying the current development paths of tourist facilities operating in the Świętokrzyskie countryside (identifying model tourist facilities);
- developing a list of new tourist products in the Świętokrzyskie countryside;
- formulating good practices that can be adapted in various farms;
- formulating recommendations for the Tourism Development Strategy of the Świętokrzyskie Region.

The LL works focused mainly on the needs of tourists, because the natural and cultural potential of the voivodeship has been thoroughly inventoried and described (Mazur et al. 2021).

Rationale and research questions

It is assumed that the development of rural tourism can complement the economic functions in rural areas and create new jobs. In the current strategic documents, the tourist function is perceived as one of the key functions of rural development in addressing negative demographic processes. The Świętokrzyskie Voivodeship is characterized by a large area and number of protected areas. Attractive environmental conditions and large and unique cultural and health values are an important factor supporting the development of various forms of recreation and tourism (agritourism, silver economy, SPA and wellness, for example). Therefore, any activity aimed at developing a diagnosis of the current state of rural tourism in the region and setting future directions for its development will be the basis for addressing negative population processes.

In the framework of the experiment, the needs of tourists coming to the Świętokrzyskie region are examined and the main problems (barriers to development) of tourist facilities operating in the Świętokrzyskie countryside are identified. It is planned to select model, exemplary tourist facilities (agritourism farms), which can be examples of good practices for adaptation in other tourist entities. It is also planned to prepare strategic assumptions and recommendations in the field of rural tourism for the planned Tourism Development Strategy of the Świętokrzyskie Voivodeship.

The research questions are as follows:

1. To what extent can the development of rural tourism stimulate positive demographic processes in the region and what are potential limitations of the impact of tourism on the development of the region?
2. What activities in rural tourism can address the processes of unfavourable demographic changes?
3. What are the needs of rural tourism stakeholders in terms of tourist data and derived elements?
4. What are the expectations of tourists visiting the Świętokrzyskie countryside?





5. What instruments should be used to support rural tourism so that it translates into local and regional development?

The above questions are very important from the point of view of the overarching goal of the LL - addressing the negative consequences of unfavourable population processes.

Policy relevance

The main result of the activity of LL Świętokrzyskie will be the collection and analysis of data for the diagnosis of the state of rural tourism and the preparation of assumptions and recommendations regarding rural tourism for the planned Tourism Development Strategy of the Świętokrzyskie Voivodeship. It is assumed that the primary goal will be achieved, which is to improve the demographic situation in the Świętokrzyskie countryside through the development of attractive agritourism (including the creation of new tourist products) and the creation of new jobs.

Expected detailed results:

- supporting the development of existing rural tourism products in the region and creating new and attractive products;
- development of tourist infrastructure in rural areas and the creation of new jobs in tourism and tourism-related services;
- initiation of activities aimed at improving the tourist image of the region;
- shaping a network of cooperation between stakeholders (owners of tourist facilities and tourist service institutions).

The above-mentioned results and the Tourism Development Strategy developed later will be used to implement the region's development policy.

Since the first LL Report, there have been no new political conditions changing the policy of regional authorities in relation to rural tourism. However, research conducted among tourists and owners of tourist facilities within the LL shed new light on some aspects of rural tourism. The main problem of entrepreneurs is the poor promotion of the region as a tourist destination, and low-quality infrastructure - including tourist infrastructure. In turn, research on the needs of tourists has shown that it is necessary to develop an information system on tourist attractions, develop tourist infrastructure (bicycle paths, educational and walking paths), and improve the quality and diversity of tourist services.

The research results indicate the need for a more active policy of regional and local authorities in the field of rural tourism. This policy should refer to the promotion of the region in all types of traditional and modern regional and national media (TV, radio, newspapers, social media) and the promotion of the countryside as an attractive place to live and work, especially among younger people. Advertising and all promotional activities in traditional regional and national media are expensive, and their costs cannot be covered by non-governmental tourist organizations or even associations of owners of tourist facilities. The research also confirmed the accuracy of the assumptions and directions of activities of the Świętokrzyskie Region.

Stakeholders

In the activities of LL Świętokrzyskie Region, several groups of stakeholders should be distinguished, whose common goal is to use the potential of the Świętokrzyskie region in the development of rural tourism.





Table 26 Participants of the LL Świętokrzyskie Region

Type of institution	Name of institution	Number of participants
Local governments	Marshal's Office of Świętokrzyskie Voivodeship	1
Tourist institutions	Regional tourist organization, Local tourist organizations, Local Action Groups, Polish Chamber of Regional and Local Product	6
Institutions serving agriculture	Świętokrzyskie Agricultural Advisory Centre	1
Owners of tourism companies	Agritourism farms, educational homestead, Agropark, Automotive Museum	5
Scientific institutions	Jan Kochanowski University in Kielce	2

The first group of actors (local government units) are representatives of regional authorities or smaller territorial units (district, commune) who directly participate in shaping development policy at various spatial scales and participate in the preparation of planning documents at the regional or local level. A representative of the Marshal's Office of the Świętokrzyskie Voivodeship and the County Office in Sandomierz directly participates in the work of LL.

The second type of stakeholders are non-governmental organizations and associations (NGOs) working for the development of tourism or, more broadly, for the development of rural areas. There are two subtypes of stakeholders in this group. There are representatives of the Regional Tourist Organization of the Świętokrzyskie Voivodeship and representatives of local Tourist Organizations (*Moc Ponidzia – Ponidzie Power, Partnerstwo Ziemi Sandomierskiej – Sandomierz Land Partnership, Góry Świętokrzyskie – Świętokrzyskie Mountains*). The second subtype are representatives of Local Action Groups (*Białe Ługi, Nad Czarną i Pilicą, Krzemieny Krąg, u Źródle*).

The third set of actors are private entrepreneurs operating in rural tourism, who can be classified as local leaders (*Agropark Dworek pod Lipą, Gospodarstwo Agroturystyczne – Mistrz i Małgorzata, Gospodarstwo Carownica, Gospodarstwa Pytlówka i Wichrowe Wzgórze*). They represent mostly agritourism farms. University scientists represent the fourth group. They can be joined by a group of students of the Jan Kochanowski University who actively participate in the work of LL Świętokrzyskie, with some of these students preparing master's theses on rural tourism in the Świętokrzyskie region.

During the work of the LL Świętokrzyskie, it turned out that not all stakeholder groups are equally involved in the work of the team. The most active are the employees of the Regional Tourism Organization and scientists. These stakeholder groups are always active, have new ideas and proposals, and above all, have a good understanding of the needs of tourists and the challenges facing tourism in the 21st century. Farm owners have limited time for our team meetings. The dates of meetings must be carefully adjusted to their time possibilities. For example, meetings cannot be held in the summer season and on weekends, when tourists visit their farms. However, in the LL stakeholder group there are several permanent representatives of rural tourist entities.





It is also worth noting the very low interest of local and regional authorities in the functioning of the LL Świętokrzyskie. Most often, we hosted only one representative of the Marshal's Office of the Świętokrzyskie provinces. The participation of UJK students in LL meetings was positive, and student participation in discussions allowed them to contribute knowledge about the promotion of rural tourism in social media.

Theory of change

The Transition Narrative concerns the socio-economic development of the Świętokrzyskie region with particular emphasis on shaping solutions to unfavourable demographic changes in rural areas. The region's problems primarily relate to population changes and include aging of the community and the resulting demographic burden, combined with depopulation processes, which include a negative natural increase with the lowest fertility rate in the country and a negative migration balance.

On the other hand, an important potential of the region is its central location within Poland, and its unique natural and cultural values. The region is characterized by the largest share of protected areas in the total area among voivodeships in Poland (65%). Natural and cultural values are the undeniable capital of the Świętokrzyskie Voivodeship and are an important factor in tourism development.

The leading challenge of the Świętokrzyskie Voivodeship is therefore to address unfavourable demographic processes, especially in rural areas. This indicates the need to increase the attractiveness of the place, especially for young people, by stimulating processes that improve the overall quality of life, employment conditions and access to public services, facilities and culture, as well as creating conditions that attract new residents. The tourism function is perceived by strategic documents as one of the key functions of rural development and suppression of negative demographic processes. The aim of the LL is to diagnose the condition and prepare assumptions and recommendations for the planned Tourism Development Strategy of the Świętokrzyskie Voivodeship, which will constitute an important document supplementing the Regional Development Strategy.

It is assumed that the project results will contribute to achieving the primary goal, which is to limit unfavourable demographic processes in rural areas of the Świętokrzyskie Voivodeship. This is to be supported primarily by diversifying their development through the promotion and creation of new tourist products and jobs.

1. Activity: commercialization of existing and creation of new rural tourism products. Result: increase in income of households and entrepreneurs, diversification of the labour market, inhibition of the outflow of young and enterprising people.
2. Activity: development of tourist infrastructure. Result: increased tourist traffic and diversification in the service sector in rural areas.
3. Activity: building the region's rural tourism brand, promotional support for rural tourism products. Result: increased tourist traffic and diversification in the service sector in the countryside.
4. Activity: building a cooperation network, increasing the professionalism of tourist staff and management methods. Result: improvement of conditions in the labour market, digitization, promotion of the region.
5. Increasing the number of overnight accommodation options in rural areas of the Świętokrzyskie Voivodeship and increasing the number of people using overnight





accommodation (currently, the Świętokrzyskie Voivodeship has 2.2% of all overnight accommodation facilities in the country, and the people using overnight accommodations constitute 1% of the number of people using overnight accommodation in the country, while the region covers 3.2% of the population of Poland). An increase in the above indicators to 3.0-3.5% would increase the number of jobs in the tourism sector in the region, which in turn would have a positive impact on reducing the negative demographic effects.

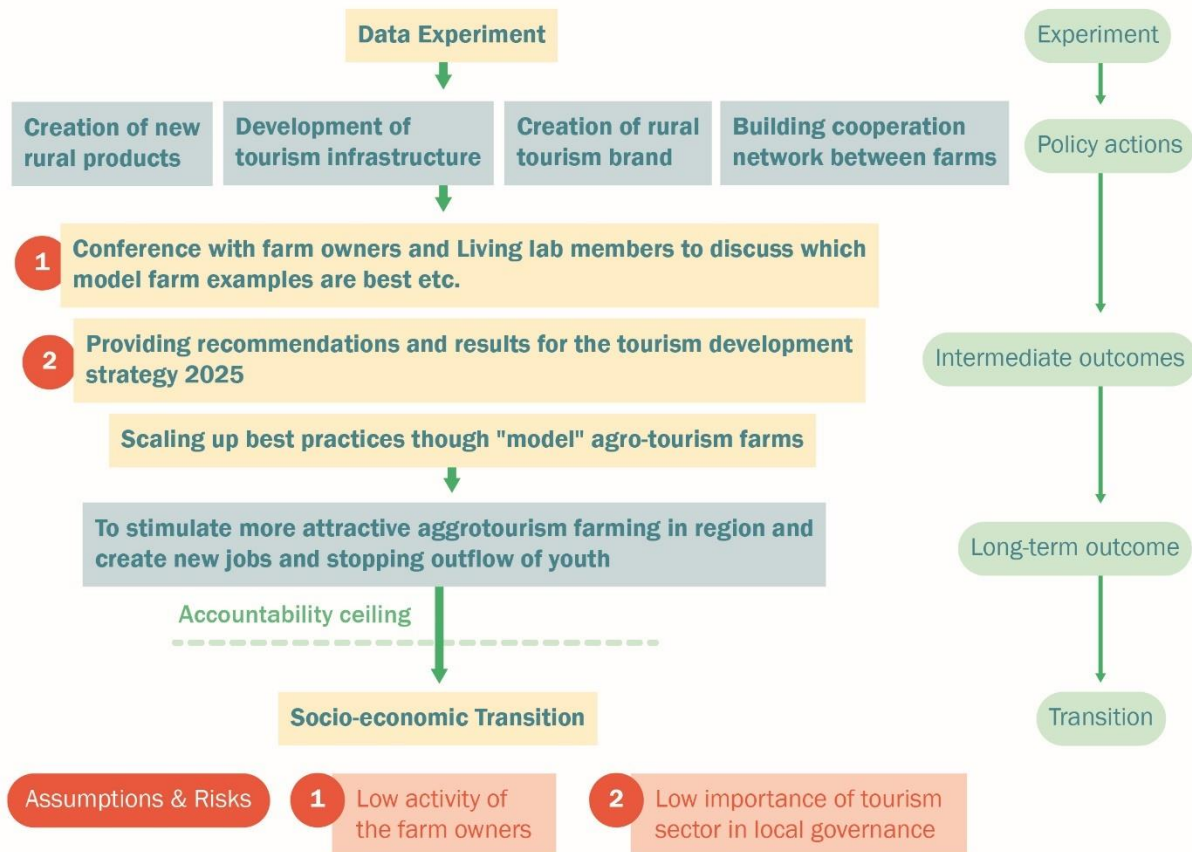


Figure 51 Theory of change model – Świętokrzyskie region

Data relevance

The available knowledge on rural tourism in the Świętokrzyskie region is very general and scattered in the literature on the subject. Available statistical material does not support a detailed analysis of the current state of rural tourism. There is a lack of data on the tourist equipment of facilities, the number of visiting tourists, or the forms of services offered. Particular needs concern the recognition of the preferences of potential tourists, the valuation of tourist attractions and the directions from which tourists come. There is also a lack of data on the barriers to the development of rural tourism within the specific natural and social conditions of the Świętokrzyskie region. There is not even basic data on the number of tourist entities operating in the studied area. There is no information on employment in tourist entities or indicators showing the impact of tourism on local and regional development. This knowledge is the basis for shaping





the development of new forms of tourism in the countryside and the use of the rich internal resources of the region that remain, at present, dormant.





Part 2: Living Lab Cycle 2: Data experiments

Data experiment

Developing the data experiment

As mentioned earlier, data on rural tourism in the region are general in nature and do not allow for a detailed diagnosis of its condition. In spatial terms, they usually concern the entire region or occasionally large territorial units (counties). Data on demographic processes are equally general in nature. Therefore, it is necessary to collect additional data and information that will allow the LL team to answer the research questions, as well as achieving the LL objectives and the operational objectives of the experiment.

To obtain the expected results of the project activities, the data and information obtained via social research (surveys and interviews) and the inventory of agritourism farms using the Google Maps application were primarily used. This material can be used by various stakeholders for important analyses (for example, scientific research, regional diagnoses, spatial planning).

As part of the LL work, a list of statistical data necessary to develop a diagnosis of the state of tourism in rural areas of the Świętokrzyskie Voivodeship and to guide future directions of its development was drawn up. A discussion on this topic took place at the first LL meeting on May 16, 2023. It was decided that the following information and data should be included:

- spatial distribution of natural and cultural resources in rural areas;
- location of agritourism farms and their characteristics;
- equipment of tourist facilities in rural areas;
- condition of tourist and tourism-related infrastructure in rural areas;
- assessment of challenges and barriers facing agritourism and expected development trends in the perspective of coming years;
- expectations and needs of tourists visiting the region.

Experiment description

General concept of the experiment:

Problem:

Unfavorable demographic processes and lack of development prospects for rural areas.

Hypothesis:

The Świętokrzyskie region located in the vicinity of large metropolitan centers (Warsaw, Krakow, Lodz and Katowice) is characterized by a high potential of the tourist function, which can shape new jobs and inhibit unfavorable demographic processes in rural areas.

Solution:

Diagnosis of the state of agritourism and identification of model examples in agritourism farms creating new jobs in rural areas.

Main stages of the experiment:





- a) *Diagnosis of agritourism farms (statistical analyses, surveys, in-depth interviews).*
- b) *Identification of model solutions shaping new jobs.*
- c) *Assessment of the possibilities of implementing model solutions in agritourism farms (farm owners and LL stakeholders).*
- d) *Recommendations for the Strategy.*

Detailed stages of the experiment:

1. Identification and location of entities providing tourist services in rural areas (including agritourism farms).
2. Selection of tourist entities for diagnostic tests.
3. Conducting social research among tourist entities (surveys and in-depth interviews) and tourists (surveys).
4. Analysis of research results and development of unique materials for the future Tourism Development Strategy of the Świętokrzyskie Voivodeship.
5. Identification of three model tourist entities for study visits.
6. Selection of stakeholders participating in study visits.
7. Study visits, identification of good practices, knowledge transfer and exchange of experiences between study visit participants.
8. LL meeting (scientific seminar) and discussion on new and innovative solutions in conducting tourist activities in rural areas along with various forms of dissemination of LL results.
9. Interpretation of results used to develop the future Strategy, and recommendations regarding limiting unfavourable demographic processes in rural areas of the Świętokrzyskie region.

Experiment objectives

LL Świętokrzyskie examines socio-economic changes with particular emphasis on demographic changes and economic diversification processes. The aim of LL Świętokrzyskie is to prepare assumptions regarding the development of rural tourism for the future Tourism Development Strategy of the Świętokrzyskie Voivodeship. It is assumed that the primary goal will be achieved, which is: stopping unfavourable demographic processes in rural areas of the Świętokrzyskie region and diversifying their economic development through promotion and creation of new tourist products.

The objectives of the experiment are:

1. Analysis of the data obtained as a result of the experiment to develop guidelines and recommendations for the Tourism Development Strategy in the Świętokrzyskie Region.
2. Identification of activities in the field of tourism that shape new jobs.
3. Identification of good examples and possibilities of their implementation in agritourism farms.

Relationship to theory of change

The data collected within the framework of the LL concerning the state of rural tourism in the Świętokrzyskie region, the location of tourist facilities, determining the needs of tourists and





identifying trends and barriers to tourism development constitute the basis for determining future directions of tourism development and formulating recommendations and assumptions for the Tourism Development Strategy. In the long term, the implemented solutions are to create new jobs in rural areas, improve the quality of living conditions and, as a result, inhibit the outflow of migration.

The research results to date indicate two basic factors limiting rural tourism in the Świętokrzyskie region: the lack of adequate promotion of the region and the low level of investment in technical and tourist infrastructure. The solution to both problems lie mainly with the regional and local authorities, which should act based on the recommendations formulated.

Another problem in the development of tourism is the poor recognition of the needs of tourists. The collected data will enrich the knowledge of stakeholders in this area, which will translate into better adjustment of the offer of tourist facilities to the needs of tourists.

To sum up, the experiment allowed us to obtain unique, unpublished data relating to tourism market demand and supply. Data analysis and utilization of the data by stakeholders will translate into the development of tourism, better promotion of the region and an increase in the employment offer in the countryside. This in turn will contribute, at least partially, to limiting the unfavorable demographic processes in the Świętokrzyskie countryside.

Data use

Data sources and methods

As part of the experiment, we collected new data on various aspects of the functioning of tourism in the Świętokrzyskie countryside (Table 27). The main source of data was social research (surveys and in-depth interviews). This research was carried out at LL meetings with stakeholders, at agritourism farms and other tourist facilities, and in various groups of tourists visiting the region. An important source of data were the websites of tourist entities and the Google Maps application. The first of these sources allowed recognition of the current offer of agritourism farms (uniform sets of information were developed for all the analyzed agritourism farms – see example fig. 7), the second source examined the location of entities.

At the beginning of the study, a survey was conducted among stakeholders - participants of the LL. The survey consisted of questions regarding:

- the most important transformation issue in the region;
- the current and potential impact of rural tourism on the development of the region;
- challenges, development barriers and competitive advantages of rural tourism in the region;
- topics important for discussion and analysis during the LL meetings.

Then we made an inventory of tourist facilities operating in rural areas of the Świętokrzyskie region, using Google Maps to examine the location of tourist facilities. On this basis, we reached the websites of individual facilities. A uniform information card was prepared for each facility, which included basic data about the tourist facility: address, contact details, tourist offer, prices for tourist services, equipment of the facility and room. We prepared information cards for 160 agritourism farms. The authenticity of the data was then partially verified - through telephone



conversations with the owners of selected facilities. It was found that approx. ¼ of the facilities are no longer operating or have been suspended.

1. Name of the facility: Jacek Guz Agrotourism Farm "Dworek staropolski" – Młyńciska

2. Town and commune: Niziny 159, 28-142 Tuczępy, Tuczępy commune

3. Website address: <http://dworekstaropolski.pl>

4. Service formula:

year-round facility X	seasonal facility
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5. Offer (apart from accommodation):

accommodation X	meals X	Other services X
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6. Other services (apart from accommodation and meals):

- Possibility to visit the mill
- Fishing
- Bike rental
- Organization of parties
- Educational activities for children and adults

7. Equipment:

- Fish pond
- Place for grill/bonfire
- Parking

8. Number of beds:

Less than 5	5-10 X	10-20	20 and more
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9. Average price of accommodation for one person (without meals)

Less than 50 zł	50-100 zł X	100-200 zł	200 zł and more
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10. Photographs of the property



11. Other important information

The offer is in two locations: a manor house and a country cottage

Figure 52 Example of an information card for an agritourism facility

Table 27 Data sources, methods and type of information

Name of the study	Participant number	Type of participants	What type of information was obtained
Survey studies	16	Stakeholders LL	challenges facing tourism in the 21st century, assessment of the impact of tourism on the economy, factors stimulating and barriers to tourism development



Name of the study	Participant number	Type of participants	What type of information was obtained
Inventory of tourist facilities	160	Agritourism farms and other tourist facilities	Location of facilities, contact details, tourist offer, equipment of facilities, prices, etc.
Survey studies	34	Owners of agritourism farms and other tourist facilities	Challenges, barriers of development and needs of owners of agritourism farms
Survey studies	288	Tourists	Needs of tourists and their assessment of conditions for recreation in the Świętokrzyskie countryside
In-depth interviews	9	Owners of agritourism farms	Problems in running agritourism, development prospects
Farm presentations	3	Owners of agritourism farms	History of farms, equipment, promotion, innovative solutions, development prospects, forms of selling services, etc.
Study visits	2	Owners of tourist facilities	Equipment of facilities, forms of sale, cooperation with other facilities, etc.
Stakeholder meetings	4	Regional and local authorities, non-governmental organizations, agritourism farms, scientists	Challenges facing tourism, forms of promotion, needs of owners of agritourism farms, etc.

Source: own data

Original data was also obtained by conducting surveys among tourists. 288 surveys were conducted in 12 tourist facilities located in 11 counties of the Świętokrzyskie region. From this survey we obtained data on the structure of tourist traffic, tourists' needs in terms of the services offered, assessment of the equipment of tourist facilities and general opinion on the conditions for recreation in the Świętokrzyskie countryside.

Another source of information were surveys conducted among 34 owners of agritourism farms and in-depth interviews with 9 entrepreneurs. We obtained information on the possibilities and barriers to the development of specific tourist facilities and information on how entrepreneurs cope with obtaining funds and promoting their business entities. Survey respondents expressed, their opinion on contemporary social and economic trends that affect the functioning of their farms, and barriers and development opportunities for rural tourism in the region. Study visits to a selection of model farms allowed the collection of detailed information via presentations by owners and subsequent discussions. These covered the genesis and history of the facilities, the level of employment, the forms of promotion and sale of the tourist offer and available facilities. Finally, data was obtained in LL meetings, where stakeholders provided information on the factors and barriers to the development of rural tourism, on the expectations of local and regional authorities and on the possibilities of development and cooperation between individual facilities.





Data innovation

The innovation of our experiment consisted in collecting a large database of unique and original data on various aspects of the functioning of tourism in rural areas of the Świętokrzyskie region.

The research combined established and innovative data collection methods, and the research was conducted at various spatial scales and locations covering the entire region. Innovative forms of data acquisition include the use of the Google Maps application and a wide range of websites of agritourism farms. The data was collected and processed using the traditional method (making cards for each tourist entity based on their websites – see fig. 7). Another innovative method of data acquisition were study visits to model agritourism farms and presentations prepared by owners of model tourist facilities.

The owners of model tourist facilities prepared 30-minute presentations in which they presented the characteristics of their facilities, discussed problems in current operations and indicated solutions enabling economic success. Particular attention was paid to:

- promotion and marketing
- diversification and quality of the offer
- cooperation of tourist entities in the region
- involvement of local authorities in the promotion of the region and the development of rural tourism
- quality of infrastructure, including tourist infrastructure

During study visits, in-depth interviews and presentations, we obtained unique data that can be used in the future by a large group of agritourism farm owners. Quantitative and qualitative data were collected on forms developed earlier by LL coordinators. During study visits, the forms were supplemented with questions asked by stakeholders participating in study visits. In addition, notes were made from each study visit, containing observations of study visit participants and an inventory of tourist facilities, and we took photographs documenting the visits.

More established forms of data collection include survey research on a large sample of tourists (288 people) and agritourism farms (34). The form of the survey in agritourism farms itself had a Nawotorian approach (see example). The questions asked to the owners of tourist facilities were innovative in nature. The research was not limited to asking standard questions regarding, for example, the number and equipment of rooms or rental prices. We also asked the owners to assess the impact of nationwide demographic trends on the development of their tourist facilities in the future. Such an approach allowed not only for the assessment of the development prospects of tourist facilities in changing economic and social conditions, but also for the assessment of the owners' preparation for these changing conditions of functioning of tourist facilities, assessment of their substantive preparation for conducting business activity in the long term and assessment of strategic thinking skills.

Table 28 An extract of the survey conducted among agritourism farms.

*Please express your opinion on the trends/processes listed below that may occur on your farm in the next few years?
(please put X in the appropriate spaces)*





Potential trends/processes in the farm and its surroundings	Yes	Rather yes	Yes nor no	Rather no	No
The number of incoming tourists will increase	9	10	8	6	1
The interest in the Świętokrzyskie region among tourists will decrease	2	3	9	17	4
The possibility of employing new employees will decrease	3	13	9	4	4
The competition among tourist entities will increase	18	11	3	2	0
The requirements of incoming tourists will increase	16	14	3	1	0
The transport accessibility of the farm will improve	6	9	12	6	2
The interest of local government in the development of tourism will increase	4	10	9	8	3
The prices of services offered by the farm will increase	9	13	4	5	2
The range of services offered by the farm will increase	13	9	9	3	0
The quality of services provided will improve	13	13	2	3	0
The tourist infrastructure in rural areas in the Świętokrzyskie region will improve due to the use of EU funds	8	15	6	4	1
The profitability of the farm will decrease	2	6	11	9	5
The interest in agritourism among seniors will increase due to the aging of the population	3	14	6	9	1
The number of promotional channels and possibilities of booking services on the farm will increase	8	18	6	1	1

Source: own data.

Implementation

Implementing the experiment

The first stage of the experiment consisted of collecting data on the functioning of tourism in specific natural and socio-economic conditions of the Świętokrzyskie region. The activities focused on the inventory of agritourism farms operating in rural areas of the Świętokrzyskie province, developing survey forms and an in-depth interview scenario, selecting tourist facilities for survey research and interviews, conducting interviews and surveys, and statistical and graphic development of the surveys (Table 29).





Table 29 Stages of the experiment in the LL Świętokrzyskie

Actions	Date of implementation	Responsible for implementation
Identification of data necessary for diagnosing the state of tourism in rural areas of the Świętokrzyskie Voivodeship and determining the directions of its development	XI -XII -2023	J. Bański, W. Kamińska, RTO, LL stakeholders
Inventory of agritourism farms	XII 2023-I. 2024	J. Bański
Development of a survey form conducted in agritourism farms, among tourists and a scenario for an in-depth interview	XI. 2023 - I. 2024	J. Bański W. Kamińska RTO
Verification of the list of agritourism farms prepared based on Google Maps and websites	I-III.2024	RTO
Distribution of surveys to selected agritourism farms (12 farms from 11 poviats, 30 surveys each). Deadline for returning surveys – May 30, 2024	II-III 2024	RTO
Selection of farms for in-depth interviews and conducting in-depth interviews	IV-V 2024	W. Kamińska
Statistical and graphic processing of surveys	VI 2024	J. Bański
Conducting surveys among tourists	V-IX 2024	W. Kamińska RTO
Statistical and graphic processing of surveys conducted among tourists	X 2024	J. Bański
Selection of model farms	IX 2024	W. Kamińska
Organization of the LL meeting	X 2024	RTO W. Kamińska
Presentation of survey results	5 XI 2024	J. Bański
Presentation of model agritourism farms	5 XI 2024	Farm owners, RTO
Study visits to model farms agritourism	6 XI 2024	Farm owners, RTO

Source: own data

In the next stage, model farms were selected, and a meeting of LL stakeholders was organized, where the results of the survey were presented, and model tourist facilities were presented. Then, study visits were held in two model agritourism farms in Lechów ("Carownica" farm) and Tarczek ("Pytlówka" farm).





Adaptations

The experiment has been conducted to date according to plan. We encountered some difficulties during the survey. Tourists and owners of agritourism farms were sometimes reluctant to participate in the survey. Earlier contacts of LL coordinators and their visits to individual farms helped to solve the problems of low activity of survey participants. We believe that the statistical material is sufficient to draw conclusions regarding the current state and future directions of tourism development in rural areas of the Świętokrzyskie region.

Other Living Lab activities and achievements

LL Świętokrzyskie took a number of actions to implement the experiment, and these were presented in Implementing the experiment. In addition, LL organized two stakeholder meetings. The first one was held on November 5, 2024, in Kielce. The meeting was attended by 16 people, including representatives of the Marshal's Office, tourist institutions, owners of tourist facilities and scientists.

During the meeting, Prof. J. Bański presented the results of the survey research, indicating the factors and barriers to the development of rural tourism in the Świętokrzyskie region, the needs of tourists and their assessment of the tourist offer and the expectations of the owners of agritourism farms. Participants were engaged with these topics and a long discussion developed on the factors stimulating and inhibiting the development of rural tourism in the Świętokrzyskie region. In general, the stakeholders shared the opinions of tourists and owners of agritourism farms regarding the poor promotion of the region and the low quality of technical and tourist infrastructure.

In the further part of the meeting, the participants identified development impulses, factors inhibiting and stimulating the development of tourism in the Świętokrzyskie region and threats to the functioning of tourism entities. Among the impulses stimulating entrepreneurs to create tourism companies in the Świętokrzyskie region were the desire to improve the lives of the region's residents, emulating the success of others, sharing passions, fulfilling dreams, the desire to create something of one's own, independence, and inheriting a business. Among the factors inhibiting the tourism business were the Covid pandemic, precarity of small businesses and vulnerability to externalities, lack of heirs, and the need to repay loans. Among the threats were lack of cooperation between entities, poor infrastructure, and lack of cooperation with representatives of local and regional authorities. In turn, the development factors included a developed brand, guest satisfaction, a sense of support from local authorities, family support, and a good geopolitical situation.



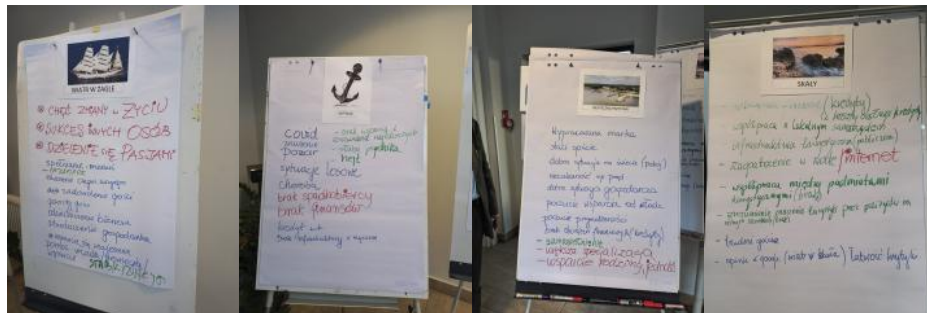


Figure 53 LL meeting stage and work results

The meeting continued with presentations of three model tourist facilities ("Dwór na Wichrowym Wzgórzu", "Pytlówka" and "Carownica"). Entrepreneurs discussed the activities of their companies, stages of development, service offerings, and forms of promotion.

The next LL meeting took place on November 6, 2014 as a study visit to two tourist facilities: Siedlisko Carownica in Lechów and Gospodarstwo Agroturystyczne Pytlówka in Tarczek. 16 people attended this meeting.



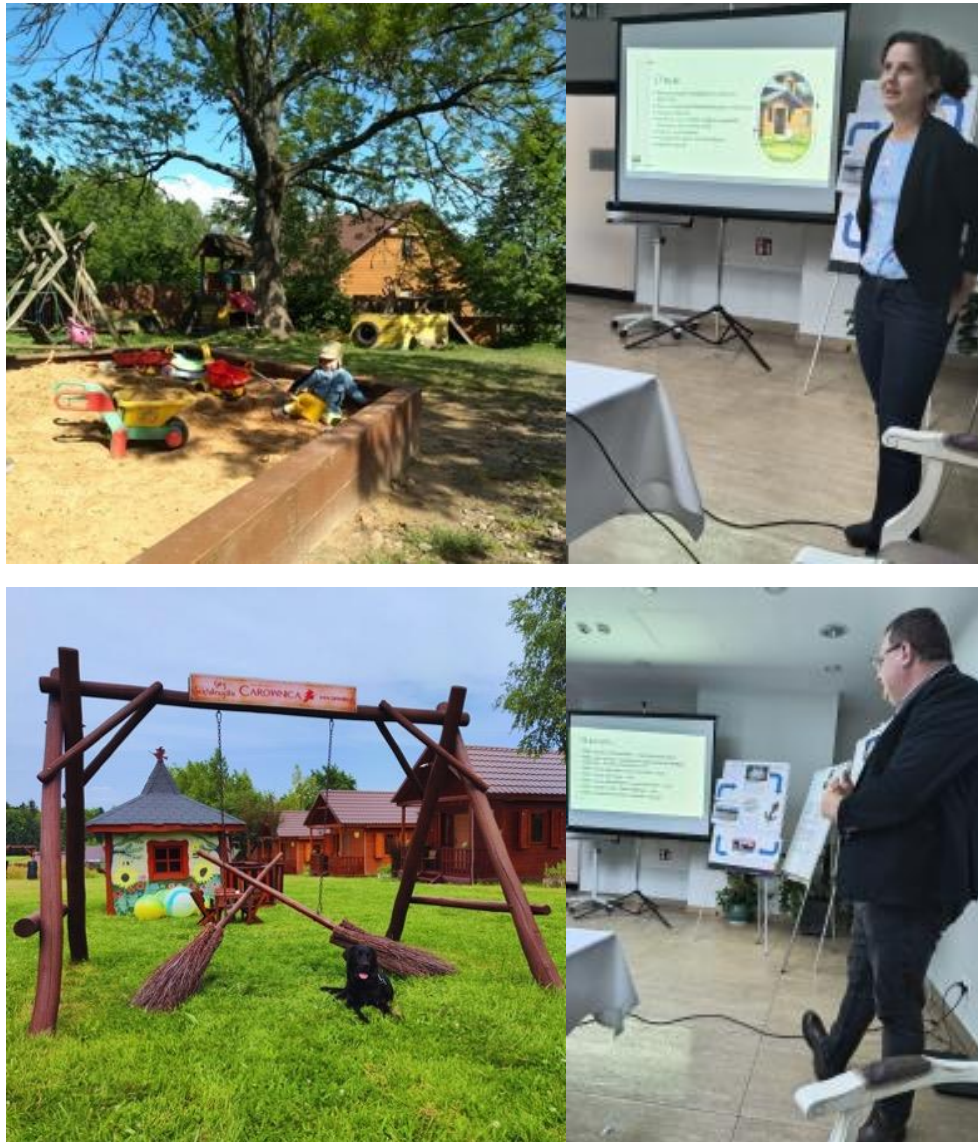


Figure 54 Presentation of three model farms.

Preliminary results

Results to date

The survey data allows for an in-depth analysis of the issues related to rural tourism in the Świętokrzyskie region. Detailed analysis and dissemination of the data will take place as a next step for the LL team.

The initial results of the survey conducted among the stakeholders of the LL clearly indicate that the tourist potential of the rural areas of the Świętokrzyskie region is greater than its current use. On a five-point scale, the current impact of rural tourism on the development of rural areas in the Świętokrzyskie region was assessed at 3.1 points. In turn, the potential impact of tourism was assessed at 4.5 points.





Table 30 Example of the result of the survey among the participants of the LL.

Rate on a scale of 1 to 5 what is the current impact of rural tourism on the development of rural areas in the Świętokrzyskie region?	3,1
Rate on a scale of 1 to 5 what could be the impact of rural tourism on the development of rural areas in the Świętokrzyskie region?	4,5

Source: own research.

Among the most important challenges facing rural tourism in the Świętokrzyskie region, stakeholders mentioned promotion and marketing, expanding the tourist offer and cooperation between entities involved in rural tourism. The cited studies also show that the features of rural tourism in the Świętokrzyskie region that provide it with a competitive advantage are natural values (environmental and landscape) and a considerable number of cultural attractions. In turn, among the features hindering the development of rural tourism, respondents mentioned: lack of promotion, limited financial resources and lack of cooperation between tourism entities.

The analysis of surveys conducted among 34 tourist facilities allowed us to identify four basic challenges for rural tourism in the Świętokrzyskie region:

1. Promotion and marketing.
2. Expanding the offer and identifying new attractive elements of the offer.
3. Cooperation of entities involved in rural tourism.
4. The need to increase the interest of local authorities in the development of rural tourism.

Findings on trends and processes that may occur in the surveyed farms in the next few years are mostly optimistic, and allows us to draw the following conclusions:

- an increase in the number of tourists coming to the Świętokrzyskie region is expected;
- interest in the Świętokrzyskie region among tourists will probably increase;
- problems will appear on the labour market related to the lack of potential employees;
- competitiveness between tourist entities will significantly increase;
- tourist requirements will significantly increase;
- transport accessibility of farms will remain at a similar level;
- local government activity towards the development of tourism will not change significantly;
- prices of services offered by agritourism farms will increase and the range of services provided will improve;
- thanks to investments financed from EU funds, the equipment of villages with tourist infrastructure will improve;
- the profitability of agritourism farms will not change;
- the level of interest in senior tourism is unlikely to change;
- the scope of promotion and service booking options will improve.

In turn, the study on the current needs of agritourism farms indicated their strong differentiation. The most important needs are investments in the expansion of existing buildings and surroundings. The main problems related to running a business include rising energy costs, limited financial resources and a lack of interest in the development of tourism on the part of local authorities.



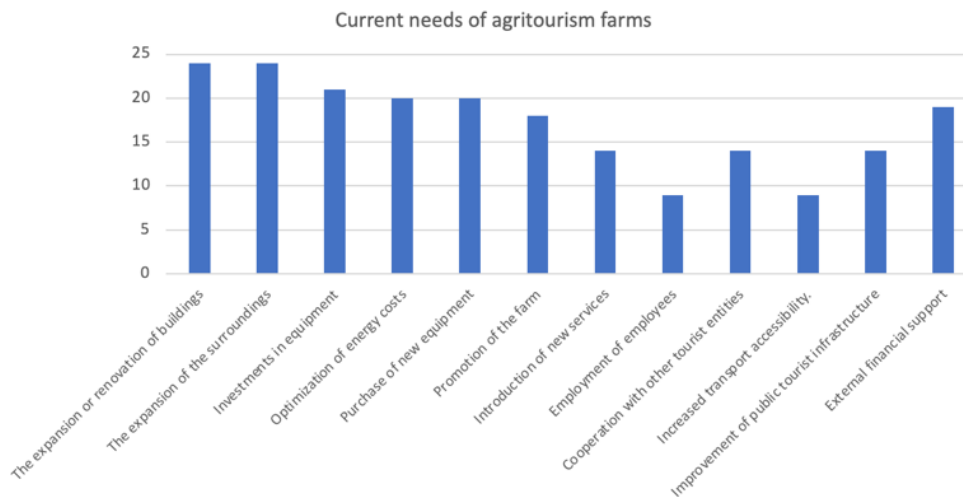


Figure 55 An example of the response of agritourism farm owners to a question about the needs of their farms

A survey conducted among 288 tourists showed that the majority come to the region once a year or less than once a year. Around 60% of the respondents stayed in the region for only a few days. One of the challenges is therefore to encourage tourists to visit the region more often. However, these visits should not be expected to last longer than a few days, because most arrivals take place on weekends and multi-day holiday periods.

The most frequently mentioned reasons why tourists decided to visit the Świętokrzyskie countryside were the attractive natural environment and conditions for recreation. On the other hand, respondents negatively assessed the communication infrastructure (especially internet access), and the low quality of the services offered. According to the respondents, the infrastructure and the proposed tourist offer require significant improvement.

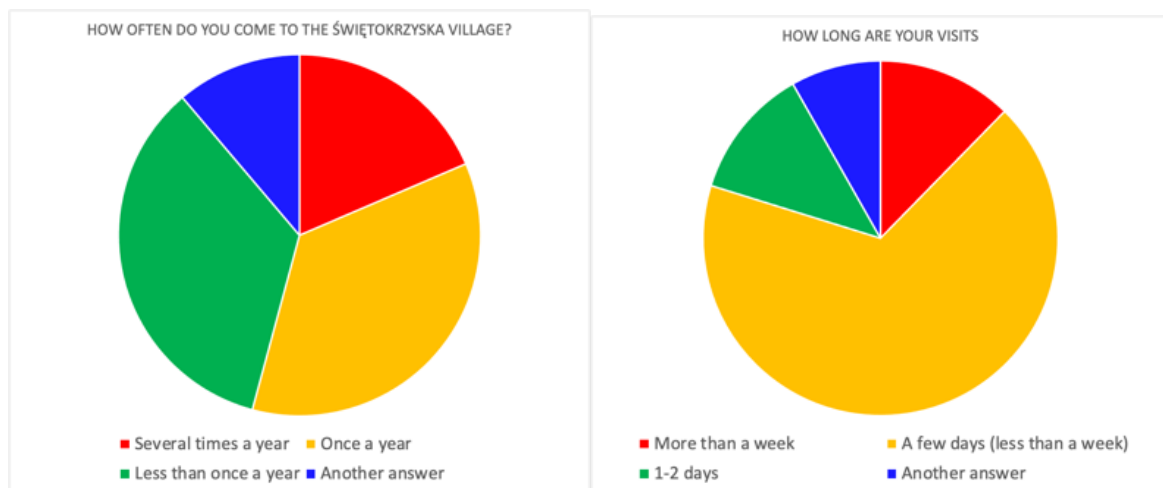


Figure 56 The responses of surveyed tourists regarding the frequency and length of visits to the villages of Świętokrzyskie



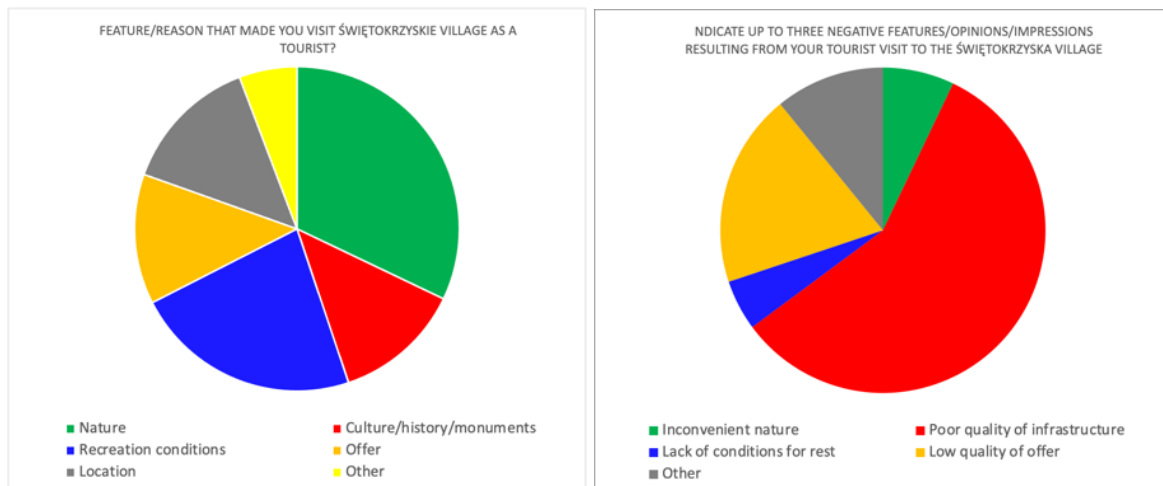


Figure 57 The answers of surveyed tourists about the reasons for choosing the Świętokrzyskie village and negative impressions related to their stay.

Data relevance

The research results align with the problems identified at the beginning of the experiment. As already mentioned, the Świętokrzyskie region is characterized by a large share of protected areas (over 60% of the province's area), and tourists appreciate this asset. The lack of greater interest in cultural assets is surprising and suggests that the cultural potential of the province is not fully exploited for tourism purposes. We were not surprised by the low assessment of infrastructure. In publications, the Świętokrzyskie region is presented as an area with the least developed transport and communication infrastructure, and the tourist infrastructure is also poorly developed.

However, at the beginning we underestimated the importance of promoting the region. In all discussions and in the results of surveys, the lack of promotion in traditional and modern media at the national and regional level appears to be one of the main barriers to the development of rural tourism in the Świętokrzyskie region.

Local relevance

The research results were made available to all interested stakeholders (owners of tourist facilities, representatives of tourist organizations and regional and local authorities). This information is important for each of these groups, as it can inform adaptation of the tourist offer to the needs of tourists. The surveys were designed to provide owners with the broadest possible information about the needs of tourists, and local authorities with information about the expectations of entrepreneurs. It is also expected that students will use the information materials and data for their master's and bachelor's theses.

Policy relevance

The results of our research are consistent with the development policy of the region (including the current strategy of the province and local strategies). However, there is a discrepancy in the possibilities of financial support for rural tourism from local and regional authorities. Representatives of local governments are aware of the region's infrastructure poverty, but revenues to local and regional budgets are limited and do not provide the possibility of quickly solving problems related to infrastructure deficiencies, especially in rural areas located peripherally in relation to the largest urban centers. However, discussions at LL meetings show that the authorities of the Świętokrzyskie region do not appreciate the power and efficiency of





promoting the region as a tourist destination. We intend to draw greater attention of the regional authorities to matters related to the promotion of the Świętokrzyskie province.

Robustness and limitations

The surveys were designed carefully and conducted on a relatively large group of respondents. Their results provide a basis for drawing conclusions regarding the needs of tourists and owners of tourist facilities in the Świętokrzyskie region. The main problems of tourism development - poor infrastructure, poor promotion and low quality of the tourist offer - appeared not only in the survey results but were verified in data collection with LL stakeholders and owners of tourist facilities. Owners of agritourism farms also highlighted a lack of promotion of the region and poor cooperation between tourist entities and identified these factors as barriers to the development of tourism in the region. Our research shows that the flow of information, existing cooperation networks and the activity of regional organisations are satisfactory. The survey conducted among LL stakeholders and owners of tourist facilities can only indirectly indicate such barriers from a local perspective.





Part 3: Reflections and learning

The second cycle involved diagnosing the state of development of rural tourism in the Świętokrzyskie region and preparing recommendations for the planned Tourism Development Strategy. A very important element of this step is also the identification of model farms in the region in terms of utilising their experiences and good practices to support other tourist entities in the region and potential new service providers. The most important result of the cycle is the collection and processing of unique and up-to-date data on rural tourism, which was obtained mainly from social research.

The collected data indicates that the tourist potential of the region is not realised to its full potential. This is due to many interconnected reasons, among which are lack of promotion and marketing, low quality of technical and tourist infrastructure, and insufficient interest of local and regional authorities in the development of tourist services. There are other reasons, but some of them are directly independent of entrepreneurs and local government authorities - for example, the commonly known financial problems. However, conversations with entrepreneurs of model agritourism farms provide positive examples and indicate that tourism is a potentially profitable economic function.

Activities carried out as part of the project also provide other conclusions resulting from cooperation (or its absence) with owners of agritourism farms. Survey research indicated a lack of interest from a large group of entrepreneurs who did not want to cooperate with us. This requires a separate analysis.

A large segment of agritourism farms do not conduct activities consistent with the definition of agritourism (rest or recreation on a functioning farm, where one can stay and observe or participate in farm work). Such farms, apart from accommodation and meals, do not offer attractions that use the potential of the environment and culture of the region. Therefore, it is difficult to expect them to achieve economic success.

Reflections on data sources, methods, and tools

Data issues and obstacles during the experiment

The spatial scale of the LL - the entire region - creates serious challenges in terms of access to statistical data and other information materials. A serious barrier is the lack of statistical data on tourism in the region, which includes limited and fragmentary information on accommodation facilities and their usage levels.

In Polish statistics, general censuses are conducted approximately every 10 years, and they refer to the smallest local government units - communes. In our research, the basic unit of reference is an entity offering tourist services in the countryside. Therefore, all quantitative and qualitative data were collected and generated by the project contractors. The data also includes information resulting from direct conversations with the owners of the entities studied, including, for example, "good practices" of model entities.





Managing data issues and obstacles

All data was collected because of project work, there was no data from other sources. Extensive social research was carried out (34 surveys in agritourism farms, 9 in-depth interviews, 288 surveys among tourists) and analyses of websites and identification of entities' locations in the Google Maps programme were carried out. We believe that the data obtained allow for the implementation of the set goals.

During data collection, coordinators encountered the following problems:

1. The definition of agritourism and agritourism farm in the scientific sense does not match the terminology adopted by some respondents. (not all facilities named “agritourism” were such in the scientific sense). The solution was to extend the study to all tourist facilities operating in rural areas of the Świętokrzyskie province.
2. Mistrust from owners of tourist facilities and reluctance to provide full information. The solution was personal contacts between project coordinators and owners of tourist facilities and referencing the university to assure participants of the legitimacy of the research.
3. Reluctance of tourists to provide information because they were not sure how this data would be used. The solution was full information about the anonymity of the surveys and the transparency of the conducted research.
4. The large area of the LL in relation to the time of the experiment made it impossible to conduct research in all tourist facilities. The solution was to select facilities located in 11 counties for the survey research (even spatial distribution).

Pilot Region Partner's perspective on data

The lack of adequate statistical data on rural tourism is a standard problem. The materials obtained as a result of the LL team's research are unique and important for shaping the strategic document and promotional materials of the Regional Tourism Organization. It should also be emphasized that the analysed data will be used by the owners of tourist entities. The experiment was designed in a way that allowed unique data to be gathered for all interested parties: entrepreneurs, tourists, NGOs and local and regional authorities.

Data from surveys conducted among owners of tourist facilities allowed for the identification of the main problems faced by entrepreneurs and their expectations towards regional and local authorities in the development of rural tourism. This is unique data that can constitute the basis for changing the policy of local government authorities in relation to the development of entrepreneurship in the field of rural tourism. Increasing the priority-level afforded to rural tourism in the development of the Świętokrzyskie village may facilitate the creation of new entities of this type and reduce negative demographic processes in the region.

Data from surveys conducted among tourists determined tourists' needs and their assessment of the tourist offer in the Świętokrzyskie region. This is also unique data that will allow for the adjustment of the tourist offer to the needs of people vacationing in the region. This is data that should be used by entrepreneurs in the process of designing and diversifying the tourist offer.





Experiment design and implementation

Strengths and successes

The results of this cycle will be implemented over a long period of time; currently, it is not possible to assess the effects of implementation, as these are still to occur.

The following strengths can be identified in the design of the experiment:

- good cooperation between the main stakeholders (numerous working meetings);
- high competence of the Regional Tourism Organization;
- good recognition of tourist entities and optimal selection of the entities studied;
- collecting unique data that can be used in a practical way by authorities and entrepreneurs in other areas of country with similar natural and socio-economic conditions, as well as similar development problems.

Scope for improvement

At the outset, it should be clearly emphasized that the results of the experiment will be implemented during the preparation of the strategic document and information materials for rural tourism entities.

The following should be considered as potential improvements to the experiment:

- reducing the spatial scale - from a region to a commune or even a set of a specific type of tourism entities, which can provide better cognitive results;
- a larger number of contractors should be involved in the study; numerous and frequent field trips consumed a lot of time;
- ways of activating the owners of tourism entities who do not express interest in the implemented project should be considered;
- preliminary work should consist of reaching out to tourism entities individually to encourage engagement, but this requires people, time and resources.

Skill development and capacity building

Skills developed

The competences of the Living Lab team members in the field of research methodology are high, therefore it is difficult to indicate new or developed skills during Cycle 2. Survey research and coding of their results, coding of data from the websites of agritourism farms, and in-depth interviews were carried out according to standard assumptions. However, combining the scientific knowledge of representatives of the Jan Kochanowski University and practitioners from the Regional Tourism Organization allowed the development of an interesting form of survey providing important knowledge for both interested groups of contractors. A novel aspect for both organisations was the recognition of good practices in model entities based on multimedia presentations combined with study visits. During the LL meeting, an interesting study modelled on the study carried out in Millstadt (RUSTIK meeting) was also proposed.





Figure 58 Board with the idea of a study on challenges in the development of rural tourism carried out among the participants of the LL meeting

Capacities

The aforementioned scientific knowledge of the representatives of Jan Kochanowski University, combined with the knowledge and experience of practitioners from the Regional Tourism Organisation, enables a broader interpretation of the results of social research. It may also be worth considering the interpretation of the data developed by the owners of tourist entities, which may provide interesting practical insights.

Following full data analysis, experiment findings will be disseminated to all stakeholders, including owners of tourist facilities, representatives of local and regional authorities, representatives of non-governmental organizations and institutions supporting tourism in rural areas of the Świętokrzyskie region. Several conclusions and observations were drawn from the LL meetings:

1. Entrepreneurs noticed the usefulness of collecting and analysing data on tourist traffic for optimising the activities of tourist facilities.
2. Entrepreneurs noticed the importance of cooperation and networking in the development of their tourist facilities and in the development of rural tourism.
3. Entrepreneurs emphasised the practical significance of the experiment.
4. The importance of creating a database and its professional analysis was emphasized for shaping the direction of development of rural tourism in the Świętokrzyskie region.

Pilot Region Partner's perspective on skills and capacities

In our opinion, the barrier to the development of rural tourism is the low level of substantive preparation for running tourist facilities on the part of entrepreneurs, and the lack of appropriate competences among the staff of institutions dealing with the support and development of tourism. Enthusiasm alone without the use of good practices and substantive skills is insufficient to





achieve long-term goals. Owners of tourist facilities generally do not create development plans and do not prepare business plans, and do not always manage their business in a carefully-thought-out, purposeful way. Entrepreneurs show reluctance to cooperate with each other and have a poor understanding of the needs of tourists and tourist attractions in the region. Most entrepreneurs lack knowledge in the field of online promotion.

Very often, owners of tourist facilities rely on a base of regular customers and word-of-mouth marketing and are unable to reach new customers. These are not businesspeople operating based on cost calculation, but rather craftspeople operating on the basis of the statement "it will work out somehow". Our stakeholders have learned to cooperate with each other and have realized that by joining forces they can achieve more. The atmosphere we have created has allowed them to get to know each other and exchange experiences and good practices. Many entrepreneurs and other stakeholders have declared that they will use the collected data and our analyses to build their tourism product. We are strongly convinced that the recommendations formulated as part of our experiment will be used in the development strategy of the Świętokrzyskie Voivodeship and then implemented.

Innovation and impact

Reflections on innovation

The innovative nature of the data results primarily from the fact that social research on this theme has never been conducted at this scale (region) nor provided such a wide range of information. Particular attention should be paid to the research assessing trends and processes (according to entrepreneurs) that may occur in the environment of tourist entities in the coming years. The results of surveys conducted among tourists can also be analysed according to different categories of respondents (gender, level of education, age, employment status).

The innovative method of data collection included study visits to model agritourism farms and their presentation by the owners during the LL meeting, with this data collection approach adapting the place of research to the requirements of the respondents.

Short-term impacts

The short-term effects of the experiment will be creating the right atmosphere for developing a network of cooperation and exchange of experiences between stakeholders. The short-term effect of the experiment will also be the creation of a basis for developing a rural tourism product based on reliable data.

Owners of tourist entities participating in the LL meeting listened with great attention to the critical opinions of tourists about their expectations during their stay at agritourism farms. This was evidenced by a very lively discussion. The second visible result of the data experiment is the interest of representatives of the Regional Tourism Organization and several owners of tourist entities participating in study visits in examples of good practices in model entities. It can be hoped that these examples will inspire other agritourism farms to similar actions increasing the attractiveness of their companies and their economic condition.





Longer-term impacts

Long-term effects will be related to the implementation of the Tourism Development Strategy and the use of good practices from model entities by various types of agritourism farms.

Potential for sharing learning

It is possible to apply analogous research methods and use the developed survey forms in other regions of the country or on smaller spatial scales. Within Poland, similar development problems and natural and cultural potential for tourism development are characteristic of the eastern Polish voivodeships (Lublin, Podlaskie, Warmia-Mauria and Subcarpathia). These are areas with a dominant agricultural function, low level of urbanization and low development indicators. After Poland joined the EU, they were covered by the “Eastern Poland” program, the aim of which was to reduce the development gap with other areas of Poland and the EU.





Part 4: Future steps

Cycle 3 plans

The next steps planned for 2025 will include the following activities.

1. Preparation of a report on the quantitative and qualitative research carried out and forwarding it to agritourism farms and the Regional Tourism Organization. The report will primarily contain the results of a survey conducted among the owners of agritourism farms and a survey conducted among tourists visiting rural areas of the Świętokrzyskie region. We expect that the report may constitute a starting point for development of the services offered.
2. Preparation of recommendations for the Tourism Development Strategy in the Świętokrzyskie Region, with particular emphasis on solutions towards increasing the tourist promotion of the region and the attractiveness of the services offered. The primary goal will be to generate new jobs in tourism.
3. Preparation of a short information guide on the development of new attractive tourist services and good practices in tourist entities. "Good practices" taken from model entities will be used.
4. Dissemination of research results at conferences and in scientific publications.
5. The use of data and information materials from the experiment in the work of students of the Jan Kochanowski University in Kielce.

Future collaborations

We will maintain contacts and cooperation with Living Lab stakeholders. This primarily concerns participation in the preparation of the planned strategic document and work on the Voivodeship Development Strategy, which should be developed in 2027. Cooperation will also result from planned promotional activities of tourism in the Świętokrzyskie region managed by the Regional Tourism Organization.

Communication and dissemination

Various forms of dissemination of LL results are planned. We plan to organize a scientific seminar at the Institute of Geography and Environmental Sciences of the UJK and disseminate the results at national and international conferences (International Geographical Union Congress, EUROGEO Conference). We plan to prepare scientific articles on the tourist potential of the Świętokrzyskie region and the development of new forms of rural tourism. As part of the master's seminar, it is planned to prepare master's theses using data obtained as part of the experiment carried out in the RUSTIK project.





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Serbia: Zaječar District

Natalija Bogdanov and Saša Todorović





Summary and overview

The Zaječar district is characterized by substantial geographical and economic diversity. It encompasses four municipalities with 97,000 people, each with distinct economic structures and dynamics, yet sharing commonalities when compared to the national average such as lower wages, a lower number of employees per 1,000 inhabitants, and higher rates of population aging. The Zaječar district boasts a wealth of natural resources and cultural sites, providing a robust foundation for the development of diverse forms of tourism, including spa tourism, rural tourism, and ski tourism.

Data experiment

The Living Lab in the Zaječar district is dedicated to improving economic outcomes in the region by promoting short food supply chains that connect local farmers with the rapidly growing demand for food in the tourism sector. This initiative addresses the current challenge that tourism centres are highly dependent on food sourced from outside the region, as local producers are underrepresented in meeting the needs of this important market segment.

The Living Lab's approach is to close this gap by collecting comprehensive data and insights from farmers, food producers and tourism operators. Using these insights, the Lab will support evidence-based decision-making and policy formulation to promote more effective supply chain coordination. This work also includes the identification and mapping of stakeholders, supply streams and potential barriers, demonstrating how the local supply chain can be strengthened.

Preliminary results

As part of the Data Experiment, extensive data collection took place during June and July 2024 by the research team. Besides web scraping, it included also field research in the municipalities of Sokobanja and Boljevac. During the experiment, 77 surveys were completed using the Maptionnaire platform. This led to a mapping of 240 supply chain actors and 300 connections, offering a detailed view of the flow of goods and spatial linkages in the local supply chain.

The survey revealed key preliminary findings: hotels and restaurants rely less on direct sourcing from local farms, preferring larger suppliers; most restaurants are supplied by wholesalers outside the region; institutional barriers, including restrictive food trade regulations, hinder collaboration between local producers and other stakeholders; local governments and tourism organisations are seen as essential actors in overcoming these barriers, while civil society groups are not viewed as central to driving change.

These findings emphasise the need for targeted policies to promote local sourcing and strengthen short food supply chains.

Key learning to date

Overall, the methodology has proven successful and minor issues have been addressed promptly. The data experiment has made considerable progress, provided actionable insights and confirmed strong ties with key elements of the theory of change that are relevant to stakeholders. However, the next phase will be to conduct focus groups and interviews with retailers, intermediaries and institutional representatives. This step aims to deepen the understanding of supply chain operations from different perspectives.





The key insights from the data experiment reveal several critical areas where process and methodology need to be improved. The research team, working with limited resources, faced challenges due to the complexity of the study, which required specialised skills such as GIS analysis, web scraping, and Social Network Analysis (SNA). Outsourcing the fieldwork involved additional coordination and administration, especially with tight time constraints. The use of the Maptionnaire platform, while suitable for mapping supply chains, proved too complex for the intended respondents and required trained interviewers, which slowed down data collection. As a solution, paper questionnaires were used, improving response rates and underlining the importance of flexible data collection tools in improving participation. In addition, willingness to participate in the survey was hampered by scepticism and concerns about data privacy, which affected responses.

Next steps

The research findings will be compiled and undergo statistical analysis. In addition to the descriptive statistics for the survey results, a SNA will be employed to examine all dimensions of the relationships between actors in the food supply chain. This dual approach will provide both a quantitative overview and a nuanced understanding of the network dynamics between actors.

To refine policy recommendations, the Living Lab will conduct targeted interviews and focus groups with local entrepreneurs and traders in the next phase to gather insights on enhancing short food supply chains and promoting local collaboration. Workshops will then share findings with stakeholders, fostering engagement and feedback.

To sustain project outcomes, the Lab will build on partnerships with the Local Action Group, a new business hub, and national stakeholders, supporting the formation of robust business networks while promoting the methodology and approach developed during this experiment.

A multi-level communication strategy will extend the reach of these results, engaging the Living Lab, national stakeholders, other regions, and the academic community.





Part 1: Living Lab context

Pilot Region introduction

Zaječar district (NUTS 3) is located in the eastern part of the Republic of Serbia, along the border with the Republic of Bulgaria. Most of Zaječar district territory is relatively remote from the major cities in the region and the main transportation corridors. Of the total of four municipalities in the territory of the district, two belong to the category of town and suburban areas, while Sokobanja and Boljevac are rural municipalities accounting for 24.2% of the total population and 37.3% of the territory.

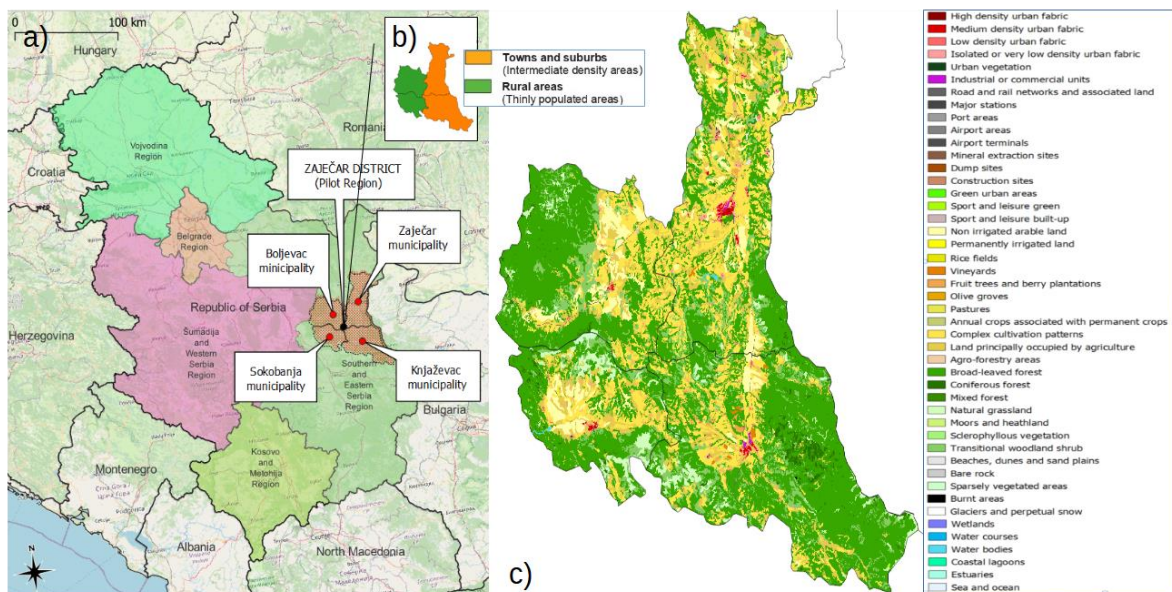


Figure 59 Map 1 - Map of the Zaječar district (Pilot Region) and (a) its position in the broader regional/national context, (b) degree of urbanisation for local administrative units (LAU) and (c) land use classes

Source: Deliverable 3.1. First Living Lab Report. Edited by: GOODWIN-HAWKINS, B. (CCRI), DWYER, J. (CCRI). 2023. RUSTIK¹⁵.

The Zaječar district is abundant in natural resources, including thermal springs, mines, mineral deposits, and forests. The area under nature parks, nature reserves and outstanding natural landscape is more than 54,000 hectares. Additionally, it boasts significant cultural heritage resources, including the UNESCO-protected site Felix Romuliana. The forests (49.5%) and agriculture area (36.0%) account for the largest part of the territory.

The region is experiencing a long-term population decline accompanied with the increasing escalation of aging of population. In the period 2002-2022, the number of inhabitants decreased by -1.7% annually, which is a faster decline than in any other region in Serbia. The causes of population decline are complex and multi-dimensional, but the low and declining fertility rate is

¹⁵ <https://rustik-he.eu/deliverables/>





one of the main factors. The fertility rate in the Zaječar district (1.2) is well below the level required for a stable natural replacement. Given the increasing aging index (from 23.5% in 2002 to 28.9% in 2021) and negative net migration rate (-0.7), the number of deaths is likely to continue to exceed the number of births, limiting population growth in the foreseeable future.

Functions

The detailed description of all functions in Zaječar District is elaborated in the first Living Lab (LL) report, which provides a detailed argument for choosing the consumption function and socio-economic transition as most important. The economy of the Zaječar district is primarily driven by the primary sector and related industries, albeit there are differences between the municipalities. The majority of companies operate in lower value-added sectors, indicating the prevalence of low-quality, often unstable jobs.

The local economy relies on several economic sectors (processing industry, agriculture, mining, forestry, and metalworking industry), with the exception of Sokobanja, which is a nationally important tourist destination.

The region is characterised by small family farms, with mixed farming practices, livestock breeding, and fruit and wine cultivation being crucial. The main food processing companies are in the fruit sector (wine, brandy, juices, frozen fruit, etc.), honey and bee products, and medicinal herbs.

Local and national strategic documents identify tourism as one of the most important pillars of the Zaječar district economy. The number of overnight stays per 1,000 inhabitants in the Zaječar district (8,931) is higher than the average for the South and East Serbia region (1,232), as is the percentage of employment in the hotel and restaurant sector (5.7% vs. 3.5%). Sokobanja is the primary contributor to the district's tourism industry. Additionally, the presence of ski resorts in Stara Planina Nature Park and Rtanj Mountain has attracted a considerable number of tourists in recent years who are highly interested for local products.

Sokobanja is one of the oldest spas in Serbia and one of the main tourist destinations in terms of overnight stays. There is a special hospital for the prevention, treatment and rehabilitation of non-specific lung diseases. In recent years significant progress has been made in upgrading accommodation facilities, enhancing technical equipment, and staff capacities, which provide a strong foundation for delivering high-quality health services.

The Rtanj Special Nature Reserve spans the municipalities of Sokobanja and Boljevac. Since 2019, Rtanj Mountain has been classified as a natural monument of the first category, a designation reserved for areas of international, national, or exceptional importance. The reserve is divided into three zones, each with varying levels of protection. This region is renowned for its diverse array of medicinal and aromatic plants, which have fostered a long-standing tradition of plant collection. This heritage is celebrated through various tourism, cultural, and herbal events that promote the region's natural and cultural richness.

Transitions

Among the challenges identified in the socio-economic transition of the Zaječar District, the integration of agriculture and tourism was chosen as the main focus for the LL. This decision was





based on findings from focus groups and surveys, which highlighted the limited presence of local and regional producers in tourism markets.

Although the tourism sector is growing, many local producers struggle to connect with this market due to a disorganised and fragmented supply chain, limiting their access to tourism-related demand. As a result, large quantities of food are sourced from other regions, limiting growth opportunities for the local agricultural sector.

Addressing these problems would help strengthen business relations in the region, empower local self-governments to create multi-sector strategies and bring greater benefits to the local community.

Living Lab partnership

The LL coordinator and research partner is the Faculty of Agriculture at the University of Belgrade (FoA), one of the leading educational and scientific institutions in the field of agriculture in the Western Balkans. Researchers at the Faculty engage in a wide range of scientific activities, including fundamental, applied, and developmental research, as well as consultancy work in the field of agricultural production, food technology, and agricultural economics. The research team participating in the RUSTIK project includes two professors with expertise in rural development, agricultural policy, and farm management.

The Pilot Region Partner is RARIS – Regional Development Agency of Eastern Serbia. Founded in 2007, RARIS emerged as a grassroots initiative by stakeholders in Eastern Serbia, reflecting a strong area-based partnership. The organisation's governance structure, the Assembly, represents a diverse cross-section of public life, encompassing government, business, academia, and civil society. RARIS has a team of professionals with knowledge in territorial development, sustainable tourism development, digital transformation, and cross-border cooperation, combined with the skills of their key personnel.

Living Lab challenge

The Zaječar District's primary challenge is its socio-economic structure and the critical need to renew its economic development strategy. To address this, the district must shift its focus toward higher-value activities by utilising its unique competitive advantages. Recognising tourism as a significant opportunity for growth, the LL has prioritised the sector's development to drive broader economic benefits for the local community, including local farmers and food industry.

The strategy includes establishing a short food supply chain that directly aligns with the expanding tourism market's needs. By developing a more integrated supply chain that matches local agricultural production with tourism demand, the district can help small-scale farmers meet the rising demand for fresh, high-quality local food. This approach aims to encourage sustainable growth in both the tourism and agricultural sectors, ultimately enabling local producers to capture a larger share of the economic value generated within the district.

Rationale and research questions

The research questions' focus on strengthening the short food supply chain in relation to the expanding tourism sector is directly tied to the region's unique economic structure, where both





tourism and agriculture play pivotal roles. The region's economy relies heavily on small family farms with mixed farming systems and fragmented land, where cattle breeding and the production of fruits, vegetables, and grapes are core activities. Despite local government support for on-farm investments in recent years, these efforts have not been complemented by equivalent advancements in processing facilities or the development of a streamlined and resilient food supply chain.

Focus groups highlighted the limited representation of local producers in meeting the food demands of tourism centres, a gap aggravated by issues such as low trust among supply chain partners, inconsistent business relationships, and limited collaboration. Additionally, there are knowledge gaps regarding the dynamics of food procurement for restaurants and tourism providers, as well as the degree to which local producers benefit from tourism-related food demand.

These findings form the basis of three key research questions, each targeting a specific objective of policy experiment:

1. Is there a local food supply chain in place in the tourism sector? Who are the main actors involved, and in which sectors (or product groups) do they participate? How significant is their role in the local market?
2. What challenges or obstacles do these actors face in participating in or enhancing the supply chain? Who are the key stakeholders that could play a role in strengthening the local food supply chain, and what specific contributions can they make?
3. What changes are necessary to create a more inclusive food supply chain that better integrates local food producers?

Addressing these questions will help identify actionable strategies for transitioning the local food system and enhancing its compatibility with the tourism sector's demands, ultimately fostering economic resilience in the region

Policy relevance

The research question is in line with the regional development strategy (Strategy for the Development of the Urban Area of the City of Zaječar and the Municipalities of Knjaževac, Boljevac, and Sokobanja), which highlights the importance of fostering innovation, improving infrastructure, and enhancing business collaborations. Understanding the food supply chain, identifying key linkages and challenges, and involving all stakeholders in the solution are essential steps toward creating a more sustainable and efficient local food system that can meet both local needs and the rising demand for local products from the tourism industry.

In addition, the topic of short food supply chains within the framework of agricultural policy and tourism development holds considerable policy significance due to its broad impact across multiple sectors. From a tourism standpoint, leveraging short food supply chains to promote local culinary identity presents great opportunity for economic expansion and enriches the overall visitor experience. This dual relevance underscores its importance for both the agricultural and tourism sectors.





Stakeholders

The key stakeholders are four local self government units – the City of Zajecar and municipalities of Sokobanja, Boljevac and Knjazevac, tourist organizations of Zajecar, Sokobanja, Boljevac and Knjazevac municipality, LAG (Local Action Group) Rtanj, Regional chamber of commerce – Zaječar, Agricultural advisory and professional service Zaječar and Knjaževac, and tourist service providers (hotels, restaurants, households offering bed and breakfast services, etc.).

Theory of change

By choosing a research topic and a research question, the policy experiment aims to provide practical insights for the design and implementation of place-based, cross-sectoral strategies for municipalities included in the policy experiment and beyond. This will help build local partnerships, foster the creation of new employment opportunities in different sectors such as agriculture, logistics, retail and manufacturing, develop new types of tourism offerings in the region and increase its visibility on the tourism map, with local farmers having the opportunity to feel the benefits of this process. This approach will not only help local governments to make informed decisions but will also pave the way for other transitions in the region, such as the environmental and digital.

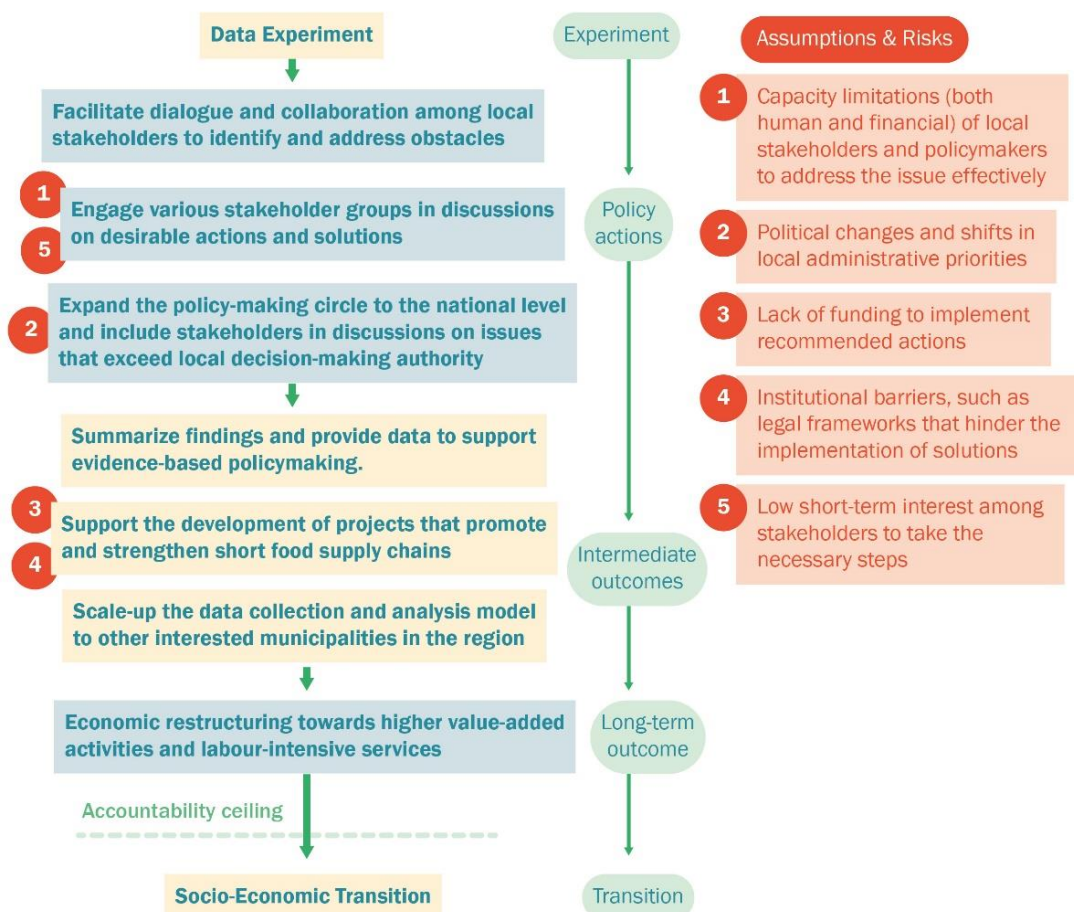


Figure 60 Theory of change model – Zaječar District





The expected intermediate outcomes focus on addressing data gaps, identifying key stakeholders and assessing their capacity and commitment to turn the results into actionable steps to integrate local actors in the food and hospitality sector. Activities will aim to strengthen the capacity of stakeholders to incorporate these findings into their agendas through expert support and policy recommendations. Key outputs of the initiative include the development of a transferable model for building a sustainable and efficient short food supply chain, building on new data sets and stakeholder analysis, and policy recommendations to guide community action and promote collaboration between various sectors of the economy. The methodology used in this experiment, results and their interpretation, are likely to be scalable and provide relevant insights and practices that institutions at different levels of government can adapt to their needs.

In the long term perspective, these changes will drive the region's economic restructuring toward higher value-added activities, fostering new partnerships and sectors, ultimately increasing the availability of better-quality jobs.

The success of the initiative relies on several key assumptions and risks:

- Capacity limitations: Local stakeholders and policymakers may face human and financial resource constraints, affecting their ability to address the issue effectively.
- Political changes: Shifts in political leadership or administrative priorities could divert attention from the initiative's objectives.
- Funding shortages: Insufficient financial resources could hinder the implementation of recommended actions.
- Institutional barriers: Existing legal frameworks and bureaucratic processes may obstruct the adoption of proposed solutions.
- Stakeholder engagement: Low short-term interest from stakeholders may delay or prevent the necessary steps from being taken.

Data relevance

To better understand local food supply chains and their capacity to meet tourism demand in the pilot region, while identifying gaps, risks, and opportunities for collaboration with small businesses, various datasets on the local food system and its actors are needed. Although agricultural statistics provide extensive data on farm holdings, there is little information available on the market flows of agricultural products and farmers' access to markets. Similarly, official tourism statistics focus on only a few indicators, such as the number of guests and overnight stays, without capturing the broader economic interactions within the sector. Moreover, stakeholders and municipal administrations often lack internal databases, or if such databases exist, they are either not accessible in the proper format or are not regularly updated, making them ineffective for informed decision-making by both policymakers and businesses.

To fill this gap, extensive desk research and surveys were conducted with food producers and tourism service providers from the region. The research method used enabled an in-depth investigation of the links between actors in the supply chain, which led to the collection of important new data and insights.





Part 2: Living Lab Cycle 2: Data experiments

Data experiment

Developing the data experiment

Focus groups with stakeholders conducted in May 2023 provided valuable insights into the pressing challenges facing rural areas in the pilot region. Key issues include population decline, inadequate infrastructure and environmental degradation. Challenges related to agriculture were particularly highlighted, with a focus on the fragmented and unstable market that disproportionately affects smallholder farmers. In contrast, the tourism sector was seen as having strong economic growth potential. Participants emphasized the importance of exploring synergies between agriculture and tourism and agreed on the need for strategies to better integrate these sectors. This integration would aim to increase the capacity of local food production to meet the increasing demand from tourists.

To substantiate these findings, which were obtained from a limited number of focus group participants, a follow-up survey was conducted with a broader range of stakeholders (representatives from the public sector, tourism and agriculture, as well as participants from CSOs and the business sector). The research question was proposed by the research team and agreed through online consultations with PRPs and local stakeholders to ensure relevance and alignment with their needs and expectations.

From April 17 to 19, a meeting between Serbian and Bulgarian LLs (Local Action Group Trojan, Aprilci and Ugarčin as well as Zaječar district) took place in Sokobanja to exchange knowledge and approaches to conducting data experiments.

The research process included the following steps:

- Secondary data collection - A comprehensive literature review and data set selection process was conducted to identify specific data needs for the policy experiment. All available secondary data related to hospitality and tourism sector, including internal databases provided by LL stakeholders, were collected and analysed as part of the baseline analysis. This approach ensured a thorough understanding of existing resources and informed the development of further data collection strategies.
- Primary data collection - The questionnaires were created and tested on a sample of restaurants owners and rural households offering B&B services. The interviewers were trained in both the questionnaire structure and the procedures for entering data into the Maptionnaire platform. This preparation ensured they were well-equipped to gather accurate responses and efficiently upload information, enhancing the overall quality and consistency of data collection.

The necessary adjustments were made before the official launch of primary data collection in the selected municipalities (Boljevac and Sokobanja). Preliminary results of the surveys indicated that the scope of the analysis needed to be expanded to include Small and Medium-sized Enterprises (SMEs) in the food processing sector, so an additional questionnaire was created.





A field survey was carried out in June and July. As part of the data experiment, a total of 40 restaurants, hotels and guesthouses providing food services, 29 local farms and 8 SMEs supplying food to these restaurants were surveyed to understand how they relate to each other and to gather suggestions for improving the supply chain.

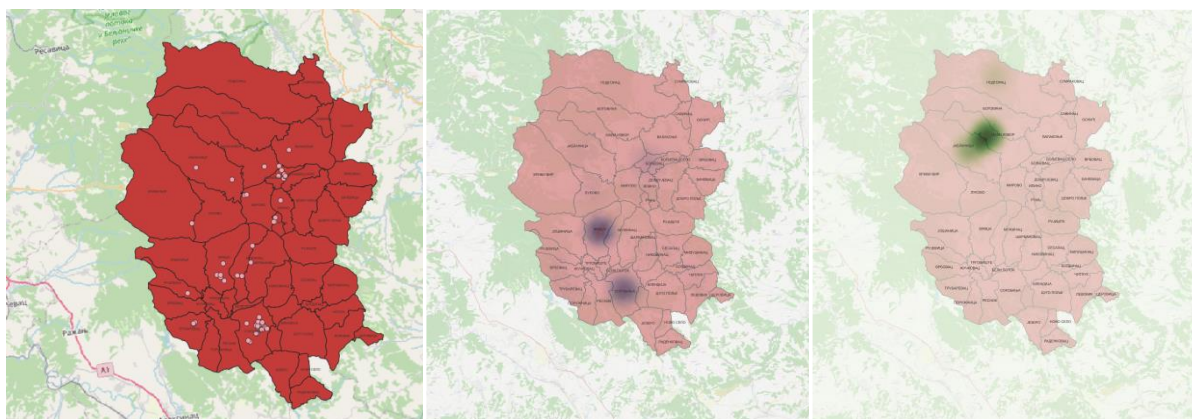
The initial results indicate that the methodology used is effective and provides good inputs to answer the research question, providing a solid basis for valid and reliable conclusions.

Experiment description

The data experiment aimed to develop a replicable tool that local authorities can use to effectively map and analyse the dynamics of the food supply chain to support more informed policy making. Designed to support policy-making, the experiment enables local governments to gather insights on supply chains across sectors to develop tailored, data-driven strategies. By examining the interconnected elements of the food supply chain (in this case particularly in tourism sector) local authorities can better understand and strengthen the region's economic network.

The experiment introduces advanced data collection and analytical methods to an area with limited existing data.

In the initial phase of the experiment, a comprehensive collection of secondary data was gathered from various sources, including the Statistical Office, the FADN (Farm Accountancy Data Network) database, and through web scraping methods. This diverse data set was then integrated and visualized using a GIS (Geographic Information System) (Figure 61). The GIS visualization allowed for spatial analysis and mapping of the agricultural and food supply chain landscape. This facilitated an understanding of existing information and resource allocation, forming a basis for subsequent phases of the experiment to address logistical and operational improvements within the local food supply network.



(a. Restaurants, hotels and rural households with B&B service)

(b. farms with OGA in tourism and related services)

(c. farms with OGA in wood processing)



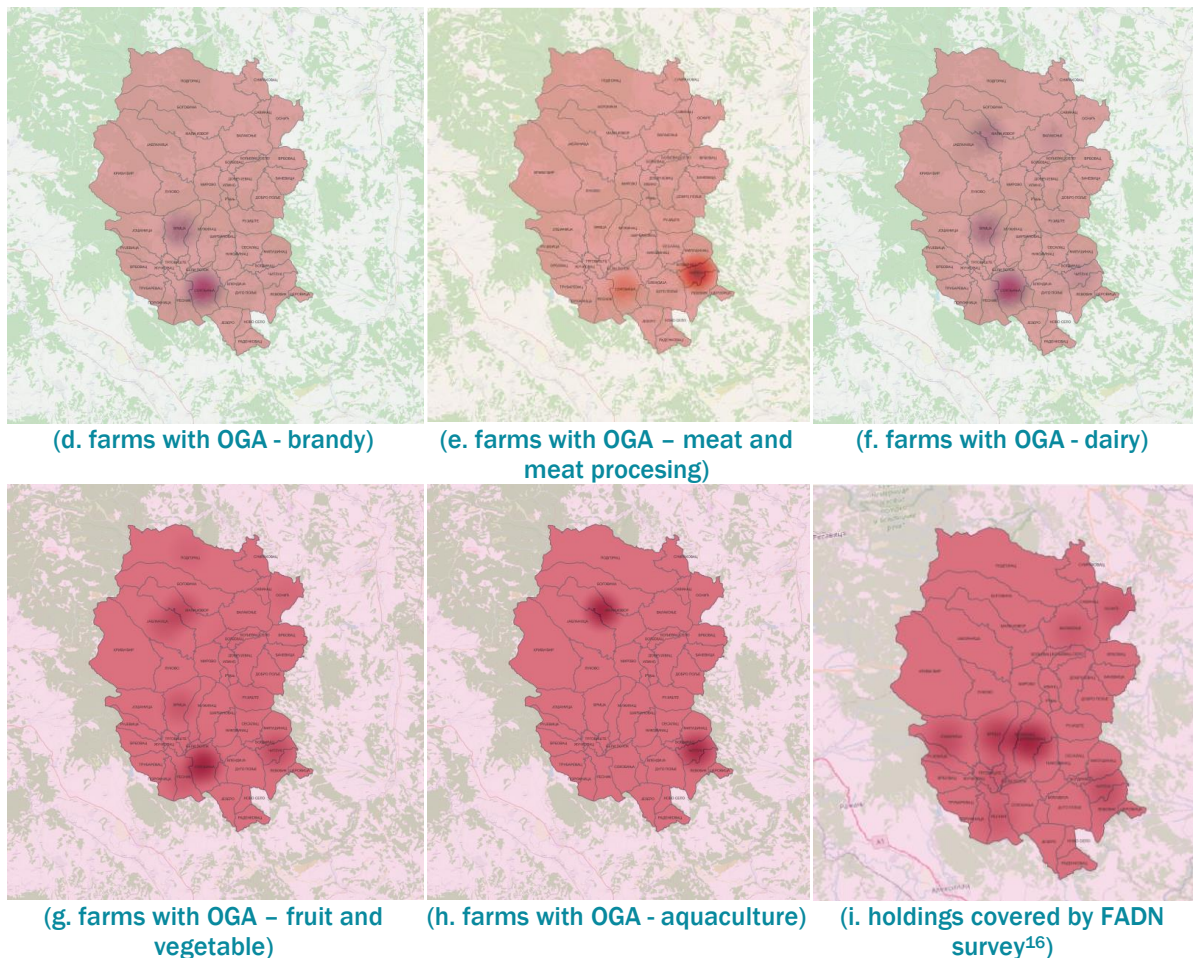


Figure 61 Map 2 - Concentration of (a.) Restaurants, hotels and rural households with B&B service, (b. – h.) commercial farms with other gainful activities (OGA¹⁷) and (i) holdings covered by FADN survey

Source: web scraping; Statistical Office of the Republic of Serbia – internal data; FADN database

For the primary data collection, three tailored questionnaires were designed and distributed to gather detailed insights into the actors, product flows, and business perspectives of three key groups: restaurant operators, including hotels, restaurants, and households offering bed and breakfast services; farmers, and SMEs (Figure 64).

The questionnaires were designed to precisely identify business relationships between actors in the food supply chain using a name generator approach (Box 2). This method enabled the mapping of food product flows and the subsequent visualisation of these connections through Social Network Analysis (Box 1), providing a clear picture of the interactions and dependencies within the network.

¹⁶ The data relates to the 2020 accounting year.

¹⁷ Commercial farms are defined as those that generate more than 50% of their total production revenue through sales.



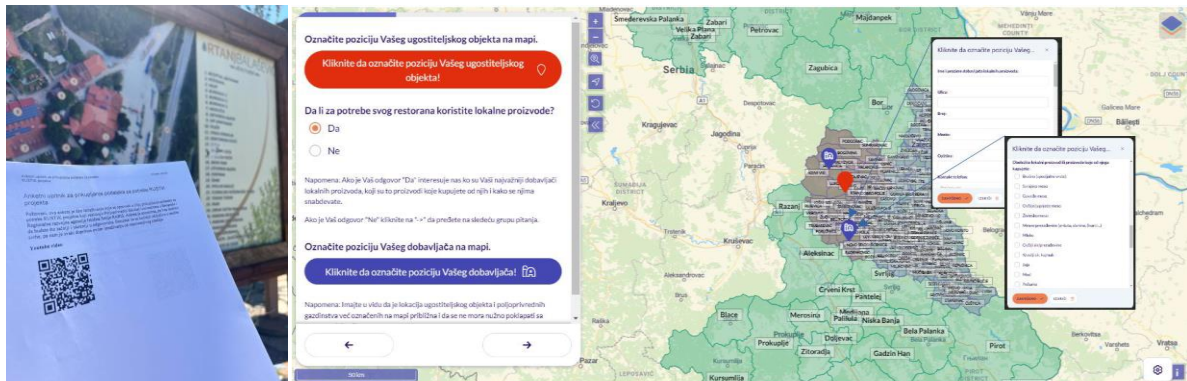


Figure 62 Screenshot of Maptionnaire window for mapping the participants in the local food supply chain.

BOX 1. Justification for the use of Social Network Analysis (SNA)

SNA is a method used to investigate social structures using network and graph theories. It characterises these structures by analysing nodes (individual actors, people or entities within the network) and the ties (relationships or interactions) that connect them. SNA can map and measure relationships and resource flows between actors, offering insights into bonding capital within a stakeholder network. It examines structural characteristics like the centrality or peripherality of specific actors and identifies emerging sub-networks that are only loosely connected to other parts of the network. SNA also highlights specific roles of actors within the network, such as boundary spanners between distinct sub-groups or between the network and external partners. SNA can explore networks in terms of actors and their relationships or interactions. For example, an SNA can be conducted on specific thematic aspects, examining thematic network plots (e.g. for identifying key players) and on overlaps between them (e.g. for identifying key connectors), and discussing them in a focus group.

Source: EU CAP Network; Evaluation Learning Portal¹⁸;

BOX 2. Name generator

A name generator is a tool used in SNA to identify and map social connections by asking participants to list individuals they interact with in a specific context or for a particular purpose. This method is valuable for collecting relationship data in personal, professional, or organizational networks.

In this policy experiment, respondents are asked to name specific individuals (e.g., farmers or SMEs) and their locations, followed by answering detailed questions about their interactions. For instance, in gathering data on farmers and SMEs supplying restaurants, a classic name generator approach was applied. Restaurant owners or managers listed their suppliers, specified the products they purchased, and evaluated their satisfaction with these relationships. This approach mirrors the methodology used in the 1998 General Social Survey (GSS), as cited by Marsden (2003), offering a structured and comprehensive way to analyse network dynamics.

In addition to the identification of short food supply chain actors, each questionnaire contained a consistent set of questions allowing for cross-group comparisons of attitudes of food chain actors

¹⁸ https://eu-cap-network.ec.europa.eu/training/evaluation-learning-portal/qualitative-approaches-social-network-analysis_en#:~:text=Social%20network%20analysis%20is%20a,complex%20interactions%20and%20overlooked%20patterns.





on drivers for cooperation, challenges and growth needs (Figure 63). Gender related questions were part of the survey. Gender-related questions were included in the survey to examine the roles and contributions of different genders within short food supply chains. These insights are crucial for developing targeted policies that address gender-specific needs and support inclusive growth in local food networks.

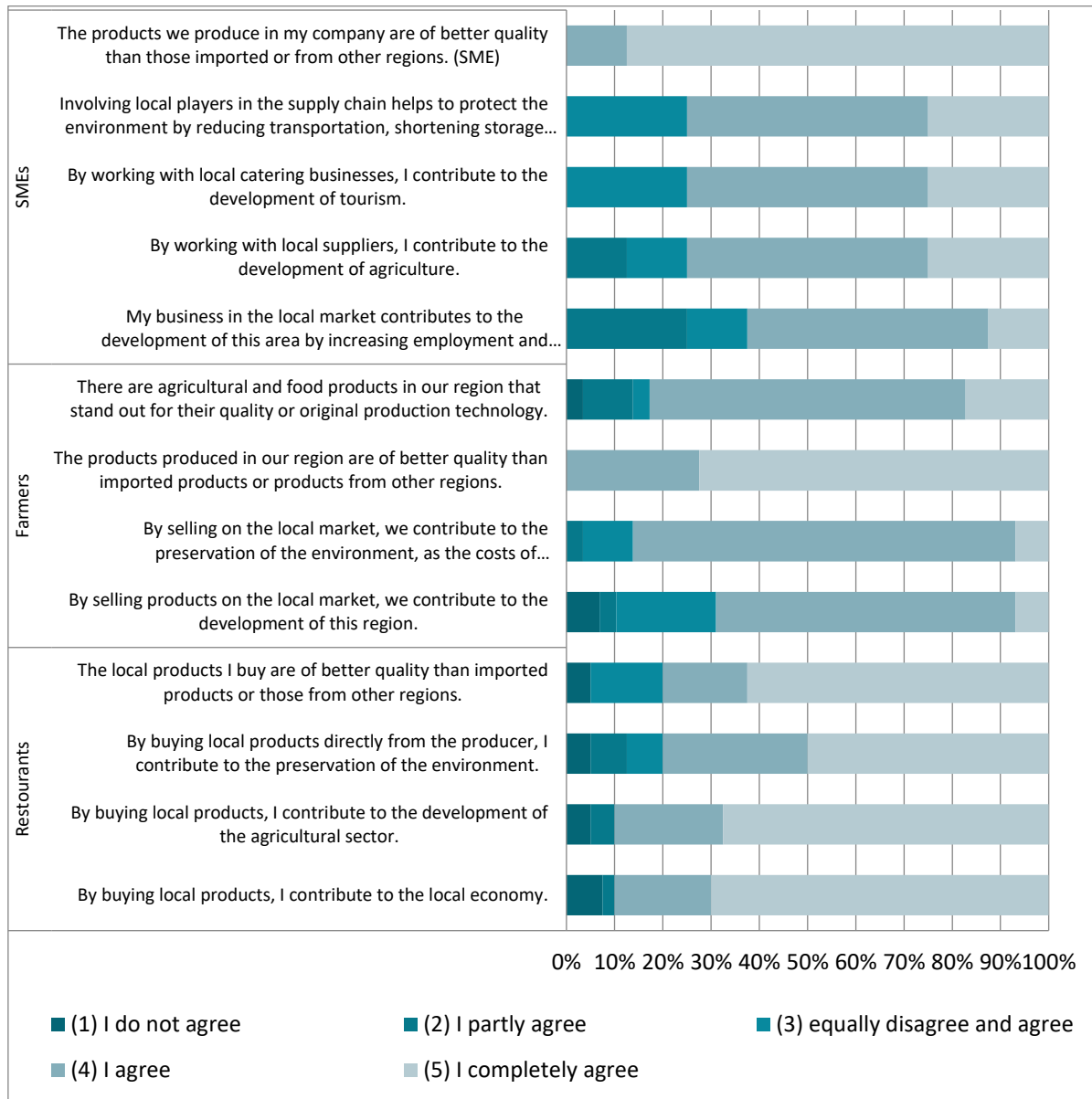


Figure 63 An example of questions from a survey with restaurant owners, SMEs and farmers

Finally, interviews with the logistics sector representatives will provide additional insights and help complete the analysis, offering a well-rounded understanding of the regional supply chain dynamics.

This structured approach enables local stakeholders to comprehensively visualise complex supply chain linkages, forming a data-driven foundation for improved decision-making and strategic





planning. With flexibility in application, this approach can extend beyond the food sector, offering a model for analysing supply chains in other industries. Furthermore, it could be enriched with new variables, such as sustainability metrics, seasonal demand patterns, or consumer feedback mechanisms. Such enhancements would provide municipalities with deeper insights across economic sectors, empowering them to make nuanced, sector-specific interventions that foster local economic growth and bolster resilience across multiple industries.

In mid-November (November 13-14th), initial findings were presented to LL stakeholders in the municipalities involved in the research. Throughout December, the PRP will conduct a series of consultative meetings with local stakeholders to address their specific needs for additional data processing and refine the format of the results.

Experiment objectives

The objective of the policy experiment is to understand the functioning of the local food supply chain in the tourism sector, to identify the main actors involved, in which sectors (or product groups) they operate and what challenges or obstacles they face.

Relationship to theory of change

Preliminary findings suggest that these localised supply chains can drive regional economic growth by fostering greater cooperation among small producers, increasing the visibility of local products, and reducing dependency on external suppliers. By prioritising connections between local producers and tourism-related businesses, these chains can improve access to market opportunities, especially for SMEs that might otherwise face challenges entering traditional retail channels.

The results also indicate potential for creating new job opportunities in areas such as logistics, marketing, and product processing—sectors that are often critical to the success of short supply chains. In the tourism and hospitality industry, the ability to offer locally sourced, high-quality products enhances the region's appeal as a destination known for authentic and sustainable experiences, potentially boosting tourist spending and seasonal demand.

On a broader scale, strengthening these connections aligns with environmental goals, as shorter supply chains reduce transportation distances, lowering carbon emissions and supporting sustainable production practices. These insights provide a roadmap for municipalities and regional authorities to create policies that reinforce local supply chains, driving both economic and environmental resilience in the area.

Data use

Data sources and methods

Several research methods were used during the policy experiment.

Initial data on actors in the hospitality sector and farmers selling certain group of products was collected through desk research, using web scraping, data from official statistics, municipal services and tourism organisations.



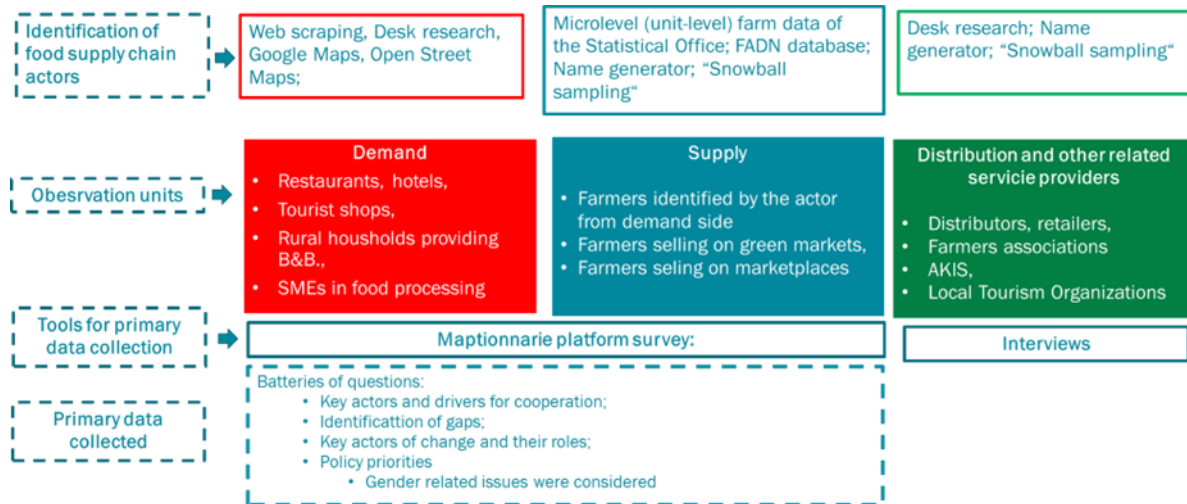


Figure 64 Data sources and data collection process

Primary data was collected through Maptionnaire surveys. As part of the survey research, a name generator was created and the snowball technique was applied to identify as far as possible the supply chain participants and how they are connected. This survey also included targeted questions on respondents' perspectives, with restaurant operators, farmers, and SMEs sharing insights on challenges and potential areas for improvement.

Table 31 Living lab data collection table

Source	Data type	Tool for data collection	Data processing method
Respondents from hospitality sector, tourist shops, households providing B&B, SMEs in food processing sector	Quantitative	Maptionnaire Survey	Social Network Analysis and descriptive statistics
Farmers			
Distribution and other related service providers	Qualitative	Interviews	

Data innovation

The research approach used in this study combines web scraping with survey data collected via the Maptionnaire platform and SNA. This innovative and complex method enables the visualisation of data in a geospatial format that provides a clear view of the connections between actors in short food supply chains. Such an approach improves the understanding of various features, such as the spatial distribution of producers and suppliers, flow of products and interdependencies within the actors of supply chain.

A key innovation of this experiment is its integrated mapping component, which facilitates spatial analysis of supply chain relationships. By using this approach, the locations of restaurants, hotels, and accommodation facilities are mapped, as well as their relation to the food supplier's location, looking by product category. This spatial representation shows how and where tourism and





hospitality businesses source food products and illustrates the strength of the links between specific actors in the local supply chain.

In the next stage, SNA was employed to identify key nodes (actors) most integrated into the local food system and pivotal to the majority of sellers and buyers. This offers critical insights into the flow of local products and the integration of supply chains across the region.

One key advantage of using SNA, as identified by the EU CAP Network, is that "thanks to the focus on the connections between actors, SNA impartially uncovers critical hidden links and weaknesses. Therefore, it enables the development of measures to improve organisational cooperation and effectiveness".¹⁹ This has been demonstrated in this experiment, confirming the broader applicability of this approach. By identifying hidden network dynamics, SNA provides actionable insights that help optimize organisational structures and supply chain relationships, proving its value across various sectors.

Web scraping has also provided new insights into weak points in public visibility and promotion of restaurants. Addressing these weaknesses could significantly improve visibility and boost their business.

Furthermore, this study fills an important research gap as it includes, for the first time, interviews with food producers (supply side) and restaurant operators (demand side) and an analysis of their interactions. This holistic approach provides both a new source of data and a more comprehensive understanding of the dynamics between production and demand in regional food supply chains.

Implementation

Implementing the experiment

The experiment was carried out in several successive steps, which are listed in the Table 2. As highlighted in the table, the activities carried out include the development and implementation of a complex research tool as well as constant communication and collaboration with local stakeholders at different stages of the research process.

Table 32 Steps and timeline of the policy experiment implementation

Date/period	Action
4. December 2023	Follow-up activity consultations with PRP on policy experiment design

¹⁹ https://eu-cap-network.ec.europa.eu/training/evaluation-learning-portal/qualitative-approaches-social-network-analysis_en#:~:text=Social%20network%20analysis%20is%20a,complex%20interactions%20and%20overlooked%20patterns





Date/period	Action
January – March 2024	Stakeholder interviews and online survey: interviews conducted with LL stakeholders and an online survey launched to assess data availability and identify needs and gaps
December 2023 – April 2024	Secondary data collection: Web Scraping and desk research; collected data processed and integrated into GIS
17-19. April 2024	LLs regional workshop organised with LL TAU Bulgaria to discuss research frameworks and possible common elements
May 2024	Secondary data collection: official data from the Statistical Office of RS processed and integrated into GIS
5. December 2023 23. January 2024 23. April 2024 23. May 2024	Attendance at four training sessions on using the Maptionnaire data collection system to ensure proficiency in the platform and improve the efficiency of data collection
March – April 2024	Survey Development: The initial versions of the questionnaires for restaurant operators and rural households offering B&B services were designed
May 2024	The questionnaire was tested to ensure clarity, relevance, and ease of understanding by respondents
4. June 2024. 1. July 2024.	A comprehensive training session for interviewers was organised, covering the survey's structure and content, as well as the use of the Maptionnaire data entry platform.
June 2024.	A field survey with restaurants operators and rural households offering B&B services was conducted by subcontracted agency in the municipalities of Sokobanja and Boljevac.
19. June 2024. 20. June 2024. 21. June 2024.	Monitoring of the survey was conducted to ensure data quality and consistency; check-ins with interviewers, reviewing the data collected for completeness and accuracy, and addressing any technical or methodological issues encountered during the survey process. A meeting with the Local Action Group (LAG) "Rtanj" to discuss progress and assess the first preliminary findings.
End of June 2024	The questionnaire was revised and adjusted based on initial feedback. Additionally, a new questionnaire was developed to include local processors identified during the process.





Date/period	Action
July 2024.	An additional round of survey research was conducted with SMEs in the agri-food sector and farmers to gather more specific insights and enhance the overall data set.
July 2024	Verification and calibration of the survey results were conducted to ensure accuracy and reliability.
August 2024.	Preliminary results were discussed with the Pilot Region Partner to gather feedback, refine findings, and ensure alignment with local context and stakeholder expectations.
September – October 2024.	The data was processed, and Social Network Analysis was conducted; the results were internally discussed to identify key insights and inform the next steps in the project.
November 2024.	The results were presented to stakeholders of the Living Lab in Boljevac and Sokobanja, fostering dialogue and feedback to enhance the relevance and applicability of the findings within the local context.

Adaptations

The research methodology was adjusted after the questionnaire testing phase, as it became apparent that SMEs and cooperatives needed to be included in the survey. This decision was based on the findings that SMEs and cooperatives, which were initially under-represented in the desk research, emerged as frequent suppliers to a larger number of restaurants and hotels than expected.

Preliminary findings have also highlighted the central role of wholesalers and intermediaries in the food supply chain, leading to a planned additional round of interviews to gain insights from this group. These adjustments aim to capture a more complete picture of the supply chain and take into account the different actors and dynamics that shape local supply networks.

Other Living Lab activities and achievements

A series of in-depth discussions with these stakeholders to identify the most critical segments of the food supply chain from their viewpoint was conducted by the PRP. To understand the role of municipal administrations, the PRP investigated what data they monitor regarding local tourism and food sectors. During this phase, 17 stakeholders interviewed in detail and an additional 28 surveyed to gather a wide range of insights.

Over the past year, the PRP maintained continuous communication with LL stakeholders throughout various phases, including the preparation for field research, the execution of the research itself, and the organisation of meetings to present the findings.

In addition, the PRP produced and disseminated a newsletter to inform stakeholders about the progress of the policy experiment, sharing the results and key insights with them.





Preliminary results

Results to date

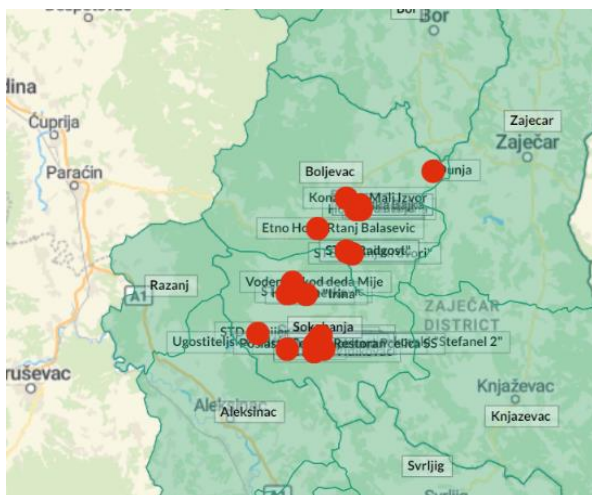
As part of the project, a large amount of data on the structure of farms, in particular farms specialising in certain types of production, farms with other gainful activities and market-oriented farms, was collected and mapped at the micro level. This dataset provides a clear insight into the potential of local agriculture to meet tourism demand and creates a clearer profile of the target group of potential beneficiaries of local agricultural support.

Secondary data collected and mapped included:

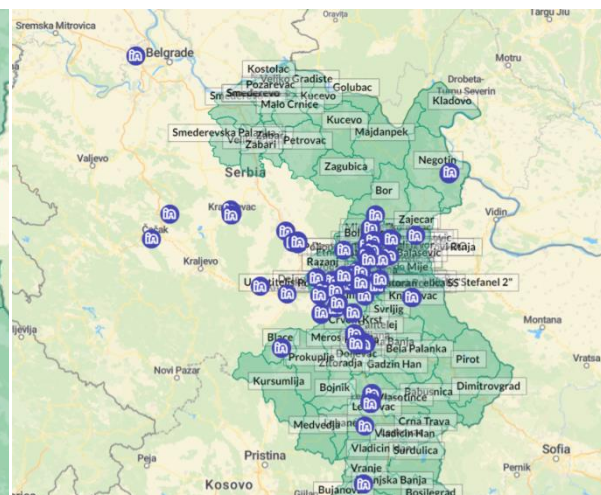
- Open Street Maps: 21 restaurants (13.12.2023) and 2 marketplaces (27.03.2024)
- Google Maps: 64 restaurants (24.03.2024)
- Categorised accommodation establishments (hotels): 5 hotels (01/01/2024)
- Accommodation facilities accepting vouchers: 33 rural households (26.01.2024)
- Farms selling online: 184 farms (11.04.2024)
- SMEs in food-businesses: 16 (11.04.2024)
- Micro level (unit-level) farm data of the Statistical Office: 4,666 farms (of which 1,962 farms sell more than 50% of production)
- FADN database: 29 farms (2014-2020)

Primary data collection:

- 77 questionnaires completed
- 240 actors (nodes) were identified and mapped
- 300 connections between actors were identified and mapped

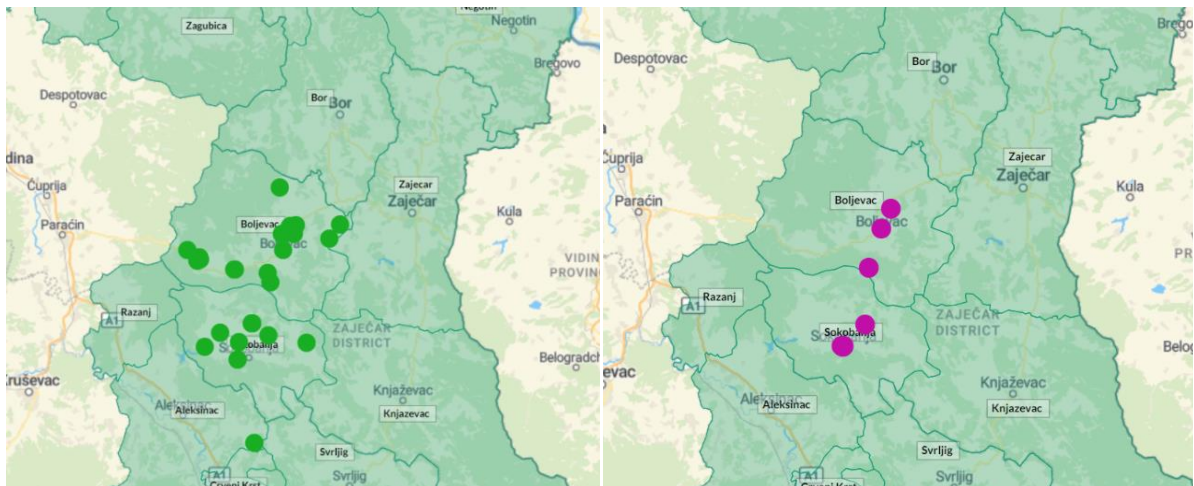


40 restaurants, hotels and B&B establishments offering food services were identified and mapped



142 food service providers were identified and mapped (95 "unique cases")





(only) 29 local farms that supply food to restaurants, 8 food processing SMEs that cooperate with tourist hotels and B&Bs are identified and mapped

Figure 65 Map 3 – Identified and mapped actors in the tourism food supply chain

These responses led to the creation of a name generator, which mapped 240 actors (nodes) and identified 300 connections (edges) between them. This mapping offers a comprehensive view of goods flow within the supply chain and a detailed picture of spatial relationships between supply and demand sides of short food supply chain (Figure 66)²⁰.

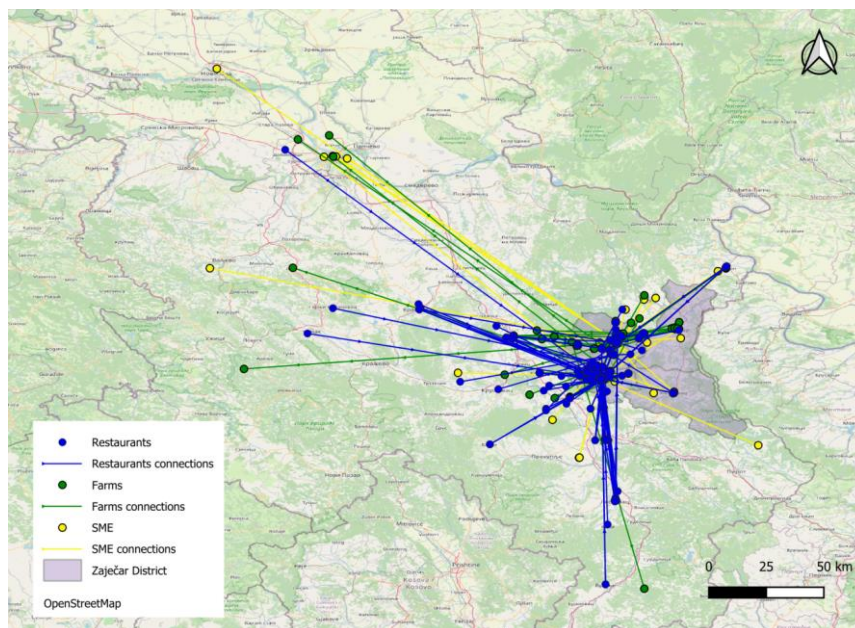


Figure 66 Map 4 - Identified and mapped actors, connections and connectors in the food supply chain in tourism sector

²⁰ The SNA graphs, which will represent “communities” (sub-networks among short food supply chain actors) and their linkages categorised by product groups, are planned to be developed in a later phase of the experiment.





The survey analysis revealed several preliminary conclusions across different dimensions:

- Local restaurant owners are not sufficiently committed to promoting local products, despite most believing in their superior quality compared to products from other regions. They often overlook emphasising the origin or unique qualities of local products in their menus, missing a valuable opportunity for differentiation.
- A small number of respondents were able to name a local product or dish they consider to be of special quality, predominantly mentioning national cuisine rather than specific local dishes. Even those who identified particular products or dishes were often unaware of the unique quality features or characteristics that set them apart, highlighting a gap in knowledge and promotion strategies. Strengthening awareness and marketing around local products could enhance their appeal and support local producers.
- Hotels and restaurants source considerably less produce directly from local farms, favouring larger suppliers instead.
- The majority of restaurants obtain supplies from wholesalers based outside the region.
- Most business relationships between local restaurant operators and farms are with those specializing in niche products such as fish, mushrooms, honey, eggs, and early vegetables. Conversely, farms focused on producing meat, meat products, and dairy tend to collaborate less frequently with local restaurant operators.
- Institutional barriers were also identified, with the current legal framework for marketing of undifferentiated or unbranded farm products presenting obstacles to collaboration between local producers and restaurant operators.
- Local and regional governments, as well as tourism organisations, were identified as primary actors in addressing these challenges, whereas the civil society sector and local NGOs was not seen as central to driving change.

These findings underscore the need for targeted policy interventions to encourage local sourcing and support short food supply chains. In addition, these conclusions highlight the need for stronger multi-stakeholder cooperation and the empowerment of key actors to assume new roles and adjust their agendas and activities. By fostering closer collaboration and encouraging stakeholders to innovate and diversify their responsibilities, the local food supply chain can become more resilient, adaptive, and better aligned with local needs.

Data relevance

The data collected, the methods used to collect it and the comparisons with data from various databases created during experiment, provide valuable insights for both decision makers and supply chain participants, including restaurant operators, suppliers and logistics teams.

- The data from the agricultural census, presented at unit level, provides detailed indicators of characteristics of commercial farms. This level of detail is crucial for planning business networks, market infrastructure and services to strengthen the competitiveness and sustainability of these farms.
- The survey data, spatially visualised and represented using SNA, improves the understanding of product flows within the short food supply chain, from suppliers to restaurant operators. This visualisation can also highlight environmental and other benefits, such as reduced transport costs, lower emissions etc. In addition, the knowledge gained from using this approach can support the creation of new tourism products – such as culinary tours – thereby expanding the region’s tourism offer.





Local policy relevance

The data gathered aligns with the goals set out in the draft Strategy for the Development of the Urban Area of Zaječar City and the Municipalities of Knjaževac, Boljevac, and Sokobanja. This strategy emphasises enhancing business infrastructure, fostering innovation, promoting business collaboration, and expanding value chains. By offering an in-depth look into the food supply chain, including the strength of connections between stakeholders and identification of key challenges, policymakers are better equipped to develop support measures and activities that contribute to a sustainable and competitive local food system.

Based on the results obtained, local authorities can plan and manage the following initiatives more efficiently:

- **Networking:** local authorities can facilitate stronger communication and collaboration between key participants in the supply chain to support the formation of robust local business networks.
- **Targeted interventions:** using insights from the research, municipalities can develop programs that address the specific needs of local food producers and the tourism sector and focus on common challenges such as promotion, skills development and overcoming institutional barriers.
- **Financial incentives:** municipalities can evaluate existing financial incentives, such as rural development programs and subsidies, to better target the support to local farmers and processors participating in short supply chains.
- **Standardisation and certification:** municipalities or tourism organisations can encourage standardised production practices and certification efforts to improve the quality of local products available on the market, thereby increasing both trust and demand for these products.

This structured approach allows for more precise planning and resource allocation and strengthens the economic and social fabric of the region.

Robustness and limitations

The preliminary results indicate that the methodological framework is soundly aligned with the research question and the objectives of the experiment.

The methodological limitation, which was recognised right at the beginning of the experiment, is that the Maptionnaire platform could be too complex for the target respondents (farmers and managers of hotels and restaurants). Therefore, certain groups of respondents – such as green market vendors – were excluded from the survey. This adjustment is not expected to significantly affect the overall results, as these vendors represent a relatively small segment of food supply chain actors and were not identified as key players by the primary respondents (i.e. restaurant operators).





Part 3: Reflections and learning

Reflections on data sources, methods, and tools

Data issues and obstacles during the experiment

The data experiment faced several key challenges:

- Complex methodology and insufficient staff capacity: the research team lacked qualified personnel for this kind of survey to handle the data collection and logistical aspects of the field work. The research approach required the coordination of various tools and techniques, such as web scraping, GIS data analysis and SNA, in addition to face-to-face and online surveys. These methods demanded specialised expertise and careful coordination. Given the limited timeframe for the field research, it was a challenge to manage this complexity efficiently²¹.
- Time pressure and subcontracting: Commissioning a third party to conduct fieldwork presented logistical and administrative hurdles. Time pressures exacerbated these issues as subcontracting required additional coordination, which affected the pace of data collection and increased the administrative tasks of the team.
- Use of the Maptionnaire platform: From the beginning of the experiment, it was planned that respondents would receive help in completing the online questionnaire due to its complexity (mapping the location of suppliers). However, it turned out that this help must be provided by a trained and competent person who is well versed in the agri-food system, which slowed down the whole process.
- Distrust and lack of cooperation from respondents: It proved difficult to get the cooperation of local respondents. Many potential participants were reluctant or refused to cooperate, possibly due to privacy concerns, scepticism about research initiatives, or fear of disclosing business practices. This reluctance limited the number of complete responses and reduced representativeness (number of completed surveys).

²¹ This problem encountered by the team is consistent with the observations of the EU CAP Network, which states that SNA "is a complex and labour-intensive method requiring high-quality data and specialised skills. Gathering complete and accurate data for SNA can be difficult." https://eu-cap-network.ec.europa.eu/training/evaluation-learning-portal/qualitative-approaches-social-network-analysis_en#:~:text=Social%20network%20analysis%20is%20a,complex%20interactions%20and%20overlooked%20patterns





Managing data issues and obstacles

The problems described above are reflected in the delay to the planned dynamics of the project activities, which primarily relate to the presentation of results to stakeholders.

As for the problems related to the survey process, they were overcome by using a paper version of the questionnaire and then entering the answers into the Maptionnaire platform.

Pilot Region Partner's perspective on data

RARIS, as the pilot region partner, has improved its knowledge through the gathered data, combined with opinions and views on the importance of short supply chain from the representatives of the municipalities and tourist organizations of Sokobanja and Boljevac.

Having in mind guided research and all accompanying activities, RARIS' point of view is that data is necessary for the improvement of decision-making processes. Research showed that the data can improve understanding of the problem and provide ground for more adequate solutions, plans and interventions. The data obtained through the research also may be used to develop specific projects that support short supply chains. Based on the collected data, regional stakeholders (municipalities, tourist organisations etc.) can highlight their commitment to short supply chains in marketing and promotional materials. They can serve for promotion of local products through marketing campaigns, themed markets and events that connect tourists with local producers.

Experiment design and implementation

The data experiment has made considerable progress, with the results showing clear causality in the theory of change and providing actionable insights for the relevant stakeholders. However, a further phase is planned in which the views of retailers, intermediaries and institutional representatives will be captured through focus groups or semi-structured interviews. This additional phase will provide a more comprehensive understanding of logistics support and supply chain dynamics from various viewpoints.

Strengths and successes

The methodology proved to be sound, with minor limitations that were efficiently addressed. The data and insights gathered provide a solid basis for relevant conclusions. Important support came from the Statistical Office, which provided extensive farm-level data on request, significantly enhancing the depth of the analysis. In addition, LAG "Rtanj" helped to streamline the data collection process through its active involvement. The presence of the research team on site during the subcontracted survey was a further benefit, allowing full control over data quality and ensuring accurate, comprehensive information.

Scope for improvement

Communication with stakeholders has been identified as an area for enhancement, as engagement was relatively limited during the initial phase. A stronger, more continuous dialogue would likely enrich the experiment's outcomes and foster ongoing support for the findings. The upcoming results presentation, scheduled for late November, is expected to catalyse a deeper level of engagement, laying a foundation for more intensive collaboration moving forward.





Skill development and capacity building

Skills developed

Conducting the policy experiment required considerable expertise in defining the research framework, a solid understanding of the institutional and policy landscape, and the ability to operationalise these elements in the local development context. It also required skills in using innovative software for data collection, processing and visualisation. The research team utilised their internal resources to conduct the study, gaining valuable experience and improving their skills in using these advanced systems throughout the process.

Capacities

The primary capacity targeted for improvement by the data experiment is enabling local governments and other stakeholders to make informed policies and business decisions grounded in data. Since the results of the experiment have not yet been shared with the LL it is too early to evaluate the extent of progress in this area. However, by equipping stakeholders with actionable insights, the experiment aims to build a foundation for data-driven decision-making that will strengthen policy effectiveness and promote sustainable growth.

Pilot Region Partner's perspective on skills and capacities

Improvement of skills and capacities gained through the process can be summarised in three main areas:

- Data collection and analysis – RARIS has acquired experience in field research, including designing and conducting interviews with various stakeholders, from tourist service providers to agricultural and SME participants in the agri-food sector and in interpreting large datasets for practical application in local supply chain optimisation. This also includes usage of Maptionnaire tool, web scraping techniques to supplement field data, improving data comprehensiveness and validation.
- Cross-functional coordination - Through collaboration with FOA (LL Coordinator) and Bulgarian LL and Coordinator, RARIS has gained skills in international and cross-functional teamwork, valuable for managing and integrating diverse perspectives.
- Supply chain understanding - Insight into local supply chains, specifically identifying the challenges of connecting local food producers with tourism-related services, including the logistical and market-related barriers.

Each of these skills showcases RARIS' growing capacity in data-driven project management and applied research.

Innovation and impact

Reflections on innovation

The innovative aspects of this policy experiment lie both in the design of the instrument and in the chosen topic. The experiment introduced an interactive data collection and visualisation platform to study local food supply chains and their links to the tourism sector, offering a new





approach to regional development studies. This methodology can be transferred to other regions and sectors, in particular by integrating new layers of data, such as on environmental impacts, competitiveness and infrastructure requirements indicators.

By improving our understanding of these linkages, the tool also has the potential to become part of a broader decision-making toolkit for regional economic development.

Short-term impacts

The experiment has already attracted the interest of local restaurant operators involved in the research, many of whom have expressed a need for more information on integrating with local suppliers and understanding market demand. This suggests that there is increasing awareness and openness within the sector to strengthening local food supply chains.

Informal discussions with donors working in local development have also shown that there is interest in the project outcomes, suggesting potential for future cooperation with RUSTIK. The reaction of local authorities and other stakeholders to the results and their willingness to act will become apparent after the official presentation of the results.

Longer-term impacts

To achieve lasting impact, it is important that policy makers and stakeholders use new data and tools to support policies, education programs, business network initiatives and institutional reforms. Although the PRP can play a role in promoting these tools and encouraging stakeholders to adopt data-driven practices, its influence is ultimately limited. It is more likely that the dissemination of project results will attract the attention of national stakeholders – such as associations, donor organisations and municipalities modernising their administrative structures – which could lead to a wider adoption of these innovative tools across all regions.

Potential for sharing learning

The policy experiment on short food supply chains in the hospitality sector has significant potential to inspire other regions, municipalities, associations and donor organisations interested in similar initiatives in the context of local development. Even if other regions do not fully adopt the tool, they can still learn from the approach, insights and lessons learned to overcome the challenges that the experiment offers.

Furthermore, the research results, together with the identified limitations, challenges and experiences, represent an important contribution to the scientific community with which they are also shared. To our knowledge, SNA has not yet been used in research on supply chains in Serbia, and thus not in the context of the topic addressed by this policy experiment.





Part 4: Future steps

Cycle 3 plans

In the upcoming cycle, the Zaječar District LL will advance the policy experiment by conducting a series of targeted interviews and focus groups. This phase will engage a broader range of stakeholders, including local entrepreneurs, traders and industry representatives, to capture their perspectives on improving short food supply chains and assess their experiences of working with local producers and vendors.

The research findings will be compiled and subjected to a comprehensive statistical analysis. This includes descriptive statistics that summarise the survey data and show the most important patterns across the responses. In addition, a SNA will be conducted to explore the complex relationships within the food supply chain. The SNA will allow us to examine the strength, frequency and nature of interactions between producers (farmers, SMEs), suppliers and hospitality sector, and uncover the key influencing factors, key nodes and potential bottlenecks in the network.

The insights gained from these sessions will provide valuable input into refining the final recommendations for policy makers and local authorities to improve the resilience of supply chains and respond to community needs.

In addition, a series of workshops is planned to promote and disseminate the results, as described in chapter Communication and dissemination.

Future collaborations

To sustain the project's outcomes, Zaječar District LL will strengthen and expand partnerships with stakeholders committed to advancing short food supply chains. This support will assist entities in launching new initiatives and projects within this sector, focusing particularly on collaboration with the LAG Rtanj, the newly established business centre, as well as national actors and decision-makers across various levels. This continued engagement will encourage the development of effective business networks and foster ongoing growth in the region's tourism sector, creating a supportive framework for innovative partnerships and the introduction of new tourism products.

Communication and dissemination

To maximise the impact of the results of the experiment, a multi-level communication and dissemination strategy is planned:

- Engaging the local community:
- The dialogue with LL stakeholders will continue with the aim of supporting their efforts to promote local food and strengthen short food supply chains. This collaboration will include ongoing expert support for developing local strategies and programs focused on rural development and tourism. Additionally, it will extend to other activities initiated by local





actors to enhance the sustainability and visibility of the region's food and tourism sectors and their integration.

- Reaching national stakeholders: Results will also be shared with national stakeholders, with discussions focusing on institutional challenges that may hinder the development of short food supply chains and exploring opportunities for government support, particularly from local governments.
- Academic exchange: The results will be shared with the academic and research community to contribute to the broader body of knowledge on regional supply chains and local economic development. There is a plan to publish two papers in peer-reviewed academic journals. By sharing results and method, the project will facilitate knowledge transfer and encourage replication of successful practices in other contexts.

This multi-layered communication and dissemination plan aims to raise awareness and acceptance of the project's novel approach among different target groups. By engaging local stakeholders, national policy makers and the academic community, the initiative aims to promote a common understanding of short food supply chains, encourage shared solutions and establish this innovative method as a valuable tool for community development and local economic resilience.





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Slovenia: Osrednjeslovenska regija

Ilona Rac, Matic Soklič





Summary and overview

The Osrednjeslovenska region in Slovenia, centred around the capital Ljubljana, combines a densely populated urban centre with extensive rural and peri-urban areas. Marked by socio-economic diversity, the region faces and is attempting to address a variety of challenges, including those related to food waste, social inclusion and sustainable development. The mix of urban and rural dynamics makes it an ideal setting for initiatives focused on enhancing environmental sustainability and social cohesion.

Living Lab challenge

The challenge is to address food loss and waste (FLW) in the Osrednjeslovenska region by redistributing surplus food to marginalized people. This issue is relevant to our focus on sustainable transitions, as it tackles environmental waste while enhancing social inclusion. By linking food redistribution with social support, we aim to create a model that reduces food waste, fosters community cohesion, and supports (rural) well-being.

Data experiment

Our data experiment combines quantitative data on food surpluses with qualitative social impact metrics to create a model for food redistribution. The model seeks to assess food surplus sources while measuring social benefits like well-being and inclusion. By aligning data on availability and impact, the experiment addresses the challenge of reducing food waste and supporting marginalized individuals, providing a framework for sustainable, community-centred food systems.

Preliminary results

So far, the experiment has produced a simplified data model that effectively combines food surplus data with social impact metrics. Challenges remain in real-time data collection and consistent social impact metrics, but the model has shown potential for realistically reflecting food redistribution processes in rural areas. Initial findings suggest that a more centralized data-sharing system and refined metrics would enhance the model's effectiveness and scalability.

Key learning to date

We learned that simplifying the model to focus on reliable data sources made the experiment more feasible. The integration of quantitative food data with qualitative social metrics provided valuable insights into the social impact of redistribution, particularly on well-being and inclusion. However, challenges included limited real-time data availability and the need for more granular social impact data. Areas for improvement include refining data collection methods, particularly for well-being, and establishing better data-sharing infrastructure to enhance coordination and scalability.

Next steps

The Living Lab (LL) will focus on refining the data model based on Cycle 2 findings and expanding partnerships with local stakeholders to enhance data access. Future plans mainly include testing the model in other rural areas, improving data sources and refining the model.





Part 1: Living Lab context

Pilot Region introduction

The Central Slovenian statistical region (NUTS3), centred around Ljubljana, is the most densely populated and urbanized area in Slovenia, especially in the urban zones near the Ljubljana Marshes and southeastern parts. The region includes six primary administrative units (LAU 1) – Domžale, Grosuplje, Kamnik, Ljubljana, Logatec, and Vrhnika (Statistical Office of the Republic of Slovenia - SURS, n.d.) – and consists of 25 municipalities (LAU 2). While nine settlements hold city status, most municipalities remain predominantly rural (Nared et al., 2019).

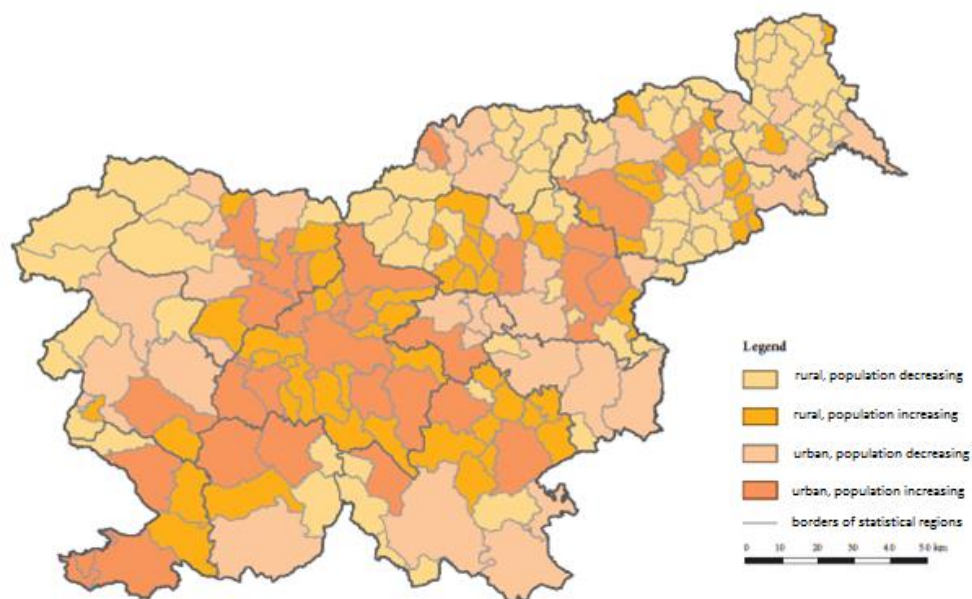


Figure 67 Classification of Slovenian municipalities in terms of rurality and population trends; Source: Nared et al., 2019.

Ljubljana serves as the capital and core of national social infrastructure, hosting major state institutions and facilities. Although some settlements beyond Ljubljana are equipped with basic administrative and service functions, others have lost essential local services (like medical centres and post offices) due to centralization, placing an added transportation burden on urban hubs (RRA LUR, 2022). While the region is economically advanced, with urbanization and a high rate of labour migration, its rural character is marked by population density variations from 37.4 to 1065.4 inhabitants per square kilometre, an average of 22,200 residents, and widespread population aging across municipalities (RRA LUR, 2022; SURS, 2022).

Natural landscapes play a significant role in the region, with extensive forests and over half the land dedicated to agriculture and forestry. Protected areas are well-represented, with 67 ecologically significant zones and nearly 27% of the region within the Natura 2000 network (RRA LUR, 2022). Although urbanization is increasing, rural municipalities retain an agricultural focus,





and the area benefits from good highway and public transport connections, enhancing accessibility across both urban and rural locales.

Functions

Production, consumption, and ecosystem functions are intertwined and dispersed across the region, which is highly diverse and characterised by disparities between different locales. As the LL partnership focused on the two issues of food loss and waste and social inclusion, this could be understood as touching upon all three groups of functions of the area.

Within the consumption function, the consumption of food (as well as energy and infrastructure) is the first and obvious element, but the LL's activities also strongly relate to the 'consumption' of social activities, through engagement and inclusion. On the production side, the LL works on preventing food loss and supplying food by redistributing it from places of excess supply to places where it can be consumed, while also stimulating social inclusion (i.e. 'producing' individual wellbeing). Finally, while reducing the environmental impact (especially greenhouse gas and waste impact) of surplus food is an important aspect of the LL's activities, the impact on ecosystem services is only indirect.

Transitions

The Slovenian LL focuses most strongly on the socio-economic and demographic transition and the climate and environmental transition. Under the first, the aim of the LL experiment is to understand how improved access to food in a specific social setting (mediated through social entrepreneurship) improves subjective perception of quality of life. Under the latter, the aim is to understand the quantities of food waste that can be prevented through innovative approaches of social entrepreneurship.

Living Lab partnership

Pilot Region Partner

Allium is a farm, social cooperative, and employment centre. It enables work and career development by employing individuals from vulnerable groups. It is a member of the Etri (e3) group, committed to raising awareness and creating a healthy and inclusive society while acting in a socially responsible way. One of its main activities in the pilot region is to stimulate awareness about the importance of food generally, as a social cohesive and as a bridge between people that can support social inclusion. They currently run a soup kitchen in the capital and a food processing unit in Rodica, a village on the outskirts.

Research partner – Living Lab Coordinator

The researchers included in RUSTIK are members of the chair of Agricultural Economics, Policy and Law of the University of Ljubljana Biotechnical faculty. They focus on the societal aspects of natural resource management and issues related to rural areas generally. With a variety of backgrounds in animal science, agronomy, biology, and related fields, they are engaged in research, teaching and consulting on agricultural and environmental policy, economics and law, as well as the bioeconomy. They employ a variety of methods, ranging from economic modelling through economic experiments to qualitative methods such as interviews and focus groups. In the Rustik LL experiment, they provide methodological support for data gathering and analysis necessary to conduct the experiment.





Living Lab challenge

The effort led by the team aims to turn the problem of FLW into a dual solution: reducing the negative environmental and social impact of FLW while improving access to quality food for marginalized populations. This approach aligns with the region's functions of production, consumption and ecosystem services by fostering sustainable use of resources, promoting local collaboration, and enhancing well-being and quality of life. This initiative seeks not only to address FLW but also to bridge social and spatial divides, linking food surpluses to needs of marginalized groups through socially conscious action and policy innovation.

Rationale and research questions

This challenge of addressing FLW in the Osrednjeslovenska region was chosen due to rising societal awareness about the importance of the issue and its environmental, but also economic and social, implications. FLW is an issue situated at the intersection of environmental sustainability and social equity. By redistributing excess food to marginalized populations, the initiative aims not only to reduce waste but also to foster social inclusion, creating a “win-win” solution that aligns with the RUSTIK project's goals, as well as the strategic priorities for a circular bioeconomy and improved quality of life.

The research questions identified for the LL work in Cycle 2 are as follows:

1. What are the costs and benefits associated with different ways of redistributing excess food?
2. How does access to food, particularly to excess food redistributed through local networks, impact subjective well-being and quality of life for recipients?
3. Can the integration of quantitative data on redistributed food quantities with qualitative measures of social impact be modelled in a way that informs policy and supports funding allocation for similar community-driven initiatives?

These research questions have evolved since the first LL report. Originally, the idea was to explore the feasibility of real-time data collection on excess food and its accessibility for vulnerable populations. However, based on initial findings and stakeholder feedback, the research has refocused to consider the impacts of food redistribution on well-being, the potential for scaling, and the potential for data integration to support policy and funding decisions.

Policy relevance

The challenge of addressing FLW aligns with both national and regional priorities for sustainable development, social inclusion, and circular bioeconomy. Slovenia's policy landscape increasingly emphasizes green growth, inclusive social policies, and efficient resource management. The Slovenian LL responds to these challenges by proposing an approach that will not only reduce waste but also strengthen social ties, thereby addressing key policy priorities around environmental sustainability and quality of life.

The research questions identified for this LL are rooted in these policy needs. For instance, the question on accessing and distributing excess food aligns with policy goals of reducing food waste and optimizing resource use, as laid out in the recent national FLW strategy. Our work seeks to inform the implementation of this policy by providing evidence-based insights into how FLW redistribution can support underprivileged groups and improve social inclusion.





The policy implications of this challenge are significant. By exploring how FLW redistribution can impact well-being, the research highlights the benefits of recognizing food as more than a resource to be managed, but a means to foster social cohesion and support the inclusion of vulnerable groups. The model developed through this research could potentially guide policymakers in creating funding mechanisms and support systems specifically for community-driven FLW redistribution efforts. This could include policy measures to incentivize partnerships between local governments, LAGs, and private sector stakeholders. The rationale behind trying to make the model transferrable between areas, especially LAGs, is that the kind of bottom-up initiatives that are usually funded through LAG funding are usually more sensitive to the specificities of the local area, as well as being somewhat more flexible regarding the specific policy area covered, allowing for more transversal (in terms of policy issue tackled) initiatives.

Stakeholders

Currently, participants from the PRP and LLC form the core of the LL, although they are both connected to a number of related activities and networks that help inform the LL. In this cycle, the work involved 3 researchers from the LLC and 3-4 people from the PRP. There was also some engagement with other stakeholders (2 interviews conducted with LAGs, 1 meeting with a mayor, and attendance of FLW-related events), but this aspect was not very prominent in this cycle. Activities at the end of this cycle involve the initiation of surveys with users of the services (meals and social inclusion activities such as workshops) offered by the PRP on-site to gather feedback on their experience. In the future, the LL team plan to engage users of other similar services, and the final result of the experiment is intended to be a transferable data model that could serve policy purposes. Therefore, it is planned that the LLC and PRP will engage with policymakers and regional stakeholders upon the model's completion.

Theory of change

The Theory of Change for the Osrednjeslovenska LL is structured around reducing food waste, social exclusion and environmental impact. This model aims to be adaptable for use for similar initiatives in other regions. The initiative's long-term goal is to set up a food redistribution system that addresses these challenges by connecting food surplus with those in need, ultimately decreasing the environmental impact of food waste and reducing social exclusion. The model would ideally reduce food waste through redistribution, improve social inclusion, and serve as an adaptable example for other regions. To test the feasibility of this goal, our data experiment combines quantitative and qualitative data on food needs, distribution, and social impact.

The expected **intermediate outcomes** are related to filling data gaps and policy needs surrounding food waste and social exclusion, as well as identifying appropriate sources of funding for similar initiatives. Key outputs from the initiative will thus be a transferable model for community-led food redistribution that other regions can replicate, a structured dataset that compiles information on food distribution needs and availability, and policy recommendations that provide guidance on encouraging community action, improving food redistribution, and supporting public-private collaboration. The core **activities and policy actions** involve stimulating community action to encourage local engagement and support for food redistribution; facilitating food transfers to vulnerable groups through structured and consistent mechanisms; and promoting collaboration between different local-level actors.

The success of the initiative depends on several **assumptions**:





- Funding will be available to implement and sustain replication project(s).
- Key stakeholders, including government and community members, will be willing to take part.
- There is a shared understanding of the problem among all involved parties.
- Effective collaboration across sectors will be possible.
- Suitable intermediaries (such as LAGs) are available to manage food redistribution.
- Accurate data will be accessible to inform decision-making.

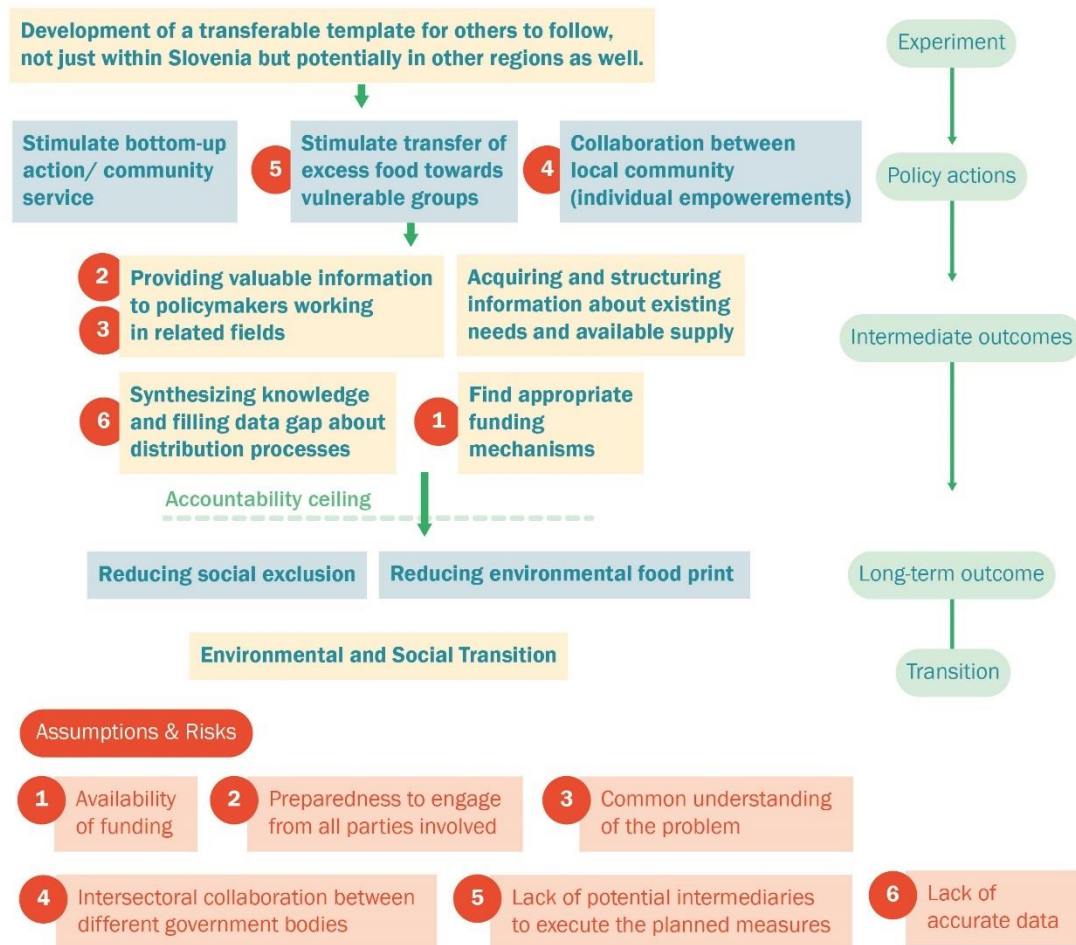


Figure 68 Theory of change. Source: WP4 team, adapted by UL team.

The main risks are associated with these assumptions not being met. Among them, a lack of available intermediaries to execute measures is likely the strongest risk (and most difficult to overcome), while the availability of funding should not be as problematic as there are a number of potential sources for small projects, such as municipal grants or CLLD funds. The lack of accurate data may to some extent be substitutable with expert judgment but may also result in potential implementers adopting those parts of the model's logic that they can accommodate and that suits their needs, rather than adopting the model in its entirety. The latter, while an aspiration, is not the LL team's main objective.





Data relevance

The data experiment was designed to integrate both quantitative data on food availability and distribution with qualitative data on social impact, allowing for a more targeted and effective approach to food redistribution. For a system that effectively connects surplus food with marginalized communities, reliable data on both food availability and social needs are necessary.

Before starting the data experiment, the following data needs and gaps were identified:

- Real-time data on food surplus in institutions and households: Over the course of the experiment, the group's enthusiasm regarding receiving real-time data on food surpluses diminished, and we reduced our ambition significantly. Similarly, expectations on gathering reliable household food waste data were significantly tempered.
- Social data on needs and vulnerabilities to make redistribution efforts more effective.
- Qualitative data on well-being impact of redistribution efforts.
- Distribution and logistical data. Limited access to this type of data presents a barrier to scaling the initiative and has proven an important challenge in our data experiment due to the rarity of such initiatives nationally.
- Indicators for policy and evaluation: Data gaps exist in measuring the outcomes and impacts of unconventional food redistribution initiatives. Developing appropriate indicators for these impacts is necessary for meaningful, evidence-based evaluation, as well as scaling of efforts.





Part 2: Living Lab Cycle 2: Data experiments

Data experiment

In this section, we describe the main activities conducted. For a structured overview, please refer to Table 33 (section Implementing the experiment).

1. Initial scoping and brainstorming: The LLC and PRP teams held brainstorming sessions to define core FLW challenges and prioritize data needs, such as real-time food surplus data and rural social needs data. In this, they were building on sessions with wider groups held in the previous LL cycle (see Cycle 1 report), which established that one of the main issues surrounding FLW was the lack of reliable data.
2. Stakeholder engagement: The team engaged local stakeholders (LAGs) to assess feasibility, refine data needs, and ensure community relevance. Face-to-face interviews were held with two LAGs (initially three were planned, but the third one was deemed unnecessary by the LL team and partners after the first two provided a very clear image of the situation). The interviews focused on LAGs' prior experience with projects related to food and food-waste, which showed that they considered this an interesting emerging field but had little similar experience, especially in combining issues of food and social inclusion.
3. Refining scope: Recognizing limitations in real-time data and household waste tracking, the team narrowed the focus to combine available quantitative food data with qualitative social impact insights. This was related to unmet expectations related to a previously implemented phone application for FLW redistribution (PriHrani), which did not yield data with a satisfactory level of detail. This prompted the team to focus more on the existing data source (see Data sources and methods) and build the conceptual model on the PRP's data.
4. Model design: The team is developing a prototype model integrating quantitative and qualitative data to assess FLW redistribution's impact on social inclusion and environmental outcomes. The model will be an economic, system dynamics model with the potential to enable analyses of internal system processes and help optimize production bottlenecks.
5. Data collection for pilot based on PRP data: A small-scale pilot is helping to refine indicators and model design based on real-world feedback. At the time of writing this report, certain social data collection activities (surveys with users) have already been conducted, and the team is planning to complement these data with further user surveys at similar sites to refine the model.

Experiment description

The data experiment aims to create a data model that integrates both quantitative and qualitative data on food redistribution and its social impact in rural areas. The experiment focuses on gathering data on the amounts of excess food available from various sources and combining this with qualitative data on well-being from recipients and community stakeholders involved in redistribution activities.





What makes this experiment “experimental” is the innovative approach of linking quantitative food surplus data with qualitative social impact measures in a coherent model. Unlike traditional food redistribution studies, which often focus only on logistics or quantities, this experiment assesses the broader social and well-being impacts of redistribution efforts in a rural setting. To the best of the LL team’s knowledge, linking different types of data (qualitative and quantitative) that belong to substantive fields that are so markedly different is quite uncommon, at least in the Slovenian context. Additionally, it includes ready-to-eat food distribution, a less common focus in redistribution models, which often emphasize packaged goods.

The goal is to determine whether this integrated model can provide actionable insights for policymakers and support small-scale, community-driven redistribution projects. If successful, this model could be a template for other regions, demonstrating how food redistribution can address both environmental sustainability and social inclusion.

Experiment objectives

The primary objectives for the data experiment remain the same as outlined in the Data Experiment Agenda:

- Build a data model: develop a model that integrates quantitative data on food surplus and redistribution with qualitative data on social impact (for example, dignity and well-being) in rural areas.
- Support small-scale projects: use the model to guide and evaluate small-scale food redistribution projects led by LAGs and other community organizations.
- Inform policy and funding: provide data and insights from the model to inform policymakers, with the goal of establishing funding mechanisms and performance indicators for community-driven FLW initiatives.

Relationship to theory of change

The data experiment was designed to test and support the Theory of Change (ToC) by supporting the attainment (or not) of the intermediate goals (filling data and information needs) and long-term goal (reduce food waste and social exclusion) outlined above. The data experiment most closely aligns with the intermediate outcomes by building a scalable model that integrates different kinds of data and supports policy decisions. In doing so, it tests the assumptions of the ToC by gathering and structuring data on whether and how food redistribution impacts dignity and well-being.

Data use

Data sources and methods

The main data source is our project partner Etri, specifically their subsidiary Mini Tovarna. At the outset we planned to obtain additional regional sources but realised there are no known similar enterprises, with a few exceptions that were either non-responsive or not relevant at this point. That is why we decided to base the internal dynamics of the model on Etri and try to design the model in a way that will enable integrating additional data sources *post factum*.





We collected quantitative accounting data and processed it using a simple framework we developed as an intermediate phase for transforming raw data into working coefficients for modelling purposes. This framework is in the form of excel sheets and is formulated in a way that it can be adopted by others that would seek to establish modelling coefficients for their specific region. Additionally, we formulated a Likert-type questionnaire for collecting qualitative data from recipients of donated food, which includes questions on both general wellbeing and on the impact the donation has on them. Aside from that it also includes questions that will enable us to assess the impact of donated food on personal finances and health.

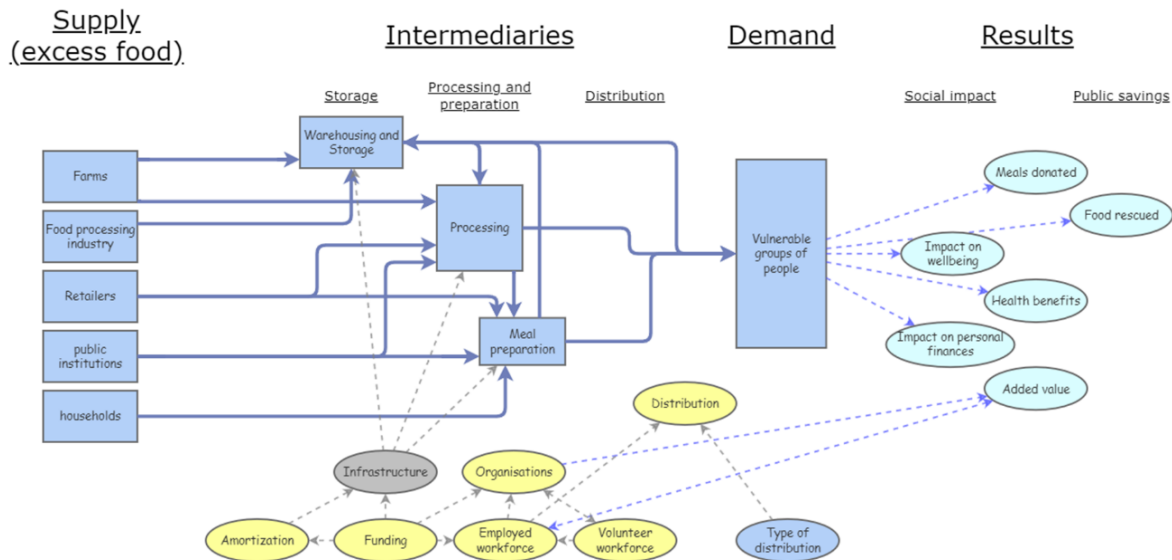


Figure 69 Disaggregation of the process that serves as a template for the model. Source: Own elaboration. The platform used (Insightmaker, 2024) is a free-to-use online modelling platform that supports basic system dynamics modelling, which we determined to be enough for our needs so far.

Our project partner, Etri, processes and redistributes excess food to vulnerable groups of people, namely to the elderly and disabled. In this process, there are numerous steps that require logistics planning and optimisation. The coefficients included in the model are a mathematical representation of these individual steps – describing the funds, workforce, and infrastructure in relation to the amount of food processed in a given time. For example, in real life the model enterprise might receive 2 tonnes of zucchini, 5 tonnes of bread and 500 kg of onions from their suppliers. These would then be transported, for which there is a coefficient that is made up of fuel prices, mileage, distance, and transport capacity, which would link these resources with associated costs. To simplify the model calculations, we also use an equation for a standard meal unit based on caloric intake (SUM-s). In doing so we build on the assumption that the meals the beneficiaries receive are nutritionally balanced. Next, there would be processing these foodstuffs and buying additional ingredients to make a whole meal, which is described in another coefficient. All these coefficients are links that form an interface between different inputs and outputs (meals prepared and donated) and are applied in baseline calculations. Finally, there is the distribution of the prepared food, where we will tie the last result from this “chain” of calculations, namely meals donated, to projected social impact.

The economic, system dynamics model developed in this LL experiment addresses a key data gap in assessing food redistribution and social inclusion in rural areas. We hope for it to be integrative





and dispersible, so that it will enable the financing and successful implementation of projects that address these issues. It captures both quantitative data on food surplus and redistribution, as well as qualitative insights on the social impact of food donations. It also has the potential to enable analyses of internal system processes, namely optimization of an organization’s bottlenecks in production. Lastly, one key intermediate output of its creation is the identification of data gaps in both FLW reduction and social indicators in rural areas. The model can thus guide rural policy decisions by providing evidence-based data, while highlighting the dual impact of food redistribution—environmental sustainability through waste reduction and improved social well-being.

Data innovation

The data experiment’s innovation centres on its integrated approach to data sources, collection, and analysis:

- Combining quantitative and qualitative data: this experiment integrates quantitative data on food surplus with qualitative data on social impact, offering a more comprehensive overview of food redistribution’s effects on communities than purely quantitative information on amounts of food redistributed or amounts of persons served.
- Social impact metrics: the experiment aims to develop specific social indicators to measure well-being improvements stemming from food redistribution. This is an explicit wish of the PRP, who has prior experience with metrics such as ‘social return on investment,’ but considers it to be too financially focussed, and inadequate in a context of fostering social inclusion. Furthermore, even non-monetary metrics for measuring social impacts are usually impersonal (for example, number of jobs created or number of persons in a programme). The implemented survey employs, inter alia, subjective experience of the service’s users. However, it is likely that entirely novel metrics will not be devised.
- Use of localized data: by collaborating with the PRP and LAGs, the experiment used local data sources and community insights, providing a clearer picture of needs and logistics for rural areas, including for transferable models.
- Prototype model for policy use: the data experiment produced a model designed for policy and funding decisions, integrating data points and indicators that can be scaled or adapted, giving policymakers a tool to assess and support community-driven FLW initiatives. It is an economic, system dynamics model that combines both quantitative (costs) and qualitative data (social impact).

Implementation

Implementing the experiment

Table 33 Timeline

Date	Action/decision
13.12.2023	Agreed on using a model to support local FLW projects and defined timelines for validation and pilot testing. Research question agreed.





Date	Action/decision
05.02.2024	Postponed contacting LAGs until a conceptual model was drafted. Agreed to acquire data on FLW from Luka Železnik (food distribution app creator)
15.04.2024	Met with LAG Srce Slovenije to discuss relevant projects
15.05.2024	Defined LL experiment parameters and intervention logic.
20.06.2024	Met with Etri employees to review data availability and adjusted the questionnaire based on findings.
16.07.2024	Met with LAG Barje z zaledjem to discuss relevant past projects; gained insight on experience implementing similar local initiatives.
18.07.2024	Decided to simplify model creation, using existing Etri data, and began preparing well-being questionnaires for model integration.
04.09.2024	Finalized questions for social impact and well-being data collection and continued model-building.
09.09.2024	Met with Etri employee to go through accounting data and clarify data needs. Began processing data into a framework, suitable for modelling needs.
25.09.2024	Obtained and processed needed data and began working on coefficients for the model.
23.10.2024	Revised the granularity of model's interfaces and filled certain data gaps using expert assessment. Established the resource to standard meal unit coefficients (SUM-s).
06.11.2024	Internally reviewed the modelling process and confirmed aggregated preliminary results with the use of real-world data.

Adaptations

The experiment required adaptations due to several challenges encountered in implementation. These adaptations were necessary to address data constraints while still allowing the experiment to yield meaningful results. The changes ensured that the experiment could proceed within the available resources and provide a framework that remains relevant to policy goals:

- Real-time data limitations: initially, the experiment aimed to incorporate real-time data on food surpluses. However, the availability of such data was limited, leading us to scale back the real-time data component and instead rely on existing data at Etri's disposal, which will be expanded upon in the final stage of model construction.
- Simplifying the model design: initially, the model aimed to incorporate a wide range of data sources, but this approach proved too complex with limited data and resources. We streamlined the model by using existing data from Etri and focusing on fewer, more consistent variables. This also allowed us to make the model more practical and scalable.





- Narrowing the scope of impact indicators: due to limitations in available data on certain social indicators, we focused on a smaller set of indicators, such as dignity and material security, which we could reliably measure.

Other Living Lab activities and achievements

Members of the LL were active in attending FLW and inclusion-related events, including the anniversary of Slovenian accession to the EU, or the launch of a national media campaign related to FLW reduction. Allium continued to develop products such as dumplings made from old bread and serve them at high-level events.

Preliminary results

So far, the experiment has yielded results in terms of:

- Data availability:
 - We found that while there are charity organizations that donate excess food (Red Cross Slovenia, Krog 9), to our knowledge there are no similar enterprises on the national level in a sense of donating prepared food (canteen). They also differ in their business models, as the Red Cross is funded by charitable donations and Krog 9 employs a subscription-type model. Both also have different approaches and criteria for determining eligibility to receive donated food.
 - There are no known charitable organizations besides from Etri that donate food while providing full time employment, thus providing additional social benefit.
 - The charities mentioned above have local subsidiaries in our region that would be suitable for helping us gather data on social variables.
 - Etri had enough accounting data for us to be able to establish internal dynamics coefficients for the model, however there are certain data gaps that will limit the model in terms of its wider relevance and scalability. This could be remedied in the next cycle by obtaining additional data sources.
- Interviews with LAGs – findings:
 - There are no similar projects in the region that would be relevant to our experiment in terms of expertise and data sources.
 - They would be willing to implement a small-scale project based on the outputs of our experiment.
 - We found that there is a project that has similar infrastructure needs to the planned implementation of our experiment. Their needs were addressed through cooperation with a local school for co-use of their kitchen.
- Etri data analysis and expert knowledge:
 - Most of the excess food received by Etri is bread (57%) that has not been sold during the day at the local retailer. This means that there are many losses in the process, as it is difficult to prepare balanced meals from a nutritionally unbalanced supply while maintaining cost-efficiency.
 - Supply of excess food, especially fresh produce, is subject to seasonal changes. We do not have access to sufficient data on supply to predict it with appropriate accuracy. This however is not the focus of our data experiment, as supply prediction is not necessary for the implementation of the model. It does however





limit how easily we can predict a region's potential for excess food supply. On the other hand, it may help highlight bottlenecks and thus necessary avenues for action.

- There is an element of socializing and reciprocity in donating food in a canteen, which indicates that there may be societal “added value” in this type of food donation.
- Existing business practices around excess food donation are not conducive to food rescue, as there are for example clauses in Etri's contracts that prevent them from obtaining donated food from their competitors. This indicates the need for regulatory action that would facilitate data-sharing and other forms of cooperation in the food supply chain.

→ Preliminary model results:

- Modelling the data on resources received, we tested the accuracy of our coefficients for transforming resources into standard meal units (SUM-s) against actual donated meals according to accounting data. We found that our meal units were fairly accurate, having predicted 25% fewer SUMs than the meals that were donated. This is in the expected range, since Etri needs to buy certain foodstuffs to be able to provide nutritionally balanced meals.

Data relevance

There are additional data needs in terms of supply that we had not foreseen, likewise there are certain limits to what Etri can provide, as they are a relatively small-scale enterprise.

Local relevance

Preliminary results are promising in terms of providing a rough estimate for funding needs. However, there is a lack of data on social variables in rural areas, which prevent further insight into local needs for relevant endeavours. Circumstantial evidence based on the interviews with LAGs does indicate that such a model could benefit them.

Policy relevance

There are many governmental and EU-wide initiatives that are aiming to address FLW (RS, 2023; EK, 2024). Our model addresses a unique niche in that regard. The results both provide important contextual knowledge for supporting food rescue in the region, and potentially provide a tool for bottom-up, evidence-based policy making. For application in other, more rural, areas, additional (or different) information has to be gathered by potential implementers. For example, on the availability of excess food from primary producers rather than processors.

Robustness and limitations

In terms of the robustness of the model, the iterative adjustments and back-testing during the model-building phase ensure the accuracy of coefficients. An example of this is the testing of our SUM calculations against real-world data. In essence, this means that we have both aggregate supply and output data (foodstuffs received and meals donated) from Etri, and we try to mathematically describe the process well enough to get an accurate prediction of output based on the actual supply amounts entered into the model.

There are however certain limitations in terms of what can be tested and what can be modelled with the available data. This is due to the small scale of Etri's enterprise and the fact that they are a relatively young enterprise, meaning that there are certain data gaps that we will need to either





estimate with expert support (for example, the variable of volunteer work) or address with additional data sources (for certain groups of vulnerable people and the availability or supply of excess food).

We also face a significant challenge in finding a truly rural equivalent for measuring social variables. This is due to there being no canteen-type waste food redistribution enterprises in the region or in other regions of the country, at least to our knowledge. We will likely have to extrapolate either from data gathered in an urban area compared with a different type of distribution in rural areas, or from organizations with the same type of distribution in rural areas abroad, which would be preferable.





Part 3: Reflections and learning

Cycle 2 demonstrated the importance of aligning data ambitions with practical limitations. The initial plan to integrate real-time data had to be scaled back due to limited data availability. Focusing on fewer, consistent data sources made constructing the model more practical and achievable. In hindsight, we might have benefitted from an earlier testing phase to identify data constraints sooner and refine the model iteratively. Overall, the cycle highlighted the need for flexibility, clear data expectations, and making use of existing partnerships to gather data at a smaller scale, then scaling up.

Reflections on data sources, methods, and tools

Data issues and obstacles during the experiment

As indicated above, the main issue was our inability to obtain real-time data on surplus food, prompting us to rethink our experiment and focus more on what was available. The unmet expectations relate especially to the volume and type of data that was expected to be obtained from the application PriHrani.

Managing data issues and obstacles

Building the model around existing and available data was chosen as an appropriate alternative. The model can still be adapted later, but what we have received should be sufficient to support our proof of concept, which was the primary goal, so the lack of different data sources was not a major issue in itself. Multiple sources of data, which are planned to be obtained in subsequent stages (for example, data from the Red Cross or similar initiatives abroad), only serve to refine the model, but are not indispensable. The same can be said of real-time data, which was initially intended as a separate way to make the model more directly relevant.

Pilot Region Partner's perspective on data

The PRP is the one supplying the data at this stage and is interested in seeing it structured and put to use, as they see this as beneficial for organizing their own work, as well as for providing evidence-based good practices that others can model their activities on. Other parties interviewed (LAGs) also seemed interested in the outcomes of our experiment and expressed interest in applying the data model in their own area.

Experiment design and implementation

Strengths and successes

- Deciding early on that the model building should be conceptual allowed for flexibility
- Shifting data sources allowed us to build a functional framework and ensured the model could be applied within existing data constraints.
- Engagement with LAGs provided valuable insights and feedback, indicating that they face similar data needs.





- Regular review sessions and adjustments throughout the experiment allowed us to refine the model in real time.

Scope for improvement

- Accessing data for so-called deep rural areas. This remains a future challenge.
- Contacting external (outside Slovenia) initiatives with similar structures. This work will be progressed in the next cycle.
- There were some delays in data collection

Skill development and capacity building

Skills developed

The person working on the model acquired substantial insights into the construction and functioning of this type of model and software to run it. This includes familiarizing oneself with accounting data gathering practices and how that data is transferable to mathematical equations that describe costs and amounts in a modelling approach.

Capacities

Some organizational experience and capacity were gained, mainly by the two coordinators of the PRP and LLC, but also other members of the team. They related to obtaining contacts, organizing meetings, co-ordinating work between partners and organizing data collection for different kinds of variables that enter the model.

Pilot Region Partner's perspective on skills and capacities

Better harmonization of Etri's recording practices was recognized as a gap. Over the course of data collection on food received, made and redistributed, it was revealed that their own bookkeeping practices were not adequate for structured calculations of inputs and outputs, as they used a variety of metrics to measure inputs, ranging from product units to kilograms.

Innovation and impact

Reflections on innovation

The experiment's innovative data approach remains a work in progress. Integrating quantitative food data with qualitative social impact metrics has proven challenging but essential, and it is still a very simple representation of real-world effects on wellbeing, as only a few indicators are used.

Short-term impacts

If the interest in LAGs that was demonstrated by the interviewed LAG representatives still exists, we will use the model to initiate a call for local-level small-scale projects. We will also present the model to the Ministry of Agriculture, Food and Forestry (MAFF) officials working on FLW, who have also expressed interest in our work in informal talks.





Longer-term impacts

There might be long-term impacts if the role of food as a social cohesive and mechanism for fostering social inclusion is better understood and integrated. The experiment will quantify the degree to which food redistribution can strengthen social ties. As a result, there may be interest among policymakers and stakeholders to adopt food redistribution as social cohesion strategy more often. Developing regular, reliable data-sharing frameworks could enable more effective use of food as a cohesive force in community-based initiatives, scaling the model to other areas in need. Embedding this approach in local and regional policies would establish food redistribution as part of social welfare strategies, recognizing its role in building inclusive communities. However, care would have to be taken to avoid perverse impacts of such initiatives, such as replacing other social welfare programmes and thus perpetuating poverty and marginalization.

Potential for sharing learning

Transfer and scalability are intended to be core features of the model. However, they are associated with certain data needs and a basic level of data capacity. A centralized data-sharing platform could improve feasibility.





Part 4: Future steps

Cycle 3 plans

What are your next steps for 2025? Do you have objectives for Cycle 3?

- Acquiring additional data sources to refine the model. A number of data sources have already been identified, both at home and abroad, and have been approached with requests, which will be built upon in the last cycle.
- Finalizing data collection and data clean-up on social variables. While some data have already been gathered to inform the social segment of the model, further data will be collected in different locales to refine aspects of the model, focussing especially on the aspect of ancillary social functions of such food redistribution facilities.
- Application of the model to other similar situations or scenarios. The model will be disseminated among project partners and at different dissemination events (both non-scientific and scientific), with the aim to stimulate application in different places across Europe; furthermore, it will be adapted and run using data acquired from other locales willing to contribute structured information.
- Application of model to real-life situation through LAG call. As agreed in discussions with the approached LAGs, once the model is workable, these LAGs will be approached again with the proposal to formulate a small-scale project call at the local level for similar initiatives.
- Presentation of model to MAFF. As indicated, the MAFF has shown interest in structured approaches to tackling food waste; this presents such an opportunity and may very well be taken up as a minor measure under the MAFF's auspices.

Future collaborations

The LLC and PRP have developed a close collaborative relationship, and this partnership is likely to continue to function. Both are also likely to continue engaging with similar initiatives, especially related to FLW management. No concrete plans have been made yet.

Communication and dissemination

The main dissemination activities will be as follows:

1. Distribution of information on the model to the broader LL (engaged in Cycle 1) and beyond, especially to local decision-making bodies, but also national stakeholders working on FLW. The high level of interest in the topic has fostered a motivated community.
2. Academic publications: Publishing findings in journals focused on sustainable development, rural studies, and social policy to reach a research-oriented audience, especially audiences interested in mixed-methods analyses and combining different kinds of data.
3. Workshops and Conferences: Hosting events and presenting at relevant conferences to engage stakeholders, share best practices, and discuss scaling opportunities with other regions.





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Spain: Galicia

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Summary and overview

Galicia is a region in northwest Spain that is characterised by highly fragmented land ownership: almost two-thirds of inhabitants are landowners, and the average size of land plots is 2,500 square metres. The decline of farming in most areas in the region over the last decades has resulted in vegetation encroachment, particularly around inhabited places, producing a high risk of wildfires in the “wild-urban” interface.

Living Lab challenge

New policy instruments were introduced in 2021, which are intended to foster farming activities around inhabited areas. This “model settlement” instrument aims to convince local landowners to hand over the management of the land they own in close vicinity to houses to one or two local farmers so that farmers can use the land and reduce the amount of biomass around the settlement. This instrument would also contribute to increasing economic activity by promoting the use of land that is currently idle. Currently, only 21 such settlements have been declared in the NUTS3 region, but more than 30,000 potential settlements could benefit from being included in the initiative. It is expected that many more applications for new projects will be produced by local authorities in the mid-term, so the regional administration (responsible for the administration of such projects) needs some way of assigning priorities among them.

Data experiment

We intend to produce a decision support system based on multicriteria analysis that combines spatial and non-spatial data from available sources to facilitate the selection of new project locations. This should enable selecting locations where high impact is expected (i.e. a bigger reduction of risk or a reduction for a larger population) and ease of implementation (i.e. facilitating success stories) is higher.

Preliminary results

This experiment succeeded in constructing a Decision Support System which combines many spatial variables to allow decision-makers to select the most relevant locations for new implementations of the model settlement policy instrument in a more efficient and effective way.

Key learning to date

Several interviews with regional and local stakeholders allowed us to gain a better understanding of the specific needs of model settlement projects, of what characteristics of the settlement and its surroundings make them more likely to succeed and what kind of settlements should probably be avoided as they are likely to fail or be too difficult to implement. We included these considerations in the design of the decision support system.

Next steps

We expect to further refine the DSS produced so far in three different ways: 1) producing a sensitivity analysis to further understand the relative influence of individual variables on the final result and the expected outcomes of a possible variation in the variable weighting used so far, 2) subjecting it to stakeholders’ analysis, particularly concerning their understanding of the relative importance of variables (and its correspondence to the importance assigned by the DSS), and 3) evaluating the locations of ongoing model settlement projects to understand whether they represent adequate selections according to the DSS and, if not, why they were selected in the first place.





Figure 70 One of the currently declared model settlement projects. Note the proximity of forest and shrublands to the main group of houses in the middle of the image and the high levels of fragmentation.





Part 1: Living Lab context

Pilot Region introduction

Galicia is a region located in a peripheral position in the northwest of Spain. With a total area of 29,574 km² and a population of 2.69 million inhabitants, its average population density is similar to the rest of the country (91 inhabitants/km² vs 94 inhabitants/km²; INE, 2024a). Nevertheless, about three-quarters of Galicia's population is concentrated in one-fifth of the territory, meaning that average density, when only rural municipalities are considered, is around 30 inhabitants/km². Perhaps one of the most remarkable differences with the rest of Spain, in any case, is the high fragmentation of land ownership: an estimated 1.9 million people are landowners (about two-thirds of the total population), and the total number of land plots is close to 12 million (DGC, 2024). As a result, each landowner's property amounts to an average of 1.5 ha, often distributed among several plots. A second conditioning element to highlight is the extreme dispersion of the Galician rural habitat: while occupying 6% of the territory, Galicia has half of Spain's population settlements (more than 30,000 in absolute terms), 90% of them with less than 100 inhabitants (INE, 2024b).

The rural population has followed a trend of decline since the 1960s, but the total number of settlements is still around 30,000, meaning that many of them are today inhabited by a very small number of people. An intense spatial specialisation of the primary sector has taken place for the last half-century, which resulted in a strong expansion of forest and spontaneous vegetation and, more importantly, a large increase of biomass physical continuity. This, combined with short but intense periods of drought during the summer, results in a high wildfire risk. This is a greater concern in the extensive wild-urban interface between populated and semi-natural areas and, accordingly, has prompted a steady increase in public spending on fire suppression equipment and infrastructures that reached 200 million euros per year in 2024 (Xunta de Galicia, 2024).

Recognising that rural depopulation, farmland abandonment and forest fires are essentially intertwined in this region, a novel legal instrument (the "model settlements") was created in 2021. This instrument is intended to promote the active management of land in the proximity of inhabited settlements by reconciling land use and land property, encouraging innovative approaches to local participation, agricultural production and improvement of living standards. When the RUSTIK project was started, a total of 21 model settlement projects had been approved by the regional government, with 20 of them in municipalities considered rural areas according to the Degree of Urbanization Classification. These were selected as the Pilot Region (PR) for this data experiment.

A model settlement project is only initiated when the majority of owners of land located around a given population settlement decide to take part. A formal application is then submitted by the local authorities to the regional government. The regional administration is then responsible for the clarification of land ownership (unknown owners are frequent), for the preparation of a joint management plan for all the plots of land provided by participating owners and, finally, for the preparation of a call for tenders for existing or new farmers who would like to make use of the land.





Functions

The structure of employment in the PR is dominated by the tertiary sector (services), which represents around one-half of the total employment. The share of agricultural employment in the PR is on the low side of the scale compared to other municipalities in the NUTS 2 region (Galicia), representing just 10-20% of total employment. Thus, the productive structure of the PR is associated with a diversified economy with a strong presence of the tertiary sector and a lower presence of the primary sector compared to other rural municipalities in the region. The agricultural sector of the PR municipalities is declining and mainly formed by a mixture of extensive cattle and non-specialized small family farms.

The Galician Green Infrastructure Strategy (Díaz-Varela et al., 2019) classifies municipalities in the PR as “abandoned rural areas” (13 municipalities) or “abandoned urban forest” (7 municipalities). Both categories identify areas where agriculture and livestock husbandry have been abandoned or replaced by afforestation during recent decades, with some presence of urbanisation processes in the latter. The Strategy expectation is that these municipalities’ main function will be related to the conservation of ecosystem services and landscape values. Maintaining a minimum level of farming activities appears necessary to preserve landscape heterogeneity and keep provision and cultural ecosystem services, particularly around inhabited settlements.

Transitions

Deep demographic changes (depopulation and ageing) are among the main challenges in rural areas of Galicia and, in particular, in the PR. These are the result of negative rates of natural population growth and persistent migration outflows to urban areas in the region other areas in Spain and abroad, that are more prevalent in the age bracket of 25-34.

Besides the loss of demographic and economic relevance of rural areas in relation to the rest of the region, another clearly identifiable trend is growing de-agrarianization, as progressively fewer and fewer inhabitants have their main source of income related to activities in the primary sector. Agricultural employment continues to decrease at high rates in the PR, as the primary sector in these areas lacks the level of specialisation that is common elsewhere in the region, which has resulted in major changes in the landscape: progressive abandonment of farmlands gives space to the expansion of semi-natural vegetation and tree cover. This presents challenges and opportunities at the same time. While large shrubland and tree-covered areas are associated with high natural values, this process also implies the loss of high nature-value farming areas that contributed to enriching the landscape and created feeding areas for species of interest (particularly steppe birds). Moreover, the increase in the volume and continuity of biomass in the landscape has largely increased wildfire risk in the context of climate change, where severe droughts and increasing temperatures are forecasted.

Living Lab partnership

The pilot region partner for this living lab is the Galician Agency for Rural Development (Axencia Galega de Desenvolvemento Rural, AGADER). AGADER is a public agency tasked with the coordination of public initiatives for rural development in the region, including the management of the Leader programme and the monitoring and control of Local Action Groups. The promotion





of employment, the provision of basic services and the improvement of local infrastructure in rural areas are also included in the Agency's duties.

The University of Santiago de Compostela (USC) acts as the living lab coordinator. The USC is a public institution for higher education and research endowed with autonomy, full legal status and its own heritage. It comprises two campuses in the cities of Santiago de Compostela and Lugo. The USC assumes and carries out its functions as an essential public service to the community through study, teaching, research and the transfer of knowledge.

The living lab coordination is carried out by a team of 7 professors and researchers from the Department of Applied Economics and the Department of Agricultural and Forest Engineering at USC. Their areas of expertise include the evaluation of rural development policy, evaluation of environmental policy in agriculture, agricultural economics, regional economics, land use/cover change and evaluation of land markets. They have participated in several EU-funded projects related to the topics of rural development, digitalisation and agricultural knowledge and innovation systems (most recently SHERPA, DESIRA, and AgriDemo-F2F).

Living Lab challenge

The analysis carried out so far allowed us to identify the high levels of land fragmentation (average data for the PR: twice as many landowners as inhabitants and nine different plots per owner) and the low reliance of the local economy on farming (only one farm for as many as eight inhabitants) as the main underlying causes of a less than satisfactory socio-economic transition in the Pilot Region. Particularly, both causes have combined to create a situation of wildfire risk around human settlements. The "model settlement" instrument launched by the regional government has presented itself as a reasonable way for landowners to voluntarily hand over management of their land to a local farmer in exchange for a small rent and to make farming activities reappear near inhabited areas.

Rationale and research questions

The Pilot Region Partner is a regional agency with responsibilities in rural development. One of the tasks that it has assigned is the responsibility for the implementation of policy instruments listed in the regional law for the recovery of agricultural land (Ley 11/2021, de 14 de mayo, de recuperación de la tierra agraria de Galicia). The law is part of a process of recognition of farmland abandonment as one of the key problems in rural areas in the region, which helps explain depopulation and ageing, the loss of valuable agricultural landscapes (some associated with high nature value farming systems) and above all, increasing wildfire risk. A large wave of wildfires in 2017 stimulated the regional parliament to pass the legislation mentioned above. While some of the instruments foreseen in the law are generally oriented to the promotion of agricultural use of abandoned land, others are specifically oriented towards increasing the protection of human settlements against wildfires: the "model settlements", in particular, are intended to promote agricultural use of the immediate vicinity of settlements, thus preventing the encroachment of vegetation in their perimeter and reducing the likelihood of the fire reaching the houses.

At the end of Cycle 1 of the Living Lab, the following research questions were identified as suitable for Cycle 2:

- Are there new ways to produce or improve information about land/housing ownership?





- In which situations can a given policy instrument (out of those contemplated by the law) be preferable to others to promote the active use of underused land/housing?
- How can the implementation of instruments such as the “model settlement” initiative be spread and scaled up to other locations in the Pilot Region?

Of the three questions presented above, in Cycle 2, we have finally concentrated on the last one, as discussions with the officials working on the field for the regional administration suggested that they perceived the scalability of model settlements to be a greater challenge than new ways to improve property investigation. One of the most important questions that should be answered when trying to scale up the use of the model settlement initiative would be to prioritise settlements that: a) could serve as a good example (a success story) for local communities, and b) would reduce fire risk for a larger population.

Policy relevance

A desired future (2040) for the NUTS2 region to which the PR belongs has been described as one in which: i) rural areas produce healthy and high-quality food and raw materials sustainably, with further development of the local agri-food processing industry; ii) rural society is empowered and involved in the governance of its territories; iii) small population centres are maintained as a guarantee of sustainable landscape management; iv) land-use planning leads to rational and sustainable use of land, taking advantage of the valuation of ecosystem services; v) and finally where there is universal and high-quality access to broadband internet for rural communities (Guimarey Fernández et al., 2021).

The transition challenge described for our PR may contribute to these objectives by facilitating access to land to new and existing farmers (and, therefore, contributing to the production of food and raw materials), facilitating access to housing (therefore contributing to maintaining small population centres) and, overall, by facilitating a rational use of land.

Stakeholders

The most relevant stakeholder is the Regional Agency for Rural Development (AGADER, which acts as Pilot Region partner in this project). AGADER is responsible for the rural development strategy in the region, manages the LEADER programme, and is responsible for the technical support, financial supervision and monitoring of the work of Local Action Groups. Additionally, AGADER is the body responsible for the application of land mobility instruments, including land consolidation and model settlements, among others. AGADER's central position among the actors involved in this project comes, therefore, from its agency but also its relationships with other key actors. Other relevant stakeholders include landowners and local authorities, both of which have been already involved in different phases of the project. Local Action Groups are also expected to be involved in the future.

Theory of change

The Galician Living Lab focuses on the obstacles faced by rural inhabitants when they try to gain access to land in a context in which idle land exists. We assume that limited access to information regarding land ownership and high transaction costs (related to the need to negotiate with multiple actors, often in distant locations) is one of the main reasons for these difficulties. Therefore, we define the main challenge for Cycle 2 of the Living Lab as “How to reconcile land





use and land ownership?” In other words, which information mechanisms do we have available to promote the active use of land even though their current owners are not farmers themselves and probably do not live nearby anyway?

We assume that finding ways to reconcile land use and land ownership would reduce the amount of abandoned land in the Pilot Region, therefore creating the conditions for a reduction of wildfire risk and an increase in local economic activity. If instruments potentially able to facilitate that change, like the model settlement initiative, end up being successful, local inhabitants and local governments will likely increase demand for this kind of project. This would likely result in more resources being needed on the side of the regional administration, which may not be enough to manage all the applications received, creating some risks. If the regional administration is not able to satisfy demand, less than optimal locations for model settlements (e.g. locations where implementation is difficult or locations where impact is very limited) may be selected. Our data experiment aims to reduce that risk by designing a spatial decision support system that would allow us to rank applications according to their potential impact and implementation difficulty. A final assumption for our experiment is that the priorities of the regional administration would remain as they are, and the model settlement initiative will continue to be considered relevant.

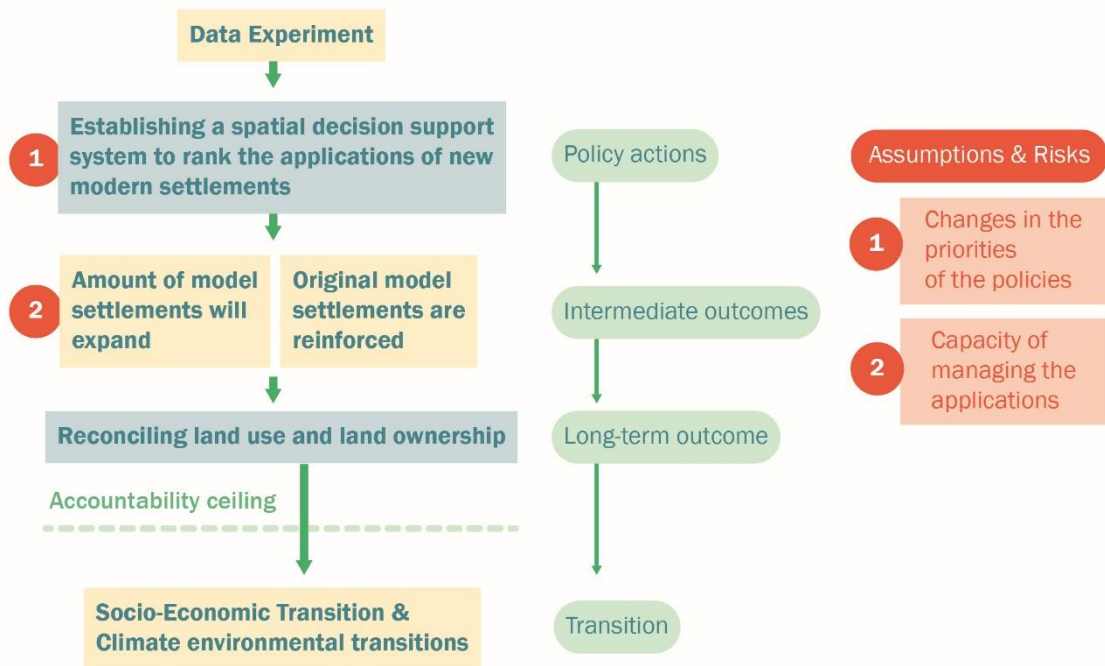


Figure 71 Diagram for the theory of change for the Galician data experiment.

Data relevance

Information on land ownership is crucial for the successful application of legal instruments aimed at reconciling ownership with land use, as is the case of model villages. However, from a perspective more linked to the strategic planning of where these instruments should be a priority, it may not be so relevant to have very precise information on landholders. Instead, it would be more interesting to be able to use and combine different sources of information already available to evaluate the balance between the potential impact of the instrument in a particular location





and the expected difficulty of implementation so it can be compared to other potential locations. From this point of view, we propose the development of a decision support system that uses available information (from both cartographic and non-cartographic sources) and combines it to provide help in selecting new candidate locations for additional model settlements.





Part 2: Living Lab Cycle 2: Data experiments

Data experiment

Developing the data experiment

The most relevant transition for our Living Lab is the socio-economic one. More specifically, the complex relationship between land use and land ownership. The analysis conducted in Cycle 1 allowed us to identify high levels of land fragmentation and a substantial reduction in economic dependence on agriculture, with implications for the employment structure, demographic trends and landscape changes. All of these have an impact on the risk of forest fires. Furthermore, the analysis of existing policies related to the relationship between land ownership and land use revealed that the regional administration has put in place several policy instruments (e.g. model settlements) aimed at promoting the use of abandoned land in recent years.

For the design of the experiment, several meetings were held between the Pilot Region partner and the Living Lab coordinator, as well as with stakeholders directly related to the implementation of the model settlement instrument.

Experiment description

The experiment is aligned with several legal instruments (including the model settlements initiative) created by the regional administration to transfer rights of use (but not necessarily property rights) between owners and potential users of land, and that are currently in experimental phases.

In this experiment, we evaluate how to integrate existing spatial and non-spatial data sources to assess the expected impact (i.e. wildfire risk reduction) of different candidate locations for the model settlement initiative. We combine qualitative and quantitative information. We are likely to move in the context of a high number of requests for new locations but with a tight budget, so we need to choose cost-effective candidate settlements. Although there is general agreement on the main variables to be considered and their expected relationship to the actual impact of a model settlement, it is not yet clear how these variables can be spatially summarised and attributed to individual settlements.

Experiment objectives

The main objectives for our data experiment are:

- To produce a Decision Support System (DSS) for the designation of new model settlements.
- To identify additional sources of information about land ownership.
- To identify landowners' reasons to participate or decline participation in model settlements.





Relationship to theory of change

The proposed data experiment is aimed to support the policy action of expanding the number of model settlement projects in the Pilot Region under the assumption that the demands by local inhabitants and local authorities will increase in the mid-term. In such a case, we also assume that the managing authority (AGADER) will not be able to satisfy all the demands of new implementation and should, therefore, select those locations in which the impact would be greater and implementation difficulties would be less. By helping to select locations with better conditions for success, we expect to support the long-term outcome of reconciling land use and land ownership in the region and, therefore, the desired transition outcome.

Data use

Data sources and methods

For this data experiment, we have combined quantitative and qualitative data. While the first type comes from public data repositories, the second type has been obtained mainly through interviews with relevant stakeholders.

The quantitative data used in the experiment have been selected based on the nine variables of interest required to develop the multi-criteria evaluation system to prioritise the potential “model settlements” candidates. This set of nine variables (see Table 36) was proposed by the staff from the pilot region partner (AGADER) and the public company Tragsa, who guided this initial phase of the experiment, as discussed further below in section of Implementation. Both AGADER and Tragsa are responsible for the implementation of the model settlement policy instrument and are, therefore, future end users of the DSS, the tool developed in this experiment. Having in mind the cost-effectiveness, they considered two aspects of their choice of variables: relevance for impact and ease of implementation of the instrument.

Knowing the variables of interest, we explored a wide range of data sources at national, regional and local levels. For some of the information (for example, settlement delimitation, population or land use cover), there are several sources available, and inconsistencies have been detected across them, mainly due to lack of accuracy or outdated information. Table 35 lists the final data and sources of the information used in the experiment, which are all official and publicly available.

Complementary to these data sources, other information has been collected through interviews with the pilot region partner and visiting some model settlements in place where the RUSTIK team could meet residents from the settlements and representatives from their local government. These interviews fulfilled two objectives: Obtaining qualitative information on landowners' motivations to adhere (or not) to the model settlement and learning about the priorities of the local and regional administration in relation to the policy instrument.

Table 34 Quantitative data and sources used in the experiment. From some of the sources, more than one data could be extracted for the experiment.

Data	Source	Type of source
Settlement delimitation (area and perimeter)	Municipal land use plan	Regional





Data	Source	Type of source
Settlement population	IGN/INE (National Geographic Institute – National Institute of statistics)	National
Land use and cover	SIOSE (National Land use and cover system/database)	National
Parcels	Cadastre	National
Orography (slope)	IGN (National Geographic Institute)	National
Protected areas (Galician Natura 2000 sites)	Galician Geographical Information System	Regional
Communal forests	Galician Geographical Information System	Regional
Areas declared as “Wildfire high-risk areas” or “with high incendiary activity”	PLADIGA 2024 (Galician Forest Fire Prevention and Defence Plan)	Regional
Land suitability for pastures	Map of productive capacity of Galician soils (Díaz-Fierros & Gil, 1984; Corbelle <i>et al.</i> , 2014)	Regional

Data innovation

The innovation of this experiment relies not on the data or sources themselves but on the methods employed.

First, it is innovative because, so far, there is no procedure available that allows thorough planning and prioritisation of potential candidates for model settlements based on a cost-effectiveness analysis. To date, all requests to become a model village received have been accepted by AGADER if they comply with the legal requirements of the policy instrument. This can no longer be the case in a future context with limited resources to attend to the expected demand.

Additionally, despite the AGADER’s experience in managing spatial data, there are no previous experiences combining cadastral, biophysical and social information to inform the implementation of a policy instrument in the region. Most initiatives, in this sense, are very limited in relation to the data used, or they apply to rather local contexts. This can be due to issues and particularities of the data available (information duplicated, data obsolescence, inconsistencies across sources, etc.).

Finally, in line with the above, the interviews with TRAGSA and AGADER revealed that, for implementation, they are carrying out a lot of fieldwork to cope with deficiencies in the officially available data. Therefore, this experiment is also an opportunity to check to which extent a preliminary assessment of the settlements can be done by relying exclusively on the current data available.





Implementation

Implementing the experiment

The practical steps undertaken for this experiment are listed in Table 35, including also their main objective or outcome.

Table 35 Timeline of the experiment

Step	When
Interview with regional administration (AGADER): learning about the application of the policy instrument: 1 st ideas on potential data required for the DSS and potential motivations of landowners to support the policy instrument).	8 April 2024
Interview with the public company responsible for the practical implementation of the policy instrument (TRAGSA): Setting the final list of variables of the experiment, learning about priorities and motivations of landowners.	19 June 2024
Field visit to pilot model settlements in place: Pedrosa and Infesta) and interviews with inhabitants and local administration: learning about neighbours' motivations to adhere – or not – to the policy instrument.	24/04/2024 (Pedrosa) 13/06/2024 (Infesta)
Quantitative data collection: screening national, regional and local data sources	June - September
Spatial analysis with GIS tools: Preparing data for the DSS	June - October
Developing first prototype of the DSS combining all the data	September
Sharing DSS with AGADER and TRAGSA for their feedback	7 October 2024

This experiment managed to build a spatial Decision Support System (DSS), combining a high number of spatially explicit variables (9 in total), which are the criteria considered of most relevance for implementing the model settlement policy instrument in a more efficient and reasoned way. Furthermore, the DSS is based fully on available and public data and has been tested with 58 settlements (from 2 out of 20 municipalities of the pilot region).

We started the experiment with interviews with the responsible bodies in charge of implementing the model settlement instruments. These are our pilot partner AGADER, from the regional government, and TRAGSA, the public company in charge of carrying out the works. These interviews improved our knowledge and understanding of the practical implementation of the model settlements instrument, namely the steps undertaken, the information considered on each phase, and impressions and learnings so far from the pilot settlements carried out. This led to some preliminary ideas on potential information and variables required for the DSS and provided some first insights on motivations by landowners to adhere or not to the instrument and priorities that the regional government considers in practice.





These first impressions were completed and refined with visits to two of the pilot model settlements in place (Pedrosa and Infesta). There, we had the opportunity to talk with neighbours and local authorities (some majors and technicians from the municipalities) that further revealed the reasoning behind institutional and personal attitudes towards the instrument, impressions about the practical implementation and potential impact, etc.



Figure 72 Pictures from the visits to the model settlements of Pedrosa and Infesta

Having this, the RUSTIK team started screening different data sources (mainly statistical and spatial data), gathering and comparing information, and preparing it for the future multi-criteria decision support system. It should be noted that, while for certain data, such as cadastral information, there is only one official source, for other types of information, such as land use or cover, population or delimitation of settlements, there are several sources available that could be used. It was necessary to compare and select the more appropriate, considering the accuracy and update of the information. In the end, more than 15 data sources were explored to create the final list of eight data sources finally selected for the experiment (see Table 34).

Due to the relevance of the geographical component, all data was worked with using GIS (Geographical Information System) tools.

The next phase was to have an interview with TRAGSA to determine the final list of variables that would be considered in the DSS according to their relevance for the impact of the instrument and ease of implementation. The final set of variables of the model is summarised in Table 36 and further explained below. For each of them, we also indicate their influence, being positive if they favour the impact or implementation of the policy instrument and negative if they diminish the impact or increase the complexity of the actual implementation.

Table 36 List of variables of the Decision Support System grouped by their influence.

Variables with positive influence (the larger the value, the better)	Negative influence
<ul style="list-style-type: none"> • Average land suitability for pastures • Population size • % area of scrub/shrub vegetation (~abandonment) • Parcel size: larger av. size, less fragmentation • In declared high-risk fire areas 	<ul style="list-style-type: none"> • % communal forests • % occupied by trees • In protected natural spaces • Terrain slope

- **Average land suitability for pastures:** We assume that a higher average suitability for pastures of parcels surrounding the settlement should be associated with a higher priority (ease of implementation). Land suitability was directly taken from the map produced by





Díaz-Fierros Viqueira & Gil Sotres (1984) in its digital edition of 2014 (Corbelle Rico et al., 2014). The map classifies suitability for pastures and other crops in five classes of decreasing suitability (S1, S2, S3, N1, N2) according to FAO recommendations (FAO, 1973).

- **Population size:** We assume that a larger population in the settlement requires higher priority since this increases the impact of the instrument in terms of inhabitants protected against wildfires. While it could appear likely that larger settlements imply lower rates of abandoned land, this is not necessarily the case, as the share of the population with farm-related jobs is usually lower in those places. Therefore, it is not uncommon for larger settlements to be equally surrounded by the wildland-urban interface.
- **Rate of area occupied by communal forests:** Communal forests require joint discussions and decisions among all members in the assembly; in addition, this normally implies delays in their feedback and reactions to the regional government initiative and, therefore, increases the complexity of the practical implementation.
- **Rate of the area occupied by bush or shrub vegetation:** this is a direct indicator of the presence of land abandonment, therefore, the higher this rate, the larger the potential impact of the instrument.
- **Average plot size:** this is understood as an indicator of fragmentation. A larger average area implies lower fragmentation and a lower number of owners to deal with. Therefore, the variable's relationship with priority would be positive since it eases implementation.
- **Rate of area occupied by trees:** the influence of this variable is negative because trees increase the complexity of the implementation. The model settlement instrument implies the re-conditioning of abandoned plots for a new land user; however, there are legal limitations in relation to the management of trees. Moreover, while there is a transfer of use between the landowner plot and the new user, this does not apply to trees present in the parcels.
- **Presence of areas designated as high fire risk:** this variable has a positive relationship with the priority, meaning that if a settlement is in one of these areas, it should be favoured by the instrument since this increases potential impact.
- **Rate of area within protected natural areas:** this increases the administrative burden and limits re-conditioning works, therefore negatively influencing implementation.
- **Slope:** the higher the slope, the more difficult it is to carry out re-conditioning works, making implementation more difficult.

The final step has been to combine all these variables, building the DSS. Before the combination, we did a linear rescaling so that all variables remained with values between 0 and 1. For this prototype, we initially considered the same weight (importance) for the nine variables. Therefore, within the DSS, each of these variables is automatically assessed per settlement, considering their value between 0 and 1 and the influence (negative or positive). By doing a weighted sum, each settlement obtains an overall value from 0 to 1, with 1 being the highest priority for the instrument. If we consider the 58 settlements, the result is a ranking of places sorted according to their potential cost-effectiveness priority to implement a model settlement. Within these 58 villages, there are two current model settlements (Infesta and Moreda), and they ended in positions 13 and 39 of the ranking, with a total value of 0.50 and 0.33, respectively. In principle, we do not use them to calibrate the model because, while the DSS considers biophysical criteria, the first model settlements were implemented as tests and selected exclusively following criteria related to the willingness and commitment expressed by the municipality and inhabitants (the





model settlements are officially requested by the municipality and demand that at least 70% of the land owners commits with the instrument).

The DSS and the result for the 58 settlements have been shared with AGADER and TRAGSA, and we are expecting their feedback on two aspects: whether they would make changes in the list of variables and whether to re-consider the importance and weight of all of them (e.g. which of them are more important or they would give a higher weight to some in the assessment).

Adaptations

As discussed above, the quality of the quantitative data has strongly influenced the experiment, requiring the screening of several sources and cross-checking accuracy and reliability before deciding what data source is more appropriate. The deficiencies of the information are due to several reasons, mainly but not limited to:

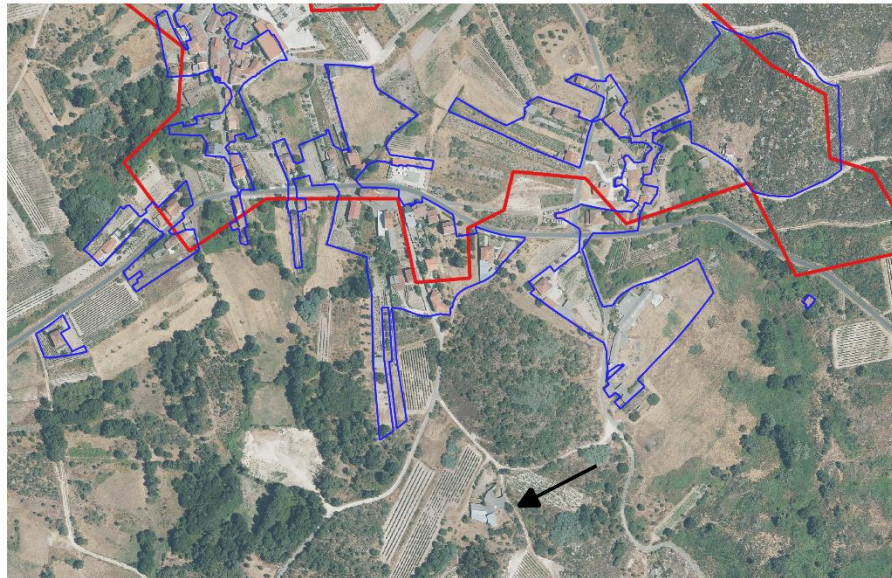
- **Duplication of and disparity between data and sources:** for example, while the number of inhabitants per settlement is officially set by the National Institute of Statistics, the data is also available and integrated into many other datasets, including spatial datasets such as the dataset of settlements by the regional government. However, the figures do not match, probably due to a lack of updates across sources. When it comes to land uses or delimitation of the settlements, several sources can be employed (land use maps or planning maps, aerial photos from regional or national government, etc.) however, there is a lot of disparity and mismatching in the data (Figure 73 Inconsistencies and lack of accuracy in the delimitation of settlements across sources).
- **Outdated information:** this is a clear issue, for example, with land use cover. The official and, in theory, more precise and detailed source is the SIOSE (National Land Use and Cover Database). However, the last version available is extracted from aerial images from 2017. Experience indicates that in our region, within this lapse of time, the landscape in areas prone to land abandonment may have changed substantially, especially the ratio between agricultural and forest covers. Another important issue is ownership information in the cadastre. In most of the rural properties, particularly land parcels, the information about the current owners is obsolete, including the contact details.
- **Lack of accuracy:** this is, for example, an important drawback of the cadastral information (together with obsolescence). Regarding the location and delimitation of model settlements, several sources can be employed such as land use maps, aerial photos from the regional or national government, or specific datasets derived from those sources; however, no single source appears to fully reflect the current and real extension of the settlements.
- Moreover, these deficiencies are **not consistent within and across sources**. For example, in relation to the settlement delimitation or the cadastre, we can observe disparities in accuracy within the same datasets depending on the settlements.

To cope with these issues, different decisions were made. First, we limited the extent of the experiment, considering only 2 out of 20 municipalities of the RUSTIK pilot region. These two municipalities have 58 rural settlements in total. The idea was to be able to properly explore and evaluate all potential data sources within the timeframe of the experiment. As indicated above, more than 15 sources of information have been explored to create the final list of eight data sources employed in the experiment (see Table 34).





Secondly, for this prototype, we decided not to correct or amend any data but to rely exclusively on official sources. The reason for this is twofold: first, to see whether we could build the prototype only with those data and, second, to be able to assess the potential impact of these data imprecisions in future versions of the DSS. For example, it may happen that, since the DSS combines multiple data, imprecisions are diluted, and the overall result provided by the prototype is sufficient.



- Settlement delimitation by the national government (based on aerial photo)
- Official delimitation according to the current Municipal Land Use Plan

Figure 73 Inconsistencies and lack of accuracy in the delimitation of settlements across sources

Preliminary results

Results to date

The experiment succeeded in constructing a DSS, which combines multiple spatial variables to allow decision-makers to select the most relevant locations for new implementations of the model settlement policy instrument in a more efficient and effective way (Figure 74). In the absence of feedback to date from Living Lab stakeholders, the variables that are having the most influence now are fire risk and the presence of protected natural areas in the area to implement the model settlement.

We expect to further refine the DSS produced so far in three different ways:

1. Producing a sensitivity analysis to further understand the relative influence of individual variables on the final result and the expected outcomes of a possible variation in the variable weighting used so far.
2. Subjecting results to stakeholders' analysis, particularly concerning their understanding of the relative importance of variables (and its correspondence to the importance assigned by the DSS).





- Evaluating the locations of ongoing model settlement projects to understand whether they represent adequate selections according to the DSS and, if not, why they were selected in the first place.

Table 37 shows the results obtained in the DSS for the best and worst-rated settlements in the two municipalities where the system is being tested. We can see how all the settlements in the municipality of Monterrei score better than those in the municipality of Folgoso do Courel.

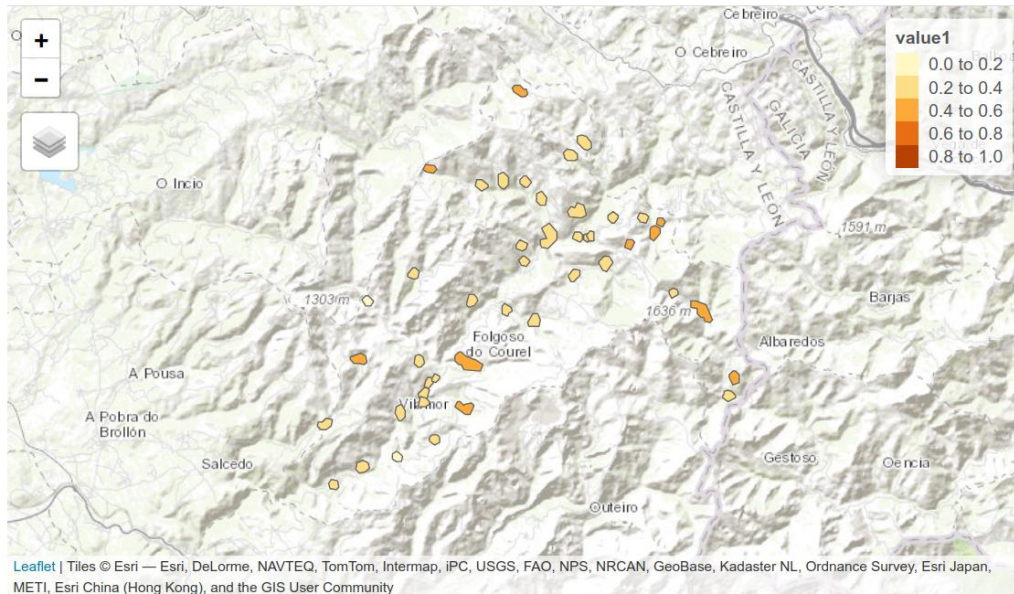


Figure 74 GIS visualisation showing settlements in the municipality of Folgoso do Courel, ranked according to their expected priority for implementation of a model settlement project.

Table 37 Comparison of the three best and the three worst-rated settlements in Folgoso do Courel and Monterrei (values from 0 to 1, where 1 is the highest priority).

Folgoso do Courel (45 settlements)		Monterrei (13 settlements)	
Settlement	Value	Settlement	Value
Hórreos	0.489945	Vilaza	0.865877
Pedrafita do Courel	0.476410	Flariz	0.799387
Teixeira	0.473717	Estevesiños	0.783740
Mazo Santigoso	0.211130	Guimarei	0.629164
Cortes	0.157162	Cardao	0.587041
Vilar	0.138143	Infesta	0.507294





Data relevance

Concerning qualitative data about landowners' motivations and beliefs, although some testimonies have been collected during the data experiment by interviews with local inhabitants, we are still far from understanding this process. Nevertheless, insights from interviews with officers of the regional administration and technicians that carry out fieldwork in model settlement projects allowed us to produce some initial hypotheses that are relevant for the future implementation of such projects. For example, it should be noted that for the successful implementation of model settlements, in addition to the prioritisation established with the DSS, it is necessary to have technical staff on the ground, but also the support of key local actors. The fact that it is the municipalities – the administration closest to citizens – that make the initial proposal for the model settlement facilitates the identification of these key actors, as municipalities usually have prior contact with them. From the point of view of landowners, a positive aspect of supporting model settlements is that the property research process implicit in the instrument involves updating cadastral information. As for reluctant landowners, issues such as the fear of losing ownership (distrust of the administration) or the fear that the income received from renting the land would hurt their income tax return were highlighted. Finally, we found that some of these reluctant landowners changed their minds when they saw that the administration started to carry out planned works, such as clearing, on the plots included in the model settlements.

Concerning the quantitative data approach implemented in the DSS, we believe that the result (the ranked settlements by relative priority for model settlement implementation) is scalable to the whole of the NUTS3 region in which the PR is included. Therefore, the result should be relevant to the regional administration.

Local relevance

Local stakeholders (local municipalities and local action groups) are still to be consulted on the results of the DSS.

Policy relevance

AGADER expects municipalities to submit a higher number of applications for model settlements in the near future. It is also expected that funds available to this instrument are likely to decrease, which means that AGADER would need to establish criteria to rank proposals according to their expected impact on local wildfire risk reduction. The proposed decision support system can help to prioritise these applications.

Robustness and limitations

So far, the qualitative data collection has been limited and does not represent the whole range of attitudes and values of local landowners. We believe this to be relevant for the long-term, as it could be used for a better design of future policies dealing with land use/land ownership issues. Nevertheless, for the mid-term approach used in this data experiment (the support to the model settlement instrument), the results may be sufficient to design better approaches in the implementation phases of new model settlements.

The quantitative exercise (the DSS) should be considered preliminary, as it still needs to receive feedback from the officers and technicians of the regional administration (and, hopefully, also from local authorities). It also needs to be subjected to a sensitivity analysis that will provide a better understanding of the influence of different variables on the results. Having said that, the





DSS design can be easily extended to the whole NUTS2 region, with relatively low effort, once the relevant variables have been identified and selected.

In terms of limitations and robustness of data sources, once the DSS is fully developed, it could be possible to estimate the influence of discrepancies detected in data sources, for example, in settlement delimitations. It is also worth noting that information on issues such as land use coverage, especially regarding vegetation cover, may have changed substantially since the last available version (year 2017).

Finally, the prototype DSS proposed here has its focus on the supply side of land. In other words, on the suitability of potential candidate locations for new model settlements. In its current form, it does not, however, consider the potential demand by existing or new farms that would be willing to use the lots of land resulting from the implementation of a given model settlement. This can be explained in part by the limitations of the current availability of data and in part by the characteristics of the model settlement process. Regarding data limitations, the most recent and comprehensive source on the structure of the farming sector currently available in the Pilot Region is the Spanish Agricultural Census of 2020. Nevertheless, this source can only offer aggregate data at the municipal (LAU 2) level, which makes it of less use when trying to rank the location of different settlements within a municipality. It could be useful, of course, to identify municipalities where the demand for land by the farming sector is higher, but this takes us to an interesting discussion about the objectives of the model settlement instrument, as recent results (Corbelle Rico & López Iglesias, 2024) suggest that it would be more useful where the current presence of the farming sector is more scarce (i.e. in locations where farmland abandonment is more common). For this reason, the model settlement initiative is open to existing farms but also to new entrants to the farming sector. Information about the potential demand for land by new entrants is very limited, and we can safely assume that it is closely linked to the availability of viable lots of land like the ones that the model settlement instrument creates.





Part 3: Reflections and learning

During interviews with officers and technicians of the regional administration carried out in Cycle 2, we learned about the specific phases of the model settlement projects. Particularly, we came to understand how different characteristics of settlements and their surroundings represent challenges and opportunities for implementation. As a result of these discussions, we produced a list of variables which influence two conditions that are considered crucial for the success of the model settlement initiative: the ease of implementation and the potential impact (reduction of wildfire risk for a larger population). We then explored different data sources already available from public sources, both spatial and non-spatial, that can be used to model those identified variables, assessed their reliability and selected the most appropriate when more than one single source was available.

All the information gathered was used to produce a decision support system based on a multi-criteria analysis that can enable the regional administration to establish priorities among candidate locations for new model settlements. The DSS needs to be refined, nevertheless, to better reflect the considerations of the regional and local stakeholders.

In addition to the priorities that may be established by the DSS after the analysis of the variables introduced, two aspects need to be integrated for the final decision-making: i) how to take into account the qualitative information collected on enabling elements, obstacles, perceptions of the landowners, etc., and ii) that the process of declaring a model settlement is initiated by the municipalities and must have the support of at least 70% of the landowners. It may happen that in settlements that appear in a very good position in the DSS ranking, the instrument is not implemented due to a lack of interest from the municipality and/or landowners.

Reflections on data sources, methods, and tools

Data issues and obstacles during the experiment

Considering the work carried out in this experiment, we can say that in Spain, we count on plenty of relevant spatial and non-spatial data available and all easily accessible. There are several national and regional repositories granting free access to any citizen, and the data is provided in various formats, from basic maps or elaborated cartography to raw data to be further exploited through expert tools such as GIS.

However, when trying to apply this data to the local level, the information becomes imprecise, inaccurate and obsolete. As explained in section Adaptations, in the experiment, it was very difficult to decide which are the best or most reliable data or data sources. The decision is even more difficult because of the inconsistency within the sources or datasets. What works best or is more precise for a certain area does not necessarily follow the same principle when we move to another place. This is the main reason why, when it comes to the actual implementation of the model settlement initiative, the regional government invest in carrying out fieldwork to cope with the lack or poor quality of the information.





Managing data issues and obstacles

To cope with the data issues, one of the first decisions was to limit the extent of the experiment, considering only two out of twenty municipalities of the RUSTIK pilot region. Still, these two municipalities have 58 rural settlements in total. The aim of reducing the context for the experiment was to be able to study in-depth, and within the given timeframe, the different sources of information, compare them and assess their suitability.

Despite reducing the study area, we made sure that these two municipalities were very diverse in terms of the variables considered: settlement size, average plot area, land use cover and uses, presence of protected areas, orography (e.g. one is in a plain area while the other is high mountain), etc. We developed a prototype DSS that is expected to be scaled up to the whole PR once it is refined.

Furthermore, during the interviews, we learned that the regional government considers a minimum operational area of 10 ha around the settlements. For the experiment, we followed a similar approach, calculating a minimum buffer of 10 ha around all the settlements. This was highly useful to cope with the imprecision of the delimitation of the model settlements (see Figure 73). This extended buffer was, in all cases, embracing all buildings, including those not yet registered or detected by the different sources of information.

Pilot Region Partner's perspective on data

While the data and information available present deficiencies, the prototype of the Decision Support System (DSS) seems to indicate that, for a preliminary assessment of the settlements, to have an idea of their priority for the model settlement initiative, the sources of information can be sufficient. This can be due to several reasons, one of the most important being the fact that the DSS is composed of a high number of variables (9 in total), which are all of high relevance for the pilot instrument.

This situation is analogous to how the pilot partner AGADER implements the policy instrument. When approving a new model settlement for preliminary planning of works, needs and expected results, AGADER (and TRAGSA) uses those same data sources. However, the actual implementation on the field relies almost entirely on fieldwork, especially when it comes to the investigation of the property ownership (rural cadastre information is not reliable and some data is not accessible due to data protection, such as landowners' personal information).

The fieldwork, despite the large investment in resources and time, seems to bring some positive and unexpected externalities discovered during the process. The frequent presence of staff from AGADER and TRAGSA in the area proved to be very helpful in building confidence with the inhabitants and local authorities, increasing local support for the instrument and proving essential for the collection of accurate data and information. One of the more illustrative examples is the investigation of the property of the parcels affected by the instrument. AGADER will not be able to get a precise dataset of parcels and information about their actual ownership without the support of the local inhabitants of the settlements.





Experiment design and implementation

Strengths and successes

Discussions with officers and technicians from the regional administration allowed us to identify variables of interest for the assignment of priority levels to potential locations for new model settlement projects. The search for spatial and non-spatial data sources from public providers worked well and enabled the production of values for all the intended variables. A sensitivity analysis and an assessment of the results by the potential end-users of the decision support system devised with those variables is still pending, but the results so far seem adequate.

Scope for improvement

A general understanding of the priorities of local inhabitants and local authorities is still pending. We believe that the results of Cycle 2 will be a good starting point for discussion with these stakeholders, as it is usually easier to discuss a concrete result (i.e. the points assigned to each settlement in each municipality and the reasons behind that) with stakeholders that are not particularly familiar with decision support systems. The future integration of qualitative data derived from interviews with local inhabitants and public officials is also still pending and will contribute to a more comprehensive understanding of the limitations of the model settlement initiative and the potential strategies to overcome them. Finally, the scaling up of the prototype DSS devised here to the whole Pilot Region will certainly allow for a more complete view of the challenges (i.e. the total number of potential settlements to benefit from the initiative, with their respective score representing the priority of implementation) and the degree of heterogeneity of the different municipalities forming the Pilot Region. It is worth mentioning that, in its current mode of implementation, the model settlement initiative does not consider intra-regional differences that could account for different priority levels among municipalities, which is something that may or may not be reasonable, depending on the results obtained in Cycle 3.

Skill development and capacity building

Skills developed

The Living Lab team is used to working with spatial analysis tools, and for the development of the experiment, they employed their skills in the handling of spatial and non-spatial data sources, particularly with the use of geographic information systems software. Nevertheless, the need to scale up the analysis (so far carried out for just a couple of municipalities) to the remainder of the pilot region makes it advisable to improve the team members' abilities regarding reproducible analysis, particularly those allowing them to implement a programmatic approach (either based on R, Python or similar programming languages). Reproducible analysis often relies on programmatic approaches (i.e., the analysis steps are written as executable code instead of done using more conventional point-and-click approaches), and this makes it quite easy to scale up analysis (by reusing the code) to different geographic locations.





Capacities

A capacity to combine qualitative and quantitative data in a mixed methods approach is still to be developed. As both the Pilot Region Partner and the Living Lab Coordinator teams have more experience in quantitative analysis, the qualitative data collected so far still needs to be truly incorporated into the analysis. Most likely, we will opt for an Explanatory Sequential Design approach so qualitative findings may be used to refine or put in perspective the quantitative results of the proposed DSS.

Pilot Region Partner's perspective on skills and capacities

The Pilot Region Partner has experience in spatial analysis, but in Galicia, experience in the use of decision support systems for the implementation of a policy instrument is scarce. An approach such as that proposed for this data experiment is perceived by the Pilot Region partner team members as one that may make their work more efficient and better aligned with specific territorial needs. Besides, fieldwork showed AGADER that the best way to build trust among the inhabitants of the model settlements to be implemented is to keep their staff on the ground. It is also essential for increasing local support for the instrument and for the collection of ownership information.

Innovation and impact

Reflections on innovation

The development of a decision support system is not new in the scientific literature, as there are numerous examples to be found. Nor is it new that both local and regional administrations have such tools at their disposal. What is innovative is the use of decision support systems to make decisions on policy issues. No such system was used to decide where to locate the first model settlements when the initiative launched. This is one of the few cases where such a tool will be used in planning at the local and regional levels. So far, the criteria for the selection of model settlement project locations are relatively unclear, and this can also be said, for the most part, of other related instruments (also included in the Law for the recovery of agricultural land in Galicia). This can be partially explained by the quasi-experimental nature of these first implementations, which makes it difficult to assess in advance which variables would be relevant for the selection of appropriate locations. In that sense, the DSS developed here benefits from the learning experiences in the initial stages of the first batch of model settlement projects to have been implemented in the region.

Short-term impacts

If the context in which the experiment was conceived and developed (increased number of requests for model settlement projects in the near future) is maintained, the use of the decision support system developed in this experiment will contribute to improving the effectiveness of the implementation of the instrument and will be a factor in ensuring the success of future planned model settlements.





Longer-term impacts

A possible long-term impact of the results of this experiment could be the introduction of the habit of using decision support systems for strategic decisions. The use of these tools, together with other tools, could improve the process and increase efficiency and effectiveness. Moreover, as discussed in section Cycle 3 plans, the DSS could be used for the ex-post evaluation of the model settlement instrument.

Potential for sharing learning

Although the decision support system developed in this experiment is designed for the specific Galician instrument of model settlements, the decisions taken during the development of the system and the problems detected in the data sources and how they were solved could be of help to the development of similar tools in other rural areas. In other places, other variables will be used, or the planning instrument for which the decision support system is intended to be developed will have other particularities, but probably the methodology followed, the difficulties encountered, and the solutions adopted could be similar.





Part 4: Future steps

Cycle 3 plans

Considering the results obtained so far within Cycle 2, we would like to pursue the following objectives within Cycle 3. First, we would like to refine and scale up, to the whole of the Pilot Region, the DSS produced in Cycle 2. Second, we would like to use the DSS to evaluate the selection of settlements on which the ongoing model settlement projects are based.

To refine the DSS produced, we expect to receive feedback from the regional and local stakeholders concerning the selection of variables and their assignment of scores and weights within the system. With this, we aim to align the DSS with the priorities and values of those stakeholders to make sure that the priority assigned to each settlement by the DSS is in correspondence with the way that the regional administration (responsible for their implementation) and local inhabitants and authorities (who should apply for implementation of model settlement projects in the first place, voluntarily). As a supporting measure for these adjustments, we will carry out a sensitivity analysis of the DSS to further understand the relative influence of individual variables on the final result and the expected outcomes of a possible variation in the variable weighting used so far.

A second step would imply the scaling up of the DSS to the whole pilot region (20 municipalities). This would be based on the findings of the previous objective and would mean that results would be available for the entire number of candidate settlements in the pilot region (rather than the settlements from the two municipalities selected for cycle 2). Once the relevant indicators and data sources have been selected, this would essentially mean the repetition of the process for the remaining municipalities. As has been already discussed earlier in this text, the use of a programmatic approach (i.e., based on code) greatly increases the reproducibility of the analysis. This means that most of the processing work can be automated and would allow for a relatively easy process.

Finally, having information for the entirety of the pilot region, we would like to evaluate the locations of ongoing model settlement projects. This would not only help us understand whether they represent an adequate selection according to the effectiveness of the use of public resources but also would allow us to evaluate in perspective any unexpected difficulties that may have arisen so far in their implementation.

Future collaborations

The work done so far allowed us to strengthen the relationship between the Living Lab coordinator (University of Santiago de Compostela) and the Pilot Region Partner (AGADER). This is a long-term collaboration that is foreseeable to continue in the future, as both institutions share a common interest in the development of rural areas in the region and have other projects in common (though not necessarily with the same people from both teams, as other departments of both institutions are also involved in those other activities).





Nevertheless, for the remainder of this project, we aim to further involve other stakeholders, mainly local ones, who have only been approached in a limited way so far. This includes municipalities, local action groups and local residents.

Communication and dissemination

Regarding the dissemination of the work done so far in this living lab, we are currently considering the preparation of an academic publication in a national journal (in Spanish). We would rather choose this option instead of an international publication in English so we can reach a local audience (both from Galicia and other regions in Spain) that international publications often miss.

Additionally, we would also like to present results in several dissemination events at a regional scale in 2025. Those would also allow for feedback from our audiences and, therefore, further contribute to Cycle 3 of the data experiment. At the time of writing this report, we are considering submitting a contribution to the XV Congress of Agri-food Economics of the AEEA (Spanish Association of Agricultural Economics), to be held in Granada (Spain) on September 3-5th 2025, and/or to the XVIII Congress of the EAAE (European Association of Agricultural Economists), to be held in Bonn (Germany) from August 26-29th 2025.





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Spain: Sant Miquel de Balenyà (Osona)

Marite Guevara (Fundació Ersília) and Andreu Blanch (Entitat Municipal Descentralitzada de Sant Miquel de Balenyà)





Summary and overview

Living Lab challenge

The challenge of the Living Lab is to enhance the quality of life (QoL) in Sant Miquel de Balenyà, with a specific focus on social cohesion and equity, climate resilience, and balanced social and economic competitiveness. The means to achieve this goal will be to improve current territorial and urban planning. This will involve understanding the territorial model and local perspectives on issues within the territory which may be addressed through planning: as such, citizen participation in the project will be required to achieve our goals successfully.

The QoL index experiment

The data experiment is to define a QoL index for the different neighbourhoods of the population of Sant Miquel de Balenyà. The experiment aims to allow the identification of possible new strategies for improving the QoL in the village, while the index can also become an element of monitoring the effects on the territory of different urban and territorial actions that must take place to face the environmental and socio-economic transitions in the near future.

Preliminary results

Based on the data collected for the QoL indicator in Sant Miquel de Balenyà, specific population areas have been identified as having significantly lower index scores than others. These areas, primarily located along high-traffic urban roads, consistently show the lowest QoL scores across all three dimensions that comprise the index.

Key learning to date

The experiment, executed in two phases—GIS analysis and participatory tools—has provided valuable insights for project partners on systematising municipal data collection and conducting QoL surveys. Key lessons include working with tools like Maptionnaire and engaging specific population groups. Mapping QoL-based population areas now offers a practical tool for future urban planning and for stakeholders managing different territorial actions.

Next steps

The next steps focus on preparing a social report and disseminating key findings to guide urban renewal projects and update the General Municipality Plan. This report will be based on data obtained through the RUSTIK project and citizen participation processes, prioritizing areas where the Quality of Life (QoL) index shows the lowest values. The index, enriched with new socio-economic and environmental indicators, integrates quantitative data and community insights to highlight key urban renewal priorities. Additionally, survey results will be shared in accessible formats tailored for the residents of Sant Miquel de Balenyà and presented to stakeholders to align findings with territorial needs. Efforts will focus on engaging political actors identified in the Theory of Change, ensuring their involvement in disseminating findings and supporting the development of participatory urban planning strategies.





Part 1: Living Lab context

Pilot Region introduction

Sant Miquel de Balenyà, part of the Seva municipality in Osona County, stands as a distinct entity with a population of 1,353. Its strategic location between the Montseny Mountains and the Plana de Vic has contributed to a strong production sector, particularly in agri-industrial activities. As a Municipal Decentralized Entity (Entitat Municipal Descentralitzada or EMD in Catalan), the Sant Miquel de Balenyà Council actively participates in the RUSTIK project, aiming to address the RUSTIK challenge, especially within its local context.

The town developed around a railway station, known as Balenyà, established in 1875. The church of Sant Miquel was built later, in 1956, during a period when most houses were constructed in a grid-like pattern. Shaped by its history, the town is characterized by its openness and vibrant social fabric, with residents demonstrating a remarkable capacity to come together and mobilize effectively in support of shared causes.

Though small, the town was divided into four different municipalities until 1995, when the entire town was integrated into the same municipality as Seva, a town of similar size. It was then that the town officially took the name Sant Miquel de Balenyà. The first land use master plan was designed in the late 1960s, and successive updated plans have consistently confirmed its initial car orientation, with the latest update occurring in 2006.

The town has an industrial area with over 30 industries located very close to the town, separated from it by the train line.

Functions

Sant Miquel de Balenyà has a strong production function covering many sectors, particularly in the secondary sector. Over 30 industries are located in the area. The sector that employs many people is the agro-industrial sector, especially the pork industry, and most of these workers are low-wage (Blanch and Ulldemolins, 2023).

The agro-industrial sector is also strong within the primary sector, with seven livestock farms and 226.8 hectares of agricultural holdings, representing 53.3% of Sant Miquel de Balenyà. Fourteen percent of the area is covered by forest, but currently, no forestry development is ongoing. (ICGC, 2018).

The tertiary sector is developed, with essential services common to rural areas, such as schools, hairdressers, and mechanics. Restoration services are particularly important due to strong economic activity and the town's role as a transit area at the regional level.

Sant Miquel de Balenyà is one of the northern gateways to the Montseny Massif, a natural area designated as a Biosphere Reserve and Natural Park, which attracts many visitors, mainly for weekend holiday purposes. There are specific festivities in the area that reflect the tourism intensity, mainly the Medieval Market in Vic and the Mushroom Fair in Seva.





The residential area is centred mainly in Sant Miquel de Balenyà town. There are a few countryside houses, mainly related to agriculture and farming, and there is the Serrat de l'Aguiar neighbourhood along the main road, which is more directly linked to the municipality of Tona.

The challenges facing Sant Miquel de Balenyà regarding landscape and cultural heritage conservation, biodiversity maintenance, soil protection, and water availability are intertwined with critical environmental concerns. Specifically, the county faces water scarcity due to declining rainfall, which impacts various activities and ecosystems. Water quality issues linked to pork manure pollution affect the northern side of Osona while decreasing water availability is a primary concern, amplified by diminishing rainfall. Climatic risks, notably decreased rainfall and rising temperatures, profoundly affect the northern Montseny, impacting vital leisure and economic activities like mushroom and chestnut collection, trekking, and cycling. These environmental challenges threaten both local ecosystems and the sustainability of recreational and economic practices within the region.

Transitions

The key transitions addressed by the Sant Miquel de Balenyà Living Lab are the socio-economic and the environmental. The challenge will be addressed in a holistic approach.

Socio-economic and demographic transition

The town has a growing population, and this is driven by three factors: its location (well-connected with Barcelona and the county capitals Vic and Granollers), the presence of factories attracting more workforce than inhabitants in the village, and the number of secondary residencies, some of which have become main residences since the Covid-19 crisis. At a regional level, there is a strong incoming migratory flow that counter-balances the low fertility rate. (CREACCIO, 2023)

Climate and environmental transition

In relation to energy, there is a commitment to green energy in the area. On the public side, wood chips from the Montseny forests are being used as solid fuel powering boilers, and the private sector is investing in solar panels, mainly on industrial roofs. Efforts need to be made regarding the water availability problem, which will become more severe in the upcoming years.

Digital transition

The digital infrastructure is appropriate for the area, with the main population centre and the industrial area covered by optical fibre and all sites being covered by 4G connection. The industrial sector is barely digitised, whereas the commercial one is progressing in this sense. However, there is no need to digitise some services as they are directly accessible to local people, who are the main users. There is currently no information on people's digital capacities.

Living Lab partnership

The Living Lab partnership consists of the EMD of Sant Miquel de Balenyà, serving as the Pilot Region Partner, and Ersilia, acting as the Living Lab coordinator.

The EMD of Sant Miquel de Balenyà is an entity with a territorial scope below the municipality level, consisting of one or more population centres without its own town hall, governed collectively by a neighbourhood board. With a current population of 1,350 inhabitants and a territory of 4.5 km², its responsibilities are determined by the agreement with the Seva Town Hall and primarily include urban planning, education, social services, mobility and public space, environment,





tourism, and economic promotion. Some of these responsibilities are carried out by the La Plana association, a supra-municipal entity that groups 12 neighbouring municipalities.

ERSILIA's expertise spans several key domains, including sustainable urban and rural development, sustainable practices, interdisciplinary and transdisciplinary learning, knowledge dissemination, and stakeholder engagement. ERSILIA works on projects such as INTREPID and UrbanShift, focusing on sustainable urban research and innovation, and RUSTIK, which centres on rural community futures. ERSILIA facilitates workshops and training in urban research, promotes the dissemination of scientific and humanistic knowledge, and leads communication efforts in European research projects. By fostering knowledge alliances between businesses, universities, research centres, and civic associations, ERSILIA supports interdisciplinary research and sustainable development goals, driving innovation, sustainability, and collaboration to address global and local challenges.

Table 38 Core team members

Name	Organisation	Role/expertise
Marite Guevara	Ersilia Foundation	Living Lab Coordinator; Communication Expert
Andreu Blanch Bou	Entitat Descentralitzada de Sant Miquel de Balenyà	Living Lab Partner, Geographer, GIS Analyst

Living Lab challenge

The challenge of the Living Lab is to enhance the QoL in Sant Miquel de Balenyà, with a specific focus on social cohesion and equity, climate resilience, and balanced social and economic competitiveness. This goal will be achieved through the improvement of current territorial and urban planning. This process will involve understanding the territorial model and local perspectives on issues within the territory, which may be addressed through planning. Therefore, citizen participation in the project will be required to successfully achieve our goals.

Rationale and research questions

The territory of Sant Miquel de Balenyà and its main stakeholders are currently facing changes to address various transitions and challenges at both local and global levels. The implementation of public policies capable of responding to these challenges is a fundamental element. The concept of QoL, despite its complexity, can become a tool to better understand citizens' perceptions of their living conditions in relation to the identified challenges and transitions. Therefore, it is necessary to identify an indicator adapted to the territory of Sant Miquel de Balenyà, which will enable the different actors to improve the public policies that need to be implemented to tackle future challenges.

The research questions that we seek to answer from our Living Lab work in Cycle 2 are:

- How can improvements in territorial and urban planning positively impact social cohesion, equity, and the overall QoL for residents in Sant Miquel de Balenyà?





- What measures can be implemented to enhance the community's resilience to climate-related challenges, ensuring sustainable development and environmental preservation?
- How can a balanced approach to social and economic competitiveness be achieved, fostering local economic growth while maintaining social equity and inclusivity?
- What strategies and methods can effectively engage and involve the community in decision-making processes and project development, ensuring their voices shape the outcomes of the Living Lab initiative?

Policy relevance

The various policies being implemented in the town of Sant Miquel de Balenyà are currently carried out by different administrations at various scales. These range from urban planning conducted by the municipality of Seva to mobility policies and major infrastructure related to transport managed by the Government of Catalonia (Generalitat), and social services and environmental policies overseen by the La Plana Commonwealth (Mancomunitat la Plana). The challenge of improving the QoL in Sant Miquel de Balenyà, and implementing a QoL index, should enable the town to generate useful information for decision-making and the evaluation of existing policies and projects in the territory.

Stakeholders

Below is a list of the main stakeholders, their types and scales of action, and whether or not they have been involved in the Living Lab to date.

Table 39 Living lab main stakeholders

Name of actor/ organisation	Type PU = Public PR = Private PPP = Public-private partnership CS = Civil society	Territorial scale RE = Regional LO = Local	Actively involved
Diputació de Barcelona	PU	RE	Yes
Consell Comarcal d'Osona	PU	LO	No
Mancomunitat de la Plana	PU	LO	Yes
Ajuntament de Seva	PU	LO	Yes
EMD de Sant Miquel de Balenyà	PU	LO	Yes
Creació	PU	LO	No
Association of Retired and Pensioners of Sant Miquel de Balenyà	CS	LO	Yes
Centre de Dia El Casal	PU	LO	Yes





Theory of change

The long-term objective, or ultimate goal, that the Living Lab seeks to achieve is enhancing the QoL in Sant Miquel de Balenyà. The experiment addresses the initial steps in this process by developing a QoL index, a critical intermediate outcome, to assess current conditions. This index helps identify specific areas of need and disparities between neighbourhoods, which in turn informs targeted policy actions and interventions. In this regard, a QoL index has been developed to provide a more nuanced understanding of well-being at the local level, as well as to challenge current assumptions.

Following the Theory of Change methodology the scheme below illustrates the policy actions that have been identified that will help to achieve the intended long-term outcome of the data experiment and intermediate outcomes that must be achieved to effectively bridge the gap between the policy actions and the long-term goal of enhancing the QoL.

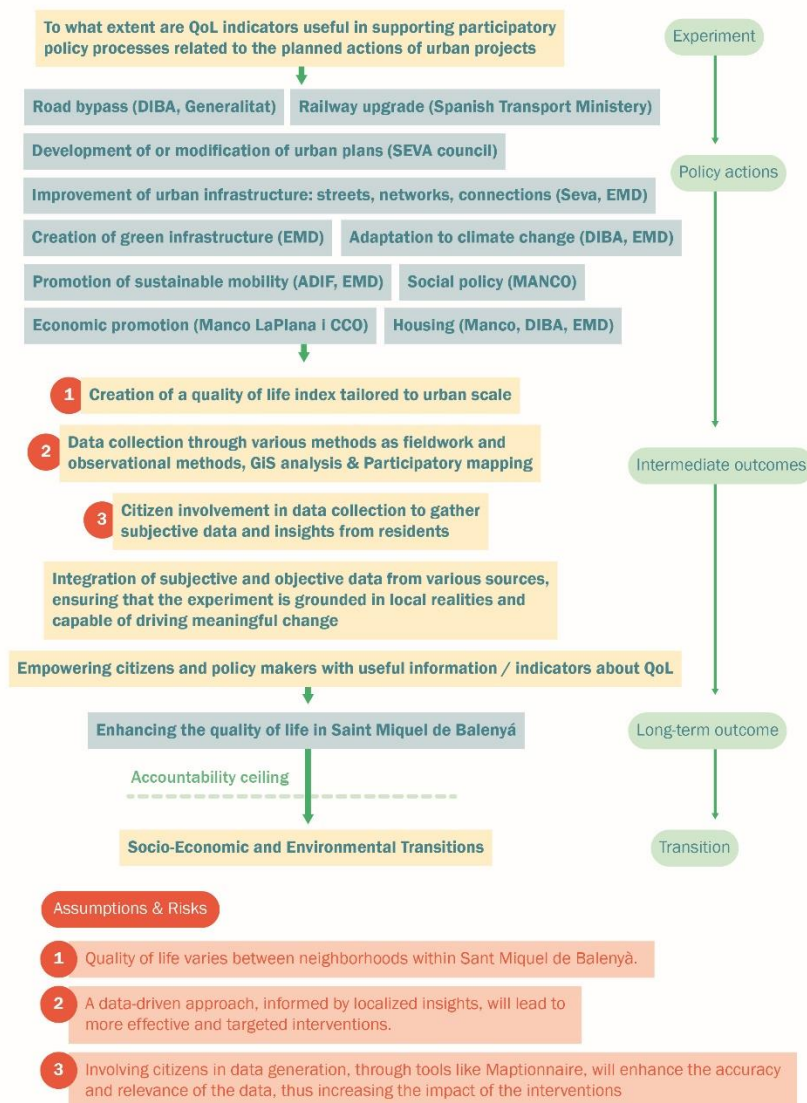


Figure 75 Policy actions identified to achieve long term outcome





Data relevance

As identified in Cycle 1 (D3.1), for the use of the concept of QoL in the implementation of public policies, it is necessary to involve citizens in the data collection processes and to understand, through qualitative and subjective data, those indicators that allow the creation of an index to measure the QoL in the town.

To improve the QoL conditions of the population in the territory, a set of indicators has been identified based on the methodology²² proposed by the European Observation Network for Territorial Development and Cohesion (ESPON) for the creation of a QoL index. This methodology proposes a set of indicators distributed across different levels and conceptual spheres. These indicators have been modified and adapted to the territory of the Living Lab, and the collection of the data that form part of these indicators is the central focus of the experiment conducted throughout this cycle.

²² ESPON.eu. (2021). Quality of Life for Territorial and Citizen-Centric Policies. [Policy Brief]. Retrieved from <https://archive.espon.eu/sites/default/files/attachments/ESPON%20Policy%20Brief%2C%20Quality%20of%20life.pdf>





Part 2: Living Lab Cycle 2: Data experiments

Data experiment

Developing the data experiment

The design of the experiment, understood as the collection of data from the territory to create a QoL index grounded in the different neighbourhoods of the population, stems from the need of local authorities to understand, in the most localized way possible, the impact that future actions developed in the territory may have, as well as to identify current and future needs that can be addressed in upcoming urban and territorial planning processes. This need, jointly identified by the regional partner and the coordinator of the Living Lab, led to a meeting aimed at determining the best methodology for creating a local-scale QoL index.

In essence, the QoL index under ESPON's framework moves beyond traditional metrics like GDP, focusing on a multidimensional understanding of well-being and empowering local actors to shape public policies that reflect their priorities and enhance their quality of life.

The QoL conceptual map developed by ESPON provides an innovative approach to a place-based and citizen-centric understanding and measurement of QoL, a multifaceted concept that enhances the effectiveness of public policies by providing a deeper understanding of how individuals perceive their own living conditions. It goes beyond traditional measures like economic output and living standards, offering a more comprehensive perspective. The ESPON approach bridges the gap between citizens and policies at all levels—local, regional, national, cross-border, transnational, or European—by incorporating place-specific perceptions of Quality of Life (QoL). This method holds significant promise for making public policies more accountable, ensuring they address the dimensions that matter most to citizens in a given location and moment. Additionally, it helps mitigate feelings of neglect and exclusion, addressing the so-called 'geography of discontent'.

The ESPON approach, QoL covers three broadly formulated spheres (personal, socio-economic and ecological), and three conceptual dimensions of QoL (good life enablers, life maintenance and life flourishing). The ESPON approach provides a simple Excel as a territorial QoL dashboard.

The framework's methodology emphasizes a place-based approach to understanding Quality of Life (QoL) at the local scale, addressing the unique characteristics and challenges of specific territories. Its citizen-centric design incorporates participatory methods, such as workshops and surveys, to reflect community perspectives and validate indicators. By treating QoL as a multidimensional concept encompassing domains like education, employment, and environmental quality, the framework promotes flexibility and experimentation, allowing stakeholders to adapt indicators and methodologies to local contexts and aspirations.

1st Meeting: It was decided to use the ESPON methodology for the QoL index, selecting those indicators that can reveal differences between the various neighbourhoods of the population. Consequently, only data below the local scale will be used, excluding data from main territorial data portals where the lowest level of granularity is the municipal level.





2nd Meeting: Indicators to be included in the index were identified. Of the three dimensions presented by the index, see table below, it was agreed that the first dimension would consist of quantitative data already collected in the first phase of the RUSTIK project through fieldwork and data scraping. Meanwhile, the second and third dimensions would be derived from a population survey using Maptionnaire's georeferenced forms and participatory workshops with citizens.

Table 40 Final proposal of indicators for the QoL index for each of the three dimensions

DIMENSION	DOMAIN	Sub-domain	Indicator name
GOOD LIFE ENABLERS	Personal Enablers	Housing & basic utilities	Energy efficiency certifications
		Consumption opportunities	Commercial activity: active premises and empty premises
	Socioeconomic Enablers	Public spaces	Proximity to Green Spaces
		Ecological Enablers	Green Infrastructure

DIMENSION	DOMAIN	Sub-domain	Indicator name
LIFE MAINTENANCE	Personal Health and Safety	Personal Health	Green and recreational spaces
		Personal Safety	Unsafe spaces
	Ecological Health	Healthy Environment	Air and noise pollution
		Climate Change	Climatic shelters

DIMENSION	DOMAIN	Sub-domain	Indicator name
LIFE FLOURISHING	Personal Flourishing	Self-esteem	Perception of the quality of life
		Self-actualization	Participation in courses
	Community Flourishing	Interpersonal Trust (societal belonging)	Participation in groups or associations
		Institutional Trust (good governance)	Awareness and Participation in Municipal Activities
	Ecological Flourishing	Ecosystems services and Biodiversity wealth	Local trade consumption

Experiment description

The creation of a Quality of Life (QoL) index, tailored to the local scale of a rural town and designed to differentiate between various parts of the Living Lab territory, forms the foundation of the experiment conducted by the Living Lab. This index is based on the methodology proposed by ESPON in 2021 as part of the "Quality of Life for Territorial and Citizen-Centric Policies" framework.





The experiment adapts the ESPON QoL conceptual map to a scale smaller than the municipal level, focusing on individual neighbourhoods within the Living Lab territory. This level of granularity is unprecedented in the context of Sant Miquel de Balenyà, aiming to uncover localized disparities and patterns that broader analyses might otherwise overlook.

The QoL index was developed using data from various sources and methods, encompassing 13 indicators across three dimensions: 1) Good Life Enablers, 2) Life Maintenance, and 3) Life Flourishing. To collect this data, the experiment was conducted in phases, employing both traditional and innovative methods to assess the index's relevance for local decision-making within the Living Lab:

- Objective data were collected through data scraping, fieldwork, and existing databases.
- Subjective data were gathered using surveys administered through the Maptionnaire tool, targeting diverse social groups.
- A participatory workshop employed photo elicitation techniques to validate some of the data, with participants identifying community spaces that evoked positive or negative emotions.

The experiment's initial findings, derived from objective data obtained through web scraping and fieldwork (representing the "Good Life Enablers" dimension), largely align with subjective data from surveys and photo elicitation, which address the "Life Maintenance" and "Life Flourishing" dimensions.

Using initial data collected through fieldwork and GIS analysis, the index has been further refined with data generated directly from citizen participation, incorporating a clear geographic dimension of the phenomena. Aligned with environmental and socioeconomic transitions, the outcome of this index is expected to help anticipate future needs and identify potential improvement actions to enhance the population's resilience and promote greater social cohesion.

The experimental nature of the action carried out in Sant Miquel de Balenyà lies in the application of the QoL conceptual map at a highly localized scale, smaller than the municipal level for which data is typically available. This approach has required data collection processes never before used in this municipal context, including data scraping and fieldwork to identify specific indicators. Additionally, the use of innovative tools such as Maptionnaire for mapping subjective data from the population represents a novel element at the municipal level in Sant Miquel de Balenyà. For the first time, these methods have enabled the inclusion of people's perceptions of their own living conditions as a source of information to support public policies.

Experiment objectives

The main objective of the experiment is to identify the QoL index for each of the different neighbourhoods in the territory and to identify the differences and motivations behind these differences, thus determining the necessary actions to improve the QoL of the population.

Other objectives of the experiment are:

- To assess the suitability of obtaining a locally grounded QoL index to evaluate the expectations of the population.
- To create a tool that allows collaboration among the different stakeholders in the territory.





Relationship to theory of change

The experiment is closely aligned with the Theory of Change (ToC) by providing a systematic approach to improving the QoL in Sant Miquel de Balenyà. As in the ToC framework, the experiment starts with the identification of a desired long-term impact—in this case, enhanced QoL. The experiment addresses the initial steps in this process by developing a QoL index, a critical intermediate outcome, to assess current conditions. This index helps identify specific areas of need and disparities between neighbourhoods, which in turn informs targeted policy actions and interventions. These interventions are designed to address the transition challenges in environmental and socioeconomic conditions, ultimately contributing to the broader goal of enhancing resilience and cohesion within the community. By involving citizen participation and integrating data from various sources, the experiment ensures that the ToC is grounded in local realities and capable of driving meaningful change.

The experiment plays a crucial role in both testing assumptions and identifying specific steps within the broader Theory of Change framework. It allows the Living Lab to explore several key assumptions. One such assumption is that QoL varies between neighbourhoods within Sant Miquel de Balenyà. By developing and applying the QoL index, the experiment will validate or challenge this assumption, revealing the actual disparities in well-being across different areas. Additionally, the experiment tests the assumption that a data-driven approach, informed by localized insights, will lead to more effective and targeted interventions. It assesses whether the data collected and the resulting index provide actionable insights that improve policy and decision-making processes. Another critical assumption being tested is that involving citizens in data generation, through tools like Maptionnaire, will enhance the accuracy and relevance of the data, thus increasing the impact of the interventions.

Beyond testing these assumptions, the experiment helps to clarify and identify specific steps essential to achieving the long-term goal of enhancing the QoL in the area. The first step outlined by the experiment is the collection and analysis of data at the neighbourhood level, which is crucial for understanding the current state of well-being. This is followed by the development of the QoL index, where the collected data is synthesized into an index that highlights disparities and guides future actions. The experiment also emphasizes the importance of integrating the findings from this index into local policy processes, ensuring that the data influences real-world decision-making and resource allocation. Finally, the experiment involves an implicit step of continuous feedback and adjustment, using insights from the index to refine the approach and adapt interventions over time, thereby keeping the Theory of Change relevant and effective.

Data use

Data sources and methods

The experiment utilized diverse data sources and innovative methods to develop a QoL index that can inform local decision-making.





Table 41 Data source and methods

Data Sources planned	Data collections / analysis methods	Data tools	Indicators QoL index
PRIMARY DATA Machine-based methods	Web scraping	Reporting platforms and Sensors	1st dimension of QoL index
PRIMARY DATA Observational methods.	Fieldwork	Smartphone apps (Locus GIS, Kobo toolbox)	1st dimension of QoL index
PRIMARY DATA Standardized self-reported	Participatory mapping / paper surveys questionnaires Photo elicitation	Maptionnaire	2nd and 3rd dimensions of QoL index
SECONDARY DATA Administrative data		Repositories and open Data Platforms	1st dimension of QoL index

Data innovation

The QoL index has been worked on internally in the Living Lab between the partner and the coordinator to find the usefulness of its results as a tool for making future decisions. The territorial scale of the index results offer a tool at the local level that has never been used before in decision-making or urban planning. For the creation of this index, a series of indicators have been established, the data for which have been obtained through a mix of known methods as well as methods that had not been previously used in this field. In this way, the use of the Maptionnaire application as a tool for collecting data from citizens through the geolocation of questions has enabled the gathering of data on the QoL of citizens, grounded in the various territorial areas of the population, allowing for neighbourhood-level identification of these qualitative and subjective data on a local scale.

Implementation

Implementing the experiment

The implementation of the experiment has been carried out in two major time blocks for the collection of data on the QoL indicators selected for the index. The first dimension of the QoL index consists of indicators formed by objective and quantitative data. These data, collected through data scraping, fieldwork, and consultations with existing data directories, are followed by the data for the indicators that form parts 2 and 3 of the QoL index. These have been collected through a survey process among the population using the Maptionnaire tool. To reach the maximum number of people, these surveys were conducted using a 4-element strategy for data collection, aiming to reach different social and age groups and communicated through various media.





Figure 76 The 4 strategies for conducting the QoL survey among the population in the village.

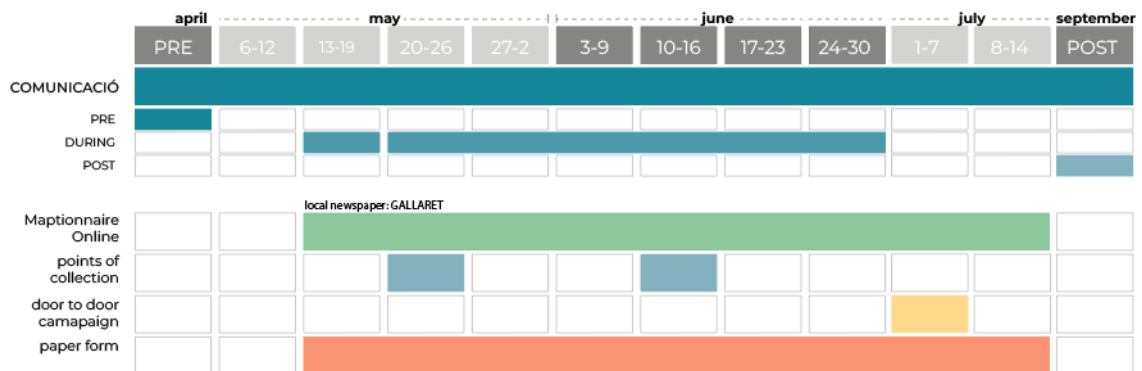


Figure 77 Timeline and development of the experiment questionnaire during the year 2024.

On the last day designated for data collection through the questionnaire, a participatory workshop was held using the photo elicitation methodology to also contrast some data based on the perceptions of the workshop participants and a photographic report of the community. The objective was to identify, through a random selection of a photograph of the village, which spaces evoke positive or negative emotions and why.





Figure 78 Pictures taken at the photoelicitation workshop held during the town fete in July 2024

Adaptations

During the second phase of the experiment, in which data was collected using the questionnaire created with Maptionnaire, it was ultimately decided not to conduct door-to-door data collection. It was considered that this could be an invasive strategy for the privacy of the residents, and therefore data collection was reinforced during the town fete at the end of July 2024.

Other Living Lab activities and achievements

Throughout cycle 2, the Living Lab has also participated in other projects that have taken place in the territory and in which the jobs and tasks developed by the Living Lab have been integrated into these projects, principally the PAMH (Municipal housing action program). The PAMH covers non-regulated planning instruments, with analytical content, which includes the proposal of concrete actions, which will define the local housing policies for municipalities with less than 10,000 inhabitants. The data obtained regarding the state of the buildings and the commercial census have been integrated into these projects aimed at improving housing policies.





Preliminary results

Results to date

During the months of January, February, March, and April, the data comprising the first dimension of the QoL index, 'Good Life Enablers,' was finalized. This dimension considered housing quality, commercial vitality (active vs. vacant premises), proximity to parks and squares, and noise. These four indicators facilitated an initial weighting and mapping of this dimension within the QoL index (see Figure 79).

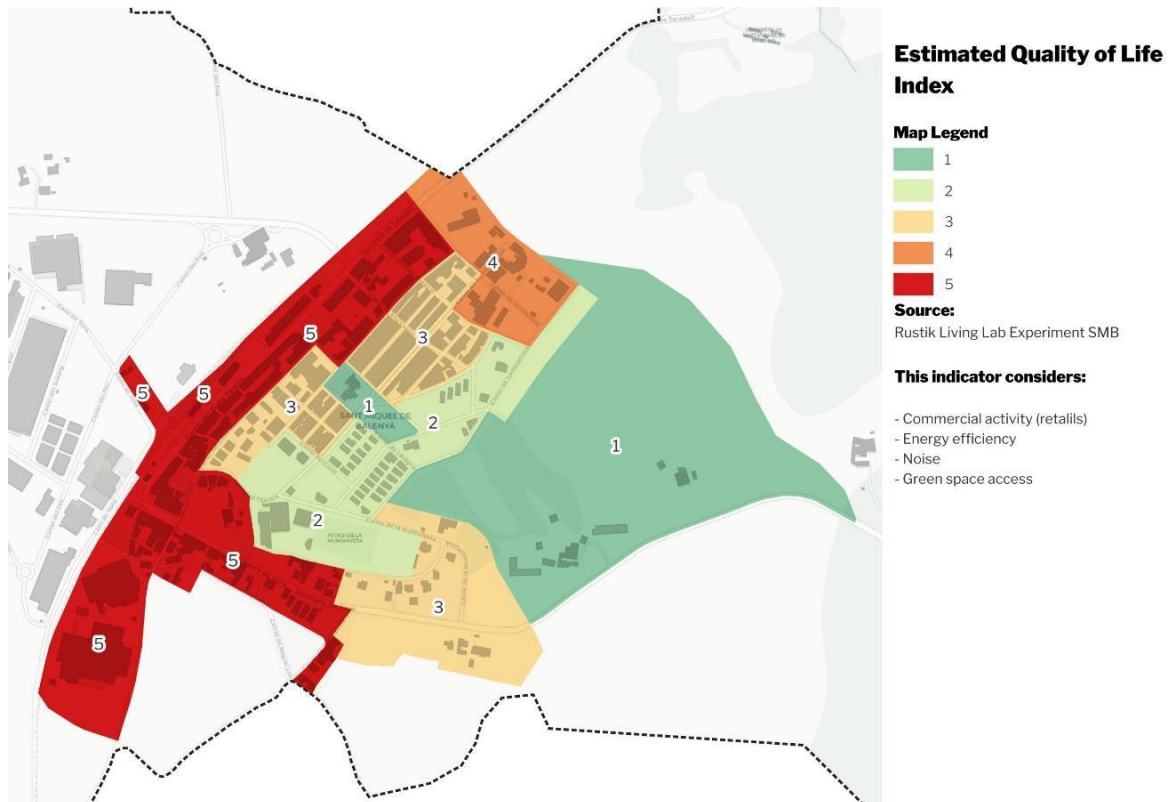


Figure 79 Weighting of the QoL index of the "good life enablers" dimension

This first section of the index, completed through data obtained from web scraping and fieldwork, provided a preliminary view that was valuable to compare with the other two dimensions, which were developed from April to July using the Maptionnaire survey (see Figure 80 below).



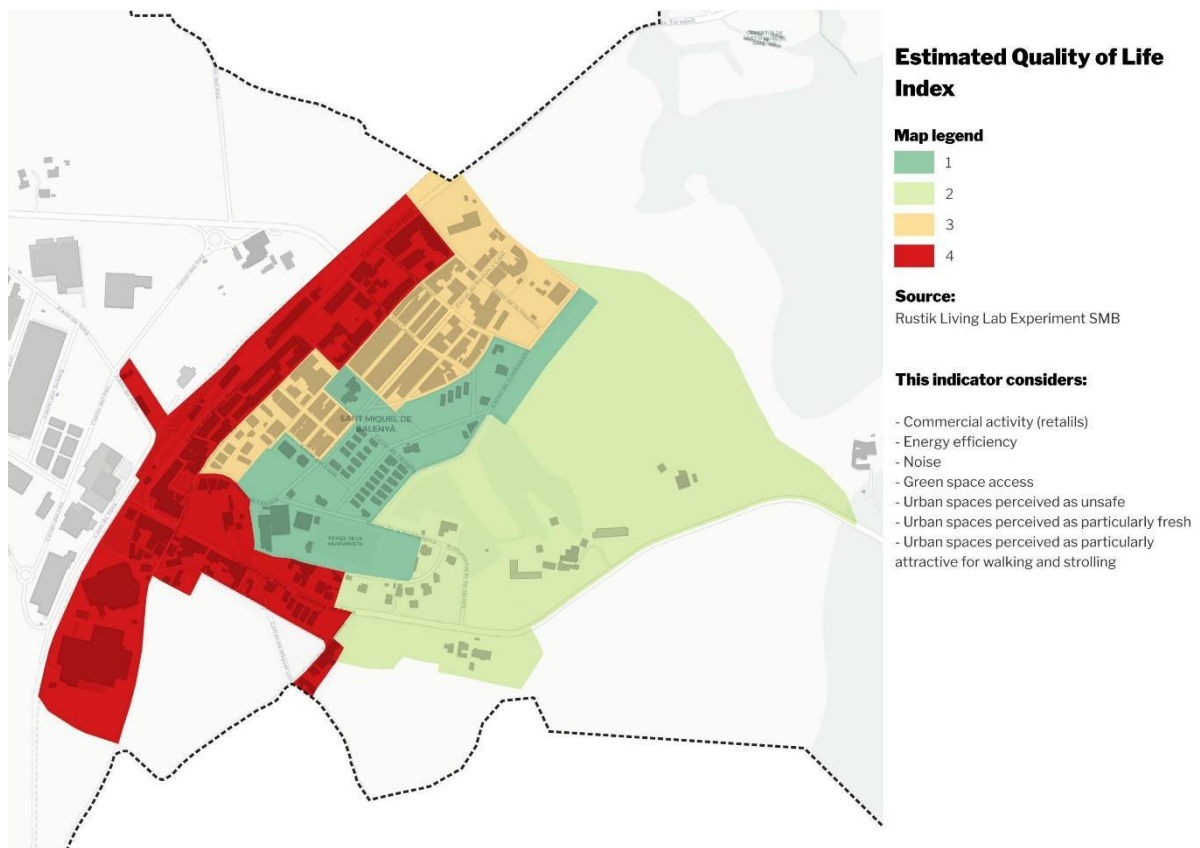


Figure 80 Weighting of the QoL index of the "Life Maintenance & Live Flourishing" dimensions

The results of the index clearly allow us to identify an area with a lower QoL index than the rest of the population. This area, located along the Seva road and the railway tracks, is also adjacent to the economic activity zone of the Avellanet PAE. This space, surrounded by major infrastructures and close to the activity zone, shows significant abandonment of commercial fabric as well as high security problems associated with the presence of interurban road infrastructures passing through it. These initial results can be linked to the transitions identified in the living lab (environmental and socio-economic) as priority areas of action for revitalizing the commercial fabric and reducing levels of air and noise pollution.

Additionally, during the town fete in July 2024, a participatory workshop was held using the photo elicitation methodology to identify spaces that evoke positive or negative emotions through a random selection of town photographs, contrasting them with previously acquired data. As shown in the photographs below (see Figure 81), both the data and participants' perceptions highlight the area adjacent to Seva Road, the railway, and the economic activity zones as the area with the lowest QoL in the town, thereby reinforcing the initial data findings.





Figure 81 Town photographic panel where local residents marked places that evoke positive (green) and negative emotions (red).

In line with the goal of improving the QoL for residents, the experimental results suggest the need to give more priority to policies revitalizing the local commercial fabric, creating safe pedestrian spaces, and establishing climate refuge areas.

Robustness and limitations

The robustness of the experiment and its conclusions on identifying differences in Quality of Life (QoL) between neighbourhoods in Sant Miquel de Balenyà rely primarily on the alignment of subjective and objective data across the various indicators comprising the QoL index. These data consistently highlight specific areas of the population with similar values. Additionally, photo-elicitation workshops conducted with residents have validated many of the final conclusions regarding the spatial distribution of QoL index results.

While the use of new technologies and the collection of citizen perception data represent innovative methods, they require refinement due to accessibility issues. Not all residents could access the platform, and many who began the survey did not complete it, frequently citing its excessive length as a barrier.

The primary limitations of the experiment stem from challenges related to the survey and the identification and weighting of QoL indicators, which led to data gaps. Of the total population, only 216 responses (15.9%) were fully completed, with 98 participants failing to finish the survey correctly. Moreover, the low participation rate among younger demographics (ages 15 to 25) highlights the need for targeted engagement strategies to enhance community involvement in future surveys.

A shorter questionnaire would likely improve participation, as a significant number of individuals did not complete it or only accessed the platform without submitting responses (147 submitted respondents, 69 unsubmitted respondents, and 83 bounce visitors).





Part 3: Reflections and learning

During Cycle 2 of the experiment, the final QoL index was defined based on data collected through various sources and methods (see Data sources and methods). The index included 13 indicators across the three dimensions proposed by the ESPON methodology. To differentiate between neighbourhoods, the indicators were limited to those obtainable through new sources such as fieldwork or questionnaires, excluding some significant QoL indicators such as economic and health data. Including these, even at a general level for the entire municipality, could have enhanced the analysis.

Online questionnaires via the Maptionnaire tool were used to collect data for the second and third dimensions, achieving a participation rate of about 15%, consistent with other recent local participatory processes. While efforts were made to engage the population, a targeted strategy to involve specific groups, especially those aged 15 to 25, was needed.

Major Learning Outcomes:

- **Indicator selection based on data availability:** The 13 indicators were chosen based on the feasibility of data collection while adhering to ESPON's methodology.
- **Need for localized indicators:** Indicators were selected to differentiate between neighbourhoods, relying on new data sources and excluding traditional economic and health metrics.
- **Exclusion of important QoL indicators:** The omission of economic and health indicators created a notable gap; their inclusion, even at a general level, would be highly beneficial.
- **Challenges in data collection and participation:** Achieving a 15.9% participation rate highlighted the need for improved engagement strategies, particularly for younger age groups.
- **Need for targeted engagement strategies:** A specific approach was necessary to engage all demographic groups effectively, with a focus on younger residents aged 15 to 25.

Reflections on data sources, methods, and tools

The data sources used in the experiment ranged from existing official repositories to direct field data collection, including surveys. With this variety of data source options, the aim was to approach the QoL index using the most relevant data for each of the selected indicators.

The main challenge in implementing a QoL index at such a small scale (which subdivides a population of 1,300 inhabitants into zones) is obtaining data at such a granular territorial level. For the fieldwork, data collection tools that had been used previously were employed, which facilitated their use and implementation (see Data sources and methods). For data collection via questionnaire, the Maptionnaire tool was used for the first time. This tool, which allows the collection of geolocated data through cartography, was accompanied by a series of training sessions, but once completed, several elements were identified that caused various errors (see Major Learning Outcomes).





Data issues and obstacles during the experiment

The main obstacles in the experiment's development were:

- Technical difficulties with the Maptionnaire tool when drafting the forms.
- Survey forms that were too long, leading to many people not completing them.
- Limited participation from the usual population groups in participatory processes and difficulty in mobilizing a segment of the population (ages 15-25).
- Gaps in participation from areas that typically have low engagement (see "Pisos d'en Mas").
- Difficulty in explaining the usefulness of the data to the participating population.

Managing data issues and obstacles

Regarding the use of the Maptionnaire tool for data collection through a questionnaire to the population, the problems mentioned in the previous point were difficult to solve because once the questionnaire was started, it could not be shortened, and the errors made were largely due to a lack of practice with the tool. The most appropriate solution would have been to limit the questionnaire questions to the indicators related to the QoL index and to use the survey to gather more information. It would also have been useful to conduct tests directly with anonymous individuals from the population to identify the difficulty in completing the questionnaire correctly, which led to 38 surveys not being properly completed.

The limited participation and the gaps in participation in certain urban areas could have been addressed with a door-to-door data collection strategy.

Pilot Region Partner's perspective on data

The data and conclusions obtained throughout the experiment are seen as valuable by the Pilot Region partner, but their utility becomes a challenge and difficulty if they cannot be integrated into current processes. The connection between the generated data and current processes and future strategies is not a simple element in such a small municipality. Therefore, summary documents are needed—concise and with a high capacity for synthesis and communication—that clearly identify how these data and results can be integrated into current and future dynamics.

This is where one of the main concerns arises from the Pilot Region partner and one of the main challenges to be addressed in Cycle 3 of the Living Lab.

Experiment design and implementation

The experiment was designed to create a comprehensive QoL index for Sant Miquel de Balenyà by combining community engagement—through workshops and participatory events—with advanced data collection techniques like data scraping and GIS analysis. This approach ensured inclusivity and accuracy, capturing both residents' experiences and objective data. By carefully selecting relevant indicators and engaging diverse demographic groups, the experiment aimed to inform policy-making, highlight disparities, and support targeted interventions.





Strengths and successes

The major strengths and successes of the experiment design and implementation are:

- Starting data collection through collection points and workshops at the school, as well as in various meeting spaces for the elderly.
- Conducting the questionnaire also on paper to better reach the elderly population.
- Using data scraping techniques to gather data from businesses, alongside the data obtained from the final fieldwork.

Scope for improvement

The experiment design and implementation scope for improvement includes:

- Involving young people aged 15 to 30 in the experiment design and implementation.
- Improving the selection of the final indicators that should be part of the index.
- Reducing the number of questions in the questionnaire to focus only on the necessary data for the experiment, rather than asking about additional matters of interest.
- Making the questionnaire shorter, as many people did not complete it or only accessed the platform without filling it out (Submitted respondents: 147, unsubmitted respondents: 69, Bounce visitors: 83).

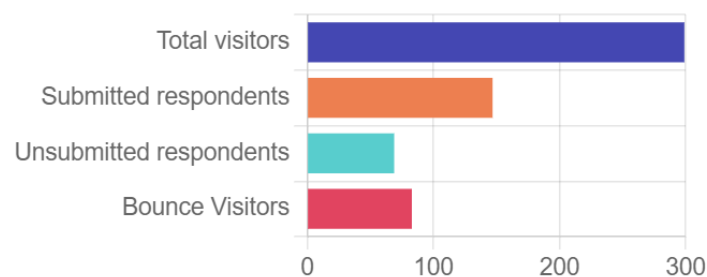


Figure 82 Questionnaire visitor metrics

Skill development and capacity building

The development of the experiment has been a challenge for the EMD of Sant Miquel de Balenyà, as they have never conducted a data collection project in their territory. The main skills developed in recent months have been the internal work to identify the needs for this data and its possible uses. This internal debate has developed a series of skills and capabilities related to strategic vision, as identifying which data may be useful first requires determining the direction the territory wants to take and which factors or processes are worth monitoring to understand their evolution and act on them in the future.

Skills developed

The primary skills developed have been working with online questionnaires in a geographic format—the tool Maptionnaire allows for georeferencing the responses of survey participants and provides cartographic outputs of this information.





Field data has been collected using digital data collection tools and integrated with GIS systems. Incorporating these data requires a minimum level of knowledge in GIS systems, knowledge that the technicians in small municipalities like Sant Miquel de Balenyà typically do not possess.

Capacities

The pilot region experiment has developed several key capacities. One of the primary capacities is the ability to integrate data generated from the experiment into future policies and decision-making processes. By using the QoL index tailored to specific areas of the population, the region can ensure that initiatives are better aligned with the unique needs of different communities. This has introduced a strategic planning approach that was previously lacking in the municipality, allowing for more structured and long-term planning.

Additionally, the process has, and will continue to require the development of a strategic vision. This involves anticipating future needs and planning accordingly, using the insights gained from the collected data. Another important capacity being developed is the ability to collaborate effectively with various stakeholders in the territory. By engaging different actors, the pilot region can ensure that diverse perspectives are included, leading to more comprehensive and effective planning. These capacities are essential for the municipality as it moves forward with its strategic initiatives, particularly in the next phase of the experiment (Cycle 3).

Pilot Region Partner's perspective on skills and capacities

The absence of personnel dedicated to tasks such as field data collection, GIS analysis, population surveys, and participatory processes during the regular activities of the town hall is highly significant. These studies are typically limited to specific reports prepared for particular projects or provided by external organizations, often offering data and information at a less detailed scale. Processes like data scraping, GIS analysis, fieldwork, or the administration of questionnaires require specialized personnel, which is practically unattainable for an institution of this size.

Innovation and impact

SMBC LL aims to integrate a novel approach to urban and territorial planning embedding the QoL index into policy processes and local development strategies. This represents a novel approach to measuring QoL at a territorial/urban scale. Using participatory mapping, GIS analysis, machine-based data scraping and fieldwork for comprehensive insights to inform policy decisions.

This experiment's approach, piloted with the QoL index, offers a replicable model for other villages and municipalities aiming to address their unique environmental, social, and economic challenges. It enables targeted interventions by identifying specific areas where QoL is lower, allowing towns to prioritize resources and policies more effectively. The index provides concrete data for informed policy decisions, ensuring that choices reflect the lived realities of residents. By involving citizens in data collection, it fosters a sense of ownership and trust in local governance, enhancing community engagement. Additionally, the QoL index supports tracking and accountability by monitoring changes over time, measuring intervention impacts, and refining strategies based on effectiveness. As towns adapt to challenges like climate change or economic shifts, the index serves as a framework for resilience and cohesion. Finally, grounded in the Theory





of Change, this experiment shows that the QoL index not only validates assumptions but also clarifies necessary actions to achieve long-term goals.

Reflections on innovation

The main innovation of the experiment is the application of a QoL index at the scale of a rural town. This revealed the differences in urban areas within a small yet complex population like Sant Miquel de Balenyà. In this case, the challenge was not so much about adopting an innovative approach—since the index itself was inherently innovative—but rather about the method of identifying the indicators to be part of this index and acquiring the data that comprise it.

The application of fieldwork and data scraping techniques had never been utilized in such a small territorial context before. Using online questionnaires to identify indicators related to the QoL in the town also represents an innovative element, particularly due to the tool's capability (Maptionnaire) to geographically reference this information. However, this aspect presented the additional challenge of working with programs that had never been used before, leading to errors commonly encountered during first-time implementations.

Short-term impacts

Throughout the experiment, some stakeholders have already been able to use data collected for reporting. For instance, the Diputació de Barcelona recently conducted a study on housing in the municipality, utilizing the commercial activity data gathered during the experiment. Thus, both the data collected during the experiment's design phase and the implementation phase can be integrated into reports prepared by other organizations. Additionally, the experiment encourages reflection on the concept of QoL and the need for actions to improve it at the local level.

Longer-term impacts

In the longer term, the creation of a QoL index should allow for:

- Integration with urban planning tools: By embedding the QoL index into urban planning frameworks, municipalities can align projects with specific quality-of-life objectives, ensuring that urban development directly addresses residents' needs and priorities.
- Synergy among stakeholders: The index fosters collaboration among different stakeholders, helping identify shared goals and encouraging coordinated actions among public institutions, local businesses, and community groups to address quality-of-life disparities.
- Impact assessment: The index will serve as a tool to evaluate the impact of specific projects on the territory, allowing urban planners and policymakers to track improvements and identify areas needing further intervention.
- Decision-making tool for urban planners: Municipalities can use the index to guide decisions on resource allocation, helping to ensure that budgetary investments are directed toward projects that offer the most significant quality-of-life benefits for the community.
- Policy adaptation for sustainable growth: As municipalities grow, the index provides a framework for sustainable development by ensuring that policies adapt to changing conditions and continue to prioritize residents' QoL. This can guide long-term growth that balances economic, social, and environmental factors.





Potential for sharing learning

Urban planning processes, supported by documentation on the social impact of proposals, can integrate this methodology to evaluate the QoL index as a tool for assessing the potential future impact of planning initiatives. Currently, the Osona-Sant Miquel de Balenyà Living Lab is actively collaborating with stakeholders using data derived from various QoL index indicators. Local and regional actors are engaging with the conclusions of the experiment, fostering opportunities to enhance the methodology further.

Local agents in Sant Miquel de Balenyà who participated in the Living Lab process can directly apply the knowledge gained during the experiment. They can use the data and index in internal processes, such as improving local commerce initiatives or proposing new activities at the social centre. This engagement is particularly valuable, as the Maptionnaire survey gathered insights into community participation in courses and highlighted topics residents felt were missing.

The methodology developed for the QoL index in Sant Miquel de Balenyà has also been discussed in meetings with regional stakeholders, including the Diputació de Barcelona and Mancomunitat La Plana. The next step is to share the results with these stakeholders to explore the potential for scaling the approach to other territories or to identify new indicators of interest for territorial policies that had not been previously recognized.





Part 4: Future steps

Cycle 3 plans

During cycle 3, a social report will be prepared based on the data obtained so far in RUSTIK and participatory processes related to urban planning will be supported. The social report is intended to accompany the update of the General Land-Use Plan, to launch new urban renewal projects in those areas where the QoL index has shown the lowest values, both in indicators based on quantitative data and in those obtained from citizen participation processes.

With the following timeline, we present the series of actions that are planned to be developed in Cycle 3 within the LL of Osona-Sant Miquel de Balenyà. The initial tasks are part of Cycle 2 in order to complete the experiment, such as combining the current QoL index from the NUTS 3 territorial scales, sourced from the RUSTIK viewer, or searching for new objective data to complete the index with more socio-economic and environmental indicators. Next, tasks more closely linked to Cycle 3 are shown, aimed at disseminating the experiment and integrating it with the political actors identified in the Theory of Change.

Table 42 Timeline. Activities Cycle 3

	2025											
Activities Cycle 3 (2025)	Jan	Feb	Mar	April	May	Jun	July	Aug	Sept	Oct	Nov	Dec
Integration of new environmental and socio-economic data in the QoL index (urban scale)												
Social report to support a review of the Land-Use Plan and participatory processes												
Combine Espon QoL data from RUSTIK viewer with the data from SMBC QoL												
LL Cycle 3 comms/dissemination campaign design												
Activity to gather QoL data from SMB young people												
Final compilation of LL data and integration in the RUSTIK viewer												
Presentation of experiment results to different actors (especially policy makers)												
Presentation of QoL index and other information to economic actors												
General assessment of the experiment process, the exploitation of the results, and future sustainability												
Communication & dissemination activities												





Future collaborations

The RUSTIK project in Sant Miquel de Balenyà, along with the planning and execution of an experiment focused on creating a QoL index tailored to different neighbourhoods, is fostering collaboration with various local actors. The community, currently experiencing multiple changes and interventions in its urban fabric, requires ongoing access to urban-scale territorial data, which has not previously been available. This data is essential for evaluating these changes and improving future planning.

In the future, building on the data collection work already undertaken, efforts will be made, in collaboration with the Diputació de Barcelona, to implement data collection processes that will ensure continuity in the work initiated by the RUSTIK project.

The EMD of Sant Miquel de Balenyà is part of the Mancomunitat de la Plana, an entity that unites neighbouring municipalities to share services such as waste management, environmental protection, and social services. Since the beginning of the RUSTIK project, the Mancomunitat has been involved as the primary agent that could, in the future, facilitate the implementation of the quality-of-life index in other nearby municipalities, thus scaling up the initiative.

Communication and dissemination

During the first part of the RUSTIK project, a communication matrix was designed by the SMBC Living Lab to organize the different actions that were intended to be carried out. For this end of cycle 2 and the beginning of cycle 3 of the Living Lab, and up until the completion of the project in mid-2026, a table is shown below with the newly proposed communication matrix, prioritizing actions based on what is to be communicated at different moments.

Table 43 Communication matrix

What we want to communicate	Action	Audience	Channel	Frequency	When
Ongoing project results and related data	Article publication	Local population	Gallaret (local newspaper)	Bimonthly	Q1 and Q2 2025
	Summary article publication on SMB website	Local population	RUSTIK section of SMB website	Bimonthly	Q1 and Q2 2025
	Social media posts redirecting to the website	Local/external population	Social media	Bimonthly	Q1 and Q2 2025
Final experiment results	Article publication finals experiment results	Local population	Gallaret (local newspaper)	Once	Q3 2025





What we want to communicate	Action	Audience	Channel	Frequency	When
	Summary article publication on SMB website	Local population	RUSTIK section of SMB website	Bimonthly	Q3 2025
	Social media posts redirecting to the website	Local/external population	Social media	Bimonthly	Q3 2025
	Internal communication with council employees	EMD employees	Meeting	Once	Q2 2025
	Workshop during town fête	Local population	Social media	Once	Q3 2025
Impact and scalability of the experiment and the QoL index	Article publication	Local population	Gallaret (local newspaper)	Twice	Q4 2025
	Summary article publication on SMB website	Local population	RUSTIK section of SMB website	Twice	Q4 2025
	Social media posts redirecting to the website	Local/external population	Social media	Twice	Q4 2025
	Publication in regional newspaper	Regional population	Regional newspaper	Once	Q4 2025
	SMB Project meeting	Political stakeholders	Meeting	Once	Q4 2025
	SMB Project meeting	Economic stakeholders	Meeting	Once	Q4 2025
RUSTIK project results and closure	Photography exhibition at the Centre (a photo bank could be created on Teams from all the Living Labs)	Local population	Physical exhibition	Once	Q1 and Q2 2026
	Article publication	Local population	Gallaret (local newspaper)	Twice	Q2 2026
	Summary article publication on SMB website	Local population	RUSTIK section of SMB website	Twice	Q2 2026





What we want to communicate	Action	Audience	Channel	Frequency	When
	Social media posts redirecting to the website	Local/external population	Social media	Twice	Q2 2026
	Publication in regional newspaper	Regional population	Regional newspaper	Once	Q2 2026





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United Kingdom: Gloucestershire

Daniel Keech, Katarina Kubinakova, Daniel Gale and Mohammad Chizari





Summary and overview

Gloucestershire is a predominantly rural county, with 87.8% of the county's area being classed as rural²³. It has a population of almost 650,000²⁴. Gloucestershire has a polycentric urban pattern, with two adjacent urban centres – the city of Gloucester which is the county's administrative capital (population 132,416) and the former spa town of Cheltenham (118,800) – which together account for nearly 40% of the county's population. There is a third substantially urban district, Tewkesbury (94,900). The three remaining districts are Stroud (121,100), Cotswold (90,800) and the Forest of Dean (87,000).

Just over half of the county is designated within three 'National Landscapes'.

The Living Lab (LL) is focused on rural Gloucestershire which, for the purposes of RUSTIK, includes the four most rural districts of the county, namely Stroud, the Forest of Dean, Cotswold and Tewkesbury; the urban districts of Cheltenham and Gloucester are excluded. The county is a lowland area characterised, broadly, by three landscape distinctions: limestone hills in the east, the wide valley of the River Severn in the centre and forest in the west.



Figure 83 Location of the county of Gloucestershire (red) within England.

Living Lab challenge

The LL is concerned with the digital transition challenge in two ways: (i) by working with rural voluntary and community sector health and social service providers to improve data collection and analysis effectiveness, to achieve a more detailed understanding of client needs and service impacts, as well as deeper appreciation of how local data could inform higher level (e.g. county)

²³ 1 Rural/Urban Classification, 2011, DEFRA

²⁴ <https://www.gloucestershire.gov.uk/media/szofuc4l/current-population-of-gloucestershire-2021.pdf>





policies; and (ii) to secure a commitment in the county's new digital strategy to include more rural and community-level data.

Data experiment

LL partners devised a prototype data collection and analysis 'smart dashboard'. This allows users (rural service providers) to upload multiple place specific data sets. These may contain 'internal' data (i.e. those collected by individual organisations), or external data sets available on-line, such as indices of deprivation by district, household digital connectivity etc. The fundamental purpose of the dashboard is to help voluntary and community sector rural service providers get a better understanding of client needs, service impacts through the data they collect, and to gain better appreciation of their data and how they can be applied. Dashboard benefits include the ability to remove duplication when importing multiple datasets, as well as the ability to generate composed text using AI technology (Google Gemini). This allows rapid correlation analysis by dashboard users, which can become increasingly sophisticated depending on the number of datasets imported. A 'heatmap' function helps to locate service provision hotspots and absences. The dashboard protects anonymity by assigning proxy IDs to personal data fields.

Preliminary results

The dashboard has been prototyped and tested in four distinct stages (see section 2).

Key learning to date

So far, the dashboard prototype seems functional and effective. However, testing and refinement activities will follow the date of this report (cf. table 2, stage 4). Login codes for the dashboard are held by Countryside and Community Research Institute (CCRI) and Gloucestershire Rural Community Council (GRCC) and are shared with prototype users.

Next steps

Gloucestershire LL RUSTIK partners will finalise a work programme for the refinement of the dashboard prototype. This will principally be linked to:

- (i) Attending existing digital inclusion events in the county and providing guided opportunities to use the dashboard. LL partners will provide access to a laptop on which a range of exemplar rural databanks have been stored. The first of these events is #Glos DataDay, 16th December 2024. The event is organised by Create Gloucestershire, Connected by Data, Age UK Gloucestershire, Active Gloucestershire and Barnwood Trust and will be held in Cheltenham.
- (ii) Establishing on-line dashboard testing opportunities with Cotswold District Council and Forest of Dean District Council for council officers and selected community organisations (dates to be confirmed for December 2024/January 2025).
- (iii) Presentation of results of the findings (in the form of a short report and a refined prototype) to the Digital Accessibility, Inclusion Support, and Innovation network (DAISI) meeting in January 2025. DAISI is an important digital inclusion and support network in the county and represents a legacy opportunity for the RUSTIK experiment.





Part 1: Living Lab context

The first Living Lab (LL) report, produced in November 2023, described how the Gloucestershire LL is concerned with the RUSTIK theme of digital transformations. A foundational concern for the LL has been several equity considerations linked to the migration of social and public services towards on-line formats. How this process of digitalisation of services affects rural communities and individuals is of importance in the LL, and universally, through the concept of digital inclusion because:

‘As dependence on digital devices and reliable internet increases, it is also becoming more and more obvious that being digitally excluded also means that this person is socially excluded.’ (Reisdorf and Rheinsmith 2020:133).

Based on the Digital Divides report (2022)²⁵ as well as Gloucestershire Rural Community Council’s (GRCC) work on digital inclusion, barriers to digital inclusion in the county usually include a lack of IT skills, lack of money with which to buy on-line subscriptions (e.g. Wi-Fi), lack of access to hardware and a cultural reluctance to change existing practices. GRCC is one of a range of civil society organisations in the county who have been commissioned by local institutions (such as the health service or the district councils) to tackle digital inequality. They do this by employing specialist digital skills coaches as well as operating Digi Hubs in two of the four rural districts in the county. Digi Hubs are located in public buildings (such as libraries) and offer people support to get online, free use of computers, as well as free smart phone network cards to enable Wi-Fi access.

While the broad backdrop surrounding digital inclusion remains the same a year after the first LL report, two developments have taken place which have influenced the LL’s direction:

- (i) Firstly, it became evident that cost, access, confidentiality and the uncertainty of long-term data storage and management (in line with General Data Protection Regulation rules) presented substantial complications for the development of a major local data set, or data lake.
- (ii) Stakeholder interviews starkly revealed the limitations of civil society partners’ capacity to collect and analyse data about the impacts of their services, often carried out on behalf of vulnerable rural people (tenants of social housing, citizens experiencing food poverty or victims of domestic violence). Interviews also highlighted the fragmented nature of digital inclusion activity in the county.

The following sections will describe the shift in focus towards the development of a smart dashboard which will eventually be freely and independently available to collect and analyse data to inform the support services offered to rural citizens by civil society organisations (which are collectively known as the community and voluntary sector - CVS).

25

<https://static1.squarespace.com/static/617abf9b742ed51f29193232/t/62443af43d9fc81d2d9a14e4/1648638711164/Digital+Divides+Report.pdf>





Pilot Region introduction

In this section, the pilot region is introduced in relation to the three RUSTIK transition themes, namely socio-economy, climate change and environment, and digitalisation.

Socio-economy

Between 2011 and 2021, the population of Gloucestershire grew by an estimated 44,411, with a growth of almost 6,000 in the year 2020-2021, or 0.9%/year, which is 0.1% higher than the average growth rate for the 2011-2021 period (0.8%/year). However, Gloucestershire's population is ageing more quickly than the UK average. By 2043, 42% of households are projected to include someone aged 65+, compared to 33% of households in 2018.

The county is predominantly rural with two urban centres that serve as the main business and commercial heartland. Gloucestershire is not a poor county by comparison with the rest of the UK, nevertheless, 12 local areas (small groups of municipalities) fall into the most deprived 10% in the UK, measured by the Index of Multiple Deprivation (IMD).

The Gross Domestic Product (GDP) of Gloucestershire was an estimated £20 billion (€22.5bn) in 2020²⁶. Gloucestershire's GDP growth between 2019 and 2020 was -1.2%, reflecting the severe impact of the COVID-19 pandemic.

The health industry is the largest economic sector in Gloucestershire measured by employment, accounting for 14.0%. Other major sectors include Manufacturing (over 10%), Financial & Insurance (3%) and Information and Communication (4%). Gloucestershire's unemployment rate was 2.6% (end 2023), below the 4% average rate for the UK. Of those in work, 12.8% are self-employed.

There were 29,405 registered businesses operating in Gloucestershire in 2022. 83% of residents in Gloucestershire also work in the county, showing high reliance on local jobs by county residents in both urban and rural areas. In the rural areas, tourism is a notable feature – the Cotswolds has an international reputation as a destination, and Cheltenham hosts many festivals including major horse racing, jazz and literature events each year. Small-scale manufacturing and the service economy are also notable rural sectors.

Farming in Gloucestershire is a notable economic sector, revealing much variation: livestock (beef, sheep, dairy, pigs and poultry), cereal crops and horticulture, which reflect the county's varied topography and soils. This has produced a mosaic of hedged and walled fields, as well as small woodlands, across the county. About 250,000 hectares - 75% of the land area - is managed as commercial farmland on around 3,000 agricultural holdings. About 60% of the utilised agricultural area on farms is grassland, 25% cereals, 13% woodland/other and under 1% horticulture.

Key challenges in respect of the socio-economic transition are an ageing population, rural isolation, poor rural public transport, income inequalities leading to lack of affordable housing (for those on average income) and lack of accessible services (especially for people without a car).

²⁶ <https://www.ons.gov.uk/economy/grossvalueaddedgva/datasets/regionalgvaibylauthorityintheuk>





Climate change and environment

The physical geography of Gloucestershire has three main features: the valley of the rivers Severn and Wye divides the county on a north-east to south-west axis. West of this is the high ground of the ancient Forest of Dean, with a history of mining for coal and minerals. To the east, rising dramatically as a wooded limestone escarpment, are the Cotswold Hills and high plateau, with shallower, stony soils.

Over half the county lies within the designation of 'National Landscapes (NL)'. By far the largest of these is the Cotswolds NL to the east, with the Wye Valley NL in the west of the county, and the Malvern Hills NL to the north-west. The Royal Forest of Dean is a 'National Forest Park' which straddles the River Severn estuary and the Anglo-Welsh border. Gloucestershire also contains many ecological, historical and geological areas of national importance, such as its 120 Sites of Special Scientific Interest.

The county's water courses include the Severn, Britain's longest river, and the Thames which rises in Gloucestershire: these connect to some of the densest urban settlements in England (including London, in the Thames' case). The River Wye marks the border between England and Wales and flows into the Severn Estuary. The upper Severn Estuary has one of the highest tidal ranges in the world and is of national and international importance for its marine, intertidal and wetland biodiversity. It has Ramsar designation, covering 4,860 ha, also a Special Conservation Area and Special Protection Area designations which conform to European Natura 2000 network criteria. Increased frequency and severity of flooding, and potential rise in sea levels due to climate change, are a major risk factor for the county, as its larger settlements are low-lying and close to floodplains.

Digitalisation

ICT connectivity has received investment in recent years to enhance rural broadband connections. However, in several parts of the county, internet speeds are low, and mobile signals are not guaranteed. 96.49% of business premises in Gloucestershire have access to Superfast (>=30 Megabits per second (Mbps)) broadband connectivity, consistent with the national average across England (96.96%). National aspirations for digital connectivity are now linked to supporting Gigabit connectivity. Gloucestershire County Council partnered with Herefordshire Council to launch the Fastershire project to address the lack of viable commercial broadband in certain areas. To bring rural broadband to fruition, Fastershire introduced a procurement program that used funding to incentivise broadband suppliers to expand their networks into hard-to-reach places. Data from the independent website [ThinkBroadband](https://www.thinkbroadband.com/) show that by spring 2024, when the Fastershire project concluded, 98.2% of Gloucestershire properties could access superfast broadband, and 77.08% could benefit from gigabit-capable speeds of 1,000 Mbps²⁷.

Functions

The focus in Gloucestershire is on digital. Gloucestershire is recognised as a hub for digital equity initiatives, focusing on rural areas and marginalised groups. GRCC (the pilot region partner – PRP), through its work on the DAISI project, has gained national recognition for its work in closing the

²⁷ <https://www.gloucestershire.gov.uk/council-and-democracy/grow-gloucestershire/digital-gloucestershire/fastershire/>





digital divide and empowering communities to participate in sustainable transitions. Gloucestershire's model is now seen by many national partners as best practice across the UK, influencing national policies and other regions' strategies for achieving digital equity.

Transitions

The Gloucestershire LL focuses on transition towards a digitally inclusive society, integrating technological innovations with community needs. Based on a Digital Exclusion Mapping report in Gloucestershire (2022)²⁸, between 30,000-40,000 (6-8%) adults in the county are effectively offline with no internet access at home, lacking internet-capable devices, or lacking the foundational skills to use a device, or all the above.

A further 80,000-100,000 adults are online but are likely to be missing out on the full benefits of the internet. This is because they lack some or all the essential skills for finding and using information, staying safe and completing transactions online – and/or they may lack access to a functional device or internet connection.

The report suggests that, nationally, there are four main reasons why someone might be digitally excluded, linked to personal statements:

1. 'It's not for me' - 3.88 million of the adult population are non-users fitting this profile (3 in 5 people)
2. 'I lack support' - 1.62 million of the adult population are non-users fitting this profile (1 in 4 people)
3. 'It's too complicated' - 1.41 million of the adult population are non-users fitting this profile (1 in 5 people)
4. 'It's too expensive' – 943,000 of the adult population are non-users fitting this profile (1 in 7 people)²⁹

The phasing out of traditional 'landline' telephone provision in favour of digital communication should be completed in the county by January 2027. Meanwhile, rural digital connectivity and computer literacy among some communities, not least elders, is limited and uneven. Enhancing digital connectivity and skills for younger, older and socially vulnerable citizens is a vital digital transition which will enhance access to jobs, training, markets and social and health services.

The digital divide is a significant concern for rural communities. Without reliable digital connectivity, some communities risk being left behind. The PRP is advocating for improved digital infrastructure and ensuring that local communities have the necessary skills to engage in the digital world confidently.

²⁸ Citizens Online (2022) Digital Exclusion Risk Mapping Report <https://static1.squarespace.com/static/617abf9b742ed51f29193232/t/62443b42ccb53108a1cc2792/1648638801092/Data+Mapping+Gloucestershire+Digital+Divides.pdf>

²⁹ Citizens Online (2022) Digital Exclusion Risk Mapping Report <https://static1.squarespace.com/static/617abf9b742ed51f29193232/t/62443b42ccb53108a1cc2792/1648638801092/Data+Mapping+Gloucestershire+Digital+Divides.pdf>





Living Lab partnership

The PRP is GRCC, which operates as a registered charity. GRCC works within Gloucestershire’s communities to inspire, enable, and deliver community action. The organisation works across the county to strengthen and develop communities to create thriving, sustainable places for local people to live and work in. Most English counties have a Rural Community Council, and, at a national level, they are represented federally by Action with Communities in Rural England (ACRE).



Figure 84 PRP and LL team member Daniel Gale (left) working at the Cotswold Digi Hub. Image: (GRCC).

The research partner is the Countryside and Community Research Institute, which is part of the University of Gloucestershire. Established in 1986, CCRI is now one of the UK’s largest specialist rural research institutes. It is one of three founding research partners of the National Innovation Centre for Rural Enterprise and is a member of the Welsh Graduate School for Social Sciences.

Table 44 Gloucestershire Living Lab team core members

Name	Organisation	Role/expertise
Daniel Gale	GRCC	Digital, data and partnership lead (DAISI/GRCC)
Louise Fletcher	GRCC	Data and organisation engagement
Katarina Kubinakova	CCRI	UK and EU rural and community development, policy analysis and evaluation
Daniel Keech	CCRI	Urban and regional geography
Mohammad Chizari	University of Gloucestershire	Programming and dashboard development





Living Lab challenge

Rationale and research questions

Having been confronted with the challenges of on-going maintenance and data management obligations of a data-lake of hyper-local data, the LL partners revised their research questions during 2024. The geographical focus of the pilot on the market town of Cirencester (Cotswold District) and its rural hinterland was retained. However, instead of trying to understand the nature, quality and the potential of access to digital services among certain socially disadvantaged groups, the LL reframed the focus to support the service providers who support them. Revised research questions became:

- What kind of data do social service providers in Cirencester gather about their clients and their needs?
- Are there any data gaps that create barriers in understanding client need or service impacts?
- How are data gathered and analysed, and for whom?
- What improvements to data collection processes might prove helpful in understanding service impacts?
- How can digital tools and platforms be best implemented to close the digital divide in rural Gloucestershire?

This shift in emphasis was inspired by stakeholder interviews that revealed:

- Social service providers (which are commonly civil society/third sector organisations) gather data from multiple sources, for example from social workers, doctors and schools, about the needs of their clients. Aggregating these data can be challenging.
- Social service providers lack time and often also analytical capacity because they are most focused on supporting vulnerable citizens/groups who may need urgent attention.
- Data collection is substantially geared to the needs of the service funders/commissioners rather than the needs of service users.

Policy relevance

The Gloucestershire County Council Digital Strategy 2018 - 2023 is out of date and consultation on a new strategy was started in 2024. However, the County Council announced during the summer of 2024 that it was revising the strategy to focus on the activities offered within and by the Council. Furthermore, the County Council's Information and Communications Technology Strategy 2019 - 2024 has been actively shaping its digital and ICT landscape to enhance services and improve efficiency. This strategy is also inward-looking, as the primary goal is to increase control over the council's ICT and digital strategies, capacity, and user experience, as well as focus on digital transformation of its services.

The DAISI network managed by the PRP supports national and local efforts toward establishing minimum digital living standards, directly contributing to policy discussions around digital inclusion. It also aligns with the UK's broader goals of achieving sustainability through digital transformation (Foreign, Commonwealth and Development Office, 2024).





Digital Divides is a community and voluntary sector programme for Gloucestershire, working to develop a more collaborative, evidence-based approach to tackling digital inequity. By presenting a detailed picture of digital exclusion in the county, Digital Divides partners hope to better inform funders interested in investing in projects to tackle digital inclusion.

Gloucestershire Health and Care NHS Foundation Trust Digital Strategy is a five-year plan to achieve local and national ambitions for digital transformation, integration and innovation, to improve people's health, well-being and care experiences, through the effective use of data, digital technology and technology-enabled care. This also links with the One Gloucestershire Integrated Care System and their strategy on Digital Health and Care Gloucestershire – with the aim to “*Design, develop and deliver simple and sustainable digital, data and technology services with our citizens, and our staff, to meet their current and future needs*”.

Gloucestershire Skills Strategy 2022-2027 highlights the ‘direction of travel’ of the skills needs of local business sectors and individuals, with digital and digital skills being an important focus, including inclusive employment. An important fact to note is that Gloucestershire is the second largest cyber cluster behind London, with Cheltenham having the highest density of cyber businesses in the country.

Stakeholders

Up to this point (November 2024), the LL partners concentrated their efforts on working with third sector and public organisations that are involved in digital inclusion or the provision of social services. In the final stages of the LL, these stakeholders will continue to be prioritised as the smart dashboard is refined. After the prototyping is complete, attention will shift to policy work and to the task of promoting and institutionalising the dashboard.

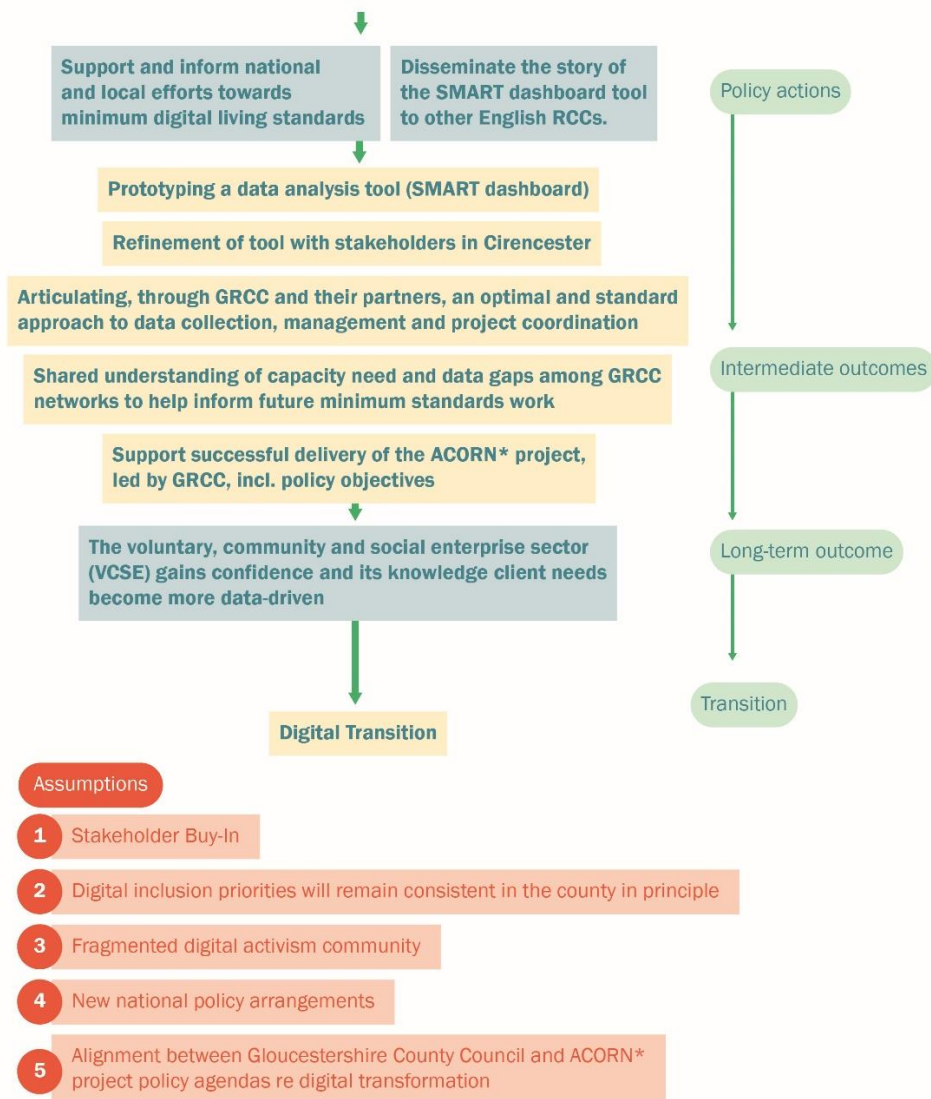
In particular, the DAISI network, ACRE and the four rural district councils in Gloucestershire will be important stakeholders.

Theory of change

Originally, the LL's intention was to ensure the representation of rural perspectives and needs in the Gloucestershire County Council (GCC) digital inclusion strategy (DIS) through the Theory of Change (ToC). This objective needed to be revisited because the DIS will become internalised by GCC. The Economy, Environment, and Infrastructure Department is now leading the Digital Strategy. The Department has recently appointed officials to take forward the next stage, which is to develop a (much broader) Digital Strategy. The LL partners presume that the DIS will focus on (i) how digitalisation can optimise the council's commissioning and delivery of social services, and (ii) how digitalisation can support GCC's economic development objectives around growth, competitive regional advantage and IT sector development support (including cybersecurity and aerospace, plus agri-tech innovation).

This development led to a revision of the ToC as set out in the figure below.





* ACORN – Is a project led by GRCC and recently awarded a 3-year national lottery grant. The acronym stands for *Advancing Communities through Outreach, Resources, and Nurturing*. The project aims to tackle the digital divide in Gloucestershire. It is a very useful and timely legacy for the RUSTIK LL in the county.

Figure 85 Gloucestershire LL Theory of Change

Intermediate objectives are based on the development and refinement of a functioning smart dashboard that will enable rural social and health service providers to better analyse and evaluate their impacts. Optimising the smart dashboard's functionality for the CVS should lead to standardisation of data collection and assessment.

The long-term outcomes of the prototyping include growth in confidence of the (often over-stretched) CVS, by improving data-driven knowledge about its clients' needs and their responses to service provision. The mechanism for moving from intermediate to long-term outcome hinges around the adoption of the fully functional smart dashboard after its period of prototyping (end





February 2025) by the GRCC ACORN initiative. This should ensure future free-of-charge access to the smart dashboard (and could include future refinements as new needs emerge).

The intermediate and long-term outcomes will support the development of a connected CVS with better understanding of their clients' needs thanks to standardised and data-driven evidence, which can in turn help service funders tailor their investments towards areas of greatest need, or in tackling digital inequality.

Data relevance

The Gloucestershire LL is distinctive in that the LL team has not gathered primary quantitative datasets. Instead, such primary data is held by rural service providers, CVS organisations. The LL experiment is directed towards optimising the interpretation of existing data which, too often, is not adequately identified, analysed or understood. The tool offers an innovative [smart] way to analyse the existing datasets that are collected by CVS organisations at local level.

In pursuing early LL ambitions, the team carried out interviews with stakeholders actively involved in digital equity initiatives. These revealed that:

- A wealth of rural data is available already in and about the county (for example through the County Council's *InformGloucestershire* service, or through national data sources).
- A wide range of data are demanded by funders and service commissioners. Yet these data-demanding organisations may not have a very clear idea of the outcomes and impacts on service provision and planning because of data being provided to them.
- The granularity of existing data may not be sufficient to support community-level advancements. For example, existing research on minimum digital living standards has been piloted only with families with children.
- Because data collected are personal and often confidential, data sharing between organisations is difficult. This impedes co-ordinated action on data governance.
- When initiatives are started, stakeholders rarely map out existing data availability and how these can be used to best effect.

Data are central to addressing the digital divide and fostering sustainable transitions in Gloucestershire, particularly in rural and marginalised communities. The PRP, through its work in the DAISI project, recognised several key data needs prior to launching the RUSTIK Gloucestershire LL data experiment:

- **Gaps in Data:**
 - Many local organisations lacked reliable, structured data on the digital needs of their communities. Specifically, there was insufficient data on the level of digital exclusion faced by rural populations, the availability of digital resources (devices, connectivity), and the capacity of the local CVS organisations and Social Enterprises to address these challenges.
 - Data about the specific needs of marginalised groups, such as the elderly, disabled, and economically disadvantaged, was fragmented or unavailable.





- **Limited Availability:**
 - Prior to the experiment, data collection across sectors (e.g., social care, education, and community services) was inconsistent, limiting the ability to make informed decisions about resource allocation and service provision.
 - Small organisations often lack the capacity to collect, analyse, and use data effectively due to limited digital infrastructure and skills.
- **Data Needs Identified:**
 - **Cross-Sectoral Integration:** There is a clear need to integrate data from multiple sectors, including health, education, and social care, to create a comprehensive picture of the digital landscape in Gloucestershire.
 - **Real-Time Data Access:** To inform decision-making and resource allocation, it has been critical to develop a system that allows stakeholders to access and analyse real-time data.
 - **Community-Driven Data:** GRCC, via DAISI, aimed to establish a participatory data collection model, ensuring that data reflected the actual needs and experiences of local communities. This was essential for tailoring solutions to specific community contexts.
 - **Data Literacy:** In addition to raw data, there is a need for tools that would enhance data literacy among local organisations, enabling them to use data more effectively for decision-making.





Part 2: Living Lab Cycle 2: Data experiments

As suggested in the introduction, the Gloucestershire LL data experiment aims to develop and prototype a smart dashboard. The objective has been to develop a user-friendly data collection and analysis tool that supports both local decision-making and broader policy objectives for digital equity.

The state-of-the-art smart dashboard has been developed specifically as part of the RUSTIK Gloucestershire LL experiment. The functions have been tailored to the needs of the CVS organisations collaborating in the project. Several meetings between LL partners took place to identify the best possible approach in developing the tool. Colleagues from the School of Business, Computing and Social Sciences at the University of Gloucestershire were approached to help the LL team develop ideas on the dashboard and were actively engaged in the selection process of identifying and appointing a PhD student to design the dashboard. CCRI signed a contract with the PhD student in June 2024. In parallel, GRCC, via DAISI, approached network partners to share anonymised data with the LL team in order to tailor the smart dashboard development. A number of civic society organisations shared their data (DAISI has sharing agreements in place between partners in the network). This allowed the LL team to better understand the type/variety of data gathered by the local organisation, quality of collected data and identify any gaps or inaccuracies which might prevent the data being uploaded and analysed using the smart dashboard. The LL team (including the PhD student developing the tool) also met with a small number of organisations in the pilot area of Cirencester to gain a better understanding of the type of data they are collecting and learn more about their needs in respect of data analyses and reporting. This information shaped the development of the smart dashboard, that focused on a user-friendly, intuitive, and easy to learn tool, accessible to users with varying levels of technical expertise.

The smart dashboard is an on-line device that enables social service providers to upload multiple data sets (either their own and/or publicly available data) to produce analytical reports and 'heatmaps' to show intensity, overlap or absence of service delivery. The heatmaps respond to the data sets used, for example they might indicate areas of high or low Wi-Fi-connectivity quality, or rural areas of low income, and can correlate all data sets uploaded to the dashboard.

To ensure a secure environment for data uploads, the smart dashboard has a robust, built-in security system that protects all data. Each user must possess a unique access key to create an account, enhancing data security. The dashboard also includes an automatic data cleaning function, preparing data for analysis. It identifies links between different data sets based on various geographical levels and runs diverse analyses, with the capability to integrate more analytical tools in the future, depending on emerging needs of users.

The smart dashboard can generate text-based analytical results and cross-reference different databases. Up to a hundred databases (internal or external, publicly available) can be uploaded and analysed at one time. Users can compare as many data sets as needed to uncover interactions and relationships. By analysing them collectively, the dashboard provides insights into connections and related data points, supporting informed decision-making by users.

Because the aim of the dashboard is to help providers of rural social services to better understand the impacts of their activities and to report this to their funders, all data used in the dashboard





needs to be geographical in some way. This may be in the form of unique post codes of service users or the location of service provision.

Developing the data experiment

The development of the experiment is set out in four stages in table below.

Table 45 Prototype development

Stage	Description	Activity	Purpose
1.	Engagement with 8 digital inclusion advocates and rural service organisations. December 2023 - March 2024	Qualitative interviews of between 35-70 minutes.	Highlight existing data collection activities, rural digital inclusion approaches, policy developments and gaps in provision/knowledge.
2.	County Council digital inclusion policy workshops (2x in person, 1 online) February - March 2024	Participation in half-day workshop activities.	Promote RUSTIK in the county and understand existing policy frameworks.
3.	Initial smart dashboard pilot. June - October 2024	Engagement of specialist postgraduate programmer	Production of first dashboard prototype.
4.	Testing and refinement October 2024 - January 2025	Demonstration and critical review of first prototype with 'friendly' civil society network (Sept) On-line demonstration and testing with digital inclusion experts from two local authorities (Nov) Further testing at Gloucestershire <i>Data Day</i> via a 'RUSTIK dashboard desk' (Dec)	Prototype refinement by prospective users.

Experiment description

As described above, the Gloucestershire LL experiment seeks, firstly, to develop a smart dashboard to analyse existing hyperlocal data, and secondly, to promote rural considerations in emerging digital strategies in the county. These activities conform to the experimental structure of LLs because:

- The smart dashboard is an innovation that responds to need (established through systematic stakeholder engagements)
- The dashboard is a prototype and is being iteratively refined by users, with a final model available by February 2025.





Experiment objectives

The data experiment focuses on building a cross-organisational data infrastructure (smart dashboard) that enables CVS organisations to access, analyse, and use data for community development. The dashboard is designed to be scalable, allowing for integration with future digital tools.

The objectives were defined as follows:

- Develop and deploy a smart dashboard to analyse and visualise community data collected by local CVS organisations.
- Use data to inform local policies and strategies [primarily aimed at reducing digital exclusion].
- Equip CVS organisations with the skills and tools to engage with data-driven decision-making processes

Relationship to theory of change

The experiment is closely tied to the ToC, testing the assumption that providing access to bottom up and community-led data and analytics will enable rural communities to make informed decisions, leading to long-term digital equity.

Data use

Data sources and methods

As suggested above, data sources include any data sets that dashboard users wish to analyse, both internal datasets collected and held by service delivery organisations, or data that is freely available on-line, such as national or local statistical data. Each user will have different needs. The dashboard has three main operational and technical functions, which are:

- Wizard-Based Smart Dashboard: The creation of the smart dashboard using a wizard-based interface makes it user-friendly, intuitive, and easy to learn. This approach enhances user experience, making it accessible to users with varying levels of technical expertise.
- Multi-Dataset Comparison and Analysis: The smart dashboard allows users to upload and compare multiple data sets simultaneously. This capability supports in-depth analysis by identifying interactions and relationships across different data sources, offering comprehensive insights that would be difficult to obtain using conventional tools. For example, clients are referred to a food bank by their family doctor, by social workers, local councils, job centres or housing associations. In some cases, more than one agency will refer the same client and may provide different reasons for their referral. In stating reasons for referral, clients may disguise situations which are causing them challenges, for example poverty or domestic violence. Furthermore, food banks tend to be located in towns where food donations can be efficiently collected and sorted, even if clients live in rural locations. The smart dashboard can remove multiple data entries, highlight contrasting referral circumstances and locate clients geographically, either by unique post





code address or by ward (lowest geographical delineation of local government), without revealing clients' identities.

- AI-Driven Text Generation for Results: The integration of AI within the dashboard enables the automatic generation of text-based analyses. These may highlight a correlation between poverty and place, between health indicators and service provision, or nuances/variations in local service coverage. By combining statistical analysis with AI, the dashboard produces readable and understandable reports, allowing users to easily interpret complex data insights without the need for advanced data analysis skills.

Data innovation

The experiment is innovative in the sense that it allows non-technical users to analyse, 'clean' (e.g. remove data duplication, see Data sources and methods. above) and interpret multiple datasets. Each user will have different data analysis objectives, including understanding client circumstances and needs, understanding service impacts, reporting to funders and operational planning. The use of AI in the smart dashboard for real-time data reporting and the integration of a user-friendly dashboard are significant innovations, reducing barriers to data usage for time-stretched rural service providers.

Implementing the experiment

The experiment was implemented in stages, beginning with stakeholder engagement and prototyping of the smart dashboard. The dashboard has been refined based on feedback from local organisations and is currently being further tested for live data analysis.

Initial challenges included varying levels of digital literacy among participants. The dashboard was adapted to include simplified reporting and further training sessions are needed to ensure all stakeholders could engage with the tool effectively. This part of the experiment is still ongoing, as the work on the prototype requires more testing, and additional analytical methods, interactive heat maps, and other features are being developed to further enhance the capabilities of the smart dashboard.

Adaptations

So far, smart dashboard testing has helped to alleviate some server interface barriers to non-university users.

Further prototyping is being carried out. We anticipate adaptation might be required in relation, for example, to the structuring of the analysis report, which currently offers a list of text statements. It may be the case that users would prefer some form of structure to the report texts, for example an ordering system (by location, user category, gender or socio-economic contexts). A crucial test event will be the #Glos DataDay event on 16th December 2024, when users from different civil society and local authority backgrounds will be given the chance to test the dashboard.

Other Living Lab activities and achievements

One important achievement by the PRP is success with a grant application to the National Lottery for a project called ACORN (see part 3 for details). ACORN will be led by the PRP, whose employees





will be able to promote access to the dashboard and, if appropriate, help adapt and develop the dashboard in new ways, depending on need. The dashboard currently requires modest financial outlay for AI software and server subscriptions, which ACORN will assume after the end of the LL prototyping period.

Preliminary results

Results to date

As described extensively in the sections above, the main result to date is the development of a smart dashboard, which is a digital tool designed to aid the analysis of existing secondary and primary data collected by the providers of rural social and health services. Current analytical methods include bootstrap analysis and T-tests, with future enhancements planned for additional analytical methods and visualization through interactive heat maps.

The LL focused on the development of the dashboard after literature searches and interviews revealed a fragmented approach to supporting digital inclusion in the county. In this respect, Gloucestershire conforms to the original application of LLs in user-led tech innovation. The positioning of the PRP, GRCC, within the CVS has thus been especially useful for understanding the sector's needs and challenges and developing stakeholder networks.

Data relevance

The Gloucestershire LL's aim was to focus on data collected by CVS organisations (in the first instance during the pilot stage), and local and national level data and statistics freely available (e.g. Office of National Statistics). The aim was to demonstrate the ways in which existing data could be cleaned, analysed and interpreted to rural service providers (CVS organisations). The smart dashboard allows users to analyse not just one but multiple datasets and cross-reference them to discover relationships. This feature provides a broader insight, particularly when datasets have common geographical references. The dashboard provides an opportunity to optimise the interpretation of existing data which, too often, is not adequately identified, analysed or understood by CVS organisations which lack data handling capacity beyond the minimum required for financial reporting.

While the LL's pathway to the smart dashboard was a direct result of the iterative LL process, the Gloucestershire region has not produced a new or innovative data set. This is a contrast to other RUSTIK LLs, where data collection has (for example) led to the development of quality-of-life indicators (Osona), or where surveys and statistical analysis have helped to contextualise rural-to-urban outmigration (Monmouthshire). In this respect, the Gloucestershire LL has been less concerned in Cycle 2 with data experimentation than with methods (cf. Goodwin-Hawkins and Keech 2022:5), yet this is a context of local relevance.

Local relevance

It became very evident in Cycle 2 that there is much potential and support for the dashboard within the county. Yet one major barrier to the refinement of the smart dashboard was the limited capacity that CVS organisations have available even to test the dashboard's functionality using their own data. The importance of this process lies in the ability of the LL team to cross-reference users' functionality needs, and for users to be able to process confidential and sensitive personal data. Testing has been refocused on public events such as the #Glos DataDay and the DAISI





conference, which offer networking and showcasing opportunities for the CVS organisations attending. Another opportunity is the broadening of dashboard functionality discussions to service commissioners (public officials). This process could reveal rural data gaps, such as the absence of data on rural elders' use of internet health services, because existing research on digital inclusion has tended to focus on families and digital educational opportunities. Data collection may continue to be a focus of the ongoing stages of the LL. In this respect, understanding data needs can be a consequence of prototyping the dashboard, not a prerequisite (because existing data is the basis of its functionality).

Policy relevance

As noted in section Theory of change, the intention was to ensure the representation of rural perspectives and needs in the GCC digital inclusion strategy (DIS). However, this plan needed to be revised as the DIS is to become internalised by GCC. Our main aim now is to secure a commitment in the county's digital strategy to include more rural and community-level data. This will include CCRI being represented on the strategy steering group.

Robustness and limitations

The experiment is ongoing, and the smart dashboard testing will continue until the end of the year. It is too soon to summarise any limitations. However, one limiting factor might be that the smart dashboard requires uploaded data to refer to at least one geographical level (e.g. postcode, district, ward code, etc.) to enable cross-referenced analysis across datasets. In other words, the smart dashboard is dependent on geographical data. Clearly, if the geographical data entered links to the scale of a district, the geographical granularity of the analysis could be limited. Another hindering factor might be the quality of data gathered at local level and lack of standardisation of data collection.





Part 3: Reflections and learning

Reflections on data sources, methods, and tools

Data sources include any data sets that dashboard users wish to analyse, both internal datasets collected and held by service delivery organisations, or data that is freely available on-line, such as national or local statistical data. A number of local data sets, provided by local organisations via GRCC, as well as GRCC's own data set, were analysed in the pilot stage.

The primary data sources included local CVS organisations, as well as organisations in the social care, education, and rural development sectors. Data collected by these organisations is mostly through surveys, stakeholder interviews, and digital tool usage statistics.

Data issues and obstacles during the experiment

Testing the prototype depends on the capacity of stakeholders to engage in dashboard development. The stakeholder organisations are sometimes very busy and cannot spare the time to test the dashboard and all its features. Initial obstacles also included inconsistent data quality and the digital readiness of certain stakeholders.

Other early issues that were quickly dealt with included the ability of external (non-university) partners to log in to the prototype.

A further challenge has been the shifts in focus of the county's digital inclusion policy as well as staff changes at the county and district councils.

Managing data issues and obstacles

In collaboration with GRCC [Daniel Gale], robust data governance practices were established, enabling the integration of data from multiple sectors while maintaining General Data Protection Regulation compliance. Through the DAISI network, GRCC tried to address some of the challenges linked to inconsistent data quality by providing additional training and technical support. The piloting is still ongoing, and more testing of the dashboard is required. CVS organisations are under significant time and workload stress and sometimes lack the capacity to engage with the Gloucestershire LL experiment. However, a number of avenues to support them and keep them engaged have been developed in close collaboration with GRCC. Suggestions on involving two rural district councils in the tool testing are being currently considered by the LL team.

Pilot Region Partner's perspective on data

From the Gloucestershire PRP perspective, Cycle 2 has been highly relevant, offering a deeper understanding of rural sustainability challenges, particularly in relation to digital inclusion, environmental resilience, and demographic trends. For example, data on rural digital access disparities has reinforced the importance of targeted interventions under GRCC's DAISI initiative. However, challenges such as inconsistent data quality and gaps in localised datasets have emerged as common obstacles, limiting the ability to form comprehensive insights. Stakeholder engagement, especially with underrepresented groups, remains a critical focus area. Notably,





input from CVS organisations—integral to GRCC's co-production model—has added rich qualitative dimensions, ensuring the experiment's findings align closely with community needs and priorities.

Experiment design and implementation

Strengths and successes

The dashboard development process worked well, once the decision was made to develop it. This involved recruiting a post-graduate researcher from within the University of Gloucestershire's School of Business, Computing and Social Sciences. A key strength was also the participatory approach, which involved local stakeholders from the beginning. This ensured that the tools developed were tailored to the organisations' needs and capabilities.

Scope for improvement

Future efforts will focus on increasing the standardisation of data collection and improving digital literacy among all stakeholders. The pilot phase is still ongoing and further testing and refining is going to take place. ACORN represents a legacy for the dashboard and opportunities for further refinement can be explored beyond the scope of RUSTIK.

Skill development and capacity building

Skills developed

From a PRP perspective, participants have enhanced their skills in data literacy, digital tool usage, and cross-sectoral collaboration, equipping them to better engage in the decision-making process. The project has enhanced the overall capacity of local organisations to interpret and use data, positioning them to address local challenges more effectively.

The Gloucestershire LL team has established close collaboration with the School of Business, Computing and Social Sciences at the University of Gloucestershire, in developing the proposal for the experiment, selection of postgraduate student in designing the tool, and overseeing the technical aspects of the tool development.

Capacities

The RUSTIK project has significantly enhanced data management and collaborative capacities in the Gloucestershire Pilot Region. GRCC has developed improved methodologies for sourcing, integrating, and interpreting diverse datasets, enabling more informed decision-making. Additionally, data literacy workshops have empowered stakeholders to assess data quality and apply insights effectively. Beyond technical skills, softer capacities have also been strengthened, particularly through the LL's focus on fostering networks and collaboration among community organisations, local councils, and grassroots stakeholders. These networks have not only facilitated shared learning but also enhanced collective problem-solving. Looking forward, developing advanced data visualisation and predictive modelling capabilities could further amplify these gains, making data insights more accessible and actionable for all stakeholders.





Pilot Region Partner's perspective on skills and capacities

Through the RUSTIK project, GRCC and its partners have gained valuable skills, particularly in data analysis and community engagement. The project has deepened understanding of rural sustainability indicators and strengthened stakeholder participation through tailored engagement strategies. Despite these advancements, technical expertise in advanced analytics, such as machine learning, remains a limitation, alongside resource constraints that hinder long-term capacity-building efforts. Addressing these gaps will require targeted investments in skills development and expanded collaborations with academic and professional organisations. Additionally, fostering peer-to-peer learning among LL participants can help sustain momentum, ensuring that skills and capacities continue to grow in alignment with emerging challenges and opportunities.

Innovation and impact

Although the experiment in particular, and the LL's presence in general, have been enthusiastically welcomed, it remains clear that the capacity of many local organisations is overstretched and that the local policy environment remains dynamic and fragmented. From the position of the LLC and PRP, this indicates the need to secure support from partners outside as well as inside the county, for example to share knowledge about the dashboard in different places and rural contexts, as well as in academic arenas.

Reflections on innovation

The use of AI for real-time data reporting and the integration of a user-friendly dashboard are significant innovations, reducing barriers to data usage for rural communities. Cross-university collaboration and GRCC DAISI network support helped to refine the experiment, while the GRCC ACORN project could further enhance the tool's function.

Short-term impacts

The evidence gained by RUSTIK and notably the smart dashboard development played an important role in the PRP winning a bid to National Lottery to secure funding for a 3-year project ACORN. ACORN, which stands for Advancing Communities and Organisations through Resources and Nurturing, aims to create a robust data infrastructure and improve digital literacy across Gloucestershire, aligning with the broader objectives of the RUSTIK project.

In effect, ACORN can serve as a legacy project for the LL, being able to signpost access to the dashboard after RUSTIK ends. GRCC will host the dashboard from mid-2025 and use finances from ACORN to pay for server and software subscriptions for the duration of the project.

Under the leadership of Daniel Gale, the DAISI project (a vehicle through which many GRCC Gloucestershire LL activities have been delivered) has gained national recognition for its work in closing the digital divide and empowering communities to participate in sustainable transitions. DAISI, through its collaboration with partners who have a national agenda for promoting digital inclusion, such as the Vodafone Foundation and the Good Things Foundation, has provided critical infrastructure and support for rural communities. This includes access to devices, data plans, and digital literacy training.





Furthermore, short-term impacts are confined to excitement about the potential of the dashboard among social service groups and local authorities. This reflects the hope that the dashboard will prove helpful to the work of these groups. When fully functional, we hope that the experiment will contribute to increased digital literacy and better decision-making processes within CVS organisations in Gloucestershire.

Longer-term impacts

In the longer term, once refinement of the dashboard is complete, we hope to see evidence of widespread use of this tool, which will require additional dissemination efforts at the local level. As a whole, the LL activities should help to strengthen digital (social) network and its capacity in the county among stakeholders trying to tackle digital exclusion. In the longer term, the RUSTIK project, especially via the DAISI network and legacy project ACORN, is expected to contribute to a more digitally inclusive and resilient rural economy, with greater access to services and resources.

Potential for sharing learning

The process of developing the tool has already been captured in technical detail by University of Gloucestershire (UoG) colleagues and the process of dashboard development will become the focus for a journal article.

More practically, the LL team will promote the dashboard through the national ACRE network, so that other rural community councils can have access to and inform future adaptations of the tool.





Part 4: Future steps

The table below provides a summary of the coming activities in the LL, especially those which extend beyond the period of prototyping.

Table 46 Plans for Cycle 3

Timeline	Activity	Led by
Nov 24 – Feb 25	Completion of prototyping	CCRI/UoG/GRCC
Dec 24 – Apr 25	Development of policy engagement workshops.	CCRI initially, then GRCC
Mar 25 onwards	Promotion of dashboard to ACRE and initiation of legacy arrangements – ACORN.	GRCC
Apr 25 – June 25	Drafting two journal articles	CCRI
Apr 25	CCRI meeting with Austrian team in Graz, to discuss potential dashboard utility for small business stakeholders.	CCRI/BAB

Future collaborations

If time allows, in addition to local policy and national (via ACRE) promotion efforts, we would like to connect with other UK universities engaged in digital exclusion research, in particular the University of Liverpool and Lancaster Business School, to help bring an additional, south-western geographical dimension to existing research knowledge. Rural aspects of digitalisation remain under-represented in the literature, where they are studied as peripheral and in relation to urban digital performance (Salemink et al. 2025).

Communication and dissemination

Academic papers are under discussion within the research team. Two ideas are current, covering (i) a technical paper on the process of the smart dashboard development; and (ii) an analysis of the literature on the Third Sector and hybrid alliances that deal with the assessment of service performance delivery, using the dashboard as a tool for improving the accuracy of rural Third Sector performance. We are active in our conversations with other LLs to consider alliances across the RUSTIK partnership.

In addition, we are exploring the opportunity for sharing the development process for the dashboard development with digital open-source colleagues in GRCC and ACORN as a form of open educational practice.

At the 2024 project meeting in Millstatt, some early ideas were discussed about the opportunity to widen the application of the dashboard (depending on the outcome of the prototyping). In





particular, some applications were envisaged that might support the work of the Small and Medium-sized Enterprises supported in the Austrian LL.

Lastly, we will be supported by UoG communications colleagues to issue a press release once the dashboard prototyping has been completed.





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United Kingdom: Monmouthshire

Aimee Morse and Demelza Jones





Table of acronyms

CCRI	Countryside and Community Research Institute
GAVO	Gwent Association of Voluntary Organisations
LL	Living Lab
LLC	Living Lab Coordinator
LSOA	Lower Super Output Area
MCC	Monmouthshire County Council
ONS	Office for National Statistics
PRP	Pilot Region Partner
WIMD	Welsh Index of Multiple Deprivation

Summary and overview

Monmouthshire (Welsh: Sir Fynwy) is a small, predominantly rural county in south-east Wales with a population of 93,000. It is a county characterised by demographic change, notably population ageing, exacerbated by a constrained, expensive housing market which is inaccessible to many younger residents. As the RUSTIK Pilot Region Partner organisation, Monmouthshire County Council (MCC) are actively seeking solutions and searching for data which contribute to the development of strategic predictions and projects for the county.

Living Lab challenge

Monmouthshire has an ageing population with a mean age of 48 and predictions that by 2036, 36% of the county's population will be aged 65+ (Monmouthshire County Council 2021b); this has implications for its economic base, future economic growth prospects, the social sustainability of the region's communities, and the public health and social care offering in the region as the demand pressures of an ageing population combined with the reduced revenue resulting from a decrease in the working-age population. The council is keen to understand the drivers of demographic change and ways to achieve better demographic balance through retaining/attracting younger people to live and work in the county, aligning to its strategic objective of *'supporting well-being, health and dignity for everyone at every stage of life'* (Monmouthshire County Council 2023).

Data experiment

To address the above challenge and data need in Monmouthshire, the following data experiment was designed, consisting of three parts:

1. Development of a comparative tool for Welsh Indices of Multiple Deprivation (WIMD) and Office for National Statistics (ONS) data analysis
2. Maptionnaire survey of residents and non-residents producing geo-referenced quantitative and qualitative data
3. Qualitative interviews and focus groups with residents

The data experiment targeted an age range of 16–44-year-olds – a group that the Living Lab (LL) is terming younger working-age people. This acknowledges that the common focus on 'young people' as aged 16-25 excludes the importance of older age groups who still have a high





proportion of their working lives ahead of them. The cut-off upper age of 44 allows alignment and comparison to age bandings in existing official statistics. As well as increasing understanding of younger residents' views and experiences, the data experiment meets MCC's identified need for more granular data, reflecting the variation that they anecdotally know exists in how residents experience life in different areas of the county and along other lines of demographic variation.

Preliminary results

A prototype dashboard has been constructed allowing LSOA-level data comparison, and this will continue to be developed via integration of the data collected during the data experiment and trialled with MCC teams in the coming months.

Full analysis of the Maptionnaire survey and focus group data will take place over the coming months, so this report contains preliminary observations. Common topics raised by survey respondents included unaffordable housing, issues around access to services and public transport infrastructure, and limited further and higher education and training and employment opportunities locally.

Focus groups targeted the younger age range (16-18) within the LL 16-44 target population because as the data experiment progressed it became clear that these younger groups were less likely to complete the Maptionnaire survey. Focus group discussions included the high cost of housing and the cost of living, limited further and higher education and training opportunities, and a lack of opportunities in young people's preferred future careers. Most said that if they were to stay in or return to Monmouthshire, the main motivation would be proximity to family, or a safe place to bring up a young family if they were to have children, although they felt high house prices and limited job opportunities could be a potential barrier to this, and most who planned to leave to attend university only envisaged a possible return to the county as a much older adult. The main message from young people about their current experience of life in Monmouthshire was that there was a lack of things for them to do – specifically a social and leisure offer that was targeted towards their age group and interests, and which was accessible and affordable.

Key learning to date

Some key challenges were encountered in the data experiment around the age and unavailability of some relevant existing official statistics. There were also challenges around promoting the Maptionnaire survey and encouraging a high participation rate. The LL team invested significant time in attending community spaces and events to speak to members of the public about the survey, and this was effective as shown by a spike in survey response rates around each outreach event. However, overall, the number of survey responses did not meet the target number calculated for a representative sample. It was particularly challenging to encourage people from the younger end of the survey's target age range to take part, which led to the pivot to increased targeting of focus groups towards this age group.

Next steps

The next step is the full analysis of the data experiment results. Geo-referenced results will be incorporated into the prototype dashboard and trialled with MCC colleagues.

Following analysis, data experiment results will be reported to MCC colleagues, and we will hold a data and policy workshop for MCC colleagues and relevant local partners early in 2025. This will include an options appraisal of more narrowly targeted data collection for the final phase of





the experiment as some of the issues identified in the data collection to date are very broad in their scope and their required policy response. Enhanced targeting could focus on:

- a narrower age range within the current target group of 16–44-year-olds
- a particular location within the county
- a specific issue or MCC policy/service area identified in the survey as a factor in younger populations' views of the county as a good and/or viable place to live or work

The workshop will also include facilitated discussion of areas of policy focus or service intervention which may feasibly address one or more of the issues evidenced by the data experiment. This will inform our decision for the focus of our final stage of data collection to maximise potential for policy relevance and impact; particularly as some of the issues identified by respondents fall outside MCC's remit or influence as a local authority or would require significant financial investment to address.

Informed by the workshop discussions and analysis of findings to date, the LL team will design a second phase of more targeted data collection, which will take place in spring 2025 with full analysis and reporting of findings concluded in summer 2025.





Part 1: Living Lab context

Pilot Region introduction

Monmouthshire (Welsh: Sir Fynwy) is a predominantly rural county in south-east Wales, United Kingdom, covering an area of approximately 880 square kilometres, with a population of 93,000 resulting in a low population density of 1.1 persons per hectare. It is home to diverse landscapes of exceptional quality, including the Bannau Brycheiniog National Park, Wye Valley National Landscape, Usk Valley and Gwent Levels.

Half of the population lives in the main towns of Abergavenny (13,689 people), Monmouth (10,675 people), Caldicot (10,339 people) and Chepstow (11,939 people) (Monmouthshire County Council, 2021a). 80% are economically active; 30% of those who are economically inactive are retired. Of the economically active, 8% work in the county's economically important visitor economy (Monmouthshire County Council 2021a). An increasing number of the population speak Welsh - although the county is well below the Welsh national average for Welsh speakers - and just over half of the county's population consider themselves to be Welsh (Monmouthshire County Council 2021a).

The county is in a strategic position, being located near growing cities such as Bristol and Cardiff. However, despite having a good road network, public transport networks within the county are limited. The bus services that link the towns and the more rural settlements have been reduced and the rail network between the county and its surrounding cities suffers from inadequate frequency and high fares (Monmouthshire County Council 2021a).

Functions

MCC is predominantly concerned with production and consumption functions, namely the employment and education of the county's residents and their access to housing and services.

The region has a higher share of individuals working in the tertiary sector than the Welsh average; however, employment in Monmouthshire itself is relatively less skilled. There is a disparity in income between those working in Monmouthshire and those working outside the county (either out-commuting or working remotely from home), which in turn affects the ability of those working in the region to live there. Additionally, professional jobs within the county attract a wider regional labour market (Monmouthshire County Council 2021a).

There is a pressing need for both a range of housing options, and affordable housing, to contribute to addressing the demographic imbalance in the county, as younger residents are commonly priced out of the current market for both purchase and rental. The county's income-to-house price ratio is 1 to 9.1, meaning the average house price is nine times the average annual income. This is significantly higher than the overall Welsh average which is 1 to 6.4 (House of Commons Library, 2023). There are several reasons for this higher-than-average ratio, including strong demand for limited housing stock that is skewed towards larger houses, coupled with physical, environmental and policy constraints on further developments around existing urban areas (Monmouthshire Public Service Board, 2022).





Transitions

MCC has identified that the transitions in the county are closely interlinked; however, work in the Living Lab (LL) has focused on demographic change and the socio-economic transition.

Monmouthshire has an ageing population with a mean age of 48 and predictions that by 2036, 36% of the county's population will be aged 65+ (Monmouthshire County Council 2021b); this has implications for its economic base, future economic growth prospects, the social sustainability of the region's communities, and the public health and social care offering in the region as the demand pressures of an ageing population combined with the reduced revenue resulting from a decrease in the working-age population.

MCC declared a climate emergency in 2019 and recognises the importance of training in green skills to meet their aim of becoming a zero-carbon county and the need to support farmers in the ongoing agricultural transition. MCC has identified the digital transition as an opportunity, intending to ensure home workers can access broadband at suitable speeds to allow businesses to compete with those in the economic powerhouses of the Southwest, supporting goals of economic investment and increased higher-paid employment opportunities within the county. Supporting the development of Green and digital skills has also been identified as important for equipping Monmouthshire residents with the attributes needed for employment in growing and future sectors (Monmouthshire Public Services Board, 2022).

Living Lab partnership

Pilot Region Partner organisation: Monmouthshire County Council (MCC) is the governing body for the Monmouthshire principal area of Wales. They are responsible for the provision of all local government services, including education, social work, and environmental protection.

The Replacement Local Development Plan (2024) and the Community and Corporate Strategy (2023) are key strategies which will guide MCC's approach to the three transitions; however, it is important to be aware of the wider governance context, particularly regarding the influences of MCC's strategic regional partnerships such as the Cardiff Capital Region City Deal and the Marches Forward Partnership.

MCC's responses to transitions will be influenced by the seven well-being goals set out in the Wellbeing of Future Generations (Wales) Act 2015. This Act aims to improve the social, economic, environmental and cultural well-being of Wales and gives a legally binding common purpose for national government, local government, local health boards and other public bodies. MCC works in partnership with other South-East Wales statutory and public bodies as part of the Gwent Public Services Board in developing strategy and policy responses to the Act.

Demelza Jones is the RUSTIK contact for MCC and the Pilot Region Partner (PRP). Demelza is employed as a Research Fellow by the Countryside and Community Research Institute (CCRI) and seconded to MCC to work on the RUSTIK project. Demelza is a qualitative sociologist, with expertise in the study of young people, children and families' lived experiences; migration and diversity; and social inequalities. Within MCC, Demelza works as part of the local authority's Strategic Partnerships team and reports to Sharran Lloyd and Rachel Rawlings (respectively Strategic Partnerships Manager and Strategic Partnerships Lead at MCC).





Living Lab Coordinator: CCRI at the University of Gloucestershire is the research partner. The CCRI is one of the largest specialist rural research centres in the UK, working at the interface of agriculture, society and the environment on issues relevant to rural and urban development, in the UK and further afield.

Aimee Morse is the Living Lab Coordinator (LLC). Aimee is a rural sociologist, and her research interests include the social and environmental impacts of collaborative working in rural communities and factors which influence individuals' relationships with their local environment.

Living Lab challenge

MCC is keen to understand the drivers of demographic change and ways to achieve better demographic balance by retaining/attracting younger people to live and work in the county. Exploring reasons why younger people stay, leave, arrive or return also offers an opportunity to examine other areas of concern in Monmouthshire, including transport and housing issues, income and social inequalities, and the changing skillsets needed for the environmental and digital transition.

Rationale and research questions

There is good data on demographic change in Monmouthshire. However, the reasons why this change is occurring are not as well understood. MCC has identified a data gap in their understanding of the needs and views of young and younger working-age people in the county. This contrasts with older populations within the county who are more likely to access council services, and who have been subject to recent targeted data collection exercises as part of national policy initiatives such as the Welsh Government's Age Friendly Wales strategy. There is a concern among MCC colleagues that the county's ageing demographic, alongside resource rationing as local authorities continue to face financial pressures, will result in services being further designed towards the needs of an older population, exacerbating inequalities impacting younger residents and making Monmouthshire a less viable place for younger people to live.

There is a perception that younger people are leaving Monmouthshire for a specific set of reasons (leading to particular interventions). RUSTIK data will increase understanding of whether this is the case and assess whether the reasons are beyond the scope of the Council's and partners' activities to retain/attract younger people or can be addressed through MCC's policy interventions. More granular data, and data on individuals' circumstances, have also been identified as useful additions to MCC's current data portfolio. Exploring how these areas could offer solutions which may influence people's decisions to stay in Monmouthshire is a focus of the RUSTIK data experiment and analysis.

The research questions are:

- For young people in Monmouthshire (16-25), what are the barriers they perceive to living and working in the county during their working lives?
- For younger working-aged people ('stayers', returnees or arrivals) in the county (25-44) what makes Monmouthshire an (un)attractive and/or (un)viable place to live and work?
- For younger working-aged people outside the county (25-44) what makes Monmouthshire an (un)attractive and/or (un)viable place to live and work?





- What might Monmouthshire County Council do, or seek to influence, to increase the attractiveness and viability of living and working in the county for younger working-aged people?

Policy relevance

MCC has identified improving demographic imbalance as a key challenge to the county's strategic plans to achieve economic growth, and viable and sustainable communities in the longer term. The ambition to improve demographic balance is included in the authority's overall corporate and community strategy statements, as well as in other policy areas relevant to the challenge, such as strategies around economic growth and local employment opportunities, and housing development. The LL experiment aims to ensure MCC and their partners have the tools to support decision-making regarding the demographic challenge.

In a meeting with MCC colleagues in October 2024, it was identified that findings from RUSTIK can contribute to Monmouthshire's Wellbeing of Future Generations assessment and provide data to inform the county's action on social determinants of health, to which it is committed as part of the Gwent Marmot Region. The granularity of the data is key, as currently much of the data held for indicators is at the county level, rather than at a lower output level, such as the Lower Super Output Area (LSOA) data used in the Welsh Index of Multiple Deprivation (WIMD). In addition to informing the Replacement Local Development Plan and the county's current post-16 offer review (reviewing the educational and training offer for 16-18-year-olds within the county), we confirmed that the data's granularity means it can be used to inform local placemaking and regeneration plans across the county's market towns. It would allow MCC colleagues to develop targeted interventions based on respondents' comments and the place-based data collected via the Maptionnaire survey.

Stakeholders

As the local statutory body, the relevant policy and delivery teams within MCC are the key stakeholders in the data experiment and in utilising learning from the data experiment in future decisions and interventions. As a large and organisationally complex body, it has not been possible to engage MCC as a 'whole organisation' in the data experiment, so targeted engagement work has taken place with those teams whose remits relate to themes within the data experiment, and who could potentially utilise the data in their future work – for example, the council's data team, and teams covering services for children and young people, housing, communities, and employment and skills. Stakeholders outside MCC include the local branch of the Gwent Association of Voluntary Organisations (GAVO) who support the voluntary sector, and the local social and affordable housing providers.

Theory of change

In the Theory of Change (Figure 86), we identified two intermediate outcomes: the data will inform updates to local strategies and plans, and decision-makers will have a better understanding of the needs of local people, so that Monmouthshire is an attractive place to live and work, and the people who would like to live in the county can do so.



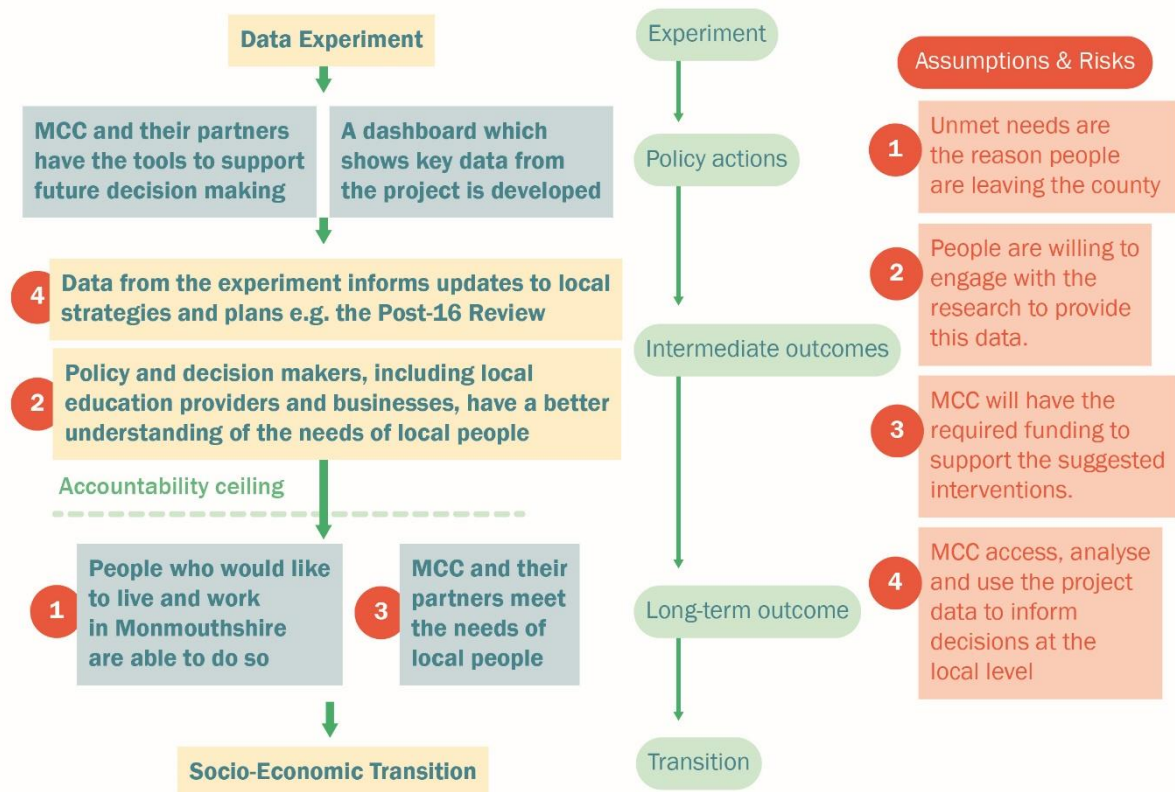


Figure 86 The Theory of Change for Monmouthshire.

The assumptions and risks (in yellow) are as follows:

1. Unmet needs are the reason people are leaving the county.
2. People are willing to engage with research to provide this data.
3. MCC will have the required funding to support the suggested interventions.
4. MCC access, analyse and use the project data to inform decisions at the local level.

Data relevance

MCC officers require more granular data to inform their decision-making concerning the Monmouthshire Offer (attributes which encourage people to live and work in the county). In a focus group with MCC officers early in the data experiment design process, they noted that qualitative data on individuals' experiences in the county is lacking and would be of value. This is particularly true of young people's views, with officers identifying that the group they had least engaged with were those aged 16-25, as well as a wider range of the younger working-age population who the council acknowledge they only have information about if they are utilising certain council-run support services.

MCC colleagues also suggested that more readily available comparative tools to allow evidencing of variation between parts of the county would be of use in decision-making; acknowledging that there is significant variability and that a more tailored response informed by local intelligence would be useful in addressing some issues.





Part 2: Living Lab Cycle 2: Data experiments

Data experiment

Developing the data experiment

The proposed challenge was discussed through a series of emails in September and October 2023, between the LL team, MCC's Head of Enterprise and Community Animation and Performance and Data Insights Manager. The Strategic Partnerships Manager, who succeeded the Head of Enterprise and Community Animation as RUSTIK's lead contact at MCC in autumn 2023, approved the challenge in a meeting in October 2023. Following this agreement, the LLC and PRP worked closely together to design a data experiment that would satisfy both the requirements of RUSTIK and the data and policy needs of MCC. The need for more granular data reflecting the variation within the county had been identified as a data gap by MCC officers, so an early decision was made to utilise Maptionnaire and its geo-referencing capabilities as a tool.

To respond to this need, the LLC developed a design for a data dashboard. The LLC and PRP presented the plans and a prototype version of the dashboard to MCC colleagues in a meeting with the Partnerships Team, and an online workshop (February 2024) with a wider range of MCC teams and external partners whose remits are relevant to the transition challenge. The prototype dashboard included existing relevant official statistics which would be integrated with original data collected via the data experiment's Maptionnaire survey, providing a new way of visualising existing Census and WIMD data alongside the survey data to demonstrate inequalities across the county. The tool was created in Excel as a prototype, and shows how two or more LSOAs compare across several domains, at the Monmouthshire and Wales levels. Satellite imagery of the LSOAs has also been incorporated showing the local natural and built environment and density. Comments from the Maptionnaire survey will also be included in the tool once analysis of this data is undertaken, linked to the area where the survey respondents lived or worked via the platform's geo-referencing ability.

As well as welcoming its comparative potential, MCC colleagues felt that the data experiment's proposed focus on age groups beyond the traditional statistical definition of a 'young person' aged 16-25 was useful, as increased data on the needs of older age groups (people in their late 20s, 30s and early 40s), who still had a high percentage of their working lives ahead of them, were just as important for understanding ways to enhance the Monmouthshire Offer and addressing inequalities to correct the demographic imbalance. Officers and external partners also stressed the need for in-depth qualitative data to understand residents' needs and decision-making, so it was agreed that targeted focus groups should run alongside the survey and that this data would also be geo-referenced for incorporation into the dashboard where possible, supporting place-based insights.

The next step in developing the data experiment was the design of the Maptionnaire survey and accompanying focus group and interview schedules. In addition to the discussion of areas of focus in the February 2024 workshop, the PRP and LLC held scoping conversations with relevant MCC officers from teams including youth services, housing, employment and skills, and community support and development, as well as local voluntary sector organisations. These stakeholders'





ideas for questions and areas where additional data was needed to support decision-making were incorporated into the data collection tools' design.

Experiment description

The Monmouthshire data experiment consists of three parts:

1. Development of a comparative tool for WIMD and ONS data analysis
2. Maptionnaire survey of residents and non-residents
3. Qualitative interviews and focus groups with residents

There are several experimental elements to the above stages. Once the analysis and inputting of Maptionnaire survey data is complete, the comparative dashboard tool will provide a new way of visualising existing WIMD and ONS data alongside the qualitative data from the Maptionnaire survey, the interviews, and the focus groups. The tool will also show satellite and Ordnance Survey maps, to allow officers to visualise the LSOAs they are examining.

Maptionnaire has not been used in Monmouthshire before. The process of integrating the original data collected via the Maptionnaire survey into the prototype dashboard will test whether the qualitative answers to questions in the survey can be mapped and incorporated into the comparative tool, to provide insight into how specific locales can be changed and/or improved to meet the needs of the population answering the survey. It will also test how Maptionnaire works in a predominantly rural area, as the tool has mainly been used in cities before.

Experiment objectives

The primary objectives for the data experiment are:

- Ascertain the reasons for which younger working-age people (16-44) leave, stay, arrive, or return to the county, and what are the barriers or enablers to this.
- Provide a dashboard through which MCC colleagues can access this granular data to inform their decision-making at the LSOA level.

Relationship to theory of change

The data experiment will collect and collate the data required by MCC colleagues to inform their decision-making concerning the Monmouthshire Offer for younger residents, thus fulfilling the input section of the theory of change.

The close collaboration between the LLC, PRP and colleagues throughout MCC has ensured that the data experiment has collected data of direct relevance to several developing policies and strategies in the county, thus ensuring a contribution to the intermediate outcomes presented in the ToC. This collaboration has also ensured that colleagues are prepared to work with the data, addressing assumption 3.

The long-term outcomes identified in the ToC are beyond the accountability ceiling of this work, as they will require sustained effort from MCC and their partners which outlast this project's term. However, the findings from the data experiment will contribute to MCC's understanding regarding reasons people might leave Monmouthshire, thus addressing assumption 1.





Data use

Data sources and methods

Numerous data sources were consulted during the data experiment (Table 47 The datasets and analysis used during the experiment. Table 47).

Table 47 The datasets and analysis used during the experiment.

Data source	Dataset	Analysis
Office for National Statistics (ONS)	Census 2021	Monmouthshire LSOA's ranked in Excel
Welsh Index of Multiple Deprivation (WIMD)	Lower Super Output Area (LSOA) deprivation data	Monmouthshire LSOA's ranked in Excel
Ordnance Survey	LSOA maps	No analysis required. Map files added to comparative dashboard.
OpenStreetMap	LSOA satellite imagery	LSOA shapefiles extracted using QGIS.
Maptionnaire	185 residents' responses 47 non-residents' responses	Statistical analysis of quantitative questions and thematic analysis of qualitative questions.
Focus groups and interviews*	50 Monmouthshire residents	Thematic analysis
Community engagement materials*	7 events/community venues	Thematic analysis

*These approaches were included in the research design from the start but were flexible and designed to respond to the level of engagement from survey respondents and stakeholders. They are described in detail in Implementation.

Data innovation

Maptionnaire has not been used in a rural context, nor by MCC before. The surveys captured specific locations for improvement, based on individuals' perceptions of barriers/opportunities within the county, which can then be used to inform place-based development.

MCC colleagues agreed that this new way of visualising existing and new data will be useful, and supported the development of a comparative tool to report results of this mixed-methods approach. The combination of datasets at this level of granularity is novel, as is the addition of geo-referenced qualitative comments from interviews and focus groups.

The satellite imagery aspect of the comparison was inspired by a data project undertaken by the US Center for Spatial Research at the University of Columbia, New York. The project worked with US Census data to visualise and map data to areas of New York City similarly sized to LSOAs, enabling visual and statistical comparison between areas which are similar across one indicator





(for example, the percentage of the population who do not speak English) but may have differences in other socio-economic indicators (for example, household income or household age distribution) enabling locally sensitive responses to social challenges (US Centre for Spatial Research 2021). The contrast between New York City and Monmouthshire as respectively metropolitan and largely rural areas further supported the experimental nature of this spatial comparative approach in Monmouthshire.

Implementation

Implementing the experiment

The experiment was implemented in the steps shown in Table 48, beginning with a secondary analysis of the ONS and WIMD data, which, in addition to conversations with stakeholders in Monmouthshire, informed the design of the Maptionnaire survey.

Table 48 : Data Experiment timeline, April-December 2024.

	April	May	June	July	August	September	October	November	December
Uploading ONS and WIMD data to a new comparative dashboard									
Creating the visual map files									
Scoping interviews with MCC officers and relevant partners									
Preparing the Maptionnaire survey									
Maptionnaire survey live									
Outreach events in Monmouthshire									
Focus groups and interviews									
Survey and focus group/interview data analysis									

Outreach events to encourage public participation in the data experiment were key in the survey phase, and significant time was invested by the PRP in liaising with MCC and external colleagues to identify and arrange opportunities for outreach to the target population, and by the PRP and the LLC in attending community events and spaces across the county during summer and autumn 2024. These events allowed the LL team to explain the research to potential respondents and hand out flyers containing the survey details. As well as promoting the survey, these events included interactive methods of dot diagrams and mapping (Figure 87), to engage with people and to provide an initial indication of the areas in which residents felt there were issues that





impacted on their experience of Monmouthshire as a good and/or viable place for them to live and/or work. Posters and flyers (Figure 88) were also displayed in public spaces around the county, including each of the council-run libraries/community hubs and leisure centres, and in the venues of several community cafes, community centres and other third-sector organisations.

The survey was also promoted through digital channels. The PRP made short promotional videos for the survey; including a version aimed specifically at the younger age range of the survey's target audience, featuring a voiceover by local young people. These were shared on the social media channels of both RUSTIK and MCC and via the online newsletter produced by Gwent Association of Voluntary Organisations (GAVO) for voluntary and community groups in the county. The video promoting the non-residents' version of the survey was shared on community Facebook groups in neighbouring counties and nearby cities. The MCC Communications Officer supported the LL in putting together an MCC webpage for the RUSTIK project and prepared a press release, although this was unfortunately not printed by the local newspaper. The leaflet was also circulated via newsletters sent out by local primary schools and early years settings (targeting parents within the target age range). As one of the largest employers in the county, MCC staff were encouraged to complete the survey and to share it with relatives and friends, and the survey was promoted via periodic posts on the council's internal staff newsletter and posters and leaflets at County Hall (MCC's headquarters). All promotional materials for the survey were produced in English and Welsh versions, and a Welsh version of the survey was also available within Maptionnaire.

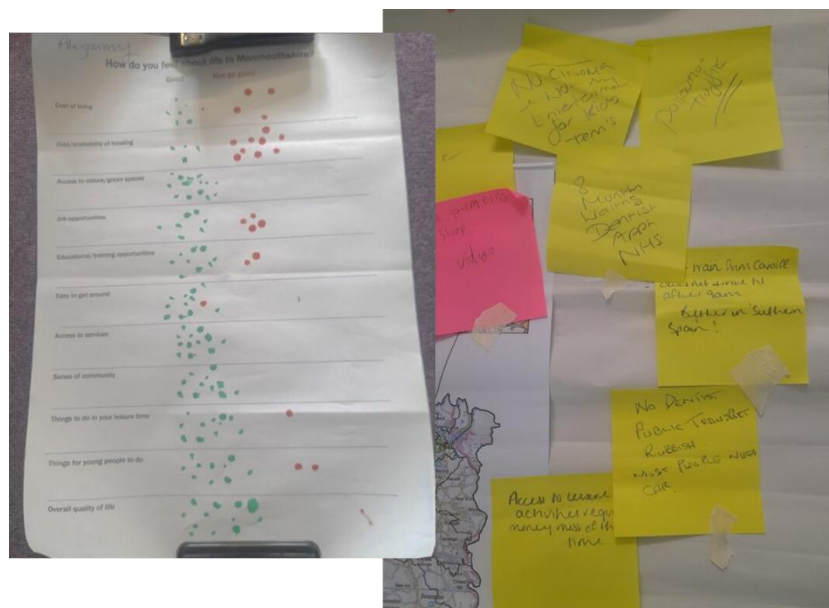


Figure 87 Examples of materials used at community outreach events, asking residents to indicate where an aspect of life in Monmouthshire was 'good' (green) or 'less good' (red), and to comment on what they liked or disliked about areas of the county by adding post-it notes to a large map.





RUSTIK

Aged 16-44 and live, work in or visit Monmouthshire?
We want to hear your views about life in the county.
Please complete the online survey

Ydych chi yn 16-44 oed ac yn byw neu'n gweithio yn Sir Fynwy?
Rydym eisiau clywed eich barn am fywyd yn y sir.
Cwblhewch yr arolwg ar-lein

If you currently live in Monmouthshire
Os ydych yn byw yn Sir Fynwy ar hyn o bryd

If you do not currently live in Monmouthshire
Os naad ydych yn byw yn Sir Fynwy ar hyn o bryd

Abertaweili / y Fenni

- 25/07/2024: Abertaweili Farmer's Market / Marchnad Ffermyr y Fenni: 09:30- 12:00
- 25/07/2024: Abertaweili Community Hub / Hyb Cymunedol Y Fenni: 14:00 - 16:00
- 25/07/2024: Abertaweili Leisure Centre / Canolfan Hamdden y Fenni: 15:00 - 17:00
- 25/07/2024: Abertaweili Street Food and Craft Night Market / Marchnad Fwd Stryd a Nosam Grefftau

Chepstow / Cas-gwent

- 16/07/2024: Chepstow Community Hub / Hyb Cymunedol Cas-gwent: 09:45 - 11:15
- 30/07/2024: Chepstow Leisure Centre / Canolfan Hamdden Cas-gwent: 09:30 - 11:30

Usk / Brynbuga

- 25/07/2024: Usk Community Hub / Hyb Cymunedol Brynbuga: 10:00 - 12:00

Caldicot / Cil-y-coed

- 12/07/2024: Caldicot Community Hub / Hyb Cymunedol Cil-y-coed: 10:00 - 11:30
- 12/07/2024: Caldicot School - Schools and Communities Together Event / Ysgol Cil-y-coed - Digwyddiadau Ysgolion a Chymunedau Ysgydy: Open to the public from 15:00 / ar agor i'r cyhoedd 15:00
- 12/07/2024: Caldicot Leisure Centre / Canolfan Hamdden Cil-y-coed: 17:30 - 19:00
- 07/08/2024: Caldicot Community Hub / Hyb Cymunedol Cil-y-coed: 10:00 - 11:30
- 07/08/2024: Caldicot Leisure Centre / Canolfan Hamdden Cil-y-coed: 13:00 - 18:00
- 16/08/2024: Caldicot Family Fun Day / Cil-y-coed Diwrnod Hwyl i'r Teulu

Monmouth / Trefynwy

- 23/07/2024: Monmouth Community Hub / Hyb Cymunedol Trefynwy: 10:00 - 11:00
- 23/07/2024: Shire Hall Museum Monmouth family craft event / Amgueddfa Neuadd y Sir Trefynwy digwyddiad crefft teulu: 11:30 - 14:00
- 23/07/2024: Monmouth Leisure Centre / Canolfan Hamdden Trefynwy: 16:00 - 17:00

Figure 88 Bilingual materials designed to promote the survey and community outreach via posters, leaflets and social media

Adaptations

The survey remained open for longer than planned. Initially, it was to be closed in September, but with interest from local schools in completing the survey and the difficulties in securing time with schools to complete this prior to the UK school summer holiday and during the busy period at the start of a new academic year, the decision was taken to keep it open until the end of November.

Fewer people than anticipated expressed an interest in taking part in a focus group or interview via the open call for eligible participants included in the Maptionnaire survey. As the survey data collection period progressed, it became clear that more people in their late 20s, 30s and early 40s were completing the survey than people at the younger end of the eligible age range (16–25-year-olds). As such, qualitative data collection via focus groups was redesigned to target this younger age group. These focus groups were conducted in each of the main settlement areas of the county and were arranged via gatekeeper organisations (secondary school sixth forms³⁰; the council-run youth service; and a third sector group working with young people) and took place concurrently with the survey, reaching approximately 50 Monmouthshire residents aged 16-19.

Other Living Lab activities and achievements

Alongside work on the transition challenge, the PRP has undertaken work connected to the Marches Forward Partnership – a local authority partnership covering English and Welsh

³⁰ The final two years of school in the UK, where 16–18-year-olds study towards academic A-Level qualifications or, sometimes, vocational awards.





neighbouring councils along the Welsh Marches border region and based on shared interests and common issues that cross national boundaries. These include an ageing population and contributing issues including housing unaffordability, lower wage economies and infrastructure challenges. The PRP conducted a policy review exercise across the four participating local authorities. While outside of the data experiment, this work has contributed to the LL team's understanding of policy landscapes in the wider region, responses to comparative challenges in other, similar counties, and possibilities for potential upscaling of the LL's data experiment to other local authorities with a similar rural context and facing similar demographic challenges.

Preliminary results

Results to date

Results from the dashboard development

ONS, WIMD, and geospatial data (Table 47) were uploaded to a comparative dashboard in Excel. The front page of the dashboard currently allows MCC colleagues to choose two LSOA areas for comparison (Figure 89). The dashboard shows how the two LSOAs compare by WIMD rank across each of the WIMD domains, both in Monmouthshire and across Wales. In addition, the dashboard contains a section for comments from the survey, which will be updated following further analysis of the survey results. The right of the dashboard shows the visual imagery of each LSOA, to provide context regarding the WIMD indicators, such as housing type and access to green space. Initial discussions of the populated prototype dashboard with MCC colleagues suggest that it addressed their need for more granular comparative data on younger working-age people's experiences of life in the county. Ongoing work will transfer the prototype dashboard into a format that offers the best possible usability for MCC colleagues.

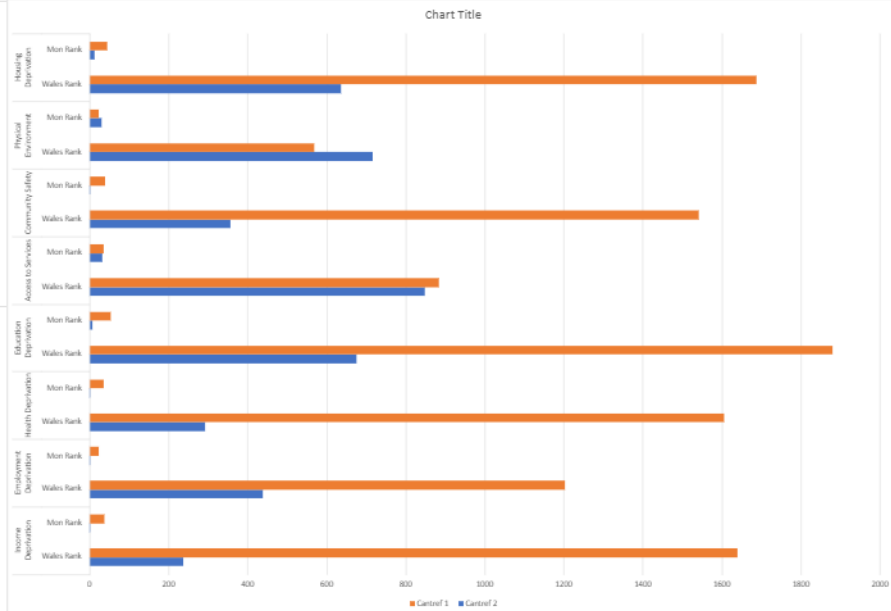
The example below from the prototype dashboard shows two LSOAs in Abergavenny – one of Monmouthshire's market towns. We can see that, whilst these LSOAs are neighbours, they are quite different. This is quite common across Monmouthshire, which, as a county, is often considered relatively affluent; however, we can see in several parts that there are areas of deprivation, which have been challenging for MCC to address given how the county as a whole is perceived. Full analysis of the Maptionnaire survey and focus group data will take place over the coming months and will be integrated into the dashboard; therefore, the below sections report preliminary observations from the data collected.





Choose the LSOAs you would like to compare by selecting a ranking in each box. The LSOAs names and data will then be shown in the table and chart, and satellite imagery of the LSOAs will also be generated.

Income Deprivation Ranking, LSOA 1:	1															
Income Deprivation Ranking, LSOA 2:	37															
	Income Deprivation		Employment Deprivation		Health Deprivation		Education Deprivation		Access to Services		Community Safety		Physical Environment		Housing Deprivation	
	Wales Rank	Mon Rank	Wales Rank	Mon Rank	Wales Rank	Mon Rank	Wales Rank	Mon Rank	Wales Rank	Mon Rank	Wales Rank	Mon Rank	Wales Rank	Mon Rank	Wales Rank	Mon Rank
Cantref 2	238	1	439	3	292	2	675	7	849	33	357	3	716	31	636	13
Cantref 1	1640	37	1204	23	1606	36	1881	53	884	36	1542	40	568	24	1687	45



Here are some comments about the selected LSOAs from a recent survey which gathered people's opinions of specific locations in Monmouthshire. If no comments were received, a "0" will show in the comments box.

Cantref 2	Comment here	Cantref 1	0
Cantref 2	Another comment!		

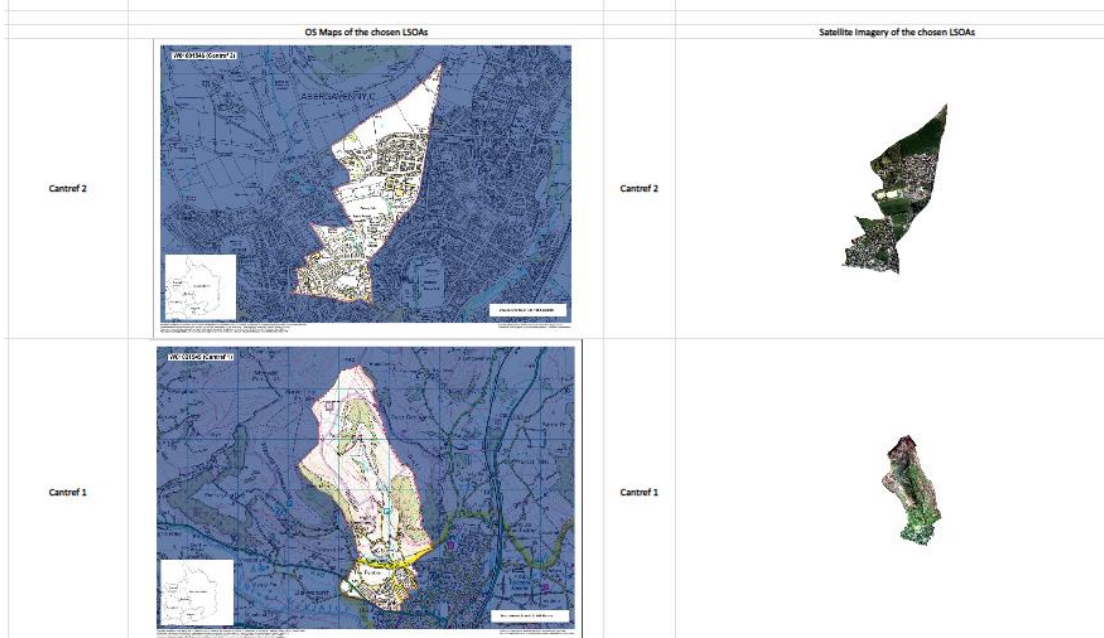


Figure 89 Extract of a prototype dashboard allowing for the comparison of Monmouthshire LSOAs based on the Welsh Index of Multiple Deprivation data. Note that in the prototype dashboard, the bar charts and maps appear side by side. Here, for the purposes of readability, they are stacked.





Results from the Maptionnaire survey

The survey captured details of working-age people's everyday experiences of Monmouthshire, aligned to MCC's data need for more information about this age group. 185 people completed the residents' survey and 44 people completed the non-residents' survey. Detailed statistical and qualitative analysis is still to be conducted. However, a preliminary analysis revealed common topics raised by respondents in open-text responses:

- Housing affordability
- Access to services
- Access to transport
- Further education and training opportunities

Maptionnaire allows respondents to place pins on a map, with the option to add georeferenced comments. 32% of respondents used this function, indicating specific locations in which they spent their time, or indicating where they live and providing their thoughts on their neighbourhood. Spatial analysis of the comments is ongoing; the aim is to allow comparison of comments at an LSOA level. These will be added to the dashboard.

Results from the focus groups and interviews

As above, the focus group questions were designed to elicit views of younger people about life in Monmouthshire, meeting MCC's data need to better understand the experiences of this age group and what factors contribute to younger people's decisions to remain in, leave or return to the county. In common with the survey and community engagement activity findings, young people felt that the most positive aspect of living in Monmouthshire was access to the natural environment. Some young people felt that Monmouthshire was a relatively safe place, although this varied across the different parts of the county. In common with the survey data, focus group participants felt that challenges for young people in the county who wished to stay into adulthood were:

- high cost of housing and the cost of living more generally.
- limited further and higher education and training opportunities locally
- a lack of opportunities in their preferred future career sectors.

Most said that if they were to stay in or return to Monmouthshire, their main motivation would be proximity to family, or as a perceived safe place to bring up a young family if they were to have children, although they felt high house prices and limited job opportunities could be a potential barrier to this.

The main message from young people about their current experience of life in Monmouthshire was that there was a lack of things for them to do in their free time – specifically a social and leisure offer that was targeted towards their age group and interests, and which was accessible and affordable to them. Young people felt that shops and amenities in Monmouthshire's town centres were targeted towards the needs and interests of the older population and said that there were few places they could go to socialise with their peers without being seen as a 'problem'. For example, a group of young men in Caldicot, a town in the southern area of the county spoke about being moved on from public spaces by the police after complaints, while in Abergavenny, a market town in the north of the county, young women described feeling unwelcome in the town's coffee shops: *'you walk in with your friends, and you feel like you're violating a sacred space for older*





people!. Young people often travelled out of Monmouthshire to access their preferred leisure activities. This introduces inequalities, as some parts of the county are much better connected to regional urban centres by public transport than others, while the cost of travelling out of the county to access leisure opportunities was a barrier for some. Reliance on public transport also meant it could be difficult for young people to travel in and out of the county in the evenings or on Sundays.

Initial analysis of the data suggests that there is variation in young people's views about life in the county and future aspirations along lines of place and socioeconomic variation and that there is a distinction between young people whose future decision-making could be termed 'aspirational' and those whose decision-making is 'practical'. For the former, decisions around moving away from and returning to the county rest on their aspiration to attend university and follow particular careers. This necessitates moving away from Monmouthshire as there is no university within the county, but most of these young people commented that even if there was a university locally offering their preferred degree course, they would still move away. Moving away and living independently of their families was viewed by these young people as a rite of passage, and they also wanted to experience a different, more urban, environment to where they had grown up. Most also said that they envisaged remaining in a city after graduation as there would be more opportunities to develop their career and that they only envisaged a potential permanent return to Monmouthshire as a much older adult. As outlined above, for those young people who did not plan to attend university, decision-making tended to centre more on practical considerations around the relatively high costs of living within the county, and the perceived lack of varied or well-paid employment opportunities.

Data relevance

The results align well with the data needs identified at the start of Cycle 2. The LL mixed methods approach to the data experiment has generated both quantitative and qualitative data on individuals' circumstances and experiences of the county, which can be analysed at the local level. The georeferenced comments from the Maptionnaire survey can be attributed to specific LSOAs, helping inform locally relevant actions.

The data collected is from the age range agreed with MCC colleagues. This was considered to be of considerable benefit, as this age range is considered the least likely to need to engage directly with council services, and as a consequence, the council lack intelligence on this age group compared to older populations.

Local relevance

The initial analysis suggests the following measures might help improve the Monmouthshire Offer for young people and younger working-age residents, improving the county's 'liveability' for these groups and helping address Monmouthshire's demographic challenge:

- Development of different forms of education and training, which focus on a range of skills development required for jobs available in Monmouthshire.
- Attracting a wider range of employers/employment sectors.
- Improved evening and weekend offer of services and social activities, for older children, young adults and young families.
- Improved access to on-demand or community transport.

Whilst the above fall within MCC's remit, it is likely that other stakeholders within the county will be able to support some of these activities, for example, local employers via enhanced





apprenticeships and skills training offers, local housing providers, and public transport companies.

Young people are likely to move for aspirational reasons, largely related to education and training opportunities and career plans. Availability of traditional, campus-based higher education provision and opportunities within some career sectors (particularly those that are city-based) are factors that lie outside of MCC's control and may be impossible to implement, and even if they could be implemented, the status of a university-related relocation as a rite of passage for some young people means that it may not redress this particular form of youth out-migration. As such it may be more effective for MCC to focus efforts on reducing inequalities and concerns around costs of living impacting those young people whose current future plans do not include higher education, or, given the well-evidenced link between tertiary education and social mobility (for example, Bell et al, 2023), explore ways to make this more accessible for young people who stay within the county (for example via promotion of distance learning options, bursary programmes, or satellite provision by universities in the wider region).

Policy relevance

MCC colleagues have agreed that the results will be useful in the county's Wellbeing of Future Generations assessment and in helping to understand how they can contribute to building a fairer Gwent through the Marmot Region initiative. In addition, the results will be used in local placemaking strategies for the county's towns. The geo-referenced data allows for key differences and concerns to be analysed at the local level, which is more granular than existing data. We anticipate that the analysed results will also feed into the current consultation around the Replacement Local Development Plan, and the post-16 offer review into further and higher education and training opportunities within the county.

There are likely other opportunities for the data to feed into current council-led projects, and these will be explored at the January 2025 workshop which will present the fully analysed data experiment findings to a broad range of MCC colleagues and partner organisations, and further explore policy relevance and potential impacts.

Robustness and limitations

The WIMD data used in the dashboard was due for an update in 2024, however this has been delayed to 2025. Several indicators which were used in 2019 are unlikely to be used again, so this may have implications for the comparability of the data over time. Looking ahead to the integration of this data with MCC's suite of PowerBI dashboards, it will be important to ensure data from the same iteration of the WIMD is included and updated as required.

There is a discrepancy in the LSOA boundaries used in each of the elements of the dashboard. The LSOA boundaries were updated for the 2021 Census, but the LSOA boundaries used in the WIMD are from 2011, whilst the OS maps on the dashboard use the 2001 boundaries and the satellite imagery uses the 2021 boundaries. This means that the data for six LSOAs may not be a true count for the exact area shown in the maps on the dashboard. The differences are likely to be negligible and could be examined on a case-by-case basis to ensure any interventions developed for the affected LSOAs accounted for this discrepancy, and there are lookup tables to support the identification of changed boundaries should this be required.





The number of survey responses was lower than planned. With the current number of resident responses (185) and an eligible population size of 26,500, the confidence interval of our findings is 90% with a 6% margin of error. Therefore, the results are not guaranteed to be representative of all Monmouthshire residents aged 16-44. To mitigate this, the LL team will triangulate the findings from the survey, focus groups and secondary data.





Part 3: Reflections and learning

The LL team completed each stage of the experiment outlined in the initial agenda, gathering valuable insights into the experiences of Monmouthshire from individuals in the target age range. The experiment process also allowed the team to improve their data collection skills and identify potential areas of impact.

However, there were some key challenges in the data experiment around the age and unavailability of some relevant existing official statistics. There were also challenges around promoting the Maptionnaire survey and encouraging a high participation rate. The LL team invested significant time in attending community spaces and events to speak to members of the public about the survey, and this was effective as shown by a spike in survey response rates around each outreach event. However, overall, the number of survey responses did not meet the target number calculated for a representative sample. It was particularly challenging to encourage people from the younger end of the survey's target age range to take part, which led to the pivot to increased targeting of focus groups towards this age group.

Reflections on data sources, methods, and tools

Data issues and obstacles during the experiment

Much of the ONS data for Monmouthshire exists only at the county level, rather than at a more granular level. An area of interest to this work – education – is a devolved policy area, which means the data collected in Wales is different to that collected in England. During the data experiment, the ONS published work on educational attainment and mobility; however, as the policy is devolved, this data was for English local authorities only. These issues meant that the LL team were not able to include all the data that they had hoped to use in the dashboard.

In addition to geographical coverage and granularity, the WIMD data is outdated. Following the timeline of previous releases, the LL team expected an updated release in 2024; however, this has now been scheduled for 2025 at the earliest. The LL team will liaise with MCC data team colleagues to ensure that the most up-to-date WIMD data is included in the dashboard at the project's conclusion. There are also issues with the indicators used in the WIMD data, as some of them have been discontinued. This will have implications for the sustained use of the dashboard; however, the LL team will meet with MCC data scientists to explore options to include elements of the dashboard in their suite of data, based on the indicators which will continue to be updated. This release delay also has implications for the geographical boundaries used in the data experiment, as explained in Robustness and limitations. The LL team examined these discrepancies and accounted for them where possible.

The number of survey responses did not meet the number calculated for a representative sample at the desired confidence interval and was least likely to be completed by people at the younger end (aged 16-25) of the survey's target age range. Reflections on how to overcome this in future work are provided in Scope for improvement. The range of survey participants' ages is shown in the following figure.



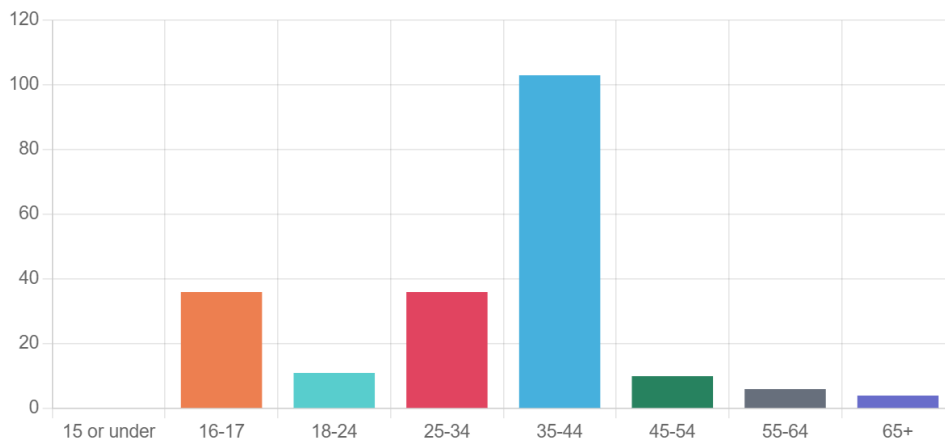


Figure 90 Age distribution of survey respondents. Note that those aged 45 or over would have been directed out of the survey as they fall outside of the target age range for the data experiment.

While focus groups were effective in accessing the views of 16–18-year-olds as an alternative to the survey, the number of focus groups the LL team was able to complete within the time and resource constraints of the data experiment means that this is a limited snapshot of young people’s views and cannot be claimed as representative. The PRP tried hard to build relationships with the local schools, but this took a long time and was challenging given the curriculum pressures schools face. Consequently, only limited time slots within the school day were able to be offered for focus groups, restricting the range of pupils able to take part. We also attempted to get schools to complete the surveys with their post-16 pupils within lesson time, but while schools were often enthusiastic about doing so, curriculum pressures meant that this did not happen within the time frame of the data experiment, although some schools did agree to display posters or digital displays within the school so that pupils could access the survey independently.

Managing data issues and obstacles

The LL team continued to develop a network of colleagues within and outside MCC and across Monmouthshire throughout the data experiment and asked colleagues to share the survey within their networks to ensure a wide range of potential respondents were reached. Given the size and organisation complexity of the PRP organisation, the high workload of council staff, and the PRP’s status as a new staff member in the organisation (given the secondment arrangement) it took time for relevant colleagues in MCC to become aware of the RUSTIK project and ways that it could support their work, so opportunities to promote the survey to relevant groups may have been missed due to this.

In future, it is recommended that more time be given to developing this network prior to the survey period, to ensure the survey link can be shared by as many partners as possible. In addition, further, targeted outreach events should be planned with partners where possible, as the survey completion data shows an increase in responses following every outreach event.





Pilot Region Partner's perspective on data

The LLC, PRP and a wider group of MCC colleagues discussed the data experiment results to date at a meeting in October 2024 and agreed that the final months of the data experiment would focus on increasingly targeted data collection to complement the broader data already collected. The LL team are currently in conversation with a wider group of MCC colleagues about what form this focus should take, having presented three possible options to colleagues from MCC's Partnerships and Data and Insight Teams:

- Focus on a narrower age range within the current target group of 16–44-year-olds
- Focus on a particular location within the county
- Focus on a specific issue or policy area identified in the survey as one of the factors in younger populations' views of the county as a good and/or viable place to live or work

A decision on a more narrowly targeted focus for the concluding phase of data collection and analysis (up to early summer 2025) will be taken following a planned workshop with a wide range of MCC colleagues and relevant external partners in January 2025. At this workshop, the LL Team will present the full results of the data experiment to date and an options appraisal of the three potential more targeted forms of data collection outlined above. The workshop will also include facilitated discussion of areas of policy focus or intervention which may feasibly address one or more of the issues evidenced by the data experiment. This assessment of feasible responses to the challenge will also inform our decision for the focus of our final stage of data collection, to maximise potential for policy relevance and impact.

Experiment design and implementation

Strengths and successes

The LL team completed each stage of the experiment outlined in the initial agenda, gathering valuable insights into the experiences of Monmouthshire from individuals in the target age range.

The outreach events were successful. It was promising to see an increase in responses following the LL team's engagement with people at events across the county (Figure 91). Although the response numbers were not as high as the LL team had hoped, the number was well-received by MCC colleagues, who acknowledged the challenge of engaging the public in consultations and data collection exercises, particularly the challenges of engaging with younger age groups.



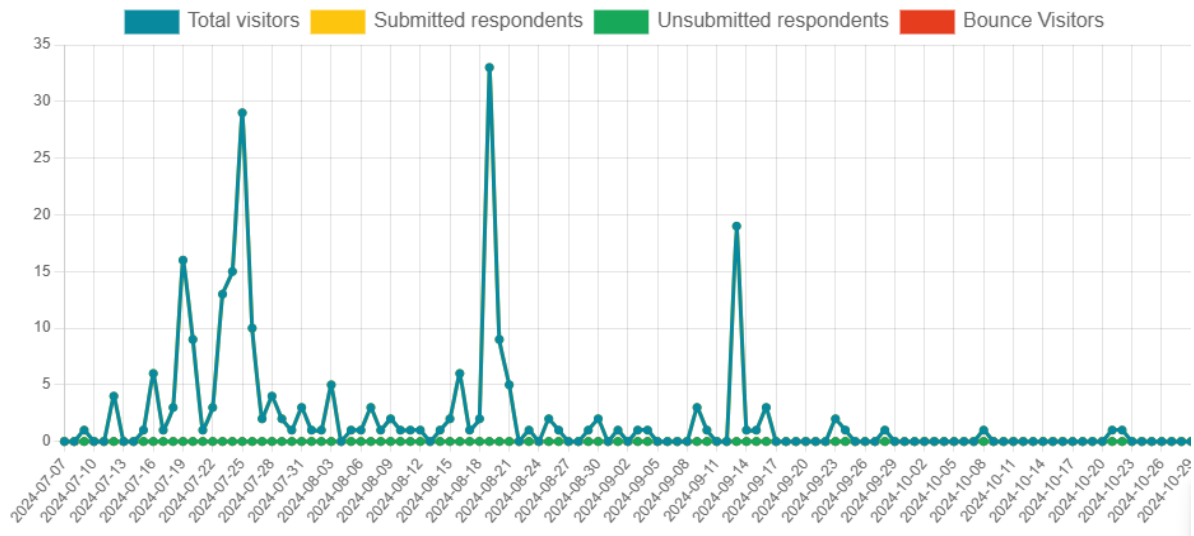


Figure 91 Spikes in response rate coincide with outreach events

The geographic distribution of responses is shown in Figure 92. Clusters of responses can be seen in the county’s main settlements which is unsurprising given the relative population density compared to more rural areas but may also reflect the outreach activity which took place in council-run venues located in these settlements (libraries, community hubs and leisure centres) or at community events in town centres or parks. The LL team attempted to engage with voluntary organisations working in more rural areas of the county (for example, the county’s Young Farmers branch) but these efforts have been unsuccessful so far, meaning that the voices of residents in the most rural areas of the county are less well represented. This was redressed to an extent for the younger age group through the focus groups in schools, as while located in the main settlements, schools draw in pupils from a wider, rural catchment area.



Figure 92 Geographic distribution of residents' survey responses





Scope for improvement

On reflection, the LL team concluded that the demographic challenge is multifaceted, and although the data collected through the experiment will be valuable in informing several future policy documents, the scope of the challenge was too broad for one experiment and revealed issues that, while sitting within different policy and delivery areas within MCC, would need to be tackled holistically in order to make a positive impact in addressing the challenge. For example, new affordable housing is of limited value if there are not locally accessible, quality employment opportunities, whereas investment by employers requires a local, securely housed workforce. This is not to say that each of the themes arising from the results should, or can be, addressed individually; however, a more limited scope may allow for the following areas to be addressed.

The research team would take more time at the start of the experiment to collect and clean data for the dashboard, notably ensuring that attention is paid to the changing LSOA boundaries and considering the impact of this on the data. If the experiment were to be repeated, it would benefit from input from a data scientist, or someone familiar with dashboards, at an earlier stage.

The final version of the Maptionnaire survey contained questions designed to gather data of use to multiple MCC teams and service areas. However, this did mean that the finalised survey was longer and more complex than anticipated. If the experiment were to be repeated, the LL team would recommend a shorter, more focused survey, to ensure those completing the survey were able to do so more quickly, supporting a higher response rate. The LL team would also consider planning guided sessions with several target groups, to ensure that they were comfortable with Maptionnaire's functionality. While promoting the survey as a MCC employee was beneficial to the PRP in terms of assuring potential participants of the legitimacy of the project and in gaining access to council-run spaces for outreach events, it did have drawbacks in terms of high levels of public cynicism towards MCC's motives and likely outcomes. At public outreach events, it was common to receive comments such as 'What's the point', 'They never listen anyway' and similar, which may reflect a more generally observed trend towards declining public faith in the ability of political and public bodies to 'make things better' (Johnson et al. 2023).

As noted, people at the younger end of the data experiment's target age group were least likely to complete the survey. The survey was live over the UK summer holidays for schools and universities, with the expectation that students visiting home for the summer might engage with the survey during the break. However, engagement from 18–24-year-olds was lower than expected, so the LL team plans to arrange some further events aimed at those in the 18-24 age group, in collaboration with the region's voluntary associations. This is perhaps the most challenging age group to access, as while we were able to redress the smaller number of 16–17-year-old responses by targeting alternative data collection (via focus groups) using local schools and youth organisations as gatekeeper organisations, there are no statutory or voluntary organisations locally that 18–24-year-olds engage with in the same way. The LL team made attempts to reach out to local sports clubs as a way of accessing this age group, but these attempts have not been successful to date.





Skill development and capacity building

Skills developed

The LL team has improved their survey design skills, specifically with respect to using Maptionnaire. The survey design process required multiple iterations to ensure all questions desired by MCC partners were included in the survey, and survey respondents were directed to the direct pathway depending on their responses, in the most efficient way.

The data dashboard also required the development of Excel skills, namely familiarisation with the functions required to prepare the dashboard. MCC commonly use PowerBI to display dashboards. This is an area in which the LL team could develop future skills, to transfer the prototype dashboard from Excel to PowerBI and maximise its continued use by MCC colleagues.

Capacities

The LL team developed confidence in engaging with a range of stakeholders and participants, particularly during the survey outreach phase.

Pilot Region Partner's perspective on skills and capacities

The PRP's position is perhaps different to some in other LLs as they have an employment history as an academic and researcher, and so already had skills and training of relevance to a data collection and analysis project. This enabled close collaboration between the PRP and LLC on the experiment design and implementation. The key challenge faced by the PRP was encouraging engagement with the data experiment, and in doing this they improved their skills in using Canva software to prepare visually appealing promotional materials for the survey suitable for use as posters/leaflets and for social media, and in producing short promotional videos.

For the future development of the dashboard, MCC agreed that it would be necessary for the LL team to work with MCC's Data and Insights team. This will include work to transfer the prototype dashboard from Excel to PowerBI which is the existing data dashboard platform used by MCC. This collaborative approach will be required as the LL team does not have existing skills or experience in developing PowerBI dashboards.

Innovation and impact

Reflections on innovation

This is the first time the datasets included in the dashboard were brought together in this way. To do so required a range of different skills, which we were fortunate to share in the LL team, but this may not be the case for all teams working on the demographic challenge.

The use of Maptionnaire was important in Monmouthshire, as the experiment required local data. The georeferenced answers from residents will allow the LL team to be geographically specific in certain recommendations, which will be important in a county such as Monmouthshire where there is variation between different local areas within the county. Often analysis will only consider the county as a whole, but as found, there are differences in how specific areas of the county are experienced and perceived.





Further innovation will likely involve the use of PowerBI as this is the data dashboard already utilised within the council and with which officers are familiar – encouraging longer-term engagement with and use of the data. The LL team will discuss the integration of the data used in the prototype dashboard with MCC’s Data and Insights team.

Short-term impacts

As outlined above, the initial presentation of the data and the early findings were well-received by MCC colleagues within the Partnerships and Data and Insights teams, who felt that this was a useful addition to their data portfolio, and helped address an identified intelligence gap around the needs and views of younger residents. Many of the findings reflected existing observations and anecdotal evidence around the challenges facing younger residents and are useful in terms of providing a stronger evidence base for these issues. Some aspects of the findings were less well-known such as the focus on access to services, and others reflected issues that had started to be talked about relatively recently in the county having been less of an issue in the past – for example, reports of young people’s concerns around anti-social behaviour by some of their peers, and the implications for their feelings of safety and belonging in the county.

As outlined above, during the data experiment, the LL team’s networking and conversations with a range of teams within MCC have identified projects and priorities where the data could be of use, including the current consultation around the Replacement Local Development Plan, the post-16 review, and local placemaking and regeneration plans. The January 2025 workshop will allow a wider pool of MCC teams and relevant external partners to understand the data findings, and consider areas of potential policy relevance and impact, with this, in turn, informing the greater focus on data collection which will take place in the final months of data collection and analysis up to early summer 2025.

Longer-term impacts

It is hoped that the findings of this experiment can support MCC in prioritising actions which improve the Monmouthshire Offer for people aged 16-44. This prioritisation is crucial given the budget allocations for local authorities in the UK.

Potential for sharing learning

The methods employed in Monmouthshire could be replicated across other local authorities in Wales, notably to provide evidence for the well-being assessments required from all Welsh local authorities by the Welsh Government under the Wellbeing of Future Generations Act. For example, all secondary data used for the dashboard is available for other local authorities and could be added for comparison. Maptionnaire has now been used successfully in Monmouthshire, and in Cardiff - where a team worked to engage young people in urban planning decisions. This shows that the tool has potential in both rural and urban settings in Wales, and its participatory nature aligns with the engagement approaches advocated for in the Wellbeing of Future Generations Act. However, the LL team would recommend that if this approach were to be scaled, a shorter and more focused survey be developed to encourage higher completion rates.

As outlined above, the PRP has also undertaken work alongside the RUSTIK data experiment, relating to the emerging Marches Forward Partnership of largely rural local authority areas along either side of the Wales-England Marches border. As these counties face a similar demographic





challenge and contributing issues including housing unaffordability, lower wage economies and infrastructure challenges, there may be scope to upscale the experiment across the partnership region through the provision of a refined version of the survey tool and dashboard, supporting other rural local authorities in amassing a relevant evidence base to feed into either county-level or Partnership-level policy responses or central government funding bids.





Part 4: Future steps

Cycle 3 plans

As shown in the below Gantt chart (Table 49), the next step for the Monmouthshire LL team is an in-depth analysis of the data experiment results to date (Maptionnaire survey, focus group and interview transcripts and community engagement activity materials) and the dissemination of findings to relevant MCC teams and external partners in a data and policy workshop early in 2025.

This workshop will also identify narrowed targeting for the remaining period of data collection as per the options appraisal outline in Pilot Region Partner’s perspective on data, with due regard to potential policy/delivery usage. We will also continue development of the dashboard to incorporate geo-referenced Maptionnaire data, and insights from focus groups, interviews and community engagement activity materials, and trial the dashboard with MCC teams, including exploring integration into MCC’s existing Power BI dashboard format with the MCC Data and Insights team.

Informed by the workshop discussions, we will design and implement a further phase of more narrowly targeted data collection to conclude the data experiment, with full analysis and reporting of the results by July 2025.

Table 49 Timeline of plans for Cycle 3.

Activity	Nov 24	Dec 24	Jan 25	Feb 25	Mar 25	Apr 25	May 25	Jun 25	Jul 25
Data analysis									
Dashboard development, integration and trials									
MCC data and policy workshop									
Targeted data collection									
Reporting final data experiment results									

Future collaborations

The meeting with the Partnerships and the Data and Insights teams at MCC in October 2024 suggested that MCC would be keen to continue to find ways to work with this data outside the time scope of RUSTIK, and a key goal would be for the LL team to leave MCC with a resource that would enable them to repeat a similar data collection exercise. This would ensure that the data





does not become out of date and continues to be a useful resource in informing relevant policy decision-making and service delivery, and in fulfilling statutory obligations such as the Wellbeing of Future Generations and the Gwent Marmot region assessments.

There are resourcing challenges to this, as outside of the RUSTIK project's timeline, Maptionnaire will only be available to the council under a paid subscription, which may be difficult given the financial challenges facing UK local authorities. As such, the LL team plans to explore transferring a refined version of the Maptionnaire survey (given the aforementioned issues around the current survey's length and complexity) into another survey platform which is either freely available or to which the council has an existing subscription. A downside of this is the loss of Maptionnaire's geo-referencing capability which is a key appeal of the data to MCC. The PRP is currently attending a series of online training sessions and seminars run by the UK Office for National Statistics (ONS) under the ONS Local programme and is looking out for ways that similarly useful and locally specific results could be achieved via alternative platforms.

As outlined earlier, in Phase 3 the PRP will also explore opportunities for upscaling a similar approach to other rural local authorities within the Marches Forward Partnership region or the Gwent Public Services board which includes other Welsh local authorities and public bodies. During Phase 2, the Monmouthshire Pilot Region has also become part of a learning cluster with the Living Lab teams in North Karelia, Finland and Rhein-Hunsrück, Germany, where teams are also working on data experiments related to a demographic challenge in their region. We plan to continue this relationship in Phase 3 to share learning. The Living Lab in Rhein-Hunsrück is a particularly interesting comparative example for Monmouthshire, as the region already has major employers (an addition which may be seen as part of a 'solution' to demographic imbalance in Monmouthshire), but still experiences high levels of out-migration and non-return by younger people. We are also very interested in collaboration with the Living Lab team in Osona, Catalonia. The Living Lab team there have also used a Maptionnaire survey with residents focusing on quality of life, and while the survey covers a wider age range than our target group in Monmouthshire, it would be valuable to compare the issues people identify and the respective Living Lab teams' experiences of Maptionnaire survey design, implementation and analysis, and public engagement in the data collection.

Communication and dissemination

January 2025: Report of the initial phase of data experiment findings for relevant MCC teams

January 2025: Data experiment dissemination workshop with relevant MCC teams and local partners (e.g. GAVO and housing providers). Facilitated discussion will also inform the increased targeting of the final stage of data collection and the targeting of policy and decision-making influence in Phase 3.

June 2025: Full report of full data experiment findings, including results from remaining enhanced targeted stage of data collection.

The dissemination workshop with MCC teams and relevant external partners in January 2025 will also include a discussion of which formats of data reporting would be most useful to users and wider community audiences, and the outcomes of this discussion will guide our output planning, which may include policy briefs, infographics, web and social media content or further dissemination events.





Additionally, the LL team plans to produce academic journal articles from the Monmouthshire data experiment data, and the exact focus of these is to be discussed at a publication strategy planning meeting between the two UK-based Living Lab teams in December 2024.

Alongside publishing work with a UK focus, we would also like to explore the possibility of co-authoring cross-national papers with our RUSTIK colleagues in Osona and Rhein-Hunsrück. A collaboration with Rhein-Hunsrück could look at LLs shared thematic focus on demographic imbalance and would be of interest given the similarities in terms of demographic challenge, but differences in terms of educational and employment infrastructure in our two regions. With Osona, we would be keen to explore collaboration around the use of a Maptionnaire survey for community engagement in rural regions and with different target age groups, and the challenge of capturing data on a range of holistic but distinctive issues relating to quality of life, place attachment and future-planning/aspiration in data collection tools.





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