

POLITECNICO  
MILANO 1863



FUNDECYT PCTEX

June 25th 2024

10:00-12:00 CEST

# Improving Soil Health: A Systemic Approach for Co-Creating Living Labs in Urban and Industrial Environments

Webinar

Moderation

Farah Makki and Eugenio Morello

POLIMI, Department of Architecture and Urban Studies



Funded by  
the European Union

# Agenda

**10:00 Introduction and moderation**

**Farah Makki and Eugenio Morello, POLIMI, DASTU**

**Presentations**

In relation to Mission's Objective 03: Stop soil sealing and increase re-use of urban soils

**10:15 "Toward the 2030 net zero land take: experience & results from the SOS4Life project" Italy**

**Dr. Fabrizio Ungaro, Institute of BioEconomy, National Research Council**

In relation to Mission's Objective 04: Reduce soil pollution and enhance restoration

**10:30 "Designing with Nature – Case study of UIA Baia Mare SPIRE"**

**Codrut Papina, URBASOFIA**

In relation to Mission's Objective 08: Improve soil literacy in society

**10:45 "Citizen science initiatives for soil literacy"**

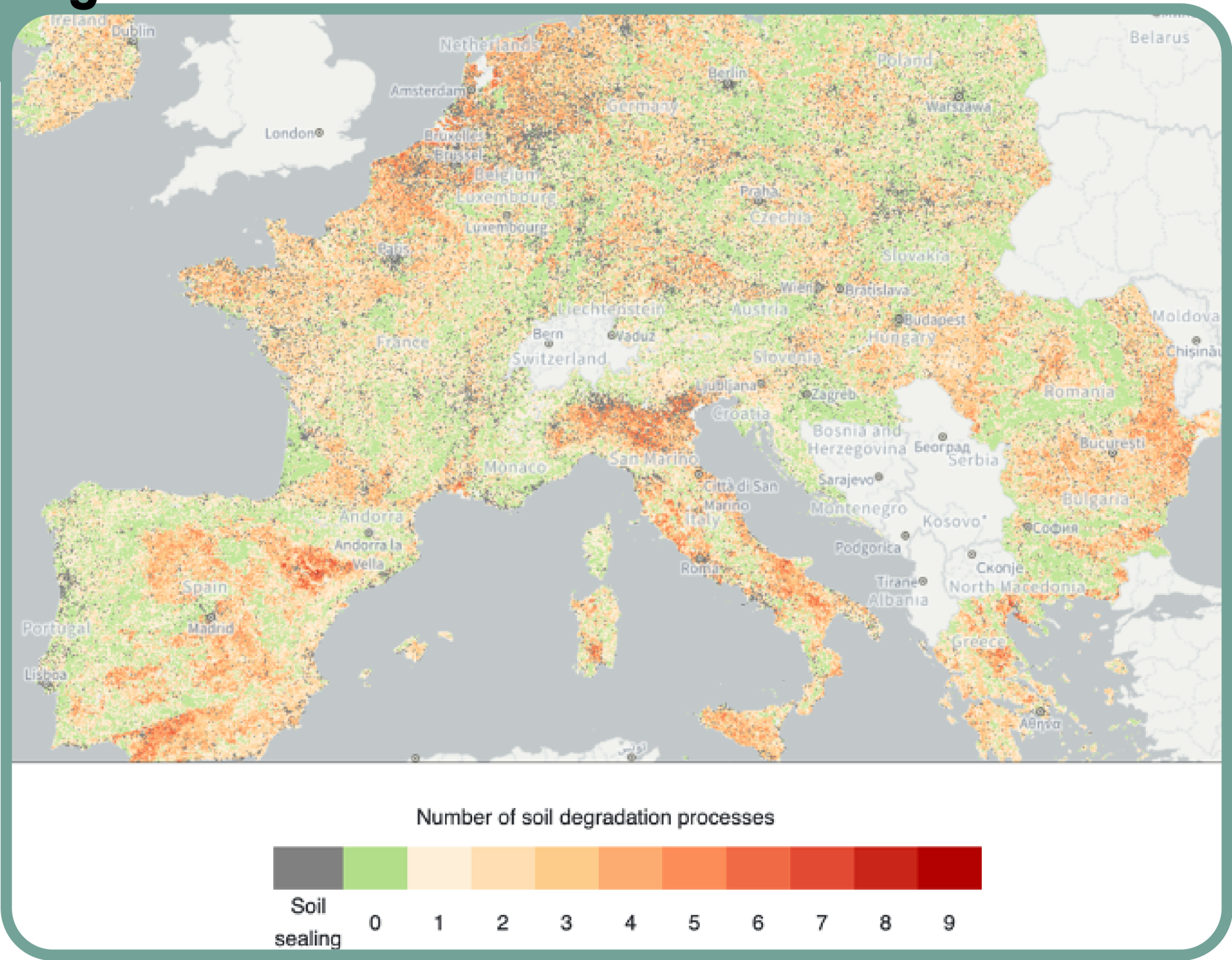
**Alba Peiro, ECHO Soil Project – Ibercivis Foundation (Spain)**

**11:00 Discussion and Exchange with the audience – Q&A session**

**with the support of Cristina Gallardo, FUNDECYT-PCTEX**



# Challenge



Soil degradation in Europe. Source: EUSO-dashboard

61% of European soil  
**unhealthy**

Current degradation rates threaten 90% of soil by 2050, risking the loss of all fertile land within 60 years (FAO).

## 8 objectives

1. Reduce desertification

2. Conserve and increase soil organic carbon stocks

3. Stop soil sealing and increase re-use of urban soils

4. Reduce soil pollution and enhance restoration

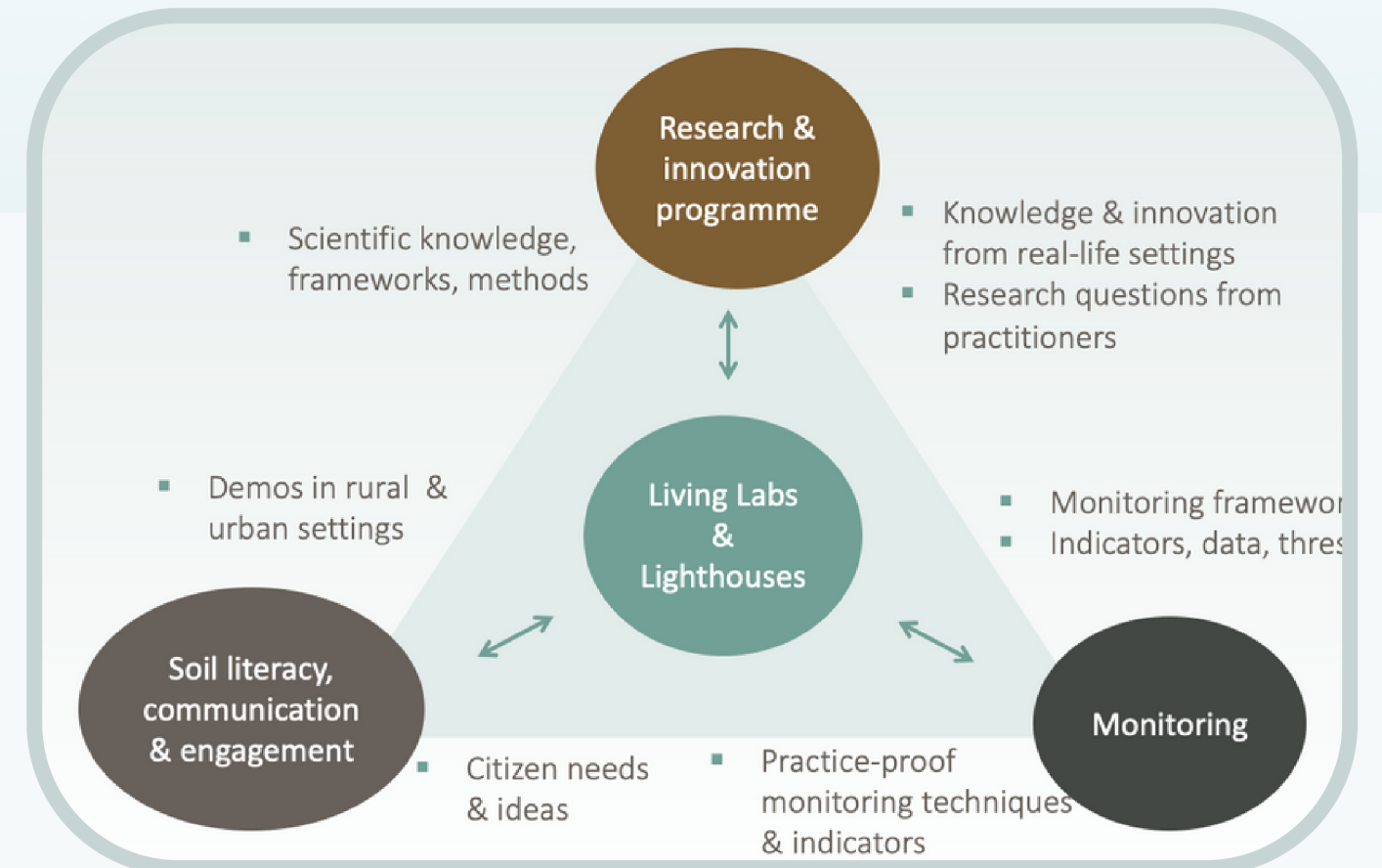


5. Prevent erosion

6. Improve soil structure to enhance soil biodiversity

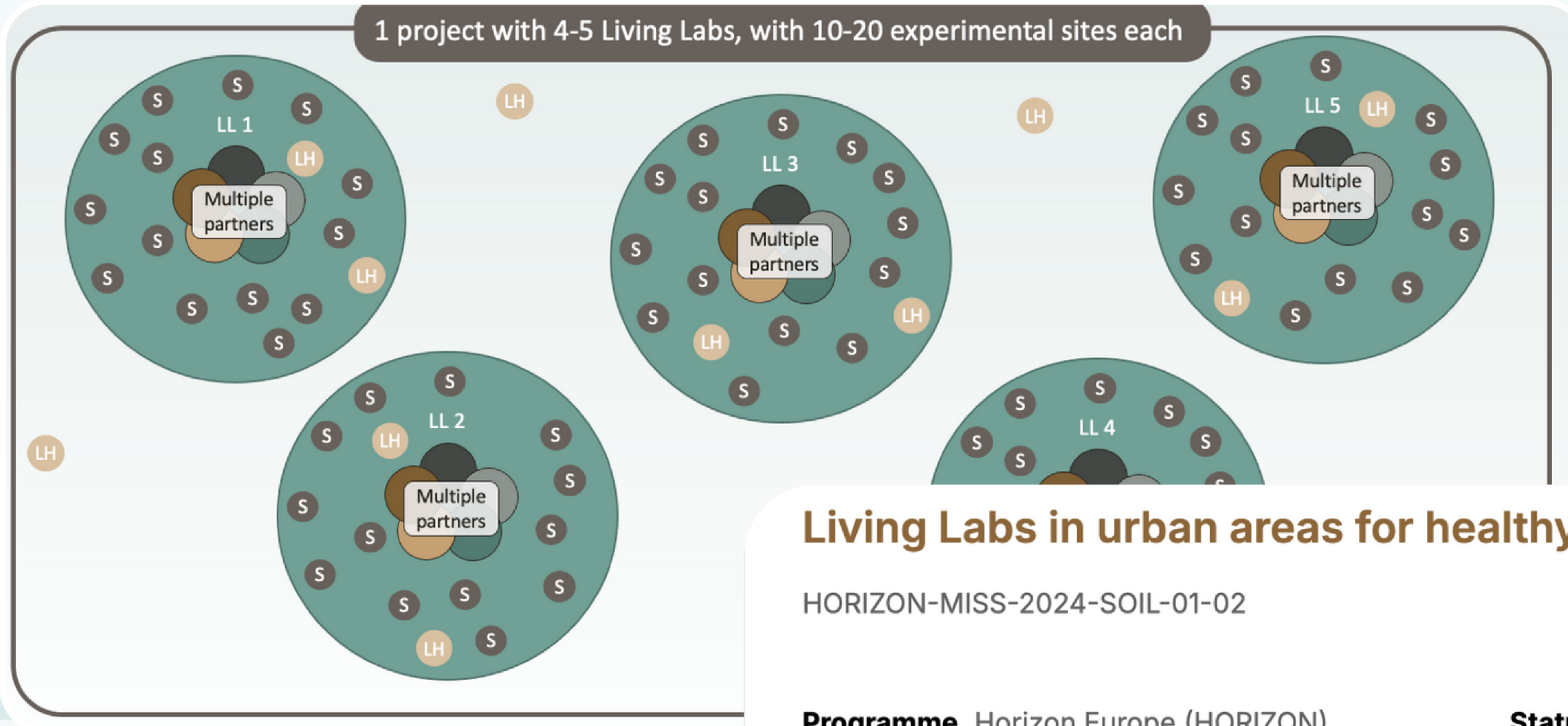
7. Reduce the EU global footprint on soils

8. Improve soil literacy in society



## 100 living labs & lighthouses

1 project with 4-5 Living Labs, with 10-20 experimental sites each



## Living Labs in urban areas for healthy soils

HORIZON-MISS-2024-SOIL-01-02

Call for proposal

Grant

**Programme** Horizon Europe (HORIZON)

**Status** Open for submission

**Type of action** HORIZON Research and Innovation Actions

**Deadline model** single-stage

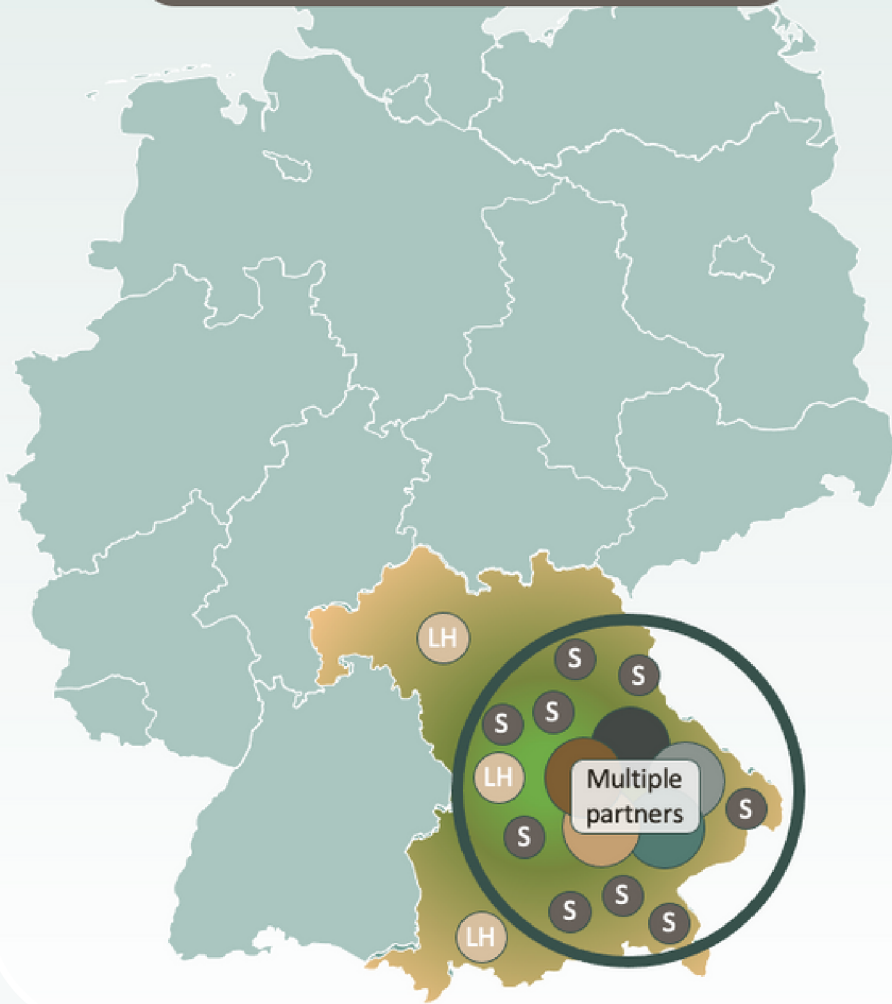
**Opening date** 08 May 2024

**Deadline date** 08 October 2024 17:00:00 Brussels time



## Scale: Regional/Sub-regional

Common soil challenges



## Scale: Cross-regional

Common soil challenges



## Scale: cross-country

Common soil challenges



## Aim

### Enable a Systemic Reflection : Urban Soil Health in Urban Living Labs

The **EU Mission “A Soil Deal for Europe”** emphasizes the need for joint efforts to promote sustainable soil management across diverse contexts.

**Living Labs offer collaborative platforms** for stakeholders to co-create strategies for preserving healthy soils.

However, **significant knowledge gaps remain**, especially regarding the design of transition pathways that govern and embed the complexity of diversity in spatial contexts, soil functions, and organisms.

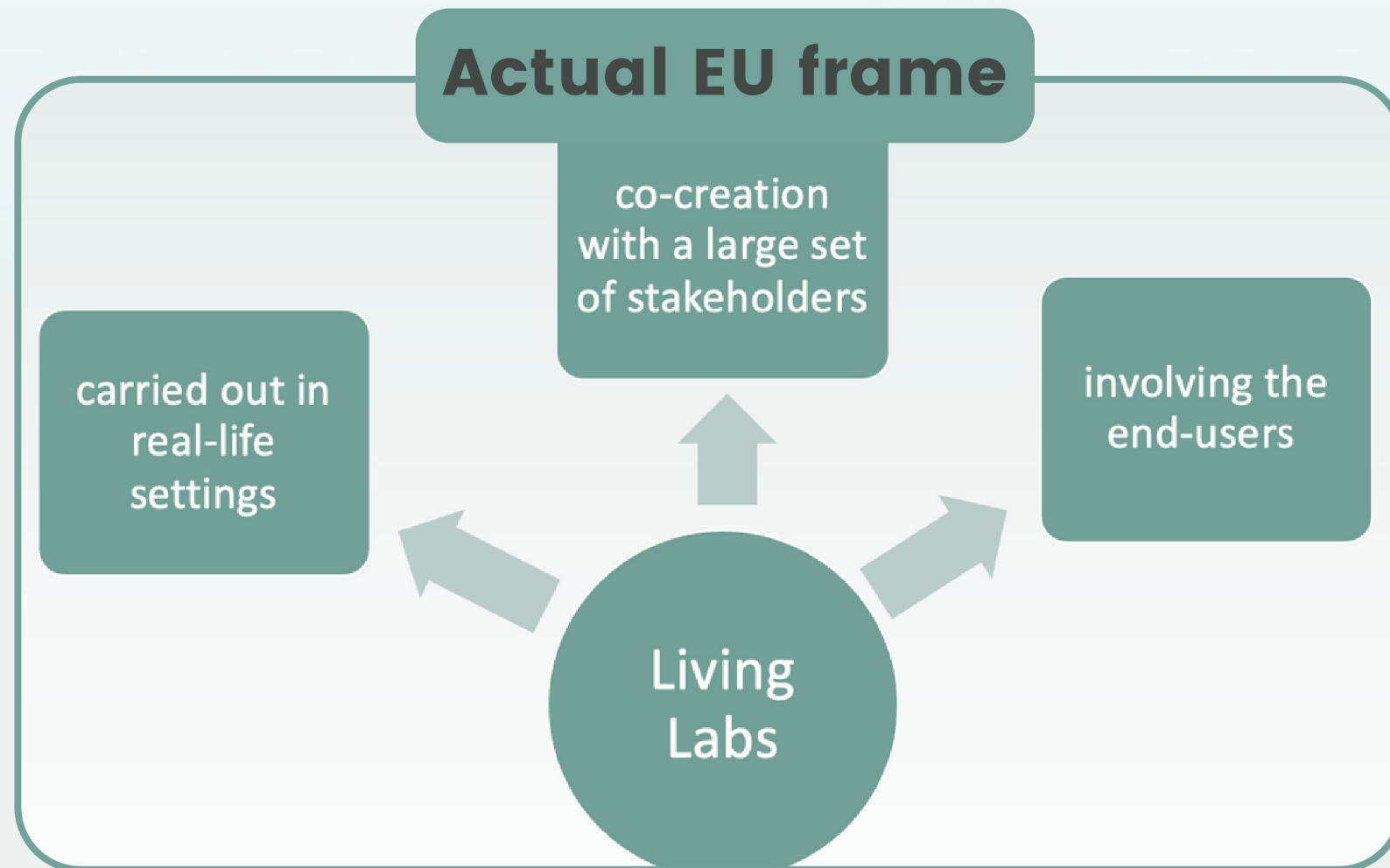
This **webinar explores diverse co-creation strategies** crucial for mobilizing stakeholders and overcoming challenges in fostering healthier soils in urban and industrial areas.



**Beyond generalized & rural focus**



**contextualization & urban env.**



**Our webinar**

- Put Urban Soil at the center of urban env. challenges
- Shift from surface to living soil - a resource to protect
- Inform ULLs approach & design
- Explore diverse levels and actors of co-creation of knowledge & action



## Living Labs design for healthy urban soil

### Considerations

- Understanding Soil Health
- Ecosystem functions of urban soils
- The impact of land take on soil properties
- Transboundary Dependencies
- Contradictions in densification & decontamination

### ULLs components

- Alert Spaces
- Actions
- Allies
- Activation Strategies
- Adversaries
- Opportunities



# Learning from what exist



Activation strategies

**Structural**

**Practical**

**Social**

Regional > Sub-regional

POLICY & SOIL DIAGNOSIS

PLANNING TOOLS

Local

DE-SEALING

DE-CONTAMINATION

PHYTOREMEDIATION

BIOMASS PRODUCTION



**SPIRE**

Smart Post – Industrial  
Regenerative Ecosystem

MONITORING

SOIL LITERACY



**ECHO**

ENGAGING CITIZENS IN SOIL SCIENCE:  
THE ROAD TO HEALTHIER SOILS

Cross-country

**Drawing from European case studies** → inform adaptive Lab strategies addressing Soil Mission's objectives across diverse sites, land use, and ownerships, scales of action, levels of governance interactions, and the variability in multi-stakeholder cooperations.

1. **Scale, Scope of action, and Actors:** influence on the effectiveness of co-creation living labs in addressing soil health challenges within urban environments.
2. **Challenges and Opportunities** in implementing co-creation strategies for soil health improvement.
3. **Intermediation for Land Access and Knowledge Co-production:** Sharing successful strategies.
4. **Land Use Optimization Stories:** e.g. sharing experiences related to integrating soil ecological functions.
5. **Advice for Peers:** for shaping future co-creation strategies in soil health initiatives.

# Presentations





Supporting the soil deal for EU  
across national communities

To ensure healthy status by 2050

# Toward the 2030 net zero land take: experience and results from the SOS4Life project - Italy

Fabrizio Ungaro

Institute of BioEconomy of the National Research Council - CNR



# SOS4Life project

LIFE15 ENV/IT/000225

Call 2015 – LIFE Programme 2014-2020

From July 2016 to September 2020

Budget € 1.788.749 EU contribution: € 1.060.551

## Partnership:

- Municipality of Forlì (Lead partner)
- Municipality of Carpi (MO)
- Municipality of San Lazzaro di Savena (BO)
- Emilia-Romagna Region
- National Research Council – IBE
- ANCE Emilia-Romagna
- Legambiente Emilia-Romagna
- Forlì Mobilità Integrata srl



COMUNE DI FORLÌ



CITTÀ DI CARPI



SAN LAZZARO  
DI SAVENA



ANCE  
EMILIA  
ROMAGNA



LEGAMBIENTE  
emilia-romagna



The project aimed to demonstrate the applicability at a municipal scale of the European strategy of “no net land take by 2050” established by the Roadmap for an efficient use of resources (2011) and relaunched by the 7th Environmental Action Program [1386 / 2013 / EU].



*Life*  
**Soil Ex-Post Study**  
Final Report



Prepared by **Riccardo Giandrini** (NEEMO EEIG)

with the collaboration of  
Pavlos Doikos and Carlo Ponzio (NEEMO EEIG)

April 2023



## 6.4 Successful projects and case studies

In this section, three successful projects in terms of sustainability are showcased. These projects were selected because they continued to have significant impacts after the end of LIFE funding. They can be taken into account as generic case studies for the relevance of the soil theme, the innovations proposed and the networking created with the stakeholders. A short description of the motivations that led to their selection is included in the following table.

LIFE15 ENV/IT/000225	SOS4LIFE	Soil sealing	
			The project provided significant examples and supporting instruments to implement de-sealing initiatives at municipal level. The tools developed by the project for public entities to reach European objectives in terms of prevention of land uptake have a strong replicability potential. The same approach has been adopted in one action of the more recent project Soil4LIFE (LIFE17 GIE/IT/000477).

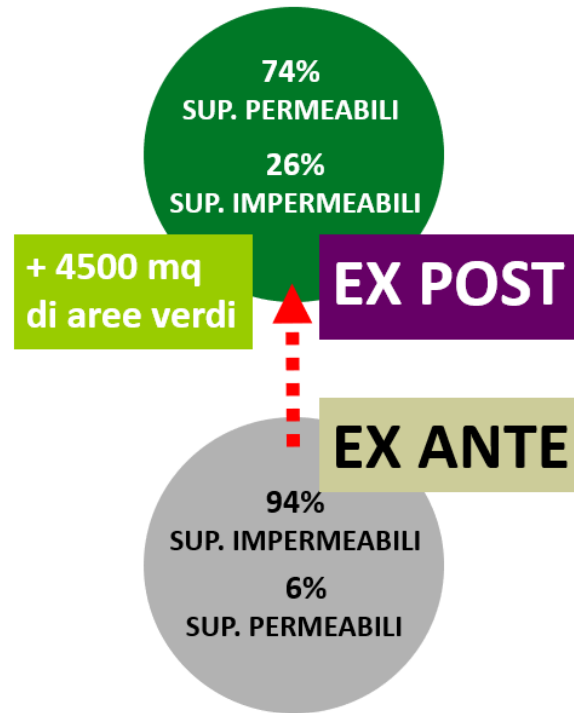


<https://www.youtube.com/watch?v=W4s7pNNjkSQ>

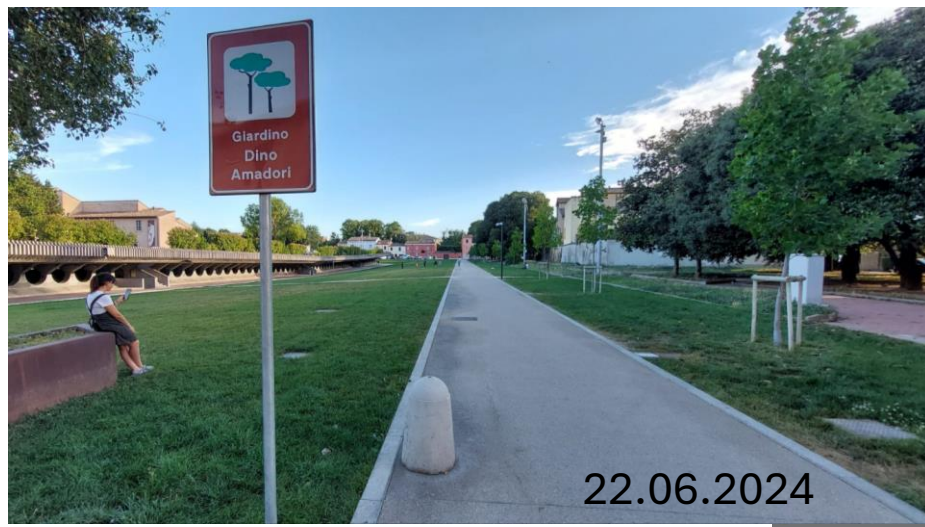
<https://www.youtube.com/@sos4life202>



## Action B2. Desealing intervention



22.06.2024



22.06.2024



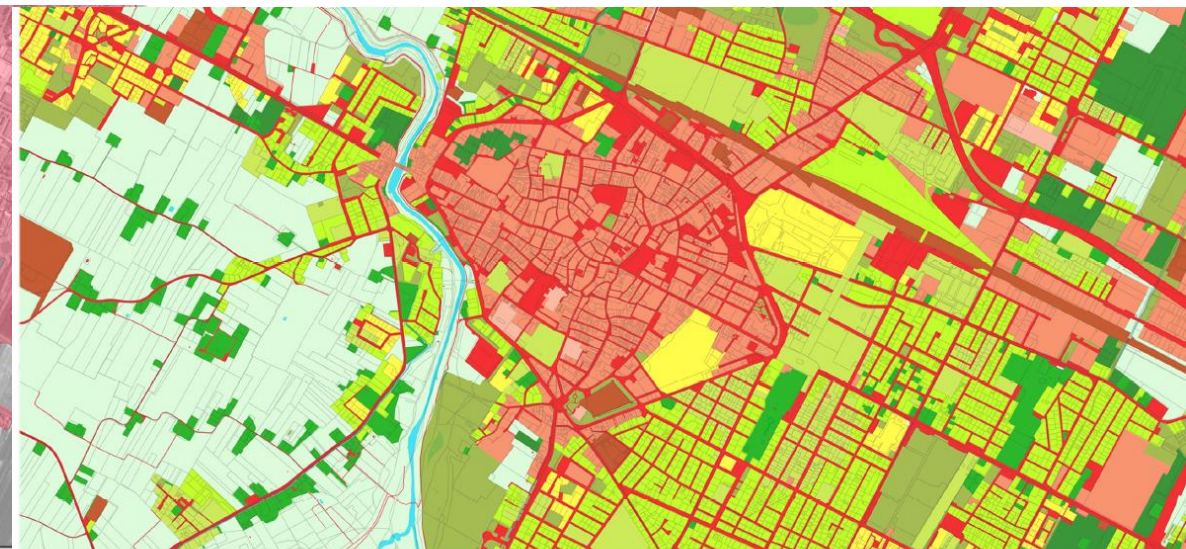
## Action B2. Monitoring soil functions



Technosol and topsoil plots were periodically monitored for soil T°, humidity, (micro)biological activity, mesofauna, bulk density, hydraulic conductivity, water retention, and nutrients ; Plants in the plots were monitored for growth, gas exchange, chlorophyll, N and C content .



Action A1. The three partner municipalities created maps of land take and soil sealing and assessed the trend in land take (1860-2016) in relation to demographic trends



**MAPPA DEL CONSUMO DI SUOLO** (trasformato da agricolo o naturale in superficie urbanizzata)

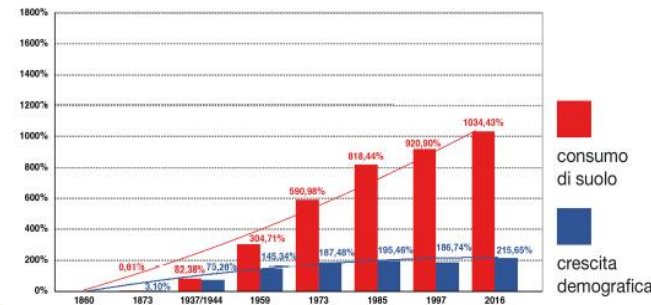
1860 1873 1936/44 1959 1973 1985 1997 2016



Evolution of land take in the municipality of Forlì

**MAPPA DEL LIVELLO DI IMPERMEABILIZZAZIONE DEL SUOLO**

0 -10 % 90 -100 %

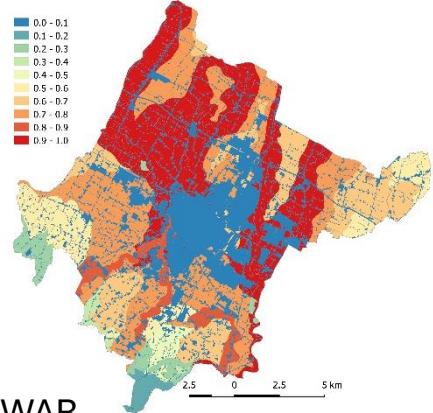


Land take

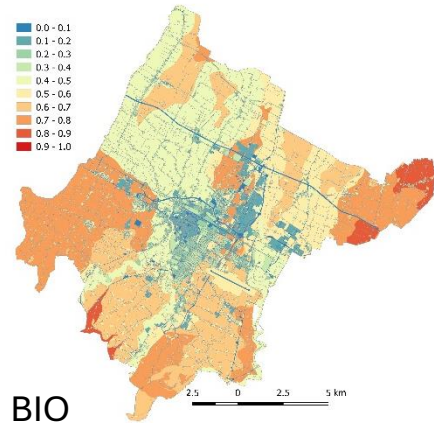
Population

# Action B1. Assessing and mapping urban soils ecosystem services supply using existing soil datasets

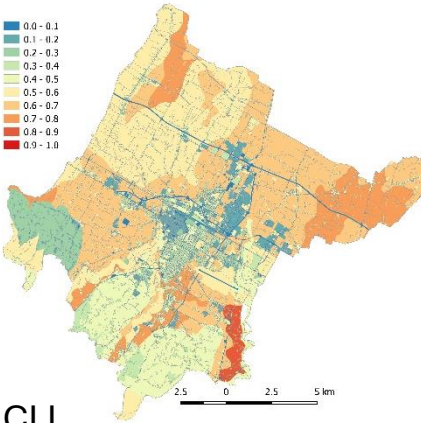
PRO



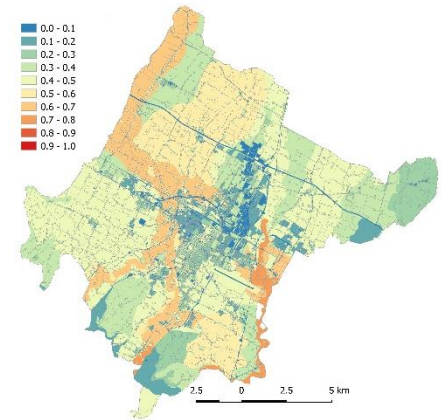
BUF



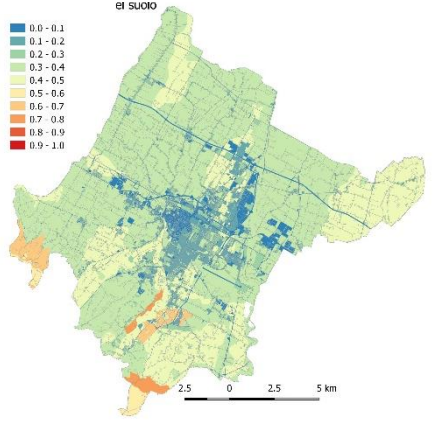
CST



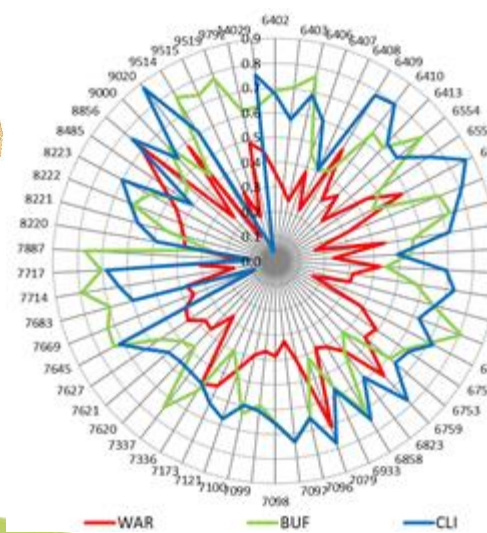
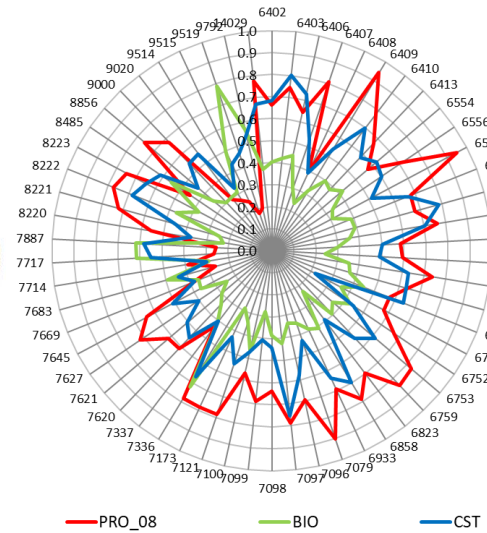
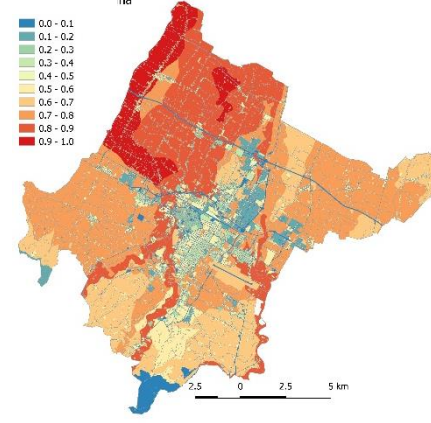
WAR



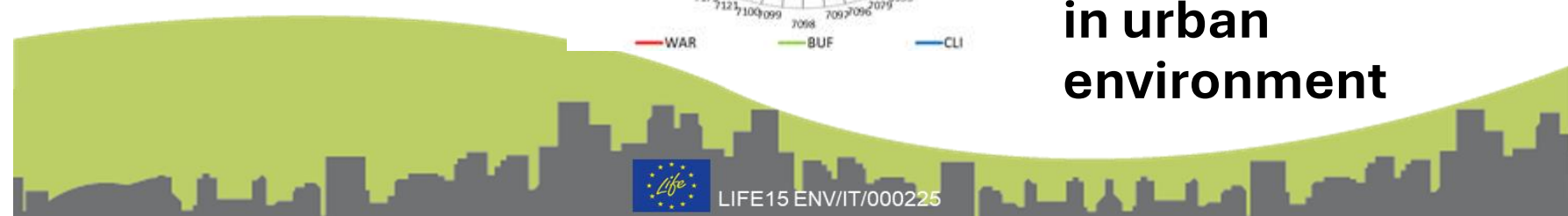
BIO



CLI

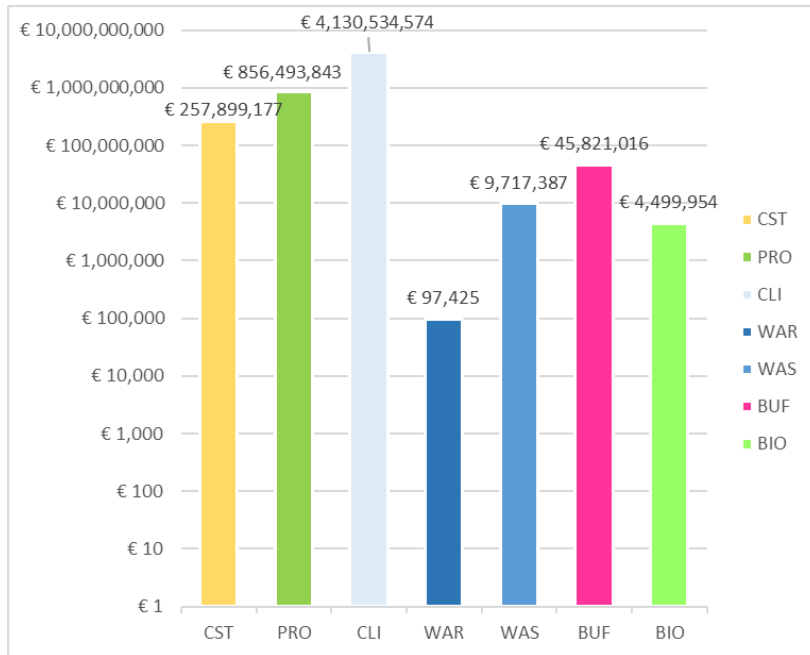


## Guidelines for assessing soil ecosystem services in urban environment

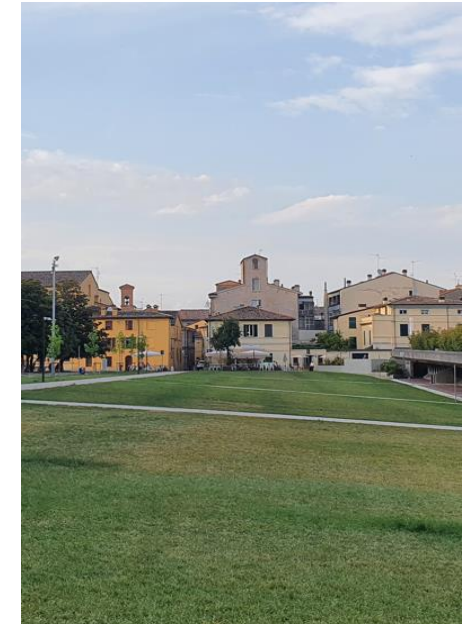


LIFE15 ENV/IT/000225

# Action B1. Assessing and mapping urban soils ecosystem services supply using existing soil datasets

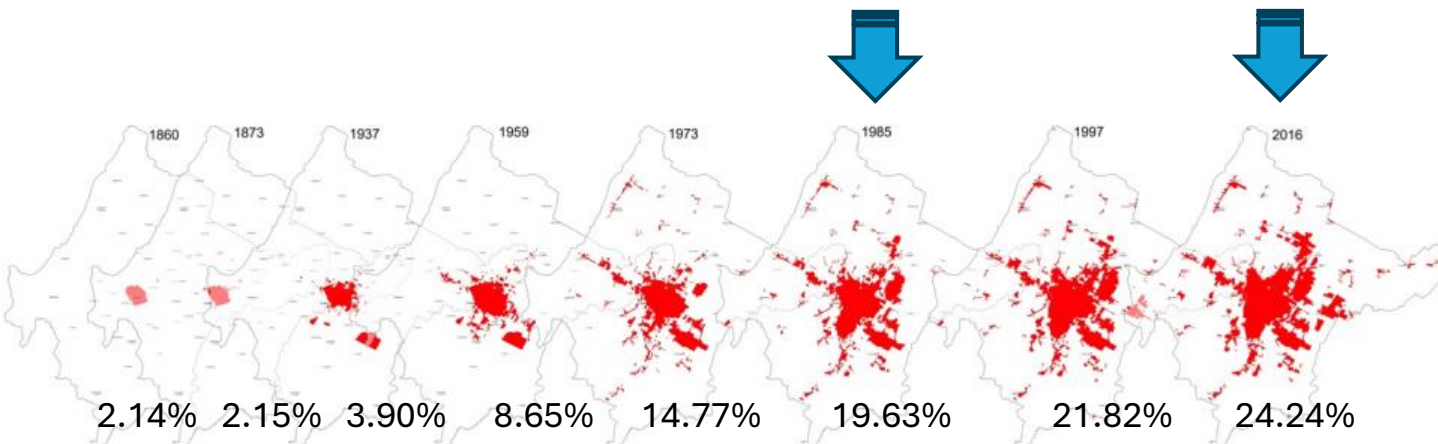


SE	Description/Units	2016	VALUE	VALUE/ha
CST	C stock (Mg)	2123500.8	€ 48,840,519.24	€ 2,479.21
	Market prize			
CST	C stock (Mg)	2123500.8	€ 257,899,176.58	€ 13,091.33
	Social cost			
PRO	VAM, euro	594028017.5	€ 594,028,017.49	€ 30,153.71
	Wheat, q			
CLI	AWC, m <sup>3</sup>	29446626	€ 4,130,534,574.35	€ 209,671.81
	m <sup>3</sup> infiltration			
WAS	AWC, m <sup>3</sup>	29446626	€ 9,717,386.57	€ 493.27
	min			
BUF	min	17294.2	€ 7,177,098.23	€ 364.32
	max			
BIO	min	17294.2	€ 4,499,954.12	€ 228.42
	max			
SUP. unsealed soil 19700 ha				
<b>TOTAL</b>			€ 5,353,903,895.53	€ 271,771.77

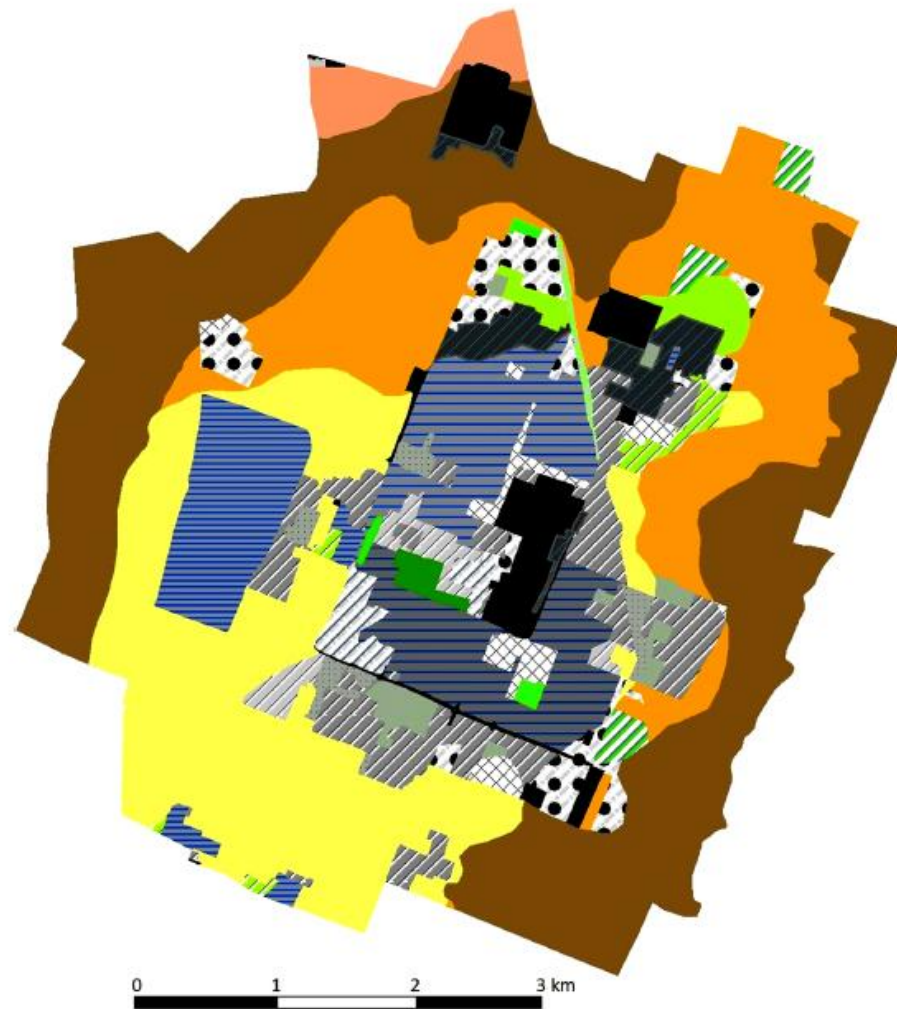
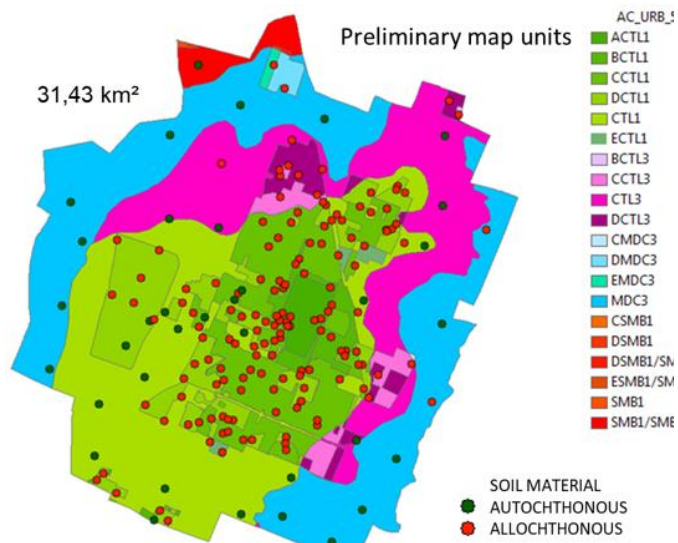


\*Metodologia: *Consumo di suolo, dinamiche territoriali e servizi ecosistemici*. Edizione 2018 ISPRA.

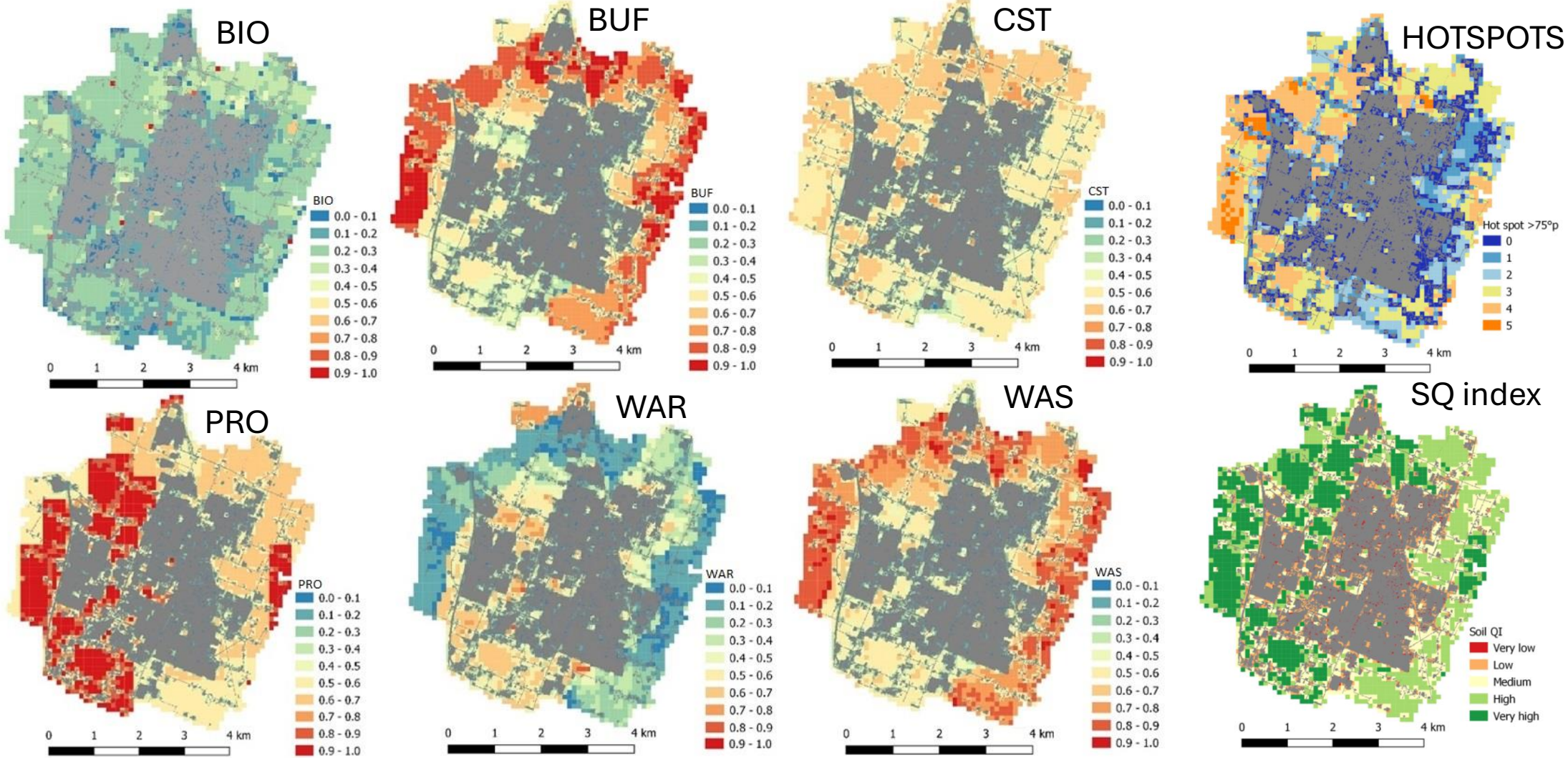
Between 1985 and 2016 we estimated an average loss in soil ESs equal to -172,085,036.185 € due to soil sealing (land take +4.61%)



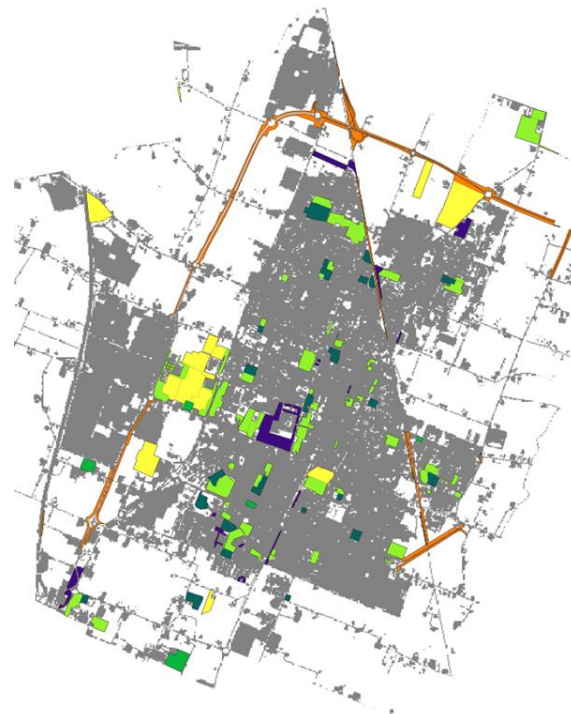
# Action B2. Assessing and mapping urban soils ecosystem services via ad hoc soil survey



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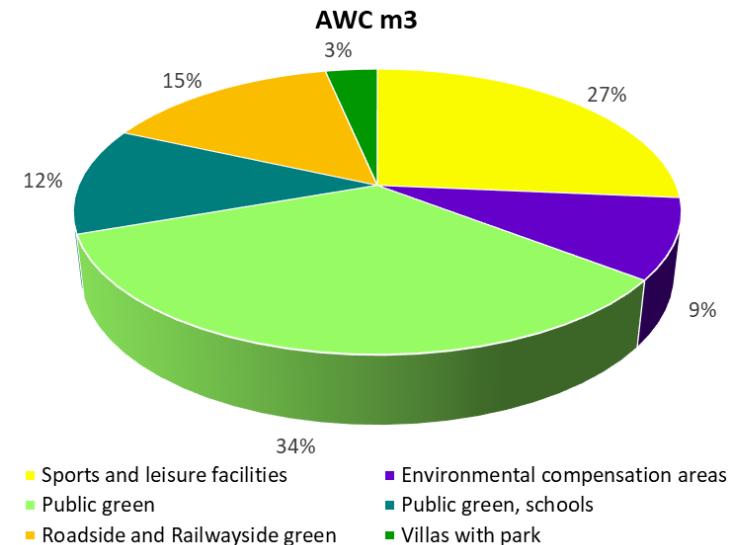
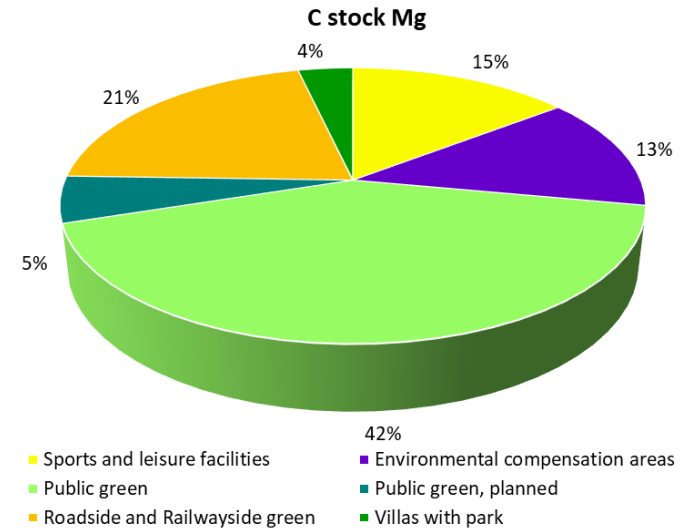


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Alberi censiti 34000

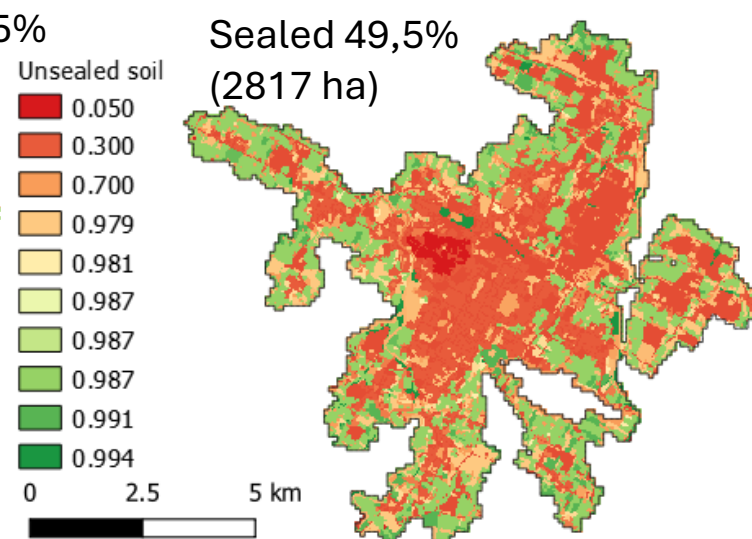
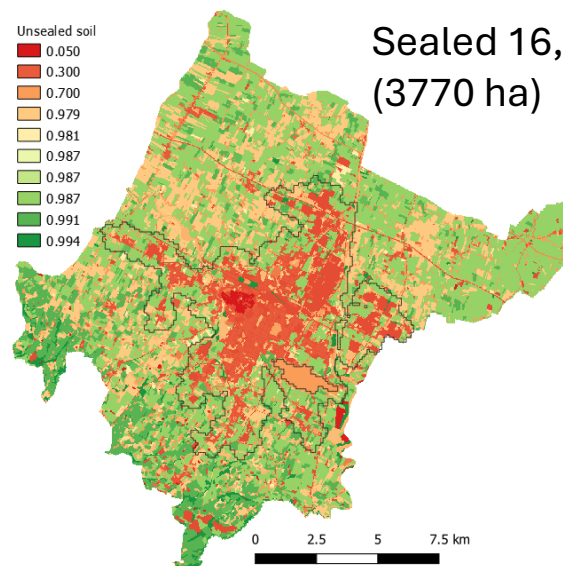
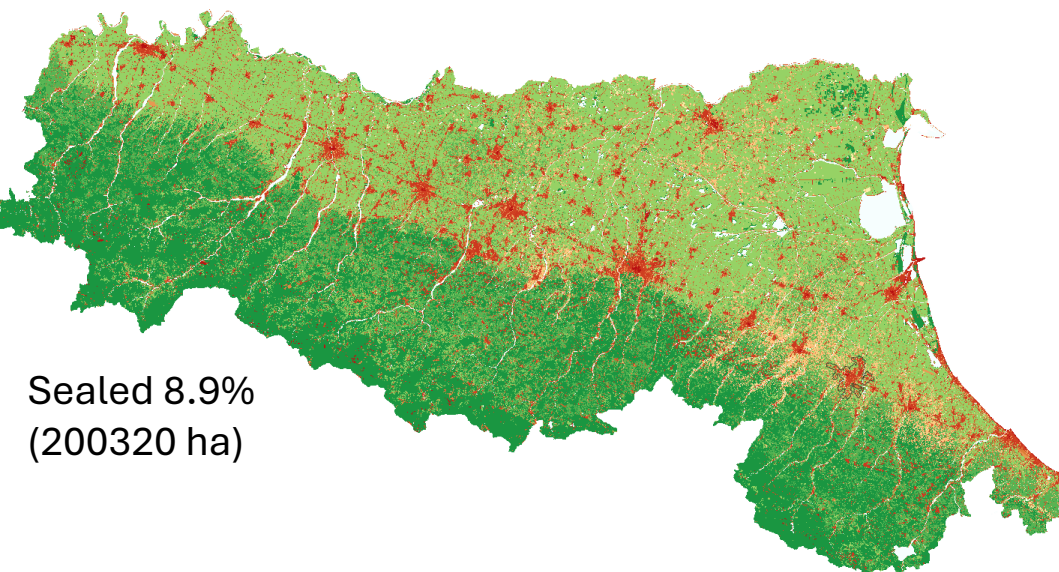
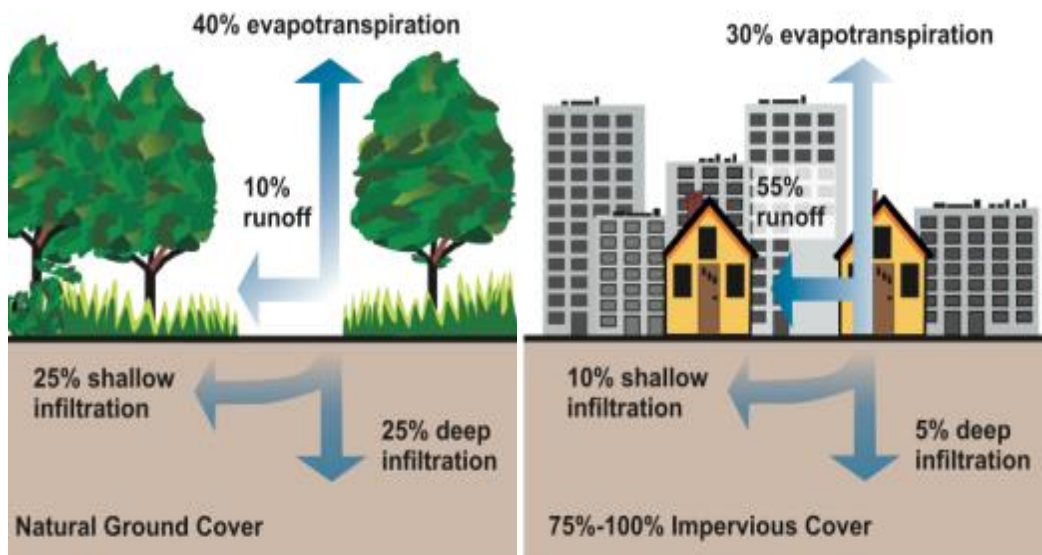
Aree verdi C stock 0-30 cm	Cstock Mg	Area Ha	Cstock Mg/ha	C stock/ab Mg	CO2eq Mg	CO2 eq /ab Mg
Verde sportivo	4041	51.2	78.9	0.06	14819	0.21
Aree riequilibrio ambientale	1407	16.9	83.2	0.02	5158	0.07
Verde pubblico	5212	64.7	80.6	0.07	19112	0.27
Verde scolastico	1832	22.6	81.2	0.03	6719	0.09
Verde stradale	2195	31.5	69.6	0.03	8049	0.11
Ville con parco	379	6.4	59.4	0.01	1388	0.02
<b>Totale</b>	<b>15067</b>	<b>193.2</b>	<b>78.0</b>	<b>0.21</b>	<b>55246</b>	<b>0.78</b>

Avg. agricultural soils = 43.4 Mg C ha<sup>-1</sup>

Aree verdi Acqua disponibile	Area Ha	AWC m3	AWC m3/ha	AWC m3/ab	AWC m3/tree	mm/m2
Verde sportivo	51.2	15488	302.4	0.218	0.456	30.2
Aree riequilibrio ambientale	16.9	5324	315.0	0.075	0.157	31.5
Verde pubblico	64.7	20024	309.6	0.282	0.589	31.0
Verde scolastico	22.6	7124	315.8	0.100	0.210	31.6
Verde stradale	31.5	8790	278.9	0.124	0.259	27.9
Ville con parco	6.4	1934	303.3	0.027	0.057	30.3
<b>Totale</b>	<b>193.2</b>	<b>58682.0</b>	<b>303.7</b>	<b>0.826</b>	<b>1.726</b>	<b>30.4</b>

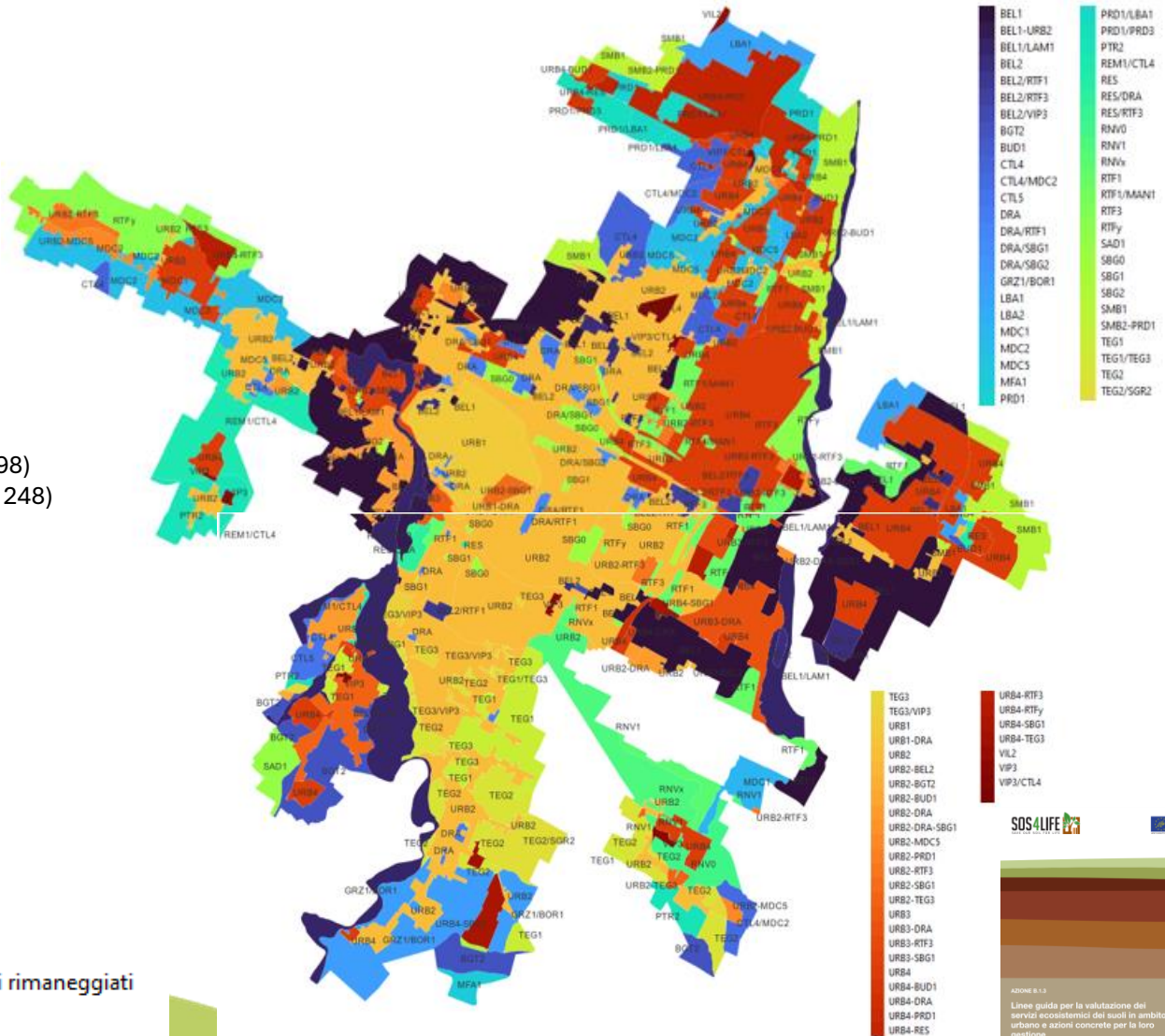
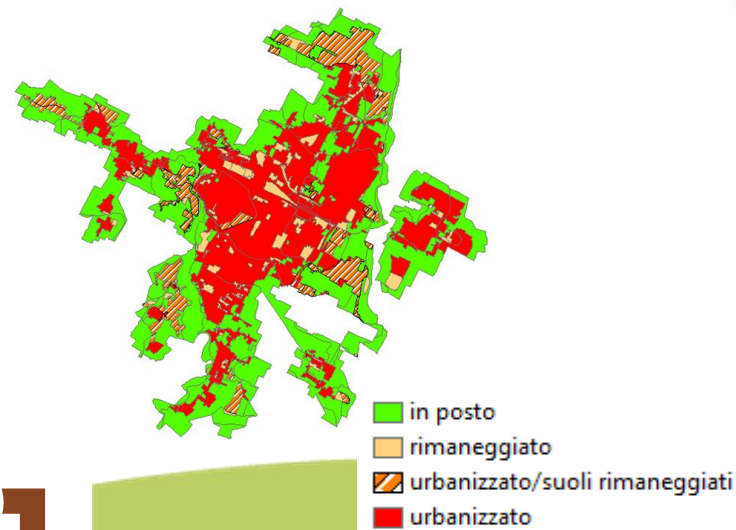
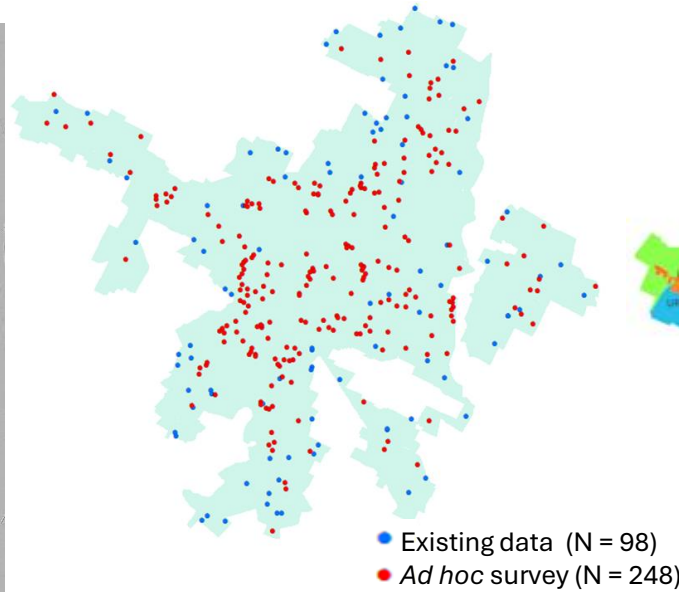
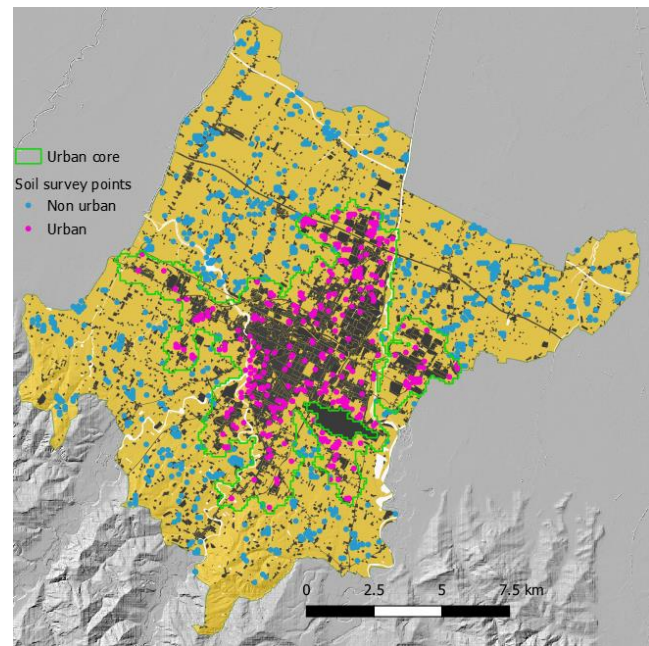


# Action B2. Assessing and mapping urban soils ecosystem services via ad hoc soil survey



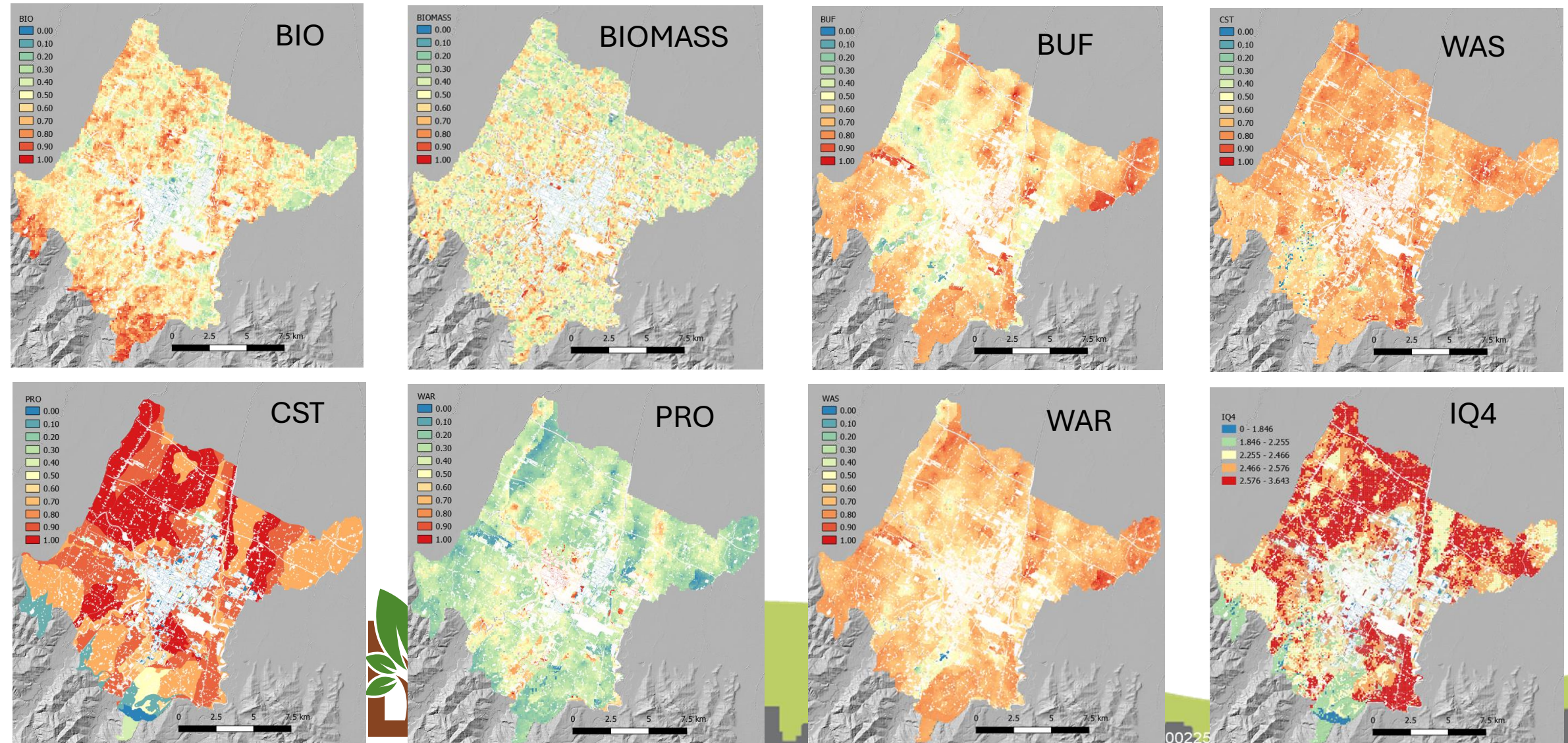


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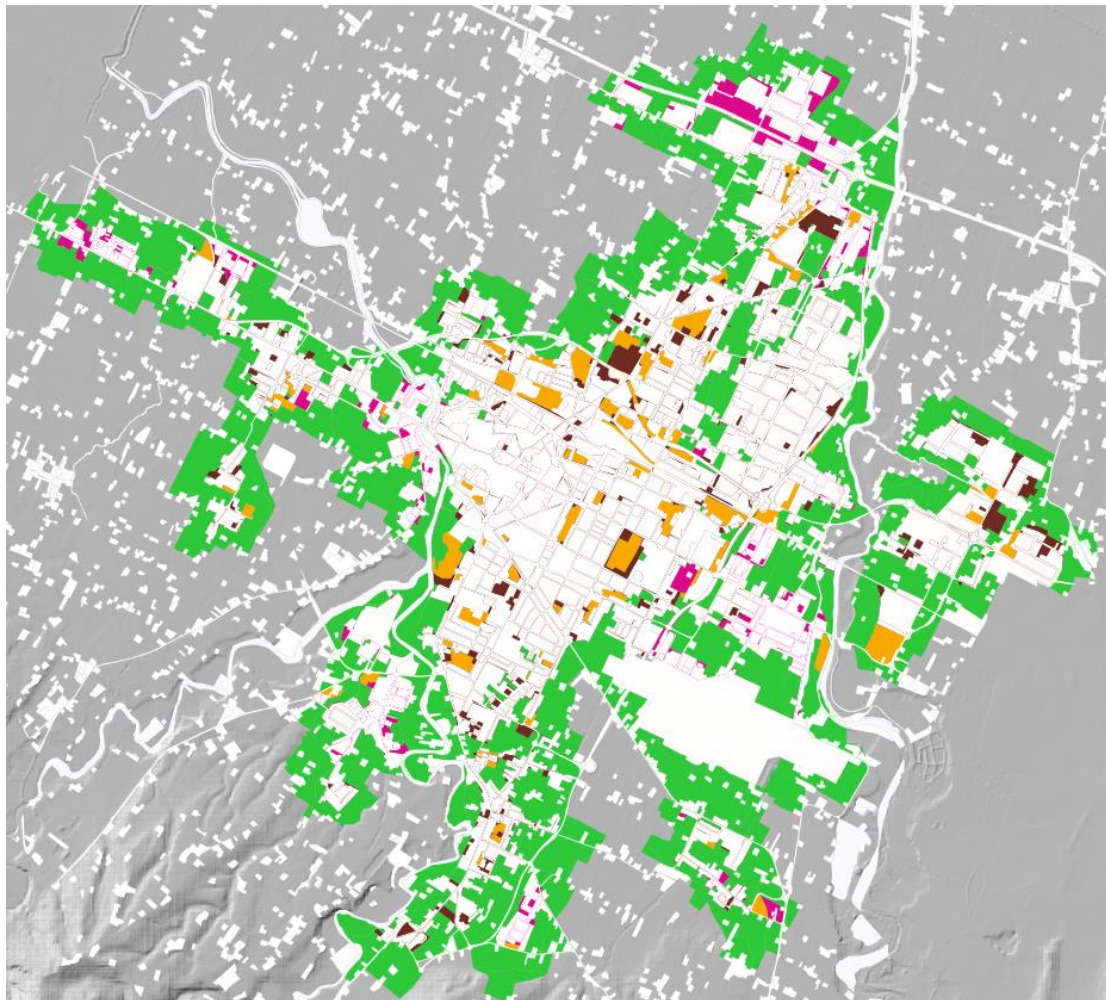


Soil disturbance	ha	%
Undisturbed soils	2771.43	48.70
Disturbed soils	274.37	4.82
Urbanized/ disturbed soils	586.43	10.31
Urbanised	2058.42	36.17
<b>Total</b>	<b>5690.65</b>	<b>100</b>

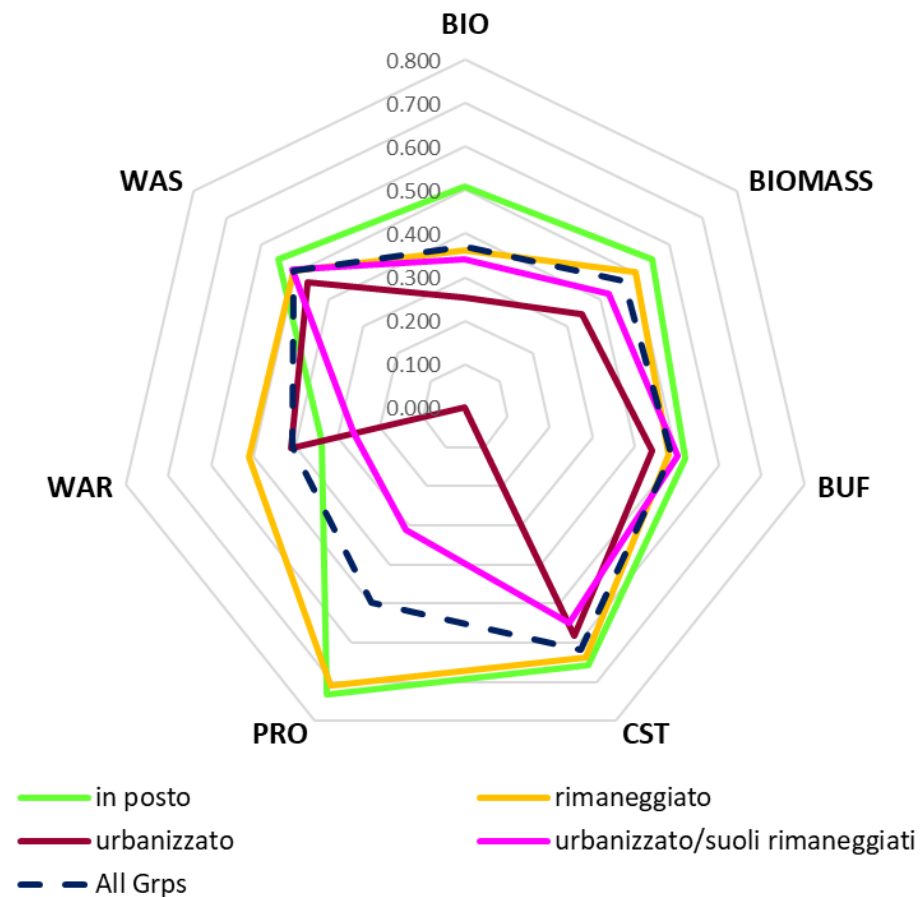
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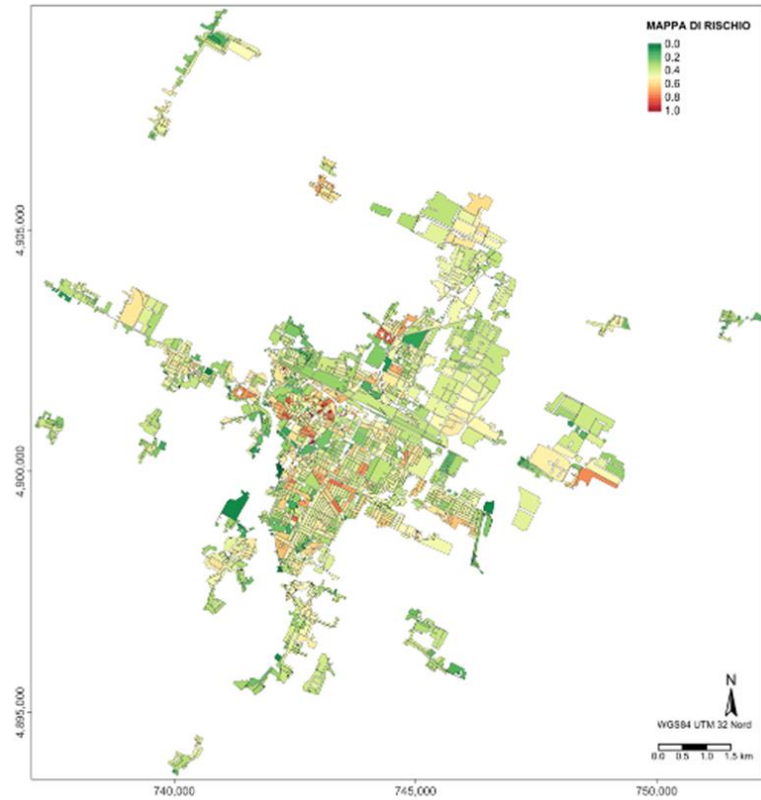
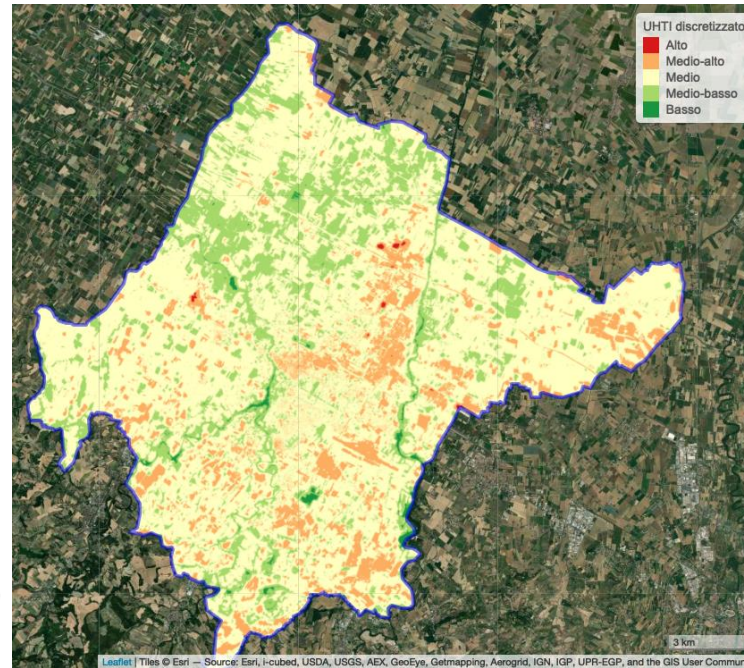
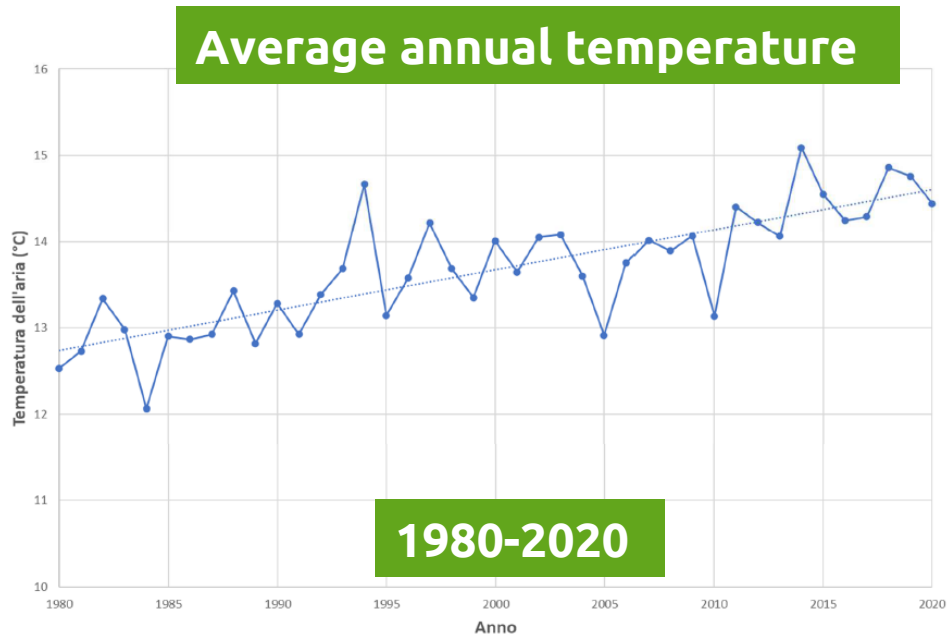
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### Servizi Ecosistemici Suoli - Tipologia suoli



## Action B2. Urban (micro)climate assessment and modelling

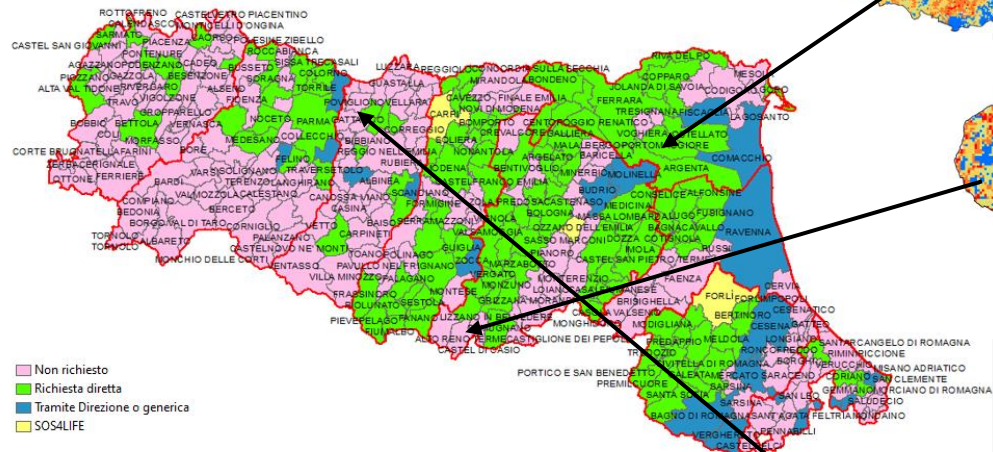
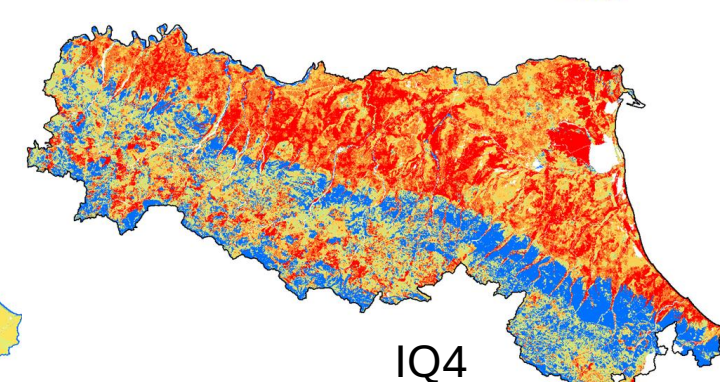
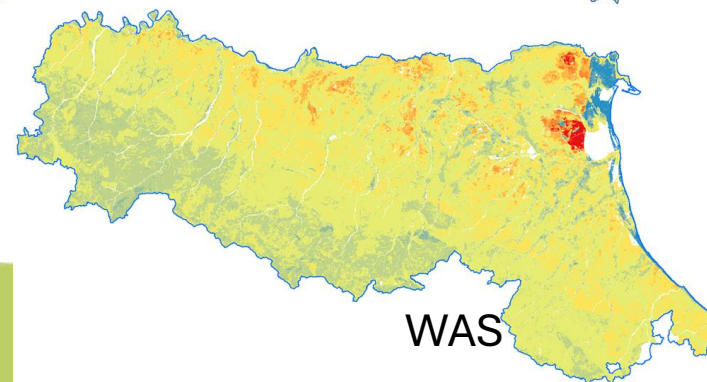
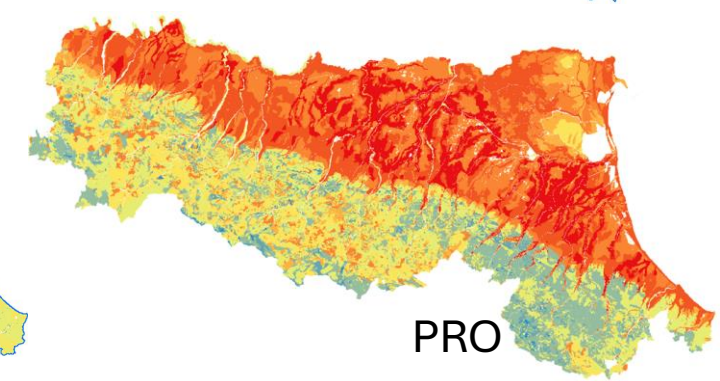
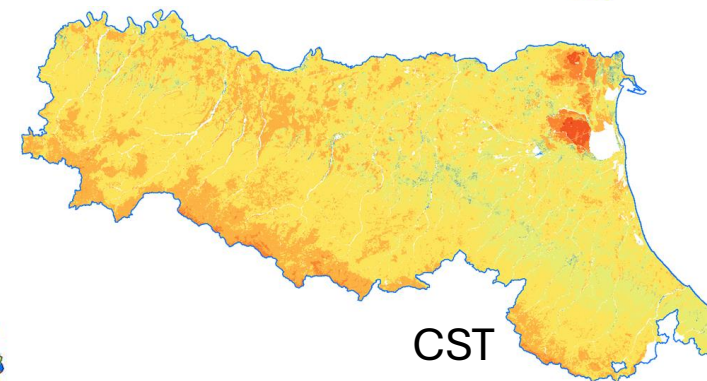
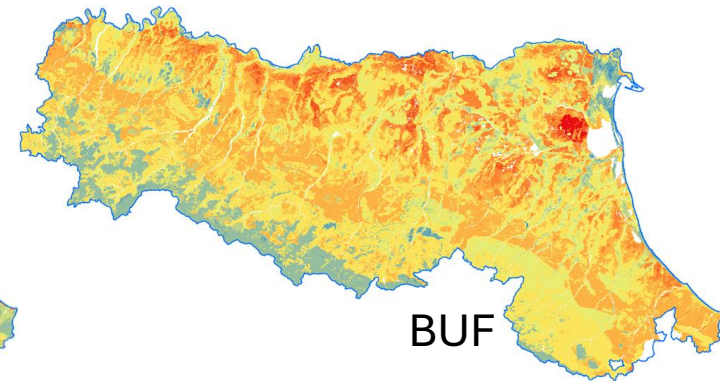
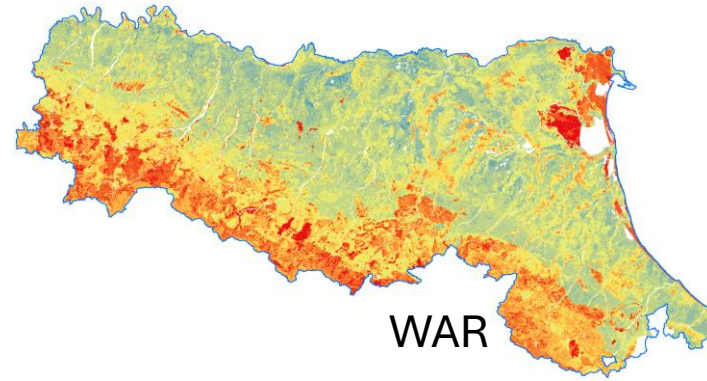
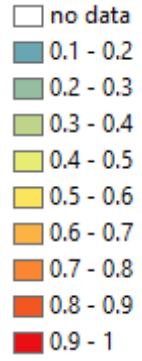


The Urban Heatwave Thermal Index was obtained by combining 3 factors: surface temperature (LST) from satellite images, vegetation index (NDVI), and building morphology (DSM). The areas with Medium-High and High index present the greatest risk during a heat wave in terms of thermal discomfort for the population.

Starting from the UHTI Map it was possible to develop a Heatwave Risk Map which will be used in the General Urban Plan to direct and prioritize climate adaptation interventions (de-sealing, restoration of green surfaces, implementation of green infrastructures).

# Assessing and mapping soils ecosystem services for land planning at municipality scale

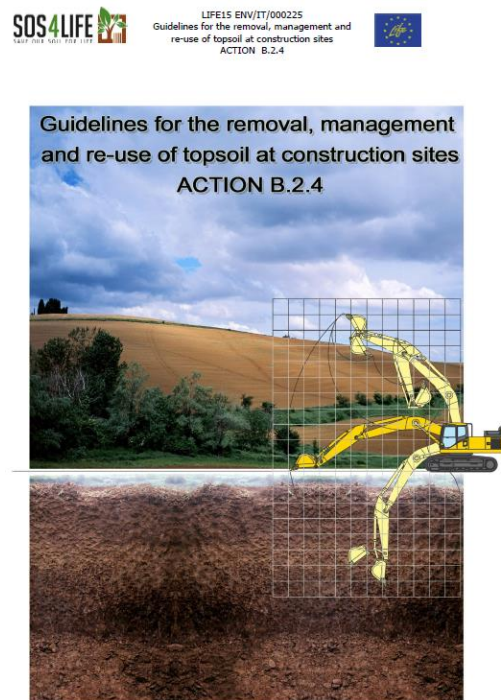
Province	Number of Municipalities	SES request	% request
BO	55	36	65.5
MO	47	29	61.7
FC	30	20	66.7
PR	44	15	34.1
FE	21	15	71.4
RA	18	10	55.6
PC	46	9	19.6
RN	27	9	33.3
RE	42	9	21.4
	<b>330</b>	<b>152</b>	<b>46.1</b>





fabrizio.ungaro@cnr.it

# Thanks for your attention!



<https://www.sos4life.it/documenti/>

[https://mappegis.regione.emilia-romagna.it/gstatico/documenti/dati\\_pedol/servizi\\_ecosistemici\\_suoli.pdf](https://mappegis.regione.emilia-romagna.it/gstatico/documenti/dati_pedol/servizi_ecosistemici_suoli.pdf)

<https://ambiente.regione.emilia-romagna.it/it/geologia/suoli/suoli-pianificazione/servizi-ecosistemici-del-suolo>

# “Designing with Nature”

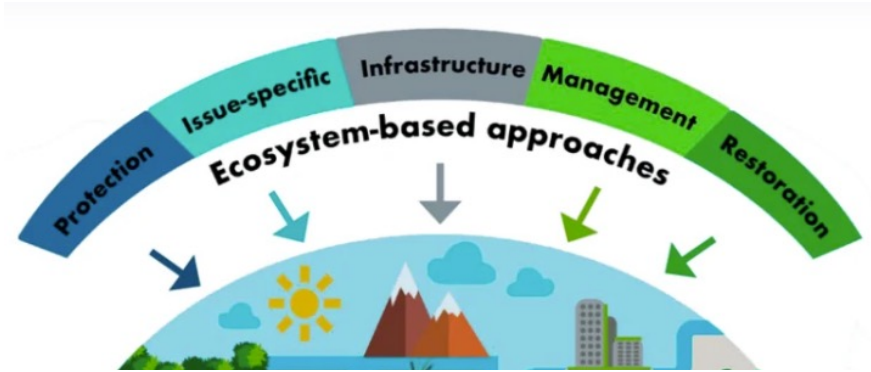
## Case study of UIA Baia Mare SPIRE

Reduce soil pollution and enhance restoration

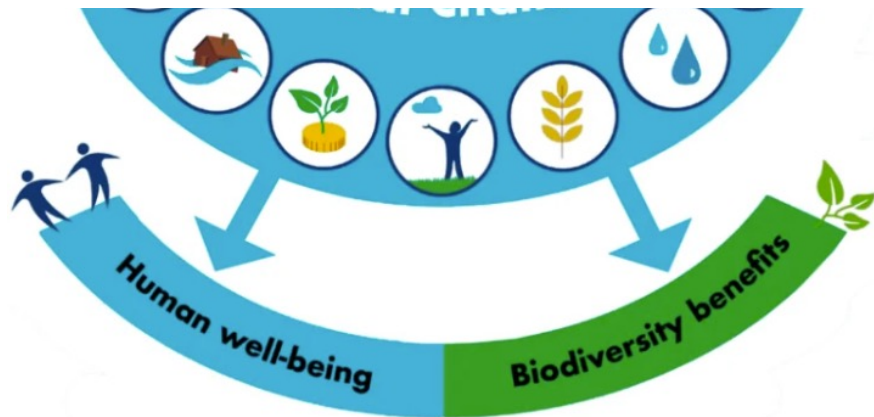
Codrut papina - urbasofia



# What is an nbs?



IT STARTS WITH THE PROBLEM!



## Nature-based Solutions

Nature-based Solutions are locally appropriate, adaptive actions to protect, sustainably manage or restore natural or modified ecosystems in order to address targeted societal challenge(s) - such as climate change mitigation -, while simultaneously enhancing human well-being and providing biodiversity benefits.

An infographic titled "Nature-based Solutions" with six horizontal panels, each with an icon, a title, a description, and a "DO NOT" warning box. The panels are: 1. Alignment with Natural Ecosystem Processes (tree icon, "Build on natural ecosystem processes and capacity for self-restoration", "DO NOT REQUIRE INTENSE HUMAN INTERVENTION"); 2. Benefit Biodiversity (leaf icon, "Protect or enhance biodiversity and ecosystem functions", "DO NOT REQUIRE ONGOING PROVISION OF ENERGY"); 3. Adaptability (target icon, "Increase adaptive capacity and resilience of ecosystems", "DO NOT HARM HABITAT AND SPECIES"); 4. Locally Appropriate Actions (location pin icon, "Aligned with local social, ecologic and economic conditions as well as tradition and culture", "DO NOT USE NON-NATIVE SPECIES"); 5. Multi-functionality (person icon, "Provide multiple co-benefits for people and the environment", "DO NOT HAVE NEGATIVE SOCIAL EFFECTS"); 6. Societal Challenges and Human Well-being (heart icon, "For example mental and physical health, social cohesion or urban regeneration", "Umwelt Bundesamt").

This graphic has been developed by Öko-Institut and Ecologic Institut on behalf of the German Environment Agency. It is based on Reize et al. (2021): Nature-based Solutions and global climate protection. Climate Change 01/2022, Dessau-Roßlau. Download at: <https://www.umweltbundesamt.de/publikationen/nature-based-solutions-global-climate-protection>. Design: Erik Teckow, sichtglatting.de.



# Baia mare

## Development STRATEGY of Maramures county

- Decontamination and reconversion of the main industrial platforms in the municipality of Baia Mare (CUPROM and ROMPLUMB),
- Greening of contaminated and potentially contaminated sites in the county,
- Regeneration of urban and rural public spaces,
- Realization of afforestation and protective forest curtains
- Establishment, modernization, maintenance and landscaping of green spaces





**SPIRE**





**Smart Post – Industrial  
Regenerative Ecosystem**

# Project partners



# uia – 4<sup>th</sup> call

### Topics of the Call

-  Digital transition
-  Sustainable use of land and nature based solutions
-  Urban poverty
-  Urban security



**Environment and climate change policy**



**Industrial and energy policy**



**Social and employment policy**



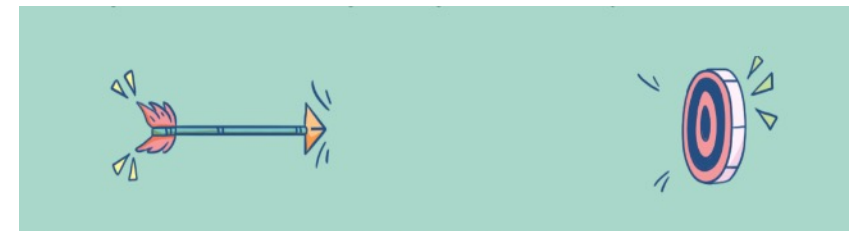
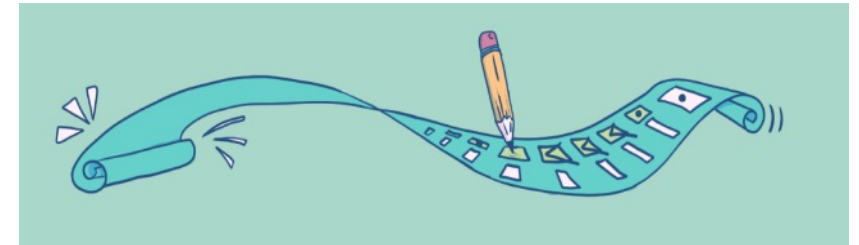
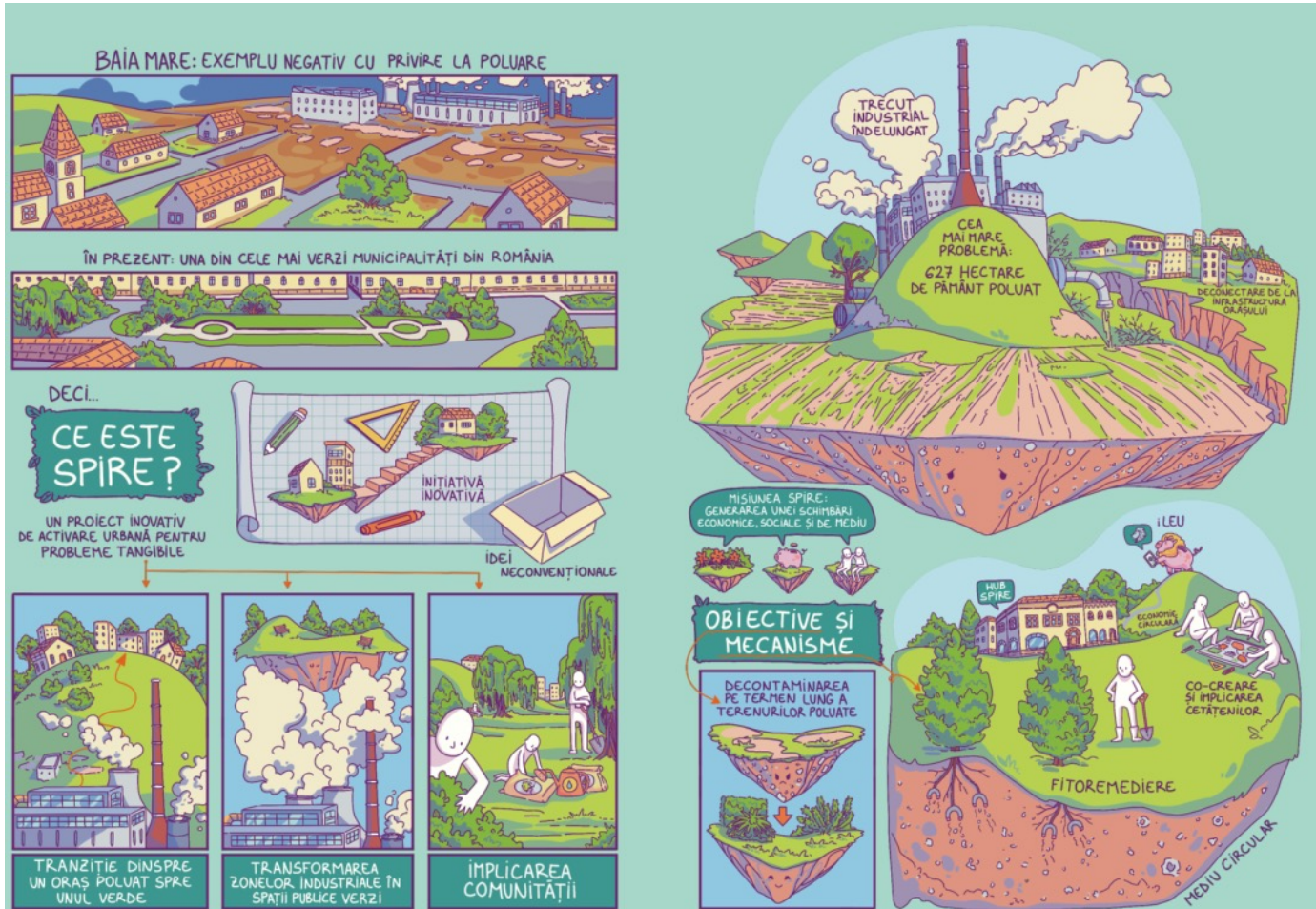
**Public health policy**



**Research and innovation policy**

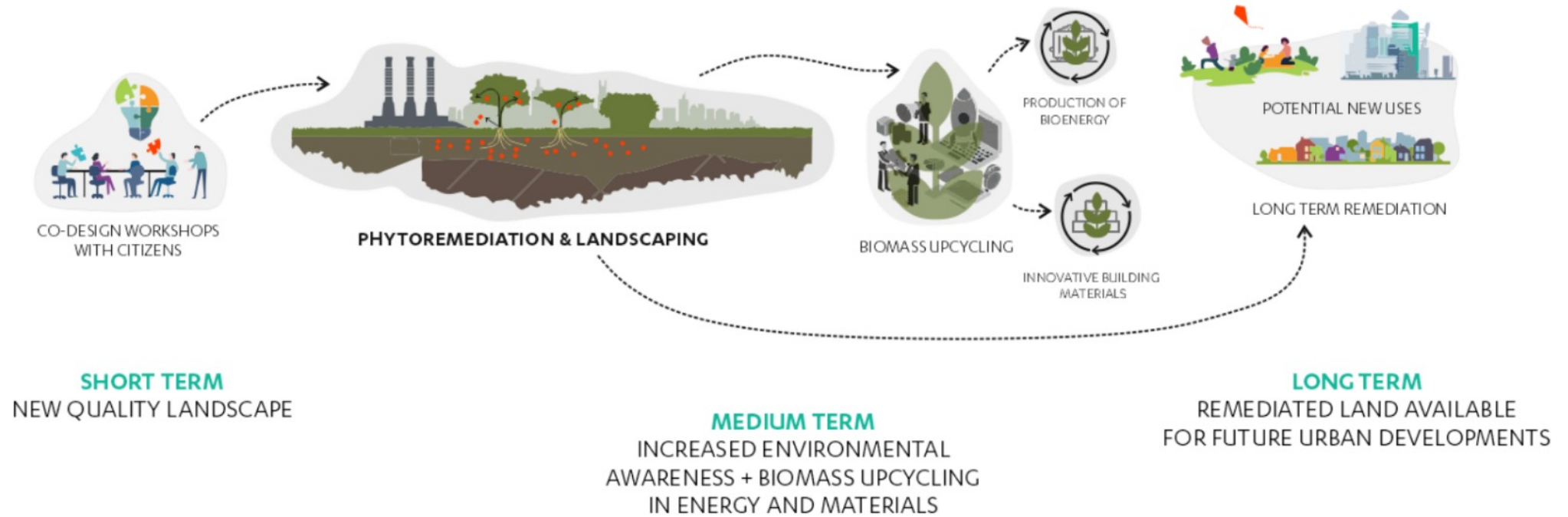


# SPIRE objective – urban regeneration

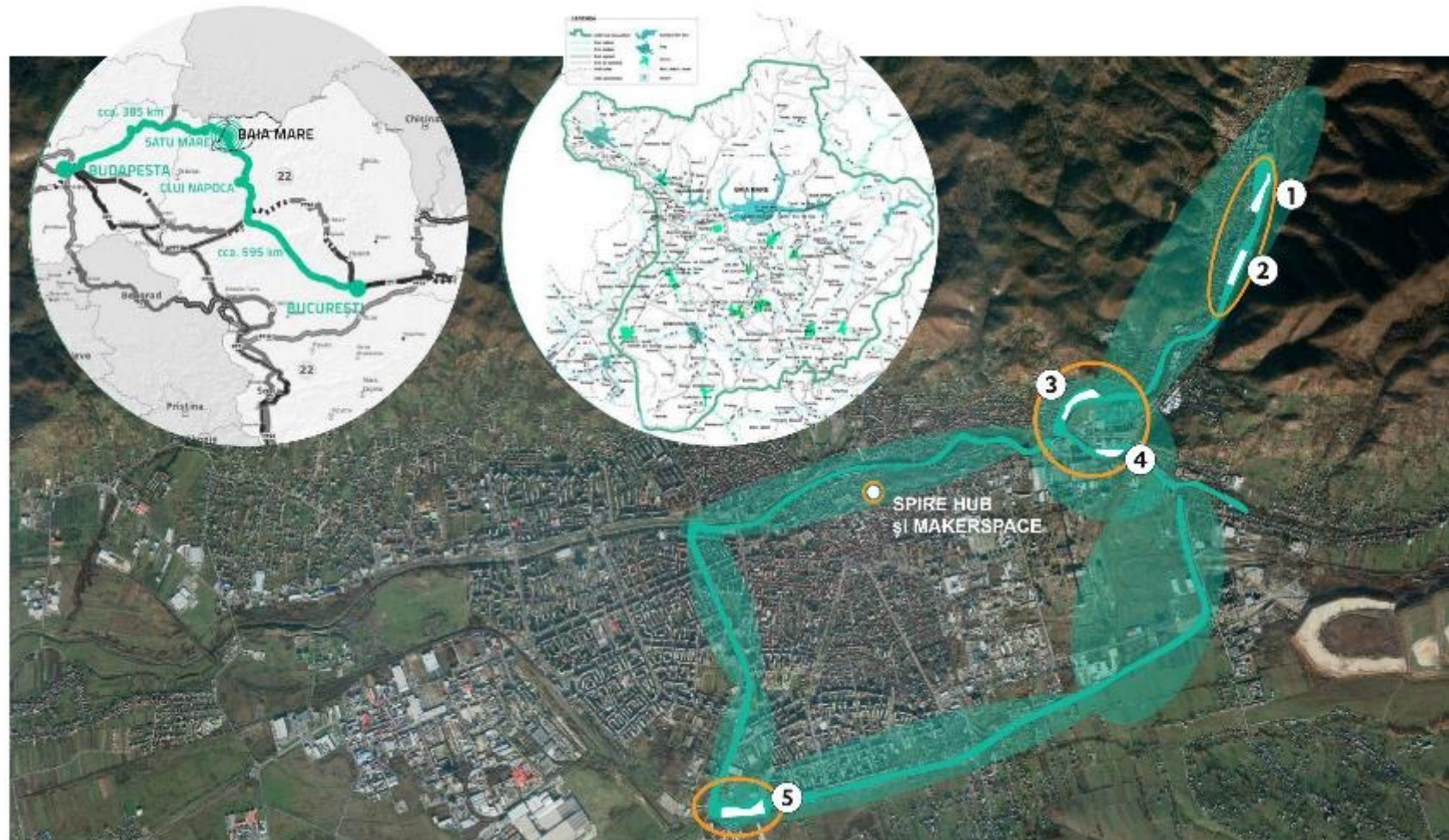


SPIRE experiments produced a body of empirical evidence upon which current and future partners can build in order to develop further plans and strategies for higher territorial levels.

# Co-developed bio-based value chains



# Pilot sites – for experimentation



1. Romplumb



2. Ferneziu 1



3. Colonia Topitorilor



4. Urbis (Politia Locala)



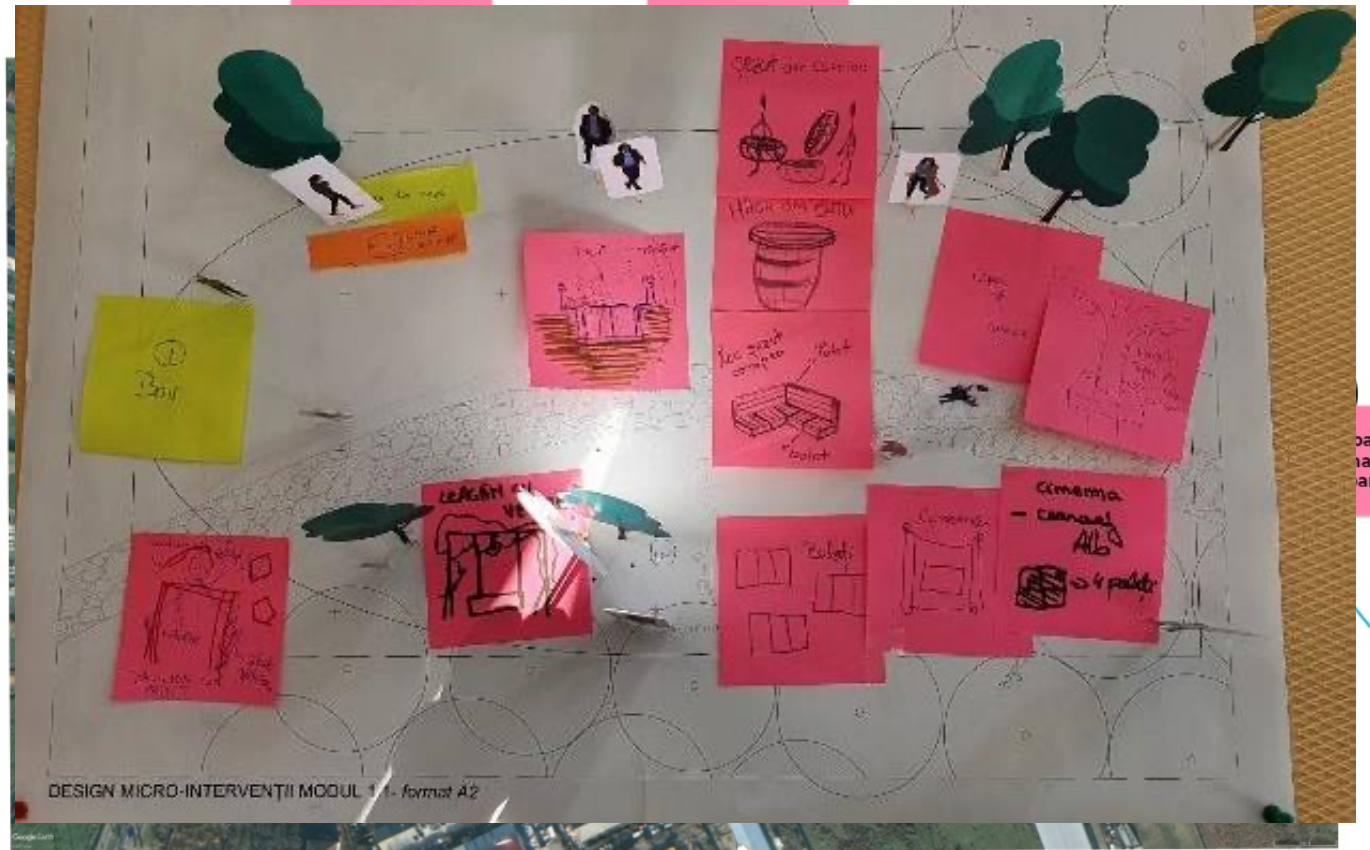
5. Craica



# Participative process



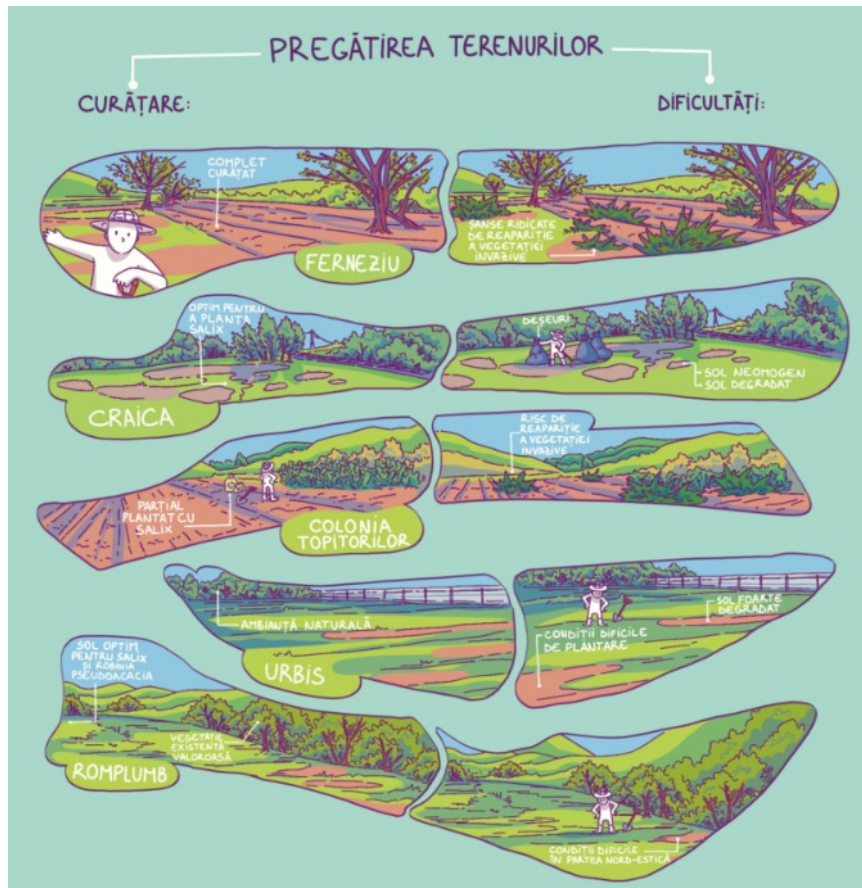
iluminat



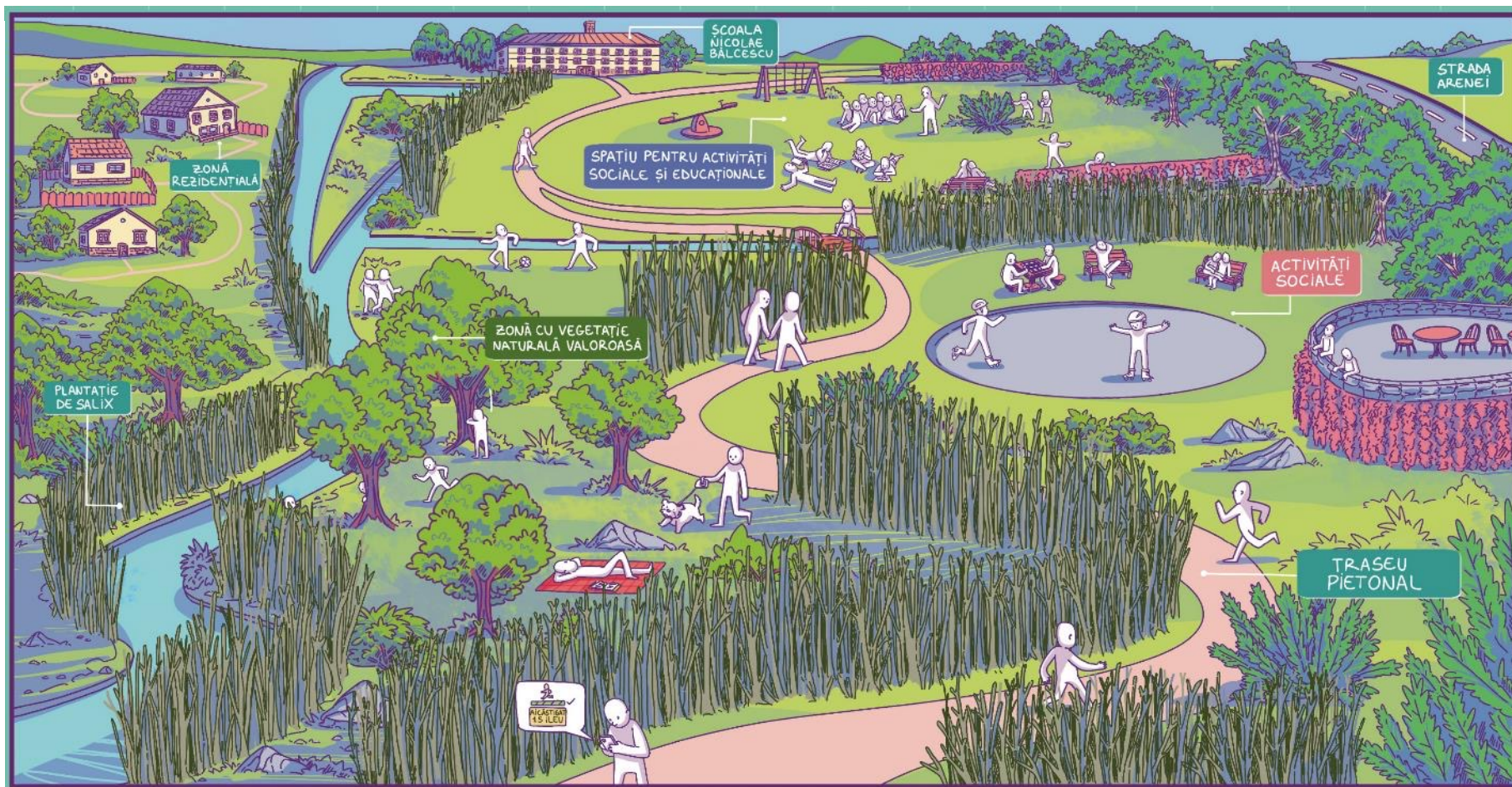
DESIGN MICRO-INTERVENȚII MODUL 1 - format A2



# Co-ownership of the unlocked sites



# Viziunea pe termen lung



# Metropolitan bio-based strategy and masterplan 2050

## Main authors:

Codruț PAPINA, Natalia MĂGUREANU (Urbasofia)

## Contributors:

Soil samples and phytoremediation expertise

Tania MIHĂIESCU, Anca PLEȘA, Ana Maria MĂLINAȘ (University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca)

Viorica RACARIU (Green Energy Cluster)

Adelin LAZĂR (Urbasofia)

Sabina DIMITRIU (Urbasofia)

Sorin POP (Indecosoft)

Valorisation of biomass

Territorial analyses and geographic maps

Final check

Digital component

## Coordinators:

Paul PECE, Ananta ARDELEAN (Baia Mare Metropolitan Area Intercommunity Development Association)



# Upscaling the spire pillars

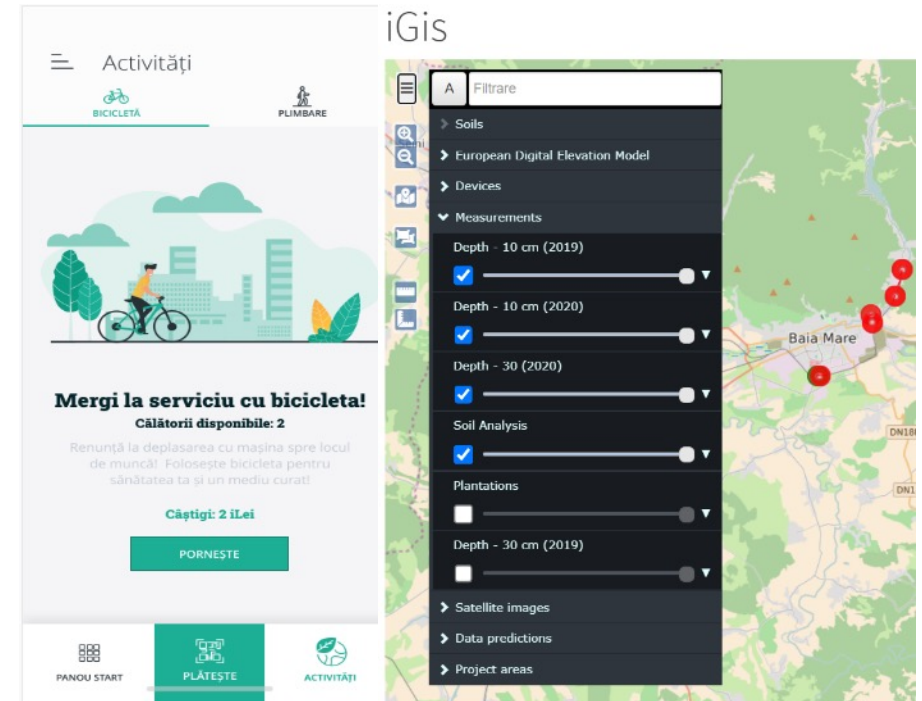
## 1. Remediation of polluted land (with community involvement)



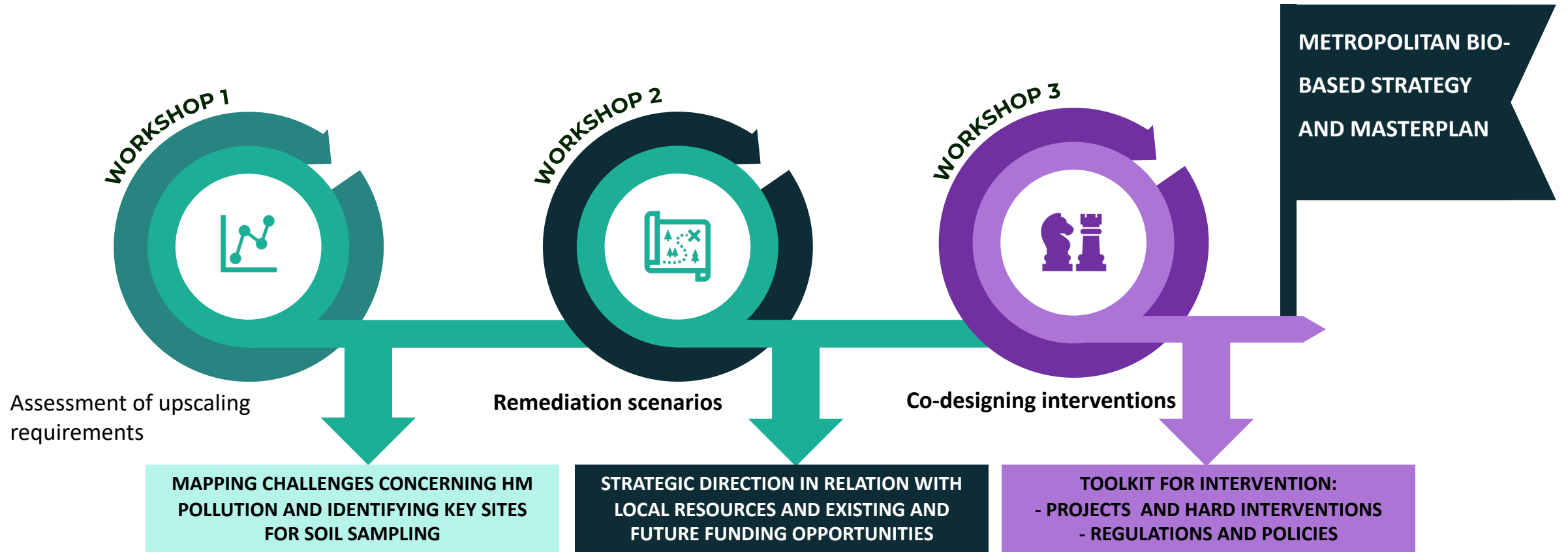
## 2 Use of biomass for energy and materials



## 3 Digital tools (eco-token)



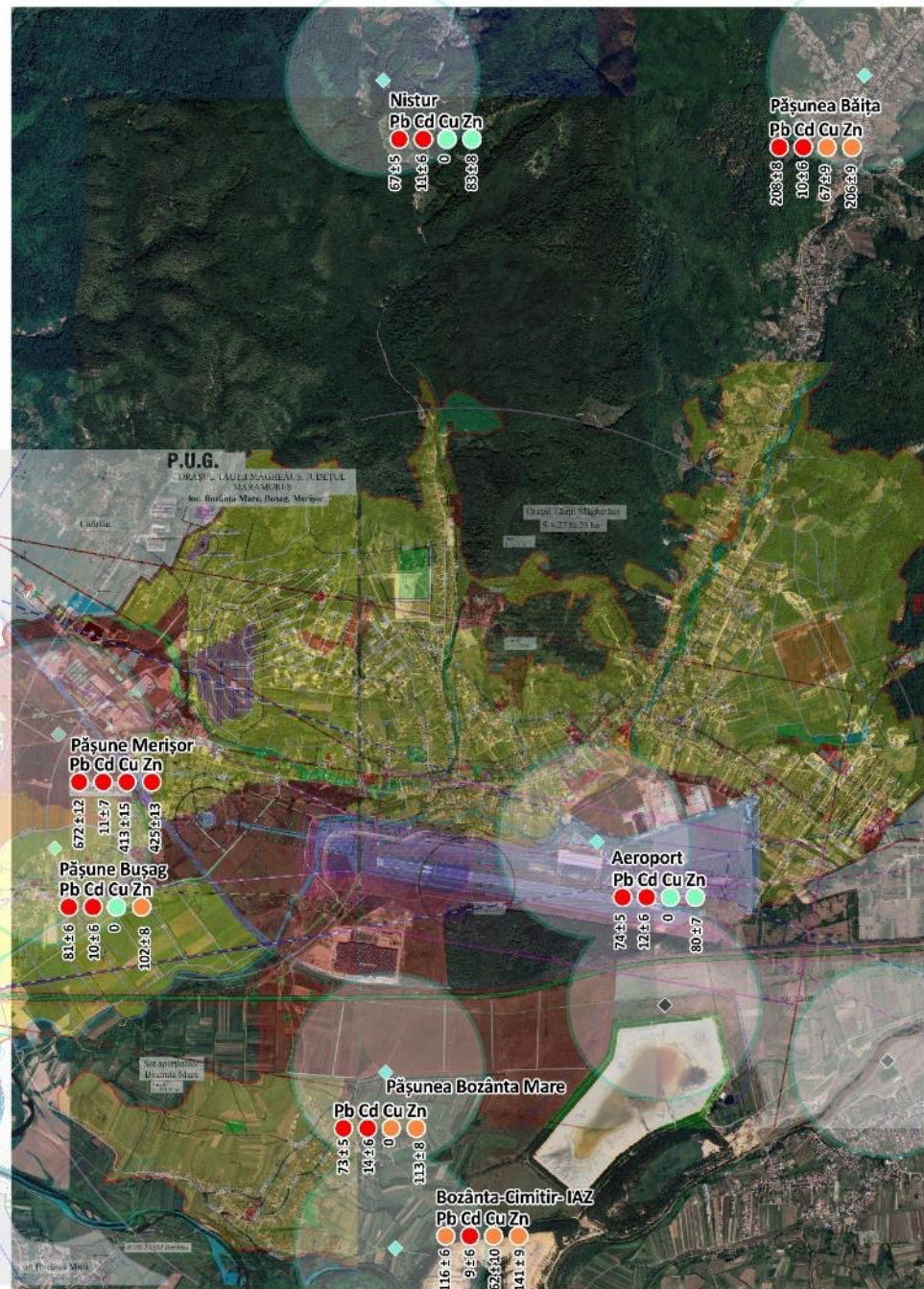
# methodology



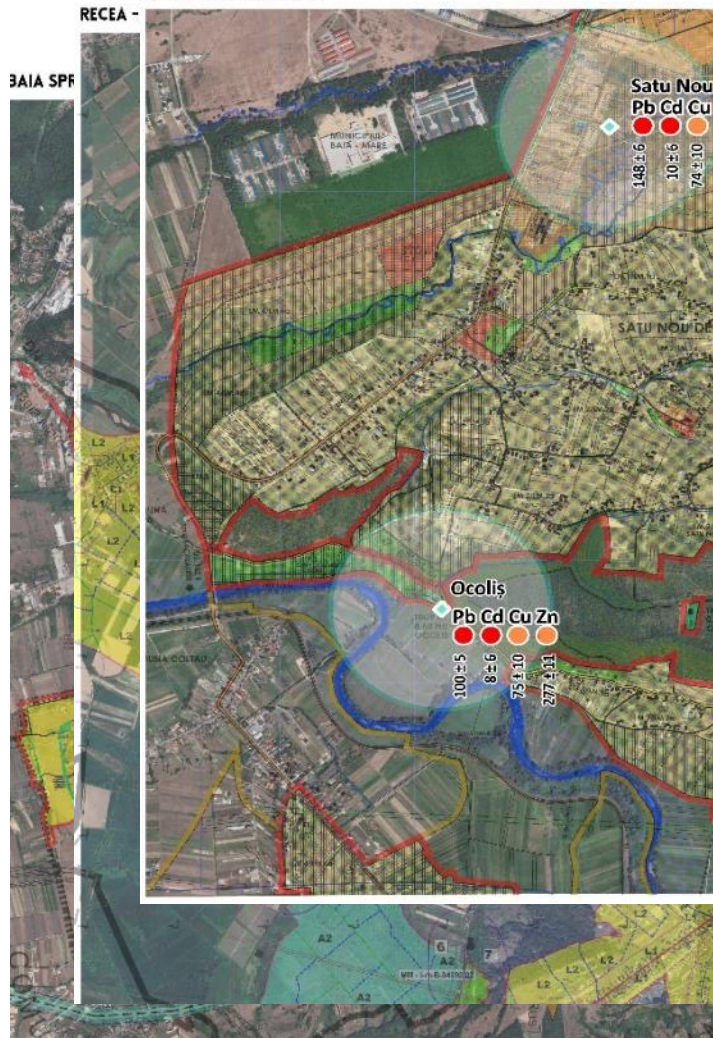


# phASE 1

TAUTII MAGHERAUS - PROBE DE SOL



GROSI - PROBE DE SOL



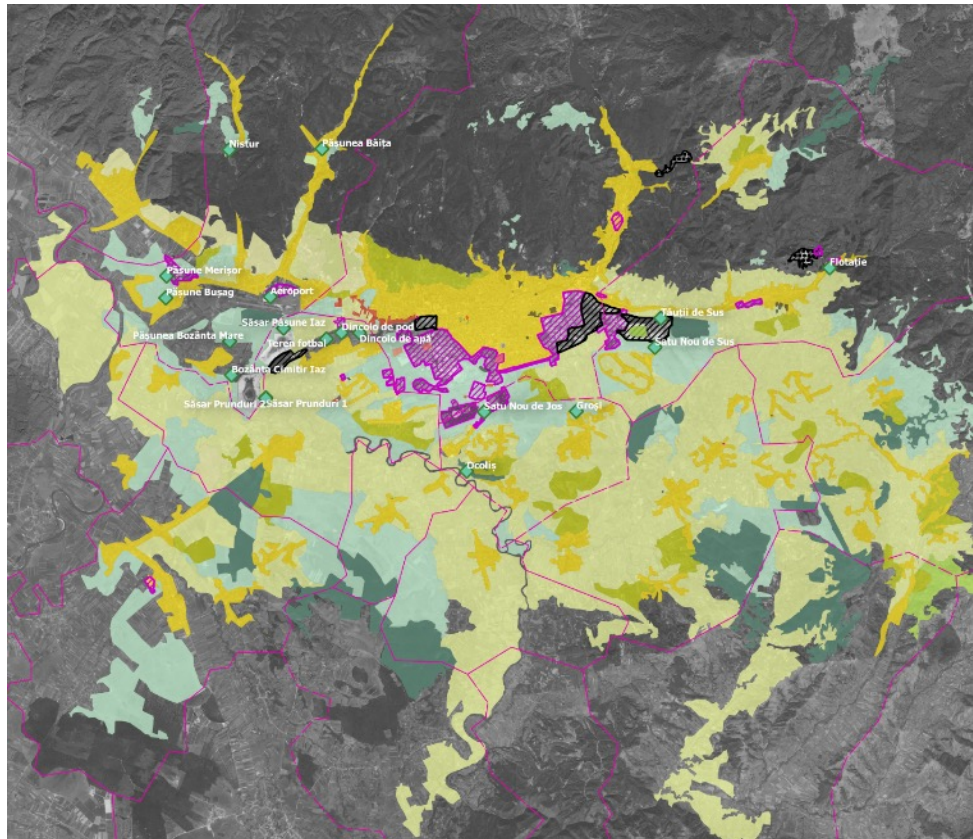
	Pb	Zn	Cu	Cd
Normal values (mg/kg s.u.)	20	100	20	1
Sensitive used intervention thresholds (mg/kg s.u.)	50	300	100	3
Less sensitive intervention thresholds used (mg/kg s.u.)	250	700	250	5
Alert thresholds sensitive uses (mg/kg s.u.)	100	600	200	5
Alert thresholds less sensitive uses (mg/kg s.u.)	1000	1500	500	10

# phASE 2

## Co-designed regeneration vision

Participatory process involving citizens, public administration, and local actors:

- Community – Nature integration
- Restoration of degraded areas
- Inclusion of phytoremediation as a standard technique in all future projects and developments (green mobility corridors, existing green spaces, new public spaces)
- Collaboration between UATs for green solutions: biomass harvesting and processing
- Conversion of tailings dumps and ponds to green energy zones

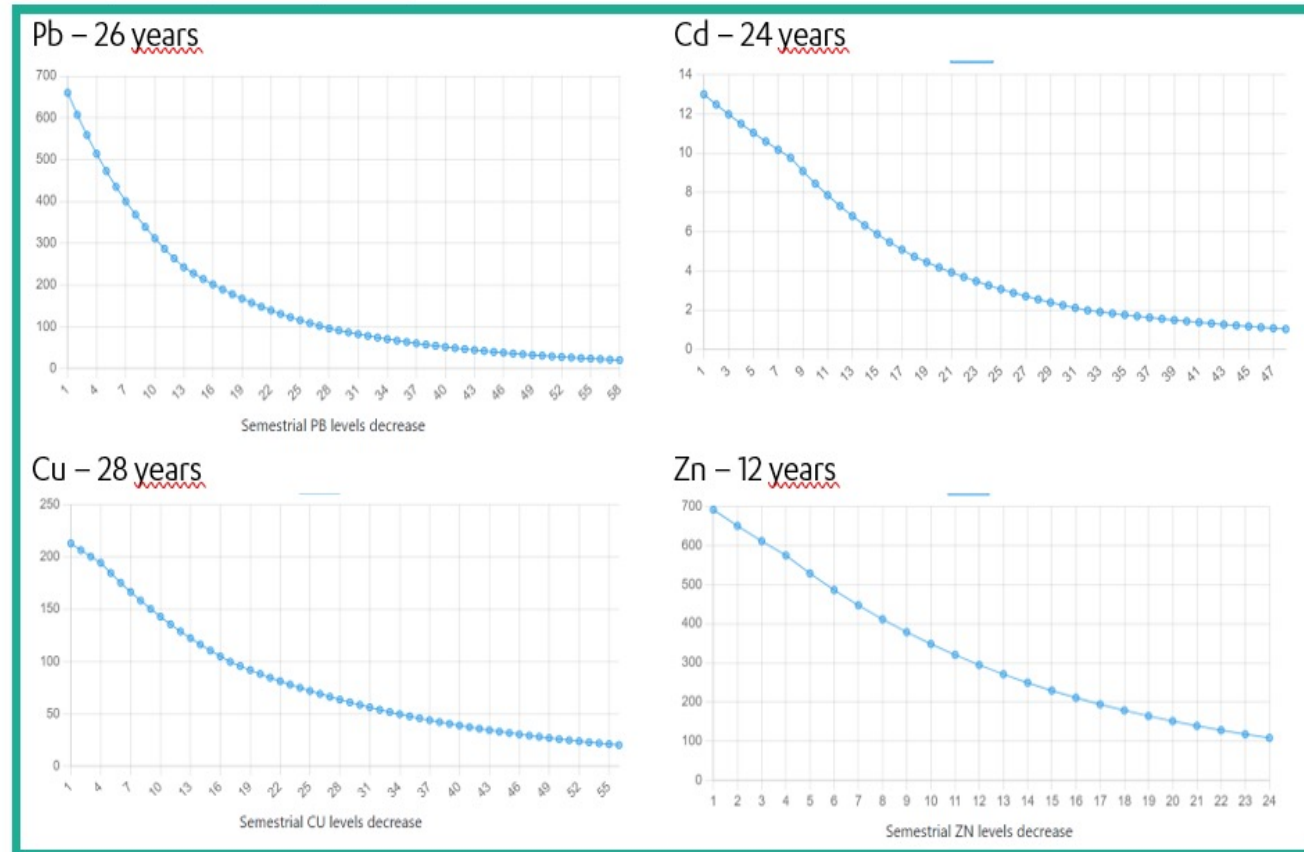




# phASE 2 scenarios

Table 1 - Tăuții De Sus site

Pb	Cd	Cu	Zn
660 ± 18	13 ± 7	213 ± 14	692 ± 16



## Phytoremediation calculator

Initial Pb:

Initial Zn:

Initial Cu:

Initial Cd:

ESTIMATE

Estimations of Pollutant levels based on the experimental SPIRE evolution. The estimates for each pollutant are extrapolated from measurements conducted on polluted lands in the Baia Mare Area. Each row represents a 6month timeframe. The estimated values are calculated up to the moment soils reach the normal levels.

Pb

Zn

Cu

Cd

# phASE 2

## RECOMMENDED SPECIES FOR PHYTOREMEDIATION AND RENATURATION OF ABANDONED/DEGRADED AREAS

	<p><i>Acer platanoides</i></p>	<p>Cd, Cu, Pb, Zn, As, Tl</p>		<p><i>Robinia pseudoacacia</i></p>	<p>Cu, Mn, Zn, Pb, Mg, Fe</p>
	<p><i>Fraxinus excelsior</i></p>	<p>Cd, Cu, Ni, Pb, Zn, Cr</p>		<p><i>Salix alba</i></p>	<p>Cd, Cu, Pb, Zn, Hg</p>
	<p><i>Miscanthus giganteus</i></p>	<p>Cd, Co, Cr, Cu, Mn, Ni, Pb, Zn, Fe, As</p>		<p><i>Salix babylonica</i></p>	<p>Pb</p>
	<p><i>Pinus nigra</i></p>	<p>Cd, Cu, Pb, Zn, As</p>		<p><i>Sorbus aucuparia</i></p>	<p>Cd, Pb, Mn, Fe</p>

# phASE 2

## RECOMMENDED SPECIES FOR PHYTOREMEDIATION AND BIOMASS PRODUCTION



*Salix viminalis*

Cd, Cu, Pb, Zn, Hg



*Miscanthus giganteus*

Cd, Co, Cr, Cu, Mn, Ni, Pb,  
Zn, Fe, As



*Betula pendula*







Cd, Mn, Ni, Pb, Zn, Fe









Creșterea salciei pe zi

# phASE 2

## RECOMMENDED SPECIES FOR PUBLIC SPACES, FUTURE DEVELOPMENTS, INDIVIDUAL GARDENS, etc...

	<i>Acer platanoides</i>	Cd, Cu, Pb, Zn, As, Tl
	<i>Betula pendula</i>	Cd, Mn, Ni, Pb, Zn, Fe
	<i>Catalpa bignonioides</i>	blocks dust with HM to lift up
	<i>Sorbus aucuparia</i>	Cd, Pb, Mn, Fe
	<i>Berberis thunbergii</i>	Cu, Ni, Pb, Zn
	<i>Hibiscus syriacus</i>	Cu, Pb, Zn

	<i>Miscanthus giganteus</i>	Cd, Co, Cr, Cu, Mn, Ni, Pb, Zn, Fe, As
	<i>Prunus laurocerasus</i>	blocks dust with HM to lift up
	<i>Juniperus</i> spp.	Cd, Cu, Mn, Pb, Zn, Fe
	<i>Lavandula angustifolia</i>	Cd, Pb, Cu, Mn, Zn, Fe
	<i>Iris germanica</i>	Pb, Ni
	<i>Parthenocissus quinquefolia</i>	Ni, Pb, U, Th, Ba, Sr

# phASE 3

## Integrated approach

Projects/Investments

Land Use Recommendations  
(Regulations)

Local policies and measures

## Driver (Trigger)

Detailed projects (with soil samples)

Future expansions

Recurring community events aimed at improving the environment

Projects related to SIDU/PMUD

Functional areas (public infr.)

Education/awareness measures for greening initiatives

Additional interventions (long term strategic projects)

Management of existing infrastructures

## Solution Matrix (replicable)



# phASE 3

## Matrix of green solutions - phytoremediation

Projects  
(enhancing green infrastructure)

Landuse  
(improving the existing situation )

Local policies and measures  
(co-ownership and collaboration)



" Forest " of  
phytoremediation



Regeneration of blue green  
corridors



Green protection areas



Green corridors and  
ecological corridors (and  
green mobility)



Conversion/renaturation of  
abandoned land



Green space requirements



Green corridor  
requirements.



Mixed zone/residential  
extension requirements



Requirements for public  
institutions/services



Industrial zone requirements



Plantathlons



Harvest Fest



Donate your Christmas Tree

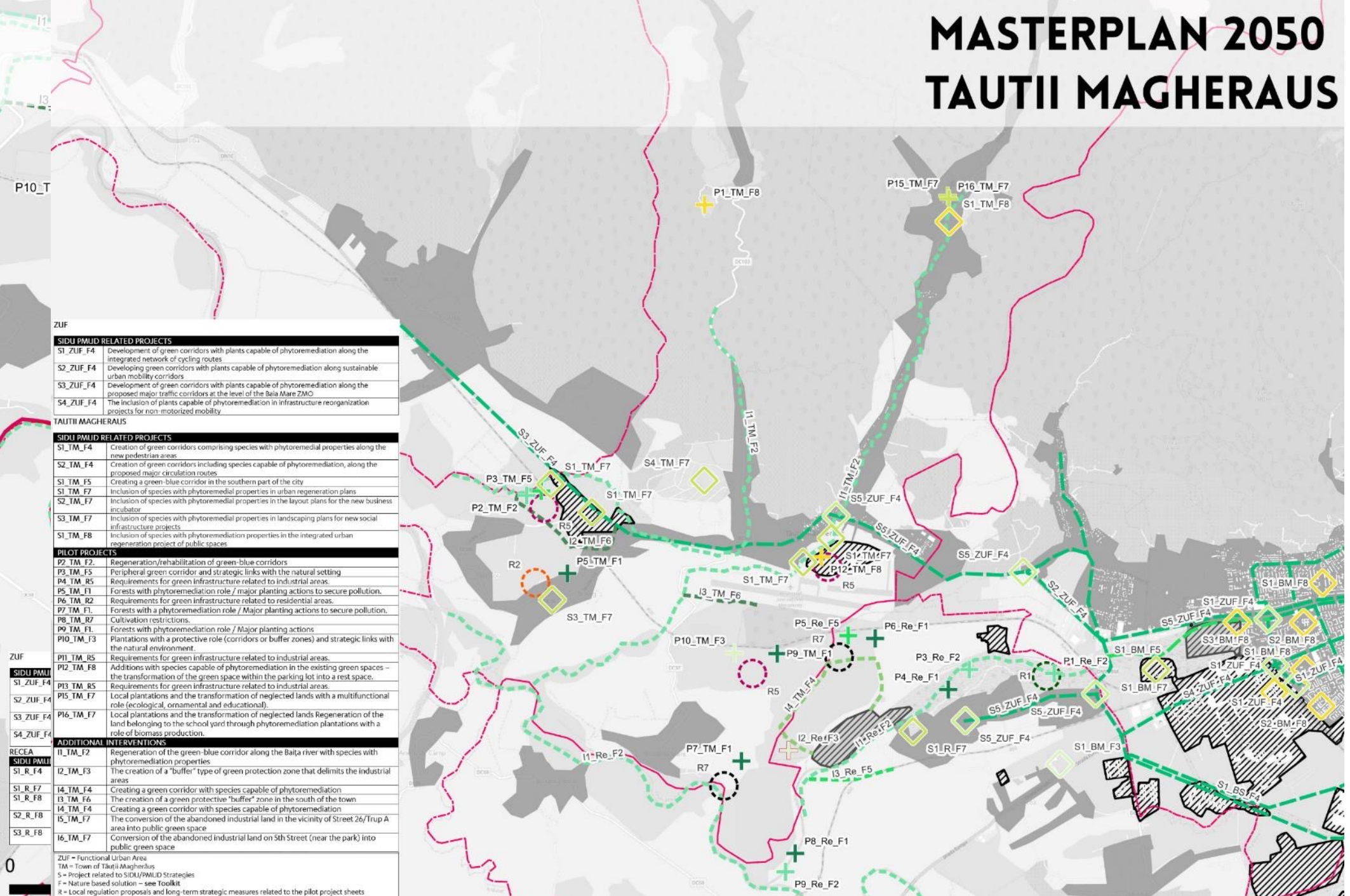


Home-garden  
phytoremediation planting



Reuse of the school yard -  
ecological planting

- TAU
- SIDU
- + Pilot
- Zon
- pilo
- Add



ZUF	
SIDU PMU	
S1_ZUF_F4	
S2_ZUF_F4	
S3_ZUF_F4	
S4_ZUF_F4	
RECEA	
SIDU PMU	
S1_R_F4	
S1_R_F7	
S1_R_F8	
S2_R_F8	
S3_R_F8	

ZUF = Functional Urban Area  
 TM = Town of Tautii Magheraus  
 S = Project related to SIDU/PMUD Strategies  
 F = Nature based solution – see Toolkit  
 R = Local regulation proposals and long-term strategic measures related to the pilot project sheets  
 !!! The full documentation will be consulted, especially Chapters 3 and 4.

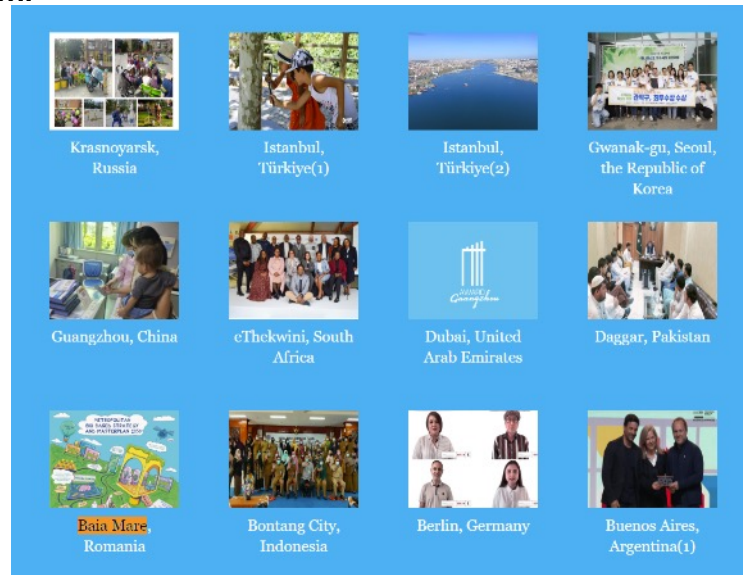
# AWARDS NOMINATION

WORLD SMART  
CITY AWARDS  
7-9 NOVEMBER  
BARCELONA

SPIRE – WINNER OF  
INNOVATION AWARDS

WELCOME  TO  
THE  NEW   
URBAN ERA.

**GUANGZHOU  
INTERNATIONAL AWARD  
FOR URBAN INNOVATION**  
BAIA MARE – DESERVING CITY  
<http://www.guangzhouaward.org/c/esixthresutls.html>

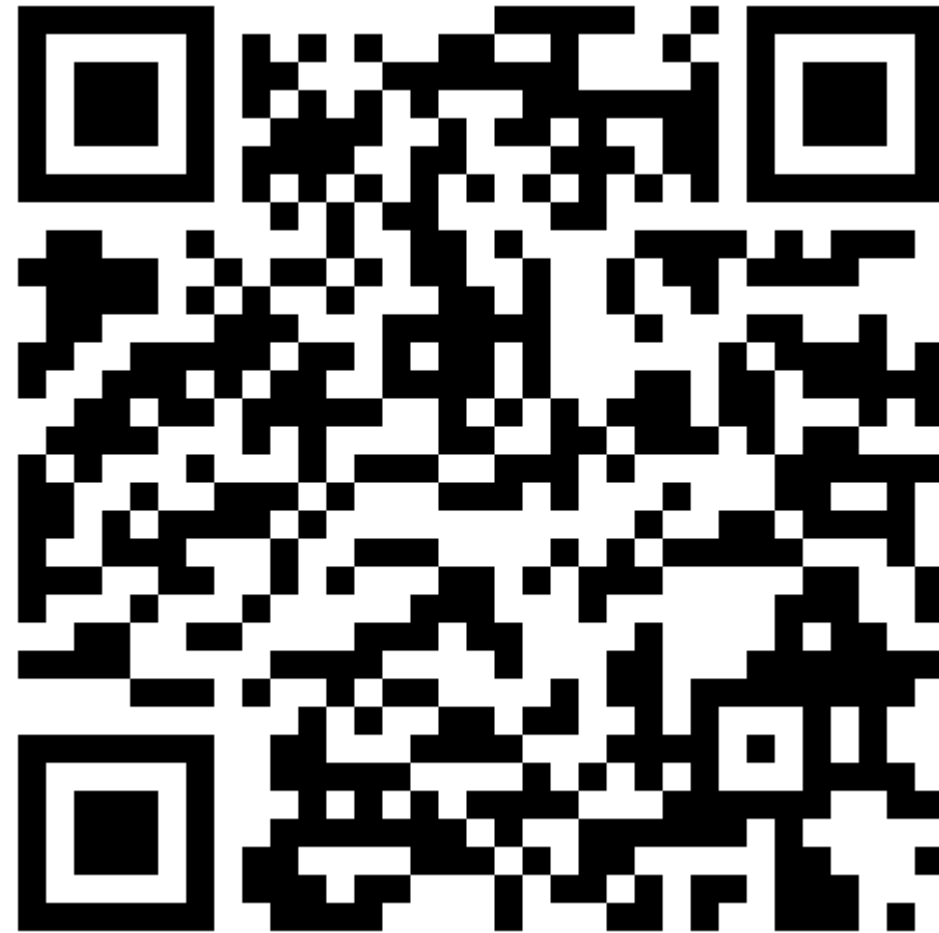


**FINALIST (1/3) IN THE  
EPSA – the European Public  
Sector Awards**





| Full strategy adi-zmbm official site



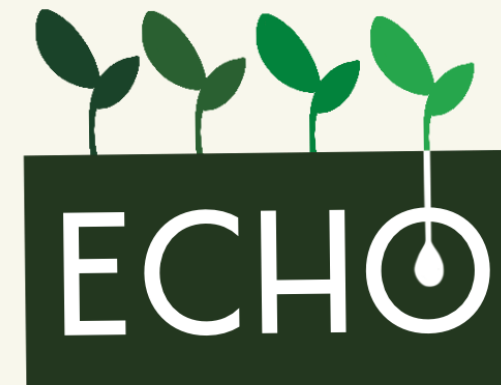


# Citizen Science initiatives for Soil Literacy

a presentation by  
**Alba Peiro**

Supporting the soil deal for EU  
across national communities

To ensure healthy status by 2050



ENGAGING CITIZENS IN SOIL SCIENCE:  
THE ROAD TO HEALTHIER SOILS



# What is ECHO?



ENGAGING CITIZENS IN SOIL SCIENCE:  
THE ROAD TO HEALTHIER SOILS

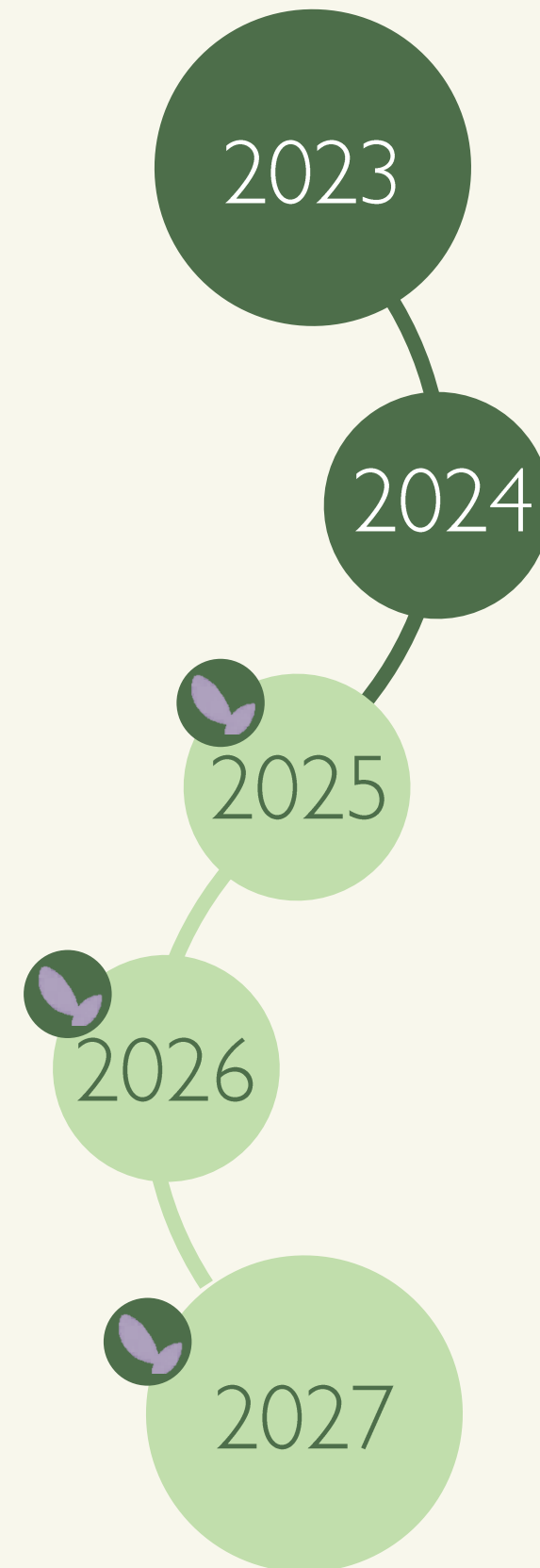


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# What is ECHO?



AIM:

To engage citizens in protecting and restoring soils by building their skills and enhancing their knowledge



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# Tools & Activities

✔ 28 INITIATIVES  
Tailor-made Citizen Science initiatives across EU Member States

✔ 16 500 SITES  
In different climate and bio-geographic regions assessed

✔ TOOLBOX  
A free resource including open access field guidelines, protocols and forums

✔ ECHOREPO  
A long-term open access repository with a direct link to the EUSO



**ECHO**

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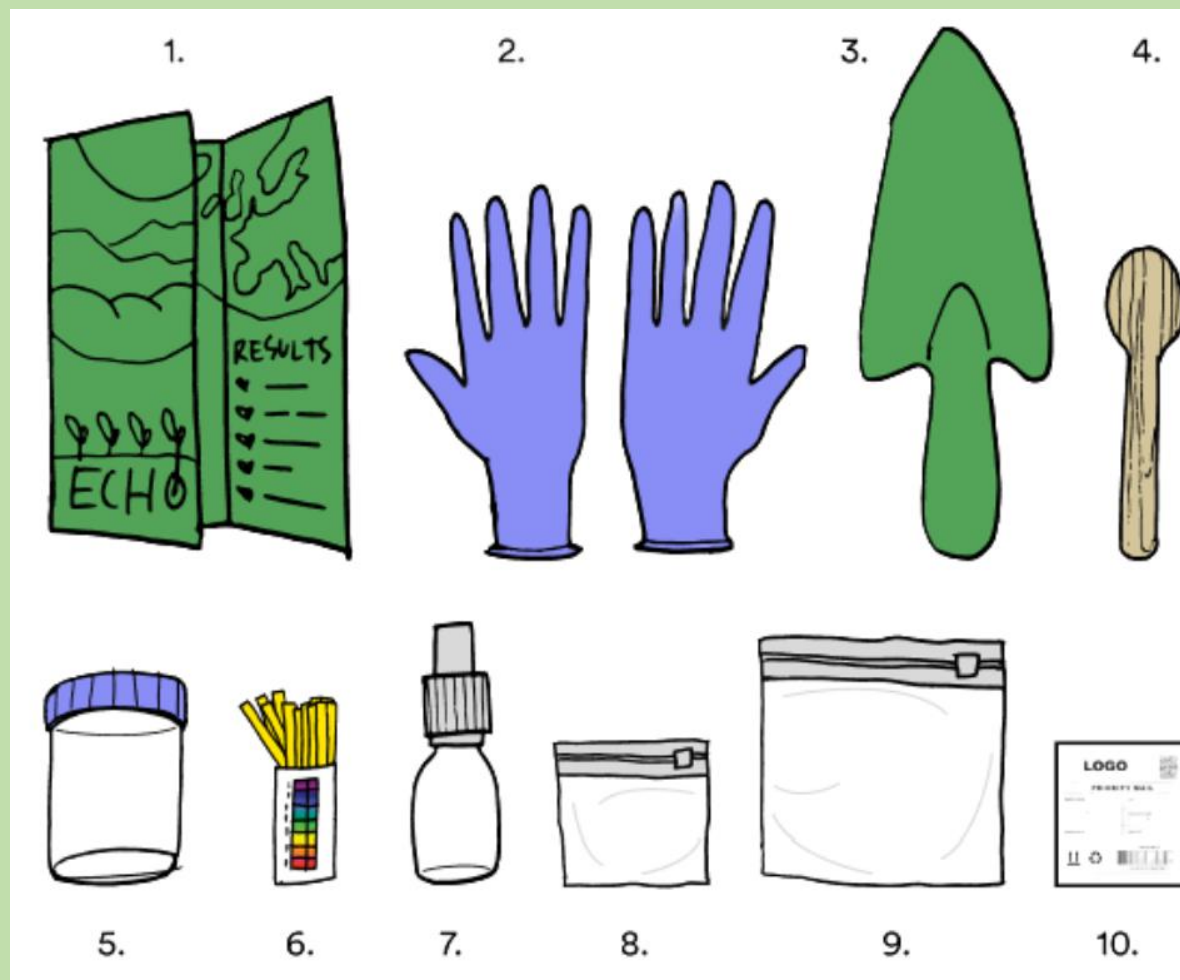
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# Tools & Activities

## TOOLBOX



1. Precise guidelines for conducting soil sampling activities (leaflet, also available on the app/website)
2. Protective gloves to be used during the sampling procedure
3. A metal shovel for soil sampling
4. A wooden spoon for soil handling
5. A plastic container for soil sample pH
6. paper strips for measuring soil sample pH
7. A plastic container for collecting soil samples for biodiversity analysis
8. A small biodegradable plastic bag for collecting soil samples for heavy metals analysis
9. A large biodegradable plastic bag for storing both soil samples to be returned
10. Contact information of designated person and lab for returning the kit



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# Tools & Activities

## ECHOREPO

- 1 Vegetation cover
- 2 Forest cover
- 3 Landscape heterogeneity
- 5 Structure and organic matter
- 7 pH
- 8 Organic carbon stock

## APP ECHO

- 4 Presence of pollutants
- 6 Biodiversity



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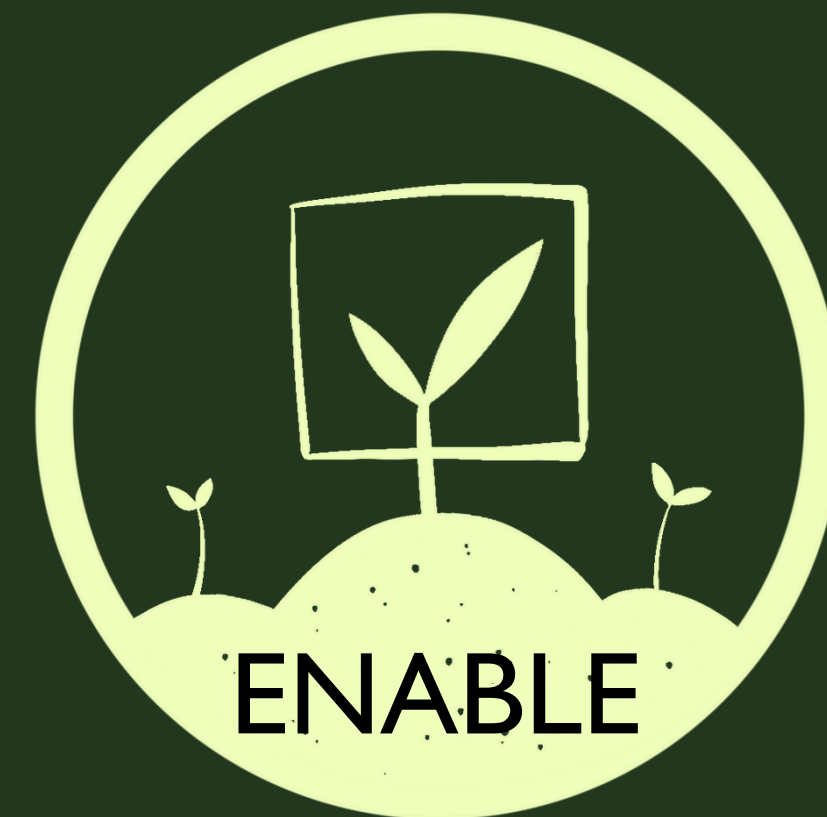
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# Our objectives

THE “3Es” FOR CITIZENS:



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# Our objectives

## SOIL LITERACY:

“38% of 18-24-year-olds had a moderate understanding of the soil challenge, compared to 44% of 55-64-year-olds.”

*Baeck et al. (2023)*

“There needs to be an adaptive approach to soil literacy, respectful of multiple perspectives and sources of knowledge.”

*Katikas et al. (2024)*



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EUROPEAN UNION



# EU MISSIONS

SOIL DEAL FOR EUROPE



*100 living labs and lighthouses to lead the transition towards healthy soils by 2030*

## Context and contribution



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# Context and contribution



Operational objectives



Specific objective 8:  
Improve soil literacy in society



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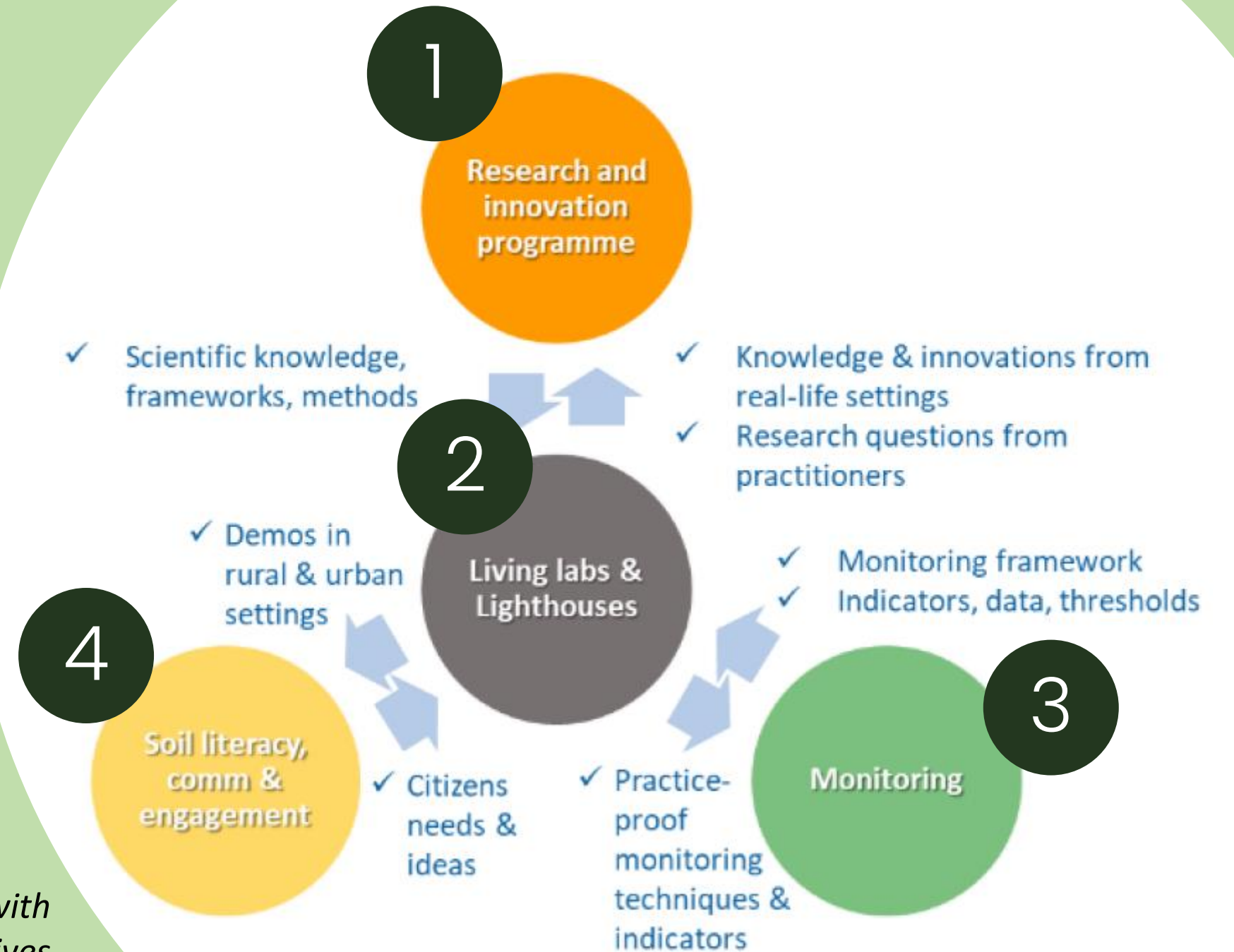
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# Operational objectives

- **ECHO isn't a living lab**
- It is a **R&I Programme** where new knowledge is being created
- This knowledge will **be further transformed into innovations**, with real impact and a high potential, **in living labs and lighthouses** across Europe.



*Living labs and lighthouses in relation with activities under other objectives*  
From the Implementation Plan



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# Specific objective 8: Improve soil literacy in society



8.1

**Awareness of the societal role and value of soil is increased amongst EU citizens**

8.2

**Soil health is firmly embedded in curricula, to enable citizens' behavioural change**

8.3

**Citizen involvement in soil and land-related issues is improved**

8.4

**Practitioners and stakeholders have access to appropriate information and training**



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# The status of ECHO



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# The status of ECHO



2023

2024

- **Testing the CS toolbox and training materials**
- **Co-determining and co-defining the activities of each CS initiative**

2025

2026

2027



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# The status of ECHO



2023

2024

- Testing the CS toolbox and training materials
- Co-determining and co-defining the activities of each CS initiative

2025

- **Running of the large CS initiatives in 9 EU countries**

2026

2027



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# The status of ECHO



2023

2024

2025

2026

2027

- Testing the CS toolbox and training materials
- Co-determining and co-defining the activities of each CS initiative

- Running of the large CS initiatives in 9 EU countries

- **Running of the satellite CS initiatives in 19 EU countries**



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# The status of ECHO



2023

2024

- **Testing the CS toolbox and training materials**
- **Co-determining and co-defining the activities of each CS initiative**

2025

- Running of the large CS initiatives in 9 EU countries

2026

- Running of the satellite CS initiatives in 19 EU countries

2027



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# Co-creation strategies

## 1 SCALE, SCOPE AND ACTORS:

- In our 1<sup>st</sup> month of co-creation:

10 workshops

5 countries

Urban

- Designed by the ECHO team
- Implemented by each partner
- Participants were the **ECHO ambassadors**
- For testing the CS toolbox and training materials
- For co-defining the activities of each CS initiative
- About to be conducted in the other 4 EU countries
- They will be repeated in the other 19 countries during 2026-2027



ECHO

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# Co-creation strategies

## 2 METHODOLOGY:

- Can be developed:

In person

Online

- ACTIVITY 1: Insights of the ECHO toolkit
- ACTIVITY 2: Shaping participation
- ACTIVITY 3: Perspectives and activities

ECHO

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# Co-creation strategies

## 2 METHODOLOGY:

- Can be developed:

In person

Online

- **ACTIVITY 1: Insights of the ECHO toolkit**

First contact with its preliminary version

An adjectives cloud triggered their opinion-sharing

- **ACTIVITY 2: Shaping participation**

- **ACTIVITY 3: Perspectives and activities**



# Co-creation strategies

## 2 METHODOLOGY:

- Can be developed:

In person

Online

- **ACTIVITY 1: Insights of the ECHO toolkit**

First contact with its preliminary version

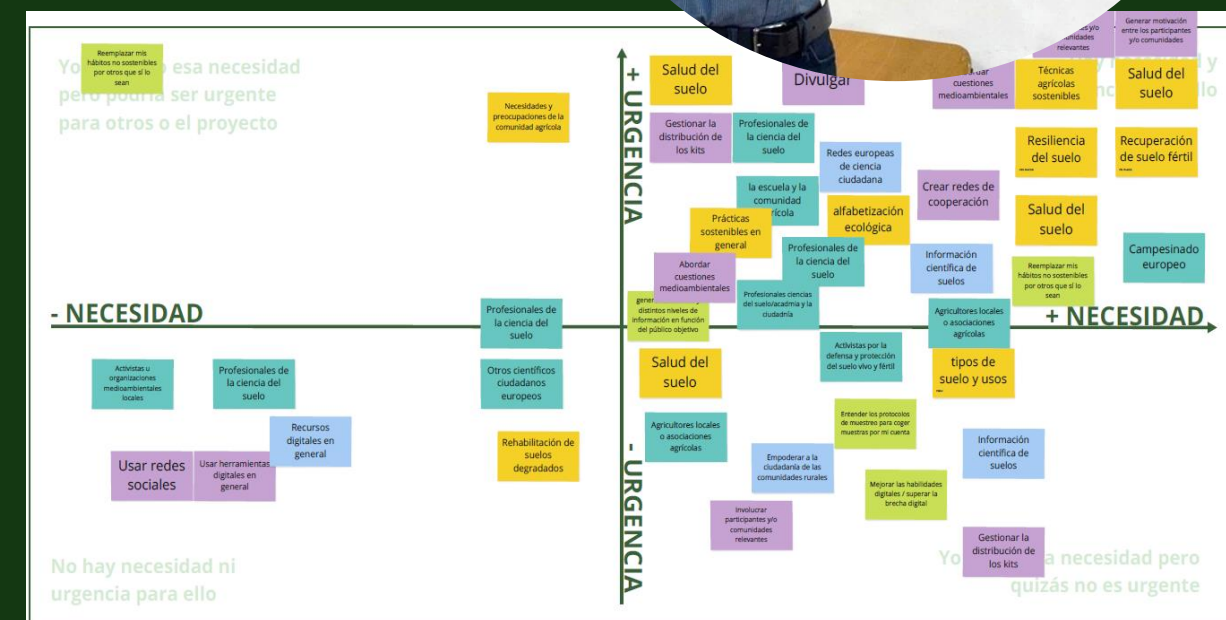
An adjectives cloud triggered their opinion-sharing

- **ACTIVITY 2: Shaping participation**

Evaluation of future key factors

Placed them on a graph

- **ACTIVITY 3: Perspectives and activities**



Graph based on the Eisenhower's Time Management Matrix popularised by Covey (2020)

# Co-creation strategies

## 2 METHODOLOGY:

- Can be developed:

In person

Online

- **ACTIVITY 1: Insights of the ECHO toolkit**

First contact with its preliminary version

An adjectives cloud triggered their opinion-sharing

- **ACTIVITY 2: Shaping participation**

Evaluation of future key factors

Placed them on a graph

- **ACTIVITY 3: Perspectives and activities**

Co-determining activities focused on the previous needs



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# Co-creation strategies

## 3 PRELIMINARY INTERESTING RESULTS:

- Ambassadors showed a proactive attitude and their willingness to lead their local CS initiatives with support (not direct assistance) from the ECHO team

From now and until the CS initiatives start, they:

- Aim to further co-design their local initiatives.
- Seek to enhance their knowledge and understanding of soil health.
- Are eager to improve their skills in outreach, mapping, engagement, and motivational activities.
- Desire easier access to soil science information.

SOIL  
LITERACY

ECHO

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# Co-creation strategies

## 4 PRELIMINARY NEXT STEPS:

- Regular interactions with Ambassadors to further co-design their local initiatives
- Co-creation workshops for mapping, engagement and communication methods and strategies  
(techniques for effective communication, examples of stakeholder analysis and engagement plans, examples of interactive activities, techniques to increase motivation, methods for connection and consciousness raising awareness of with soils...).
- Workshops for soil literacy  
(soil health, resilience, sustainable practices, tools to address local environmental issues, connections and strategies to connect with soil science professionals, local environmental organizations and farmers).
- Workshops to understand future results and implications, and to boost soil restoration  
(knowledge on how to interpret results analysis; applications of sustainable soil practices; knowledge on how to choose cultivations).

## TIME

To consolidate and prepare each initiative.  
To build trust.

## CONDITIONS

Weather conditions, as well as  
socio-cultural and political contexts of each country.

## EXPECTATIONS

Understand the barriers but never make promises.  
About the innovation.

## GDPR

Consider ethical and legal issues,  
such as data protection and privacy.

# Challenges



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## WHEN MAPPING AND ENGAGING CITIZENS/USERS...

- Categorize them into different priority groups.
- Include individuals flexible towards change.
- Include individuals with different levels of knowledge.

## WHEN DEVELOPING THE CO-CREATION ACTIVITIES...

- Never underestimate their previous knowledge.
- If you do not have experience with co-creation, start with simple tools.
- Avoid prolonging the activities.
- Design a comprehensive feedback collection strategy.

## IN GENERAL...

- People need time to get used to co-creation and to get involved.
- Give them the feeling that their contribution is important.
- But set clear objectives and manage their expectations.

# Some advice



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## Discussion & Exchange with the audience

