POLICY BRIEF

Producing Actionable Knowledge for Crop Diversification

Walter Rossing, Luca Colombo, Barbara Koole, Antoine Messéan

- Actionable knowledge is context-specific knowledge that assists actors in their decision-making to be better positioned to achieve their goals.
- Producing actionable knowledge with Multi-Actor Approaches requires more than gathering 'multiple actors' around the table; it requires attention for the settings and processes that stimulate social learning, empower actors, and build social capital leading to consensus for action.
- Effective actionable knowledge production is based on mutual understanding, trust, and a common vision among researchers and societal actors; consortia should be enabled to stimulate social learning and build this social capital both before as well as over the course of a project.
- The inherent unpredictability of innovation processes requires funding schemes that foster adaptive, learning-oriented project governance approaches replacing the accountability-focused schemes currently in place.
- More experimentation with innovation-sensitive funding instruments is needed to better understand how to effectively cross-pollinate scientific and practitioner knowledge and address pressing global issues.

Introduction

How to produce, hybridise and use knowledge that supports the diversification of European cropping systems to promote agroecological transitions is a key question that resonates with 'how to' questions on other urgent sustainability transitions. Given that the majority of research funding is spent through projects, projects need to address this 'how to' question. The Multi-Actor Approach, which has been mandatory for certain categories of European research and innovation (R&I) projects since 2014, aims to address this question. However, the approach meets with considerable lock-ins in science, society, and the EC's own funding regulations, which hinder the full potential of research to support the transformation away from unsustainable systems and practices [1].

The Horizon 2020 project DiverIMPACTS has combined substantial investments with innovative context-sensitive project governance in 25 case studies (CSs) to move beyond generic scientific knowledge and produce actionable knowledge, i.e. context-specific knowledge that aims to assist actors in their decision-making to be better positioned to achieve their goals. A range of innovative project management tools, such as a co-innovation workshop series, quarterly reflection meetings, Learning Histories, and a seed money fund were applied to enhance social learning and social capital formation.

Drawing on DiverIMPACTS' experiences and analytical results, this policy brief highlights lessons for scientists and practitioners considering getting involved in actionable-knowledge-oriented R&I projects funded by the EC, and for policy makers involved in designing the calls for projects with a Multi-Actor Approach or for the recent Agro-ecology Living Lab and Research Infrastructures Research and Innovation initiative. All need to rethink their perspectives and practices to enhance the efficacy of joint production of actionable knowledge.

Context-sensitive governance in DiverIMPACTS

Actionable knowledge was facilitated through specific governance structures at the project level and across innovation case studies, referred to as Co-innovation [2] (Figure 1).

At the project level:

- The workpackages (WPs) were arranged in a matrix structure to enable context-specific knowledge building among the analysis-oriented research WPs and the 25 Case Studies (CSs) in which actors worked on locally relevant crop diversification. Generic scientific knowledge was accumulated in a 'toolbox'.
- Project management fostered inclusivity of societal actors and scientists: from the start the CSs' missions and visions were considered as important as those of the scientists. This provided a unique – as well as diverse – project setting to enable CS creativity in a scientific context.
- Frequent interactions between CSs and WPs and among CSs were brokered to promote social learning, empower CS actors, and build social capital – understanding by scientists and CS practitioners of each other's offers and needs, and the trust [3] to act jointly.
- Over 20 webinars were held to make scientific insights accessible across CSs and to demonstrate to the researchers the contexts the CSs operated in, including their tensions and lock-ins.
- A 'seed money fund' was created for each CS to support out-of-the-box ideas emerging during the innovation activities, conditional on the CS actors' support in-cash and in-kind, e.g., CS-CS visits, food jams, regional foresight ateliers, and renting specialized equipment.

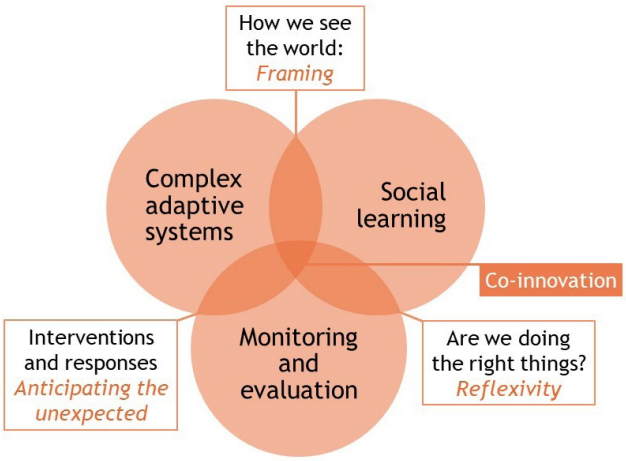

Figure 1: Co-innovation approach to project governance and management in WP2.

At the level of the innovation Case Studies:

- Each CS was led by a CS leader driving the CS dynamics, supported by a CS process monitor to enhance reflection on the local transformation dynamics. Groups of 5 CSs were connected in clusters, facilitated by a Cluster Leader.
- During the first 18 months of the project, three rounds of Co-innovation Workshops were held at 15 CS sites, to create a community of practice and build social capital for the new way of working.
- Reflection and action plan building by the CS teams in the Co-innovation Workshops were followed up with quarterly meetings between each CS team and its Cluster Leader based on short progress reports to maintain connections to the project at large and enable connections among CSs and with WPs.
- Progress on the action plans of each Case Study was measured by CS-specific quantitative performance indicators, and qualitative process indicators through Annual Biographies and Learning Histories (Figure 2).
- A specific task was dedicated to the intensive support of three CSs based on the RIO (Reflexive Interactive Design) methodology, as 'an experiment within an experiment'.

Action and reflection

- Iterative cycles of action and reflection were fostered at the CS level (quarterly reports, annual biographies, and learning histories), and at the level of the project as a whole (during annual meetings and through a final learning history). This enabled both learning for action and scientific analysis.

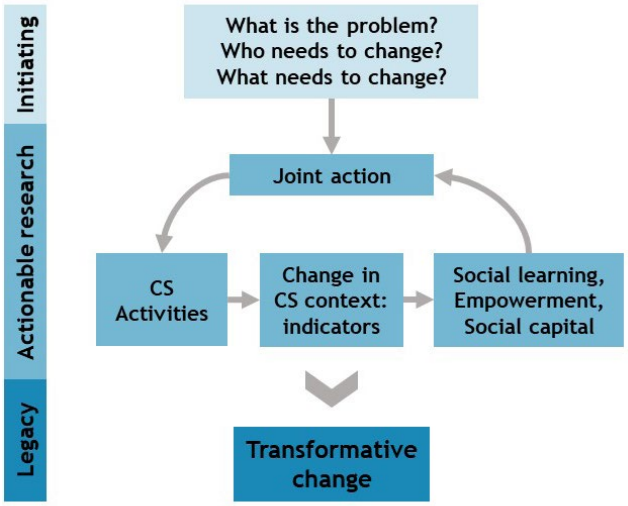

Figure 2. CSs' evolution towards transformative change supported by alternating between Reflection and Action.

Insights: producing actionable knowledge iwn research-and-innovation projects

Differences among the innovation Case Studies provided opportunities for mutual learning, and showed the usefulness of the adaptive and context-sensitive approach to project governance and management, as well as the need to learn more about how to get better.

Diversity of contexts and activities

- Despite the common co-innovation approach, the way in which actionable knowledge was crafted differed greatly among the Case Studies, reflecting differences in the type of crop diversification (rotation, inter- and multiple cropping), age (emergent to well-established networks), the focus (production, value chain, regional food system), lock-ins [4], and experience with innovation both at individual and institutional levels. This diversity is pervasive in innovation, and project governance needs to be responsive.
- CSs often started with network and action plan development and knowledge generation, but fanned out into 11 types of innovation activities, such as partnership building and advocacy and lobbying (Figure 3).

Diversity of assessment methods

- Quantitative performance indicators were beneficial to CSs that required knowledge development at the field and farm scale, and in one case, regional scale. For CSs concentrating on network or value chain building and on-farm or between-farm organizational arrangements, existing indicator frameworks were not appropriate. Some CSs developed an alternative scientific framework to measure quality of life variables.
- Describing the evolution of significant events and their effects in Learning Histories was considered useful by nearly all CSs, especially when they received feedback from cross-case comparisons.

Diversity in linkages between WPs and CSs

- Despite matchmaking throughout the project, not all CSs found salient scientific support from the work being done in the WPs, and vice versa.
- Some CSs fit well the scientific goals of WPs and became involved in multiple scientific studies.
- To support local innovation, research needs to adopt design-oriented approaches. While these could still support classical analysis-oriented approaches, actionable knowledge and generic knowledge constitute different outputs and joint production requires more resources than classical analysis-oriented research.

Diversity in CS activity levels and results

- Changes in personnel and institutional commitments were risks to CS activity levels. The DiverIMPACTS community of practice largely overcame personnel changes; institutional changes were more difficult to address.
- Deploying projects as a means to help solve persistent, systemic problems is threatened by 'projectivation' where projects are seen as a means to primarily sustain the cash flow of organizations. This affects the individuals' scope for responding to emergent needs due to the transaction costs involved.
- Some CSs found out during the project that actors were not motivated to engage with their proposals, and struggled to re-adjust their missions, something that in many projects is considered a failure rather than progressing insight.

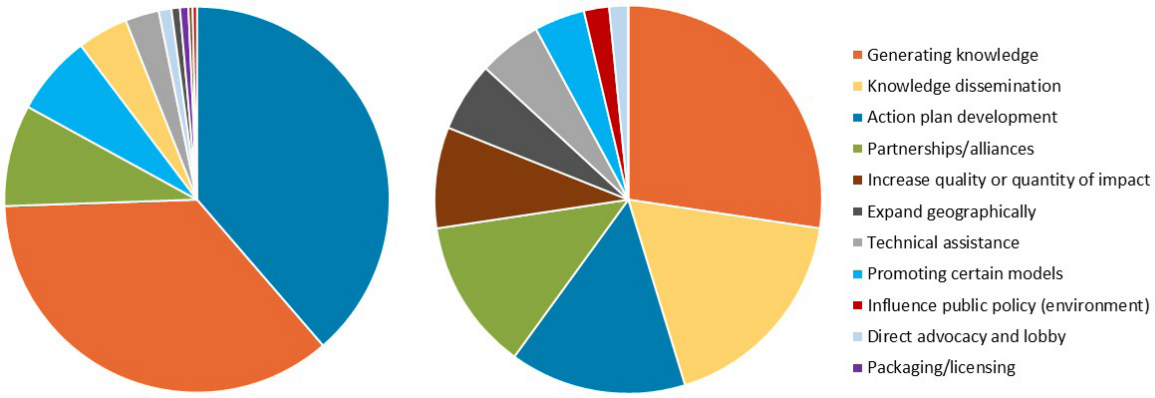

Figure 3. Types of activities developed by the Case Studies during the first half (left) and the second half (right) of the project to support actionable knowledge development. The attention for action planning and knowledge generation early on evolved into a diversity of activity types during the second half of the project.

- Satisfaction with CS progress varied among teams. High satisfaction was mostly associated with CSs that had started (well) before the project. This calls for sustained support of CSs beyond the lifetime of projects.

Efficacy of project governance instruments (Figure 4)

- Practitioners felt welcome and empowered by the research project's approaches and management.
- Mechanisms to forge connections among scientists and practitioners were greatly appreciated. Their efficacy requires further learning.
- Producing actionable knowledge takes more time and funding than traditional research methods. The 5-year duration of DiverIMPACTS was appropriate for adjusting to the new way of working; continued organizational learning is needed to fully realise the potential of research to support transformation.
- There was little learning on production of actionable knowledge across the projects in the same crop diversification cluster due to difference in emphasis on and elaboration of multi-actor approaches.

Fostering change through research and innovation projects requires changes in researchers, practitioners, and research policy design

Conclusions

Projects constitute a valuable but underexploited means of producing actionable knowledge by connecting research and innovation through multi-actor approaches. A key missing element is the attention before and during project execution to shaping empowerment, social learning and social capital development through context-sensitive project governance.

The design-oriented approach in DiverIMPACTS implemented these governance structures to produce actionable knowledge between innovation Case Studies on crop diversification and research-oriented Work Packages.

To be effective, innovation-oriented research projects should be enabled to

- build meaningful alliances between scientific and practitioner knowledge before the start of a project or during an initial phase (e.g. the first year of the 5-year DiverIMPACTS project);
- build process monitoring frameworks for social learning, in addition to sustainability indicators;
- adapt the consortium when the project and institutional goals no longer align;
- have more flexibility in responding to emerging developments that are characteristic of innovation.

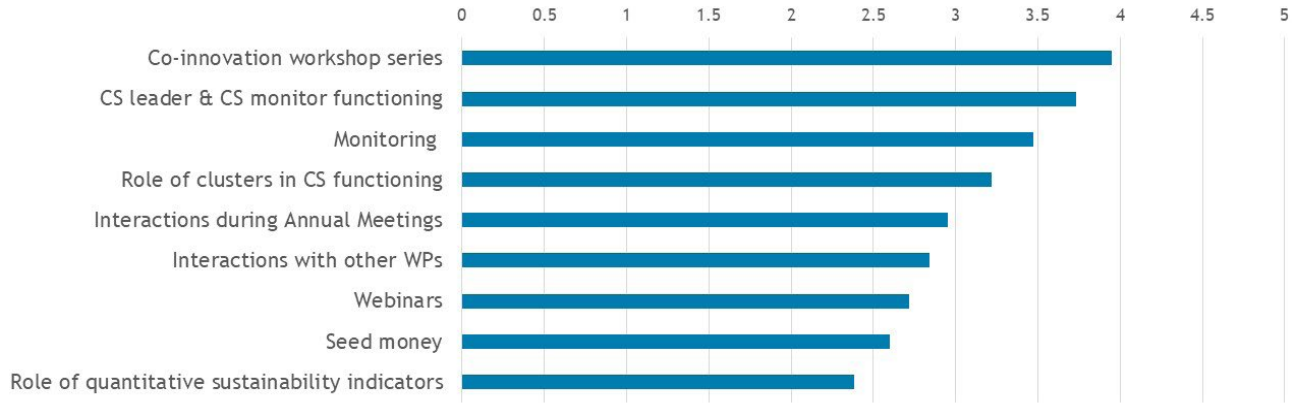

Figure 4. Assessment by the CSs of the usefulness of the various co-innovation components deployed in DiverIMPACTS (scored out of 5).

Recommendations to promote the production of actionable knowledge

The production of actionable knowledge can be promoted through changes to proposal development and project governance. These changes can be facilitated through an adapted research policy design to create impact.

	Recommended changes to proposal development and project governance	Recommended changes to research policy design to facilitate these changes (at EC and national levels)
1	After a proposal passes a first round of evaluation, require consortia to elaborate productive partnerships in detail for the full proposal.	Provide EC funding and/or national funding for activities to elaborate partnerships, such as scoping missions or consortium building workshops.
2	Evaluate research for innovation projects not only on scientific potential, but also on appropriate governance for innovation.	Select proposal reviewers based on their complex adaptive systems expertise in addition to their disciplinary expertise: from disciplinary reviewers to transdisciplinary reviewers.
3	In addition to EC project reviews for accountability, include EC project reviews for learning.	Implement a knowledge broker at the EC level to stimulate learning among projects with actionable knowledge production objectives.
4	Give project managers more flexibility to respond to emerging developments, allowing new tasks to be implemented according to actors' needs and corresponding budget allocation.	Allocate a percentage of a project's budget to activities that cannot be foreseen during project development, but that can be expected to contribute to innovation (i.e. 'seed money'). Allow partners who no longer align with the project's direction to leave the project at specific moments.
5	Maintain resources created by projects (methods, tools, databases) over time so they are easily available in future projects.	Put in place networking infrastructure supported by the EC, so new projects can take advantage of and contribute to the knowledge base, thus speeding up impact.

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Authors: Walter A.H. Rossing (WUR), Luca Colombo (FIRAB), Barbara Koole (UvA), Antoine Messéan (INRAE).

Reviewers: Hauke Ahnemann (LWK), Lenn Gorissen and Mirjam Schoonhoven-Speijer (WUR), Michelle Hallemans (Bioforum), Laura Kemper (FiBL), Loïc Viguier (INRAE)

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