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Les Laboratoires vivants comme approche pour renforcer les systèmes de connaissances et d'innovation agricoles (SCIA)

Living Labs als Ansatz zur Stärkung der Wissens- und Innovationssysteme in der Landwirtschaft

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Climate and ecosystem changes, economic and policy imperatives, food system pressures, and multiple societal expectations are driving sustainability imperatives and transitions in agriculture. Responding to these complex challenges requires action including changes in roles and behaviours of many different actors such as farmers, input suppliers, technology developers, researchers, agricultural advisors, policymakers, citizens and consumers. Policymakers involved in agriculture and rural development at European, national and regional levels are working to develop stronger Agricultural Knowledge and Innovation Systems (AKIS) to optimally support the transition process. However, a key problem facing policymakers and practitioners is determining effective and efficient approaches to enable and stimulate innovation in these complex, multi-stakeholder settings. One approach currently receiving much policy attention and investment in the EU is 'Living Labs' which are characterised as open innovation processes bringing together public and private users and stakeholders to co-create, validate and test new services, business ideas, markets and technologies in 'real-life' contexts. Encompassing a wide variety of multi-actor constellations, the experiences of convening a Living Lab have been documented (Hossain *et al.*, 2019; Leminen *et al.*, 2012; McPhee *et al.*, 2021), and methodological guidance provided (Cremers, 2015; ENoLL, 2020). Less attention has been given to the analysis, monitoring and evaluation of Living Labs and to determining their effectiveness and value for policy in different contexts. Understanding the conditions in which Living Labs can support AKIS development is still limited. This article aims to provide an empirical answer to the questions of how and when AKIS policy can benefit from and contribute to Living Labs as an effective approach for facilitating transitions to sustainable agriculture.

Learning from AgriLink Living Labs

The AgriLink Living Labs operated between 2018 and 2021 in Italy, Latvia, Netherlands/Belgium, Norway, Romania and Spain. In each Living Lab, advisors, researchers and farmers worked together to develop improved innovation support services and explore new advisory roles and practices to support sustainable agriculture. These Living Labs used the five characteristics identified by the European Network on Living Labs as a starting point: real life setting; co-creation; end user involvement; multi tool and multi stakeholder participation; and the

Table 1: Overview of the six Living Labs in AgriLink

Location	Topic	Objective
Italy	Local food production on common land	Rebuilding a local food community and developing a local value chain
Latvia	Processing and marketing of horticultural products	Improving farmers' access to suitable information and advice
Netherlands / Belgium	Sustainable soil management in maize cultivation	Strengthening farmers' awareness of environmental impact and supporting farm decision-making
Norway	Crop rotation on farm and between farms	Developing innovation support services and tools to facilitate crop rotation
Romania	Professionalisation of food producers' cooperative	Providing fiscal information to small farmers in a complex informational landscape
Spain	Integrated pest management	Improving an early warning system by engaging farmers' cooperatives

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application of principles of 'design thinking' (Buchanan, 1992), 'systems thinking' (Checkland *et al*., 1990) and 'reflexive monitoring' (Ison and Blackmore, 2014). The Living Labs have common elements but vary in context, focus and composition. Table 1 provides an overview of the topic and the objective of each Living Lab.

> "Der Living-Lab-Ansatz ist wichtig und wertvoll für die Stärkung des AKIS und die Unterstützung von Innovationen, die für eine nachhaltige Landwirtschaft erforderlich sind."

Each Living Lab had two additional elements: a facilitator focusing on the *progress* of the process and a monitor focusing on the *quality* of, and reflection on, the process. In practice the two roles worked flexibly; monitors and facilitators could exchange tasks. The reflexive monitoring and evaluation approach used criteria developed in soft systems thinking (Checkland *et al*., 1990): focusing on the efficacy, efficiency and effectiveness of the Living Lab. The robust methodological framework and transparent monitoring and evaluation procedures provided rich insights. Documented discussion with the facilitators and monitors of the six Living Labs also allowed for joint learning between the labs to better understand the conditions in which Living Labs can effectively support the development of a strong AKIS and new roles for advisory providers. The experiences in the Living Labs were enriched by an E-workshop in 2021 to discuss the value of Living Labs for policy and *vice versa* with practitioners and policymakers.

Implications for policy and practice

Our findings have two main implications for policymakers. First, the results provide insights into the potential contribution of Living Labs to the realisation of AKIS policy objectives. Second, the results shed light on the specific conditions required for Living Labs. Both implications contribute to a more precise application of the Living Lab approach for attaining policy objectives and indicate how policymakers can contribute to creating favourable conditions for the optimal functioning of Living Labs.

1. Potential contribution of Living Labs to AKIS policy. Living Labs can contribute to AKIS policy in three ways; through the products and outcomes the actors co-create, through the dynamics and new relationships that emerge, and finally the learning in Living Labs can provide insights and lessons about the state of the AKIS.

Products and outcomes.

In complex sustainability challenges, the AgriLink Living Labs have shown to be suitable settings for developing tailor-made innovation support services that fill voids in the existing AKIS. For example, the Norwegian Living Lab developed a roadmap for facilitating crop rotations between farms. In Latvia a knowledge platform was developed together with horticultural producers. In Spain participants contributed to improving early warning systems for Integrated Pest Management which was better suited to the needs and practices of the farmers. In Italy, advisors together with community leaders and members co-created an advisory tool to support the community to develop the value chain for organic wheat produced on common lands. In Romania, knowledge about fiscal management was made available for a farmer's cooperative that specifically addressed the fiscal and financial information needs of small producers. In The Netherlands/Belgium two advisory tools were developed to be used by farmers and advisors together. One tool raised awareness of the environmental impacts of their own farming practices and the other supported decision making in catch crop cultivation. In their different ways, each Living Lab directly contributed to innovations within the AKIS for sustainable agriculture. Since farmers, researchers and advisors co-created the advisory tools themselves, it is expected they continue to use them and thus strengthen the AKIS. The Living Labs process is further embedded in the AKIS, as illustrated below.

Dynamics and new relationships.

Another key contribution of AgriLink Living Labs to the development of the AKIS stems from new collaborative practices. For each sustainability challenge the most relevant farmers,

Living Lab event in Romania, where the members of a farmers' cooperative discuss fiscal and financial information needs with fiscal advisors

advisors, researchers, public sector and other actors were identified in a stakeholder analysis and invited by the Living Lab facilitators to collaborate as equal partners in a specific sustainability challenge. Although some actors were already known to each other, the safe setting created in the Living Lab helped forge new relationships and fostered mutual appreciation leading to new insights and richer knowledge exchange. In Romania, the Living Lab was the first time that small producers were enabled to access peer-to-peer advisory services. The created knowledge tools regarding financial matters and marketing supported the farmers in keeping up with the increased administrative burdens, ongoing changes in financial legislation, and developing entrepreneurial skills, thus improving connection to markets. In Spain, the relationships between the cooperatives and advisors improved substantially. They collaborated as 'sparring' partners, resulting in a better designed, functioning and more widely used pest management warning system. The role of advisors was broadened from only providing information to creating spaces for learning and transformation.

Insights and lessons.

Collaborating in development of an innovation support service enables stakeholders to understand their own and others' knowledge needs and information gaps. For example, in the Latvian Living Lab advisors and educators became acutely aware of current gaps in knowledge and advice provision with regard to horticultural production and marketing. In The Netherlands, stakeholders appeared to share an interest in developing a decision support tool for catch crops in maize, but during the Living Lab it became clear that collaboration is not always logical in a privatised advisory system with competing advisors predominantly concerned with providing exclusive services to their own clients. Such insights can enrich the understanding of the AKIS and inspire measures to strengthen the AKIS to better support sustainability transitions.

> « L'approche faisant appel aux Laboratoires vivants est pertinente et valable pour renforcer le SCIA et soutenir l'innovation nécessaire à une agriculture durable. »

2. The conditions for successful Living Labs and the role of policy. Analysis of the experiences and lessons learned in the AgriLink Living Labs identified four conditions that are pivotal in developing a successful functioning Living Lab. These conditions have implications for policy, they can be used to improve the contribution of Living Labs to policy objectives and can inspire policy to stimulate the creation of optimal conditions for Living Labs.

Condition 1. Complexity of the challenge.

Living Labs require significant resources and a nascent group of dedicated actors, so are best used for complex challenges which require the interaction and knowledge of multiple actors to address a given policy objective. There are three distinct but interconnected aspects to consider when assessing the complexity. The first aspect is the level of agreement between the actors involved about the direction of development. For example, in the Dutch Living Lab the challenge was complex because some stakeholders thought maize production could continue unchanged, while others saw a necessity to develop new practices. In response the actors in the Living Lab developed a practical procedure for water sampling at farm level, as an advisory

Field visit in the Spanish Living Lab in Navarra, where farmers discuss their experiences with the early warning system for integrated pest management.

Reflection session between different Living Labs, where facilitators and monitors explore and discuss the conditions that influence the functioning of their Living Lab.

tool to create awareness of a farmer's own influence on water quality. Second, complexity stems from differences in ideas about viable solutions or the criteria to assess the solutions. Third, complexity can also originate from a gap or friction between the challenge in the Lab and the private interest of the end users, as already noted in the example of the Norwegian Living Lab. These are more complex challenges than solving an individual farmer's technical problem.

The challenge at hand should be complex enough to justify the investment in a Living Lab, but harmonious enough to allow some common ground to be identified and enable co-creation. Where stakeholders already agree on both the need for change and the possible solutions, a 'lighter' process of stakeholder involvement, such as consultation, may be more appropriate. For example, the Latvian challenge to improve farmers' access to marketing information could have been served through prototyping an information tool with a test panel; while in the Dutch Living Lab the objective of sustainable maize cultivation was not directly aligned with the primary interests of the farmers involved. In the Dutch case, after a fragile start the Living Lab facilitator guided the identification of a public–private win–win situation in developing a tool to support the farmers to improve their catch crop cultivation. Policymakers can use the complexity condition either to assess whether for a specific sustainability challenge it is a good idea to invest in a Living Lab or to identify situations where they judge that a Living Lab can be a valuable approach to adopt.

Condition 2. Enabling setting.

As Living Labs are not necessarily a physical place, the *enabling setting* refers to a combination of context, institutional support and latitude for experimentation and commitment to co-creation. Establishing a Living Lab to develop an innovation support service should only be done when the cost of failure is acceptable, when there is room for unanticipated outputs arising from the co-creation process, and when stakeholders or partner projects are willing and able to provide the necessary commitment. If these conditions are not met or are largely absent, time and effort is needed to create more supportive circumstances, or there should be serious questions asked about whether to start a Living Lab at all. Policymakers can play a crucial role in creating a more enabling setting by ensuring inclusiveness, creating spaces for dialogue, and securing funding or creating funding procedures which do not require predetermination of all outputs in detail. Further, it helps if policymakers coordinate action and agree on clear long-term policy directions to reach societal objectives. If not already in place a Living Lab can provide a space for the dialogue between policymakers and other involved actors about the policy direction, and to coordinate action. In AgriLink the Spanish publicly funded advisory organisation in Navarra provided an enabling setting for the Living Lab and facilitated the adoption of the lessons learned in the AKIS. By working closely with Living Labs, policymakers can take an enabling role in adapting regulations, creating instruments, or support capacity building and training that will help scale-up and deploy the innovations that have been developed in the Living Labs.

Field visit in the Dutch/Belgian Living Lab, where farmers compare the performance of different systems for maize cultivation.

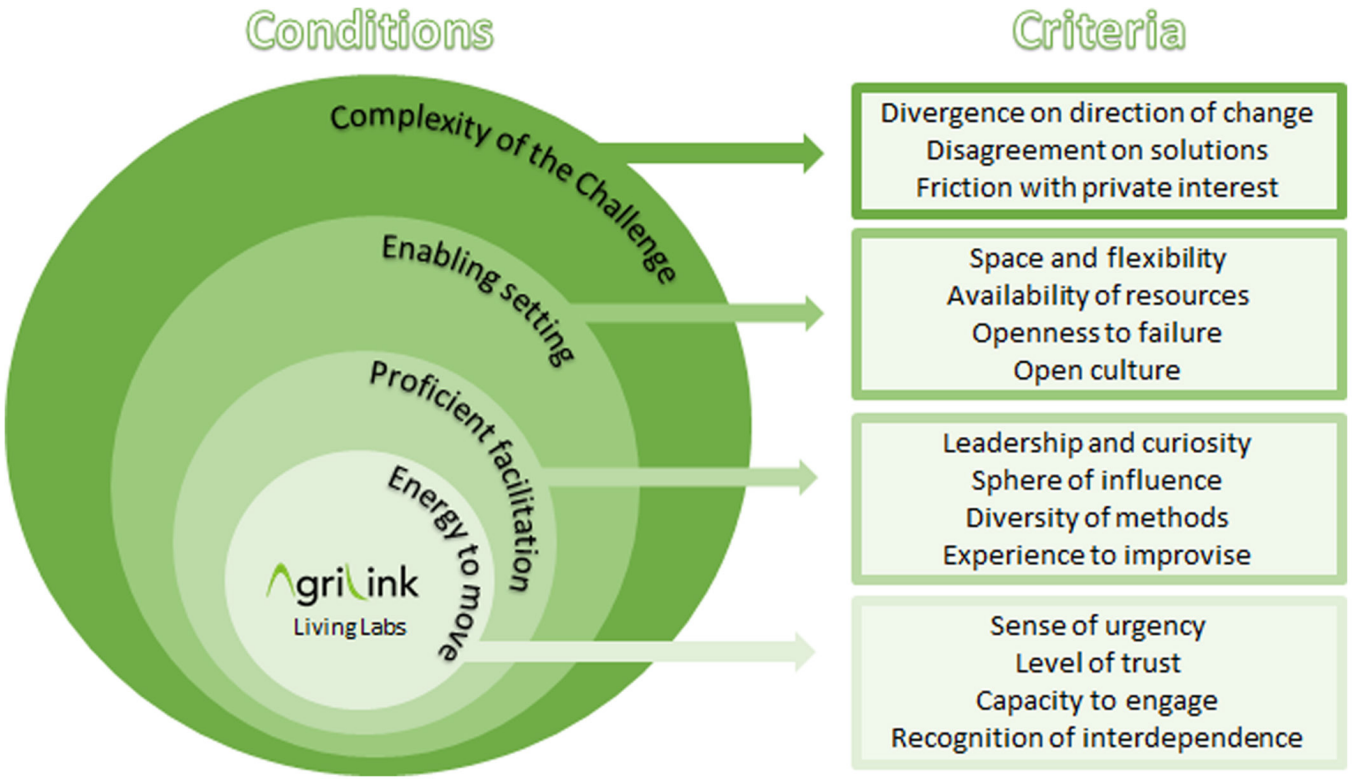
Condition 3. Proficiency of facilitation. Living Labs require facilitation and this role is crucial for the effective functioning of the Living Lab. The facilitator needs to be familiar with the real life setting where the Living Lab is positioned and be accepted and mandated by the participants. Ideally, facilitators will have a sound methodological preparation and knowledge of relevant facilitation tools and willingness to adapt as the Living Lab develops. This allows the facilitator to provide a balance of leadership and guidance and at the same time be open to unexpected opportunities for learning and innovation. The experiences in AgriLink show that if initial interest and capacity are present, many of these 'soft skills' and the methodological experience can be developed 'on the job' with dedicated training and support. Policymakers can contribute to the proficiency of facilitation by supporting the development of training, including creating spaces for exchange and peer-to-peer mentoring on facilitation skills (some guidance on this is provided in the AgriLink online course referenced in Further Reading).

Condition 4. Energy to move. The ability of the Living Lab to operate effectively is directly related to its composition and culture. Multi-stakeholder processes such as Living Labs are intensive and require significant dedication from all participants involved. Without sufficient energy and momentum, the Living Lab will stall, lose speed, or not start at all. The energy to move condition is expressed in the capacity and willingness of stakeholders to engage. Collaboration in a Living lab requires stakeholders to feel a sense of urgency and to recognise their interdependencies, acknowledging that different types of knowledge and action are required to move forward. A crucial aspect influencing the *energy to move* is the level of trust between the participants and the facilitator. In Romania the level of trust in the Living Lab was initially low because farmers were not expecting to be taken seriously. When the facilitators really listened and adapted the focus of the Living Lab to better match the farmers' needs, the gradual process of trust building could start and good results eventually followed. In some situations, direct involvement of policymakers in Living Labs can contribute to *energy to move* by increasing the profile and importance of the Living lab process. However, identifying the appropriate mode of involvement is a delicate process as other participants may not feel safe or confident to speak up when 'significant' policymakers are present. For the most part, a key contribution of policy actors is indirect through targeted policy design, regulations, subsidies and funding for innovative processes, thereby signalling a sense of urgency to create more sustainable agriculture.

> "The Living Lab approach has relevance and value for strengthening the AKIS and supporting innovation needed for sustainable agriculture."

Figure 1 provides an overview of the four conditions for a Living Lab and the corresponding criteria. It illustrates how each of the four conditions operates at a different level.

Figure 1: The four conditions for a Living Lab with corresponding assessment criteria



Messages for policymakers

The AgriLink Living Lab approach has relevance and value to strengthen AKIS through offering critical reflection and learning about how to support innovation for sustainable agriculture in specific practical situations. The strength of the Living Lab approach arises from combining stakeholder participation and end-user involvement with a high degree of exploration and flexibility. Living Labs can be a suitable setting for co-creating tailor-made innovation support services that fill gaps in the AKIS with respect to complex sustainability challenges. The democratic element in this method is significant, as the various interests, perspectives and types of knowledge can be involved as part of the co-creating process towards improving sustainability. Furthermore, strengthening collaboration in the Living Lab recognises the changing roles of farmers and advisors as equal colleagues in addressing sustainability challenges. Finally, the process of collaboratively developing an innovation support service provides valuable new insights into what different stakeholders do and do not know and the dynamics and relationships in which agriculture takes shape. With new relations, increasing trust, the combination of explicit, implicit and tacit knowledge and new emergent understanding, Living Labs can be a vehicle for the contextualisation, democratisation and strengthening of the AKIS.

Policymakers and public actors have key roles in the realisation of the potential of Living Labs in sustainable agriculture. Policymakers can provide leadership by recognising the need for, and investing in, co-design approaches which enable stakeholders and actors to collaborate and develop new attitudes, new behaviours and new responses for more sustainable agricultural practices. However, Living Labs are not panaceas for all situations. By understanding the conditions in which Living Labs are most beneficial and legitimised, policymakers and practitioners can learn together to be more precise and effective in applying Living Labs to specific policy objectives and sustainability challenges. Turning the conditions into pre-assessment criteria can help to decide whether a Living Lab is a suitable approach in specific contexts and can improve the quality of the design and implementation of the Living Labs, thus enhancing their contribution to policy objectives. Policymakers also can provide seed money, flexible project programming and long-term commitment. They can support capacity building for the facilitation of Living Labs in the AKIS; and importantly can become involved in joint learning in the Living Lab process themselves. Policymakers can also contribute to the development, networking and scaling-up involved in the Living Labs approach to allow cross-Living Lab insights and learning. If designed and deployed appropriately in accordance with AgriLink findings, Living Labs offer policymakers a valuable approach to improving AKIS to address the complexities of policy and practice associated with transitioning to more sustainable agriculture.

Further Reading

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Summary

Living Labs as an Approach to Strengthen Agricultural Knowledge and Innovation Systems

Climate and ecosystem changes, economic and policy imperatives, food system pressures, and multiple societal expectations pose complex challenges for sustainable farming. A key problem is determining an effective and efficient approach to enable innovation in complex, multi-stakeholder settings. One approach currently receiving much policy attention and investment in the EU is 'Living Labs' which bring together public and private stakeholders to co-create, validate, and test new services, business ideas, markets and technologies. However, the analysis, monitoring and evaluation of Living Labs and their effectiveness and policy value in different contexts is limited. The *AgriLink* Living Labs were undertaken between 2018 and 2021 in Italy, Latvia, The Netherlands, Norway, Romania and Spain to co-create innovation support for improving agricultural sustainability. Our evaluation suggests that four inter-related critical conditions are needed for the success of Living Labs. These relate to the *complexity of the challenge*, the *enabling environment*, the *proficient facilitation* and the *energy to move*. These conditions influence the functioning of the Living Lab and we discuss the implications for policymakers and practitioners for the deployment of Living Labs in agricultural settings.

Les Laboratoires vivants comme approche pour renforcer les systèmes de connaissances et d'innovation agricoles (SCIA)

Les changements climatiques et écosystémiques, les impératifs économiques et d'action publique, les pressions sur le système alimentaire et les multiples attentes sociétales posent des défis complexes pour une agriculture durable. Un problème clé consiste à déterminer une approche efficace et efficiente pour permettre l'innovation dans des contextes complexes et multipartites. Une approche qui reçoit actuellement beaucoup d'attention de la part des pouvoirs publics et d'investissements dans l'Union européenne est celle des 'Laboratoires vivants' qui rassemblent des acteurs publics et privés pour co-créer, valider et tester de nouveaux services, idées commerciales, marchés et technologies. Cependant, il existe peu d'analyses, de suivi et d'évaluation des Laboratoires vivants ainsi que de leur efficacité et leur valeur en matière de politique dans différents contextes. Les laboratoires vivants AgriLink ont débuté entre 2018 et 2021 en Italie, en Lettonie, aux Pays-Bas, en Norvège, en Roumanie et en Espagne afin de co-créer un soutien à l'innovation pour améliorer la durabilité de l'agriculture. Notre évaluation suggère que quatre conditions critiques interdépendantes sont nécessaires au succès des Laboratoires vivants. Celles-ci sont liées à la complexité du défi, aux conditions propices de l'environnement institutionnel, à la présence d'une facilitation compétente et à l'énergie pour le changement. Ces conditions influencent le fonctionnement du Laboratoire vivant et nous discutons des implications pour les décideurs des politiques et les praticiens du déploiement des Laboratoires vivants en milieu agricole.

Living Labs als Ansatz zur Stärkung der Wissens- und Innovationssysteme in der Landwirtschaft

Klima- und Ökosystemveränderungen, wirtschaftliche und politische Zwänge, Druck auf das Ernährungssystem und vielfältige gesellschaftliche Erwartungen stellen komplexe Herausforderungen für eine nachhaltige Landwirtschaft dar. Ein zentrales Problem besteht darin, einen effektiven und effizienten Ansatz zu finden, der Innovationen in einem komplexen Umfeld mit vielen Interessengruppen ermöglicht. Ein Ansatz, der derzeit in der EU viel politische Aufmerksamkeit und Investitionen erhält, sind die 'Living Labs'. Diese bringen öffentliche und private Akteure zusammen, um gemeinsam neue Dienstleistungen, Geschäftsideen, Märkte und Technologien zu entwickeln, zu validieren und zu testen. Die Analyse, Überwachung und Bewertung von Living Labs und ihrer Wirksamkeit und ihres politischen Nutzens in verschiedenen Kontexten ist jedoch begrenzt. Die *AgriLink* Living Labs wurden zwischen 2018 und 2021 in Italien, Lettland, den Niederlanden, Norwegen, Rumänien und Spanien durchgeführt, um gemeinsam Innovationsförderung zu entwickeln, die der Verbesserung der landwirtschaftlichen Nachhaltigkeit dient. Unsere Bewertung legt nahe, dass für den Erfolg der Living Labs vier miteinander verbundene kritische Bedingungen erforderlich sind. Diese beziehen sich auf die *Komplexität der Herausforderung*, das *fördernde Umfeld*, die *kompetente Durchführung* und die *Energie, etwas zu bewegen*. Diese Bedingungen beeinflussen das Funktionieren des Living Labs. Wir diskutieren die Folgen für Personen mit politischer Entscheidungsbefugnis und solchen aus der Praxis für den Einsatz von Living Labs in der Landwirtschaft.

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