



The Living Lab Approach to Agricultural Innovation

Chris McPhee

Innovation Management Specialist

Living Labs Division, Agriculture and Agri-Food Canada

2026



Agriculture and
Agri-Food Canada

Agriculture et
Agroalimentaire Canada

Canada



The Living Lab Approach to Agricultural Innovation

© His Majesty the King in Right of Canada as represented by the Minister of Agriculture and Agri-Food, 2026.

English version available at www.publications.gc.ca

AAFC no. 13359E

ISBN 978-0-660-99592-2

Catalogue no. A59-133/2026E-PDF

Paru également en français sous le titre

Innovation agricole selon l'approche des laboratoires vivants



To cite this booklet: McPhee, C. (2026). *The Living Lab Approach to Agricultural Innovation*. Agriculture and Agri-Food Canada. Ottawa, Canada.

Version: April 2026

Photo credit (title page): LL–Regenerative Alberta



Who Is This Booklet For?

This booklet was written as a general introduction to the living lab approach to innovation in agriculture, including its key processes and how they can be put into action. It draws on the author's knowledge gained from more than 15 years working in the living labs domain but focuses on bringing together guidance, presentation material, and advice he provided to participants working within Agriculture and Agri-Food Canada's Living Laboratories Initiative and Agricultural Climate Solutions – Living Labs programs from 2019 to 2026.

The booklet is designed for readers who play a central role in running a living lab, who need to explain the approach to others, or who simply want to know more about the approach. The context is an agroecosystem living lab, where the solutions are developed to solve agri-environmental challenges, but the booklet is still relevant to other types of living labs in agriculture.

About the Author

Chris McPhee is an Innovation Management Specialist whose collaborations and experience with the theory and practice of the living lab approach to innovation go back to 2010, when he decided on living labs as an area of focus for the *Technology Innovation Management Review*, an international journal focusing on emerging topics in innovation from a multidisciplinary perspective, which he launched and served as Editor-in-Chief for 9 years while publishing numerous special issues and nearly 100 articles on living labs. In 2019, he joined Agriculture and Agri-Food Canada's Living Labs Division, where he leads the Innovation & Knowledge Team in support of a nationwide network of living labs in the use of living lab approach through the Agricultural Climate Solutions program and Living Laboratories Initiative. Chris also engages in international collaborations with partners as co-lead of the Special Interest Group on Living Labs for the International Society for Professional Innovation Management (ISPIM), Theme Lead for Agriculture and Rural Living Labs within the European Network of Living Labs (ENoLL) Research Community, and by sitting on several international working groups and scientific committees focused on living labs in agriculture. Earlier in his career, he held various innovation-related roles in the private sector, the public sector, and academia, primarily in the areas of technology innovation, software development, entrepreneurship, agriculture, health, and education in both Canada and Scotland. Chris holds an MSc degree in Technology Innovation Management from Carleton University in Ottawa, Canada, and BScH and MSc degrees in Biology (Plant Ecology) from Queen's University in Kingston, Canada.



Table of Contents

What Is Innovation?	1
Innovation as a Process	2
Innovation as an Outcome.....	3
Increasing the Chances of Successful Innovation	4
What Is a Living Lab?	6
The Three Core Principles of the Living Lab Approach	6
User-Centred Innovation.....	7
Working in Partnership.....	8
Testing in the Real-Life Context of Users	9
The Innovation Cycle.....	11
Co-Develop	11
Test	11
Evaluate	12
The Cycle Repeats.....	12
Co-Development Essentials	14
A Year in the Life of a Living Lab	16
Living Lab Roles	16
What Now? Turning Concepts Into Action	18



What Is Innovation?

Innovation is at the heart of the living lab approach. But what exactly do we mean by “innovation”? Before exploring what a living lab is or how it works, let’s talk about innovation.

To many people, the word “innovation” is used in so many different ways by different people that it is hard to know what it really means. It can be confused with related ideas such as research or adoption, or it can be used so broadly that its meaning becomes unclear.

One reason it’s confusing is that innovation can mean a process or it can mean the outcome of a process. As a process, innovation can be broadly defined as “developing and introducing something new”. As an outcome of that process, an innovation can be defined as “the thing that is new”. For example, a company can engage *in* innovation to create a new or improved product, and this product can itself be considered *an* innovation.



in·no·va·tion /,ˌɪnəˈvɑːʃ(ə)n/

noun

1. Process: developing and introducing something new.
2. Outcome: the thing that is new.



Innovation as a Process

Let's take a closer look at each part of the definition of innovation as a process of “developing and introducing something new”.

Developing and introducing...

The word “developing” can refer to an inventive process or the activities focused on improvements or adjustments needed to put an existing innovation into use. In either case, “introducing” means the innovation actually is put into use. If something is never put into practice, it may be better described as an invention – or even an unsuccessful innovation. In this way, the concept of innovation is linked to its final step: adoption. But the main point is that there will be some degree of development, change, or transformation occurring through the innovation process, which will be supported by relevant research to show that the innovation actually “works”, meaning it is providing the desired effect.



...something...

The innovation process can result in various forms of outcomes, which are themselves called innovations. An innovation can be a product, a technology, a service, a practice, a method, a process, or another type of “something”. Whatever the form of outcome, the innovation process means that “something” is being developed and introduced with the intention of adding value.



...new.

To be considered an innovation, the “something” that is developed and introduced doesn't have to be new to the world. It might be completely new or it might already exist and just be new to a particular context. For example, a technology originally developed in another sector may be adapted to solve a problem in agriculture. Or, a farming practice developed in another part of the country may be customized to solve a similar problem in a different local context.





In Practice: Incremental vs Radical Changes

The degree of change or novelty represented by an innovation may be small, as in the example of an *incremental innovation*, which provides small improvements to an existing solution. Where the innovation is particularly novel, the degree of change may be substantial, perhaps even disrupting the usual way of doing things, in which case the innovation may be considered *radical* or *transformative*.

Innovators and their potential adopters may have different ideas of how new or “innovative” something is based on their experiences and contexts. They may also have different ideas about how *valuable* the innovation is to them, regardless of how new it seems.

Innovation as an Outcome

The outcome of an innovation process is a practical “something”, such as a product, process, or practice that has been developed and introduced to add value. This outcome is what we call *the innovation itself*. It is the tangible result of the work, collaboration, and experimentation that occurred during the innovation process.

Importantly, an innovation is not simply knowledge. While knowledge is essential to the innovation process, and is often generated in a living lab through research and testing by users, it is not the end goal. Knowledge supports innovation, but the innovation outcome must be something that can be applied or adopted in practice.

For example, a research team might study an agricultural management practice and generate valuable knowledge about its performance along several dimensions. That knowledge becomes an innovation only when it leads to a new or improved version of that practice that can be used in the field. Research produces knowledge, and this is incredibly important. But it is the practical outcome of this work that is adopted by farmers, in the form of an innovation.

In reality, the boundary between research and innovation is not always clear. In many cases, especially in applied research, the results can be highly practical, which starts to blur the line between generating knowledge and producing an innovation. However, when the primary goal of an approach is to create practical solutions, it becomes important to emphasize innovation. This focus helps ensure that outcomes are not only insightful, but also usable and readily adoptable. It also encourages a deeper engagement with the needs, constraints, and realities of users – something that research alone may not always prioritize.

This is where the often-overlooked “development” side of research and development (R&D) plays a critical role: it bridges the gap between generating knowledge and developing innovations that are grounded in user needs and ready for real-world application. By focusing on innovation (while supporting it with research), we increase the chances of developing solutions will be meaningful, practical and relevant to potential adopters.



In Practice: The Two Meanings of Innovation

Innovation as a process: Participants in a living lab work together to develop and refine a new cover crop mix suited to local conditions. This process is innovation.

Innovation as an outcome: The final proven mix becomes a practical soil health solution that other farmers can adopt. The new cover crop mix is an innovation.

Increasing the Chances of Successful Innovation

Humans are naturally innovative. Groups of humans are naturally collaborative. Put a group of people together, and innovation is almost inevitable. New solutions will emerge from the conversations, interactions, and work that these people share together. But innovation is also a risky game. Many innovations fail to gain traction because they don't deliver the intended value or don't fit the needs of potential adopters.

So, how can we increase the chances of success? Above all, we can be deliberate about innovation. Instead of just letting it happen naturally and hoping for the best, we can make innovation an explicit and shared objective of the work. We can also put processes in place to manage and support it. Just as importantly, we can create conditions that are conducive to success. For example:

- Involve potential adopters to understand their needs, problems, and perspectives.
- Include researchers to assess whether the innovation is working, to interpret results, and to draw on existing knowledge.
- Invite a diversity of voices and keep an open mind. Good ideas often come from unexpected places.
- Test innovations in real-world settings where they will actually be used, not just in controlled environments.
- Use deliberate actions such as reflection, creative exercises, and focused conversations to unlock new ideas.
- Stay open to unexpected insights and fresh perspectives.
- Embrace failure as part of the process. It can be efficient to fail quickly then learn, adapt, and move forward.
- Iterate. Improve the innovation over time based on learning, research, and feedback.
- Put systems in place to track progress, share results, and prioritize next steps.



These are just some of the ways that we can increase the chances of success when playing the innovation game. What they all have something in common is that they reflect the kinds of conditions that living labs create in order to help foster innovation.

Before we discuss what living labs are and how they work, take a moment to consider the 40 most frequently used words used when defining living labs.¹

You'll notice right away that living labs are all about innovation. But consider the other words, too. What kinds of conditions do they suggest? And how might those conditions increase the chances of successful innovation?



¹ A. Berberi, C. Beaudoin, C. McPhee, J. Guay, K. Bronson & V. M. Nguyen (2023). Enablers, barriers, and future considerations for living lab effectiveness in environmental and agricultural sustainability transitions: a review of studies evaluating living labs, Local Environment. <https://doi.org/10.1080/13549839.2023.2238750>



What Is a Living Lab?

A living lab is an approach to innovation that brings together people and organizations to co-develop solutions that will meet the needs of users. For this reason, an essential and central ingredient in a living lab is users themselves. By focusing on their needs and actively involving them throughout a cycle of innovation and improvement, living labs help refine solutions so that they are more likely to be adopted by other users.

Innovation is always risky, and success is never guaranteed. But a living lab tries to increase the chances of successful innovation by grounding innovation in real-world needs and experiences.

The Three Core Principles of the Living Lab Approach

Across all sectors and contexts, living labs are guided by three core principles:



User-centred innovation

Activities focus on the users' needs and users are involved throughout the development process



Working in partnership

Experts from diverse disciplines and backgrounds work together to address shared challenges



Real-life context

Solutions are tested where they will actually be used



Why Is It Called a “Living Lab”?

Many people are drawn to the name “living lab” because it sounds active and alive. And it is!

The word “living” reflects the dynamic, iterative nature of the innovation activities and the importance of working in real-life settings.

But is it really a “lab”? Not in the traditional sense of a physical “scientific laboratory”, although research obviously plays a big role. Instead, the word “lab” is more informally to describe a collaboration where different people from different backgrounds solve problems together.

User-Centred Innovation

By putting the needs of users at the centre of everything – and involving users throughout the innovation process – the living lab approach ensures that the innovations will meet the needs of users and therefore be more likely to be adopted widely. Users are involved right from the beginning, and they aren’t just there to provide a bit of feedback to a team that will go away and try to come up with solutions for them. Instead, they play an active, central role from start to finish, not as research subjects, but as participants in an innovation process. The living lab doesn’t create solutions *for* users; it creates solutions *with* users.

User-centred innovation does not imply that users are the ones that come up with the ideas or that the activities will be led by users – it just means that the users’ needs are at the centre and users will be involved throughout the innovation process. Anyone in a living lab provide direction or come up with ideas for what innovations could be developed, as long as those solutions will address the users’ needs. So, it’s particularly important to draw on the full diversity of participants in a living lab when being open to ideas. You don’t need to put extra pressure on the users to come up with the ideas. They are part of a team... but a very special part. In contrast, a user-led approach assumes that the users are going take on a bigger role – bigger than maybe they want to take – and that others will follow instead of joining in as equals in a collaboration.



In Practice: User-Centred Innovation

Imagine a farmer joining a living lab because they want to solve problems on their farm. At first, their role seems simple: share the challenges they face. Maybe it's a pest issue, soil health concern, or something that hasn't worked despite trying different approaches. They might not have the solution, or they may be unsure whether past attempts were successful. Sometimes, they join because the living lab is tackling an issue they care about and they want to be part of it.

Their needs, problems, and ideas become the starting point. Other participants – researchers, industry partners, and organizations – listen closely and work together to design solutions worth testing. The farmer stays involved throughout: attending meetings, sharing feedback, and allowing trials on their farm. It's a real commitment, but their perspective shapes every decision. That's what user-centred innovation means: the user's needs are at the heart of the process.

Working in Partnership

Innovation thrives when people with different experience, expertise, or perspectives come together to share their ideas and work together toward a common goal. This sharing requires a willingness for people and organizations to share their ideas and knowledge, which can be difficult if they are used to keeping information to themselves. This is the opposite of working in “silos”.

With user-centred innovation, the users (usually farmers, in the case of agriculture) are represented, but what other partners should be there?

What other perspectives should be represented? The answers will depend on the goals and contexts of the particular living lab, but they generally will fall into the following categories:

1. Industry
2. Government(s)
3. Indigenous communities
4. Academia / Universities
5. Public / Citizens / Society

These broad categories emphasize the diversity of partners you can expect to see in a living lab, and more complex problems may require greater diversity of partners. These categories also emphasize the challenge in bringing together such diverse perspectives. It is common for living labs to have to deal with competing interests, values, and goals, because all of these partners have a keen interest in the desired outcomes of the living lab. This diversity represents a challenge to collaboration, but it can also be a success factor for innovation and other outcomes of the living lab.



In Practice: Working in Partnership

Picture a living lab tackling nutrient runoff. Farmers share their experiences and what they see in their fields, researchers bring scientific insights about soil chemistry and runoff patterns, and industry partners offer technology options or other types of support. Government and local organizations join to align goals and resources. Each partner brings a different perspective, and together they co-develop solutions that none could achieve alone. This diversity can be challenging, but it's also what makes innovation stronger.

Testing in the Real-Life Context of Users

It is quite common to ask users to test innovations. But this usually happens in an artificial setting, where potential users are asked to attend a focus group or try a product under development in an artificial environment. This type of feedback is useful, but limited. Much richer knowledge about how well an innovation will meet the users needs can be gained by having them try it out in the real-life situations where they would actually use it. If it's a municipal bus route app, have travellers try it out on their own phones while taking a real trip. If it's a new item on a fast-food menu, have potential customers try it out in a real store when they are actually hungry. If it's a farming practice, have real farmers try it out on their own farms. There is nothing like the user's real-life context – where the way an innovation works actually rubs up against the reality of its use – to uncover issues or show how it can really fit with the users needs.

In agriculture, understanding the experiences of the farmers (users) testing innovations in their own real-life context of use is essential. But there is another, equally important side to this: the scientific research into the effectiveness of these innovations, which also primarily takes place in the same real-life context. In agriculture, the accompanying experiments provide essential knowledge about how well a farming practice really works, whether from a productivity, economic, or environmental perspective. Scientific testing in the real context and at the real scale of farm production provides key insights and evidence to support the further improvement of the innovations in the living lab.



In Practice: Testing in the Real-Life Context of Users

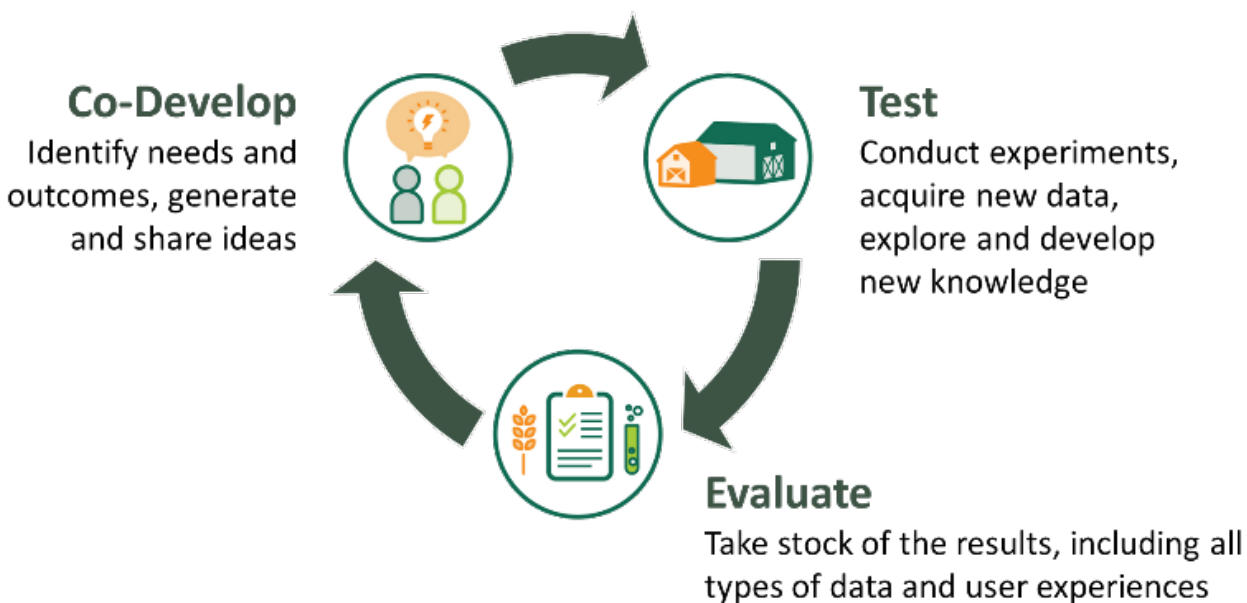
A living lab is exploring a new practice to reduce greenhouse gas emissions by acidifying manure storage. Building on promising results from small-scale studies in controlled research facilities, the living lab aims to find out whether similar results can be achieved at scale and under the real-life conditions of working farms. Crucially, the goal is to turn this concept into a practical, farmer-ready solution. Researchers monitor emissions and potential impacts on manure quality. Farmers weigh in on practical issues such as handling safety and equipment compatibility, and socio-economists provide insights into real-world costs. Testing in real conditions shows what works – and what doesn't – so everyone can collaborate on adjustments before the practice is ready for wider adoption.





The Innovation Cycle

Innovations are improved in a living lab through an ongoing cycle that has three key stages: co-develop, test, and evaluate.



Co-Develop

The co-development stage is essential for innovation. This is when creative minds come together to identify needs and outcomes, generate and share ideas, discuss what to do about them. All available information is considered, and conversations are focused on what new ideas or improvements can be made to the innovation being developed in the living lab.

Note: Because of the critical role that co-development plays in driving innovation processes, “co-development essentials” are covered in greater detail later in this booklet.

Test

In the testing stage, we find out how well the innovations work by having the users try them and running scientific experiments to provide knowledge about their effectiveness and their environmental and socio-economic impact. This stage focuses on collecting various types of data, including scientific data and the experiences of users.

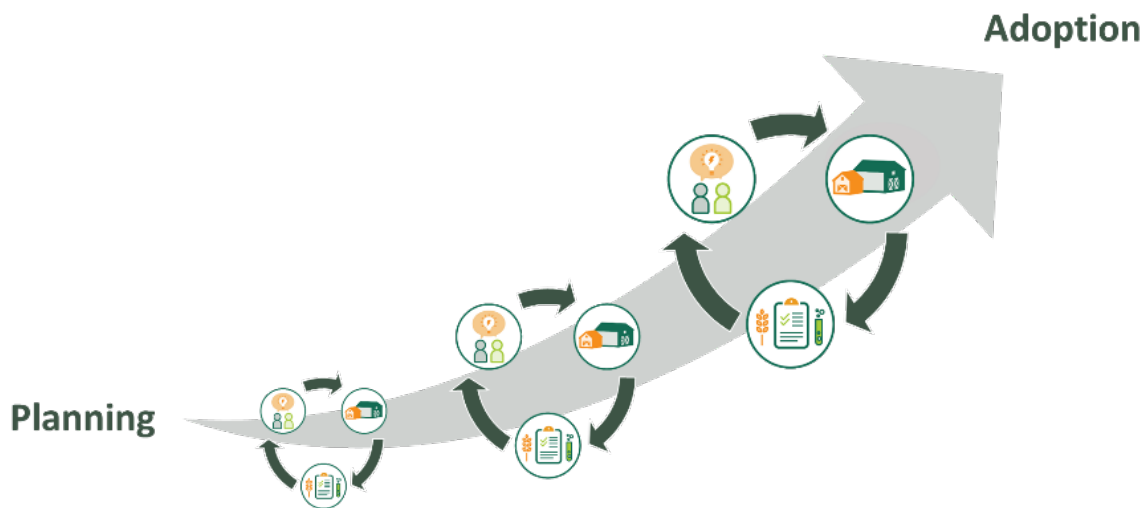


Evaluate

In the evaluate stage, we take stock of the results. The innovations are evaluated in many ways, such as their practical application and effectiveness, based on scientific research, the hands-on experience of farmers, and socio-economic analyses. These evaluations then set the stage for another cycle of co-development, meaning what has been learned will feed into further adjustments the innovations to further improve how they perform and the needs of the users.

The Cycle Repeats

With each cycle of innovation, we learn more about the innovations under development. As the cycle is repeated, the innovations are continually adjusted and improved to address feedback from users, researchers, and other partners. Along the way, we learn more about the innovations and improve their fit to the user's needs. Because the resulting innovations are co-developed with farmers from beginning to end, they are more likely to be adopted by farmers.





In Practice: The Innovation Cycle in Action

A living lab is working on rotational grazing to improve soil health and reduce greenhouse gas emissions.

Co-Development: In winter workshops, participants bring their perspectives and expertise to the table. Farmers share observations about pasture conditions and challenges with moving animals efficiently. Researchers contribute insights from past studies on how adaptive grazing can increase carbon sequestration and reduce emissions from overgrazed areas. Socio-economists help the group think through equipment, labour, and cost trade-offs. Together, they sketch out adaptive grazing plans that can be adjusted as conditions change, rather than following a rigid schedule. This stage is about shaping ideas into practical strategies that everyone agrees to try, building on lessons from previous seasons.

Testing: When spring arrives, farmers implement adaptive grazing plans on their own pastures. During the season, farmers put the adaptive grazing plan into action on their own pastures. They move animals based on forage growth and soil conditions, while researchers track carbon levels, methane emissions, and pasture recovery. Farmers share real-time feedback – what’s easy, what’s hard, and what tools can help. Socio-economists start collecting data on labor hours and costs as they emerge. This isn’t just testing – it’s learning together in real time and adjusting as needed.

Evaluation: After the season, the focus is on making sense of what has been learned. Data and observations from experiments are gathered, analyzed, and synthesized into a usable form so that the living lab can act on the findings. It’s normal that not all scientific analyses will be complete before the co-development session, so participants will try to prepare the best available evidence while acknowledging gaps. Evaluation also goes beyond scientific data – the experiences and insights of producers who tested the practices are equally important and will be considered alongside research findings in the next round of co-development, where participants discuss possible changes to improve the practice for the next season.



Summary: How Does a Living Lab Work?

1. A consortium of partners leads activities to co-develop, test, and evaluate practices.
 2. Farmers are at the centre of activities and involved throughout the project.
 3. The practices are tested on-farm and supported by scientific research and socio-economic analyses.
 4. The innovation cycle drives improvements to encourage adoption.
-

Co-Development Essentials

In a living lab, co-development involves users and partners working together to shape ideas into solutions that are likely to meet the needs of potential adopters (other users). It is a key part of the cycle of innovation in a living lab, which is focused on improvement of the innovations.

Key features of co-development in a living lab:

- **Part of an ongoing innovation cycle:** Co-development is not a one-time event – it's a regular and required part of the iterative innovation process.
- **User-centred, but inclusive:** Although users are central, all participants contribute their knowledge and perspectives.
- **Formal and informal:** Structured and intentional activities or events are organized to focus attention on improving solutions. These formal events complement the equally important informal or unplanned moments of reflection and conversation between participants.
- **Actionable and documented:** Insights must be captured in ways that support decision-making and next steps.
- **Adaptable to local contexts:** The approach can be tailored to fit the realities of different projects or communities.



At Agriculture and Agri-Food Canada, the use of the word “co-develop” has become very general; it has almost become a synonym for “collaboration” or “working together”. But in the context of a living lab, we mean something quite specific with reference to the innovations. The “co-” part refers back to the core principle of working in partnership, and it means that everyone in the living lab contributes, whether they are the user (farmer), a researcher, or any other type of partner. The “development” part refers to the innovations. Innovations are what is being co-developed. Co-development is a team sport, and the goal is to innovate.

Sometimes, people use the word “co-develop” to refer to proposals, research protocols, or plans. This type of collaborative work is valuable, but it’s not the type of co-development that we are focused on when we talk about co-development in a living lab. In a living lab, co-development (more commonly called “co-creation”) refers to the development and improvement of practices and technologies using the living lab approach. In other words, in a living lab, we co-develop *innovations*.

In Practice: The Key Aim of a Co-Development Workshop

The key aim of a co-development workshop is **to generate and share ideas for improvements to the innovations being co-developed**. This aspect is absolutely essential and lies at the heart of the innovation process in the living lab. However, additional activities may need to be part of a co-development workshop to set up these essential conversations, including:

- Sharing project updates
- Networking / building relationships
- Identifying everyone’s needs and desired outcomes
- Sharing research results related to the innovations being co-developed
- Sharing producer experiences with the innovations being co-developed
- Deciding on changes to the innovations being co-developed for testing*
- Planning / logistics for future testing*

*These last two aims can also be achieved through follow-up meetings.

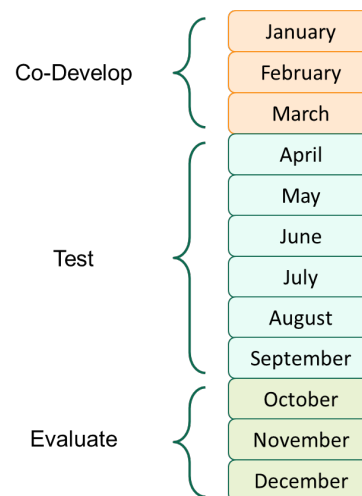


A Year in the Life of a Living Lab

When the innovations in a living lab are focused on farming practices, the innovation cycle naturally follows the cycles of the growing seasons, while taking into account busy periods in the working lives of farmers and scientists. The exact schedule of activities will vary based on geography, farming systems, and other factors but, generally speaking, practices will be tested on the farm during the growing season, with as much evaluation as possible taking place after harvest in order to be ready with some results to share in winter co-development sessions.

The picture on the right shows the rough timing of the three phases of the innovation cycle when dependant on the growing seasons. The exact timing may vary by context and local conditions.

Of course there are also activities that take place year-round, including logistics, planning, and integration activities, important conversations and reflections that serve as informal co-development, socio-economic surveys and analyses, and knowledge and communication activities such as events, field tours, newsletters, etc.



Living Lab Roles

In a living lab, everyone has a role to play, whether they are a producer, partner, biophysical scientist, social scientist, economist, or bring some other expertise to the table. However, there are some shared roles that everyone in a living lab plays, which include participating in the co-development activities so they can bring their unique and valuable perspective to the innovation process.



The Role of the Producer

- Help identify issues and priorities
- Share ideas for improvement through co-development sessions
- Work with scientists on planning
- Testing the practices on their farms
- Be mindful: How is it going? How does it feel to “use” it? How could it be better?
- Provide data and information for scientific and socio-economic analyses

The Role of the Partner

- Lead activities
- Help identify issues and priorities
- Share ideas for improvement through co-development sessions
- Connect to users
- Report on progress and outcomes

The Role of the Researcher

- Turn practical problems into research that contributes to the partners’ objectives
- Collaborate with colleagues from various disciplines and across the network
- Work with producers on logistics and planning
- Share ideas for improvement through co-development sessions
- Share knowledge about their research



What Now? Turning Concepts Into Action

This booklet has provided a high-level introduction to the living lab approach to innovation. It explained the principles and processes that guide living labs, but it does not cover the detailed methods needed to put these ideas into practice. Putting the approach into action requires tools and techniques for co-development, testing, and evaluation – and for managing collaboration across diverse partners.

For practical guidance, see the companion resource:

- **Innovation Methods: Supporting Agroecosystem Living Labs in Practice**, which offers concrete methods, useful tips and advice for working together in a creative, inclusive and structured way.
 - <https://www.publications.gc.ca/>

The following additional resources will help you explore the practical application of the living lab approach in more depth:

- **European Network of Living Labs (ENoLL) Knowledge Hub:** <https://knowledgehub.enoll.org/>
- **LIAISON Interactive Innovation Tool Box:** <https://liaison2020.eu/your-material/>



Key Takeaways

Living labs create the conditions for innovation by bringing together diverse perspectives in real-world contexts while involving users and focusing on their needs.

Through cycles of co-development, testing, and evaluation, they turn ideas into practical solutions that farmers can adopt.

This collaborative approach accelerates the development of innovations and improves their fit to real needs, increasing the chances of success.

By working in partnership and learning continuously, living labs help agriculture move toward a more sustainable and resilient future.
