Report about the Living Labs setup and results, update at M36

30 September 2025

Livia Ortolani (UNIPI), Katrine Soma (WR) & Femke Meulman (WR)

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D8.6 Report about the Living Labs setup and results, update at M36

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Project Coordinator	University of Pisa

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REPORT ABOUT THE LIVING LAB SETUP AND RESULTS, UPDATE AT M36 – VERSION 1.0

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1 Introduction

The main aim of the second part of Deliverable 8.2 is to report on the Living Labs activities between months 18 and 36. As such, this deliverable builds on D8.5 where we reported on the Living Lab setup and results until month 18. Between months 18 and 36, all the core data collection activities in the Living Labs have been done. Therefore, Living Lab coordinators and task leaders have interacted and collaborated extensively to execute the activities needed to reach project objectives.

This deliverable first touches upon the Living Lab trainings and data collection moments that have passed during months 18 and 36. Furthermore, because of the extensive collaboration between the Living Labs coordinators and task leaders, we collected feedback of both (respectively in chapter 3 and 4) to identify lessons learned (in chapter 5) and recommendations (in chapter 6).

2 Living Lab trainings & data collection/datasets

2.1 Update on methodological approach

The interaction between CODECS Living Lab coordinators and CODECS Task Leaders was managed by the Living Lab coordination team (WUR and UNIPI) through the application of the methodology presented in the first part of the report. During the period between M18 and M36 there was an increased intensity of interactions among the three groups in order to monitor data collection and ensure successful collaboration.

Researchers from T8.4 coordinated the different data collection phases by developing timelines of the data collection activities. As such, the researchers from T8.4 aimed to ensure efficiency of interactions between the Living Lab coordinators and the task leaders in order to streamline data collection activities. This interaction and collaboration between Living Lab coordinators and task leaders was facilitated by organising Living Lab trainings. In addition, researchers from T8.4 sometimes intervened or had to mediate in case of problems in the collaboration or to clarify the data collection activities.

The ambition of keeping the theoretical part of the CODECS project connected with the needs of stakeholders at local level was challenging in this phase and the iterative learning process defined in the first phase of the project was adapted to the needs of each data collection phase.

Data collection phases followed several steps, in line with the iterative learning process that was introduced in D8.5.

1. **Online training sessions** targeted to Living Lab coordinators were scheduled based on the activities and the needs of CODECS task leaders to present their data collection expectations. Moreover, a specific space for questions and clarifications from Living Labs coordinators was always available to identify key obstacles and challenges in each data collection phase.
2. CODECS **Task leaders presented their activities** during specific online training sessions. In each session the task leaders presented in detail all the activities expected from Living Labs and data collection templates. Guidelines were often presented in a presentation format.
3. The small group meetings that had a great role in the first phase of the project were reduced and finally cancelled, as the online training sessions and the discussion during the sessions appeared to be sufficient for most Living Labs coordinators in understanding the data collection requirements by the task leaders. Instead of the small groups meeting, a **constant monitoring of the data collection state** was carried out by T8.4 researchers and other task leaders and specific **individual meetings with Living Labs coordinators** were set up to clarify delay and difficulties in data collection.

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4. **On-field activities of data collection** took place in 20 locations across Europe at least twice a year following detailed instructions given by task leaders. Living Lab coordinators managed the social practice of knowledge development interacting with local stakeholders and experiencing opportunities and limitations of different data collection methods in different contexts and by different stakeholders.
5. Living Lab coordinators **report back** to task leaders according to reporting templates provided. Monitoring the data collection reports was carried out by task leaders with the support of T8.4 researchers. The data management plan (D8.3) includes more specific details on data collection gaps.
6. **All CODECS** researchers who instructed on data collection in the Living Labs finalise the analysis of the reports received by individual Living Labs and develop deliverables, publication and dissemination materials.

A total of six data collection phases has been completed since the beginning of the project. In other words, the six steps mentioned above have been completed six times (or are to be finalised in the remaining months of the project). Also, part of these phases has taken place before M18. These are quickly mentioned in the following section, after which we focus on the data collection phases between M18 and M36.

2.2 Living labs activities between M18 and M36

The 20 CODECS Living labs completed a total of six data collection phases by M36, with the exception of the final step of the data collection phase in which deliverables, publications and dissemination materials need to be finalised. Table 1 below illustrates the timeline of Living Lab trainings, data collection activities and annual workshops between M1 and M36.

Table 1: Timeline overview of Living Lab activities

Date	Type of activity	Description
4 July 2023 / 7 September 2023	Living Lab training	Data collection activities were introduced by: • T3.2 on mapping socio-ecological systems • T4.1 on focus groups on perceptions of costs and benefits
October, November & December 2023	Annual workshop	Living Labs collect data required by T3.2 and T4.1 as introduced on training on 4 July 2023
22 February 2024	Living Lab training	Data collection activities were introduced by: • T3.3 on deconstructing the process for process modelling. • T4.5 on the social costs and benefits assessment
27 September 2024	Living Lab training	Data collection activities were introduced by: • T2.2 on validation of value tree for outcomes of digitalisation • T3.3 on validation of process modelling

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Date	Type of activity	Description
7 October 2024	Living Lab training	Information session, including: • WP5 on exchange on demonstration events • WP1 on tips and tools for communication • WP8 on outlook on future Living Lab activities
October, November & December 2024 (Living Lab specific dates are available in the Annex)	Annual workshops	Living Labs collect data required by T2.2 and T3.3 as introduced on training on 27 September 2024
18 February 2025	Living Lab training	Data collection activities were introduced by: • T3.3 on process modelling • T4.3 and T4.4 on environmental and economic costs and benefits assessment • T6.2 on the role of intermediaries in digitalisation • T7.4 on the technological assessment tool In addition, T8.4 organised a feedback session on the role of Living Labs in CODECS (see chapter 3).
29 April 2025	Living Lab training	Data collection activities were introduced by: • WP5 on virtual demo farms • WP3 on indicators for digital ecosystem conduciveness, farmer readiness and AKIS • WP6 on interviews on digitalisation with policy makers • WP2 on value tree exercise

Table 1 shows that a total of six Living Lab trainings have taken place until M36. This corresponds with the six data collection phases that are happening in CODECS, as the Living Lab trainings launch a new data collection phase. Out of these six Living Lab trainings, the last four trainings have taken place in M18-M36.

The Living Lab trainings facilitate the dissemination of data collection activities from CODECS researchers to the Living Lab coordinators. Along with the Living Lab trainings, the rest of the data collection phases has been organised accordingly. This includes the preparation of data collection materials by the CODECS researchers, any necessary individual Living Lab meetings, the data collection itself (e.g. on-field, through survey, or in the annual workshops), reporting and monitoring, and the creation of deliverables, publications and other dissemination materials.

As apparent from Table 1, the density of data collection activities is higher in 2025 than in the years before. Therefore, the Living Lab training was divided into two different sessions. From the data collection activities that were introduced in the Living Lab training on 18 February 2025 and 29 April 2025, Figure 1 shows the current status of data collection.

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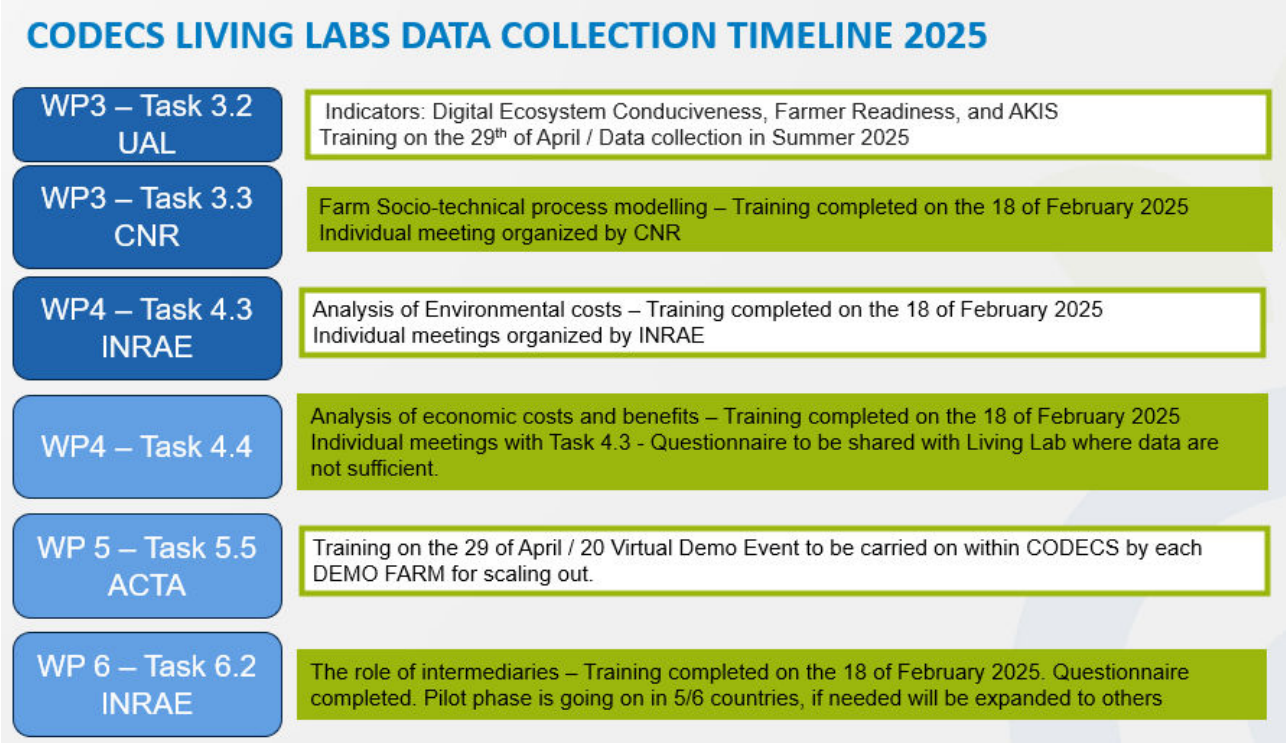

Figure 1: Living Lab (LL) data collection timeline 2025.

As mentioned above, each training session launched a new data collection phase for Living Labs, in which each Living Lab carried out the field work at local level involving the stakeholders relevant for the specific focal actual situation. After the field work, each Living Lab provided feedback to individual task leaders or to the Living Labs coordinators depending on the linearity of the data collection process. In some cases, an adjustment of the methodology provided by tasks was needed before applied in practice to ensure optimal applicability of the data to be collected. A summary of the data collection requests in terms of topics and outcomes is summarised in Table 2.

***Table 1**: Overview of data collection in Living Labs collected by specific tasks and organisation, including outcomes of each contribution*

T#	Organisation	Topics	Outcomes
T1.1	AEDIL	Communication Taskforce	Communication material
T2.2	WUR	Participatory theory building	Value tree reports
T3.2	UAL	Participatory Mapping of Digital Ecosystems	Reports on AKIS and RCCI
		Indicators validation	Online Survey for Living Labs Coordinators
T3.3	CNR	Participatory Process Modelling	Deconstructing the process
	CNR	Participatory Process Modelling	Feedback on participatory modelling

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T#	Organisation	Topics	Outcomes
	CNR	Participatory Process Modelling	Validation of 20 process models
T4.2	ELGO	C&B perception	Focus Groups Transcripts
T4.3	INRAE	Environmental Assessment	Interviews and Data Sheets for LCA
T4.4	ELGO	Economic Assessment	Online survey for Living Lab Coordinators
T4.5	INRAE	Social Assessment	Farmers Interviews and Reports
T5.1, T5.4, T5.5	ACTA	Demonstration Activities	Demo farms descriptions and Demo events reports
T6.2	INRAE	AKIS and intermediaries for digitalisation	Online survey for intermediaries
T7.2	BIOS	Meta inventory of digital technologies	Online survey for Living Labs Coordinators

The CODECS methodology to coordinate Living Labs is based on the organisation of a Living Lab training to introduce data collection activities. Besides the formal training sessions, between M1 and M18, extra sessions were organised with smaller groups of 4-6 Living Labs. The extra training sessions were meant to encourage more targeted information to specific needs, and also to facilitate dialogue to ensure that people who did not comfortably speak in the whole group, would be more willing to discuss an ask question in smaller groups.

While this was a strategy that we used a lot, we encountered that this extra effort to facilitate Living Labs did not contribute as expected. This was because some groups were completely silent, and others communicated a lot. The groups with no communication did not benefit from what was said in the more active groups. The Living Labs themselves also did not find this useful, because of the extra time required and because the information was already provided in a formal training. We therefore turned it into a different strategy, where we asked the Living Labs to contact us individually if they had any concern or question.

3 Feedback from Living Labs

This section of the report highlights the feedback that Living Lab coordinators gave during the project. Some of the feedback was signalled and put on the agenda for further discussion by the researchers in WP8. Moreover, a specific feedback session was organized during the Living Lab training on 18 February 2025 to give a central role to Living Labs coordinators in expressing their ideas.

As often in multi-actor projects, once the project starts there is a need to align researchers and practitioners' expectations. In this sense, during 2024, WP8 researchers increasingly received critical messages from the Living Labs concerning the way of working of researchers in CODECS. Therefore, T8.4 researchers organised a feedback session in the Living Lab training. Collecting feedback can help to see whether current methods, tools and collaboration models are working well. And, if any issues do occur, it offers a space to suggest possible changes for the reminder of the project. By creating this space, we have tried to signal that their voice in this project matters,

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which hopefully strengthens collaboration for the rest of the project and/or shapes suggestions for possible further similar research projects.

This training thus aimed to systematically collect the feedback that Living Labs have for the project. For this purpose, a MIRO board was made. The MIRO board included four questions:

1. What are current “problems” with the role of Living Labs in CODECS?
2. How can these problems be addressed within the project?
3. What is going well considering the role of Living Labs in CODECS? (e.g. What do you appreciate? What should not change?)
4. What other suggestions, ideas or thoughts do you want to share?

Living Lab coordinators were invited to write down their answers on digital post-it notes. They were given the opportunity to do this in an anonymous way if preferred. In addition, they were invited to share their answers with the group to have a discussion about it. However, a real discussion did not really occur. Nevertheless, a lot of answers were given on the MIRO board, and Living Labs coordinators “interacted” by giving others’ answers a thumbs-up to demonstrate they agreed with what was written down. The figure below shows the “final” MIRO board with all the input given.

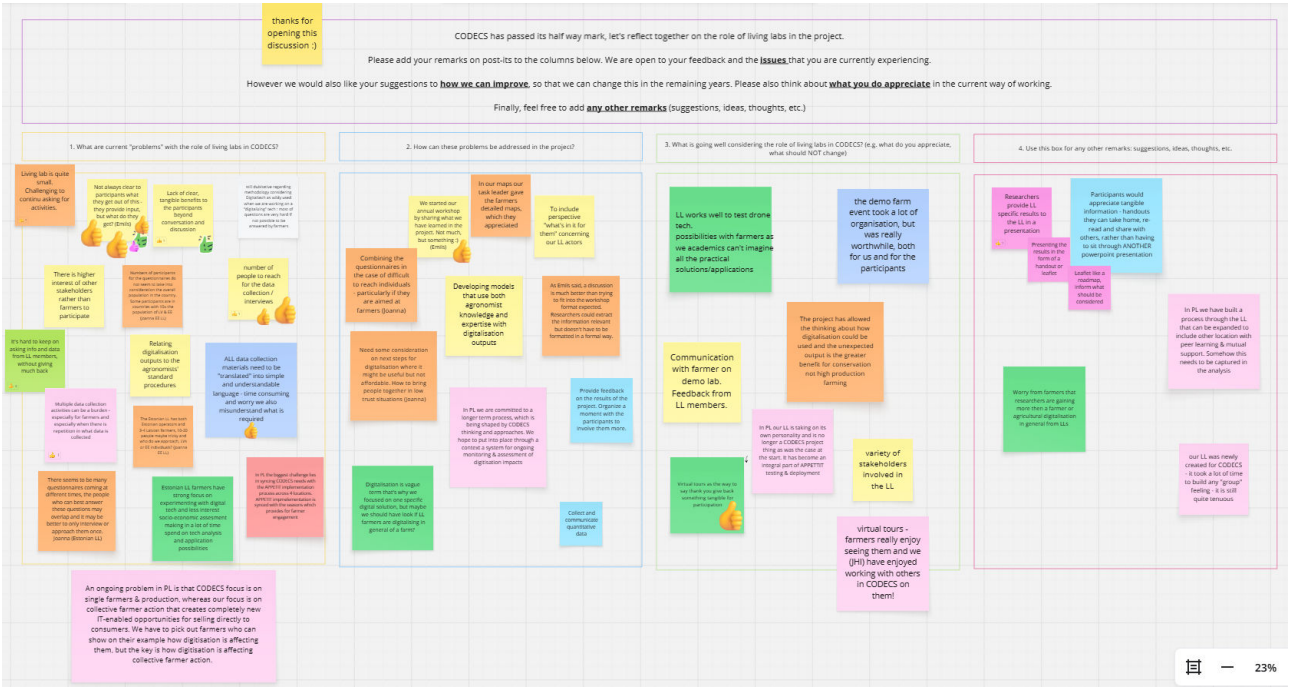

Figure 2: MIRO board with input received during the online session on 18th of February.

After the session, WP8 researchers analysed the answers given and attempted to categorise the most important topics that were written in the MIRO. In order to understand the concerns, it is important to consider the context of a Horizon Europe project and the complexity of carrying on multi-actor research projects with an heterogenous set of actors. However, such project allows the European Commission to get results from their research programmes that are directly connected to real life issues and not only theoretical. Simultaneously, the practitioners involved in the Living Labs can contribute to identify policy recommendations based on their experience, even if indirectly, developed by research results not directly suitable for them.

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The main barriers identified in this exercise are related to misunderstandings from both the perspectives of the researchers and the practitioners. Considering this context, we are presenting the following concerns identified in the MIRO board:

- **Benefits and value for Living Labs:** This concern revolves around the lack of clear, tangible benefits for Living Labs. They may feel uncertain about the value they receive from their involvement, as their input is gathered, but the returns are unclear. Therefore, the Living Labs worry that researchers gain more from the project. Additionally, continuously requesting data and information from Living Labs without offering meaningful reciprocity makes sustained engagement challenging.
- **Data collection methods:** The small sizes of the Living Labs makes it difficult to continuously request participation in activities. Repeated data collection efforts can also become burdensome, especially when there is redundancy in the information being gathered from the different researchers involved in the project. Additionally, reaching a large number of people for data collection and interviews is challenging.
- **Role of Living Lab coordinators:** All data collection materials need to be translated into simple and understandable language by Living Lab coordinators. This is time-consuming and they worry that they misunderstand what is required. The role of Living Lab coordinator is considered quite a difficult one, bridging the CODECS researchers and the practitioners in the field.
- **Theoretical and methodological misalignment:** There are uncertainties about the theories and methodologies underlying the data collection. For example, in the data collection, it is sometimes assumed that digital technologies are widely used, while digitalisation is still in progress across the Living Labs. This makes some questions difficult for farmers to answer. Additionally, CODECS sometimes focuses on individual farms or businesses when collecting the data, which does not align well with a collective and collaborative approach that is used in some Living Labs. Lastly, linking digitalisation outputs to agronomists' standard procedures remains a challenge.

Based on these results, possible follow-ups were identified and summarized in Table 3.

Table 2: Possible follow-ups to feedback provided by Living Labs

Concerns	Possible follow-ups
Benefits and value for Living Labs	• Communicating clearly why input is asked and what's in it for them to participate. If possible, improve incentives or gamify participation • Share project findings with participants to keep them informed and engaged, for example by creating tangible information such as handouts • Foster open discussions instead of rigid, structured workshops
Data collection methods	• Streamline data collection by merging questionnaires where feasible to collect all necessary data with fewer data collection moments • Create a centralized data repository to track and share collected information and prevent duplication • Document lessons learned for future methodology improvements • Coordination of data collection methods should be a dedicated task, more than coordination of Living Labs

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Concerns	Possible follow-ups
Role of Living Lab coordinators	• Create templates for data collection methods in simple language, including examples and explanations to ensure clarity when technical terms are still necessary • Use similar digital data collection tools for consistency (e.g. similar online survey tools) • Set up a feedback loop where coordinators can clarify doubts before finalising translations
Theoretical and methodological misalignment	• Explain how approaches apply to diverse contexts • Include alternative response options in data collection methods which allow for the diversity of the Living Labs • Engage Living Lab coordinators to identify practices that need representation in the project

4 Feedback from Task leads collecting data in the Living Labs

4.1. Introduction

In CODECS a substantial amount of analyses are based on the collection of information from the Living Labs. This means that the Living Labs are asked for multiple contributions. There is a risk that if this collection of data is not going well, the outcomes of CODECS may be impacted. In this section we look from the perspective of the CODECS researchers in charge of carrying out analyses based on information collected in the Living Labs.

A total of 12 WP/Task representatives in CODECS were asked to respond to the following questions about their experience with interaction with Living Labs to gather information:

1. Please briefly explain which information you asked from the Living Labs; Objectives; Data
2. Let us know how you experienced the processes of interactions so far? What worked well? What did not work so well?
3. What could have been done differently in your opinion? Please give your advice on how to improve the collaboration
4. Any other remarks?

The responses collected by WPs/Tasks responding to the four questions on experiences working with Living Labs, were provided by a total of 10 WP/Task leads who had been collecting data as described above. They included data collection related with the DECO strategy (WP1), the CODECS Methodology (WP2: Task 2.2), the socio-ecological context and process modelling (WP3: Tasks 3.2/3.3), perceptions of cost and benefits with digitalization, as well as environmental, economic and social costs and benefits (WP4: Tasks 4./4.3/4.4/4.5), demonstrations of costs and benefits (the DEMO's) of the Living Labs (WP5), and meta-inventory of digital technologies (WP7: Task 7.2).

4.2. Brief overview of information collected

WP1. We requested a description of their activities, the name and location of the Living Labs, their main objectives, and what they aim to achieve. We also asked for the coordinators' names and contact details, along with visual

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content such as pictures and videos. Additionally, we collect news items and blog posts about their activities and events they attend. In some cases, we have also conducted video interviews with certain Living Labs.

WP2: Task 2.2. We asked the Living Labs to organise a workshop session where they discussed with stakeholders the sustainability outcomes (environmental, economic, social) that they experienced in the Living Lab as a result of digitalisation.

WP3: Task 3.2 (2023). We asked the Living Labs about their; 1) Focal Action Situation (FAS) problem statement, 2) identification of resources, capabilities, collaborations and innovations they already had ("have") and those they still required ("need") to address the FAS and 3) mapping of how the four SESF subsystems (actors, resource units, resource systems, governance) influenced these RCCIs.

WP3: Task 3.2 (2024). Stakeholders' ratings of indicator relevance using a Likert scale about digital ecosystem conduciveness, farm digital readiness, and scaling readiness.

WP3: Task 3.3. Data were collected through structured reports provided by the Living Labs and subsequently refined through direct stakeholder interaction in focus groups about; 1) Identification of stakeholders involved, 2) Current status and level of digitalisation, 3) Description of activities undertaken with the digital technology in place, 4) Description of activities undertaken in the absence of digital technology, 5) Key components and features of the technology introduced, and 6) Procedures and steps followed in the digital transition.

WP4: Task 4.2. Qualitative data was collected in the form of responses to a set of semi-structured questions (10 guiding questions covering perceptions of farm digitalisation, the potential and conditions for using high-resolution drone images, expected contributions to farmers' incomes, welfare, quality of work, and gender equality, the willingness to pay for associated costs, as well as broader economic, social, and environmental costs and benefits), supplemented by demographic information (age, gender, occupation, education). Some Living Labs provided complete demographic datasets, while others submitted partial information.

WP4: Task 4.3. To assess the environmental impacts of farm digitalisation, we used the Life Cycle Analysis methodology. We needed information about; 1) general information to better understand the context of digitalisation, 2) the level of digitalisation, the process to be assessed and the feasibility of conducting an LCA at the scale of a farm, and 3) if possible (i.e if data is available), technical data on the process (before and after digitalisation) have been collected (using excel sheets).

WP4: Task 4.4. Two complementary data collection surveys on economic costs and benefits are currently taking place to collect qualitative and quantitative data; 1) in-depth data collection survey, to facilitate both the economic and the environmental analysis, since a lot of data requirements are common, and 2) a survey focusing only on economic quantitative and qualitative information on costs and benefits of digitalisation.

WP4: Task 4.5. To deepen our understanding of the social changes that digital technologies are bringing to farmers, we put particular attention to intangible aspects of adoption and use such as health, wellbeing, work practices, and communication, with the aim to gain a comprehensive understanding of their effects on farmers and their practices.

WP5. Demo activities in Living Lab involved gathering of information on the demo farms and demo events, all available on the CODECS website, as well as three different trainings; 1) Training July 2024: Tips and tricks for successful demo events. No information asked from the Living Labs, 2) Training October 2024: Exchange and feedback on the first on-farm Demo Events. Registration on the website, the demo event and the reporting process, and Training April 2025: Virtual demonstrations first guidelines. No information asked from the Living Lab.

WP7: Task 7.2. We have asked Living Lab representatives to send us data about digital technologies they are using/testing in their Living Labs. This data was needed as we (WP7) decided to present all Living Lab digital technologies in a systemic manner at CODECS platform, to showcase what digital technologies are in use at our Living Labs. This data will be presented in a repository, next to digital technologies collected in repositories of other projects with similar topic (Desira, Smart AKIS, etc).

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4.3. What worked well?

The first question asked to the researchers in CODECS about the interaction with Living Labs was the following: Based on the processes of interaction you have had with the Living Lab so far – what worked well?

In this paragraph we present the main issues emerged from the collection of data from the researchers, with interesting direct quotations. They inform that overall, the processes went fairly well, with a decent response rate.

- **Structured methodologies and tools** (workshops, templates, guidelines, and training) ensured comparability, consistency, and high-quality data across diverse Living Labs. (WP2, WP3, WP4, WP5, WP7).
- **Direct personal contact** (one-on-one meetings, individual follow-up, tailored support) was highly effective in clarifying doubts, building trust, and improving engagement. (WP3, WP4, WP5).
- **Flexibility and timing** (allowing enough time for responses, adapting to local constraints, and sending periodic reminders) supported higher response rates and smoother processes. (WP3, WP5).
- **Interactive meetings** encouraged open sharing of experiences, helped identify ecosystem gaps and opportunities, and strengthened relevance of outputs. (WP2, WP3, WP5).
- **Engaged coordinators and stakeholders** played a key role through contextual knowledge, inclusive recruitment, and strong understanding of requirements. (WP3, WP4, WP5).
- **Balanced communication channels** (general online sessions plus targeted exchanges) provided both broad guidance and customised support, improving outcomes. (WP2, WP3, WP4, WP5).

4.4. What did not work so well?

Based on the processes of interaction you have had with the Living Lab so far – what did not work so well?

- **Slow or inconsistent engagement:** Response rates were often delayed, with some coordinators unresponsive or not participating at all. (WP1, WP2, WP3, WP4, WP5, WP7).
- **Complexity and burden of data collection:** Tasks were sometimes too demanding, repetitive, or overlapping, making it difficult for coordinators and stakeholders to provide consistent, detailed input. (WP1, WP2, WP3, WP4).
- **Variability in data quality:** Submissions differed in completeness, depth, and accuracy, requiring extra harmonisation and limiting robustness of some analyses. (WP2, WP3, WP4).
- **Conceptual and methodological difficulties:** Some frameworks and tools were hard to understand or apply, while methods like LCA and economic analysis were not always well-suited to Living Labs' contexts. (WP4).
- **Communication and participation gaps:** Online meetings and collective feedback sessions did not always encourage equal participation, leading to bias and missed opportunities for peer learning. (WP2, WP3, WP4, WP5).
- **High coordination effort required:** Continuous follow-up, reminders, and reactive support were necessary, making the process resource intensive. (WP1, WP2, WP3, WP4, WP5)

4.5. What could have been done differently?

What could have been done differently? What could have been done to improve cooperation? The main points made included the following:

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- **Strengthen engagement methods:** Increase in-person interactions, ensure all voices are heard, and create clearer roadmaps so Living Labs can anticipate tasks and feel part of the process. (WP1, WP4, WP5).
- **Improve communication and coordination:** Foster open two-way communication, set clearer expectations, and maintain accurate, updated contact lists to avoid misunderstandings. (WP2, WP3, WP5).
- **Reduce workload and overlap:** Use lighter or tiered reporting templates, better coordinate data collection across work packages, and clarify purposes to avoid duplication. (WP3, WP4, WP5, WP7).
- **Enhance data quality and consistency:** Introduce earlier harmonisation through interim check-ins, apply validation steps during collection, and reinforce the importance of quantitative data. (WP3, WP4, WP7).
- **Leverage digital and iterative tools:** Employ collaborative platforms for modelling and co-design, and use shorter, iterative feedback loops to balance accuracy with effort. (WP3, WP4).
- **Motivate through recognition and results:** Show how Living Lab contributions feed into outputs, highlight tangible results, and acknowledge their diverse expectations to build a more balanced partnership. (WP4, WP5, WP7).

4.6. Other remarks

A few other remarks were provided, including;

- **Stakeholder engagement and accessibility:** Involved stakeholders were generally engaged and end users clearly understood the models, producing lively focus-group discussions. This shows that software and requirements-engineering notations can be made accessible beyond developers and engineers, helping communication between ICT and rural domains.
- **Clarify links between project tasks:** Living Labs found it difficult to see how the project's individual tasks related to one another (each task had specific demands). Making those links clearer will improve their understanding and alignment across activities.
- **Recognise farmers' time:** Consider offering a small monetary recognition to farmers to value their time, encourage participation, and improve response rates.
- **Maximise participation and sample size:** Ensure full participation from all Living Labs and recruit a larger number of farmers. Stronger coverage will significantly improve the quality of economic analyses and give farmers, advisors, policymakers and technology providers clearer cost–benefit insights.
- **Living Lab collaboration and contextual diversity:** Collaboration with Living Labs is crucial for capturing authentic stakeholder voices. The diversity of contexts revealed common themes (e.g., high investment costs, trust issues, sustainability benefits) and region-specific challenges (for example, stronger cooperative support in Southern Europe versus higher barriers in smallholder-dominated contexts). This diversity is a key strength of the Living Lab approach.
- **Capacity-building for facilitators:** Continue investing in training and support for Living Lab facilitators to enhance robustness, comparability, and the overall quality of outcomes across diverse contexts.

5 Lessons learnt

In this section, we combine the feedback from the Living Lab coordinators to the feedback of the WP/Task researchers to identify some shared and diverging perspectives about their collaboration within the CODECS project.

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First, the following points were identified that indicated shared perspectives on their collaboration.

- Both the Living Lab coordinators and the WP/Task researchers share the concern about the **intensity and complexity of data collection** and its impacts on engagement and output quality. While the Living Lab coordinators feel overwhelmed by repeated requests, especially given their small size and/or limited capacity, WP/Task researchers found tasks demanding, repetitive and sometimes overlapping which challenged consistency and quality.
- **Conceptual challenges** were relevant to both groups as well. For example, Living Lab coordinators signalled issues with digitalisation assumptions and a mismatch between individual and collaborative approaches inherent to the research activities. The WP/Task researchers add to this that it was hard to apply some of their frameworks as they were not suited to Living Lab contexts.
- Finally, both groups highlighted **communication issues**. While Living Lab coordinators struggled with the interpretation of the data collection materials, the WP/Task researchers identified gaps in participation during online sessions as well as unequal participation. Although it was tried to create an enabling environment in Living Lab trainings in which Living Lab coordinators could interact with the WP/Task researchers and asked clarifying questions, this has apparently not been fruitful.

Furthermore, diverging perspectives can also be identified:

- Although WP/Task researchers saw participatory approaches and contextual engagement as strengthening relevance and ecosystem understanding, the Living Lab coordinators did not necessarily perceived this **value**. They experienced unclarity about the tangible benefits that they received from participation. The Living Lab coordinators questioned reciprocity, while the WP/Task researchers do see value creation through engagement.
- **The role of Living Lab coordinators** was also perceived differently. The Living Lab coordinators struggled with their role and experienced burdens. However, they were praised by the WP/Task researchers for their contextual knowledge.

6 Recommendations

By comparing Living Lab coordinators and WP/Task researchers feedback, the following synergies and trade-offs can be identified that can be important recommendations or opportunities for possible further and similar research projects.

Shared priorities and opportunities can be sought in:

- **Clear communication and shared purpose**: Emphasise the need for transparency, clarity, and mutual understanding to build trust and engagement.
- **Reducing burden and streamlining processes**: Share concerns about workload and redundancy, with practical ideas for simplification such as simpler templates, guidelines and similar data collection tools.
- **Recognition and motivation**: Ensure Living Labs feel valued and see the impact of their contributions.
- **Improving data quality and consistency**: Set mutual goal to enhance the robustness and usability of collected data.

Overall, Living Lab coordinators emphasised the usability of research methods and results on the ground, while the WP/Task researchers emphasize strategic structure and institutional support.

Relevant recommendations and opportunities to solve mentioned issues are:

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- Pairing engaging **formats** with visible impact could boost motivation and participation, yet they have to allow for both **standardization/comparability** (for the WP/Task researchers) and **local adaptation** (for the Living Lab coordinators)
- A **shared data hub** can support early harmonisation and reduce duplication across work packages - Living Lab specific datasets could be given to them to facilitate further sharing. In this way they may feel stronger ownership to their own data.
- **Recognising contributions** visibly and fairly, whether through incentives, results sharing, or public acknowledgement.
- **Aligning data collection moments** including many tasks and work packages who simultaneously ask, to ensure more effective use of time.
- "**Full" assessment of project** still has to be carried out to collect input on lessons learned of working with Living Lab in the project, to support follow-up projects with what worked well and what can we learn to improve in future.

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7 Annex: Living Lab annual workshop dates

Living Lab	Country	Partner	Annual workshop date
Pecorino Toscano	Italy	UNIPI + Pecorino Toscano	29/10/2024
Greenhouse smart sensor technology	Serbia	BIOS	18/12/2024
Organic Table Grapes	Italy	CIHEAM-IAMB	19/06/2025
Appetit	Poland	ISOTECH	04/12/2024
Scottish farms and digital platforms	Scotland	HUTTON	04/02/2025
Cloughjordan Food Hub	Ireland	SUST	7/11/2024
Agrifood Technology	Belgium	EV ILVO	25/11/2024
Almeria Agroecology	Spain	UAL + COEXPHAL	29/11/2024
Smart Villages Network	Slovenia	UL	21/11/2024
Artificial Irrigation Management Systems	Slovakia	NEWEDU	06/12/2024
LIT Ouesterel	France	ACTA+IFIP	10/12/2024
Local beef cattle farming	Latvia	BSC+ZSA	5/11/2024
Occitanum - Open Lab Sheep	France	INRAE + IDELE	2/12/2024
Occitanum – Open Lab Viticulture	France	INRAE + IFV	N.A.
Spraying Drones	Greece	AUA	29/11/2024
Automation of orchard management	Czech Republic	CSITA+CZU	21/11/2024
Agri-Digital Bildung	Germany	UNI HOHENHEIM	25/10/2024
Grassland Management	Estonia	EMU	21/11/2024
RAMAS	North Macedonia	AGFT	25/10/2024
Innovative Soil Scanner	Hungary	SZE	21/11/2024

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8 Annex: Living Lab's expected benefits and demonstration technology

Living Lab	Expected benefits	Technology (TRL)
Pecorino Toscano DOP (Italy, Tuscany) Extensive dairy sheep farms	To improve the quality of production, the quality of work and the life of farmers, the visibility of the farm and the animal health and welfare	Farm Management Information System (FMIS) – TRL6 Facilitating farmers in the data collection of data related to farm processes
Greenhouse smart sensor technology (Serbia) Vegetable greenhouse production	To increase quantity and quality yield and preventing damage and plant stress induced by low or high temperatures in greenhouses, reduce the use of water and increase agricultural production, and reduction of pesticide use	IoT sensors node, combine with a web platform suitable for pc, tablet and smartphone TRL 7 Monitoring the conditions in the greenhouse (soil moisture, soil pH, CO2 sensor, etc.), and leaf wetness
Organic Table Grapes (Italy, Puglia) Organic table grape production	To increase the quality and quantity of organic table grape production by reducing the qualitative and quantitative pressure on the soil and water resources	Sensors in orchard at field level (soil, environment, and crop) interconnected and in communication with a Decision Support System TRL 8 Managing the key factors of production: irrigation, fertilisation patterns, pest and disease control
Appetit (Poland) Short food chains	To grow local markets, by decrease transaction costs and increase benefits of virtual and physical market-place interactions between buyers and sellers in a defined geographical space	APPETIT IT-enabled platform for collaborative organisational arrangements TRL 4 Connecting many producers to many consumers directly to one another via a virtual marketplace
Scottish farms and digital platforms (Scotland) Small farmers and crofters	To promote and improve economic activities of small farmers and crofters	Digital platforms for selling, promotion, advertising, training and collaboration, online social media (24-hrs shop & farm monitoring tech., & weather station), QR coding, 360-degree cameras and virtual tours demonstration TRL 3 For knowledge exchange and peer-to-peer learning for small farmers understanding the potential of digital technologies

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Living Lab	Expected benefits	Technology (TRL)
Cloughjordan Food Hub (Ireland) Local communities and small farmers	To shortening long supply chains and underpin a new food system owned and controlled by producers, eaters and local enterprises	Opensource digital platform TRL 7 Developing an online marketplace to facilitate small scale food producers and people in rural areas in accessing local markets, supporting local economies
Agrifood Technology (Belgium) Arable crops	To reduce the use of crop protection products through site specific spraying	Ultra-high resolution RGB on drones and AI models, task map generation, label tools TRL 7 Detecting weed, disease and pest in commercial farms of arable crops
Almeria Agroecology (Spain, Almeria) Vegetable greenhouse production	To develop resilience in the local agricultural sector through the integration of data from diverse digital technologies for the improved and efficient management of natural resources.	Sensors, actuators, centralised platform for data management TRL 5 Facilitating interoperability of heterogeneous data from different sources
Smart Villages Network (Slovenia) Vineyards sustainable agriculture	To increase sustainability and reduce the use of fuel water and pesticides in wine production	A vineyard monitoring system that integrates IoT sensor infrastructure to track weather and viticultural parameters. Data is transmitted via LoraWAN communication network and stored to a cloud-based analytics platform, accessible through web and mobile application TRL 7 Deploying microclimate, soil moisture, rain, and leaf wetness sensors, the system transmits data to a dashboard, ensuring continuous monitoring and informed decision-making
Artificial Irrigation Management System (Slovakia) Vegetable greenhouse production	To improve the irrigation system in order to optimise the watering of plants in term of time and quantity	A mobile application based on new sensors for measure soil moisture placed at the depth where the decisive part of the active plant roots is located and model of the curve of physiological need for irrigation TRL 7 Providing irrigation doses for the plant according to the phenophase, water reserves in soil and meteorological situation

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Living Lab	Expected benefits	Technology (TRL)
LIT Ouesterel (France, Grand Ouest) Pig meat production	To find non-invasive practice methods and technologies to improve pig welfare and workers 'conditions, ease the farm management and traceability to reinforce food safety and quality control, from farmers to consumers	Platform linking farm and equipment data TRL 6 Facilitating data sharing between equipment and management software
Loca beef cattle farming (Latvia) Grassfed beef cattle production	To improve the precarious market position of local beef cattle farmers	ZSA GEO map environment (https://app.smartagro.lv) TRL 7 Providing an effective and easy-to-use marketing tool to promote an emerging food product from semi-natural grasslands characterised by high biodiversity
Occitanum - Open Lab Sheep (France, Occitanum) Dairy sheep farms	To prevent animal health and welfare problems in advance	Digital milk counter and connected weight milk tank. TRL 7 Automatically collecting herd production data through tank weight measurement
Occitanum - Open Lab Viticulture (France, Occitanum) Vineyards sustainable agriculture	To manage fertilisation to preserve typicality of wines while protecting the environment	Satellite images, vigour maps, user-friendly web interface TRL 7 Modulating rate of applied fertilisers
Spraying Drones (Greece) Vineyards sustainable agriculture	To assess and analyse the best drone spraying configurations for field use and crop protection	Spraying UAVs (drones), GIS, sensors, IoT station, LiDAR for altitude adjustment, vision system TRL 9 Obtaining qualitative data on the spraying applications and droplet displacement, applying agrochemicals at a desired rate close to the canopy (commonly <5m)
Automation of orchard management (Czech Rep) Fruit crop production	To reduce impact of adverse weather on crops, reduce water and pesticide use, automation of irrigation and facilitate reporting obligations	A new sensor-based orchard management system for crop protection, remote control of the irrigation system, frost and pollination monitoring and an end-user application for the farmer TRL 6 Collecting, storing and analysing on farm data

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Living Lab	Expected benefits	Technology (TRL)
Agri-digital Bildung (Germany) Knowledge transfer	To increase the application of digital and precision farming technologies in crop production by teaching to young and future farmers	Digitally related educational format TRL8 Supporting knowledge building on digitalisation in vocational education for prospective farmers and agricultural educators
Grassland Management (Estonia) Grassland	Customise drone-based remote sensing services for grassland management and planning/monitoring of semi-natural grassland restoration	Drones, machine learning, GIS software TRL 5/6 Implementing GIS solutions for livestock farmers operating in nature conservation areas and challenging terrains. Capturing changes in vegetation/tree cover and creating semi-automated land cover maps
RAMAS (North Macedonia) Crop production	To improve agricultural professional support	Farm accountancy form, field repository, user-friendly dashboard, earth observation data, environmental monitoring data. TRL5 Generating real-time field data that will be used by experts/advisors for delivering tailor-made advice
Innovative Soil Scanner (Hungary) Arable crops	To optimise fertilisation and reduce environmental impact, through site specific fertilisers application	Soil scanner, NIR sensor, cloud, database, soil analysis, mobile phone TRL9 Analysing nutrients in soil in a fast, affordable, and reliable way

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