Data Management Plan, update M48

30 SEPTEMBER 2026

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D8.4 DATA MANAGEMENT PLAN, UPDATE M48

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Task number and title	8.3 - Ethics, Open Science, data management and gender perspective
Work Package Leader	UNIPI (with support of CNR)
Contributors	All partners
Project Coordinator	University of Pisa

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DATA MANAGEMENT PLAN, UPDATE M48 - VERSION 4

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3.4	21 September 2026	Comments provided by WP/Task leaders and LLs	CODECS Consortium representatives
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1 Administrative references

1.1 Project factsheet

Project name	Maximising the CO-benefits of agricultural Digitalisation through conducive digital ECoSystems
Project acronym	CODECS
Horizon Europe Topic ID	HORIZON-CL6-2021-GOVERNANCE-01-22
Project ID	101060179
Granting authority	European Research Executive Agency
Project starting date	1 October 2022
Project end date	30 September 2026
Project duration	48 months
Project website	https://www.horizoncodecs.eu/

1.2 Project beneficiaries

Beneficiary n. and role	Organisation	Acronym	Country
1 - COO	UNIPI	UNIPI	Italy
2 - BEN	ACTA	ACTA	France
2.1 - AE	INSTITUT FRANCAIS DE LA VIGNE ET DU VIN	IFV	France
2.2 - AE	INSTITUT DE L'ELEVAGE	IDELE	France
2.3 - AE	IFIP-INSTITUT DU PORC ASSOCIATION	IFIP	France
3 - BEN	CONSIGLIO NAZIONALE DELLE RICERCHE	CNR	Italy
4 - BEN	SZECHENYI ISTVAN EGYETEM	SZE	Hungary

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Beneficiary n. and role	Organisation	Acronym	Country
5 - BEN	ASSOCIATION EUROPEENNE POUR L'INFORMATION SUR LE DEVELOPPEMENT LOCAL	AEIDL	Belgium
6 - BEN	CENTRO INTERNAZIONALE DI ALTISTUDI AGRONOMICI MEDITERRANEI	CIHEAM-IAMB	Italy
7 - BEN	EIGEN VERMOGEN VAN HET INSTITUUT VOOR LANDBOUW- EN VISSERIJONDERZOEK	EV ILVO	Belgium
8 - BEN	ELLINIKOS GEORGIKOS ORGANISMOS - DIMITRA	ELGO-DEMETER	Greece
9 - BEN	CESKA ZEMEDELSKA UNIVERZITA V PRAZE	CZU	Czechia
10 - BEN	GEOPONIKO PANEPISTIMION ATHINON	AUA	Greece
11 - BEN	BIOSENSE INSTITUTE - RESEARCH AND DEVELOPMENT INSTITUTE FOR INFORMATION TECHNOLOGIES IN BIOSYSTEMS	BIOS	Serbia
12 - BEN	UNIVERZA V LJUBLJANI	UL	Slovenia
13 - BEN	ZEMNIEKU SAEIMA	ZSA	Latvia
14 - BEN	UNIVERSITAET HOHENHEIM	UNI HOHENHEIM	Germany
15 - BEN	NEW EDU NO	NEWEDU	Slowakia
16 - BEN	INSTITUT NATIONAL DE RECHERCHE POUR L'AGRICULTURE, L'ALIMENTATION ET L'ENVIRONNEMENT	INRAE	France
16.1 - AE	INSTITUT NATIONAL D'ENSEIGNEMENT SUPERIEUR POUR L'AGRICULTURE, L'ALIMENTATION ET L'ENVIRONNEMENT	Institut Agro	France
17 - BEN	SUSTAINABLE IRELAND CO-OPERATIVE SOCIETY LTD	SUST	Ireland
18 - BEN	NODIBINAJUMS BALTIC STUDIES CENTRE	BSC	Latvia
19 - BEN	AG FUTURA TECHNOLOGII DOOEL SKOPJE	AGFT	Macedonia
20 - BEN	CONSORZIO TUTELA PECORINO TOSCANO	Pec. Toscano	Italy
21 - BEN	EESTI MAAULIKOOL	EMU	Estonia

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Beneficiary n. and role	Organisation	Acronym	Country
22 - BEN	CSITA	CSITA	Czechia
23 - BEN	ISO-TECH SP ZOO	ISO-TECH	Poland
24 - BEN	UNIVERSIDAD DE CORDOBA	UCO	Spain
25 - BEN	UNIVERSIDAD DE ALMERIA	UAL	Spain
26 - BEN	ASOCIACION DE ORGANIZACIONES DE PRODUCTORES DE FRUTAS Y HORTALIZAS DE ALMERIA	COEXPHAL	Spain
27 - BEN	STICHTING WAGENINGEN RESEARCH	WR	The Netherlands
28 - BEN	Laboratoire d'Innovation Territorial Ouest Territoires d'Elevage	LIT OUSTEREL	France
29 - AP	THE JAMES HUTTON INSTITUTE	Hutton	UK

2 Project Overview

The CODECS project has worked to realise a vision of “sustainable digitalisation” to contribute to a multi-level transition intertwining social, economic, and ecological aspects, to be achieved by adopting an innovative system based-actor centred approach, and an action research methodology based on coordination of 20 Living Labs (LLs) through interdisciplinary and transdisciplinary teams. It worked to co-develop user-friendly approaches, methods, and tools, in collaboration with farmers and AKIS (Agricultural Knowledge and Innovation Systems) actors, to document both the co-benefits and costs of technologies applied in real contexts with the objective of improving the collective capacity to understand, assess and foresee the full range of benefits and costs of farm digitalisation, and to build digital ecosystems maximising its net benefits. CODECS project:

- studied the role of “digital ecosystems” in the rate of uptake of digital technologies and in the distribution of their costs and benefits;
- assessed and compared the social, economic, and environmental costs and benefits of farm digitalisation, identifying synergies and trade-offs between different sources of costs and benefits;
- tested and demonstrated digital technologies in 20 Living Labs through physical and virtual demonstration.

A CODECS platform has been put in place, grouping all digital tools, methodologies and handbooks and hosting search, demonstration, and assessment tools. At the same time, a knowledge accelerator was established, articulated into:

- a Science-Policy interface;
- a Demonstration Working Group;
- an AKIS network.

CODECS had a strong commitment to get an impact in the AKIS domain and in the policy field thanks to a dedicated work package on policy analysis and policy tools, a set of policy briefs and webinars and an engagement strategy

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at local, national, European level through the above-mentioned Science-policy interface, AKIS network, Living Labs and a network of Demo Farms that they established.

LLs covered a key role in fulfilling the project objectives as local networks of farmers, knowledge intermediaries, stakeholders, policy makers, technology providers. They constituted around an emerging problem in the area they were established in, within a given application scenario and willing to develop solutions through collaboration. For instance, “irrigation of permanent crops” was an application scenario, and the problem was formulated as a question: “how to increase farm’s value creation by minimising irrigation costs and save water? As a matter of fact, their work encompassed all the project activities planned in the diverse Work Packages (WPs).

CODECS has been implemented through 8 WPs: WP3, WP4, and WP5 were dedicated respectively to analysis of Digital Ecosystems (WP3), analysis of Costs and Benefits (WP4), Demonstration and Assessment activities (WP5). These three work packages, that organised the core activities of Living Labs, were supported and complemented by five horizontal work packages: Dissemination, Exploitation, Communication, and Outreach (DECO) strategy (WP1), Conceptual framework and methodology (WP2), Policy tools (WP6), Digital support tools (WP7), and Overall coordination (WP8).

3 Data Management Plan in CODECS project

3.1 Scope of this DMP

The Data Management Plan outlines the management and handling of research data both on a daily and long-term basis, establishing early-stage choices about the main aspects of the lifecycle of research outputs. In the CODECS project, the DMP has been established to plan and make careful choices about the necessary data to achieve the project's goals, with the aim of ensuring that data is managed securely and in accordance with the highest standards of quality and ethics, in compliance with all regulations involved. In the light of the general framework outlined by the European Commission, which promotes open and collaborative science, the data management of this project adhered to the principles of Open Science. In accordance with Horizon Europe guidelines[1], the DMP established the rules for responsible management of research data in line with the FAIR principles of ‘Findability’, ‘Accessibility’, ‘Interoperability’ and ‘Reusability’, and according to the principle of "as open as possible, as closed as necessary", in compliance (also) with the European General Data Regulation Policy (GDPR).

The first DMP was released in March 2023. The second version provided a clearer delineation of Living Labs activities, introduced adjustments to the data-related tasks across WPs, updated the personal data flow, and detailed materials of legal relevance. The third version included further updates to reflect the current status of data production and management, including an updated section on the integration of the gender perspective within the project. This fourth and final version provides a consolidated overview of the project outputs produced to date and includes, as an annex, a list of the datasets generated during the project.

3.2 Overall structure of the DMP in CODECS project

This document is intended to be a single point of reference for all data-related issues and in general for all CODECS research outputs, from day-to-day data management issues (e.g. the organisation of information and data safety strategies) to all aspects of data sharing and dissemination of results.

[1] See Horizon Europe Programme Guide: V2.0 – 11.04.2022: https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/programme-guide_horizon_en.pdf

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For the first version of the DMP, information regarding the data to be handled by consortium partners during the project was gathered through a dedicated questionnaire, answered by WP leaders. The responses obtained were used to structure the first version of CODECS Data Management Plan (D8.1) and the Personal Data Policy. For the second version (D8.2), updates on ongoing data management were gathered through interviews conducted between the contributors of Task 8.3 and the WP leaders in small groups or individually. For the third version information was collected from WP and Task Leaders through dedicated questionnaires. In addition, Living Lab coordinators were consulted, and a live questionnaire was administered during the General Assembly held on 23-24 September 2025, aimed at gathering insights into the current state of gender balance in the implementation of the project. For this fourth and final version, the content of the DMP was reviewed and updated in consultation with WP and Task Leaders to reflect the final status of project activities, data management practices, and research outputs.

The CODECS DMP has been established following the Horizon Europe DMP template[2], and thus it contains the following sections:

- data summary, in which all relevant information on data types and their collection or gathering process are described for each WP;
- the data management in CODECS project, where information on the organisation of data management among consortium partners are provided;
- FAIR data management, with information on each component of the FAIR acronym, included details on provisions for metadata, access to data and protection of personal data, licensing, and the modalities through which Open Access to publications are carried out;
- other research output, where a strategy for managing and sharing the software and communication materials produced within the project is described;
- estimated costs, where the allocation of the necessary resources is described;
- data security, where choices to secure all project information and the quality assurance process put in place are outlined. Roles and responsibilities are also specified;
- legal and ethical aspects, in which details on the management of personal data are given;
- gender perspective: a self-assessment by the consortium members.

4 Data Summary

4.1 Types of data

In CODECS project data are classified according to the source used, whether primary or secondary, and according to their content, whether texts, tables, or multimedia. Information is included on provenance or data collection processes and on all the aspects relevant for data reuse and how to facilitate it. Besides, a further distinction is made between personal and non-personal research data in order to detail specific treatment related to personal data (see “Legal and ethical aspects” section). A personal data policy was shared among the CODECS project partners for the lawful processing of personal data. In order to answer the research questions and carry out the activities foreseen in CODECS project, both primary and secondary data have been used, in a combination of qualitative and quantitative analyses. In CODECS the following types of data are described:

- documents (e.g. reports, briefs, deliverables, publications, presentations);
- datasets;
- multimedia;

[2] See Data Management Template (HE): V1.0 – 05.05.2021, downloadable from: https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/how-to-participate/reference-documents;programCode=HORIZON

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- software (e.g. Farm Management Information System – FMIS – designed to assist farmers to perform operational planning, implementation and documentation for assessment of performed field work).

Based on the type of collection, a distinction is made between:

- surveys;
- interviews and focus groups;
- measurements (e.g. in-field data collection) and data inventory;
- demonstrations (e.g. activities in Demo Farms and Living Labs, carried out in WPs 3, 4 and 5);
- literature.

With Measurement data we refer to in-field measurement, administrative records, field notebooks, data coming from Farm Management Information Systems (FMIS). With Demonstrations we refer to testing and showcasing digital technologies within 20 Living Labs, utilizing both physical and virtual platforms to illustrate their functionality and capabilities.

4.2 Work packages and Living Labs data overview

In this section, information is provided regarding data management by LLs and individual WPs. The data production activities of the LLs and WPs are closely interconnected. LLs and WPs/task leaders are responsible for collecting the primary raw data, according to the methodological guidelines provided by specific WPs/task leaders. WP and Task leaders defined and structured the data collection process, designed the methodology, and established the research questions, as well as provided the templates used for data collection. Moreover, the WP/Task leaders provided training sessions to guarantee the data quality standards. The Living Labs involved the local actors and carried out the data collection. The raw datasets were then curated, processed, and further elaborated by the respective WPs to produce structured and analysable outputs. This collaborative workflow has ensured consistency and alignment between field-level data collection and research-driven data refinement.

The following chart illustrates the overall data flow between LLs and WPs. Subsequently, detailed information is provided on the data management activities carried out by the LLs and WPs over the course of the project.

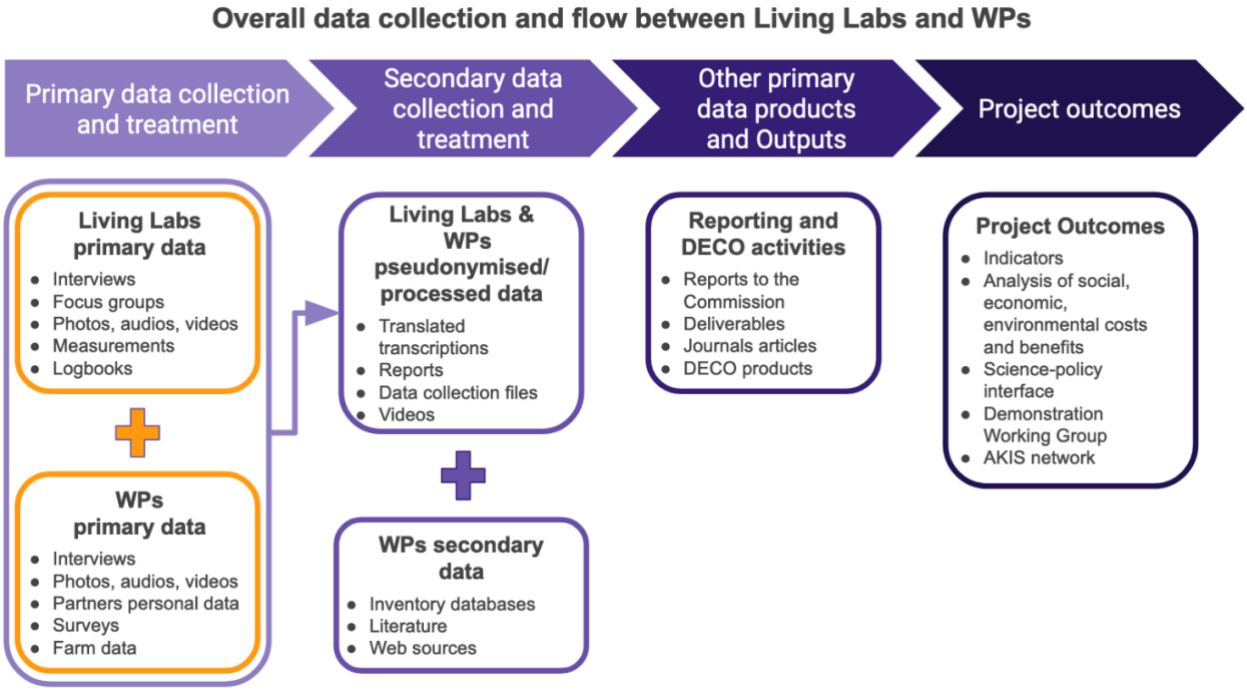

Figure 1 - Comprehensive data collection and flow between LLs and WPs and expected outputs

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4.2.1 WP1 - Dissemination, Exploitation, Communication and Outreach (DECO) strategy

Lead beneficiary: AIEDL

Origin of the data	✓	Primary data
	✓	Secondary data
Type of collection	✓	Interviews
	✓	Surveys
		Measurements
		Demonstration
		Literature
Content of the data	✓	Text (e.g., field or laboratory notes, survey responses)
		Numeric (e.g., tables, counts, measurements)
	✓	Audiovisual (e.g., images, sound recordings, video, presentations)
		Instrument-specific (e.g., equipment outputs)
		Software
Data volume		More than 2 MB, considering both primary and secondary data
Software used		Microsoft Office suite; Adobe; Brevo (for mailing lists), Canva (for photo editing and media graphics elaborations)
File formats		DOC/DOCX JPEG/PNG/SVG PDF PPT/PPTX MPx MP4/MOV/WMV/WEBM…./

Primary data collection mode

Interviews were conducted with project partners, Living Lab members, Demo Farms, Knowledge Accelerator actors, etc. Such interviews were recorded, where appropriate, and used to produce communication and dissemination materials, including video interviews featuring Living Labs and project partners. Additional outputs generated in connection with these activities included event reports, images, sound recordings, videos and presentations. Besides data were collected to measure the DECO impact.

Surveys were carried out among project partners, Living Lab members, demo farms, KA actors, etc. with the purpose of understanding optimal ways to reach CODECS target audiences.

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Among the activities conducted by WP1, there was the creation of the project's website: https://www.horizoncodecs.eu/. The website features a Privacy Policy[3], as well as a Cookie Policy[4]. Treatment of collected personal data is illustrated in the Legal and ethical aspects section.

Source of secondary data

Materials and resources (e.g. images, templates for slides or infographics) were sourced, where applicable, from the following databases: Artgrid, Adobe, Freepik, Pexels, Pixabay, YouTube Library for Creators, project partners, AIEDL's internal archives, Canva.

Purpose of the data

In this WP the purpose of collecting primary and secondary data was to develop the dissemination and communication (DECO) strategy, as well as to produce communication and dissemination materials (videos, interviews, briefings, practice abstracts).

4.2.2 WP2 - Fostering capabilities: towards a conceptual and operational framework

Lead beneficiary: WR

Origin of the data	✓	Primary data
	✓	Secondary data
Type of collection	✓	Interviews
	✓	Surveys
		Measurements
		Demonstrations
	✓	Literature
Content of the data	✓	Text (e.g., field or laboratory notes, survey responses)
	✓	Numeric (e.g., tables, counts, measurements)
		Audiovisual (e.g., images, sound recordings, video, presentations)
		Instrument-specific (e.g., equipment outputs)
		Software
Data volume		More than 2 MB

[3] https://www.horizoncodecs.eu/privacy-policy/

[4] https://www.horizoncodecs.eu/cookie-policy-eu/

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Software used		Microsoft Office suite; Adobe; Reference software (Endnote, Mendeley); VARI; Microsoft SQL server
File formats		PDF XLS

Primary data collection mode

Interviews of Living lab coordinators in CODECS, stakeholder sessions in the 2nd Annual Workshops to discuss context relevant factors of sustainability, assignments of weights (pairwise comparison of the identified factors) by the Living Lab coordinator in CODECS,

Source of secondary data

Scientific literature, policy documents, national statistical offices, international statistical offices (OECD, FAO), reporting from other WPs and Living Labs activities, other institutions and/or research facilities. research facilities.

Purpose of the data

In this WP the collection of primary data for the VARI survey was done for the purpose of assigning weights to tell what sustainability outcomes according to the Living Lab coordinator, who were all CODECS consortium partners, were judged more or less relevant to the particular Living lab. In preparation, some stakeholder consultations took place during the 2nd Annual Workshops of Living labs to discuss among stakeholders the relevance of different sustainability factors. The secondary data aimed at designing a conceptual framework of what sustainable development means in different agricultural contexts, as well as at developing a methodology to provide guidance for the digital transition in these contexts. In addition, to assess the Living Labs, reporting about their setup and results was used, in order to provide insights into synergies and differences across them.

4.2.3 WP3 - Analysis of digital ecosystems

Lead beneficiary: UAL

Origin of the data	✓	Primary data
	✓	Secondary data
Type of collection	✓	Interviews
	✓	Surveys
		Measurements
		Demonstrations
	✓	Literature
Content of the data	✓	Text (e.g., field or laboratory notes, survey responses)
	✓	Numeric (e.g., tables, counts, measurements)

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	✓	Audiovisual (e.g., images, sound recordings, video, presentations)
		Instrument-specific (e.g., equipment outputs)
		Software
Data volume		More than 500 MB
Software used		Microsoft Office suite; OpenOffice; Adobe
File formats		DOC/DOCX JPEG/PNG/SVG PDF PPT/PPTX MPx XLS

Primary data collection mode

Primary data were collected through workshops, online/video/phone interviews, and focus groups directly carried out with different actors (such as agtech providers, agricultural engineers, researchers, farmers, among others), in addition to surveys and interviews aimed at the LL coordinators. Moreover, analyses, reports, and articles were produced based on these results for representing the socio-ecological context and the socio-technical processes of the different Living Labs.

Source of secondary data

Secondary data derive from scientific literature, government statistics and reports from other research facilities.

Purpose of the data

In WP3 primary data were collected for the purposes of mapping the socio-ecological context. Measures, criteria and indicators, graphical representations were created for Living Labs. Components of the socio-technical process modelling were represented. Besides, based on the data collected through the different tasks performed, a comparative analysis of digital ecosystems was carried out. Also, data on the role of AKIS systems were gathered.

Secondary data were also needed to complement the comparative assessment of digital ecosystems.

Analyses, reports, and articles were produced based on the results of the WP activities.

4.2.4 WP4 - Costs and benefits analysis – assessment of the potential of digital technologies in agriculture

Lead beneficiary: INRAE

Origin of the data	✓	Primary data
	✓	Secondary data
	✓	Interviews

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Type of collection	✓	Surveys
	✓	Measurements
	✓	Demonstrations
	✓	Literature
Content of the data	✓	Text (e.g., field or laboratory notes, survey responses, transcripts)
	✓	Numeric (e.g., tables, counts, measurements)
	✓	Audiovisual (e.g., images, sound recordings, video, presentations)
		Instrument-specific (e.g., equipment outputs)
	✓	Software
Data volume		More than 2 GB (both primary and secondary)
Software used		Microsoft Office suite, NVivo, MaxQDA, SPSS, SimaPro
File formats		DOC/DOCX JPEG/PNG/SVG PDF PPT/PPTX MPx MOV XLS

Primary data collection mode

Primary data were collected through quantitative data collection, web surveys and inventories (e.g., Life Cycle inventories and economic analyses). Qualitative data were collected through interview and focus group transcritps provided by the Living Lab coordinators, through participatory workshops (MCA).

For the Multi-Criteria Analysis (MCA), primary data were collected through structured participatory assessments involving Living Lab stakeholders. Stakeholders evaluated the expected impacts of digitalisation according to a harmonised set of sustainability criteria and provided information on their level of certainty regarding these assessments. Stakeholder preferences and criterion weights were also collected to support the multi-criteria evaluation. Where Living Labs assessed alternative digitalisation scenarios, scenario-specific observations were retained in the MCA database.

The resulting MCA data were subsequently harmonised across Living Labs into a common analytical structure while preserving traceability to the original Living Lab, scenario, sustainability dimension, criterion and stakeholder assessment.

Source of secondary data

Scientific literature, reports, existing inventory databases, and statistical indicators were used for the ongoing Cost & Benefits (C&B) analysis of the use of Digital Technologies at the farm level within the CODECS Living Labs. These data contributed to the Cost & Benefit analysis (eco, environmental, social) of digital technology use at the farm level

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within the CODECS Living Labs. For the Multi-Criteria Analysis, secondary evidence and outputs from other CODECS activities were used to inform the analytical framework, including the definition and interpretation of sustainability criteria, digitalisation scenarios and technological contexts. However, secondary datasets were not merged with stakeholder observations in the harmonised MCA database. MCA impact, certainty and preference data therefore remain traceable to the primary participatory assessments conducted within the Living Labs.

Purpose of the data

Data collection enabled analysis on:

- Cost & Benefit perceptions of the use of digital technologies in agriculture;
- Environmental impact of the use of digital technologies in the Living Lab's focal action situation based on comparative Life Cycle Assessment (LCA);
- Economic costs and benefits analysis of the digitalisation process at farm level;
- The social/human-centred costs and benefits of digitalisation in agriculture for the farmer/user;
- Stakeholder expectations regarding the economic, environmental and social sustainability impacts of digitalisation through Multi-Criteria Analysis;
- Stakeholder certainty regarding expected sustainability impacts and the robustness of these expectations;
- Differences in expected sustainability outcomes across Living Labs, digitalisation scenarios, sustainability criteria and technology groups;

For the MCA specifically, the harmonised dataset supports comparative analysis across heterogeneous Living Lab contexts while preserving the participatory origin and traceability of the underlying stakeholder assessments.

4.2.5 WP5 - Demonstration of Costs and Benefits of digitalisation and technology assessment

Lead beneficiary: ACTA

Origin of the data	✓	Primary data
	✓	Secondary data
Type of collection	✓	Interviews
	✓	Surveys
	✓	Measurements
	✓	Demonstrations
	✓	Literature
Content of the data	✓	Text (e.g., field or laboratory notes, survey responses)
	✓	Numeric (e.g., tables, counts, measurements)
	✓	Audiovisual (e.g., images, sound recordings, video, presentations)
		Instrument-specific (e.g., agricultural machinery outputs)

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	✓	Software (e.g., mobile applications, digital platforms)
Data volume		More than 30 GB
Software used		Microsoft Office suite; Adobe; Canva (for video editing and media graphics elaborations)
File formats		DOC/DOCX JPEG/PNG/SVG PDF PPT/PPTX CSV XLSX MP4

Primary data collection mode

Primary data at the scale of Demo Farms were collected through online registration and reporting forms completed by Living Lab coordinators and Demo Farm representatives, including Demo Farm registration data and factual reports following demonstration events.

During Demo Events, qualitative data were collected through the WP5 Demo Assessment Grid, and quantitative data were collected through post-demo event surveys completed by demo participants. Additional feedback was gathered from Living Lab coordinators and demo organisers through interviews, workshops and online questionnaires.

Technical reports were produced by Living Lab partners following physical demonstrations and photographs were collected from Living Lab partners and centralised.

Source of secondary data

The sources of secondary data used for WP5 activities are:

- WP3 and WP4 processed data;
- national statistical offices;
- scientific literature;
- agricultural technical institutes (applied research) literature;
- engineering consulting firms;
- private companies.

Purpose of the data

Primary and secondary data were collected to create and coordinate a demonstration network. They also supported the development of tailored demonstration guidelines addressed to the Living Labs and the implementation and assessment of demonstrations of the costs and the benefits of adopting technologies within the scope of the Living Labs along the CODECS project.

The data were used to document demonstration activities and assess participants' perceptions of digital technologies. They helped identify perceived benefits, barriers and conditions influencing adoption. They also supported the comparative analysis of physical and virtual demonstration formats and the identification of good practices.

The results contributed to the Handbook of Demonstration of Digital Technologies (D5.3), the Synthesis Report of on demonstration and assessment of digital technologies (D5.5) and 28 Practice Abstracts. They also supported communication and dissemination resources for farmers, advisors and other AKIS actors. Quantitative data from the

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post-demo survey were also used by WP3 and WP4 to analyse digital ecosystems and the costs and benefits of agricultural digitalisation. Finally, Virtual Tours on the demo farms were produced.

4.2.6 WP6 - Policy analysis and roadmap

Lead beneficiary: BSC

Origin of the data	✓	Primary data
	✓	Secondary data
Type of collection	✓	Interviews
	✓	Surveys
		Measurements
		Demonstrations
		Literature
Content of the data	✓	Text (e.g., field or laboratory notes, survey responses)
	✓	Numeric (e.g., tables, counts, measurements)
	✓	Audiovisual (e.g., images, sound recordings, video, presentations)
		Instrument-specific (e.g., equipment outputs)
		Software
Data volume		Less than 200 MB for both primary and secondary
Software used		Microsoft Teams EUSurvey
File formats		DOC/DOCX PDF XLS

Primary data collection mode

Original data were collected through online surveys and interviews. It is however to be highlighted that the participants in the interviews were assured that the recordings would have been deleted after the analysis, since they expressed personal opinions and comments. Moreover, the recordings could not be anonymised: on the basis of the principle “as open as possible and as closed as necessary”, the recordings were therefore deleted, while the collected info were synthetised in an excel file and in the deliverables produced thus obtaining processed data.

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Source of secondary data

Secondary data was obtained via scientific literature, reports, policy recommendations, public databases and publications on the state of digitalisation (and rural digitalisation) in partner countries.

Purpose of the data

The secondary data and interviews with experts on policy across the EU regarding digitalisation in agriculture and rural areas were used to prepare a report on policy environments for digitalisation in Europe.

Survey data of AKIS actors was used to study how they can support the diffusion of support the diffusion of evidence about digital technologies C&B regarding their resources and strategies in front-office (contextualisation) and back-office (accumulation of evidence). The analysis was also included in D6.2

4.2.7 WP7 - CODECS platform

Lead beneficiary: AUA

Origin of the data	✓	Primary data
	✓	Secondary data
Type of collection	✓	Interviews
	✓	Surveys
		Measurements
		Demonstrations
		Literature
Content of the data	✓	Text (e.g., field or laboratory notes, survey responses)
	✓	Numeric (e.g., tables, counts, measurements)
	✓	Audiovisual (e.g., images, sound recordings, video, presentations)
	✓	Instrument-specific (e.g., equipment outputs)
	✓	Software
Data volume		More than 100MB
Software used		Microsoft Office suite; Adobe; Figma, Heyzine, Canvas, Visual Studio Code, Mongo DB as DBM software
File formats		DOC/DOCX JPEG/PNG/SVG PDF JSON

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		MP4 CSV XLS PNG WMV

Primary data collection mode

Surveys and interviews were conducted to collect the CODECS platform user needs.

Source of secondary data

Secondary data were collected from already existing inventories of other projects delivering information about digital farming technologies.

Purpose of the data

The WP7 produced the CODECS platform, intended as a single-point-of-access for:

- a meta-inventory of digital technologies offering an overview of technologies across different domains tailored to the user needs and requests. The meta-inventory was built on existing repositories FAIRshare, SmartAKIS, DESIRA and expanded to host more open-source EU repositories, including Nutri-Check Net and IPM Works. Also, all technologies used in CODECS Living Labs were added as a separate meta-data source. This LL data collection was done through an online questionnaire;
- a dataset inventory offering storage abilities to CODECS research outputs (analysis of data collected from LLs) and open access to the material for CODECS stakeholders;
- the Digital technology impact assessment toolkit encompassing a technology, economic, environmental and multicriteria assessment calculator.

The CODECS platform is intended to act as a quality-checked database where all the project outputs and results are gathered and showcased.

A dedicated data entry tool has been established for specific consortium partners. This process entails specific partners who, after completing authentication and obtaining authorisation from WP7 platform admins, can upload processed and pseudonymised data from the Living Labs (LLs). The uploaded data are made public on the platform.

4.2.8 WP8 - Coordination

Lead beneficiary: UNIPI

Origin of the data	✓	Primary data
	✓	Secondary data
Type of collection		Interviews
		Surveys
		Measurements
		Demonstrations

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	✓	Literature
Content of the data	✓	Text (e.g., field or laboratory notes, survey responses)
	✓	Numeric (e.g., tables, counts, measurements)
	✓	Audiovisual (e.g., images, sound recordings, video, presentations)
		Instrument-specific (e.g., equipment outputs)
		Software
Data volume		More than 10 GB
Software used		Open Office, Adobe, Microsoft Office Suite
File formats		DOC/DOCX JPEG/PNG/SVG PDF PPT/PPTX CSV XLS MPx

Primary data collection mode

The original data to be produced by this WP were:

- textual data, produced through reports, project deliverables, timelines and work plan preparation;
- numeric and tabular data, derived from updates on financial aspects and project scientific progress.

Source of secondary data

Data provided by the other WPs and by the LLs to carry out the project management and consortium coordination.

Purpose of the data

The data were used to ensure:

- project efficient management, financial monitoring and reporting;
- compliance with research ethics and open science, and a proactive approach to gender dimension;
- coordination of Living Labs and monitoring of the learning process.

4.2.9 Living Labs

The table hereinafter shows the Living Labs involved in the project and the project beneficiaries responsible for their management. These beneficiaries acted as the leaders of their Living Lab.

LL number	Name of the Living Lab	Country	Beneficiary
1	Pecorino Toscano	Italy	UNIPI + Pec. Toscano

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LL number	Name of the Living Lab	Country	Beneficiary
2	Greenhouse smart sensor technology	Serbia	BIOS
3	Organic table grapes	Italy	CIHEAM-IAMB
4	Appetit	Poland	ISOTECH
5	Scottish farms and digital platforms	Scotland	HUTTON
6	Cloughjordan Food Hub	Ireland	SUST
7	Agrifood Technology	Belgium	EV ILVO
8	Almería Agroecology	Spain	UAL + COEXPHAL
9	Smart Villages Network	Slovenia	UL
10	Artificial Irrigation Management System	Slovakia	NEWEDU
11	LIT Ouesterel	France	IFIP
12	Local beef cattle farming	Latvia	BSC + ZSA
13	Occitanum – Open Lab Sheep	France	INRAE + IDELE
14	Occitanum – Open Lab Viticulture	France	INRAE + IFV
15	Spraying Drones	Greece	AUA
16	Automation of orchard management	Czech Republic	CSITA
17	Agri-Digital Bildung	Germany	UNI HOHENHEIM
18	Grassland Management	Estonia	EMU
19	RAMAS	North Macedonia	AGFT
20	Innovative Soil Scanner	Hungary	SZE

Origin of the data	✓	Primary data
	✓	Secondary data
	✓	Interviews

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Type of collection	✓	Surveys
	✓	Measurements
	✓	Demonstrations
		Literature
Content of the data	✓	Text (e.g., field or laboratory notes, survey responses)
	✓	Numeric (e.g., tables, counts, measurements)
	✓	Audiovisual (e.g., images, sound recordings, video, presentations)
	✓	Instrument-specific (e.g., equipment outputs)
	✓	Software
Data volume		100 GB
Software used		Open Office, Adobe, Microsoft Office Suite
File formats		DOC/DOCX JPEG/PNG/SVG PDF PPT/PPTX CSV ODT XLS MPx, video formats

Primary data collection mode

The original raw data to be produced by the LLs are:

- personal data of the stakeholder involved in project activities and of the possible targets of DECO activities (for all WPs except WPs 6 and 8);
- data on the socio-technical processes related to Living Labs' Focal Action Situations (such as components of the process, interaction with the subsystems of the digital ecosystem, for WP3);
- in-field data related to the environmental effects, the economic costs, the social costs and benefits of the digitalisation (for WP4);
- data of technology performance monitoring (for WP5).

Source of secondary data

Data sources are field notebooks, farm management information software (FMIS), in-field measurement, administrative records (WP 4).

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Purpose of the data

The Living Labs brought together farmers, knowledge intermediaries, stakeholders, policy makers, and technology providers who cooperatively discussed specific problems related to the geographic areas they worked in, with reference to the theme of costs and benefits of digitalisation of rural areas: they collected and provided data and points of view, discussed and proposed solutions to these problems. They therefore contributed to the implementation of the entire project, and they collected and treated data for the activities outlined in the various WPs:

- WP1 - DECO strategy: to write practice abstracts, blog posts and news items as well as to be active on social media;
- WP2 - Participatory theory building: to organise working sessions within Annual Living Lab Workshops;
- WP3 - Participatory assessment of digital ecosystems: to carry out interviews and focus groups, and prepare reports on the outcomes of these activities;
- WP4 - Estimation of the costs and benefits of digital technologies adoption: to implement on-farm data collection, interviews, surveys, focus groups;
- WP5 - Demonstration and assessment of digital technologies: to set up Demo farms, organise demonstration activities, participate to Demo farm networks, and prepare reports on the outcomes of these activities;
- WP6 - Co-design of scenarios: to organise specific sessions at the 3rd Annual LL Workshop;
- WP7 - Testing, validating and assessing digital tools: to contribute to the survey for users' needs, organise focus groups and the LLs Annual Workshops;
- WP8 - Living Lab coordination: to write and approve the workplan of their activities, carry out online interaction; deliver reports on learning processes.

5 Data Management inside the consortium

A dedicated Microsoft Teams workspace was established to support collaboration, document sharing and communication across the consortium, with separate channels for the different Work Packages and project management activities.

6 Folder structure

The project documentation was organised within the Microsoft Teams "Documents" workspace using a shared folder structure. Each Work Package managed its working documents within its dedicated channel, while documents of common interest to the consortium (e.g. approved deliverables, reports, project agreements and reference materials) were stored in the "General" channel according to a predefined folder structure. A shared file naming convention (Section 7) ensured consistency, traceability and version control across the project.

7 File naming

Project files were organised according to a shared file naming convention to ensure consistency, traceability and version control across the consortium. File names generally included the document type (where applicable), title,

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version number, date of release and file extension. For project deliverables, the naming convention followed the Grant Agreement numbering (e.g. D8-4_DataManagementPlan_V1_31072026.pdf).

8 Selection Criteria for long-term preservation

To facilitate the reproducibility of the results and to increase the reusability of the data, these have been preserved in the long term through a reliable repository. For the choice of repository and its characteristics, see the section FAIR data management.

As CODECS project used different types of data, the following rules have been applied for long-term preservation:

- Primary data collected in the project have been preserved except in the case of personal data, when it was not possible to anonymise or pseudonymise them, upon request of the involved people or on the basis of what agreed with the involved people before carrying out the activities with them.
- Secondary data, already available from other sources and provided with a persistent and unique identifier (PID), have not been preserved.
- Secondary data that, for the purposes of the project, were rearranged into original datasets (as for instance statistical data, even if data themselves have not been changed), have been preserved.
- Datasets whose data were cited by any of the publications, reports, or deliverables, have been preserved.

To facilitate versioning, at different stages of the research life-cycle, depending on the level of processing, data in CODECS project may have been referred to as:

Raw data: unprocessed data, eventually with full personal information (non-anonymised data).

Processed data: recodes, transformations, selections, or enrichment of the anonymised data, which were all captured and described in metadata and documentation files.

Stable data: processed data, on which no new data are added. These were preferably selected for long-term preservation.

In addition, personal data may have been referred to as:

Pseudonymised data: raw data in which any personal identifiers were removed, but whose link to the data allowing identification was located separately.

Anonymised data: raw data in which any personal identifiers were removed.

9 FAIR Data Management

The acronym FAIR - standing for Findable, Accessible, Interoperable, Reusable - and the FAIR principles are widely acknowledged in the scientific community as the model to follow to optimise the dissemination and exploitation of scientific resources. The aim of FAIR principles is to increase the possibility of finding, understanding, and using research data for anyone who can benefit from it.

This section describes the choices and actions for the CODECS project to be in line with the FAIR principles.

In accordance with the Grant Agreement, research data management within CODECS project follow the principle of “as open as possible, as closed as necessary”.

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9.1 Findability

A dedicated community in the Open Access **repository** Zenodo was set up to facilitate the discoverability of CODECS research outputs and to guarantee long-term preservation. It can be reached at the following link: https://zenodo.org/communities/codecs/records?q=&l=list&p=1&s=10&sort=newest

The policy of the Zenodo repository is available at the following link: https://about.zenodo.org/policies/

A guide for advanced search is provided here: https://help.zenodo.org/guides/search/

For the unique identification of products, on Zenodo a **Digital Object Identifier (DOI)** can be issued for each deposited product. Alternatively, an already registered DOI can be entered (for example if the publisher already provided a DOI for a publication). In addition, the use of **ORCID** as researchers' PID is supported.

The table in the Annex provides an overview of all research outputs deposited in the project repository.

9.1.1 Enriching metadata

Depending on the type of data managed within the CODECS project, the following additional metadata were included where relevant and available.

Documents

All CODECS public **documents** have been prepared with the following information on one of the initial pages:

Field	Content / description
Project name	Maximising the CO-benefits of agricultural Digitalisation through conducive digital ECoSystems
Project acronym	CODECS
Horizon Europe Topic ID	HORIZON-CL6-2021-GOVERNANCE-01-22
Project ID	101060179
Project website	https://www.horizoncodecs.eu/
Document type	Report / Deliverable / Briefing / etc. (see the complete list of document types at paragraph 4.1)
Title	The title of the document
Status	Draft / Final version /Final Version accepted by the Commission
Version number	
Dissemination level	Internal/Public…
Date of creation	DDMMYYYY

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Field	Content / description
Date of release	DDMMYYYY
Author(s)	
Contributors	
Internal reviewers	
Work package Leader	
Project Coordinator	
Keywords	

Dataset inventory in CODECS platform

The CODECS platform hosts an inventory of datasets, which have been described with the following metadata:

Property	Type	Notes	Description
Mandatory metadata			
Dataset Name	Text	-	A descriptive name for the dataset that reflects its content and purpose
Sector (AGROVOC)	Text	List of open text	The domain where the dataset belongs to, e.g., agriculture, rural areas etc.
Abstract	Text	Open text or WYSIWYG	A short description that summarises the dataset
Description	Text	Open text or WYSIWYG	What the dataset contains, its source, and its potential uses. This can include information about data collection methods, variables, and any pre-processing steps
Keywords (AGROVOC)	Text	List of AGROVOC and list of open text	Relevant keywords or phrases that describe the dataset's subject, content, and potential applications. In the CODECS platform it will be supported by AGROVOC, a multilingual controlled vocabulary covering all areas of interest of the Food and Agriculture Organisation of the United Nations (FAO)
Date of release	Date Datetime	-	The date when the dataset was initially published or made available

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Property	Type	Notes	Description
Data format	Text URL	List (multiple choice)	The file format in which the dataset is provided, such as CSV, JSON, Excel, jpeg, etc.
Creator	Organisation Person	Organisation List (name, link) Name: text Email: text Link: url	The individual or organisation responsible for creating and/or maintaining the dataset. The contact information of the creator is given within this property
Licensing Scheme	URL	https://creativecommons.org/share-your-work/cclicenses/	CC0 or CC-BY
Optional metadata			
Data collection method	Text	Open Text	The approach, technique and any relevant information on the method used to gather information within a dataset
Version	Number Text	-	Each new version of a dataset may include minor documented revisions. Major updates, improvements, corrections, or additions to the data will be addressed in creating new entries of the datasets
DOI	Text	-	Persistent link provided by Zenodo
OECD Frascati classification	Text Number	-	Categories of R&D activities
External data source	URL	-	The origin of dataset produced outside the project
Data usage/ Audience	Text	List	Target audience and/or user demographics

Other datasets and multimedia

To complement the metadata provided through the Zenodo repository, the following additional metadata were recommended for inclusion in a supporting documentation (.txt) file, where appropriate. These metadata were intended to facilitate the understanding and reusability of the datasets. Where suitable disciplinary metadata standards were available, their use was also recommended. Additional metadata could have included:

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Metadata field	Description
Mode of collection	The procedure, technique, or mode of inquiry used to attain the data. Vocabulary: DDI controlled vocabulary on mode of data collection: https://ddialliance.org/Specification/DDI-CV/ModeOfCollection_3.0.html
Country/ies of reference	To which country(ies) does the resource pertain
Year(s) of reference	To which year(s) the content of the resource refers
Data collection start date	Indicates the start of data collection
Data collection end date	Indicates the end of the data collection
Last Update	Indicates the date the resource was last modified
Data type	Dataset / Multimedia
Data formats	E.g.text / numbers / images / 3D models / audio files / video files / / surveys / maps / scientific articles .txt; .csv; .shp; .pdf, .stadat, .wav; .mp3; mp4 etc.
Data origin	Primary or Secondary
Source	The source of secondary data reused in CODECS project. Ideally a PID or URL can be added to the original source
Licence	The original licence of secondary data
Software	If specific software is needed to access/process the data. If multiple are available, one is sufficient. Open Source or Free ones are preferred
Data size	Known data size
Data version	Can be: raw data; pseudo anonymised personal data; anonymised personal data; processed data (see Personal data policy and paragraph 4.3)
Specific metadata for Video	This may include: Type of product (interview, video-news release, documentary, stockshots, clips, etc); Director (if any); Place of the event; Start date of shooting; End date of shooting; Start date of distribution (if any) End date of distribution (if any); Script or short list with names and functions of the personalities filmed and clear identification (e.g.: from left to right; 2nd from left; etc.); **Links** and other useful information/website where the product can be viewed or downloaded; **Technical aspects** (such as format, sound transmission, etc)

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Metadata field	Description
Specific metadata for images	This may include: **Date** when the photo has been taken; **Place** where the photo has been taken; **Event description**; Description of each photo with **names and functions** of the personalities photographed and clear identification (e.g.: from left to right; 2nd from left; etc.); Name of the **photographer**; **Links** and other useful information/website where the product can be viewed or downloaded; **Technical aspects** (such as format, resolution, etc.)
Specific metadata for audio	This may include: Date when the audio was recorded; **Place** where the photo has been taken; **Event description**; **names and functions** of the personalities audio-recorded; Name of the interviewer/speaker/presenter; **Links** and other useful information/website where the product can be heard or downloaded; **Technical aspects** (such as format, etc.)

Software

To support transparency, reuse and long-term maintenance, the source code of the CODECS Digital Platform is shared through the project's GitHub repository: https://github.com/aua-sftg/Codecs-Platform. This will facilitate future maintenance, adaptation and reuse beyond the project lifetime.

9.2 Accessibility

For long-term preservation and to increase the discoverability of the project results, the catch-all repository Zenodo was chosen. Thus, the record metadata are always publicly available and licensed under **public domain** and no authorisation is needed to retrieve them. At the same time, metadata contains the DOI of the record and they allow the user to reach the data itself.

9.2.1 Access to literature

To comply with the European Commission Open Access mandate on scientific literature, all consortium members were recommended to provide Open Access to peer-reviewed scientific publications arising from the project by depositing an appropriate version of each publication in accordance with the publisher's policy and the European Commission requirements. Specific training and guidance on Open Access compliance and deposition procedures were provided to support beneficiaries in fulfilling these obligations.

To support compliance with the European Commission Open Access requirements, consortium members were provided with the following guidance. Green Open Access (i.e. self-archiving a version permitted for Open Access by the publisher) was recommended as the preferred route, while a dedicated budget was made available for publication in eligible Gold Open Access journals.

Beneficiaries were advised to retain sufficient rights to enable Open Access to scientific publications arising from the project. Corresponding authors were recommended to deposit, as soon as possible after acceptance and no later than the time of publication, the version of the article permitted by the publisher's policy in the Zenodo repository, including a reference to the CODECS grant in the metadata and ensuring Open Access to the machine-readable version of the publication.

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The use of the Open Research Europe publishing platform and participation in open peer review processes were also recommended. Authors were further advised to acknowledge the project in all relevant publications, preferably within the "Funding" or "Acknowledgements" section, using the following wording:

"This [article/chapter/report/result/equipment] is part of the CODECS project - 'Maximising the CO-benefits of agricultural Digitalisation through conducive digital ECoSystems'. The project has received funding from the European Union's Horizon Research and Innovation Actions under the HORIZON-CL6-2021-GOVERNANCE-01 call, grant agreement No 101060179."

Specific training and guidance on Open Science, Open Access, and Research Data Management were provided throughout the project (see the section on training in the paragraph "Quality assurance processes").

9.2.2 Access to data

The data collected or produced within the CODECS project were intended to be made accessible through the Zenodo repository (see the paragraph 9.1 "Findability").

In accordance with the Grant Agreement, unrestricted and royalty-free access was recommended in order to allow third parties and the general public to mine, exploit, reproduce, and disseminate research data generated by CODECS, thus maximising the impact on the scientific community.

Should the need arise, embargo periods were to be clearly declared, taking into account the need to balance openness and exploitation, protection of scientific information, commercialisation, IP Rights, security, and preservation requirements

Open access was recommended to all data selected for deposition as soon as possible once an appropriate version had been established, or at the latest once the datasets were considered stable. For data continuously updated throughout the project, annual deposition with appropriate versioning was recommended: Section 8 "Selection criteria for long-term preservation" provides further details.

As the CODECS project aimed at collecting primary data through interviews and surveys, all personal data were treated in compliance with ethical standards and in full respect with the provisions of the GDPR.

Where applicable, access restrictions and anonymisation measures were to be applied in accordance with the GDPR and the project's Personal Data Policy.

9.3 Interoperability

In order to enrich metadata and to achieve interoperability with other data, the resources listed in initiatives such as the RDA Metadata Standards Catalog (https://rdamsc.bath.ac.uk) and the FAIRsharing registry of standards and semantic artifacts (https://fairsharing.org/search?fairsharingRegistry=Standard) were recommended for the retrieval of specific controlled vocabularies.

For data description, AGROVOC, a multilingual controlled vocabulary encompassing all domains of interest for the Food and Agriculture Organization of the United Nations (FAO), was recommended to use whenever suitable.

In addition to discipline-related resources, Zenodo uses vocabularies for licences (provided by Open Definition), funders (by FundRef), and grants (by OpenAIRE).

Where appropriate, links between related research outputs were recommended through the relevant metadata fields in order to enhance contextual information and interoperability.

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9.4 Reusability

Beneficiaries commit to attach additional documentation whenever it is necessary to add information to the metadata provided, in order to make the resources more understandable and thus to increase opportunities of data reuse.

9.4.1 Documentation

Within the consortium, the documentation was stored together with the data, in the corresponding data subfolder. For deposition and public sharing, the documentation was recommended to be attached in the form of a readme file in .txt or other text format. The readme files were intended to complement the deposited resources with information on methodology, codebooks, machinery settings, data cleaning, analyses, variable definitions, units of measurement, etc.

The project outputs are intended to remain reusable by third parties also after the end of the project. To this end, data and metadata are retained for the lifetime of the Zenodo repository.

9.4.2 Licences

To permit the widest reuse possible, CODECS outputs were recommended to be made freely available with a licence of the Creative Commons framework.

The data produced by the CODECS project were recommended to be made available under the latest available version of the Creative Commons Attribution International Public License (CC BY) or Creative Commons Public Domain Dedication (CC0) or a licence with equivalent rights.

Immediate open access was recommended to the deposited publication via the Zenodo repository, under the latest available version of the Creative Commons Attribution International Public Licence (CC BY) or a licence with equivalent rights; only for monographs and other long-text formats, the licence may exclude commercial uses and derivative works (e.g. CC BY-NC, CC BY-ND).

Standard citation

When the data are deposited and access granted for reuse, a standard citation is provided in order to facilitate reuse and repurpose of the dataset while ensuring proper credit and recognition to the author. Zenodo provides standard citations in different styles, and which can be exported in different formats, all containing basic metadata (author, title, date) and a resolvable DOI.

10 Other research outputs

No physical products such as samples, new materials, reagents or similar are produced in the CODECS project. This section therefore gives details on the management of other digital products resulting from the project work and activities, in addition to the data, scientific literature and the so-called grey literature (i.e. everything beyond academic publishing in the narrow sense).

10.1 Software

All relevant software and computer code developed in CODECS project to collect and analyse data was recommended to be properly documented and openly shared through the project's GitHub repository: https://github.com/aua-sftg/Codecs-Platform

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Licences are essential to establish the conditions for re-use, modification or distribution of the software as well. Where applicable, and once the ownership of the intellectual property had been established, software was recommended to be released under a Free and Open Source Software (FOSS) licence[5] between the ones listed by the Open Source Initiative: https://opensource.org/licenses/. The CODECS platform source code is licensed under the European Union Public Licence v. 1.2 (EUPL-1.2) while content published on the platform is licensed under Creative Commons Attribution 4.0 International (CC BY 4.0).

For anyone to be able to read and understand the research software, the following good practices were recommended, where applicable:

- variables and functions names to be as self-descriptive as possible;
- proper code commenting to be realised while developing;
- a readme file in .txt format to be attached, including all irrelevant information (e.g. how to install and configure the software, if a full documentation is available and where it is possible to find it, if a quick-start guide has been released etc.);
- proper version control both of the software and of its documentation to be applied using Zenodo versioning functionalities.

10.2 Communication materials

One of the project goals was to enable a two-way communication between researchers, all relevant stakeholders, the widest scientific community and society at large. A variety of outputs were envisaged for dissemination purposes: articles, newsletters, reports and videos. Besides, social media accounts were managed.

Moreover, a project website was developed for the project results to be publicised. It can be reached at the following URL: https://www.horizoncodecs.eu/.

The website server is hosted by Siteground with IP 35.214.213.135. The appropriate cookie policy is displayed on the website. Whenever possible, the DOIs of products published elsewhere and deposited on Zenodo were referred. The project data, where appropriate and following anonymisation wher required, could also be displayed on the project website, always referencing the deposited version in the repository with the appropriate PID.

For the protection and management of personal data, please refer to the ethics section. Whereas for the materials deposited in Zenodo, please refer to paragraph 9.1.

11 Estimated costs

The costs associated with data management activities were covered through the project budget. Detailed information on the financial resources allocated and reported is available in the project's financial reports.

[5] Morin A, Urban J, Sliz P (2012) A Quick Guide to Software Licensing for the Scientist-Programmer. PLoS Comput Biol 8(7): e1002598. https://doi.org/10.1371/journal.pcbi.1002598

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12 Data security

This section describes data storage during the project, the adopted backup strategy and specifies roles and responsibilities. Moreover, the initiatives and processes implemented to ensure data quality are outlined.

12.1 Roles and responsibilities

Researchers, technicians and Living Lab participants were in charge of **collection** of research data.

Both Living Lab coordinators, acting as supervisors, and researchers have dealt with data quality assurance. With specific reference to personal data it is clear that the security of personal data and the compliance with the GDPR were in charge to the data controller (art.4, n.7 controller 'means the natural or legal person, public authority, agency or other body which, alone or jointly with others, determines the purposes and means of the processing of personal data; where the purposes and means of such processing are determined by Union or Member State law, the controller or the specific criteria for its nomination may be provided for by Union or Member State law').

If needed, institutional staff, such as data management staff, have been involved in the management of research data.

All data were stored on servers that are password protected with secure online access and authentication measures.

The project coordinator (UNIPI) was responsible for granting access to the data in the shared project folders, while the list of authorised staff was provided by the project leader of each partner institution.

The project coordinator was responsible for the quality of the DMP and for its implementation during the project's lifetime.

Within the project consortium, all the involved beneficiaries were responsible for:

- uploading all data related to the project into the designated data repository; verifying that sufficient metadata are provided;
- ensuring that data structure, naming, etc. comply with the DMP.

Besides:

- Cnr-Ifac was responsible for managing personal data protection and ethical issues.
- UNIPI (with CNR-Isti support) was responsible for the update of this DMP whenever any significant change occurred and at scheduled mandatory updates.

12.2 Data storage and back-up

The data were stored in institutional servers and cloud services during the collection phases. All the data relevant for the activities of the consortium were stored and managed by the Microsoft 365 platform and cloud service provided by the project coordinator (UNIPI).

This cloud environment was based on Microsoft Azure technology. The disaster recovery solution was based on the backup solutions offered by Microsoft Azure cloud services, which are GDPR compliant. In addition, the project coordinator ensured at least six-monthly back-ups of all project data stored in non-Microsoft infrastructure.

12.3 Quality assurance processes

Since CODECS project includes data collection from different stakeholders through Living Labs, specific training materials and activities have been carried out in order to ensure the highest level of quality. Training activities were delivered periodically, with a focus on how to collect data and how to assure data quality.

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In addition, manual control, **pre-processing and cleaning** steps were implemented on unstructured raw data whenever necessary.

Proper trainings have been provided on legal and ethical aspects and on open science.

In particular, the first training session was about personal data and its aim was to make the beneficiaries aware of the roles and responsibilities to properly process this kind of data in compliance with the relevant legislation. In addition, some instructions were given with respect to the involvement/recruitment of individuals in CODECS research activities, namely the necessity to obtain complete and legitimate consent from the data subjects, the respect of confidentiality and the safeguard of the voluntary nature of participation of all persons interviewed.

Furthermore, they have been trained on the different pre- and post-peer-review versions (preprint, Author's Accepted Manuscript - AAM - and the Version of Record - VoR), on the Rights Retention Strategy, and on the use of tools to check editorial policies such as Sherpa Romeo, specifying that publication fees are only eligible when publishing in full open access journals. The slides used in the trainings have been made available to the partners in the proper project folder, and publicly shared in the Zenodo community.

13 Legal and ethical aspects

In CODECS project a comprehensive framework for managing personal data was developed to effectively trace how to handle such data and how this impacted project activities, particularly those involving natural persons.

The data flow, as depicted in Figure 1 “Overall dataflow between LLs and WPs”, incorporated LLs activities in data collection, including their handling and pseudonymisation role in managing personal data. The figure illustrates the kind of personal data collected and provides an overview of their moving that is functional to address the data protection in CODECS as in the privacy-by-design tools described in the next paragraph.

For details on the technical security measures applied to the storage of personal data (e.g. password-protected servers and GDPR-compliant Microsoft Azure backup solutions), see Section 12.2 “Data storage and back-up”.

Various activities were organised within LLs as requested by the different Work Packages and Task leaders and the main occasions for the data collections were the Focus groups, interviews, questionnaires, surveys and observations. For instance, through the participation list at the LL Annual Workshops, the following personal data were collected: name, surname, occupation, eventually personal contact (email) and signature. Even the Demo activities could be occasions to collect this kind of data (e.g. name, surname, contacts). As far as interviews are concerned (for C&B analysis at farms level) personal data could be collected such as name, surname, position, address, income. No special categories of personal data are used. The data subjects involved were mainly those acting in the LLs, that is, participants in the LL Annual Workshop, farmers that are interviewed and other actors involved in the Focal Action Situation that interacted for the purposes of the project.

The processing of personal data within CODECS was based on the explicit consent of the data subjects, pursuant to Art. 6(1)(a) GDPR, collected through the information sheets and informed consent forms. Consent was sought as a specific, informed, and freely given indication of the data subject’s wishes, and could be withdrawn at any time without affecting the lawfulness of the processing carried out before its withdrawal. Since the data collected did not fall within the special categories referred to in Art. 9 GDPR, no additional safeguards under that provision were required.

Against this background, the LL coordinators collected personal data and consent forms, then:

- pseudonymised these data before sending them to the WPs, and kept at the level of the LLs the link between the real ID and the anonymised ID. More precisely, these data make it possible to retrieve – if necessary – the link between the involved stakeholder and the information related to him/her. Data were stored in a folder within a dedicated space by the LLs coordinators who also set the appropriate security measures;

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- in alternative, processed the non-personal data obtained in the frame of the activities they carried out with the stakeholders without keeping their personal data.

When it comes to the participation of individuals, information sheets and consent forms were provided by the WP leaders: such documents were meant to explain the research activities and their scopes.

Considering the management of personal data (i.e. name, position, country of origin and organisation) by WPs, these data referred to project stakeholders, research participants and project staff and the processing activities included video recording, event registration documents, storage, and data collection. The majority of WPs (WPs 1, 3, 6, 7 and 8) did not transfer data to third countries. Within WP4, anonymised interview transcripts were shared with Hutton (UK) for analysis. Within WP5, materials containing personal data were shared with Hutton (UK) to develop the virtual tours. The transfers to the UK were covered by the applicable European Commission adequacy decision and managed in accordance with the project's data-protection requirements.

The project website (https://www.horizoncodecs.eu/) also hosted a personal area, accessible with personal credentials only after registration and approval. This section was used to register demo farms and to report demo events. Data collected in this section was visible only to personnel associated with WP1 and WP5, whereas information on demo events could be disseminated or collected for reporting purposes only, according to a choice made in the backend form.

The CODECS project also features a platform (https://www.digital-agriculture.horizoncodecs.eu/) that hosts a personalised section exclusively available to designated consortium partners. Access to this area is contingent upon approval from WP7 and is subject to an authentication process.

Privacy-by-design tools: Personal data policy ad Ethics requirements

Considering the nature, scope, context, and purposes of the personal data processing carried out within CODECS – which did not involve special categories of data, large-scale systematic monitoring, or automated decision-making with legal effects on data subjects – a Data Protection Impact Assessment (DPIA) pursuant to Art. 35 GDPR was not deemed necessary. This assessment was reviewed at each update of the DMP in light of any changes to the scope or nature of the data processing activities.

As indicated in the first version of the DMP and pursuant to the activities implemented within CODECS, a Personal Privacy Policy was elaborated to support the partners in processing personal data. This document aimed at raising awareness of the legal and ethical requirements when processing personal data across the projects activities towards the achievements of results. The main goal of the Personal Privacy Policy was to equip the CODECS consortium with an instrument providing indications on the relevant implications in handling personal data.

The Privacy Policy was structured in sections that should be consulted along with the attachments that consisted of practical forms and sheets to be used for research activities.

In accordance with EU legislation, namely the Regulation EU 2016/679 on the protection of natural persons about the processing of personal data on the free movement of such data repealing Directive 95/46 (hereinafter referred to as GDPR) as well as the applicable laws, recommendations and authorisations issued by the Supervisory Authorities, the sections of the Personal Privacy Policy described the notions and legal requirements for the lawful and secure processing of personal data within CODECS. The Personal Privacy Policy included the following attachments:

- Attachment 1. General Information on the Treatment of Personal Data for the CODECS Project;
- Attachment 2: CODECS Table Purpose of Processing: Scientific Research;
- Attachment 3: CODECS Table Purpose of Processing: Communication and Dissemination;
- Attachment 4: Information on the Treatment of Personal Data for Stakeholders;
- Attachment 5: Informed Consent for Stakeholders;
- Attachment 6: Informed Consent for Speakers Invited to Conventions and Events;
- Attachment 7: Informed Consent of Conventioneers/Persons Attending Events.

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In line with Chapter III of the GDPR (Arts. 12–22), the Personal Privacy Policy and the information sheets provided to data subjects informed them of their rights to access, rectify, erase, restrict, or object to the processing of their personal data, as well as their right to data portability, where applicable, and their right to lodge a complaint UNIPI, which liaised, where necessary, with the other joint controllers pursuant to Art. 26 GDPR.

The release of the Personal Privacy Policy was preceded by a training seminar describing its correct implementation and a constant support for its use was ensured by the coordination.

Special attention has been put on informed consent as pivotal for legitimate processing of personal data and CODECS partners were made aware that consent to the processing of personal data for research activity is separate from consent to (and to be involved in) research activity. This implies that when it comes to research activities involving the participation of individuals, the Personal Privacy Policy must be read jointly with the Ethics Guidelines made to support CODECS partners when recruiting/inviting people to join the activities of the project. In this case, partners are invited to make use of the provided attachments to the Ethics Guidelines and more precisely:

- information sheets for participants;
- informed consent forms.

In all activities realised, the above-mentioned sheets must be delivered jointly with the Attachment 1. General Information on the treatment of personal data for the Codecs Project of the Personal Privacy Policy.

The attachments of both the Personal Privacy Policy and the Ethics requirements were also put at the CODECS partners' disposal through the shared folder of the project. Moreover, the attachments and forms also included instructions for their compilation in comments.

The CODECS partners were made aware of the necessity to use the above-mentioned attachments and forms. Partners are responsible for the use of forms other than those above mentioned and provided. Partners assume responsibility that the content of different forms, which are not the ones above mentioned and provided, complies with the legal requirements for the processing of personal data.

Based on meetings with WPs, it emerged that the processing of the personal data, which comes from the activities of the LLs, the website, the contacts with the stakeholders, is co-determined by all Consortium members. Therefore, pursuant to art. 26 GDPR and as agreed in the CODECS Consortium Agreement (art. 4.4.) a Joint controller agreement has been set. The reference to the joint controllers has already been inserted in the consent forms and information sheet for the project activities. In case, partners intend to use other forms and information sheets than those provided by the coordination and under their responsibility, they were strongly invited to indicate as follows: "The Parties of CODECS shall act as joint controllers for the processing of personal data in accordance with art. 26 GDPR".

Personal data collected within CODECS, including consent forms and information sheets, were retained by the respective Living Lab coordinators and data controllers for the duration of the project and, where required by the Grant Agreement and applicable audit obligations, for 5 years after the end of the project, after which they will be securely deleted. Only pseudonymised or anonymised data, prepared in accordance with the criteria described in Section 8 "Selection Criteria for long-term preservation", were retained for long-term preservation and made available through the Zenodo repository.

14 Gender perspective

Gender-related aspects were first assessed through a consortium-wide survey included in the initial version of the DMP. The assessment was subsequently updated through an anonymous questionnaire administered during the General Assembly held in Ljubljana on 23–24 September 2025, with the aim of gathering partners' views on inclusiveness, gender balance and the integration of the gender perspective within the project.

Overall, the responses indicated that the project environment was widely perceived as inclusive and gender-balanced, with women well represented in coordination and leadership roles. While some suggestions for further

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improvement emerged (e.g. training, mentoring and periodic monitoring), respondents generally considered the project's approach to gender equality to be effective.

Particular attention was drawn to the lower representation of women in some Living Labs, reflecting the gender imbalance that still characterises parts of the agricultural sector rather than project-specific practices.

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Annex - Research outputs deposited in the project repository

LL name and title of dataset	WP/ Task	Raw/ Processed/ Stable data	Personal data	Notes
All LLs - Value tree of digitisation outcomes	T2.2	Stable	Anonymised	This dataset consists of two parts: 1. One qualitative ranking relevant sustainability outcomes into value-trees as concepts that has been discussed during one of the Annual Workshop sessions, and 2. one quantitative assigning what is relatively more important of the sustainability outcomes ranked
All LLs - CODECS VARI Excel sheet 15.09.2025_KS1	T2.2	Raw	Anonymised	This dataset comprises LL's perceptions about what the sustainable digitalisation means in specific context Excel file with perceptions in % adding to up 100% for each LL distributed relevant economic, social and environmental sustainability outcomes to deduct what is relatively more relevant to each LL
All LLs - Participatory mapping of digital ecosystem	T3.2	Stable	No	Participatory mapping of digital ecosystem (Annual workshops 2023)
All LLs - Farm socio-technical process modelling - Living Lab Reports	T3.3	Stable	No	19 final reports produced by Living Labs and describing the transformation of their agricultural process after the introduction of a specific digital technology. Detailed descriptions of the process before and after digitalisation, highlighting added and removed actors, resources and activities, as well as advantages and goals
All LLs - Farm socio-technical process modelling - Living Lab Process Models	T3.3	Stable	No	19 sets of graphical models developed as part of Task 3.3 of the CODECS project, using the software engineering notations UML, iStar, and BPMN. The models were created by the Task 3.3 Team based on the final reports produced by the Living Labs. Each set includes three complementary types of models capturing different dimensions of the process transformation that occurs in the Living Lab after the introduction of a specific digital technology: the structure of the process; the actors' goals and the process transformation

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LL name and title of dataset	WP/ Task	Raw/ Processed/ Stable data	Personal data	Notes
All LLs - Perception of costs and benefits_FG Trancripts 2023-2024	T4.2	Stable	No	Debrief and transcripts, 2023 - 2024
All LLs - Perception of costs and benefits _FG Trancripts 2026	T4.2	Stable	No	Debrief and transcripts, 2026
All LLs - FG Results in Table Form per LL_2023-2024	T4.2	Stable	No	Perceptions of Costs & Benefits Results_2023-2024
All LLs - FG Results in Table Form per LL_2026	T4.2	Stable	No	Perceptions of Costs & Benefits Results_2026
All LLs - Stakeholders FG Demographic Dataset 2023-2024	T4.2	Stable	Anonymised	Stakeholders Demographic Document 2023-2024
All LLs - Stakeholders FG Demographic Dataset 2026	T4.2	Stable	Anonymised	Stakeholders Demographic Document 2026
All LLs - Dataset on environmental costs of digital technologies (Results report, Power point and data)	T4.3	Stable	No	Results of the environmental analysis of farm digitalisation in the LL
All LLs - Dataset on economic costs and benefits (Results report)	T4.4	Stable	No	Results of the economic analysis of farm digitalisation in the LL
All LLs - Data set Web survey Economic Analysis	T4.4	Stable	No	Outputs from the online survey on economic analysis
All LLs - Social cost and benefit analysis reports	T4.5	Stable	No	Results of the social analysis of farm digitalisation in the LL
All LLs - Dataset for Multicriteria assessment	T4.6	Stable	No	Done at Annual workshops 2028

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LL name and title of dataset	WP/ Task	Raw/ Processed/ Stable data	Personal data	Notes
All LLs - Demo Farms registration	T5.1	Stable	No	Dataset describing the Demo Farms containing information on: farm characteristics, agricultural specialisation, farm management type, Living Lab affiliation, country, digital technologies tested or showcased, related online resources
All LLs - Technical Reports Dataset	T5.3	Stable	No	Collection of technical reports documenting physical demonstration activities across CODECS Living Labs
All LLs - Factual Reports Dataset	T5.4 T5.5	Stable	No	Dataset compiling standardised factual information reported by CODECS Living Labs following physical and virtual demonstration events. It documents event characteristics including event title, date and duration, Living Lab and Demo Farm, participant and demonstrator profiles, event implementation, and links to related resources and supporting materials
All LLs - Living Lab Demonstration Photos	T5.4 T5.5	Stable	No	Collection of photographs documenting CODECS Living Labs demonstration activities
All LLs - WP5 Practice Abstracts Overview	T5.4 T5.5 T5.6	Stable	No	Overview of the Practice Abstracts developed within CODECS WP5
All LLs - Demo Assessment Grids	T5.4; T5.6	Stable	No	Collection of completed CODECS Demo Assessment Grids used during demonstration events to capture participants' collective perceptions of demonstrated digital technologies
All LLs - Demonstration organisers' feedback sessions	T5.6	Stable	No	Dataset compiling qualitative and quantitative feedback collected from CODECS Living Lab coordinators and demonstration organisers on the preparation, implementation and follow-up of physical and virtual demonstration activities
All LLs - Video to farmers and advisors	T5.6	Stable	No	Video developed within CODECS WP5 to communicate key lessons from the demonstration and assessment of digital technologies to farmers and farm advisors
All LLs - LLs Focal Action Situation	T8.4	Stable	No	LLs Focal Action Situation

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LL name and title of dataset	WP/ Task	Raw/ Processed/ Stable data	Personal data	Notes
All LLs - LLs profile 2023	T8.4	Stable	No	LLs profile 2023
All LLs - Post-demo Event Survey Dataset	WP3 WP4 WP5	Stable	No	Structured participants feedback collected following CODECS demonstration events to assess perceptions of demonstrated digital technologies and the conditions influencing their adoption. It covers technology acceptance and adoption readiness, farm readiness and digital ecosystem conduciveness, Agricultural Knowledge and Innovation Systems (AKIS) and knowledge flows, and perceived environmental, economic and social costs and benefits of agricultural digitalisation
NA - Summary of interviews with experts in the agricultural digitalisation policy landscape	T6.1	Processed	Pseudonymised	Dataset with excerpts and summaries of the experts' interviews from the CODECS countries
Pecorino Toscano - First workshop on the perception of costs and benefits of digitalisation	WP4	Raw	No	Transcripts from the first workshop on perception, showing how participants responded to the ten questions in accordance with the methodology
Pecorino Toscano - Second workshop on the perception of costs and benefits of digitalisation	WP4	Raw	No	Transcripts from the second workshop on perception, showing how participants responded to the ten questions in accordance with the methodology
Greenhouse Smart Sensor Technology - Farminar CODECS: Smart sensors in greenhouses	WP5	Stable	No	Video content which showcases how farm demonstration can be done in digital environment. It video covers all aspects of qualitative event where technology and its application results are presented to the interested public
Greenhouse Smart Sensor Technology - Practice Abstract: Organising demos to showcase IOT sensors in vegetable	WP5	Stable	No	PDF file which explains how on-farm demonstration event was organised by the Serbian Living Lab and what are its outputs
Greenhouse Smart Sensor Technology - Storybook:	WP7	Stable	No	Digital book about work and results happened in Serbian Living Lab. It describes all important aspects of Serbian Living Lab - how it was

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LL name and title of dataset	WP/ Task	Raw/ Processed/ Stable data	Personal data	Notes
Living Lab Greenhouse Smart Sensor Technology				managed, what was its focus and what are the key outputs
Almería Agroecology - Research data	WP2 WP3 WP4 WP5	Raw	Pseudonymised	Dcollected during annual workshops, interviews with stakeholders, demonstration activities (online and offline)
Almería Agroecology - Farminar CODECS	WP5	Raw	No	-
Smart Villages Network - Storybook: Living Lab Smart Villages Network	WP7	Stable	No	Digital book about work and results happened in Slovenian Living Lab, describing all important aspects of Slovenian Living Lab - technologies used, problems addressed and key outputs
Smart Villages Network - Workshop audio recordings WPs 2, 3 and 4	WP2 WP3 WP4	Raw	No	Recordings of annual workshops and LL activities (2023, 2024, 2026)
Artificial Irrigation Management Systems - Farm and Crop Production Data	WP4	Stable	No	Farm-level dataset describing soybean production and agricultural practices in the Slovak Living Lab, used to assess the environmental and economic effects of digital irrigation management. It covers tillage, seeding, fertilisation, crop protection, mechanical weeding, irrigation and harvesting, including quantities of agricultural inputs, labour requirements, energy inputs, number of applications and crop yield
Artificial Irrigation Management Systems - Digital Technology and Irrigation System Data of the Slovak Living Lab	WP4	Stable	No	Technical dataset describing the digital technologies and irrigation infrastructure implemented in the Slovak Living Lab for sensor-based irrigation management. It describes the technological configuration of the digital irrigation system, including soil moisture sensors, weather station, edge unit, control modules, data transfer and storage infrastructure and irrigation equipment. It includes available technical characteristics, quantities, utilisation data and investment information required for environmental and economic assessment of the technology

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LL name and title of dataset	WP/ Task	Raw/ Processed/ Stable data	Personal data	Notes
Artificial Irrigation Management Systems - Environmental Assessment of Digital Irrigation Management in the Slovak Living Lab	WP4	Stable	No	Dataset supporting the Life Cycle Assessment of soybean production under reference and digital irrigation scenarios in the Slovak Living Lab. It quantifies environmental impacts associated with farming practices and the digital irrigation technology. It contains Life Cycle Inventory and Life Cycle Impact Assessment data comparing production of 1 kg of soybean under reference and digital irrigation scenarios. It combines agricultural production data, yield, sensor and weather-station use, data transfer and storage, technology inventory and modelled environmental emissions and impacts. Environmental impacts were assessed using Environmental Footprint v3.1
Artificial Irrigation Management Systems - Economic Assessment of Digital Irrigation Management in the Slovak Living Lab	WP4	Stable	No	Dataset assessing the economic costs and benefits of digital irrigation management for soybean production in the Slovak Living Lab, including production costs, investment, revenues, productivity, profitability, partial budgeting and investment viability. It contains economic data and calculated indicators used to compare soybean production under reference and digital irrigation scenarios. It includes labour, variable and fixed production costs, investment costs for digital technologies and irrigation infrastructure, revenues, productivity and profitability indicators, partial budget calculations and a five-year Net Present Value analysis.
Artificial Irrigation Management Systems - Social Costs and Benefits of Digital Irrigation Management in the Slovak Living Lab	WP4	Stable	No	Qualitative dataset documenting perceived social costs and benefits of digital irrigation and agricultural digitalisation in the Slovak Living Lab, covering skills, decision-making, working conditions, risk management, sustainability, work-life balance and generational renewal. It contains anonymised and coded qualitative evidence from the Slovak Living Lab social assessment. Evidence is organised across human, work and social-integration dimensions and covers training and skills needs, access to expertise, informed decision-making, risk management, sustainable farm management, workload and time use, social interaction and

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				the attractiveness of agriculture for younger generations
Local Beef Cattle Farming - GIS Data Layer for Label "Natural Meadow Product" Producers	WP5	Stable	No	Data layer representing spatial data for the "Pļavas zīmols" (Meadow Brand) initiative managed by the Farmers' Parliament (Zemnieku saeima). It maps participating farmland plots, semi-natural grasslands, and eco-friendly agricultural areas certified or monitored under the meadow brand framework. It integrates geospatial boundaries with rich attribute data to support sustainable grassland management, biodiversity conservation, and agricultural auditing
Spraying Drones - Annual workshop 2023 report	WP3	Stable	No	Report of the participatory mapping of the digital ecosystem of the Greek Spraying Drones LL, held on 14 November 2023 (hybrid, AUA)
Spraying Drones - Farm socio-technical process modelling – Greek LL report (Digitalising): AUA Spraying Experimentation Living Lab	WP3	Stable	No	Task 3.3 report describing the drone spraying process in the AUA Spraying Experimentation Living Lab before and after the introduction of the digital solution. LL summary; focal action situation and problem statement (sub-optimal spraying, spray drift, over-use of PPPs); digital solution (drone spraying as an alternative to terrestrial sprayers, with a protocol for safe use and risk-mitigation guide); field methodology: spraying quality measured with water-sensitive papers at 0.3/0.6/1 m and on the ground, analysed with a MATLAB image-processing script (D10, D50, D90, droplets/cm²); spray drift measured under ISO 22866:2005 with tartrazine tracer and spectrophotometry at 426 nm; actors, resources (DJI Agras T10/T16, weather station, spectroscopy lab), activities, weaknesses of the current process; process after; transition; coordinator and participant feedback; short survey. Based on the 1st LL workshop and focus group (14/11/2023) and meetings in April–May 2024. Includes figures

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Spraying Drones - Social-human costs and benefits analysis – interview report and transcript, Greek LL	WP4	Stable	Anonymised	Interview report and English transcript on the social and human changes brought by drone spraying at the AUA demo farm (May 2024). It describers: context of the LL and demo farm (AUA experimental conventional-row vineyard, Spata), digital technologies used (spraying UAVs, GIS flight planning, IoT weather stations, LiDAR, vision systems, image analysis and tracer-based drift assessment), key impressions, and the full translated transcript of the semi-structured interview with the farm operator. Topics: farm readiness, expected changes, human and social changes, environmental and quality-of-life benefits, health and safety, challenges (costs, digital literacy, regulation) and opportunities
Spraying Drones - Perception of costs and benefits – 2nd Focus Group report, Greek LL (2026)	WP4	Stable	No	Report of the 2nd focus group of the Greek LL (08/03/2026) tracking how perceptions of the costs and benefits of farm digitalisation and drone spraying changed since the 1st focus group (November 2023). Summary and answers per question from the 2nd focus group. Topics: meaning of farm digitalisation; tools adopted or developed since 2023; effects on farming, supply chain and advisory practices; benefits that materialised; visible economic, social and environmental costs and who bears them; willingness to pay; problems that emerged; trust in digital tools, providers and policies; challenges and opportunities for the next two years. Includes facilitator notes and a conclusion
Spraying Drones - Stakeholders FG Demographic Dataset 2026 – Greek LL (2nd Focus Group)	WP4	Stable	Anonymised	Anonymised demographic profile of the 9 participants of the 2nd focus group of the Greek LL (08/03/2026). One record per participant (Participant 1–9): stakeholder role (researcher, farmer, agronomist), gender, age and education level. The group was 7 men and 2 women, aged 29–52, with education from a bachelor's degree to PhD candidate. Used to describe the focus group sample
Spraying Drones - Drone Spraying Demo Event (31/10/2024) event report	WP5	Stable	No	Event report

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Agri-Digital Bildung - Research data collected during annual workshops, interviews with stakeholders, demonstration activities (online and offline)	WP2 WP3 WP4 WP5 WP6	Choose from the dropdown menu	No	Dataset provided by the WP leader
Agri-Digital Bildung - Documentation of Demonstration activities for teachers and students	WP5	Stable	No	Documentation of demonstration activties
Grassland Management - GIS Project of demo farm "Bekas"	WP5	Raw	Anonymised	Drone survey products used in digital solution LL co-creation process, demo events and peer-to-peer learning (RGB, multispectral, thermal drone aerial images and photogrametry products/maps)
Grassland Management - GIS Project of demo farm SIA “3Dpro”	WP5	Raw	Anonymised	Drone survey products used in digital solution LL co-creation process, demo events and peer-to-peer learning (RGB, multispectral, thermal drone aerial images, 3D model and photogrametry products/maps, semi-automated land cover classification)
Grassland Management - GIS Project of demo farm Z/s “Vekši”	WP5	Raw	Anonymised	Drone survey products used in digital solution LL co-creation process, demo events and peer-to-peer learning (RGB, multispectral, thermal drone aerial images, 3D models and photogrametry products/maps, semi-automated land cover classification)
Grassland Management - GIS Project of Estonian Boreal coastal meadow "Viscosa"	WP5	Raw	Anonymised	Drone survey products used in digital solution LL co-creation process, demo events and peer-to-peer learning
Grassland Management - Detecting and mapping red clover (Trifolium pratense) using a fixed-wing drone equipped with a multispectral sensor	WP5	Processed	No	Technical report on digital solution report

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Grassland Management - Workshop recording	WP2 WP3	Raw	Anonymised	Voice recording during the workshop and text notes (2024, 2025, 2026)
Grassland Management - Instructions on how to open drone survey maps in QGIS	WP5	Processed	No	Training materials prepared for digital solution demonstration for semi-natural grassland farmers
Grassland Management - Training video MP4 "Mapmaking tutorial "WebODM demo""	WP5	Processed	No	Training materials on how to use a drone survey product, publicited through virtual tour
Grassland Management - Asset bundle (mixed media files) for Virtual tour of "Bekas" demo farm	WP5	Raw	No	Demo farms virtual tour creation assets folder
RAMAS - Organising On-farm Demos to showcase Digital Advisory Systems	5,4	Stable	No	Practice Abstract describing the organisation and implementation of on-farm demonstrations within the RAMAS Living Lab (LL) in North Macedonia – exploring how to define the perfect setting for demonstrating digital advisory and farm management technologies – and shares key practices and lessons to support future demonstrations
RAMAS - Storybook LL RAMAS	7,5	Stable	No	LL Information & RAMAS solution
Innovative Soil Scanner - Research data collected during annual workshops	WP2 WP3 WP4 WP5	Raw	Pseudonymised	Workshop outcomes in written form, photos, videos, Interview transcripts, demo photos and videos. Research data collected during annual workshops, interviews with stakeholders, demonstration activities (online and offline)
Innovative Soil Scanner - Practice Abstract #11_Innovative Soil Scanner	WP5	Stable	No	It describes how to engage farmers around digital soil analysis. Contains LL location data and names of demo farms
Innovative Soil Scanner - Technical data collected by the LL	WP 3,4,5	Stable	Pseudonymised	Dataset of the farmers. Soil scan result of the farmers, and their visualisation in nutrient availability maps

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