AgriDataValue

Smart Farm and Agri-environmental Big Data Value

Deliverable D5.2
Data Privacy, Ethical, GDPR &
Regulatory Compliance V2

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Abstract	AgriDataValue is a comprehensive research project aimed at leveraging advanced technologies to revolutionize the agricultural sector. The project has been developed and operates in a highly regulated environment, to facilitate the exchange of pilot data collected from drones, satellites and EO data sources across use cases. Therefore, various ethics, legal, and regulatory frameworks have been taken into consideration, conducting a comprehensive continuous assessment covering data protection, ethical, social, and legal issues (PIA+) of the AgriDataValue framework. Consequently, a process that supports building GDPR compliance, demonstrating accountability, and transparency of the AgriDataValue framework has been adopted. The PIA+ is an iterative process across all phases of the project and involves steps to identify the key ethical, legal, social, and privacy related themes of the AgriDataValue platform, to map the data flows amongst the AgriDataValue technologies, users and the services with which they interface, to identify key risks associated with these data flows, to run two day-long interactive workshops, and to engage with all partners to suggest possible technical or operational solutions, mitigation measures with special attention given to privacy, social impact security, lawful basis and aspects of surveillance.

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	Participant organisation name	Short	Country
01	SYNELIXIS SOLUTIONS S.A.	SYN	EL
02	ATOS IT SOLUTIONS AND SERVICES IBERIA SL (Terminated)	ATOS	ES
03	SIXENSE ENGINEERING	SIXEN	FR
04	NETCOMPANY-INTRASOFT SA	INTRA	LU
05	SIEMENS SRL	SIEM	RO
06	SINERGISE LABORATORIJ ZA GEOGRAFSKEINFORMACIJSKE SISTEME DOO	SINER	SI
07	ALMAVIVA – THE ITALIAN INNOVATION COMPANY SPA	ALMA	IT
08	INTERNATIONAL DATA SPACES EV	IDSA	DE
09	SOFTWARE IMAGINATION & VISION SRL	SIMAVI	RO
10	SINGULARLOGIC S.A.	SLG	EL
11	EIGEN VERMOGEN VAN HET INSTITUUT VOOR LANDBOUW- EN VISSERIJONDERZOEK	EV ILVO	BE
12	ETHNIKO KAI KAPODISTRIAKO PANEPISTIMIO ATHINON	NKUA	EL
13	INAGRO, PROVINCIAAL EXTERNVERZELFSTANDIGD AGENTSCHAP IN PRIVAATRECHTELIJKE VORM VZW	Inagro	BE
14	UNIWERSYTET LODZKI	UL	PL
15	FUNDACION PARA LAS TECNOLOGIAS AUXILIARES DE LA AGRICULTURA	TEC	ES
16	DELPHY BV	Delphy	NL
17	INSTITUTO TECNOLOGICO DE ARAGON	ITAIN	ES
18	ZEMNIEKU SAEIMA	ZSA	LV
19	SOCIEDAD ARAGONESA DE GESTION AGROAMBIENTAL SL	SARGA	ES
20	AGROTIKOS KTINOTROFIKOS SYNETAIRISMOS KATOUNAS TO VIOLOGIKO AGROKTIMA	TBA	EL
21	SOCIETA ITALIANA DI VITICOLTURA EDENOLOGIA	SIVE	IT
22	NILEAS – SYNETAIRISMOS PISTOPOIIMENON AGROTIKON PROIONTON DIMOU NESTOROS MESSINIAS	NILEAS	EL
23	CONSEIL DES VINS DE SAINT-EMILION	CVSE	FR
24	ASOCIATIA OPERATORILOR DIN AGRICULTURA ECOLOGICA BIO ROMANIA	BIORO	RO
25	RI.NOVA SOCIETA COOPERATIVA	RI.NO	IT
26	AGRO DIGITAL SOLUTIONS	AgroDS	LT
27	NATIONAL PAYING AGENCY	NPA	LT
28	AGENZIA PROVINCIALE PER I PAGAMENTIDELLA PROVINCIA AUTONOMA DI TRENTO	APPAG	IT
29	AGENTIA DE PLATI SI INTERVENTIE PENTRU AGRICULTURA	APIA	RO
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Document Reviewers

Date	Reviewer's name	Affiliation
15/09/2025	S. Tsanakas	SYN
22/09/2025	Krishna Chandramouli	QMUL

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Definitions, Acronyms and Abbreviations

ADS	Agri-Environment Data Space
AI	Artificial Intelligence
ALLEA	All European Academies
BDVA	Big Data Value Association
CA	Consortium Agreement
DMP	Data Management Plan
DoA	The Description of Action
DPO	Data Protection Officer
EC-GA	European Commission Grant Agreement
EO	Earth Observation
EU	European Union
FAIR	Findable, Accessible, Interoperable, and Reusable
GDPR	EU General Data Protection Regulation no. 2016/679
IDSA	International Data Spaces Association
LMAA	Lean Multi-Actor Approach
ML	Machine Learning
PIA	Privacy Impact Assessment
POPD	Protection of personal data
TL	Task Leader
TM	Technical Manager
WP	Work Package
WPL	Work Package Lead

Executive Summary

This document is the second and final version of the report on the AgriDataValue project's commitment to data privacy, ethical considerations, and legal compliance. It updates the initial version, D5.1, and outlines the definitive procedures established to ensure adherence to the highest standards of EU, international, and national law.

As the AgriDataValue platform operates in a complex regulatory environment involving data captured from drones, satellites, and Earth Observation sources, this report confirms the final methodologies adopted in the project for managing ethical, social, legal, and GDPR compliance throughout the project's lifetime. It presents the established procedures for identifying and recruiting research participants for pilot activities and provides a comprehensive description of our GDPR compliance framework.

Furthermore, this updated deliverable provides final details on:

- The protection of personal data in all research activities.
- Ethical requirements and compliance for research activities involving animals.
- Measures related to environmental protection and the safety of all personnel and citizens involved in the project.

This document, "D5.2: Data Privacy, Ethical, GDPR & Regulatory Compliance V2", serves as the conclusive record of the project's compliance strategy, building upon the foundations laid in the initial version and reflecting the project's activities and findings up to M32.

1 Introduction

AgriDataValue main objectives are to strengthen the capacities for smart farming and enhance the environmental and economic performance of the agricultural sector. AgriDataValue introduces an innovative, open source, intelligent and multi-technology, fully distributed Agri-Environment Data Space (ADS). To achieve technological maturity, fast and massive acceptance, AgriDataValue adopted and adapted a multidimensional approach that combined state of the art big data and data-spaces' technologies (BDVA/ IDSA/ GAIA-X) with agricultural knowledge, monetization, new business models and agri-environment policies, leveraged on existing platforms, edge computing and network/ services, and introduces novel concepts, methods, tools, pilot facilities and engagement campaigns to go beyond today's state of the art, perform breakthrough research and create sustainable innovation in upscaling (real-time) agricultural sensor data, already evident within the project lifetime.

AgriDataValue conducted scientific research and worked toward the development of the required technological innovations. The project consortium partners recognized the importance and significance of conducting ethical research with respect to engaging with citizens, farmers, experts, and policy makers. Research within the project always follows the democratic values of the EU member states and the UK.

The overall implementation of the AgriDataValue project is fully compliant with the "do no significant harm" principle as per Article 17 of Regulation (EU) No 2020/852 since it has been designed in a way that it is not harming any of the 6 environmental objectives of the EU Taxonomy Regulation (climate change mitigation, climate change adaptation, sustainable use and protection of water and marine resources, transition to a circular economy, pollution prevention and control, and protection and restoration of biodiversity and ecosystems). The AgriDataValue consortium is committed to take all necessary measures to ensure that all project activities comply with the GDPR/European Chart of Fundamental rights and all data protection-relevant EU regulations, soft law, standardization, and policy initiatives. AgriDataValue consortium is well aware of the importance of personal data privacy preservation, as well as of the regulation and legislation in the EU.

The AgriDataValue will be validated via 24 Use cases in 23 pilots carried out across 9 countries, representing more than 181,000ha with 25 types of crops that span from southwest to northeast Europe, outdoor and greenhouse crops, organic and non-organic production, and more than 2,000 animals of 5 types (Beef Cattles, Dairy Cows, sows, piglets, fattening pigs). In addition, more than 4,200 farmers will provide insights and more than 89,000 will be directly informed. The AgriDataValue consortium is committed to take all necessary measures to ensure that all project activities comply with the relevant EU regulations and comply with the Horizon Europe ethical standards (REGULATION (EU) 2021/695, Article 19)

This Deliverable responds to task 5.1 and is in line with task 7.5 guidelines covering data protection, privacy, ethical, social, and legal issues (PIA+) of the Agri framework. This document also includes information and feedback that has been collected during the second interactive workshop that took place on July 1st, 2025, where the consortium partners:

1. Were updated on the key ethical, legal, social and privacy related themes of the ADV platform, and how the ADV platform was designed to address them;
2. Were updated on Data Privacy issues from experts;
3. Were presented with Data privacy related approaches, practices, and plans followed in other EU projects.

During that workshop, three (3) agri-related EU projects presented their approach while discussion focused on the personal data collection and protection. In addition, two (2) external organisations presented an overview the status of several Data Privacy topics that are considered crucial, particularly in EU projects and the domain of interest.

The aim of this document is to be self-contained so that the reader need no referencing to the previous version; therefore, content that is still valid and relevant to the task at hand has not been removed. The main updates in this section can be found in sections 7, 0, 9, 13, and 16.

1.1 Intended audience

The document will be delivered to the European Commission and will be communicated to all project partners of the AgriDataValue project regarding the project data Privacy, Ethical, GDPR, Legal & Regulatory Compliance (PIA+) issues. The general indications for the project deployment have been defined in the European Commission Grant Agreement (EC-GA), the Description of Action (DoA), and the Consortium Agreement (CA).

The present deliverable D5.2: Data Privacy, Ethical, GDPR & Regulatory Compliance V2 is the final of two (2) deliverables provided within the WP.5 Steady validation and adaptation to strengthen LMAA ecosystem capacities. This document does not replace any of these established agreements.

1.2 Document overview

This document, as the previous version, is divided into 20 chapters, all including any necessary updates compared with the previous version:

- Chapter 2 includes general information on Ethics that are applicable in the AgriDataValue project.
- Chapters 3-4 include information on human participants in the project and how research participants can be identified and/or recruited.
- Chapters 5-6 include information about informed consent procedures in the project and sample templates for such forms.
- Chapters 7-14 include information about data privacy and protection within the AgriDataValue project such the project's DPO, processes for data minimisation, anonymisation/pseudonymization, security measures, and precautions for data transfers between EU and other countries.
- Chapters 15-19 include information specific to aspects such as AI and animals within the project, data in the project's pilots and use cases, environmental impact of the project, as well as health and safety procedures that need to be applied.
- Chapter 20 includes the conclusions of the deliverable.

2   Ethics in AgriDataValue

The Consortium of AgriDataValue understands that research projects should address ethical implications. In this deliverable, as well as in its previous version, we once again demonstrate the commitment to respect the EU ethical standards and rules. The ethical standards and guidelines have been and will be rigorously applied, regardless of the country in which the research takes place. All partners have equal responsibility for meeting ethical and legal requirements in the context of the work they undertake in the project.

AgriDataValue aims on delivering an end-to-end data-aware, federated platform of platforms in the agri-environment domain, in order to optimize the complete "Data Path": data collection, storage, transfer, processing and querying, with a primary purpose for its operations being fully environmentally sustainable. The overall implementation of AgriDataValue project is fully compliant with the "do no significant harm" principle as per Article 17 of Regulation (EU) No 2020/852, since it is designed in a way that it is not harming any of the 6 environmental objectives of the EU Taxonomy Regulation.

Ethics also extends to how individuals behave and interact in their relationships. For research funded by the EU, ethics assumes a pivotal and integrated role throughout the entire research journey. It is imperative to conduct a thorough ethical assessment to tackle any potential issues or challenges that may arise during the research process. AgriDataValue complies with EU, international and national law on ethical principles in all project activities including activities involving humans. In addition, AgriDataValue) commits to and respects basic EU values such as respect for human dignity, freedom, democracy, equality, the rule of law and human rights, including the rights of minorities, in accordance with Article 14 – Model Grant Agreement (MGA)

AgriDataValue follows and complies with the guiding principles of regulation (EU) 2021/695, which establishes Horizon Europe. The consortium confirms that all project activities align (and will align) with the European Code of Conduct for Research Integrity issued by All European Academies (ALLEA). AgriDataValue complies to the Charter of Fundamental Rights of the European Union and the European Convention of Human Rights, as well as to all relevant laws, regulations, and ethical principles to achieve and maintain the highest standards of research integrity.

Actions carried within the project conducted in accordance with Article 19 – Regulation (EU) 2021/695 and Particular attention has been paid to the principle of proportionality, to the right to privacy, the right to the protection of personal data, the right to the physical and mental integrity of a person, the right to non-discrimination and to the need to ensure protection of the environment and high levels of human health protection.

Though the project pilots will involve volunteers (section 3), only their opinion and feedback on the AgriDataValue platform efficiency will be collected and processed. The AgriDataValue project activities evaluate informed consent to guarantee voluntary participation in research as it is one of the most important procedures to address privacy issues in research.

AgriDataValue, as described in sections 3, 4, 5, 7, 0, 9, 10, 11, 12, 13, 17) of this document, complies fully with the General Data Protection Regulation (GDPR)/European Chart of Fundamental rights and all data protection relevant EU regulations. Furthermore, the project is aligned with all Legal & Regulatory Compliance (PIA+).

Animals are involved within the AgriDataValue research activities. The project collects data using environmental sensors and collars that do not affect the animal life or wellbeing (section 16).

Finally, AI modeling is incorporated within the AgriDataValue research activities without any use in humans, human life or any dual use potential (section 7). In Addition, the use of AI technology by the project is done based on sustainable practices (section 7).

2.1 Relevant laws, regulations, and frameworks

The overall implementation of AgriDataValue project is fully compliant with the "do no significant harm" principle as per Article 17 of Regulation (EU) No 2020/852, since it is designed in a way that it is not harming any of the 6 environmental objectives of the EU Taxonomy Regulation. Moreover, the AgriDataValue consortium is committed to take, and have been taking, all necessary measures to ensure that all project activities comply with the GDPR/European Chart of Fundamental rights and all data protection relevant EU regulations, soft-law, standardization, and policy initiatives.

AgriDataValue consortium includes NETCOMPANY-INTRASOFT as Legal and Ethical compliance monitoring company, which has significant legal and ethical competence and other large companies (NETCOMPANY, SIEMENS, ALMAVINA, SIXENSE) with dedicated departments whose task will be to ensure the respect for fundamental rights (privacy and personal data protection in particular) and ethical principles. AgriDataValue consortium is well aware of the importance of personal data privacy preservation, as well as of the regulation and legislation in EU.

The following list mentions the main background documents that have been taken continuously into consideration during the deployment of the different research activities:

- Article 19 – Regulation (EU) 2021/695 establishing Horizon Europe

- Article 14 – Model Grant Agreement (MGA)

- Nuremberg Code (1947)

- World Medical Association (WMA)declaration of Helsinki (1964)

- Convention for the Protection of Human Rights and Dignity of the Human Being (Oviedo, 4 April 1997) (Oviedo Bioethics Convention)

- Charter of Fundamental Rights of the EU (2000/c 364/01)

- General Data Protection Regulation (GDPR) (Regulation (EU) 2016/6795)

- European Charter for Researchers (2000)

- European Code of Conduct for Research Integrity (ALLEA 2017)

- Ethics in Social Science and Humanities (European Commission, DG Research and Innovation, 2018)

- Horizon Europe regulations

- Guide for Research Ethics Committee Members (Steering Committee on Bioethics, 2010)

3 Human participants in AgriDataValue project

AgriDataValue activities involve human participants for the evaluation of the technologies to be established and human participants are expected to take part in surveys, workshops as well as the projects use cases. Even though the project pilots involve volunteers, no personal data is processed or stored; only the volunteers' opinion and feedback on the AgriDataValue platform efficiency is collected and processed, via a fully anonymized process. In any case, all humans (i.e., personnel, researchers, citizens) participating in the AgriDataValue project are informed in detail and in writing on the project activities and benefits of the project on agricultural and climate change protection. Participants to the pilots activities were contacted using email, phone, and other forms of digital and physical communication channel that is available within the project partners. Participants in the surveys and scenario exercises are selected on the basis of their profession function/role. Participation in AgriDataValue project is voluntary and anyone has the right to refuse to participate and to withdraw his/her participation. The research activities that may involve human participants are described in the present document. Furthermore, the AgriDataValue ethical guiding principles and strategy have been made clear in the Grant Agreement.

3.1 Project Use cases and pilots

The AgriDataValue consortium is committed to take all necessary measures to ensure that all project activities comply with the relevant EU regulations and comply with the Horizon Europe ethical standards (REGULATION (EU) 2021/695, Article 19). The AgriDataValue technological tools, mechanisms and Lean Multi-Actor Approach (LMAA) analyzed in the previous sections will be fully tested and validated during the AgriDataValue project lifetime through 24 Use Cases (UC) in 23 pilots in 9 countries, representing more than 181,000ha with 25 types of crops that span from southwest to northeast Europe, outdoor and greenhouse crops, organic and non-organic production, and more than 2,000 animals of 5 types. In addition, more than 4,200 farmers will provide insights and more than 89,000 will be directly informed.

The use cases, according to deliverable D1.2, have been grouped in seven (7) clusters, addressing similar domains in different regions, crops, cultural, societal, and farming contexts. The UCs were updated as the project progressed and end users needs were further captured and analyzed. Moreover, the pilots were refined in Deliverable D3.4. In case of any inconsistency, the information included in D1.2 and D3.4 will considered valid.

The AgriDataValue use cases:

Use Case Cluster 1	Sector: Arable Crops
Countries	Poland, Netherlands, Latvia, Greece, Belgium, Romania
Crops	Grain (wheat, hard wheat, corn, rye, oats, sugar beet), tuber (potato, onions), forage (clovers, corn)
Partners	Inagro, ZSA, Delphy, TBA, UL, BIORO

Use Case 1 purpose: The UC Cluster 1 is focused on Arable Crops and aims to optimize the quality and quantity of the crops, while lowering the environmental footprint. In detail, the objective of UC Cluster 1 is to optimize the quality and quantity of the arable crop production, reduce environmental footprint and increase environmental sustainability of the crop production, and optimize the natural resources utilization by reducing the wasted irrigation water, reduce or replace chemical fertilizers with organic ones, reduce or replace chemical pesticides with organic ones, reduce the consumed energy and/or increase the renewable energy mix. The approach to realize the UC cluster 1 objectives is to combine agricultural knowledge, historical data, (real-time) ICT systems and Big Data processing technologies such as IoT sensors, edge cloud, drones/satellite visual/multispectral images

and AI models and train ML-based Decision Support Systems (DSS) and applications to provide advice on improved crop production. The demonstration will take place in Poland, Netherlands, Latvia, Greece, and Belgium.

Use Case Cluster 2	Sector: Vegetables
Countries	Poland, Latvia, Spain, Belgium
Crops	Alliaceae (leek), Apiaceae (celeriac, fennel, carrots), Pulse (beans, peas), lettuce, tomato, cucumber
Partners	Inagro, TEC, UL

Use Case 2 purpose: The UC Cluster 2 is focused on the Vegetables Crops and aims to optimize the quality and quantity of the crops, while lowering the environmental footprint. In detail, the objective of UC Cluster 2 is to improve precision irrigation and fertilization, mainly via automatization of irrigation and fertilization, and to predict more accurate harvesting time to crop increased production/diseases predictions. It will involve IoT sensors, edge cloud, radiation/chlorophyll/pH metering, multiple data platforms with geotagged photos alone with drones/satellite multispectral imagery. The demonstration will take place in Poland, Latvia, Spain and Belgium.

Use Case Cluster 3	Sector: Trees/Vineyards
Countries	Netherlands, Spain, Greece, France, Italy, Romania
Crops	Apples, Pear, non-citrus fruit trees, Kiwi, (Biological) Olives, (Biological) Grapes/Vineyards
Partners	SARGA, RiNO, Nileas, CVSE, DELPHY

Use Case 3 purpose: The UC Cluster 3 is focused on Tree/Vineyard crops and aims to focus on use cases related to disease/frost detection, improve quality of vegetables, optimize the quality and quantity of the crops, while lowering the environmental footprint. In detail, the objective of UC Cluster 3 is to protect the health and quality of fruit trees and vineyards crop, to increase quality and quantity, avoid diseases with less pesticides, and to foresee and mitigate frost and heil. The Cluster involves IoT sensors, edge cloud, geotagged photos, and drones/ satellite multispectral imagery. The demonstration will take place in the Netherlands, Spain, Greece, France, Italy, and Romania.

Use Case Cluster 4	Sector: Livestock
Countries	Belgium, Latvia, Greece
Animals	Cattle (Beef Cattles, Dairy Cows), Pigs (Sows, piglets, fattening pigs)
Partners	EV ILVO, ZSA, TBA

Use Case 4 purpose: The UC Cluster 4 is focused on livestock and aims to focus on use cases related to reduction of gas emissions, reduction of nitrogen deposition, and proactive livestock health/welfare and calving monitoring.

Objectives: In detail, the objective of UC Cluster 4 is to use edge cloud and real-time IoT sensor data (e.g. neck collar, feeders, emission sensors) together with GPS location data to monitor the cattle/pig health, activity, feeding and calving, to proactively control milk and meat quality, and to reduce the GHG emissions and nitrogen deposition. The demonstration will take place in Belgium, Latvia, and Greece.

Use Case Cluster 5	Sector: Cross Sector
Countries	Greece
Crops/Animals	Cattle, Pigs, Forage (clovers, corn), Olive production, Winery production
Partners	TBA, Inagro, SIXEN, ALMA

Use Case 5 purpose: The UC Cluster 5 is focused on Cross Sectors' applications and aims to underline AgriDataValue focusing on a business-oriented dimension. In detail, the objective of UC Cluster 5 is to validate cross domain use cases (fruit, vineyards, livestock, milk, oil, biogas, manure, energy), and to address both supply and demand sides of the supply chain, including interoperability and traceability of platforms, electricity production and waste management. The demonstration will take place in Greece.

Use Case Cluster 6	Sector: CAP realization
Countries	N/A
Crops/Animals	N/A
Partners	SIMA, ALMA, SINER, SYN, NPA, APPAG, APIA

Use Case 6 purpose: The UC Cluster 6 is focused on CAP realization tools/applications and aims to underline AgriDataValue focusing on a CAP monitoring tools. In detail, the objective of UC Cluster 6 is to assess and manage the risk through modern ML, aiming to reduce the use of pesticides, fertilisers, and antibiotics, to bring forward modern crop monitoring technologies (e.g. automatic pixel classification of satellite images, automatic processing of data received from in-situ sensors), to benchmark eco-scheme monitoring tools to support the new CAP towards fair income, land use protection and environmental care.

Use Case Cluster 7	Sector: Climate monitoring
Countries	N/A
Crops/Animals	N/A
Partners	SIXEN

Use Case 7 purpose: Climate change poses significant challenges to the agricultural sector, impacting crop growth, livestock production, and overall farm productivity. To effectively adapt to these changing conditions and build resilience, farmers and policymakers rely on climate monitoring as a crucial tool. Climate monitoring refers to the

systematic observation and analysis of weather patterns, atmospheric conditions, and long-term climate trends. This essay explores the role of climate monitoring in agriculture, its importance, the advantages it brings to the sector, and real-life use case examples showcasing its potential in improving agricultural practices and outcomes. A number of Climate related use cases that mainly target Climate Monitoring and their influence in various activities of the project are defined.

AgriDataValue Pilots

The AgriDataValue pilots will demonstrate how the project creates real impact in the agricultural domain and contributes to climate change reduction. The pilots, summarized in table Table 1 below, will also be used to collect sensor data and feedback from the involved end-users, and monitor and adapt the pilots over the project lifetime.

AgriDataValue Pilots will be conducted in the following 9 Countries (EU member states): Poland, the Netherlands, Latvia, Greece, Spain, Belgium, Italy, France, and Romania.

Table 1: Pilot summary

#	Crops/Animals	Farmers Involved		Country	Partners Involved
		Directly	Indirectly		
P1	Wheat, Com, Rye, Oats	1000	>6000	Poland	UL
P2	Potato, Onions, Sugar Beet	15	>1200	Netherlands	Delphy
P3	Wheat and hard wheat	1	>2000	Latvia	ZSA
P4	Forage (clovers, corn)	15	>5000	Greece	TBA
P5	Potatoes, Celeriac, Leek, Maize, Winter wheat	2	>1000	Belgium	Inagro
P6	Greenhouse Tomato & cucumber	2	>500	Spain	TEC
P7	Belgian Endives	5	>500	Belgium	Inagro
P8	Leek	10	>1000	Belgium	EV ILVO
P9	Potatoes	2	>800	Belgium	EV ILVO
P10	Arable crops and vegetables	8	>500	Belgium	Inagro
P11	Apple and Pear trees	2	>1000	Netherlands	Delphy
P12	Non-Citrus Fruit Trees	50	>2	Spain	SARGA
P13	Vineyards	2	>12000	Greece	TBA
P14	Vineyards	900	>5000	France	CVSE
P15	Vineyards	20	>500	Italy	RI.NO
P16	Olive Trees	20	>800	Greece	NILEAS
P18	Cereals	1	>10000	Romania	BIORO
P19	Dairy Cows	-	>200	Belgium	EV ILVO
P20	Beef Cattle	1	>24000	Latvia	ZSA
P21	Beef Cattle	2	>12000	Greece	TBA
P22	Pigs	0	>1000	Belgium	EV ILVO
P23	Biogas electricity generation	10	>20000	Greece	TBA

4 Identify/Recruit research participants

This section describes the procedures and criteria used to identify/recruit research participants in the AgriDataValue project. All humans involved in the project are EU adult citizens, equally representing different professions, nationality, and gender. The Partners of the project identify, select, and recruit the research participants according to the relevant activities of their responsibility. AgriDataValue is committed to respecting the EU ethical standards and rules. Ethics principles, laws, and regulations are being followed fully, as described in section 2.

4.1 Data Protection and Privacy

The AgriDataValue project commits to following all relevant data protection laws and formal regulations. The project complies and implements the GDPR regarding data protection and privacy to all relevant project activities. The consortium is committed to take all necessary measures to ensure that all project activities, as well as the recruitment of research participants, comply with the standards defined by the EU GDPR/European Chart of Fundamental rights and all data protection- relevant EU regulations, soft law, standardization and policy initiatives, as previously mentioned.

AgriDataValue has been developed and is operating in a highly regulated environment. Task 5.1 along with Task 7.5 both led by INTRA provide all consortium members with guidelines that summarize the findings in ethics, legislation and data protection, point out areas of relevance and include actionable recommendation for the development process. As this field is particularly volatile, developments are being monitored in order to keep the Consortium Members up to date about relevant developments. In addition, Deliverable D3.4 – Smart Farming pilots & Data Management Plan (DMP) V2 in M24 provided an update on the project DMP and open data, along with procedures (to be) used at pilot sites.

The present document deals with issues of personal data processing and the security measures that are or will be implemented in AgriDataValue while AgriDataValue ethics are being coordinated by the project's Data Protection Officer (DPO) ***Despina Anastasopoulos*** from INTRA, who ensures the compliance of the project with ethics codes and legislations.

4.2 Gender Balance

Gender balance is taken seriously by the AgriDataValue. Even though "*the integration of the gender dimension (sex and gender analysis) in research and innovation content is not a mandatory requirement*" in the specific call, AgriDataValue still ensures equality in project activities from three perspectives:

(1) **Gender empowerment and human development.** As the UN Women agency reported, AI and ICTs have a huge potentiality for the achievement of Sustainable Development Goals (SDGs), specifically SDG 5 "Achieve gender equality and empower all women and girls". AgriDataValue enforces sustainable development from data sources to inform policy interventions on economic, social, and environmental pillars essential to highlight the role of gender dimension in business and society.

(2) **Gender in leadership position.** AgriDataValue overcomes any socio-cultural barriers that discourage or prevent females from progressing and moving into senior leadership positions.

(3) **Gender in design the project's Pilots/Living Labs.** AgriDataValue selects the farmers/volunteers sets to include an appropriate representation of all genders and considers the gender component in every assessment.

4.3 Research integrity and good research practices

AgriDataValue places significant emphasis on research integrity. All partners of the project follow the ethical principles and applicable EU, international and national law, including the EU Charter of Fundamental Rights and the European Convention for the Protection of Human Rights and Fundamental Freedoms and its Supplementary Protocols. The project is aligned with the European Code of Conduct for Research Integrity published by All European Academies (ALLEA) and adhere to the ETHICS (— ARTICLE 14) of the AgriDataValue GA. Good research practices are being followed throughout the research activities of the project including ensuring, where possible, openness, reproducibility and traceability and refraining from research integrity violations.

4.4 Understanding procedures

Details on the procedures have been provided to all participants by the AgriDataValue members. Participation in the project is voluntary and the participant has the right to refuse and withdraw their participation, or data at any time without any consequences. The consortium members inform the potential participants regarding the methods and implications of the research, the nature of the participation and any benefits, risks, or discomfort that might ensue, in a language and in terms that participant can fully understand and obtain their informed consent in advance.

4.5 Participants freedom

For each investigation activity, details on the used procedures and criteria are readily made available to the participants. It is at the participant's discretion as to whether s/he wishes to participate in the investigation activity or not. They have a chance to judge whether it is worthwhile taking the time and making the effort to share information with the project. Participants are asked to give their informed consent to participate as part of negotiating the terms of the relationship with the research team.

5 Informed consent procedures

AgriDataValue activities involve human participants for the evaluation of the technologies to be established and human participants are expected to take part in surveys, workshops as well as crop/livestock use cases. The project pilots involve volunteers, while only their opinion and feedback on the AgriDataValue platform efficiency is collected and processed via a fully anonymized process. All humans (i.e., personnel, researchers, citizens) participating in the AgriDataValue project are informed in detail and in writing on the project activities and benefits of the project on agricultural and climate change protection. An individual agreement is given to the participants. The AgriDataValue consortium is committed to respecting individual rights and freedom in every stage of the research in compliance with the national, international, and EU regulations and the EU GDPR.

The informed consent procedure consists of the Information Sheet (section 6.1) and the Consent Form (section 6.2). Before the activity takes place, these documents are provided in written by the partners to the potential participants. Once the subjects or their legally authorized representatives sign the forms, they are given a copy, while the original is kept in the subject's research record by the Partner responsible for organizing the Project activity involving humans. Each Partner involved is responsible for collecting and securely storing the consent forms. The responsible Partner safeguards the Consent forms in a secure location until they are either destroyed or needed by the Ethics Committee (EC) or Research Ethics Board (REA).

5.1 Voluntary and appropriately informed participation

The humans involved in the AgriDataValue project are adults voluntarily participating. Furthermore, participants equally represent different educational levels, professions, nationality, and gender. They are fully informed about the potential risks and benefits involved, and efforts are made to prevent unrealistic expectations. Participants provide their consent to take part in the specific project research activities, willingly and without any coercion. The partners of the project also ensure that informed consent is obtained and privacy, as well as data confidentiality is maintained. Throughout the entire process, the partners aree accessible to participants, offering any essential information they may require.

6 Templates for the informed consent/assent forms and information sheets

In this chapter, you can find templates and information sheets intended for partners who involve humans in research activities. These templates include informed consent/assent forms and information sheets covering topics such as voluntary participation and data protection. They are presented in a language and format that the participants can easily understand, including contact details for the Data Protection Officer (DPO) for host institutions required to appoint one under the General Data Protection Regulation 2016/679.

The provided templates and information sheet are essential tools to inform research participants about the project and to obtain their consent. Consortium partners involved in research activities that require interaction with human participants must utilize these templates to inform the individuals involved about the project and the specific activities they are participating in and to obtain their consent for participation.

6.1 The AgriDataValue project information sheet

The following document is a template of the Information Sheet that is given to individuals prior to their involvement in the project. The Information sheet will be adapted according to the specific project activities.

Information Sheet

About the Project

AgriDataValue aims to establish itself as the "*Game Changer*" in Smart Farming digital transformation and agri-environmental monitoring, and strengthen the smart-farming capacities, competitiveness and fair income by introducing an innovative, open source, intelligent and multi-technology, fully distributed Agri-Environment Data Space (ADS). AgriDataValue adopts and adapts a multidimensional approach that combines state of the art big data and data-spaces' technologies with agricultural knowledge, monetization, new business models and agri-environment policies, leverages on existing platforms, edge computing and network/ services, and introduces novel concepts, methods, tools, pilot facilities and engagement campaigns to go beyond today's state of the art, perform breakthrough research and create sustainable innovation in upscaling (real-time) agricultural sensor data, already evident within the project lifetime. AgriDataValue will develop an efficient, massively distributed, open-source, privacy-preserving, federated AI-based platform, aiming at capturing and managing agri-environment data, from a variety of heterogeneous data sources, enabling trustworthy secure and GDPR compliant interoperability and data sharing across end-users, industries and organizations.

To this extent, it has been established a Consortium among several companies and institutions among which we as ……………………………… [please insert your organization name] are responsible for *pilots/training/evaluation activities* [strike out as needed].

Start date of the project/activity (ies)

End date of the project/activity (ies)

Purpose of the pilot

The AgriDataVAlue pilots aim to test and validate the AgriDataValue tools in the following pilots:

- **Use Case 1, …:** Pilots will evaluate
- **Use Case 2:**
- Use Case 3:
- Use Case 4:
- Use Case 5:

Voluntary Participation

Your participation is entirely voluntary and free of charge, as well as your consent to participate in the AgriDataValue Project as described above. It is your choice to participate or not. You might change your mind later and stop participating even if you agreed earlier at any time without any negative consequence. The duration of the participation will be ……… months.

Risks

No risks are involved for the participants because the data collection is completely anonymous.

By granting your consent to participate in the activities indicated above, you commit yourself to follow all the security procedures that will be deemed necessary to protect your individual safety.

Benefits

There will not be a direct benefit for you, but your participation is an opportunity to learn skills and get useful experiences.

Reimbursement
You will not receive any incentives to take part in the research.

Data Protection
We will process your personal data for the purposes of the AgriDataValue Project. Only information that is necessary to address the central purpose of the research will be recorded, and the data will be anonymised at the point of collection. Your name or any information that could identify you or relate to your identity will not be linked with the research materials. The personal data will be securely stored and retained for the lifetime of the Project and safely deleted afterward.

Your personal data will be treated as strictly confidential and handled in accordance with the provisions of the Charter of Fundamental Rights of the EU (2000/c364/01), Convention No. 108 of the Council of Europe for the Protection of Individuals and Regulation (EU) 2016/679 ("**GDPR**"). You can find more details in the attached Privacy Notice.

If you have any questions about the activities or the Project itself, any problems, unexpected physical or psychological discomforts, any injuries, or think that something unusual or unexpected is happening I am free to contact:

_____   _____   _____
Name of participant   Signature   Date

_____   _____   _____
Name of pilot DPO   Signature   Date

Thank you for taking part in the AgriDataValue pilot.

Annex I

Privacy Notice

Introduction
Company "…." is established in Company's Address, (hereinafter "Company", "we" or "Us") and it is committed to ensure the security and privacy of your Personal Data. As a Data Controller, the Company takes its responsibility regarding the security and privacy of Personal Data very seriously and is going to be transparent about the type of data it collects and how it is being handled.

Pursuant to article 5 of the General Data Protection Regulation (EU) 2016/679 ("GDPR"), the Processing of the Personal Data carried out by the Consortium for the implementation and execution of the Project will be based on the principles of lawfulness, fairness, transparency, purpose limitation, data minimization, accuracy, storage limitation, integrity, and accountability.

To this extent, please read the following Privacy Policy (hereinafter the "Privacy Policy") that explains the reason for the processing of your Personal Data, the way we collect, handle and ensure the protection of all Personal Data provided, how that information is used and what rights you have in relation to your Personal Data.

Any term indicated in capital letter shall have the meaning attributed to it within the GDPR, or otherwise provided hereto.

Contact Details
If you would like to exercise your rights under GDPR, or if you have comments, questions, or concerns, or if you would like to submit a complaint regarding the collection and use of your Personal Data, please feel free to contact our project DPO, Despina Anastasopoulos from Netcompany-Intrasoft, at the following email address despina.anastasopoulos@netcompany.com

Data Controller
The Data Controller of your Personal Data will be the Company.

Personal Data Processing and Lawful Basis
The Company will process the Personal Data that you will voluntarily and directly provide and/or disclose in connection with the invitation to participate in the Smart Agriculture use cases of the AgriDataValue project.
We may ask you to provide us with your Personal Data such as first name, last name, address, and e-mail. We may also publish video or photographs of your image in case of pilot activities in which you participated. The Company will also process your Personal Data that you will voluntarily provide to us to post a comment or to send a message to the Company itself.
Without prejudice to the above, we collect your Personal Data only with your Consent and only if it is necessary for the Project.
We also may process your Personal Data if it is necessary for compliance with a legal obligation to which the Data Controller is subject.
The lawful basis pursuant to which the Coordinator will process your Personal Data shall be your free and informed consent to the data processing itself given at the moment of the execution and entry into force of the Invitation Letter, with reference to the processing of your name and surname, contact details, job title and, experiences.
Your Personal Data will not be used for any automated decision-making including profiling.

Purpose of Personal Data Processing
We will process your Personal Data exclusively within the purposes of the research for the AgriDataValue project. In particular, we will process your Personal Data to be able to get in contact and inform you by email or phone about the upcoming meetings or pilot activities for AgriDataValue use cases.
Any other further processing of your Personal Data will be excluded without your previous consent.

Recipients of Personal Data and Personal Data Transfer
Access to your Personal Data is provided to the Company that is responsible for carrying out this Processing operation and to authorised staff according to the 'need to know' principle. Such staff abide by statutory, and when required, additional confidentiality agreements.
However, we may disclose your information in order to comply with the law, a judicial proceeding, court order, subpoena, or other legal process or where we believe it is necessary to investigate, prevent or take action regarding illegal activities, suspected fraud, situations involving potential threats to the safety of any person or as evidence in litigation in which we are involved.

Retention period
The Company only keeps your Personal Data for the time necessary to fulfill the purpose of the AgriDataValue project and will be destroyed when no longer needed for that purpose. This does not affect your right to request that we delete your personal data before the end of its retention period. We may archive personal data (which means storing it in inactive files) for a certain period prior to its final deletion, as part of our ordinary business continuity procedures.

How we protect and safeguard your Personal Data
All processing is carried out in compliance with article 32 of the GDPR, with the adoption of appropriate security measures. Technical measures include appropriate actions to address security, risk of data loss, alteration of data, or unauthorised access, taking into consideration the risk of the processing and of the nature of the Personal Data. Organisational measures include restricting access to the Personal Data solely to authorised persons or third parties where legitimated by the Data Controller for the purposes of processing operation.

Which your rights are and how you can exercise them
The Company would like to make sure you are fully aware of all of your data protection rights. Every user is entitled to the following:
The right to be informed. You have the right to be provided with clear, transparent, and easily understandable information about how we use your information and your rights. This is why we are providing you with the information in this Privacy Notice.
The right of access. You have the right to obtain access to your Personal Data subject matter of the Data Processing. This will enable you, for example, to check that we are using your Personal Data in accordance with the relevant data protection law. If you wish to access the information we hold about you in this way, please get in touch (please see section Contact Details). The right to rectification. You are entitled to have your Personal Data corrected if it is inaccurate or incomplete. You can request that we rectify any errors in the information that we hold by contacting us (please see section Contact Details).
The right to erasure. This is also known as 'the right to be forgotten and, in simple terms, enables you to request the deletion or removal of certain of the Personal Data that we hold about you by contacting us (please see the section Contact Details). Please remember that it is possible that pursuant to any applicable law you may not have all your Personal Data erased.
The right to restrict processing. You have rights to 'block' or 'suppress' certain further use of your Personal Data. When processing is restricted, we can still store your Personal Data, but will not use it further.
The right to data portability. You have the right to obtain your personal information in an accessible and transferrable format so that you can re-use it for your own purposes across different service providers. This is not a general right however and there are exceptions. To learn more please get in touch (please see the section Contact Details). The right to withdraw consent. If you have given your consent to anything we do with your Personal Data (i.e. we rely on consent as a legal basis for processing your information), you have the right to withdraw that consent at any time. You can do this by contacting us (please see section Contact Details). Withdrawing consent will not however make unlawful our use of your information while consent had been apparent.
The right to object to processing. You have the right to object to certain types of processing. You can for example object to the publication of pictures taken of you within the context of pilot activities.
Where you wish to exercise your rights in the context of one or several specific processing operations, please provide their description in your request.Your requests will be handled within a maximum of 30 (thirty) working days.

Changes
Where appropriate, we will notify you of any changes to this privacy policy, for example by email or push notification.

Entry into force
The present Privacy Policy entered into force on the Xth of Z 202Y.
Last update X/Z/202Y.

6.2 The ADV project consent Template

The following Informed Consent template document will be adapted according to the activities to be performed.

Informed Consent Template

I ……………………………………… agree to voluntarily participate in the following pilot(s)
Please tick the appropriate boxes

Pilot Activities	YES	NO
Crop-based farming:	☐	☐
Livestock farming:	☐	☐
Vegetable/Fruit farming:	☐	☐

Which will take place in

Pilot Location	YES	NO
Poland	☐	☐
France	☐	☐
Netherlands	☐	☐
Latvia	☐	☐
Greece	☐	☐
Belgium	☐	☐
Spain	☐	☐
Italy	☐	☐
Romania	☐	☐

I declare & confirm that	YES	NO
Taking Part		
I have read and understood the project information sheet dated …/…./…….., as well as what activities the pilot use cases involve.	☐	☐
I have been provided with the relevant Privacy Notice, as well as a copy of the Information Sheet.	☐	☐
I have been given the opportunity to ask questions about the project and all my questions have been answered to my satisfaction.	☐	☐
I agree to take part in the project. Taking part in the project may include being interviewed and recorded (audio or video).	☐	☐

I understand that my participation is voluntary. I can withdraw from the pilot at any time and I do not have to give any reasons for why I no longer want to take part. In case of withdrawal, I will not be penalised for withdrawing nor will I be questioned on why I have withdrawn.	☐	☐
Use of the information I provide for this project only		
I understand that my personal details such as phone number and address will not be revealed to people outside the project without my consent.	☐	☐
I understand that my personal details such as phone number and address will be deleted after the project ends. I understand that my personal details will be deleted before the project end upon my request.	☐	☐
I understand that my personal data will be processed in accordance with GDPR and any other applicable laws.	☐	☐
Use of the information I provide beyond this project		
I agree for the data I provide to be archived at the data repository selected by AGRIDATAVALUE in an anonymized form	☐	☐
I understand and agree that other authenticated researchers may have access to these data only if they agree to preserve the confidentiality of the information as requested in this form.	☐	☐
I understand and agree that other authenticated researchers may use my words in publications, reports, web pages, and other research outputs, only if they agree to preserve the confidentiality of the information as requested in this form.	☐	☐
Consent Certification		
I agree to voluntarily participate in the pilot activities of the AgriDataValue project as a tester/ operator [strike out as needed].	☐	☐

_____   _____   _____

Name of participant   Signature   Date

_____   _____   _____

Name of Pilot DPO   Signature   Date

7 Data within the AgriDataValue project

The AgriDataValue project has adopted a high degree of transparency. The consortium is committed to follow all the relevant rules, in line with the highest ethical standards and the applicable EU, international and national law on ethical principles (Article 14 – Ethics of the Grant Agreement). Furthermore, the consortium pays particular attention to the protection and privacy of personal data and in accordance with the EU's 2016 General Data Protection Regulation (GDPR 2016/679). AgriDataValue ethics will be coordinated by the project's Data Protection Officer (DPO), Despina Anastasopoulos from INTRA (see section 8). Human participants are expected to be requested to take part in surveys, workshops as well as crop/livestock use cases; yet, no personal or sensitive data as defined in the GDPR, i.e. "personal data revealing racial or ethnic origin, political opinions, religious or philosophical beliefs, or trade union membership, and the processing of genetic data, biometric data for the purpose of uniquely identifying a natural person, data concerning health or data concerning a natural person's sex life or sexual orientation", will be collected, stored or processed, and no data will be shared between EU and non-EU countries.

7.1 Research data management

AgriDataValue Use Cases will generate datasets, which will be shared based on AgriDataValue Data Management Plan (DMP), developed, and reported in the context of Task 3.1 led by EV ILVO and in-line with EU privacy and data protection regulations, through the Open Research Data Pilot (ORD Pilot) and following the principles of:

Findability: To facilitate findability, AgriDataValue will a) publish the datasets in trustworthy repositories (e.g., 4TU.Research Data, EOSC, Zenodo), b) use standardized naming conventions (e.g., comply with ISO/IEC 11179-5:2005), c) use identifiers, which are persistent, non-proprietary, open and interoperable (e.g. leveraging existing sustainable initiatives such as ORCID for contributor identifiers and DataCite for data identifiers) and d) include datasets' annotation and rich metadata, describing the data, and making sure they are findable through disciplinary discovery portals (local and international).

Accessibility: After anonymization, AgriDataValue dataset will become and remain accessible using a) open, permanent, non-proprietary repositories and non-proprietary indexing (also facilitating findability), and common formats will be used. Also, AgriDataValue will consider authentication and authorization in specific accessing procedures where datasets are confidential or private. Even in the case of private data, metadata and owner contact information will be available.

Interoperability: To facilitate interoperability AgriDataValue data and metadata will follow a) *Standards compliant format* (e.g., Dublin Core Metadata Initiative, DCMI) to address the interoperability requirement with other data sources in the linked data environment, b) *Standards vocabulary* (e.g. DCMI uses natural language definitions that can be instantly converted into open machine-readable formats such as XML and JSON) and c) Design *standards based digital data models and ontologies* (e.g. WMO Codes Registry or GRIB Discipline Collection ontology).

Reusability: AgriDataValue open datasets will have *clear and accessible usage licenses*, to inform the permitted kind of reuse, including provenance information. These licenses will permit any interested 3rd party to further re-use the data under specific terms of conditions. The *Creative Commons (CC)* licensing scheme will be used to make it possible for others to mine, exploit and reproduce the data. *Business friendly licenses* (i.e., EPL 2.0, LGPL v3) will be also considered for the AgriDataValue open-source software components.

Curation and storage/preservation costs: A Data Manager Officer will be identified for each pilot for overseeing data gathering and quality management and creating/executing the DMP of each pilot site. Provisions for data

curation and preservation will be accordingly made in the project's exploitation plan. In principle, the preservation and curation of the data beyond the end of the project will be ensured through: a) utilization of **permanent repositories** such as the European Open Science Cloud, b) **Detailed documentation** provided at project (i.e. project methodology), file (i.e. how the dataset files interrelate) and component (i.e. used variables) level, c) **formal versioning methodology**, including file naming conventions, file version control, file structure and directory tree structure.

7.2 Data privacy and protection in AgriDataValue

AgriDataValue Use Cases have external party platforms providing smart farming services. These platforms had already been in use prior to the project start and are part of the day-to-day operation of the end user infrastructure. Therefore, they have been integrated in the AgriDataValue Platform to accommodate the needs in the context of the project. The subsections below offer an overview on how data privacy concerns are being addressed within these external platforms.

7.2.1   Integrated platforms Data Privacy Policies

7.2.1.1 FieldClimate platform:

FieldClimate[1] operates on the principle of data stewardship. The platform recognizes that information from a user's farm is a valuable asset and is committed to handling it transparently and securely. This document provides a straightforward overview of its data privacy practices.

What Data is Collected

To deliver its services, the FieldClimate platform collects a few types of information:

- Sensor & Device Data: This is the main data from a user's iMETOS® devices and other sensors. It includes weather readings (temperature, rain), soil conditions (moisture), and the device's GPS location. It also collects images from camera traps like the iSCOUT®.
- User-Input Data: To make the tools more accurate, users can add information like their field boundaries, crop types, and planting dates.
- Account Data: This is the basic information needed to manage a user's account, such as their name, email, and subscription details.

How Data is used

User data is used for one primary purpose: to provide users with actionable insights for their farm. FieldClimate does not sell farm data to third-party marketers.

Specifically, the platform uses data to:

- Power its core features, like disease models, irrigation schedules, and weather forecasts.
- Improve its services by analyzing aggregated, anonymous data to make its predictive models more accurate.
- Manage user accounts and provide technical support.

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[1] https://metos.at/privacy-policy/

<u>Data Sharing and Security</u>

Users are in full control of their data. They can choose to share access with their agronomists or consultants directly through the platform's settings.

The platform uses trusted cloud service providers for secure data storage and processing. All user data is protected with industry-standard security measures, including encryption, both during transit and while stored on the platform's servers.

<u>User Rights and Control</u>

FieldClimate provides users with easy access to their information. Through the platform, users have the ability to:

- View and access all data from their devices.
- Export their raw data at any time.
- Update their account information and farm details.
- Request the deletion of their account and all associated data.

7.2.1.2 Farm21 platform:

The Farm21[2] platform operates on a principle of data stewardship, recognizing that a user's farm data is a critical asset. The company is committed to handling this information with transparency and security, as outlined in its privacy practices.

<u>What Data is Collected</u>

To function effectively, the Farm21 platform collects several types of information:

- Sensor Data: The core data comes from in-field sensors, measuring soil moisture, temperature, and electrical conductivity at various depths, along with the sensor's specific GPS location.
- Scouting Data: Through the mobile app, users can contribute geotagged photos and notes related to crop health, pests, and diseases.
- Field & Account Data: This includes basic information provided by the user, such as field boundaries and crop type, as well as the details needed to manage their account (name, email, etc.).

<u>How Data is Used</u>

User data is processed with one main goal: to help users make better-informed decisions about irrigation and crop management. Farm21 does not sell a user's farm data to third-party marketers.

The platform uses this data to:

- Provide irrigation advice and visualize field conditions through graphs and maps.
- Improve the platform's intelligence and accuracy by analyzing aggregated, anonymous data.
- Manage user accounts and provide necessary technical support.

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[2] https://www.farm21.com/privacy-policy

Data Sharing and Security

Users maintain full control over their data. They have the ability to share access with trusted partners, like agronomists, directly through the platform's settings.

Farm21 uses leading cloud providers for secure data storage. All user data is protected with industry-standard encryption both as it travels over the internet and while it is stored on the platform's servers.

User Rights and Control

The Farm21 platform provides users with direct control over their information. Through the platform, users can:

- View and access all of their sensor and scouting data.
- Export their raw sensor data at any time.
- Update their account and field information.
- Request the deletion of their account and all associated data.

7.2.1.3 Green Project platform:

Based in the European Union, the Green Project[3] platform operates with a core commitment to data stewardship and regulatory alignment. The company recognizes that farm data is a private and essential asset for modern agriculture. Its privacy practices are designed to be transparent, secure, and fully compliant with EU regulations such as the GDPR.

What Data They Collect

To provide its comprehensive farm management services, the Green Project platform collects several categories of information:

- Field & Sensor Data: This includes environmental data from connected weather stations and soil sensors (e.g., temperature, rainfall, soil moisture), along with the specific GPS coordinates of fields and sensors.
- Farm Activity Data: Users input detailed logs of their agricultural activities, such as fertilization and crop protection applications, irrigation events, and other cultivation practices required for compliance records.
- Account Data: This consists of the basic information needed to manage a user's account, such as their name, farm or organization details, and contact information.

How They Use Data

User data is utilized for two primary purposes: to optimize farm management and to simplify regulatory compliance. Green Project does not sell a user's private farm data to third-party marketers.

Specifically, the platform uses data to:

- Generate recommendations for irrigation and fertilization.
- Create detailed compliance reports required for standards like the CAP, GlobalG.A.P., and other national certifications.

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[3] https://www.greenproject.gr/en/privacy-policy/

- Improve its agronomic models and platform features using aggregated and anonymized data.

Data Sharing and Security

Users retain full control over their data. The platform enables them to securely share information with their agronomists, consultants, or certification bodies as needed for their operations.

All user data is protected with industry-standard security measures, including encryption, both during transit over the internet and while stored on the platform's servers. The platform utilizes trusted cloud infrastructure located within the EU to ensure data sovereignty and security.

User Rights and Control

In accordance with GDPR, Green Project ensures users have robust rights over their data. Through the platform, users can:

- Access and view all of their collected farm and activity data.
- Export their data in a structured format.
- Update and correct their account and farm activity logs.
- Request the complete deletion of their account and all associated data.

7.2.1.4 iFarming platform:

As a comprehensive farm management solution operating within the European Union, the iFarming[4] platform is built on a foundation of trust and data protection. The company handles all user information with the utmost care, ensuring its practices are transparent, secure, and fully aligned with the principles of the General Data Protection Regulation (GDPR).

What Data They Collect

To provide a holistic view of farm operations, the iFarming platform collects information across different aspects of the business:

- Operational & Field Data: This includes data from IoT sensors (weather, soil conditions), machinery telematics, as well as user-inputted records on inventory levels (e.g., seeds, fertilizers) and crop health observations.
- Financial & Labor Data: Users may enter financial information such as the cost of inputs and sales records to utilize budgeting tools. The platform also processes data related to labor management, including task assignments and work schedules.
- Account Data: This covers the standard information required for account creation and management, including the user's name, contact details, and farm identification.

How They Use Data

User data is used exclusively to enhance farm management, improve operational efficiency, and simplify record-keeping. iFarming does not sell private farm or financial data to third-party marketers.

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[4] https://www.intracom-telecom.com/privacy_policy

Specifically, the platform uses data to:

- Offer decision-support for agronomic activities (e.g., irrigation, fertilization).
- Provide financial analysis, budget tracking, and cost management reports.
- Facilitate labor scheduling and task management.
- Generate traceability and compliance reports for agricultural authorities.

Data Sharing and Security

Users maintain complete control and ownership of their data. The platform allows them to grant access to trusted third parties, such as their agronomists, accountants, or financial advisors, through secure permission settings.

All data is protected with robust, industry-standard security protocols, including end-to-end encryption. To comply with EU data sovereignty standards, the platform relies on secure cloud infrastructure located within the European Union.

User Rights and Control

In full accordance with GDPR, iFarming ensures users can exercise their data rights at any time. Through the platform, users have the ability to:

- Access and review all operational and financial data linked to their account.
- Export their information in a machine-readable format.
- Update and correct any of their submitted records.
- Request the permanent deletion of their account and all associated data.

7.2.1.5 ThingsSpeak platform:

ThingSpeak[5], an IoT analytics platform service from MathWorks, is designed to enable developers, researchers, and hobbyists to build and deploy IoT applications. As a global platform serving users in the European Union, it operates with a strong commitment to data protection and handles user information in accordance with GDPR principles.

What Data They Collect

The data collected by ThingSpeak is primarily defined and generated by its users:

- User-Generated Channel Data: The core data on the platform is the time-series information that users or their connected devices send to a ThingSpeak "channel." The nature of this data is determined by the user and can include anything from environmental sensor readings to machine status updates.
- MATLAB Analysis Code: Users can write, store, and execute MATLAB® code within the platform to perform online analysis and processing of their data streams.
- MathWorks Account Information: To use the service, a user needs a MathWorks Account, which includes standard information like their name, email address, country, and license affiliation.

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[5] https://www.mathworks.com/company/aboutus/policies_statements/privacy-policy.html

How They Use Data

The platform uses data to perform the functions and services requested by the user. ThingSpeak does not sell user-specific channel data to third-party marketers.

Specifically, the platform uses data to:

- Receive and store data streams sent to a user's channels.
- Generate visualizations (plots and graphs) as configured by the user.
- Execute user-created MATLAB code to analyze data or trigger actions.
- Analyze anonymized, aggregated usage metrics to monitor the health, performance, and utilization of the service for improvement purposes.

Data Sharing and Security

Users have explicit control over the visibility of their data.

- Public and Private Channels: Users determine whether their data channels are private or shared publicly with the ThingSpeak community or via a direct link. The platform will not make private channel data public.
- Security: The platform uses industry-standard security measures, including encryption for data in transit, to protect user accounts and data streams. It is built on secure, professional cloud infrastructure.

User Rights and Control

In line with GDPR, users retain full rights over their data and account. Through their MathWorks Account and the ThingSpeak interface, users can:

- Access and view all of their channel data and associated code.
- Export their data from any channel via the API or download options.
- Update and modify their channel settings, privacy controls, and analysis code.
- Delete specific data channels or their entire MathWorks Account.

7.2.1.6 ADCON Livedata platform:

The ADCON[6] data platform, addVANTAGE Pro, is a professional telemetry and data visualization service from OTT HydroMet. It is engineered for critical applications in agriculture, hydrology, and meteorology. Operating within the European Union, the platform adheres strictly to the principles of the General Data Protection Regulation (GDPR), ensuring user data is managed with the highest standards of security and transparency.

What Data They Collect

The platform is designed to process high-resolution environmental data from ADCON's professional-grade remote telemetry units (RTUs) and sensors:

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[6] https://www.otthydromet.com/en/privacy-policy/

- Sensor & Telemetry Data: This is the primary data stream, consisting of time-stamped and geotagged measurements. It includes a wide range of parameters such as meteorological conditions, soil moisture, water level and flow, and water quality metrics.
- Configuration & User Data: Users define the context for their data, including specific site names, alarm thresholds for critical events, custom calculations, and reporting configurations.
- Account Information: The platform collects standard user credentials, including name, organization, and email address, which are necessary for secure access and service administration.

How They Use Data

User data is used exclusively to deliver reliable, real-time monitoring, visualization, and alerting services. The platform does not sell specific user data to third-party marketers.

Specifically, this data is used to:

- Power real-time dashboards and generate historical graphs and reports.
- Trigger automated alarms via SMS or email based on user-defined thresholds.
- Enable sophisticated analysis for resource management, such as irrigation scheduling or flood monitoring.
- OTT HydroMet may also use anonymized, aggregated data for product improvement and specialized environmental research.

Data Sharing and Security

Users maintain full control over access to their environmental data.

- User-Controlled Access: The platform's permission system allows account holders to securely share access with colleagues, stakeholders, or consultants as required for their operations.
- Security: Built on professional-grade infrastructure to ensure high availability and data integrity, the platform employs industry-standard encryption for data in transit and at rest. Data is processed in secure, professionally managed data centers.

User Rights and Control

In full compliance with GDPR, users are guaranteed comprehensive rights over their data. Through the addVANTAGE Pro interface, users can:

- Access their complete historical and real-time data at any time.
- Export their data in various formats for offline analysis or compliance reporting.
- Update and modify their site configurations, alarm settings, and user details.
- Request the deletion of their account and all associated data.

7.2.2   Technical approach

The ADV platform is implemented using a hybrid architecture that distributes components between a central cloud infrastructure and one or more edge deployments. This model is designed to balance centralized processing power with low-latency data handling at the source.

The central cloud infrastructure hosts the platform's core services. This tier is responsible for computationally intensive tasks and overarching data governance, encompassing the components of the AI-based Cloud Platform and the Data Security, Privacy, Traceability & Sharing blocks.

Conversely, edge deployments are situated in geographic proximity to the pilot sites. This tier is designed for immediate data processing and analytics, minimizing latency for time-sensitive operations. The edge infrastructure consists of one or more nodes, each hosting components from the Edge Cloud Analytics Suite and the Decentralised Data Capture Management & In-situ Pre-processing Tools.

Secure data exchange between all platform components is governed by an Authorization and Control Service (ACS). Following ACS-defined policies, authorized components communicate using standard protocols such as HTTPS, TCP, and MQTT. To ensure semantic consistency across the system, dedicated adaptors handle the transformation of all data payloads to and from the canonical ADV data model.

A foundational design principle of the platform is its capacity for federated, multi-instance deployment. The architecture is not monolithic; it allows for multiple, independent ADV platform instances—each with its own cloud and edge tiers—to operate concurrently. Interconnection and secure communication between these instances are facilitated by an Interoperability and Data Sovereignty (IDS) component. This federated model ensures scalability, enabling the deployment of distinct instances that serve data sources at local, regional, national, or continental scales while maintaining seamless interoperability.

Data privacy and security are foundational principles in the ADV platform's design, not supplementary features. The technical architecture employs a multi-layered strategy that aligns with the principles of Privacy by Design and is engineered to comply with modern data protection regulations such as the GDPR. This approach is realized through three key architectural pillars: distributed processing at the edge, centralized governance, and a federated model for data sovereignty.

7.2.2.1 Data minimization through Edge nodes

The platform's hybrid architecture is crucial in promoting the principle of data minimization. By deploying the Decentralised Data Capture Management & In-situ Pre-processing Tools at the edge, closer to the data sources, we can process, filter, and aggregate raw data locally. This allows for the extraction of valuable insights while reducing the volume and sensitivity of the information transmitted to the central cloud infrastructure. For instance, sensitive identifiers can be pseudonymized or removed, and high-frequency sensor readings can be converted into meaningful, aggregated events before they ever leave the local environment. This "in-situ" handling ensures that only necessary data is propagated through the system.

7.2.2.2 Centralised governance and Access Control

While processing is distributed, governance is centralized to ensure consistent and auditable policy enforcement. The Data Security, Privacy, Traceability & Sharing block (through the IDS, the SECURESTORE, and the DLT components) serves as the central access control and policy engine. It is responsible for managing user consent, defining data usage policies, and maintaining an immutable record of data lineage for traceability purposes.

Access control is carried out by the Access Control System (ACS) while Policy Enforcement is carried out by the IDS component. These components act as the gatekeepers for all data exchanges intra-platform (ACS) and inter-platform (IDS. Every interaction between components, whether edge-to-cloud or cloud-to-cloud, is subject to authorization by the ACS. This guarantees that only explicitly authorized services can access specific data streams, preventing unauthorized access and ensuring data is used only for its intended purpose.

7.2.2.3 Data sovereignty via Federation and IDS

The architecture's vision as a federated, multi-instance platform directly addresses the requirement of data sovereignty. The IDS component is the key enabler of this model, allowing for the deployment of multiple, independent ADV instances that can be restricted to specific geographic or legal areas (e.g., local, regional, or national).

This federated approach ensures that data can remain within a designated boundary, respecting national and EU regulations on data residency. While the IDS facilitates secure and policy-driven data exchange between these instances when required, the default operation is that data resides within the instance where it originated. This provides organizations and public entities with the reassurance that they can make use of the platform's functionality while maintaining full control over their data.

7.2.2.4 DLT

To enhance our architectural commitment to auditable and transparent data handling, the ADV platform includes support for DLT functionality. This is not just a logging mechanism; it provides assurance of data governance actions across the entire federated ADV ecosystem. Its presence elevates the platform's privacy framework by creating an immutable, tamperproof record of how data policies are applied and enforced.

The main functionality of this component is to enhance traceability and verifiability. Key governance events, such as the granting of data access (the registration of user consent or a cross-instance data exchange handled by the STORE/SECURESTORE/DLT/IDS components), can potentially be recorded as transactions across distributed ledgers; the DLT current implementation provides support this functionality. This creates a shared, immutable audit trail accessible to authorized stakeholders. For a data owner, this provides verifiable proof of who has accessed their data and under what authority. For auditors and regulatory bodies, it offers a transparent and reliable method for confirming that the platform operates in accordance with its stated privacy policies and GDPR mandates.

It is critical to distinguish, however, that ADV's implementation of DLT follows a strict "off-chain" data model to remain fully compliant with data protection principles like the Right to Erasure. Personal or sensitive data is never stored directly on any distributed ledger. Instead, the ledger records only a cryptographic hash of the data transaction alongside non-sensitive metadata about the event. The actual data remains securely stored in the platform's conventional, access-controlled databases, where it can be managed, updated, or erased as required by law.

This architectural approach allows us to leverage the benefits of DLT (immutability, transparency, and decentralization) without compromising data privacy rights. The ledger provides proof that an action occurred and that the underlying data has not been altered, while the actual data remains off-chain and under the full control of their data owners. In essence, the inter-DLT component adds a layer of accountability to the ADV architecture.

7.2.3   Workshop on Data Privacy

The workshop held in the context of T5.1 on July 1st, 2025, had several sessions where the participants were presented and informed on aspects that are relevant, if not essential, to the smart agriculture domain. Besides the approach that AgriDataValue followed during the course of the project so far, three additional EU projects, namely CEADS, GEORGIA, Green.Dat.AI, presented their approaches and discussions on data privacy.

Besides the EU Projects, there were two invited presenters from Arthur Legal and HomoDigitalis, describing complex issues such as the Data Act, GDPR, AI Act, and their connection/relevance to the Smart Agriculture domain. The first presentation provided an overview of the EU's Data Act, explaining its purpose and its specific relevance to the agricultural sector by empowering farmers and other users to control and share data generated by their connected devices. The second presentation explained how European regulations like the General Data Protection Regulation (GDPR) and the new AI Act apply to the rapidly evolving field of smart agriculture.

The insights and the discussion followed the latter presentations are described and reported in the following subsections.

7.2.3.1 Data Act – some insights

7.2.3.1.1 The Nature and Value of Data

Data is a complex, multi-dimensional asset and not just a technical component but a valuable resource that can be used for both good and malicious purposes. To unlock its value, whether ecological, financial, or for knowledge, it is crucial to classify it and manage it in a secure and transparent manner. This is very important in the context of sustainable agriculture.

7.2.3.1.2 The EU Data Act

The Data Act, which becomes effective on September 12, 2025, is a key part of the EU's broader digital and cybersecurity strategy. Its main goal is to create a data economy that is more fair by shifting control of data to the user of a connected product or service.

Key provisions of the Act include:

- Data Access: Users have the right to access the data generated by their connected products (e.g., smart tractors, sensors).
- Data Sharing: Users can authorize that their data be shared with a third party of their choice.
- Fairness: It aims to ensure a fair distribution of the value derived from data, preventing it from being held exclusively by manufacturers.
- Interoperability: It promotes the development of standards to make it easier to transfer and use data across different services.

The EU anticipates that by unlocking the value of data from connected devices, the Data Act could generate an additional €270 billion in GDP by 2028.

There are three primary stakeholders in the data-sharing ecosystem:

1. User/Customer: The individual or business that owns or uses the connected product (e.g., a farmer).
2. Data Holder: The entity that collects the data, typically the manufacturer of the product (e.g., a farm equipment company).
3. Data Recipient: A third party chosen by the user to receive the data (e.g., an agronomist, an insurance company, or a different software platform).
4. Under the Data Act, the Data Holder is legally required to make data available to a Data Recipient upon the user's request. This mandatory data sharing may include provisions for reasonable compensation to the Data Holder for providing access.

The Data Act is highly relevant for projects like AgriDataValue because it directly addresses the issue of data ownership and control in modern farming. For example, currently, data from smart machinery is often held exclusively by the manufacturer. The Act changes this by giving farmers and other businesses more control over their own data. This allows them to easily share it with agronomists, maintenance providers, or other platforms to improve efficiency, promote sustainable practices, and unlock new business models. The European Commission is also developing model contractual terms (MCTs) to help standardize and simplify these data-sharing agreements.

7.2.3.2 EU AI Act

7.2.3.2.1 A technological view on its impact in Smart Agriculture

The new EU AI Act introduces harmonized rules for artificial intelligence, and several of its provisions are relevant to smart agriculture.

The European Union's Artificial Intelligence Act is an important milestone in the road towards regulating technology, shifting the concept of "Trustworthy AI" from an academic principle to a legal and engineering mandate.[7] From our standpoint as technologists, developing systems for the agricultural domain, it is essential to view the Act not as a blocking point to innovation, but as a structured framework for risk management. Its core, risk-based approach frames our design, development, and deployment lifecycle, particularly for applications where digital decisions have direct physical or economic consequences.

The Act categorizes AI systems into a hierarchy of risk, which is important for understanding its practical impact.[8] Most decision-support tools, such as yield prediction models for internal planning or disease risk dashboards that support agronomists, most probably belong to the Minimal Risk category, leaving them effectively unaffected.

However, as we move up the risk hierarchy, the regulations become more important. Systems such as AI-powered chatbots, offering agronomic advice, i.e., systems with specific transparency obligations, are categorized as Limited Risk and must disclose their non-human nature to the user in a clear way. The most significant engineering implications arise from the High-Risk category, which is where a substantial number of advanced smart agriculture technologies will be placed.

Key considerations from the AI Act include:

- High-Risk AI Systems: The Act places strict obligations on AI systems considered "high-risk."In an agricultural context, this is particularly relevant for AI used in employment—for example, systems that monitor worker performance, allocate tasks based on behavior, or make decisions about promotions or termination. Both the providers (developers) and the deployers (farm owners) of such systems will have significant compliance duties.
- Transparency Obligations: If an AI system is designed to interact directly with people (e.g., a chatbot for farm support), it must be clear to the person that they are interacting with an AI, unless it's already obvious from the context.

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[7] https://www.ey.com/en_ch/insights/forensic-integrity-services/the-eu-ai-act-what-it-means-for-your-business
[8] https://artificialintelligenceact.eu/high-level-summary/

- AI Literacy: The Act mandates that providers and deployers of AI systems must ensure their staff have a sufficient level of "AI literacy." This means employees who operate or use AI systems must receive adequate training to understand their capabilities and limitations.

The AI Act does not impose obligations on deployers for "General Purpose AI Systems," but the other provisions have direct implications for how AI is responsibly implemented on modern farms.

The question of "How to identify a high-risk AI System in Smart Agriculture" arises. An AI system is identified as high-risk if it either functions as a safety component in a product governed by existing EU regulations or if it is explicitly listed in the Act's annexes.[9] In the case of the domain of smart agriculture, several clear use-cases fall under this description:

- Autonomous Machinery and Robotics: A good example would be an AI system which controls the navigation and operation of an autonomous vehicle, e.g., a tractor, a drone for crop spraying, or a harvester. The AI plays the role of the safety component of a machine; a failure, e.g., in its decision-making logic could lead to physical harm, potential environmental damage, or property damage. These systems will need to be assessed for compliance and conformity, identified with a CE marking for the components that are responsible for the system's intelligence.[10]
- Critical Resource Management: AI platforms managing/operating critical infrastructure will be classified as high-risk. This includes systems used e.g., in controlling large-scale, regional irrigation systems, or managing resource allocation for agricultural cooperatives. An operational failure could potentially have a big economic and environmental impact.
- Access to Services and Benefits: An AI tool used by a government or finance institutions to assess a farmer's application for EU subsidies, grants, or loans would also be high-risk, as it directly impacts an individual's livelihood and access to essential public and private services.

Nevertheless, the identification of a system as "high-risk" is not a blocking point; it is merely an indication of the necessity for strict requirements posing direct implications to the technical approach to be adopted:

- Data Governance: The quality and suitability of training, validation, and testing data need to go through legal checks. Beyond simply achieving high model accuracy, maintaining records of data provenance, labeling processes, and bias assessments need to be performed. For example, a crop disease detection model trained with data from one climate zone need to be also tested and documented for biases before being deployed in another use case in a different climate zone.
- Transparency and Robustness: The Act requires that high-risk systems are technically robust and that human monitoring is possible. This leads to high prioritization of model explainability (XAI) and to systems designed with fail-recovery and human intervention points. Why an autonomous system made a critical decision needs to be explained in a reasonable manner and mechanism(s) for a human operator to override it need to be provided. [11]

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[9] https://www.europarl.europa.eu/topics/en/article/20230601STO93804/eu-ai-act-first-regulation-on-artificial-intelligence
[10] https://artificialintelligenceact.eu/article/6/
[11] https://www.europarl.europa.eu/topics/en/article/20230601STO93804/eu-ai-act-first-regulation-on-artificial-intelligence
and https://artificialintelligenceact.eu/article/13/

- Continuous Post-Deployment Monitoring: The Act requires continuous risk management throughout the AI system's lifecycle.[12] This creates the need for a robust ML framework capable of monitoring for performance degradation, data drift, and any vulnerabilities that might emerge. It needs to be ensured that the systems remain safe and accurate long after they are deployed in a real-world farm where the conditions are dynamic and variable.

7.2.3.2.2 The EU AI Act's Impact on Data Privacy Practices in Smart Agriculture

Smart agriculture utilizes a wide range of technologies, including soil sensors, drones, robotics, GPS, and AI-powered imaging, to optimize farming. Data lies at the core of these technologies. This data can be broadly categorized into farm data (e.g., soil moisture levels) and personal data (e.g., farmworker hours, location data from GPS). A key challenge is that farmers often have limited control over the data collected by the various Agriculture Technology Providers (ATPs) they use.

The GDPR is crucial in smart agricutlure because many smart farming operations involve the processing of personal data.

Some key GDPR definitions:

- Personal Data: Any information related to an identifiable person. In farming, this could be a farmworker's performance data or a farm owner's location
- Processing Activity: Any operation performed on personal data, from collection and storage to analysis.
- Data Subject: Any person in the EU whose data is being processed.

Because personal data is being processed, ATPs and farm owners have significant obligations under GDPR. These include:

- Transparency: Clearly informing individuals how their data is used.
- Data Protection by Design: Building privacy protections into technology from the start.
- Data Processing Agreements: Having clear contracts that govern how data is handled.
- Breach Notifications: Reporting data breaches to authorities.
- Data Protection Impact Assessments (DPIAs): Assessing the risks of new data processing activities.

The EU AI Act does not replace the GDPR; instead, based on its principles, it acts as a complementary framework that further refines the requirements for data handling in specific contexts.[13] From the smart agriculture platform development point of view, the Act reframes aspects of data privacy, elevating them from purely data protection concerns to integral components of system safety, reliability, and compliance. The way the Act treats high-risk systems that are becoming more and more central to modern agriculture makes this even more evident.

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[12] https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_1683#:~:text=Compliance%20system%20before%20and%20after,and%20potential%20risks%20are%20promptly

[13] https://gdprlocal.com/how-the-eu-ai-act-complements-gdpr-a-compliance-guide/#:~:text=Essentially%2C%20the%20AI%20Act%20addresses,rights%20over%20their%20personal%20data.

A GDPR obligation is to ensure that data is processed in compliance with the law in effect and justify the purpose in a specific manner.[14] The AI Act, through its "Data and Data Governance" requirements for high-risk systems, introduces a new dimension: accountability for the quality, integrity, and suitability of data relative to the system's operation.[15]

A practical example would be the following: consider having a high-risk AI model for an autonomous sprayer that differentiates between crops and weeds. Under GDPR, the focus would be on having a legal basis to process the thousands of images used for training.[16] However, the AI Act takes this further; it must be demonstrated and documented that this dataset is "relevant, representative, free of errors and complete."[17] If the data is biased, e.g., if it primarily contains images of weeds only from one geographic region or under specific lighting conditions, the resulting model would not work properly in a more generic context, potentially having financial and environmental consequenses.

Therefore, there are two impacts on data privacy that need to be addressed:

- even more metadata about the datasets need to be collected and maintained, linking them both to consent and to performance and safety benchmarks.
- data governance needs to be at the core of product liability; a data privacy issue (e.g., using data that is improperly sourced) could be identified as a safety and compliance failure under the AI Act.

Moreover, GDPR grants data subjects the right to transparency regarding how their data is processed.[18] The AI Act enforces this transparency for high-risk systems through its reqiurements for Technical Documentation and automatic event logging.[19]

A practical example would be a farmer who is using a high-risk AI system for subsidy eligibility assessment; GDPR ensures that they know their data is being used, whereas the AI Act also requires that the system's provider maintains detailed, immutable logs of the system's operation and the data that lead to a specific decision.[20] In this way, a verifiable audit trail is created, that is more granular than a standard privacy policy.

The above introduce a new level in the data privacy concerns; that of accountability: if, for example, a farmer observes an issue with an automated decision, the platform provider can no longer simply state that their algorithm processed the data, but they must be prepared to provide technical documentation and system logs that reconstruct the process that lead to the decision. This converts data privacy from a statement of policy to a demonstrable record of action, providing a link between the data input and the data that lead to the AI's output.

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[14] https://gdpr-info.eu/art-6-gdpr/#:~:text=processing%20is%20necessary%20for%20the%20purposes%20of%20the%20legitimate%20interests,where%20such%20interests%20are%20overridden

[15] https://artificialintelligenceact.eu/article/10/

[16] https://www.cnil.fr/en/ai-ensuring-gdpr-compliance

[17] https://www.wilmerhale.com/en/insights/blogs/wilmerhale-privacy-and-cybersecurity-law/20240717-what-are-highrisk-ai-systems-within-the-meaning-of-the-eus-ai-act-and-what-requirements-apply-to-them

[18] https://gdpr-info.eu/art-12-gdpr/#:~:text=12%20GDPR%20%E2%80%93%20Transparent%20information%2C%20communication,General%20Data%20Protection%20Regulation%20(GDPR)

[19] https://artificialintelligenceact.eu/article/16/

[20] https://artificialintelligenceact.eu/article/12/

The two regulations have, though, a key point where they intersect; the AI Act's requirement for Human Oversight in high-risk systems.[21] This gives further practical and architectureal significance to the rights individuals have under GDPR's Article 22 about automated decision-making.

An example would be the following: consider an AI platform managing a local irrigation network, a high-risk application which affects multiple farms. The AI Act states that this system must be designed in a way that a human operator can monitor its operations and intervene if necessary in an adequate manner.[22] This means, however, that the user interface cannot be just a black box, but it must present the data and the AI's reasoning behind any decisions in a way that is understandable by the human operator.

The implication on the handling of data privacy in a system is that during the design phase of the system the need of handling data rights needs to be addressed. A farmer's "right to an explanation" is no longer considered just a legal concept but it becomes a direct requirement for the user interface. There is a legal obligation to build tools that allow human operators to check the data leading to automated decisions and override them, if needed; thus, linking he platform's architecture to data privacy-enhancing control in a direct way.

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[21] https://www.europarl.europa.eu/topics/en/article/20230601STO93804/eu-ai-act-first-regulation-on-artificial-intelligence
[22] https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai#:~:text=clear%20and%20adequate%20information%20to,of%20robustness%2C%20cybersecurity%20and%20accuracy

8   Data Protection Officer (DPO)

AgriDataValue ethics are being coordinated by the Data Protection Officer (DPO), who (a) ensures the compliance of the project with ethics codes and legislations, and (b) aligns project research results with the most advanced outcomes of the international scientific community on ethics, engineering, and emerging technologies. The project policy implementation are extremely vigilant in handling data and strictly collect and use only the one necessary to carry out the project activities considering all the processes and actions. In the case of indirectly collecting personal data (e.g., as a part of pilots/Living Labs), they are anonymized before used.

The AgriDataValue Data Protection Officer (DPO) is **Despina Anastasopoulos** from INTRA. Anastasopoulos also leads the *Privacy, Ethical, Legal & Regulatory Compliance* monitoring tasks (T5.1, T7.5). AgriDataValue DPO is compliant with the GDPR (EU 2016/679, EU 2016/680). Anastasopoulos has more than 10 years of experience as a recognized data privacy and data protection expert within an international IT oriented environment in both private and public sector, but also for regulatory and public institutions. AgriDataValue DPO is responsible for ensuring that an appropriate data management plan is developed and used to protect the privacy of data. More specifically, she ensures that the following rules as described in the AgriDataValue project Grant Agreement are followed:

- Personal Data is properly anonymized/pseudo-anonymized and processed legally and fairly
- It must be collected for explicit and legitimate purposes and used accordingly
- It must be adequate, relevant, and not excessive in relation to the purposes for which it is collected and/or further processed
- It must be accurate and updated where necessary
- Each pilot assigns an Ethical & Ecosystem Chair (Pilot Data Controller), who must ensure that data subjects can rectify, remove, or block incorrect data about themselves
- Data that identifies individuals (personal data) must not be kept any longer than strictly necessary and always in an encrypted format
- Data controllers must protect personal data against accidental or unlawful destruction, loss, alteration, and disclosure, particularly when processing involves data transmission over networks. They shall implement the appropriate security measures

The AgriDataValue project's initiatives involve assessing and applying aspects concerning data protection and privacy, as well as evaluating informed consent. This evaluation aims to ensure that research participants willingly participate, as it is a crucial measure for addressing privacy concerns in research.

The following tables present information regarding the DPO for host institutions required to appoint a DPO under the GDPR 2016/679.

Partner Name: SYNELIXIS SOLUTIONS S.A. (SYN)	
Do you have a Data Protection Officer (DPO)? (Yes/No)	NO
Contact Information of DPO	Name: Email:

Partner Name: SIXENSE ENGINEERING (SIXEN)	
Do you have a Data Protection Officer (DPO)? (Yes/No)	YES
Contact Information of DPO	Name: Emilie Chamla Email: emilie.chamla@nuvia.com

Partner Name: NETCOMPANY-INTRASOFT (INTRA)	
Do you have a Data Protection Officer (DPO)? (Yes/No)	YES
Contact Information of DPO	Name: Law office "PISTIOLIS – TRIANTAFYLLOS & ASSOCIATES E-mail: privacy@netcompany.com Contact Person: Nikolaos Zelios

Partner Name: SIEMENS (SIEM)	
Do you have a Data Protection Officer (DPO)? (Yes/No)	N/A
Contact Information of DPO	Name: Email:

Partner Name: SINERGISE (SINER)	
Do you have a Data Protection Officer (DPO)? (Yes/No)	N/A
Contact Information of DPO	Name: Email:

Partner Name: ALMAVIVA (ALMA)	
Do you have a Data Protection Officer (DPO)? (Yes/No)	YES
Contact Information of DPO	Name: Carla Sforza Email: DPO.GruppoAlmaviva@almaviva.it

Partner Name: INTERNATIONAL DATA SPACES (IDSA)	
Do you have a Data Protection Officer (DPO)? (Yes/No)	YES
Contact Information of DPO	Name: Anil Turkmayali Email: anil.turkmayali@internationaldataspaces.org

Partner Name: SOFTWARE IMAGINATION & VISION (SIMAVI)	
Do you have a Data Protection Officer (DPO)? (Yes/No)	YES
Contact Information of DPO	Name: Radu Soare Email: radu.soare@simavi.ro

Partner Name: SINGULARLOGIC (SLG)	
Do you have a Data Protection Officer (DPO)? (Yes/No)	N/A
Contact Information of DPO	Name: Email:

Partner Name: EIGEN VERMOGEN VAN HET INSTITUUT VOOR LANDBOUW (EV ILVO)	
Do you have a Data Protection Officer (DPO)? (Yes/No)	YES
Contact Information of DPO	Name: Elien Dewitte Email: elien.dewitte@ilvo.vlaanderen.be

Partner Name: ETHNIKO KAI KAPODISTRIAKO PANEPISTIMIO ATHINON (NKUA)	
Do you have a Data Protection Officer (DPO)? (Yes/No)	N/A
Contact Information of DPO	Name: Email:

Partner Name: INAGRO (Inagro)	
Do you have a Data Protection Officer (DPO)? (Yes/No)	YES
Contact Information of DPO	Name: Anja Lemmens Email: anja.lemmens@inagro.onmicrosoft.com

Partner Name: UNIWERSYTET LODZKI (UL)	
Do you have a Data Protection Officer (DPO)? (Yes/No)	YES
Contact Information of DPO	Name: dr. Edyta Bielak-Jomaa Email: iod@uni.lodz.pl

Partner Name: FUNDACION PARA LAS TECNOLOGIAS AUXILIARES DE LA AGRICULTURA (TEC)	
Do you have a Data Protection Officer (DPO)? (Yes/No)	YES
Contact Information of DPO	Name: Nerea López Montalvo Email: nlopez@fundaciontecnova.com

Partner Name: DELPHY BV (Delphy)	
Do you have a Data Protection Officer (DPO)? (Yes/No)	NO
Contact Information of DPO	Name: Email:

Partner Name: INSTITUTO TECNOLOGICO DE ARAGON (ITAIN)	
Do you have a Data Protection Officer (DPO)? (Yes/No)	YES
Contact Information of DPO	Name: Isabel Marco Lacoma Email: dpo@itainnova.es

Partner Name: ZEMNIEKU SAEIMA (ZSA)	
Do you have a Data Protection Officer (DPO)? (Yes/No)	NO
Contact Information of DPO	Name: Email:

Partner Name: SOCIEDAD ARAGONESA DE GESTION AGROAMBIENTAL SL (SARGA)	
Do you have a Data Protection Officer (DPO)? (Yes/No)	YES
Contact Information of DPO	Name: Jose Sirvent Email: strategicprojects@sarga.es

Partner Name: AGROTIKOS KTINOTROFIKOS SYNETAIRISMOS KATOUNAS TO VIOLOGIKO AGROKTIMA (TBA)	
Do you have a Data Protection Officer (DPO)? (Yes/No)	Yes
Contact Information of DPO	Name: Ioannis Katris Email: ikatris@gmail.com

Partner Name: SOCIETA ITALIANA DI VITICOLTURA ED ENOLOGIA (SIVE)	
Do you have a Data Protection Officer (DPO)? (Yes/No)	NO
Contact Information of DPO	Name: Email:

Partner Name: NILEAS - SYNETAIRISMOS PISTOPOIIMENON AGROTIKON PROIONTON DIMOU NESTOROS MESSINIAS (NILEAS)	
Do you have a Data Protection Officer (DPO)? (Yes/No)	NO
Contact Information of DPO	Name: Email:

Partner Name: CONSEIL DES VINS DE SAINT-EMILION (CVSE)	
Do you have a Data Protection Officer (DPO)? (Yes/No)	NO
Contact Information of DPO	Name: Email:

Partner Name: ASOCIATIA OPERATORILOR DIN AGRICULTURA ECOLOGICA BIO ROMANIA (BIORO)	
Do you have a Data Protection Officer (DPO)? (Yes/No)	NO
Contact Information of DPO	Name: Email:

Partner Name:) RI.NOVA SOCIETA COOPERATIVA (RI.NO)	
Do you have a Data Protection Officer (DPO)? (Yes/No)	YES
Contact Information of DPO	Name: Claudia Guidi Email: cguidi@rinova.eu

Partner Name: AGRO DIGITAL SOLUTIONS (AgroDS)	
Do you have a Data Protection Officer (DPO)? (Yes/No)	N/A
Contact Information of DPO	Name: Email:

Partner Name: NATIONAL PAYING AGENCY (NPA)	
Do you have a Data Protection Officer (DPO)? (Yes/No)	YES
Contact Information of DPO	Name: Greta Lelekauskaite Email: great.lelekauskaite@nma.lt

Partner Name: AGENZIA PROVINCIALE PER I PAGAMENTI DELLA PROVINCIA AUTONOMA DI TRENTO (APPAG)	
Do you have a Data Protection Officer (DPO)? (Yes/No)	YES

Contact Information of DPO	Name: Alessandra Ianes
	Email: idprivacy@provincia.tn.it

Partner Name: AGENTIA DE PLATI SI INTERVENTIE PENTRU AGRICULTURA (APIA)		
Do you have a Data Protection Officer (DPO)? (Yes/No)		N/A
Contact Information of DPO	Name:	
	Email:	

Partner Name: QUEEN MARY UNIVERSITY OF LONDON (QMUL)		
Do you have a Data Protection Officer (DPO)? (Yes/No)		N/A
Contact Information of DPO	Name:	
	Email:	

9 Data Minimization

The following chapter provides explanations of how the data that will be processed are relevant and limited to the purposes of the AgriDataValue research project and research activities. The AgriDataValue project partners will follow the data minimization principle.

9.1 Data minimization principle

The consortium of AgriDataValue will comply to the GDPR (EU 2016/679 (Union, REGULATION (EU) 2016/679 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL, 2016), EU 2016/680 (Union, DIRECTIVE (EU) 2016/680 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL, 2016)) (Union, REGULATION (EU) 2016/679 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL, 2016).

Based on these principles governing data security and personal data processing, the handling of data must be done lawfully, with fairness and transparency. Only necessary and proportionate data should be used to achieve the intended task or purpose for which they were gathered. The AgriDataValue partners also pledge to process the data in a way that guarantees its security, as detailed in the current deliverable.

According to GDPR - CHAPTER II / Article 5 (Union, REGULATION (EU) 2016/679 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL, 2016) the ''principles relating to processing of personal data'', states that Personal Data should be:

- processed lawfully, fairly and in a transparent manner in relation to the data subject ('lawfulness, fairness and transparency')
- adequate, relevant, and limited to what is necessary in relation to the purposes for which they are processed ('data minimisation')

9.2 Data minimization within AgriDataValue

The AgriDataValue Partners will collect only the essential data to facilitate and ensure the successful implementation of the project's pilot activities. Additionally, only the absolutely necessary data will be gathered for the purpose of efficient communication with the pilot participants. Periodically, the partners will review the collected data to assess its continued necessity and promptly delete any data that are no longer required, such as when a participant terminates their activities or withdraws their participation. The data collection process will be conducted with formal consent from the participants, which will be confirmed through signed consent forms.

In rare instances, such as with steering committee members or workshop participants, the data collected will be limited to business contact information, including names, affiliations, and email addresses. This data will be strictly utilized for communication purposes among the partners. The following table provides information on whether each consortium partner processes personal data for the AgriDataValue research activities.

Table 2: Personal Data (to be) collected by each AgriDataValue Partner

European Partners
Partner Name: **ZSA**
ZSA might need to collect personal data from livestock farmer indirectly; data from livestock farm owned by farmer
Partner Name: **Inagro**

Inagro might need to collect personal data from farmers indirectly; data from fields owned by farmers
Partner Name: **EV ILVO**
EV ILVO might need to collect personal data indirectly; tagging might take place during pre-processing
Partner name: **CVSE**
CVSE might need to collect personal data from winegrowers; some data can be owned by farmers (field observations, phenology, frost damage, data from personal weather stations and sensors,…)
Partner name: **DELPHY**
DELPHY might need to collect personal data from farmers indirectly; data from fields owned by farmers
Partner name: **BIORO**
Bio Romania does not collect personal data. The only data collected are Equipment Data which are generated by the use of or collected by the equipment. Equipment Data includes: Precipitation quantity; Soil temperature; Soil moisture; Wind speed; Air temperature; Relative air humidity; Atmospheric pressure; Wind direction; Leaf wetness; Date and time; Battery voltage; Solar panel voltage. The data collected by the weather stations located on the two lots reach SIMAVI directly, and from them directly to the project via API.
Partner name: **RINO**
RINO might need to collect personal data from farmers indirectly; data from fields owned by farmers
Partner name: **TECNOVA**
TECNOVA might need to collect personal data from participants indirectly; data from Tecnova workers or external farmers.
Partner name: **SARGA**
SARGA might need to collect personal data from farmers indirectly; data from fields owned by farmers (phenology and pest field observations, and parcel plot).
Partner name: **ITA**
ITA might need to collect personal data from farmers indirectly; data from fields owned by farmers (phenology and pest field observations, and parcel plot).
Partner name: **NILEAS**
NILEAS might need to collect personal data from olive growers indirectly: field observation data
Partner name: APPAG
APPAG collects personal data from farmers for its ordinary activities as CAP Paying Agency. Any data provided for the project Agridatavalue will be fully anonymized.

9.3 Data collection surveys

In order to evaluate the technologies to be established human participants are expected to take part in surveys, workshops as well as crop/livestock use cases. The AgriDataValue project pilots will involve volunteers to collect and process their opinion and feedback on the AgriDataValue platform efficiency. The collected data will be processed fully anonymized. Participants will give their consent to be part of the research by responding to the questions asked, as described previously in the present deliverable. AgriDataValue will not use surveys to collect any sensitive personal data and no data transmitted between project partners that might lead someone to identify an individual (e.g., location information will be removed). Information regarding the purpose of the research and methods used will be provided to the participants such that participants will be aware of what is expected from them in the study and how their responses will be used. The participants will be informed before the research is undertaken about their right to withdraw from the research, without giving a reason, at any time during the data gathering, or to refuse answering specific questions.

10 Anonymization/Pseudonymization

To ensure that data subjects cannot be identified in any documents (reports, publications) or datasets within the project, only anonymized and aggregated data is made public. The responsible partner (the partner that is gathering the data) follows all required anonymization procedures to make sure that the data subject is no longer identifiable. Consequently, during the process of anonymization, data identifiers need to be removed, generalized, aggregated, or distorted and a small cell analysis should be carried out by the responsible partner. At this point, it is important to underline that anonymization is different than pseudonymization (GDPR treats it as a distinct category, see Recital 26). Anonymization is the process of encrypting removing personally identifiable information from data sets so that the people whom the data relate to remain permanently anonymous, and thus un-identifiable; whereas pseudonymization, as defined in the GDPR (which incentivizes its use in Recital 29,e.g.)., means "the processing of personal data in such a manner that the personal data can no longer be attributed to a specific data subject without the use of additional information, provided that such additional information is kept separately and is subject to technical and organisational measures to ensure that the personal data are not attributed to an identified or identifiable natural person" (GDPR, Art. 4(5)).Below we add a table containing a list of good practices for anonymization of quantitative and qualitative data, using the tour guide on data management of the Consortium of European Social Science Data Archives (CESSDA[23]) as source.

Table 3: Good practices for data anonymization

Type of data	Good practices
Quantitative data	• *Removing or aggregate variables or reduce the precision or detailed textual meaning of a variable.* • *Aggregate or reduce the precision of a variable such as age or place of residence. As a general rule, report the lowest level of geo-referencing that will not potentially breach respondent confidentiality.* • *Generalise the meaning of a detailed text variable by replacing potentially disclosive free-text responses with more general text.* • *Restrict the upper or lower ranges of a continuous variable to hide outliers if the values for certain individuals are unusual or atypical within the wider group researched.*
	• *Use pseudonyms or generic descriptors to edit identifying information, rather than blanking-out that information;* • *Plan anonymisation at the time of transcription or initial write-up, (longitudinal studies may be an exception if relationships between waves of interviews need special attention for harmonised editing).*

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[23] https://www.cessda.eu/Research-Infrastructure/Training/Expert-Tour-Guide-on-Data-Management/5.-Protect/Anonymisation

Qualitative data	• *Use pseudonyms or replacements that are consistent within the research team and throughout the project. For example, using the same pseudonyms in publications and follow-up research;* • *Use 'search and replace' techniques carefully so that unintended changes are not made, and misspelt words are not missed;* • *Identify replacements in text clearly, for example with [brackets] or using XML tags such as <seg>word to be anonymised</seg>;* • *Create an anonymisation log (also known as a de-anonymisation key) of all replacements, aggregations or removals made and store such a log securely and separately from the anonymised data files.*

11 Safeguard Rights/Freedoms of Data Subjects

In AgriDataValue, technical and organizational measures are implemented (D1.3, D1.4, D2.1, D2.2, D3.1, D.3.4) to safeguard the rights and freedoms of the data subjects and research participants. The GDPR regulation, that the AgriDataValue consortium is committed to follow, requires all data controllers and processors to implement appropriate technical and organisational measures to safeguard rights and freedoms of data research participants, as well as to ensure a level of data security that is commensurate to the risks faced by the data subjects in the event of unauthorised access to, or disclosure, accidental deletion or destruction of, their data (art.32 GDPR).

The principle of transparency is followed by the AgriDataValue consortium, and as stated before, their participation of human participants is voluntary, and they are informed accordingly. Their confidentiality and anonymity is respected throughout the project. The project's Data Protection Officer (DPO) identity and contact details, as well as the partner responsible for the data collection is communicated to the participants. Furthermore, in order to prevent unauthorised access to personal data, security measures are implemented as described in section 12 of the present document.

12 Security measures to prevent unauthorized access to personal data

The previous section outlined the technical and organizational measures to protect the rights and freedoms of study participants and safeguard their data. In this section, we focus on the security measures that the AgriDataValue consortium partners will adopt to prevent unauthorized access to personal data. It is important to note that no personal data is being collected or processed during the AgriDataValue project activities.

However, researchers are required to use trustworthy devices and conduct their research tasks on trusted networks during the project's research activities. They must also adhere to data protection policies and institutional guidelines. The implemented measures involve access controls through secure logins, the installation of current security software on devices, and regular data backups.

In addition, the project implements adequate institutional-level network security, which includes security systems, firewalls, and secure storage facilities. Personal data will not be stored on cloud storage unless it is encrypted. Any paper-based personal information and data is be securely locked in designated areas to prevent unauthorized access. It is highly recommended that all passwords used should be encrypted, not written down, and changed regularly.

The security measures that are applied by the AgriDataValue project to prevent unauthorised access to personal data are:

- Data anonymization/pseudonymization at the source
- Use trustworthy devices (install the latest versions of Operating System, Firewall and up to date antivirus software). Moreover, secure storage devices (encrypted disks) are used.
- Strong authentication/authorization process to get access to the data. A strong Password Policy is followed. The users are forced to select long passwords including letters, numbers and special characters, and change passwords frequently.
- Users are educated to avoid using terms that can be guessed in a brute force attack, while they are informed on routine password updating. Any password is encrypted, never written, and changed regularly. Two factor authentication (2FA) has been considered, but not implemented yet.
- Access to systems and databases with data is monitored to detect anomalous activity such as multiple login attempts, login at unusual hours, or login by users to systems or data they don't usually access.
- End point security. Historically, most security breaches were a result of penetrating the network perimeter. Today, many attacks circumvent network defences by directly targeting endpoints, such as employee workstations, servers, cloud instances. Installing antivirus on every endpoint is the most basic security measure.
- Only persons that have been authorised by their organization and have submitted an official request to the Pilot Data Controller and the Project Data Protection Officer have access to the data.

13 Personal Data transferred outside EU and personal data transferred from a non-EU country to the EU

The AgriDataValue is a joint project between EU countries and the United Kingdom (non-EU country). Research activities will be conducted in EU countries and through the conduct of these activities following the specific call requirements, all Ethic requirements will be respected fully and unconditionally.

The consortium of the AgriDataValue project clearly states that during the project's lifespan, *no personal or sensitive data will be shared or transferred from EU to non-EU countries or international organization*.

In the unforeseen case, that any personal data is required to be transferred outside EU, the chapter V of the General Data Protection Regulation 2016/679 entitled ''*Transfers of personal data to third countries or international organisations*'' will be applied in order to ensure that the level of protection of natural persons is guaranteed. In more details, the article 44 of chapter V of GDPR will be applied which describes the principles for 'any transfer of personal data which are undergoing processing or are intended for processing after transfer to a third country or to an international organisation'. The AgriDataValue pilots will be conducted in EU countries (Greece, Spain, France, Romania, Italy, Belgium, Poland, the Netherlands, and Latvia). All AgriDataValue activities and experiments will concentrate on crop, livestock, and vegetables/fruits monitoring in accordance with the project scope.

As described in chapter 9.3 of the present deliverable, surveys will be used to collect data and opinions of people regarding non sensitive issues**.** No sensitive personal data will be collected, and no data transmitted between project partners that might lead someone to identify an individual (e.g., location information will be removed).

During the research activities of the project, the partners of AgriDataValue commit to comply with the Ethics EU regulations and legislations.

The AgriDataValue consortium confirms that no personal or sensitive data will be shared or transferred from UK (non-EU country) to the EU (or another third state) in a readable (not encrypted, non-anonymized/ pseudonymized format).

During the workshop held in June 2023, pilot participants were enquired as to whether the third-party tools/platforms that they are currently using for their daily operations are collecting/storing data outside of the EU. Below, the list of third-party tools/platforms that are being used in all Use Case Clusters and the links to their respective privacy policies:

Use Case Cluser 1 - Arable Crops	
AgriDataValue partners involved: Inagro, ZSA, Delphy, TBA, UL, BioRO	
Third party tool:	Privacy policy link:
Fieldclimate	https://metos.at/en/privacy-policy/
Watchitgrow	https://watchitgrow.be/nl/uw-data
Meteobot	https://meteobot.com/en/privacy-policy/

Use Case Cluser 2 - Vegetables	
AgriDataValue partners involved: Inagro, TEC, UL	
Third party tool:	**Privacy policy link:**
Fieldclimate	https://metos.at/en/privacy-policy/
Watchitgrow	https://watchitgrow.be/nl/uw-data
Thingspeak	https://www.mathworks.com/company/trust-center/privacy-policy.html

Use Case Cluser 3 - Trees/Vineyards	
AgriDataValue partners involved: SARGA, RiNO, Nileas, CVSE	
Third party tool:	**Privacy policy link:**
Platform - iFarming - Agricoltura di precisione	https://www.ifarming.it/privacy-policy/?lang=en
AEMET-Agencia Estatal de Meteorología	https://www.aemet.es/es/nota_legal
Sistema de Información Agroclimática de Regadio	https://servicio.mapa.gob.es/websiar/ (Clicking "Aviso Legal" button)
Aragón Open Data	https://www.aragon.es/politica-de-privacidad https://www.aragon.es/-/aviso-legal
Sede Electrónica del Catasto	https://www.catastro.hacienda.gob.es/ayuda/avisolegal.htm https://www.catastro.hacienda.gob.es/ayuda/condicionesuso.htm https://www.catastro.hacienda.gob.es/ayuda/Politica_privacidad.htm
Copernicus (Sentinel-2)	Privacy Policy link
ECMWF Reanalysis v5 (ERA5)	https://www.ecmwf.int/en/privacy https://www.ecmwf.int/en/forecasts/accessing-forecasts/licences-available
Red FARA (Red de Vigilancia Fitosanitaria de Aragón)	N/A
OpenMeteo	https://open-meteo.com/en/terms
GP CoreIoT™	https://coreiot.green-projects.gr/admin/privacy_policy

Use Case Cluser 4 - Livestock	
AgriDataValue partners involved: EV ILVO, ZSA, TBA	
Third party tool:	**Privacy policy link:**
C-lock dashboard	https://www.c-lockinc.com/privacy-policy
Synfield dashboard	https://www.synfield.gr/privacy-policy/

Use Case Cluser 5 - Cross sector	
AgriDataValue partners involved: TBA, Inagro, SIXEN, ALMA	
Third party tool:	**Privacy policy link:**
N/A	N/A

Use Case Cluser 6 - CAP realization	
AgriDataValue partners involved: SIMA, ALMA, SINER, SYN, NPA, APPAG, APIA	
Third party tool:	Privacy policy link:
N/A	N/A

Use Case Cluser 7 - Climate monitoring	
AgriDataValue partners involved: SIXEN	
Third party tool:	Privacy policy link:
N/A	N/A

14 Respective national legal framework

The AgriDataValue project and all the partners comply with the Horizon Europe ethical standards and guidelines, the consortium is committed to take all necessary measures to ensure that all project activities comply with the GDPR/European Chart of Fundamental rights and all data protection relevant EU regulations, soft law, standardization and policy initiatives, soft law, standardization, and policy initiatives. Throughout the present document the AgriDataValue partners provided sufficient confirmation of compliance to relevant laws and regulations. In addition, the consortium complies with the laws of the country in which the research is conducting regarding national data-protection and processing laws, as well as legislation regarding the rights of data subjects.

Among AgriDataValue Consortium partners, one (1) beneficiary is from a non-EU country:

Partner Name: **QUEEN MARY UNIVERSITY OF LONDON**	non-EU country: **United Kingdom**
The UK GDPR is effectively the General Data Protection Regulation (Regulation (EU) 2016/679) ('GDPR')	

15 Artificial intelligence (AI) and compliance with AI Regulations

AgriDataValue adopts the Guideline of the EU High-Level Expert Group on AI (AI HLEG) to design and implement trustworthy AI/ML ecosystems. AgriDataValue ethics are coordinated by the Data Protection Officer (DPO), who (a) ensures the compliance of the project with ethics codes and legislations, and (b) aligns project research results with the most advanced outcomes of the international scientific community on ethics, engineering, and emerging technologies. The project policy implementation is extremely vigilant in handling data and strictly collect and use only the one necessary to carry out the project activities considering all the processes and actions. In the case of indirectly collecting personal data (e.g., as a part of pilots/Living Labs), they will be anonymised before used.

AgriDataValue project ensures the trustworthiness and reliability of its AI systems based on the approach:

- **Development/use of "White Glass" Models wherever applicable:** In cases where "White Glass" explainable models (e.g., decision trees, models derived from FDML) yield acceptable performance, they are preferred over "black-box" models like multi-layer deep neural networks.
- **Explaining "black-box" models in cases where they must be used:** In cases where the use of "black-box" models is deemed necessary (e.g., due to their performance when large volumes of data are available), the project employs XAI techniques to interpret the models and boost their trustworthiness.
- **Dealing with AI trustworthiness towards AgriDataValue' tools adoption**: AI trustworthiness is considered and analysed during the development of the project use cases, with the active engagement of farmers, agronomists, citizens, and administrations/public organizations. One of the main goals of this process is to find the proper balance between model explainability, trustworthiness and performance.
- **Compliance with mandatory regulations (e.g., GDPR) and the European Parliament & Council Proposal for an AI Regulation:** The AI systems of the project comply with the mandates of mandatory regulations like GDPR and with emerging AI regulations at the European level. Special emphasis is being paid in studying and ensuring the social robustness of the AgriDataValue AI systems. In ensuring the trustworthiness of the AI systems, the project leverages the partners' background results in AI technologies, and their participation in some prominent EC-funded projects (e.g., H2020 STAR, AI4PublicPolicy).

16 Animals within the AgriDataValue project

The AgriDataValue technological tools, mechanisms, and Lean Multi-Actor Approach (LMAA) analyzed in the previous sections are fully tested and validated during the AgriDataValue project lifetime through 24 Use Cases (UC) in 23 pilots in 9 countries (Greece, Spain, France, Romania, Italy, Belgium, Poland, the Netherlands, and Latvia).

The AgriDataValue activities which involve animals will take place in Belgium, Latvia, and Greece, within the use case cluster 4 as described in section 3.1. In total, 4 AgriDataValue pilots will be conducted involving more than 2,000 animals of 5 types (Beef Cattles, Dairy Cows, Pig Sows, piglets, and fattening pigs). All activities undertaken in EU countries will comply with the Horizon Europe ethical standards.

Use Case Cluster 4	Sector: Livestock
Countries	Belgium, Latvia, Greece
Animals	Cattle (Beef Cattles, Dairy Cows), Pigs (Sows, piglets, fattening pigs)
Partners	EV ILVO, ZSA, TBA, SARGA

16.1 AgriDataValue procedures to ensure animal welfare

Throughout the demonstration activities in AgriDataValue project, animals will be involved. With respect to livestock animals, the project will only perform not interfering and non-invasive Experiments, ensuring animal welfare. In details, the project uses digital tools, such as IoT sensors and environmental monitoring devices to oversee and optimize the livestock for maximum efficiency. The following table shows the pilots, the country that the pilot will be conducted and the leading member of the consortium.

Table 4: The AgriDataValue pilots involving animals

Animal Type	Country	Partners involved
Dairy Cows	Belgium	EV ILVO
Beef Cattle	Latvia	ZSA
Beef Cattle	Greece	TBA
Pigs	Belgium	EV ILVO

16.2 AgriDataValue activities involving animals

For the research purposes involving animals within the AgriDataValue project, IoT devices and appropriate sensors will be installed at the pilot sites. Training related to their use, functionality, data recording and interpretation will also be delivered to the people involved in the animals' experiment by Experts.

The pilot activities are described in WP3, WP4, and WP5.

16.2.1   Overview of the scope and nature of the experiments

The following tables present information regarding the country in which the pilots will take place, the AgriDataValue partners that will be involved, as well as an estimation of the total number of the animals that will be involved. In addition, a description of the nature of the experiments and the harm that will be caused to the animals, will be provided.

Pilot Demonstration country: Belgium	Location: Melle
AgriDataValue partners involved: EV ILVO	
Animal Type: Dairy Cows	Number of involved Animals: 164

The nature of the experiments: Feeding trials, animal welfare assessments, emission monitoring

The harm that might be caused to the animals: No harm

Number of involved animals may increase as the project goes on and more data becomes available.

Pilot Demonstration country: Latvia	Location: Kurzeme
AgriDataValue partners involved: ZSA	
Animal Type: Beef Cattle	Number of involved Animals: >100

The nature of the experiments: Improve health and welfare of the livestock

The harm that might be caused to the animals: No harm

Pilot Demonstration country: Greece	Location: Agrinio
AgriDataValue partners involved: TBA	
Animal Type: Beef Cattle	Number of involved Animals: 320

The nature of the experiments: Calving monitoring

The harm that might be caused to the animals: No harm

Pilot Demonstration country: Belgium	Location: Melle
AgriDataValue partners involved: EV ILVO	
Animal Type: Pigs	Number of involved Animals: 1450

The nature of the experiments: Feeding trials, animal welfare assessments, and emission monitoring

The harm that might be caused to the animals: No harm

Number of involved animals may increase as the project goes on and more data becomes available.

17 Assessment of participant's risk

The following section provides an assessment of the potential risks to both research participants and project staff. Additionally, comprehensive details on the steps taken to mitigate these risks is provided. The members of the AgriDataValue consortium strictly adhere to the highest ethical standards and comply with relevant EU and international laws governing ethical principles.

17.1 Personal Data

Even though the project involves volunteers for the pilots, only completely anonymized data is gathered and processed. This data specifically aim to gather their opinions and feedback regarding the evaluation of the AgriDataValue technologies that were or will be implemented. All individuals, including personnel, researchers, citizens, and farmers, who participate in the AgriDataValue project, are extensively informed about the project's activities and advantages. Their written consent is obtained before they take part in the project.

To fully ensure privacy, each participant is Anonymized from the very beginning of his/her direct or indirect involvement in the project, while the number of volunteers in project pilots is sufficient for demonstrating the project functionality and ensuring that anonymization is not possible to lead someone to identify an individual. In the unlikely case that any personal or sensitive information needs to be stored, it is maintained in an encrypted form.

In conclusion, human participants in AgriDataValue are expected to take part in surveys, workshops as well as crop/livestock use cases; yet, no personal or sensitive data will be collected, stored, or processed, and no data is shared between EU and non-EU countries.

17.2 AgriDataValue pilot activities

The AgriDataValue pilot activities within the project involve human participants for the evaluation of the AgriDataValue technologies and as stated previously, is conducted in EU member states. The research activities, throughout the project, do not entail any risks for the researchers and participants. These activities are in strict compliance with the biosecurity protocols as regulated by the relevant national EU member states.

17.3 Research 'in the field'

Throughout the project, the pilots are conducted in the nine (9) EU countries in an open field environment, involving activities such as installing IoT devices and sensors, and routine maintenance. This constitutes research 'in the field' situation and up until the end of these activities, certain procedures are followed to help keep researchers safe. These should include:

- using mobile phones to stay connected with the research base

- carrying authorized identification

- reporting any health & safety incidents.

- no lone working (does not work alone)

1.4. Drones – UAV

In the usage of *drones/UAVs,* it should be clear that safety is a top priority for the AgriDataValue consortium and that their utilization is not associated with any activity that could cause any harm (e.g., spraying), as drones/UAVs wherever they are utilized are equipped only with remote sensing equipment (i.e., optical, and multispectral video cameras).

Moreover, their flight is controlled by trained/licensed pilots to avoid any harm to the environment or humans in proximity. Furthermore, in case authorization is needed for flying the drone in a specific location, copies are kept on file and provided to the Agency upon request.

18 Analysis of the potential Environmental impact

AgriDataValue aims on delivering an end-to-end data-aware, federated platform of platforms in the agrienvironment domain, in order to optimize the complete "Data Path": data collection, storage, transfer, processing and querying, with a primary purpose for its operations being fully environmentally sustainable. This section of the deliverable provides details on the potential environmental impact and harm that might be caused by project research activities. Furthermore, the precaution measures that have been and are still being taken by the consortium of the AgriDataValue project to mitigate any risks are also described.

18.1 EU Green Taxonomy Regulation

The EU Green taxonomy for sustainable activities (i.e., "green taxonomy") is a classification scheme developed in the framework of the European Green Deal to make clear which investments are environmentally sustainable (Commission, https://finance.ec.europa.eu/, n.d.). The taxonomy's main goals are to stop "greenwashing," play a significant role in aiding the EU in increasing sustainable investment, assist investors in making greener decisions, and carry out the European Green Deal. The EU taxonomy would provide companies, investors, and policymakers with appropriate definitions for which economic activities can be considered environmentally sustainable. In this way, it should create security for investors, protect private investors from greenwashing, help companies to become more climate-friendly, mitigate market fragmentation and help shift investments where they are most needed. The EU taxonomy came into force in July 2020. It is designed to support the transformation of the EU economy to meet its European Green Deal objectives, including the 2050 climate-neutrality target. As a classification tool, it seeks to provide clarity for companies, capital markets, and policy makers on which economic activities are sustainable. As a screening tool, it seeks to support investment flows into those activities.
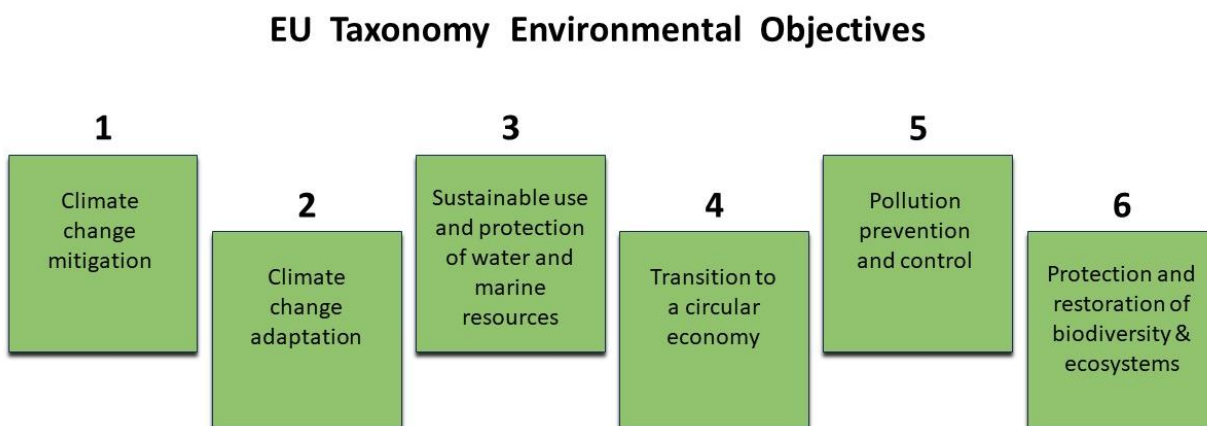

Figure 1: The six (6) environmental objectives of the EU Taxonomy

The six (6) environmental objectives of the EU Taxonomy are (Commission, REGULATION (EU) 2020/852 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL, 2020):

1. Climate change mitigation,

2. Climate change adaptation,
3. Sustainable use and protection of water and marine resources,
4. Transition to a circular economy,
5. Pollution prevention and control
6. Protection and restoration of biodiversity & ecosystems.

The Technical Screening Criteria (TSC) are a set of precise requirements and thresholds that determine whether an economic activity can be classified as significantly contributing to a specific sustainability objective. These criteria are detailed in secondary legislation known as Delegated Acts (DAs). The Delegated Acts provide additional specifications and guidelines, allowing for a more comprehensive and transparent assessment of whether an activity qualifies as sustainable in alignment with the desired sustainability objectives.

18.1.1   The 'Do No Significant Harm (DNSH) Principle

To be considered sustainable according to the EU Taxonomy, an activity must align with at least one of the six objectives. Additionally, it must not result in significant harm to any of the other Taxonomy objectives. For each activity, the TSC lay out thresholds to define compliance with do no significant harm. The overall implementation of AgriDataValue project is fully compliant with the "do no significant harm" principle as per Article 17 of Regulation (EU) No 2020/852, since it is designed in a way that it is not harming any of the 6 environmental objectives of the EU Taxonomy Regulation.

18.1.2   Enabling & Transitional Activities

The EU Taxonomy includes two classification categories for activities that significantly contribute to one or more environmental objectives: enabling activities and transitional activities. These categories were introduced to broaden the scope of sustainable contributions and promote overall sustainability.

Enabling activities facilitate other activities in making significant positive contributions to the Taxonomy's six objectives. However, they must not cause a 'lock-in' of assets that would hinder long-term environmental goals. Additionally, enabling activities must demonstrate substantial positive environmental impact throughout their lifecycle.

Transitional activities, on the other hand, must actively support climate change mitigation and align with the goals of the Paris Agreement in limiting global warming. To qualify as transitional activities, they need to meet specific criteria:

a) There are no technologically or economically feasible low-carbon alternatives;
b) Green House Gas emission levels correspond to the best performance in the sector or industry
c) The activity does not lead to carbon lock-in or hamper the development and deployment of low-carbon alternatives.

18.1.3   New Taxonomy Reporting Requirements

Apart from its main role as a classification tool, the E U Taxonomy serves other purposes as well. One such function involves mandating certain entities to disclose information about how their activities align with the Taxonomy. This disclosure requirement involves amending the guidelines in the EU's Non-Financial Reporting Directive (NFRD) and the Sustainable Finance Disclosure Regulation (SFDR).

18.1.4   IoT devices and sensors

IoT devices and appropriate sensors have been installed at the pilot sites during AgriDataValue's research activities. The devices will be used for purposes such as, environmental conditions monitoring, soil conditions

monitoring, smart farming irrigation and smart farming evaluation. Furthermore, the hardware is used in monitoring of livestock wellbeing, and remote sensing solutions. These devices and sensors that are installed in demonstration sites do not and will not cause any harm to the environment.

18.1.5   Drones/UAVs

During the pilot activities of the AgriDataVAlue project, drones/UAVs are used. It should be clear that their utilization is not associated with any activity that could cause any harm to the environment in any way (e.g., spraying), as drones/UAVs wherever they are utilized are equipped only with remote sensing equipment.

18.1.6   Artificial Intelligence (AI)

The AI/ML technologies are algorithms that are applied on the data. Artificial Intelligence/Machine Learning (AI/ML) modelling is directly applied to crops and livestock. The use of AI technology by the project is done based on sustainable practices (i.e., green data center, moving AI functions to the edge, working with minimal data). Most importantly, the project's AI tool generate CO_2 emissions in an one-off fashion, while the resulting federated ML models lead to continuous/long-standing sustainability benefits. Moreover, although most advanced deep learning models require several hours of training (i.e., higher electricity consumption), AgriDataValue tools' socio-economic benefits are significantly higher than the required recourses consumption. The Artificial Intelligence/Machine Learning technologies that are applied throughout the AgriDataValue project, refer solely to the data produced by the IoT, Drones/UAVs, satellite images and recordings from researchers. Thus, under no circumstance it affects the EU pillars of sustainability and environmental protection.

18.2 Potential AgriDataValue environmentally risks

Throughout the research activities of AgriDataValue, the only potential environmental risk that has been identified, could be the increased electrical energy consumption and CO_2 generation due to utilization of AI. It must be said that the likelihood is small, and the potential impact is small.

The development and utilization of AI technologies contribute to reduce the overall energy consumption and CO_2 generation in the long term. Thus, the energy and CO_2 generation, regarding the AI training, is much less than the significantly greater future benefit. As a result, the use of AI technology overall is environmentally friendly.

Finally, AgriDataValue makes sure that only energy neutral or energy positive or energy neutral data centre policies are used, while green datacenter facilities and policies are followed wherever possible to reduce the AI training CO_2 generation.

19 Health and Safety procedures

19.1 Safety when using Drones – UAV

As described previously in sections 1.4 and 18.1.5. of the present document regarding the usage of drones/UAVs, it should be clear that safety is a top priority for the AgriDataValue consortium. Wherever used, their flight is controlled by trained/licenced pilots to avoid any harm to the environment or humans in proximity. The consortium confirms that if authorization is needed for flying the drone in a specific location (not needed so far), the authorization will be obtained.

19.2 Health and Safety guidelines and legislation

The AgriDataValue consortium confirms the compliance with the relevant local/national guidelines/ legislation are followed for staff involved in this project. The AgriDataValue partners declare that they do not and will not expose its employees to health and safety risks. All European members of the consortium are aware of and comply with the following international, EU and national legislation for health and safety at work:

- The Universal Declaration of Human Rights, proclaimed by the United Nations General Assembly in Paris on 10 December 1948

- The Directive 89/391 - OSH "Framework Directive" of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work - "Framework Directive

- The EC Communication (COM [2004] 62) on the practical implementation of 89/391 EEC (framework directive), 89/654 EEC (workplaces), 89/655 EEC (work equipment), 89/656 EEC (personal protective equipment), 90/269 EEC (manual handling of loads) and 90/270 EEC (display screen equipment)]

- The Directive 2009/104/EC – use of work equipment

- The Directive 92/58/EEC - safety and/or health signs

- The Directive 89/656/EEC - use of personal protective equipment

- The Directive 89/654/EEC - workplace requirements

- The Regulation (EU) 2016/425 on personal protective equipment

- The Directive 90/269/EEC - manual handling of loads

- The Directive 90/270/EEC - display screen equipment

- The Directive 92/85/EEC - pregnant workers

- The Directive 2006/54/EC - equal opportunities

- The Directive 2002/14/EC - informing and consulting employees

- The Directive 2000/78/EC - equal treatment

- The national Code of Laws for Health & Safety at Work, ratified by article one of law 3850/2010

20 Conclusions

The deliverable is an updated version of D5.1, reporting the changes that took place since the previous version. It is a self-contained document, and the main updates since the previous version can be found in the description of the technical approach of AgriDataValue in the context of Data Privacy, as well as the insights that followed the workshop that took place in July, and are reported in section 7, concerning the Data Act, GDPR, and the AI Act.

For the project's work in smart agriculture, the EU AI Act should be interpreted as an enabler for engineering excellence. It codifies many of the best practices that the responsible AI community has long been in discussions about. It motivates the technology stakeholders to build systems that are not just intelligent, but also robust, transparent, and demonstrably safe; qualities that are essential for any technology intended to operate in the real world and manage e.g., critical food production systems. The AI Act serves as a guide to integrate data privacy into the very core of the engineering lifecycle for high-risk agricultural AI. It elevates responsibilities from protecting data at rest to ensuring its quality and integrity in motion, making robust data governance an inseparable component of system safety and trustworthiness.

The deliverable presented the procedures and precautions that have been followed and will be followed by all consortium partners that include humans in research activities. It also presents and updates the project partners' commitment to comply with necessary ethics requirements when research activities include humans' engagements. The procedures and the criteria to be followed when it comes to the selection of human participants were also described. In order to assist the consortium members, the informed consent procedures that will be implemented for the research participants were presented, accompanied by sample templates of these informed consent/assent forms and information sheets which cover voluntary participation and data protection issues.

The document has also presented the compliance of AgriDataValue with the ethics framework in place for data protection in research. Specifically, attention was given to the data collection and processing, adhering to principles such as the data minimization principle. Also, measures that need to be adopted for safeguarding the rights and freedoms of the data subjects and research participants were references, along with measures that will be employed to prevent unauthorized access to personal data. Additional content was included for the anonymization/pseudonymization principles that will be followed, as well as clarifications about data transfers from EU countries to non-EU countries and vice versa.

Finally, this deliverable provided updated information on the compliance of the ADV project with ethics regarding animals' participation in research as well as with ethics regarding environmental protection and safety.

21 References

[1] E. Union, "REGULATION (EU) 2016/679 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL," *Official Journal of the European Union,* 2016.

[2] E. Union, "DIRECTIVE (EU) 2016/680 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL," *Official Journal of the European Union,* 2016.

[3] E. Union, "REGULATION (EU) 2016/679 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL," 2016.

[4] E. Commission, "https://finance.ec.europa.eu/," [Online]. Available: https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities_en. [Accessed 2023].

[5] E. Commission, "REGULATION (EU) 2020/852 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL," *Official Journal of the European Union,* 2020.