D1.3 - Data Management Plan – Draft 2

Work Package 1 – Coordination and Management

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6	FUTURE IMPACT, CORNELIA DAHEIM	FI	DE
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Executive Summary

The deliverable **D1.3 Data Management Plan – Draft 2** builds upon the initial version (D1.2) developed under **WP1 – Coordination and Management**. This updated version reflects the progress made in the project and any changes in data-related practices or responsibilities across the consortium. This essential document outlines the 4Growth project's DMP and details how data will be generated, curated, and preserved throughout the project. Its purpose is to describe the consortium's data management policy concerning all data generated or collected during the project. The DMP outlines the data management lifecycle for all datasets collected, processed, or generated during the research project. Task T1.2 "Data Management" within the 4Growth project is dedicated to data management and the creation of the DMP. The DMP ensures that the project's activities align with the Horizon Europe Open Access Policy and the recommendations of the Open Research Data Pilot -ORDP-. It addresses various issues such as the handling of research data during and after the project, the data to be collected, processed, or generated, the methods and standards to be used, the conditions for data sharing or public availability, and the curation and storage of data. The DMP is crucial for the project's success for two reasons: it provides guidelines for the availability and quality of datasets used or generated by the project, encompassing both research data and pilot site data, and it offers a detailed description of all datasets and associated software to ensure they are accessible and usable by third parties. The DMP is designed to be a dynamic document, updated as the project progresses and significant changes occur, as well as at the end of each reporting period.

1. Introduction

1.1 Purpose

The 4Growth project has developed a comprehensive DMP to ensure that data generated by the project are properly used, made accessible for review and reuse, and retained for the long term. The DMP is prepared in accordance with the Horizon Europe Programme guidelines and will follow the "Guidelines on FAIR Data Management in Horizon Europe". The first version of the DMP was delivered in M6, is updated in M18 and will be finalized in M33 to reflect the progress of the project. The DMP focuses on identifying the types of data and research outputs generated by the project, making the data findable using online platforms and persistent identifiers, ensuring accessibility and open access to the data, promoting interoperability by standards and promoting reusability through the adoption of different standards. The DMP also includes plans for the curation and storage/preservation of the data, including the use of dedicated repositories and the provision of the necessary resources for the organisation, management and maintenance of the data. The 4Growth project will also adhere to ethical guidelines and comply with the GDPR in relation to data management and privacy. To protect privacy, data collected through surveys will be stored and transmitted in a form that does not include personal identifiers. In cases where certain parts of datasets cannot be shared, the reasons for this will be clearly stated in the DMP. Overall, the 4Growth project commits to follow the principles of FAIR regarding data management and to ensure that the data generated by the project is Findable, Accessible, Interoperable, and Reusable.

1.2 Relation to other project documents

In the event of discrepancy between documents, this document is overruled by the Grant Agreement including its Annexes and the Consortium Agreement with its possible addendums.

1.3 Abbreviations

CA	Consortium Agreement	**HE**	Horizon Europe
DMP	Data Management Plan	**IPR**	Intellectual Property Rights
DoA	Description of Action	**PC**	Project Coordinator
DOIs	Digital Object Identifier	**FAIR**	Findable, Accessible, Interoperable and Reusable
EC	European Commission	**PI**	Persistent Identifier
EOSC	European Open Science Cloud	**PURLs**	Persistent URLs
GA	Grant Agreement	**WP**	Work Package
EU	European Union	**GDPR**	General Data Protection Regulation
ORDP	Open Research Data Pilot	**RGPD**	French abbreviation for Règlement Général sur la Protection des Données (General Data Protection Regulation)

2. General Principles & Guidelines

This DMP has been prepared, detailing what data the project will generate, whether and how it will be exploited or made accessible for verification and re-use, and how it will be curated and preserved. The DMP addresses the topics that are indicated within the DMP template for Horizon Europe programs and has also been prepared in accordance with the EU data management guidelines (e.g. “Guidelines on FAIR Data Management in Horizon Europe”). The DMP is a living document, and it will be updated over the course of the project whenever significant changes arise, and as a minimum by the end of each reporting period. The DMP will address the following:

Identification and description of data types: Through its engagement activities under WP2 and WP4 and its market monitoring efforts in WP3, 4Growth will collect and store significant and various amounts of input data from project participants/stakeholders. The type of data generated in the project will include personal and private company strategic documentation and private code for digital products and services, which will remain confidential. This data will be hosted by the organisation generating that data. The internal mechanisms of that entity will be employed to ensure that any personal data will be treated in strictest compliance with EU GDPR and that IPR considerations as described in the Consortium Agreement are respected. Each data type will be fully described in the DMP, including its size, utility, type, format, etc.

Findability: The data will be made easily discoverable to both humans and machines through (SPARQL) queries, which will include precise metadata and leverage the EOSC and other data platforms. Additionally, the resources will be assigned long-lasting identifiers, such as Persistent Identifiers given by the Zenodo data platform (Zenodo DOI), to guarantee their re-discoverability. Furthermore, 4Growth will actively participate in the ORDP, and all publications will be accessible through Gold Open Access and Green Open Access via OpenAIRE, ResearchGate, and repositories supported by individual institutions.

Accessibility: 4Growth will adhere to an open access policy for data and research results, making the majority of the gathered data available through the project's developed services, with the exception of proprietary software and private company data. Furthermore, it is envisaged that datasets containing sensitive/personal data will either be processed first (anonymisation, pseudonymisation) or not shared at all. Results approved for dissemination will be made accessible through a variety of channels including project webpage social media, scientific conferences, scientific publications in peer-reviewed journals, data repositories, among others.

Interoperability: The 4Growth project will collect textual data and prioritize interoperability by utilizing established agrifood sector vocabularies and ontologies, such as SAREF4AGRI ontology. Metadata descriptors will also be included with the data to facilitate discoverability through (SPARQL) queries.

Reusability: To ensure that the data generated by the versatility of 4Growth activities can be accessed and reused, several standards will be implemented. These standards include the EIP-AGRI common formats, as well as standards suggested by SCAR SWG AKIS, and other standards that may be developed during the project's lifespan. 4Growth aims to promote the reuse of data by providing clear and accessible usage licenses, such as MIT or Creative Commons, and by utilizing standardized and interoperable data modelling techniques based on semantic web ontologies.

Curation and storage/preservation costs: T1.2 will play a crucial role in ensuring that all 4Growth outputs are efficiently organized, managed, maintained, and made available to authorized entities throughout the project's life cycle. To achieve this, all data will be carefully curated and preserved in dedicated repositories that cater to the specific requirements and

type of data. WUR as the scientific coordinator and leading WP4 will use its DataWareHouse for data storage (already used for data collected for FADN and other trade and market data). Moreover, to minimize potential risks, all data will be deposited in open digital repositories like OpenAIRE's Zenodo repository, thereby ensuring that it is easily discoverable, accessible, and comprehensible. The 4Growth partners will utilize project funding to ensure that all necessary resources are available to ensure the generated data remains FAIR and open while being made available without any undue delays.

3. 4Growth Data Management Principles

3.1 Summary of Data Management Plan issues

Table 1 described in the European Commission's "Guidelines on FAIR Data Management in Horizon 2020" DG Research and Innovation, provides a summary of the DMP issues to be addressed. In order to comply with the Horizon Europe research data management requirements as set out and analysed in Article 15 of the annotated Grant Agreement, Horizon Europe beneficiaries must prepare and regularly update a DMP. It is recommended to use the Horizon Europe Data Management Plan template to do so.

Table 1 Summary of DMP issues to be addressed

DMP Component	Issues to be addressed
1. Data Summary	• State the purpose of the data collection/compilation • Explain how it relates to the objectives of the project • State the types and formats of data generated/collected • Indicate whether existing data will be reused (if any) • Indicate the source of the data • Indicate the expected scope of the data (if known) • Outline the data utility: for whom will it be useful?
2. FAIR data	
Making data **findable** (including provisions for metadata)	• Explain the discoverability of data (provision of metadata) • Explain the identifiability of data and refer to standard identification mechanisms. Do you use persistent and unique identifiers such as Digital Object Identifiers? • Outline the approach for search terms • Outline the approach to clear versioning
Making data openly **accessible**	• Specify which data should be made publicly available? If some data is kept under lock and key, give reasons for this • Specify how the data will be made available • Specify what methods or software tools are needed to access the data Is there documentation on the software needed to access the data? Is it possible to include the relevant software (e.g. in the form of open source code)? • Indicate where the data and associated metadata, documentation and code are stored • Indicate how access to the data is granted, if there are any restrictions
Making data **interoperable**	• Assess the interoperability of your data. Indicate which data and metadata vocabularies, standards or methods you will use to

	facilitate interoperability. ● Indicate whether you will use a standard vocabulary for all data types present in your dataset to facilitate interdisciplinary interoperability If not, will you provide mapping to common ontologies?
Increase data **reuse**	● Specify how the data should be licenced to allow the widest possible reuse. ● Specify when the data will be made available for reuse. If applicable, specify why a data embargo is required and for how long. ● Indicate whether the data created and/or used in the project can be used by third parties, especially after the end of the project? If the re-use of some data is restricted, explain why. ● Describe the procedures for ensuring data quality. ● Indicate how long the data can be re-used.
3. Allocation of resources	● Estimate the cost of producing your data FAIR. Describe how you intend to cover these costs. ● Clearly define the responsibilities for data management in your project. ● Describe the costs and potential value of long-term retention.
4. Data security	● Address data recovery and secure storage and transmission of sensitive data

5. Ethical aspects	● Addressed in the ethics review, ethics section of the DoA and ethics performance. Include references and related technical aspects if not covered by the former.
	  ● Privacy
	  ● Data ownership or the right to access data
	  ● Fair distribution of benefits if applicable

6. Other	● Refer to other national/state/sectoral/departmental data management procedures you use (if any).

3.2 Data Summary

3.2.1 Background data

"Background" is defined as intellectual property that a partner in the consortium brings to the project. This can be, for example, inventions, know-how, secret knowledge, methods, etc. "Background data" is data and/or databases that existed before the project and that are brought into the project. Partners must grant each other access to background data that they need to carry out their own tasks and exploit their own results. However, there is no obligation to grant access if there are restrictions or limits (legal or otherwise) and the partner has informed the other partners of this. The background is set out in the CA.

3.2.2 Data collected, processed and/or generated during the project

A general overview on the data generated in each WP is shown in Table 2.

Table 2 Types of data generated in each 4GROWTH Work Package

Work Package	Data to be collected
WP1 – Coordination and Management	• Agreements, project reports and project deliverables, minutes, videos and photos of project related meetings.
WP2 – Uptake of Digital Agriculture & Forestry Technologies	• Agriculture and Forestry data in a comprehensive review for the adoption and uptake of various technological solutions • Deliverables: Initial state-of-art analysis (SOTA) with further updates to reflect new data and technology trends • Uptake assessment grid in questionnaire-style framework which will be used to gather data via the observatories in WP4 • Analysis of innovative approaches to market monitoring: data collection via distributed observatories, ingested macro-economic data, foresight analysis, IoT or geolocation data to measure user uptake and qualitative data (mass qual approach)
WP3 – Digital Agriculture & Forestry Uptake – Forecast & Foresight	• Build the market monitoring and forecasting tool (MMFT) by producing market data outputs with respect to users, penetration, new users/sales of devices, revenue (hardware/software), and prices (device/subscription), sing a combination of open data from free sources (e.g., Eurostat) and purchased data from commercial providers to ensure comprehensive and reliable inputs. • Develop the foresight module using the SOTA analysis and WP4's field level data collection • Deliverables reflecting findings from observatory data collection and the MMFT
WP4 – Observatory Data Collection and Analysis	• Develop a catalogue of various agricultural and forestry stakeholders who will be reached out to gather data on the adoption and use of digital technologies • Data gathering can involve, where necessary, digital correspondence (email, video calls etc.) and in-person interviews with entities utilizing digital agriculture and forestry technologies
WP5 – Impact Maximisation	• Personal data such as names, affiliations and e-mail addresses used for mailing lists and newsletters and alike. • IPR management report, where each partner's relevant IP background and foreground will be mapped, along with potential IP issues concerning 4Growth's exploitable results. • Data acquired from questionnaires defining the consortium's IP and exploitation potential.

3.3 FAIR data

4Growth is committed to the general FAIR principles (Findable, Accessible, Interoperable, Reusable) that are guidelines to make research data and other results more findable, accessible and usable. They can be applied to the management of all types of research outputs, both digital and physical, to ensure that they are easy to find, understand and use by other researchers.

- Are the research outputs discoverable? This means that they should be easy to find and identify, using clear and descriptive metadata, persistent identifiers and appropriate repositories or platforms.
- Are the research results accessible? This means that they should be available to anyone who needs them, regardless of their location or technical capabilities and subject to any necessary legal or ethical restrictions.
- Are the research results interoperable? This means that they can be used and understood by different systems and software programmes and are compatible with relevant standards and protocols.
- Are the research results reusable? This means that they should be available for reuse by others, either for further research or for other purposes, and should be accompanied by the necessary documentation or guidance.

By answering these questions and following the FAIR principles, 4Growth beneficiaries can ensure that their research results are managed in a way that maximises their potential impact and contributes to the advancement of knowledge. The general principles of FAIR are described below and refined by the practises of the individual partners, as described in the partners' DMPs in section 5 “Individual Data Management Plans”.

3.3.1 Making data findable, including provisions for metadata

In the context of a Horizon Europe project, it is important to ensure that data is "findable" to make it easily accessible and discoverable by others. To make data findable, it must be stored and organised in a structured and defined way. Each partner has defined its own principles for this (see section 5 “Individual Data Management Plans”). Examples of making data findable are: using a defined way of naming folders and files on a data drive and adding metadata and keywords to the dataset. An important aspect of making data findable is to provide comprehensive and accurate metadata that describes the data in detail and provides information about the content, context and structure of the data. This can include elements such as the title, authors, date of creation, location and subject of the data, as well as details about the format, size and accessibility of the data. It is also generally recommended that the data and associated metadata be assigned a persistent identifier, such as a Digital Object Identifier (DOI). This allows the data to be easily and uniquely identified and retrieved by others. It also ensures that the data can be properly cited and credited to the appropriate parties.

The 4Growth project requires beneficiaries to follow certain processes for storing and making their data "findable”. These processes include making data openly accessible in an online repository appropriate to the type and format of the data, cross-referencing research outputs and datasets (e.g. scientific publications and their underlying data), determining the discoverability of data, and ensuring that data are properly backed up to avoid loss. The organisation, data collection and format of the data are the responsibility of the individual Task

Leaders, who are also responsible for depositing the data in the online repository. Each beneficiary is also responsible for maintaining the records and documentation of the data they generate.

Persistent identifiers

For data published to a wider audience, persistent identifiers/references are used. A persistent identifier (PI or PID) is a permanent reference to a document, file or web page. Persistent data identifiers are preferred when publishing data. According to data storage practise, a unique and persistent identifier is assigned to a record. There are a number of different types of persistent identifiers that can be used to identify data, including Digital Object Identifier (DOIs), persistent URLs (PURLs) and handles. A DOI number assigned to a publication from the International DOI Foundation https://www.doi.org/. This way, the data can be easily and unambiguously identified and viewed by others. It also ensures that the data can be properly cited and credited to the appropriate parties.

Metadata

In addition to assigning a persistent identifier to the data itself, it is also important to ensure that any metadata associated with the data is properly identified and also assigned a persistent identifier. 4Growth will ensure that rich metadata is made available to enable data discovery. Metadata is essentially "data about data' and provides information about the content, context and structure of the data. This includes information such as the title, authors, date of creation, location and subject of the data, as well as details about the format, size and accessibility of the data.

4Growth metadata items include: contact information, locations, agriculture/forestry subsectors covered via the observatories data collection and also raster data, tables, pictures, videos, and other data formats such as JSON files for the 4Growth Visualisation Platform.

Metadata harvested and indexed

In order to offer metadata in a way that it can be harvested and indexed, it is generally recommended to use a metadata format that is widely accepted and supported by metadata harvesters and search engines. Some examples of metadata formats commonly used for this purpose are the Dublin Core Metadata Initiative (DCMI) standard and the DataCite Metadata Schema.

It is also important that the metadata is provided in a way that is easily accessible to metadata harvesters and search engines. This may mean that the metadata is made available via a metadata repository or via a web service that allows the metadata to be accessed and queried. In addition to using a widely accepted metadata format and making the metadata easily accessible, it is also important to ensure that the metadata is described accurately and consistently.

Keywords

It is generally recommended to include search terms in the metadata to optimise the possibility of finding and potentially reusing the data. Search terms are terms or phrases associated with the data that can be used to describe the content and topic of the data. Appropriate keywords are used for each dataset to optimise that potential users of the data can find the dataset. The keywords used must be appropriate to the content of the data and the standards of the research field. Including relevant and descriptive search terms in the metadata makes it easier for others to find and access the data using search engines or other research tools.

Version numbers

In some cases, already deposited datasets are updated, for example by new observations. The versions are marked with the date and the most important points that have been updated (e.g. number of observations), as well as with references to possible corrections to the data.

3.3.2 Making data accessible

One of the goals of HE is to make research data more accessible and reusable. This includes initiatives to promote the sharing of data across different sectors and disciplines, as well as the development of common standards and infrastructure for data management. To achieve this goal, HE has several initiatives in place, such as the EOSC, which is a platform for storing, sharing, and reusing research data. The EOSC aims to provide a single point of access to a wide range of research data, including data from public sector organisations, universities, and industry. For data to be accessible, they should be assigned a globally unique and persistent identifier, described with extensive metadata, registered or indexed in a searchable resource, specified with a data identifier.

3.3.3 Making data interoperable

Interoperability refers to the ability of different systems, devices or software programmes to exchange and use data in a meaningful way. In the context of research, interoperability is important to enable the sharing and reuse of data across different sectors and disciplines and to facilitate the integration of data from different sources. To promote interoperability in research, HE has launched several initiatives. The EOSC, for example, is a platform for storing, sharing and reusing research data and aims to provide centralised access to a wide range of research data from different sources. In addition to EOSC, HE also supports the development of common standards and protocols for data management and interoperability. The Research Data Alliance (RDA), for example, is an international organisation that works to develop standards, guidelines and best practises for data sharing and interoperability. Supported by Horizon Europe and other funding organisations, the RDA brings together researchers, policy makers and industry representatives to advance research data interoperability. Therefore, the data will be in the form that is a common standard in the field. This makes the datasets interoperable and enables the exchange and reuse of data between researchers, institutions, organisations and countries.

For data to be interoperable, it should: have a formal, accessible, common and universally applicable language for representing knowledge and vocabularies that conform to the principles of FAIR and contain qualified references to other metadata.

The 4Growth project has a dissemination and communication strategy that aims to be inclusive and open, and to reach a wide and diverse audience. To achieve this, the project will develop targeted content that will be made available in different languages on the 4Growth Visualisation Platform, and the project will focus on producing freely reproducible material that can be shared and integrated into other platforms. Demonstration events will be held to ensure that the results are widely disseminated, including among members of the EU states that are not directly involved in the project. Special care will be taken to ensure that the results benefit as many drone-interested stakeholders as possible. The project portals will apply best practices for accessibility, navigation, and user use, and will aim to deliver the project results to a wide and diverse audience, considering the different digital skills and accessibility of the target group.

3.3.4 Increase data re-use

Data access, sharing and reuse

Increasing the reuse of research data is an important goal of the 4Growth project, as it can accelerate scientific discovery, improve research impact, and foster innovation, as well as help avoid duplication and make better use of resources. The project will produce a range of reusable data, including knowledge (scientific publications), software, training materials, governance models and datasets. In general, it will promote the reuse of data by ensuring that it is easily findable and accessible, and that it is supported by documentation and long-term

preservation. Finally, it is envisaged that datasets containing sensitive/personal data will either be processed first (anonymisation, pseudonymisation) or not shared at all.

To be reusable, data should have a variety of accurate and relevant attributes, be released with a clear and accessible data use license, be linked to its provenance, and meet relevant community standards. These characteristics ensure that the data is of high quality, can be used and shared legally, has a clear and traceable history, and is consistent with the standards and expectations of the research community. By meeting these criteria, data can be more easily reused and integrated with other datasets, which can help accelerate scientific discovery, improve research impact, and foster innovation. Researchers can take several steps to increase the reuse of data in 4Growth, such as planning for data sharing and reuse from the outset by developing a data management plan that describes how data will be collected, stored, shared, and reused, making the data openly available by depositing it in a trusted repository such as the EOSC and applying an open license such as CC0 or CC-BY to the data, using standard formats and protocols to improve interoperability and reuse of data, and thoroughly documenting and describing the data by creating metadata that provides information about its content, context, and origin.

Licencing

In the case of data published on open access repositories, the data are free of charge for every user. However, special licences may apply to this data, such as one of the Creative Commons (CC) licences. There are six different CC licence types, ranging from "The author must be credited" to "Only non-commercial use of the work is permitted". Details of the different CC licences can be found here: https://creativecommons.org/about/cclicenses/. For restricted access data, specific contracts can be concluded between the owner and the third party to protect the owner and agree on general rules for data use.

Embargo

4GROWTH has many corporate partners and protecting IPR is a top priority. In some cases, an embargo may be necessary to open the data to allow time for publication or patent searches, with the aim of making the data available as soon as possible. An embargo may be necessary to protect the company's business, product development and its IPR, patent applications or repeated use of the same data by partners for additional results. Again, the need for an embargo and its duration are case-dependent and determined by the partners involved who own the data.

3.4 Allocation of resources

The costs of producing data and other research outputs under the 4Growth project FAIR (Findable, Accessible, Interoperable, Reusable) will depend on the nature and scale of the project and the specific requirements and resources needed to comply with the principles of FAIR. Costs that may be incurred include those for storage and archiving, reuse and sharing, and security. These costs may include the cost of hardware or software, the cost of maintenance and support, the cost of developing and maintaining repositories or platforms, the cost of access to specialised equipment or software, and the cost of implementing security measures or training staff in data protection practises. These costs may be covered by the HE grants if they are in line with the terms of the GA. Responsibility for data management in the 4Growth project will be shared among project team members, with specific roles and responsibilities assigned as appropriate. It is important to establish clear policies and procedures for data management and to ensure that all team members are aware of their responsibilities and have the necessary skills and resources to fulfil them. Long-term storage of research data and other outputs is essential to ensure that they remain accessible and usable over time and requires dedicated resources and a clear plan for maintaining and updating the data or outputs. When deciding which data or results to keep and for how long,

the potential value of the data or results, as well as legal or ethical considerations, should be considered.

Covering the cost of open data

The costs for processing and documenting the data are part of the other direct costs of the individual partners. The costs for open data are paid from the budget of the respective partner. The use of some public open access data repositories is free of charge.

Responsible person

The individual partners are responsible for the collection, transfer, storage and documentation of data from their own research activities within the DMP. Each consortium partner has detailed in their own DMP in section 5 “Individual Data Management Plans” who will be responsible for the data.

3.5 Data security

Data security is of paramount importance in the 4Growth project, particularly when dealing with sensitive data or data that is subject to legal or ethical restrictions. To ensure data security, each project partner is responsible for the data they produce, and the project will follow certain guidelines to ensure the secure handling of data. These guidelines include storing data sets on the responsible partner's storage system, performing regular backups of personal computers, storing data in at least two different locations to avoid loss, ensuring that data is stored securely and in compliance with the GDPR, encrypting data where necessary, structuring and systematically labelling data, restricting the use of USB sticks, transferring data files over secure connections, and restricting the handling of raw data to researchers interacting with participants. By following these guidelines, the 4Growth project can ensure that data is handled in a secure and compliant manner.

Trusted repositories can also be used for long-term preservation and curation of research data, providing a range of services such as data storage, backup and recovery, data management and curation, and data publishing and sharing. By following these precautions and utilizing trusted repositories, the 4Growth project can ensure that data is stored and made available for reuse in a way that meets high standards of security, accessibility, and usability, and complies with relevant legal, ethical, and technical standards.

For the internal exchange of documents and data within the project, 4Growth uses the services of Microsoft 365, provided by WUR. SharePoint meets the highest data security standards, has restricted access and versioning of documents. Access to the data is managed through credentials (username and password), including occasional two-factor authentication. SharePoint data is stored on servers within the EU. Microsoft 365 is committed to taking all necessary precautions to ensure the physical security of the data. This includes protection against fires and protection against physical intruders in the data centres. As a rule, the 4Growth project will not shop any data, especially sensitive data, exclusively on local systems (such as laptops, external hard drives or USB sticks, etc.). However, it may be necessary to do so temporarily (for the minimum time required) to carry out a specific task of the project. The data collected on site will be copied/backed up as soon as possible. See section 5 for how individual partners have arranged data security of their own data. For long-term storage and publication (even beyond the project duration), certified repositories that ensure data security are preferred.

3.6 Ethics

The confidentiality of personal information provided to the consortium during the implementation of the project must be respected. The 4Growth project will comply with the EU's on GDPR, which sets rules for the protection of personal data and the free movement of

such data. The personal data collected must be kept confidential and should be destroyed when no longer needed. One way to keep data for a longer period and even make it available to others is to anonymise personal data. The main objective of the GDPR is to give individuals control over their personal data and to simplify the regulatory environment for international companies.

In cases involving personal data, the 4Growth project will provide detailed information about the collection, storage, and processing of personal data, as well as the recruitment process and inclusion and exclusion criteria for participation. The project will also detail its data protection and confidentiality procedures, including how informed consent will be obtained and whether an application needs to be made to a local/institutional ethics review body. The legal experts of the project will ensure that this process, including the provision of information about data protection issues, is fully compliant with national and EU laws. By providing this information and following proper procedures, the project can ensure that the handling of personal data is transparent and compliant with relevant laws.

There are a number of ethical and legal issues that may impact data sharing in the 4Growth project, depending on the nature and context of the research. These may include obtaining informed consent from research participants for the use and sharing of personal data, complying with data protection laws and regulations such as the GDPR, maintaining the confidentiality of sensitive or confidential data, and ensuring the quality and reliability of the data shared. It is important to consider these and other relevant ethical and legal issues as part of the research planning process and to include appropriate provisions in the Description of the Action (DoA) to address them. By considering these issues and following proper procedures, the 4Growth project can ensure that the sharing of data is ethical and compliant with relevant laws and regulations.

4. 4Growth Data Management Plan Templates

4.1 Internal Stakeholders

The 4Growth Data Management Plan was created based on the Horizon Europe template for the DMP following the “Guidelines on FAIR Data Management in Horizon 2020” or any update released during the project’s lifespan. It circulated to all 4Growth Partners to initially identify the data used in the Project. It will address data management for the outputs of the project itself (publications, software, ontologies, deliverables, etc.) as well as for collected third-party data. The template is available in Annex I.

5. Individual Data Management Plans

5.1 Data Management Plan of EVF

DATA SUMMARY	
Purpose *Describe the purpose of data collection/generation and its relationship to the objectives of 4Growth?*	Targeted communication and outreach to promote the project and its results
Types and formats of data *Describe what types/ formats of data the project will generate/collect?*	- Website: Google Analytics has been implemented to collect data on the number of visits to specific pages. This includes geolocation information (country, city) and information about the browser used, but cannot track individual users or their identity - Contact form on website: collects first name, last name and email address of sender - Newsletter: collects the email address of subscribers - Social media (LinkedIn, X): statistics on likes and reposts of individual posts
Existing data and Origin *Will you reuse any existing data and how? What is the origin of the data?*	No
Size of the data *What is the expected size of the data?*	N/A
Usage of the data *To whom might it be useful ('data utility')?*	The data will only be used for the purpose of communication and dissemination of the project and measuring specific KPIs.

FINDABLE: Making data findable	
Provision of metadata *Is the data created and/or used in the task discoverable and identifiable through metadata?*	N/A (FAIR data principles are not applicable to the type of data collected through and for communication and dissemination activities)
Identification of the data *Do you make use of persistent and unique identifiers such as Digital Object Identifiers (DOI)?*	N/A
Naming conventions *What naming conventions are followed?*	N/A

Search terms *Are search keywords provided that optimise opportunities for reuse?*	N/A
Versioning *Do you provide unique version numbers?*	N/A
Standards for metadata creation? *What metadata is created? If there are no metadata standards in your discipline, please describe what kind of metadata is created and how.*	N/A

ACCESSIBLE: Making data open and accessible	
Openly available and closed datasets *Which data created and/or used in the task are made openly available by default?* *If certain datasets or parts of them cannot be released (or need to be released only under restrictions), explain the reasons, clearly separating legal and contractual reasons from voluntary restrictions (e.g. ethical reasons, personal data rules, intellectual property, commercial reasons, data protection, security reasons, etc.).*	N/A
Data Repository *How will the data be made accessible (e.g. by depositing it in a repository)?* *Where will the data and associated metadata, documentation and code be deposited?*	Data will remain in the respective applications (i.e. Website, Google Analytics, LinkedIn, X) and summarised in deliverable documents reporting on communication and dissemination.
Conditions of access *What methods or software tools are needed to access the data?* *If there are restrictions on use, how will access be provided?*	Access to the specific applications is required, limited to EVF staff assigned to the respective tasks

Are there well-described conditions for access (e.g. a machine-readable licence)?	
Identity verification *How will the identity of the person accessing the data be ascertained?*	All applications containing the data require login and password information.

INTEROPERABLE: Making data interoperable	
Interoperability of data generated *Do the data enable the exchange and reuse of data between researchers, institutions, organisations, countries, etc. (i.e. adherence to standards for formats, compatibility with available (open) software applications to the greatest extent possible and, in particular, facilitation of recombinations with different datasets from different origins)?*	N/A
Vocabularies *What data and metadata vocabularies, standards or methodologies will the task follow to make the data interoperable?*	N/A

REUSABLE: Making data reusable	
Licence *How will the data be licenced to enable the widest possible reuse?*	N/A
Availability *When will the data be made available for reuse?* *How long should the data be available for reuse? If applicable, specify why and for what period a data embargo is needed.*	The consented data will only be stored and utilised for the purpose of the project, including a period after the end of the project as (to be) defined in the Exploitation and Sustainability Plan.

Third parties *Are the data produced and/or used in the task useable by third parties, in particular after the end of the project? If the re-use of some data is restricted, explain why.*	No
Data quality *How is the data quality assured?*	N/A

Allocation of resources	
Costs *What are the costs for storing the data. And how will these be covered?*	No additional cost beyond implementation of the applications and hosting of website
Responsibility for data management *Who will be responsible for data management in the task?*	EVF Communications Manager and EVF Project Manager for 4Growth
Costs and potential value of long-term preservation *What are the costs of long-term archiving? And who decides what data is kept and for how long?*	N/A

Data Security	
Data security *What provisions are in place for data security (including data recovery and secure storage and transmission of sensitive data)?*	Access requires login and password; all applications storing data are websites that have secure transfer implemented (https); the used social media services ensure data recovery through their dedicated infrastructure; the website and its contents (including e.g. messages received through contact form, subscriptions to newsletter) is regularly backed up
Data storage *Is data stored securely in certified repositories for long-term retention and curation?*	No

Ethical Issues	
Ethical or legal issues *Are there ethical or legal issues that may affect data sharing?*	Personal data including names, email addresses, associated messages are subject to GDPR and thus not to be shared, but only used for the purpose of communication and dissemination, and reporting on the impact of these activities

Personal data *Is informed consent for data sharing and long-term preservation included in questionnaires dealing with personal data? Do you comply with the GDPR concerning information provisions and access to personal data?*	Users of the contact form consent to the privacy policy, newsletter subscriber scan opt out from their subscription, website users can reject the use of browser cookies; access to and use of personal data is restricted and limited and fully GDPR-compliant

Other Issues	
Other methods of data management *Do you use other national/state/sectoral/departmental data management procedures? If yes, which ones?*	No.

5.2 Data Management Plan of WUR

DATA SUMMARY	
Purpose *Describe the purpose of data collection/generation and its relationship to the objectives of 4Growth?*	As the leader of WP4 `Observatory data collection and analysis`, WUR will (1) organise an array of distributed observatories across technologies, subsectors. and regions (2) analyse the framework conditions, technical aspects, governance models, socio-economic benefits and data sharing practices associated with the adoption of digital agriculture & forestry, this task involved data collection via the observatories.(3) build synergies with other key European initiatives through which further data can be analysed and outcomes of the project can be sustained and (4) produce policy recommendations for governance actors and best practice guides for value chain actors to encourage the adoption of digital technologies.
Types and formats of data *Describe what types/ formats of data the project will generate/collect?*	WUR will be collecting various data types across multiple work packages to evaluate the uptake of digital technologies in the agricultural and forestry sectors: **Qualitative Data:** Usage metrics and adoption rates gathered from virtual observatories, formatted as CSV and Excel files for systematic analysis. This quantitative data helps map the current landscape of technology adoption across regions. **Quantitative Data:** Insights from interviews and surveys are detailed in PDF and DOC formats. These qualitative assessments capture user experiences, barriers to technology adoption, and insights into the effectiveness of current digital tools. The data collection spans the following WP:

	WP4 Observatory Data Collection and Analysis: WUR is responsible for the data collection efforts within the agricultural observatory in the Netherlands (and the broader Benelux region) that blend digital innovation hubs and stakeholder ecosystems to gather comprehensive data. This includes both digital and in-person data collection methods, ensuring a rich dataset.
Existing data and Origin *Will you reuse any existing data and how? What is the origin of the data?*	WUR adheres to the principle of OPEN SCIENCE and make our data FAIR. WUR may reuse data or deliverables from other projects later on such as for the policy recommendations in task 4.5, possible projects are Smart-AKIS, QuantiFarm, and CODECS.
Size of the data *What is the expected size of the data?*	Data is unlikely to exceed 20gb as most of the data will be in the form of excel sheet or online survey response databases.
Usage of the data *To whom might it be useful ('data utility')?*	The data from the 4Growth project benefits consortium partners, researchers, developers, policymakers, and industry stakeholders by enhancing digital technology development, enabling in-depth analysis, and supporting strategic decisions in agriculture and forestry.

FINDABLE: Making data findable	
Provision of metadata *Is the data created and/or used in the task discoverable and identifiable through metadata?*	For WUR, the data created and used is indeed discoverable and identifiable through comprehensive metadata. This ensures that all datasets are accessible and can be efficiently utilised for further research, analysis, and development activities. T4.4, will include metadata detailing content, format, context, and usage to facilitate accessibility and interoperability across different platforms and among various stakeholders.
Identification of the data *Do you make use of persistent and unique identifiers such as Digital Object Identifiers (DOI)?*	Selected data and/or reports from the 4Growth project, particularly those intended for a wider audience, are published in journals or deposited in data archives where Digital Object Identifiers (DOIs) are assigned.
Naming conventions *What naming conventions are followed?*	In the 4Growth project, WUR adheres to clear and systematic naming conventions for data and files to ensure consistency and ease of access. The naming conventions typically include key identifiers such as the project name, work package number, task number, type of data, and date of creation. E.g. [project]_[filesubject]_[subsubject]_[date]_[version].[extension] WUR avoids the use of special characters and spaces, such as #$^&()+=?\/!@*%{}[]<>.

Search terms *Are search keywords provided that optimise opportunities for reuse?*	Documents, publications, and released records in the 4Growth project are tagged with appropriate keywords to facilitate searchability and reuse.
Versioning *Do you provide unique version numbers?*	Yes, WUR assigns unique version numbers to all documents, datasets, and deliverables. Each document features a version section or header that specifies the date and version number. Also, Microsoft Teams enhance version control by offering a "version history" feature for each document. This allows all project partners to access and review the evolution of documents, ensuring that everyone is working with the most current and accurate information. To distinguish between versions of files WUR: – Dates within file names are updated when files are modified. – A version number in the format 'v01' will be added to all file names which increases after file modification. The designation 'vRAW' is added to file names that contain raw unaltered data (before any processing and cleaning). Any alteration of RAW data is done on a copy of the RAW data and appended with a version number which increases with each file modification (e.g. v01, v02, v03 etc.).
Standards for metadata creation? *What metadata is created? If there are no metadata standards in your discipline, please describe what kind of metadata is created and how.*	WUR adheres to established metadata standards suitable for digital agriculture and forestry research, ensuring data consistency, discoverability, and usability. Metadata includes descriptive elements like title, author, creation date, version number, and geographic location when applicable. Independently of where data is preserved (e.g. at WUR, in a data repository) the data will be accompanied by: **- a readme file** The readme file contains information about the steps that have been undertaken in processing and analysing data. In short: all information necessary to understand the data, reproduce research and verify results. **- metadata** Metadata is machine-readable information about the data, according to fixed terms, which makes the data findable and searchable.

ACCESSIBLE: Making data open and accessible

Openly available and closed datasets *Which data created and/or used in the task are made openly available by default?* *If certain datasets or parts of them cannot be released (or need to be released only under restrictions), explain the reasons, clearly separating legal and contractual reasons from voluntary restrictions (e.g. ethical reasons, personal data rules, intellectual property, commercial reasons, data protection, security reasons, etc.).*	WUR requires that all research data underlying publications is preserved for at least 10 years. Research data should be made publicly available for reuse, unless there are valid reasons not to do so. In that case, research data should at least be archived within WUR. As much as possible, research data would be made publicly available for reuse. As a minimum, the data underpinning research papers would be made available to other researchers at the time of the article's publication, unless there are valid reasons not to do so. The guiding principle at WUR is 'as open as possible, as closed as necessary'. Due consideration is given to aspects such as privacy, public security, ethical limitations, intellectual property rights and commercial interests. In relation to research data, EU recognises that software may be necessary to access and interpret data. In such cases, WUR will develop a data management plan will be expected to address how information about such items will be made available. WUR would restrict the access of data sets when there are reasons such as: Privacy/GDPR, Ethics, Contractual agreement, Commercial interests, Public security, IP rights.
Data Repository *How will the data be made accessible (e.g. by depositing it in a repository)?* *Where will the data and associated metadata, documentation and code be deposited?*	Data will be managed using repositories. For internal use and collaboration within the consortium, data is stored on network storage solutions like Microsoft Teams, allowing controlled access among project partners. For public dissemination, particularly when linked to scientific publications, data will be uploaded to certified public repositories. This approach not only enhances discoverability but also ensures the integrity and citation of the data through associated publications. In the case data cannot be published, the metadata associated to the data is published.
Conditions of access *What methods or software tools are needed to access the data?* *If there are restrictions on use, how will access be provided?* *Are there well-described conditions for access (e.g. a machine-readable licence)?*	Access to the COMFOCUS Tool, Qualtrics and the WUR ADAGIO tools are necessary to access the raw data. The access of these tools is restricted to WUR employees with WUR accounts for safety & security reasons. The meta data may be available to be delivered outside these tools upon request to outside users in formats such as excel. Similarly Raw data may be able to be provided via shareable format to authorized users. The licence/terms of use that will be applied to the data will depends the type of data. Could be through one of the following licences: – Open access (Creative Commons Attribution licence (CC BY); anyone can access and reuse with attribution). – Restricted access (custom licence text or data sharing agreement is required, dictating restrictions of access and reuse). When a data sharing

	agreement is required, the WUR Privacy Officer or WUR Information Security Officer will be consulted. Closed access (only metadata published, data is not allowed to be requested or reused).
Identity verification *How will the identity of the person accessing the data be ascertained?*	For restricted data, identity verification is managed through user credentials, ensuring that only authorised individuals have access. For publicly accessible data in repositories or on open access platforms, the identity of users is not tracked by WUR.

INTEROPERABLE: Making data interoperable	
Interoperability of data generated *Do the data enable the exchange and reuse of data between researchers, institutions, organisations, countries, etc. (i.e. adherence to standards for formats, compatibility with available (open) software applications to the greatest extent possible and, in particular, facilitation of recombinations with different datasets from different origins)?*	The data produced will be compatible with widely-used open software applications, ensuring broad accessibility and usability. The project consortium will determine the specific data types to be employed for various tasks, promoting standardisation across outputs. Moreover, the project will feature a dedicated API (Application Programming Interface), allowing third parties to easily retrieve information. Metadata descriptors included with the data will enhance discoverability, enabling efficient search and integration through SPARQL queries, thus facilitating the exchange and reuse of data among researchers, institutions, organisations, and countries.
Vocabularies *What data and metadata vocabularies, standards or methodologies will the task follow to make the data interoperable?*	The project employs the SAREF4AGRI ontology, designed to ensure seamless data exchange and integration within the agricultural sector.

REUSABLE: Making data reusable	
Licence *How will the data be licenced to enable the widest possible reuse?*	There are different licenses that will be applied depending on the type of data and its restrictions: – Open access (Creative Commons Attribution licence (CC BY); anyone can access and reuse with attribution). – Restricted access (custom licence text or data sharing agreement is required, dictating restrictions of access and reuse). When a data sharing agreement is required, the WUR Privacy Officer or WUR Information Security Officer will be consulted. – Closed access (only metadata published, data is not allowed to be requested or reused). For data that can be freely accessed, a Creative Commons license is typically preferred to encourage broad use and distribution.

Availability *When will the data be made available for reuse?* *How long should the data be available for reuse?If applicable, specify why and for what period a data embargo is needed.*	WUR requires that all research data underlying publications is preserved for at least **10 years**. Research data should be made publicly available for reuse, unless there are valid reasons not to do so. In that case, research data should at least be archived within WUR. As much as possible, research data should be made publicly available for reuse. As a minimum, EU requires that the data underpinning research papers should be made available to other researchers at the time of the article's publication, unless there are valid reasons not to do so. The guiding principle at WUR is 'as open as possible, as closed as necessary'. Data availability within the 4Growth project varies based on specific task requirements. Internally, data is accessible to consortium members immediately after collection, except if is personal data. **After conducting the activity personal data are pseudonymized as soon as possible. Access to the 'key' file is restricted to researchers analyzing the data. Analyses are conducted only on the basis of pseudonymized data. The pseudonymized data are only accessible to the researchers analyzing these data within the framework of the 4Growth Horizon Europe project.** External availability depends on conditions such as accepting associated scientific publications or completing student theses.
Third parties *Are the data produced and/or used in the task useable by third parties, in particular after the end of the project? If the re-use of some data is restricted, explain why.*	The 4Growth Visualisation Platform, accessible via a free, open-access model, will function as the official website of the project. This platform will make all valuable information readily accessible to all interested parties, significantly enhancing the dissemination and communication strategy of the project. The reuse of raw data from surveys will be highly restricted to protect GDPR rights of survey fillers.
Data quality *How is the data quality assured?*	Data quality within the WUR-led tasks is primarily ensured by the team responsible for data collection and analysis. The WUR team implements stringent measures to validate and verify the data at various stages of collection and processing, ensuring accuracy, consistency, and reliability. This includes regular checks, peer reviews, and adherence to our internal data management protocol.

Allocation of resources	
Costs *What are the costs for storing the data. And how will these be covered?*	The cost of storing data falls under WUR institutional budget. The cost of depositing data, such as in Microsoft Teams, is covered also by WUR.

Responsibility for data management *Who will be responsible for data management in the task?*	Each WP leader is responsible for the data collected in their respective work package. According with WUR Data Management Protocol, the project leader is: – Responsible for Data Management during the research project and supervises that storage solutions and software, that match the classification of the data are used. – Responsible that Data Management is executed by data engineers by primarily using WSER data management solution (Adagio). – Final responsibility for Data Management during the research project. – Responsible that the correct authorisation of people for read/write access to the data (folders and/or files) is in place and periodically checks these authorisations. – When applicable, ensures careful handling any sensitive (e.g. personal) data during and after the research project, (according to the data management plan). – Makes sure all data, at the end of a project, is archived on W-drive. – Archives data underlying (a) publication(s) after the research project for at least 10 years. – Archives data according to the agreements made with clients and legal requirements. – Registers published data sets in Pure via data@wur.nl if applicable.
Costs and potential value of long-term preservation *What are the costs of long-term archiving? And who decides what data is kept and for how long?*	The data will be kept in accordance with WUR data policy for at least 10 years. The costs associated with this will depend on the quantity of data collected by the end of the project and potential value to other projects and researchers following the conclusion of 4Growth.

Data Security	
Data security *What provisions are in place for data security (including data recovery and secure storage and transmission of sensitive data)?*	Within WUR we apply risk management to data collection, processing and storage. All unique data sets will be classified in order to determine the underlying risks and based on the integrity, availability and confidentiality of the data itself. An appropriate tool will be selected to have an overview of centrally managed applications that are safe to use for WUR data. All tools use during research will also be selected on their security baseline and will be checked beforehand if the use of

	these tools may result in (new) unidentified risks. For the project in general, data security is in place using the project collaboration platform MS Teams, which is linked to the Share Point site, hosted on the WUR network. Data files are stored in locations secured by username/password combinations only accessible by authorized staff known to the respective data providers. The used servers are frequently updated. **Using Google Drive, for example, is not allowed, due to the risk of security holes and loss of control over the data**. Research data stored in Zenodo is securely stored on CERN premises, is being backed up and checked for data compatibility. WUR will handled personal data with the utmost care and confidentiality. Security measures, including encryption and access controls, will be implemented to safeguard the information collected. Personal data will be anonymized in any reports, infographics or publications. The security of personal data and by the processors takes place on the basis of generally accepted standards and best practices. Please refer to the *WUR information security policy* and *WUR data policy* for more details.
Data storage *Is data stored securely in certified repositories for long-term retention and curation?*	Selected data is stored securely in certified repositories that ensure long-term retention and curation, guaranteeing access for over 10 years.

Ethical Issues	
Ethical or legal issues *Are there ethical or legal issues that may affect data sharing?*	The type of data generated in the project will include personal and private company strategic documentation and private code for digital products and services, which will remain confidential. Personal data will be treated in strictest compliance with EU GDPR and that IPR considerations as described in the consortium agreement are respected.
Personal data *Is informed consent for data sharing and long-term preservation included in questionnaires dealing with personal data? Do you comply with the GDPR concerning information provisions and access to personal data?*	Yes, informed consent for long-term preservation is included in surveys dealing with personal data. WUR complies with the GDPR concerning information provisions and access to personal data. After conducting the activity personal data are pseudonymized as soon as possible. Access to the 'key' file is restricted to researchers analyzing the data. Analyses are conducted only on the basis of pseudonymized data. The pseudonymized data are only accessible to the researchers analyzing these data within the framework of the **4Growth** Horizon Europe project.

	Please refer to the *WUR information security policy* and *WUR data policy* for more details. Authorization to share is only possible with the researchers analyzing the data for the purpose for which the data was collected. Researchers must be part of the 4Growth Consortium in countries within the EU.

Other Issues	
Other methods of data management *Do you use other national/state/sectoral/departmental data management procedures? If yes, which ones?*	WUR primarily follows the data management procedures outlined by the 4Growth project. Additionally, WUR adheres to national regulations and guidelines for data management in the Netherlands (including the GDPR enforced by the Dutch Data Protection Authority), as well as institutional policies for data handling and preservation (such as secure storage protocols and data retention policies).

5.3 Data Management Plan of AUA

DATA SUMMARY	
Purpose *Describe the purpose of data collection/generation and its relationship to the objectives of 4Growth?*	As the leader of the WP2 'Uptake of Digital Agriculture & Forestry Technologies', AUA will evaluate the adoption of digital technologies within the agriculture and forestry sectors. AUA will collect data focusing on analysing current digital technology usage (T2.1), aiming to thoroughly document existing adoption levels and shape future advancements in the sector. Data from other projects such as Smart-AKIS, QuantiFarm, and CODECS will enrich this analysis. By leading T2.1, AUA generates critical data that impacts several major components of the 4Growth project. These include developing the Uptake Assessment Grid (T2.2), enhancing the 4Growth Visualisation Platform (T2.3), contributing to the Market Monitoring & Forecasting Tool (T3.1), and supporting the Foresight Module (T3.2). These tools are designed to provide actionable insights for policymaking and strategic planning. Additionally, AUA leads Task T4.4, which involves analysing the socio-economic impacts and framework conditions that influence digital technology adoption. This task focuses on identifying both barriers and enablers, offering recommendations to facilitate more effective technology deployment and shape supportive policy frameworks. As partner in other WPs, AUA will also collect data in tasks such as T4.2, which involves data collection via observatories, and generates data for WP5 (Dissemination).

Types and formats of data *Describe what types/ formats of data the project will generate/collect?*	AUA will be collecting various data types across multiple work packages to evaluate the uptake of digital technologies in the agricultural and forestry sectors: **Qualitative Data:** Usage metrics and adoption rates gathered from virtual observatories, formatted as CSV and Excel files for systematic analysis. This quantitative data helps map the current landscape of technology adoption across regions. **Quantitative Data:** Insights from interviews and surveys are detailed in PDF and DOC formats. These qualitative assessments capture user experiences, barriers to technology adoption, and insights into the effectiveness of current digital tools. The data collection spans several work packages: **WP2 Uptake of Digital Agriculture & Forestry Technologies:** AUA leads T2.1 to produce a SOTA analysis in Excel format, which is crucial for documenting existing technology adoption levels. In T2.3, the data informs the 4Growth Visualisation Platform, providing an overview of technology uptake. **WP3 Digital Agriculture & Forestry Uptake - Forecast & Foresight:** Utilising the SOTA analysis from T2.1, WP3 forecasts market dynamics such as user demographics, penetration rates, and economic impacts, which are essential for strategic decision-making. **WP4 Observatory Data Collection and Analysis:** AUA is responsible for the data collection efforts within the agricultural observatory in Greece (and the broader Balkan region) that blend digital innovation hubs and stakeholder ecosystems to gather comprehensive data. This includes both digital and in-person data collection methods, ensuring a rich dataset.
Existing data and Origin *Will you reuse any existing data and how? What is the origin of the data?*	AUA will reuse existing data from projects such as Smart-AKIS, QuantiFarm, and CODECS within the 4Growth project. Data, originating from extensive studies on digital technology adoption in agriculture and forestry, will enrich the SOTA analysis in WP2, specifically in T2.1, by providing a historical baseline and context. Additionally, it will be used to calibrate and validate models and tools developed across the project, such as the Market Monitoring & Forecasting Tool (MMFT) in WP3 and WP4. This data will also be integrated with outputs from all work packages (1 to 5) to support the ongoing development of the 4Growth Visualisation Platform, ensuring the research is robust and comprehensive.

Size of the data *What is the expected size of the data?*	The expected size of the data in the 4Growth project by AUA is anticipated to be relatively modest, likely under 10GB. The SOTA analysis, primarily in Excel format, does not constitute a "data-heavy" collection. This suggests that while the project handles diverse data types, the overall data volume will remain manageable within this scope.
Usage of the data *To whom might it be useful ('data utility')?*	The data from the 4Growth project benefits consortium partners, researchers, developers, policymakers, and industry stakeholders by enhancing digital technology development, enabling in-depth analysis, and supporting strategic decisions in agriculture and forestry.

FINDABLE: Making data findable	
Provision of metadata *Is the data created and/or used in the task discoverable and identifiable through metadata?*	For AUA, the data created and used is indeed discoverable and identifiable through comprehensive metadata. This ensures that all datasets are accessible and can be efficiently utilised for further research, analysis, and development activities. AUA's data, particularly from tasks T2.1 and T4.4, will include metadata detailing content, format, context, and usage to facilitate accessibility and interoperability across different platforms and among various stakeholders.
Identification of the data *Do you make use of persistent and unique identifiers such as Digital Object Identifiers (DOI)?*	Selected data and/or reports from the 4Growth project, particularly those intended for a wider audience, are published in journals or deposited in data archives where Digital Object Identifiers (DOIs) are assigned.
Naming conventions *What naming conventions are followed?*	In the 4Growth project, AUA adheres to clear and systematic naming conventions for data and files to ensure consistency and ease of access. The naming conventions typically include key identifiers such as the project name, work package number, task number, type of data, and date of creation.
Search terms *Are search keywords provided that optimise opportunities for reuse?*	Documents, publications, and released records in the 4Growth project are tagged with appropriate keywords to facilitate searchability and reuse. A taxonomy, based on the data generated, is expected to be developed and utilised on the platform. This taxonomy will guide users in navigating and searching for information effectively, ensuring that relevant data can be quickly and easily accessed.
Versioning *Do you provide unique version numbers?*	Yes, AUA assigns unique version numbers to all documents, datasets, and deliverables. Each document features a version section or header that specifies the date and version number. Additionally, the use of Microsoft Teams enhances version control by offering a "version history" feature for each document. This allows all project partners to access and review the evolution of

	documents, ensuring that everyone is working with the most current and accurate information.
Standards for metadata creation? *What metadata is created? If there are no metadata standards in your discipline, please describe what kind of metadata is created and how.*	AUA adheres to established metadata standards suitable for digital agriculture and forestry research, ensuring data consistency, discoverability, and usability. Metadata includes descriptive elements like title, author, creation date, version number, and geographic location when applicable. It extends to data type (quantitative or qualitative), format (CSV, Excel, PDF), and content-related keywords for enhanced searchability. Each dataset is accompanied by documentation, such as readme files in MS Word format, detailing the data's origin, location, collection settings, and equipment used, which is essential for accurate data interpretation and reuse.

ACCESSIBLE: Making data open and accessible	
Openly available and closed datasets *Which data created and/or used in the task are made openly available by default?* *If certain datasets or parts of them cannot be released (or need to be released only under restrictions), explain the reasons, clearly separating legal and contractual reasons from voluntary restrictions (e.g. ethical reasons, personal data rules, intellectual property, commercial reasons, data protection, security reasons, etc.).*	Not all data collected or generated by AUA will be openly shared by default. Only data deemed useful for broader research or public interest will be considered for publication, ensuring that intellectual property (IP) and data protection regulations are meticulously observed before any data is made public. Aligned with an open access policy, the majority of non-sensitive data gathered through the project will be made available via the project's Platform. This commitment to open access facilitates broader dissemination and utility of research outcomes. However, stringent measures are taken to anonymise all data to safeguard user privacy and comply with ethical standards and legal requirements concerning data protection.
Data Repository *How will the data be made accessible (e.g. by depositing it in a repository)?* *Where will the data and associated metadata, documentation and code be deposited?*	Data will be managed using repositories. For internal use and collaboration within the consortium, data is stored on network storage solutions like Microsoft Teams, allowing controlled access among project partners. For public dissemination, particularly when linked to scientific publications, data will be uploaded to certified public repositories. This approach not only enhances discoverability but also ensures the integrity and citation of the data through associated publications. The use of public repositories, which are certified and secure, guarantees that published data complies with open access policies and is accessible to a broader audience.

Conditions of access *What methods or software tools are needed to access the data?* *If there are restrictions on use, how will access be provided?* *Are there well-described conditions for access (e.g. a machine-readable licence)?*	The required software tools are specified in the accompanying metadata and documentation, which includes readme files that detail the necessary software for each data type. Access to certain datasets is restricted and controlled through user credentials to ensure that only authorised individuals can access the data. This method helps maintain the integrity and confidentiality of the data, aligning with intellectual property and data protection standards.
Identity verification *How will the identity of the person accessing the data be ascertained?*	For restricted data, identity verification is managed through user credentials, ensuring that only authorised individuals have access. For publicly accessible data in repositories or on open access platforms, the identity of users is not tracked by AUA.

INTEROPERABLE: Making data interoperable	
Interoperability of data generated *Do the data enable the exchange and reuse of data between researchers, institutions, organisations, countries, etc. (i.e. adherence to standards for formats, compatibility with available (open) software applications to the greatest extent possible and, in particular, facilitation of recombinations with different datasets from different origins)?*	The data produced will be compatible with widely-used open software applications, ensuring broad accessibility and usability. The project consortium will determine the specific data types to be employed for various tasks, promoting standardisation across outputs. Moreover, the project will feature a dedicated API (Application Programming Interface), allowing third parties to easily retrieve information. Metadata descriptors included with the data will enhance discoverability, enabling efficient search and integration through SPARQL queries, thus facilitating the exchange and reuse of data among researchers, institutions, organisations, and countries.
Vocabularies *What data and metadata vocabularies, standards or methodologies will the task follow to make the data interoperable?*	Data interoperability is prioritised through established agrifood sector vocabularies and ontologies. The project specifically employs the SAREF4AGRI ontology, which is designed to ensure seamless data exchange and integration within the agricultural sector.

REUSABLE: Making data reusable	
Licence *How will the data be licensed to enable the widest possible reuse?*	For each dataset, a decision is made regarding the appropriate license type. For data that can be freely accessed, a Creative Commons license is typically preferred to encourage broad use and distribution.

Availability *When will the data be made available for reuse?* *How long should the data be available for reuse? If applicable, specify why and for what period a data embargo is needed.*	Data availability within the 4Growth project varies based on specific task requirements. Internally, data is accessible to consortium members immediately after collection. However, external availability is contingent upon conditions such as the acceptance of associated scientific publications or the completion of student theses. Consistent with AUA's data policy, all project data will be retained for a minimum of ten years post-project to support ongoing research and verification. Moreover, 4Growth commits to maintaining open access to its platform for seven years following the project's conclusion, primarily to support the drone community and integrate major findings into relevant EU projects under the "HORIZON-CL6-2023-GOVERNANCE-01-15: EU-wide inventory". To facilitate data reuse and ensure interoperability, 4Growth will implement several standards, including EIP-AGRI common formats and those recommended by SCAR SWG AKIS. Additional standards may be developed and adopted throughout the project's duration to accommodate the diverse activities of 4Growth, ensuring the data remains accessible and usable across various platforms and by multiple stakeholders.
Third parties *Are the data produced and/or used in the task useable by third parties, in particular after the end of the project? If the re-use of some data is restricted, explain why.*	Some data from the 4Growth project might continue to be useful beyond the project's timeline. Accordingly, we aim to publish selected datasets on certified long-term storage platforms to ensure their availability for future use. Additionally, the 4Growth Visualisation Platform, accessible via a free, open-access model, will function as the official website of the project. This platform will make all valuable information readily accessible to all interested parties, significantly enhancing the dissemination and communication strategy of the project.
Data quality *How is the data quality assured?*	Data quality within the AUA-led tasks is primarily ensured by the team responsible for data collection and analysis. The AUA team implements stringent measures to validate and verify the data at various stages of collection and processing, ensuring accuracy, consistency, and reliability. This includes regular checks, peer reviews, and adherence to established data management protocols.

Allocation of resources

Costs *What are the costs for storing the data. And how will these be covered?*	The cost of storing data falls under AUA's institutional budget (overhead). The cost of depositing data, such as in Microsoft Teams, is covered by the coordinator.
Responsibility for data management *Who will be responsible for data management in the task?*	Each WP leader is responsible for the data collected in their respective work package. Ultimately, the WUR and EVF coordination teams are responsible for overseeing data management across the entire 4Growth project.
Costs and potential value of long-term preservation *What are the costs of long-term archiving? And who decides what data is kept and for how long?*	AUA will comply with Greece's data policy and the GDPR, ensuring that all research data and underlying publications are retained for at least 10 years. The costs of long-term archiving fall under AUA's institutional budget. The decision on what data is kept and for how long is made in accordance with these regulations and project-specific needs.

Data Security	
Data security *What provisions are in place for data security (including data recovery and secure storage and transmission of sensitive data)?*	Data security provisions include secure storage on encrypted drives and cloud services with robust access controls. Data recovery plans involve regular backups stored in multiple locations. Only authorised personnel have access to sensitive data, with strict adherence to GDPR guidelines ensuring compliance with data protection standards. The project uses Microsoft servers, which include regular backups, firewalls, and access based on personal credentials. In most cases, two-factor authentication is required to access the network.
Data storage *Is data stored securely in certified repositories for long-term retention and curation?*	Yes, selected data is stored securely in certified repositories that ensure long-term retention and curation, guaranteeing access for over 15 years.

Ethical Issues	
Ethical or legal issues *Are there ethical or legal issues that may affect data sharing?*	The data collected by AUA does not have ethical or legal issues that affect data sharing. Within the observatory, there are ethical and legal issues that may affect data sharing. These include compliance with GDPR regulations, ensuring informed consent for data collection and sharing, protecting the privacy of individuals, and safeguarding intellectual property rights. Ethical considerations also involve maintaining the confidentiality of sensitive data and adhering to ethical standards for research and data management.

Personal data *Is informed consent for data sharing and long-term preservation included in questionnaires dealing with personal data? Do you comply with the GDPR concerning information provisions and access to personal data?*	Yes, informed consent for data sharing and long-term preservation is included in questionnaires dealing with personal data. AUA complies with the GDPR concerning information provisions and access to personal data.

Other Issues	
Other methods of data management *Do you use other national/state /sectoral/departmental data management procedures? If yes, which ones?*	AUA primarily follows the data management procedures outlined by the 4Growth project. Additionally, AUA adheres to national regulations and guidelines for data management in Greece (including the GDPR enforced by the Hellenic Data Protection Authority), as well as institutional policies for data handling and preservation (such as secure storage protocols and data retention policies).

5.4 Data Management Plan of FSH

DATA SUMMARY	
Purpose *Describe the purpose of data collection/generation and its relationship to the objectives of 4Growth?*	By leading T2.2 - Digital Agriculture and Forestry Uptake Assessment Grid, FSH will develop a questionnaire-style framework which will be used to gather data via the observatories in WP4. The grid will be developed to document as many relevant data points as possible when it comes to how various actors in the agricultural and forestry value chains adopt and use digital technologies. The data gathered using the grid will be used to fine-tune the assumptions in the MMFT (T3.1) and enhance the content of the Foresight Module (T3.2). In addition, FSH leads T4.3 - Synergy Building with other European initiatives, aiming to build transdisciplinary links and synergies among stakeholders, networks as well as other projects and initiatives relevant to 4Growth (e.g. SmartAgriHubs, AKISs, EU CAP Network, etc.). The aim is to nurture an open, expanding, and sustainable ecosystem on digital technologies in agriculture and forestry in order to enhance knowledge exchange. Networks and synergies will allow 4Growth to: a) explore and harness further sources of quantitative and qualitative data on the uptake, use and impact of

	digital technologies which can inform the findings of 4Growth; b) encourage the widespread exploitation of the 4Growth Visualisation Platform; c) investigate the creation of links with other initiatives sharing the same goals related to the deployment of digital technologies in agriculture and forestry; and d) allow the undertaking of joint communication and dissemination activities with other EU projects.
Types and formats of data *Describe what types/ formats of data the project will generate/collect?*	T2.2 - Digital Agriculture and Forestry Uptake Assessment Grid FSH will develop this questionnaire-style framework which will be used by project partners and more specifically via the observatories in WP4 to gather data from various actors in the agricultural and forestry value chains on their level of adoption and use of digital technologies.
Existing data and Origin *Will you reuse any existing data and how? What is the origin of the data?*	T4.3 - Synergy building with other European initiatives 4Growth will seek to build transdisciplinary links and synergies among stakeholders, networks as well as other projects and initiatives relevant to 4Growth (e.g. SmartAgriHubs, AKISs, EU CAP Network, etc.). Through this process, existing quantitative and qualitative data that has already been collected by other European initiatives and projects is expected to be used by 4Growth.
Size of the data *What is the expected size of the data?*	At this stage of the process, it is too early to determine the expected size of the data.
Usage of the data *To whom might it be useful ('data utility')?*	The data from the 4Growth project benefits consortium partners, researchers, developers, policymakers, and industry stakeholders by enhancing digital technology development, enabling in-depth analysis, and supporting strategic decisions in agriculture and forestry.

FINDABLE: Making data findable	
Provision of metadata *Is the data created and/or used in the task discoverable and identifiable through metadata?*	No
Identification of the data *Do you make use of persistent and unique identifiers such as Digital Object Identifiers (DOI)?*	Selected data and/or reports from the 4Growth project, particularly those intended for a wider audience, are published in journals or deposited in data archives where Digital Object Identifiers (DOIs) are assigned.

Naming conventions *What naming conventions are followed?*	In the 4Growth project, FSH adheres to clear and systematic naming conventions for data and files to ensure consistency and ease of access. The naming conventions typically include key identifiers such as the project name, work package number, task number, type of data, and date of creation.
Search terms *Are search keywords provided that optimise opportunities for reuse?*	Documents, publications, and released records in the 4Growth project are tagged with appropriate keywords to facilitate searchability and reuse. A taxonomy, based on the data generated, is expected to be developed and utilised on the platform. This taxonomy will guide users in navigating and searching for information effectively, ensuring that relevant data can be quickly and easily accessed.
Versioning *Do you provide unique version numbers?*	Yes, FSH assigns unique version numbers to all documents, datasets, and deliverables. Each document features a version section or header that specifies the date and version number. Additionally, the use of Microsoft Teams enhances version control by offering a "version history" feature for each document. This allows all project partners to access and review the evolution of documents, ensuring that everyone is working with the most current and accurate information.
Standards for metadata creation? *What metadata is created? If there are no metadata standards in your discipline, please describe what kind of metadata is created and how.*	Metadata created in the Microsoft forms, docs, sheets etc. As well as the “Version history” of each document is available to partners.

ACCESSIBLE: Making data open and accessible	
Openly available and closed datasets *Which data created and/or used in the task are made openly available by default?* *If certain datasets or parts of them cannot be released (or need to be released only under restrictions), explain the reasons, clearly separating legal and contractual reasons from voluntary restrictions (e.g. ethical reasons, personal data rules, intellectual property, commercial*	Collected data will not be shared by default.

reasons, data protection, security reasons, etc.).	
Data Repository *How will the data be made accessible (e.g. by depositing it in a repository)?* *Where will the data and associated metadata, documentation and code be deposited?*	Data will be managed using repositories. For internal use and collaboration within the consortium, data is stored on network storage solutions like Microsoft Teams, allowing controlled access among project partners.
Conditions of access *What methods or software tools are needed to access the data?* *If there are restrictions on use, how will access be provided?* *Are there well-described conditions for access (e.g. a machine-readable licence)?*	Access to certain datasets is restricted and controlled through user credentials to ensure that only authorised individuals can access the data. This method helps maintain the integrity and confidentiality of the data, aligning with intellectual property and data protection standards.
Identity verification *How will the identity of the person accessing the data be ascertained?*	For restricted data, identity verification is managed through user credentials, ensuring that only authorised individuals have access.

INTEROPERABLE: Making data interoperable	
Interoperability of data generated *Do the data enable the exchange and reuse of data between researchers, institutions, organisations, countries, etc. (i.e.*	N/A

adherence to standards for formats, compatibility with available (open) software applications to the greatest extent possible and, in particular, facilitation of recombinations with different datasets from different origins)?	
Vocabularies *What data and metadata vocabularies, standards or methodologies will the task follow to make the data interoperable?*	N/A

REUSABLE: Making data reusable	
Licence *How will the data be licenced to enable the widest possible reuse?*	For each dataset, a decision is made regarding the appropriate license type. For data that can be freely accessed, a Creative Commons license is typically preferred to encourage broad use and distribution.
Availability *When will the data be made available for reuse?* *How long should the data be available for reuse?If applicable, specify why and for what period a data embargo is needed.*	N/A
Third parties *Are the data produced and/or used in the task useable by third parties, in particular after the end of the project? If the re-use of some data is restricted, explain why.*	Some data from the 4Growth project might continue to be useful beyond the project's timeline. Accordingly, the project aims to publish selected datasets on certified long-term storage platforms to ensure their availability for future use. Additionally, the 4Growth Visualisation Platform, accessible via a free, open-access model, will function as the official website of the project. This platform will make all valuable information readily accessible to all interested parties, significantly enhancing the dissemination and communication strategy of the project.
Data quality *How is the data quality assured?*	Data quality within the FSH-led tasks is primarily ensured by the team responsible for data collection and analysis.

Allocation of resources	
Costs *What are the costs for storing the data. And how will these be covered?*	The cost of depositing data, such as in Microsoft Teams, is covered by the coordinator.

Responsibility for data management *Who will be responsible for data management in the task?*	Each WP leader is responsible for the data collected in their respective WP. Ultimately, the WUR and EVF coordination teams are responsible for overseeing data management across the entire 4Growth project.
Costs and potential value of long-term preservation *What are the costs of long-term archiving? And who decides what data is kept and for how long?*	N/A

Data Security	
Data security *What provisions are in place for data security (including data recovery and secure storage and transmission of sensitive data)?*	Data security provisions include secure storage on encrypted drives and cloud services with robust access controls. Data recovery plans involve regular backups stored in multiple locations. Only authorised personnel have access to sensitive data, with strict adherence to GDPR guidelines ensuring compliance with data protection standards. The project uses Microsoft servers, which include regular backups, firewalls, and access based on personal credentials. In most cases, two-factor authentication is required to access the network.
Data storage *Is data stored securely in certified repositories for long-term retention and curation?*	N/A

Ethical Issues	
Ethical or legal issues *Are there ethical or legal issues that may affect data sharing?*	The data collected by FSH does not carry any ethical or legal issues. Most of the information is already publicly available.
Personal data *Is informed consent for data sharing and long-term preservation included in questionnaires dealing with personal data? Do you comply with the GDPR concerning information provisions and access to personal data?*	Yes, informed consent for data sharing and long-term preservation is included in questionnaires dealing with personal data. FSH complies with the GDPR concerning information provisions and access to personal data.

Other Issues	
Other methods of data management *Do you use other national/state/sectoral/departmental*	No

data management procedures? If yes, which ones?	

5.5 Data Management Plan of LEE

DATA SUMMARY	
Purpose *Describe the purpose of data collection/generation and its relationship to the objectives of 4Growth?*	LEE is collecting data for secondary analysis within the Market Monitoring and Forecasting Tool (MMFT, Task 3.1). The objective of the activity is to quantify uptake of digital technologies in Agriculture and Forestry.
Types and formats of data *Describe what types/ formats of data the project will generate/collect?*	LEE collects data in spreadsheet format (.xlsx or compatible), depending on availability from input data sources. The output generated in Task 3.1 will be in .xlsx-format.
Existing data and Origin *Will you reuse any existing data and how? What is the origin of the data?*	Secondary data from external commercial providers and national statistics data, predominantly collected from Eurostat. The task will also draw on the data made available other WPs in 4Growth, namely D2.2 and D2.3: Analysis of the state-of-the-art and D4.8-D4.10 Synthesis of Observatory Findings.
Size of the data *What is the expected size of the data?*	The disparate input data sources are expected to be in the 1-10MB range. The output data will be in the 1-5MB range, with an underlying model of 15-30MB.
Usage of the data *To whom might it be useful ('data utility')?*	The output data from Task 3.1 will be used in Task 2.3: Data visualisation. Indirectly, therefore, the output data will be made available for a wide audience of beneficiaries, including researchers, policymakers, and stakeholders in agriculture and forestry.

FINDABLE: Making data findable	
Provision of metadata *Is the data created and/or used in the task discoverable and identifiable through metadata?*	The data created in the MMFT will be discoverable through accompanying metadata.
Identification of the data *Do you make use of persistent and unique identifiers such as Digital Object Identifiers (DOI)?*	Yes, data will be assigned unique identifiers.
Naming conventions *What naming conventions are followed?*	LEE uses the naming convention: *[Project]-[Filename]-[Version]-[Date].[format]*

Search terms *Are search keywords provided that optimise opportunities for reuse?*	Keywords for output data will be provided.
Versioning *Do you provide unique version numbers?*	LEE uses unique version numbers.
Standards for metadata creation? *What metadata is created? If there are no metadata standards in your discipline, please describe what kind of metadata is created and how.*	LEE uses schema.org's metadata standard, including: • Creator • dateCreated • description • format • identifier • filename • supersededBy • temporalCoverage

ACCESSIBLE: Making data open and accessible	
Openly available and closed datasets *Which data created and/or used in the task are made openly available by default?* *If certain datasets or parts of them cannot be released (or need to be released only under restrictions), explain the reasons, clearly separating legal and contractual reasons from voluntary restrictions (e.g. ethical reasons, personal data rules, intellectual property, commercial reasons, data protection, security reasons, etc.).*	The outputs of task 3.1 are made available by default. Input data are not made available as these are covered by a commercial relationship with data providers, who have restricted the use to LEE's staff.
Data Repository *How will the data be made accessible (e.g. by depositing it in a repository)?* *Where will the data and associated metadata, documentation and code be deposited?*	The outputs of Task 3.1 will be hosted by Wageningen in their data environment.

Conditions of access *What methods or software tools are needed to access the data?* *If there are restrictions on use, how will access be provided?* *Are there well-described conditions for access (e.g. a machine-readable licence)?*	LEE is not the gatekeeper of access to 4Growth data. Wageningen is. The output of Task 3.1 will be in .xlsx format, so MS Excel or compatible software is required for access.
Identity verification *How will the identity of the person accessing the data be ascertained?*	LEE is not the gatekeeper of access to 4Growth data. Wageningen is.

INTEROPERABLE: Making data interoperable	
Interoperability of data generated *Do the data enable the exchange and reuse of data between researchers, institutions, organisations, countries, etc. (i.e. adherence to standards for formats, compatibility with available (open) software applications to the greatest extent possible and, in particular, facilitation of recombinations with different datasets from different origins)?*	The outputs of Task 3.1 will be interoperable with other data. Application of the outputs will depend on other users' access to MS Excel compatible software.
Vocabularies *What data and metadata vocabularies, standards or methodologies will the task follow to make the data interoperable?*	Definitions and segmentation of the data follows other Horizon Europe projects (Quantifarm, Codecs), and established EU publications (e.g. EUSPA Market Report).

REUSABLE: Making data reusable	
Licence *How will the data be licenced to enable the widest possible reuse?*	LEE is not the gatekeeper of access to 4Growth data. Wageningen is.
Availability *When will the data be made available for reuse?* *How long should the data be available for reuse?If applicable, specify why and for what period a data embargo is needed.*	LEE is not the gatekeeper of access to 4Growth data. Wageningen is.

Third parties *Are the data produced and/or used in the task useable by third parties, in particular after the end of the project? If the re-use of some data is restricted, explain why.*	The output data is freely useable by third parties. The input data is restricted by commercial procurement contract and third parties will therefore need to procure own access.
Data quality *How is the data quality assured?*	Data quality is assured by the Task 3.1 team. LEE have strong quality management and assurance procedures (BS EN ISO 9001:2008 certification). We will also apply best practice guidelines outlined in the UK HMT Aqua Book. As a standard, our QA process employs a senior member of staff, external to the project team, for fresh-eyes review and challenging of the inputs, methodology, and results. All partners on 4Growth have resource against Task 3.1, which they will use to validate input assumptions and outputs throughout the period, and specifically for each wave of deliverables.

Allocation of resources	
Costs *What are the costs for storing the data. And how will these be covered?*	LEE is not the gatekeeper of access to 4Growth data. Wageningen is.
Responsibility for data management *Who will be responsible for data management in the task?*	The Work Package Leader is responsible for data management.
Costs and potential value of long-term preservation *What are the costs of long-term archiving? And who decides what data is kept and for how long?*	LEE is not the gatekeeper of access to 4Growth data. Wageningen is.

Data Security	
Data security *What provisions are in place for data security (including data recovery and secure storage and transmission of sensitive data)?*	LEE is not the gatekeeper of access to 4Growth data. Wageningen is.
Data storage *Is data stored securely in certified repositories for long-term retention and curation?*	LEE is not the gatekeeper of access to 4Growth data. Wageningen is.

Ethical Issues

Ethical or legal issues *Are there ethical or legal issues that may affect data sharing?*	None.
Personal data *Is informed consent for data sharing and long-term preservation included in questionnaires dealing with personal data? Do you comply with the GDPR concerning information provisions and access to personal data?*	LEE will not handle any personal data.

Other Issues	
Other methods of data management *Do you use other national/state/sectoral/departmental data management procedures? If yes, which ones?*	No

5.6 Data Management Plan of FI

DATA SUMMARY	
Purpose *Describe the purpose of data collection/generation and its relationship to the objectives of 4Growth?*	As the leader of the task T3.2 “Foresight Module”, FI will collect signals of change, trends and developments (including possible disruptions) that highlight the fast-changing framework conditions in agriculture and forestry, in the form of qualitative descriptions and qualitative analysis. FI is carrying out continuous monitoring (“horizon scanning”) and developing framework scenarios for the year 2040. Horizon Scanning is a holistic analysis of the general environment (study of events, issues, and trends affecting a business, industry, or policy area). It involves the systematic gathering of information and monitoring of weak signals / changes in order to provide early warning about possible future changes. Methods used range from a literature review of academic journals, news, blogposts etc. Results provide insights in possible plausible changes that can play a role and influence digital agriculture and forestry futures. Selected outputs will be integrated in the Market Monitoring & Forecasting Tool (T3.1) by shaping core assumptions on drivers and developments of market uptake of digital technologies. Result might be taken up and presented in the 4Growth Visualisation Platform (T2.3). The Forecasting and Foresight tools are

	designed to provide actionable insights for policymaking and strategic planning.
Types and formats of data *Describe what types/ formats of data the project will generate/collect?*	FI will collect only qualitative data and mainly secondary data in WP3, Task T3.2, stemming from coming from academic journals, news, webpages, blogposts, newsletters etc. **Main qualitative data**: Original sources are mainly articles or text bodies in PDF format or can be exported as PDF formats. Main relevant insights from the original sources are extracted and interpreted in documents (Word or excel Format) that include the link to the original source and are categorized; sources are clustered into issues and described in a word document. Results are produced and shared as word documents and pdfs. **Original data**: Possibly, expert consultations and assessments might be collected in bilateral interviews, surveys or online group workshops. Respective data will cover assessments and validation of the raw findings and enrichment of insights, collected in spreadsheets or word documents.
Existing data and Origin *Will you reuse any existing data and how? What is the origin of the data?*	FI will work with publications / sources from overarching foresight projects (public reports), overarching and specific academic publications, blogs and newsletters from think tanks and experts in the areas, new research findings via analysis of press releases of research agencies, startup and business activities via network reports or websites as well as newspaper articles and news via respective websites and news alerts. FI will use the key insights / essence of the message, not the detailed background data underlying the publications.
Size of the data *What is the expected size of the data?*	The expected size of the data in the 4Growth project by FI is anticipated to be relatively modest, likely under 5GB. Collecting the original sources to ensure their retrievability might cover the highest share, analysis and interpretation only uses their metadata enriched by own interpretations.
Usage of the data *To whom might it be useful ('data utility')?*	The data from the 4Growth project benefits consortium partners, researchers, developers, policymakers, and industry stakeholders by enhancing digital technology development, enabling in-depth analysis, and supporting strategic decisions in agriculture and forestry.

FINDABLE: Making data findable	
Provision of metadata	For FI, the data created and used is indeed discoverable and identifiable through comprehensive metadata. This ensures that all datasets are accessible and can be efficiently utilised for further research, analysis, and

Is the data created and/or used in the task discoverable and identifiable through metadata?	development activities. The spreadsheet in which signals are selected link to the original articles, issues are clusters of signals link back to the signals. In the delivery report academic referencing allows drawing back to the sources.
Identification of the data *Do you make use of persistent and unique identifiers such as Digital Object Identifiers (DOI)?*	Selected data and/or reports from the 4Growth project, particularly those intended for a wider audience, are published in journals or deposited in data archives where Digital Object Identifiers (DOIs) are assigned.
Naming conventions *What naming conventions are followed?*	In the 4Growth project, FI adheres to clear and systematic naming conventions for data and files to ensure consistency and ease of access. The naming conventions typically include key identifiers such as the project name, work package number, task number, type of data, and date of creation.
Search terms *Are search keywords provided that optimise opportunities for reuse?*	Documents, publications, and released records in the 4Growth project are tagged with appropriate keywords to facilitate searchability and reuse. A taxonomy, based on the data generated, is expected to be developed and utilised on the platform. This taxonomy will guide users in navigating and searching for information effectively, ensuring that relevant data can be quickly and easily accessed.
Versioning *Do you provide unique version numbers?*	Yes, FI assigns unique version numbers to all documents, datasets, and deliverables. Each document features a version section or header that specifies the date and version number. Additionally, the use of Microsoft Teams enhances version control by offering a "version history" feature for each document. This allows all project partners to access and review the evolution of documents, ensuring that everyone is working with the most current and accurate information.
Standards for metadata creation? *What metadata is created? If there are no metadata standards in your discipline, please describe what kind of metadata is created and how.*	FI adheres to established metadata standards suitable for digital agriculture and forestry research, ensuring data consistency, discoverability, and usability. Metadata includes descriptive elements like title, author, creation date, version number, and geographic location when applicable. It extends to data type (quantitative or qualitative), format (CSV, Excel, PDF), and content-related keywords for enhanced searchability. Each dataset is accompanied by documentation, such as readme files in MS Word format, detailing the data's origin, location, collection settings, and equipment used, which is essential for accurate data interpretation and reuse.

ACCESSIBLE: Making data open and accessible

Openly available and closed datasets *Which data created and/or used in the task are made openly available by default?* *If certain datasets or parts of them cannot be released (or need to be released only under restrictions), explain the reasons, clearly separating legal and contractual reasons from voluntary restrictions (e.g. ethical reasons, personal data rules, intellectual property, commercial reasons, data protection, security reasons, etc.).*	Not all data collected or generated by FI will be openly shared by default, such as draft versions of reports. Only data deemed useful for broader research or public interest will be considered for publication, ensuring that intellectual property (IP) and data protection regulations are meticulously observed before any data is made public. Aligned with an open access policy, the majority of non-sensitive data gathered through the project will be made available via the project's Platform in the project deliverables. This commitment to open access facilitates broader dissemination and utility of research outcomes. However, stringent measures are taken to anonymise all data to safeguard user privacy and comply with ethical standards and legal requirements concerning data protection.
Data Repository *How will the data be made accessible (e.g. by depositing it in a repository)?* *Where will the data and associated metadata, documentation and code be deposited?*	Data will be managed using repositories. For internal use and collaboration within the consortium, data is stored on network storage solutions like Microsoft Teams, allowing controlled access among project partners. For public dissemination, particularly when linked to scientific publications, data will be uploaded to certified public repositories. This approach not only enhances discoverability but also ensures the integrity and citation of the data through associated publications. The use of public repositories, which are certified and secure, guarantees that published data complies with open access policies and is accessible to a broader audience.
Conditions of access *What methods or software tools are needed to access the data?* *If there are restrictions on use, how will access be provided?* *Are there well-described conditions for access (e.g. a machine-readable licence)?*	The required software tools are commonly available office tools like PDF reader, spreadsheets (Excel), text reader (Word). A documentation for the whole project includes instructions to get access for each data type. Access to certain datasets is restricted and controlled through user credentials to ensure that only authorised individuals can access the data. This method helps maintain the integrity and confidentiality of the data, aligning with intellectual property and data protection standards.
Identity verification *How will the identity of the person accessing the data be ascertained?*	For the whole project and for restricted data, identity verification is managed through user credentials, ensuring that only authorised individuals have access. For publicly accessible data in repositories or on open access platforms, the identity of users is not tracked by FI.

INTEROPERABLE: Making data interoperable

Interoperability of data generated *Do the data enable the exchange and reuse of data between researchers, institutions, organisations, countries, etc. (i.e. adherence to standards for formats, compatibility with available (open) software applications to the greatest extent possible and, in particular, facilitation of recombinations with different datasets from different origins)?*	The data produced will be compatible with widely-used open software applications, ensuring broad accessibility and usability. For qualitative data, summarizing and interpreting findings of the broad variety of contextual conditions, interoperability is provided through easily understandable language. FI will avoid abbreviation as far as possible.
Vocabularies *What data and metadata vocabularies, standards or methodologies will the task follow to make the data interoperable?*	Not applicable for qualitative text data, as a common vocabulary of foresight, agriculture, forestry and digitalization are used. When needed, a glossary will be provided.

REUSABLE: Making data reusable	
Licence *How will the data be licenced to enable the widest possible reuse?*	Not applicable for the qualitative data used here. For the whole project, for each dataset, a decision is made regarding the appropriate license type. For data that can be freely accessed, a Creative Commons license is typically preferred to encourage broad use and distribution.
Availability *When will the data be made available for reuse?* *How long should the data be available for reuse? If applicable, specify why and for what period a data embargo is needed.*	For the whole project, data availability within the 4Growth project varies based on specific task requirements. Internally, data is accessible to consortium members immediately after collection. However, external availability is contingent upon conditions such as the acceptance of associated scientific publications or the completion of student theses. 4Growth commits to maintaining open access to its platform for seven years following the project's conclusion, primarily to support the community and integrate major findings into relevant EU projects under the "HORIZON-CL6-2023-GOVERNANCE-01-15: EU-wide inventory".
Third parties *Are the data produced and/or used in the task useable by third parties, in particular after the end of the project? If the re-use of some data is restricted, explain why.*	The 4Growth Visualisation Platform will host the core outputs of the Foresight Module. It will be accessible via a free, open-access model and will function as the official website of the project. This platform will make all valuable information readily accessible to all interested parties, significantly enhancing the dissemination and communication strategy of the project.

Data quality *How is the data quality assured?*	Data quality within the FI-led tasks is primarily ensured by the team responsible for data collection and analysis. The FI team implements stringent measures to validate and verify the data at various stages of collection and processing, ensuring accuracy, consistency, and reliability. This includes regular checks, peer reviews, and adherence to data quality standards in foresight research.

Allocation of resources	
Costs *What are the costs for storing the data. And how will these be covered?*	The cost of storing data falls under FI's institutional budget (overhead). The cost of depositing data, such as in Microsoft Teams, is covered by the coordinator.
Responsibility for data management *Who will be responsible for data management in the task?*	The Task T3.2 leader is responsible for the data collection in this task, enabling WP3 leader to take the overall responsibility for the entire WP data. Each WP leader is responsible for the data collected in their respective work package. Ultimately, the WUR and EVF coordination teams are responsible for overseeing data management across the entire 4Growth project.
Costs and potential value of long-term preservation *What are the costs of long-term archiving? And who decides what data is kept and for how long?*	FI will comply with Germany's data policy and the GDPR, ensuring that all research data and underlying publications are retained for 15 years. The costs of long-term archiving fall under FI's institutional budget. The decision on what data is kept and for how long is made in accordance with these regulations and project-specific needs.

Data Security	
Data security *What provisions are in place for data security (including data recovery and secure storage and transmission of sensitive data)?*	Data security provisions include secure storage on encrypted drives and cloud services with robust access controls. Data recovery plans involve regular backups stored in multiple locations. Only authorised personnel have access to sensitive data, with strict adherence to GDPR guidelines ensuring compliance with data protection standards. The project uses Microsoft servers, which include regular backups, firewalls, and access based on personal credentials. In most cases, two-factor authentication is required to access the network.
Data storage *Is data stored securely in certified repositories for long-term retention and curation?*	Yes, selected data is stored securely in certified repositories that ensure long-term retention and curation, guaranteeing access for over 15 years.

Ethical Issues

Ethical or legal issues *Are there ethical or legal issues that may affect data sharing?*	The data collected by FI does not have ethical or legal issues that affect data sharing. Within the observatory, there are ethical and legal issues that may affect data sharing. These include compliance with GDPR regulations, ensuring informed consent for data collection and sharing, protecting the privacy of individuals, and safeguarding intellectual property rights. Ethical considerations also involve maintaining the confidentiality of sensitive data and adhering to ethical standards for research and data management.
Personal data *Is informed consent for data sharing and long-term preservation included in questionnaires dealing with personal data? Do you comply with the GDPR concerning information provisions and access to personal data?*	FI does not intend to use personal data in questionnaires. In cases where e.g. questionnaires would include personal data like email addresses to follow up with sharing findings, informed consent for data sharing and long-term preservation is included. FI complies with the GDPR concerning information provisions and access to personal data.

Other Issues	
Other methods of data management *Do you use other national/state/sectoral/departmental data management procedures? If yes, which ones?*	FI primarily follows the data management procedures outlined by the 4Growth project. Additionally, FI adheres to national regulations and guidelines for data management in Germany (including the GDPR enforced by the Federal Data Protection Authority of North Rhine-Westphalia and the German Federal Commissioner for Data Protection and Freedom of Information), as well as institutional policies for data handling and preservation (such as secure storage protocols and data retention policies).

5.7 Data Management Plan of VIZ

DATA SUMMARY	
Purpose *Describe the purpose of data collection/generation and its relationship to the objectives of 4Growth?*	Vizzuality is retrieving the surveys data from the Wageningen database in order to create an APi where we can filter and get subsets of the data to display in the visualization tool.
Types and formats of data *Describe what types/ formats of data the project will generate/collect?*	Vizzuality will collect registration details for those users who want to create an account and use the sandbox section. Vizzuality will collect survey data from the WUR database:

	Qualitative Data: Usage metrics and adoption rates gathered from virtual observatories, formatted as CSV and Excel files for systematic analysis. This quantitative data helps map the current landscape of technological adoption across regions. **Quantitative Data:** Insights from interviews and surveys are detailed in PDF and DOC formats. These qualitative assessments capture user experiences, barriers to technology adoption, and insights into the effectiveness of current digital tools.
Existing data and Origin *Will you reuse any existing data and how? What is the origin of the data?*	We reuse the survey data directly from the WUR database, being that the origin of all the data we use.
Size of the data *What is the expected size of the data?*	Data is unlikely to exceed 20gb as that is the maximum size established by the origin data that contains the original online survey response database.
Usage of the data *To whom might it be useful ('data utility')?*	The data from the 4Growth project benefits consortium partners, researchers, developers, policymakers, and industry stakeholders by enhancing digital technology development, enabling in-depth analysis, and supporting strategic decisions in agriculture and forestry.

FINDABLE: Making data findable	
Provision of metadata *Is the data created and/or used in the task discoverable and identifiable through metadata?*	We are filtering and processing the WUR survey database that is already discoverable and searchable through metadata, but we do not add any metadata on our side.
Identification of the data *Do you make use of persistent and unique identifiers such as Digital Object Identifiers (DOI)?*	No, since we are using the database internally for our tool and all that data is already being published with DOI by WUR.
Naming conventions *What naming conventions are followed?*	We are using a subset of the WUR survey data that adheres to clear and systematic naming conventions for data and files to ensure consistency and ease of access. The naming conventions typically include key identifiers such as the project name, work package number, task number, type of data, and date of creation. E.g. [project]_[filesubject]_[subsubject]_[date]_[version].[extension] It avoids the use of special characters and spaces, such as #$^&()+=?\/!@*%{}[]<>.

Search terms *Are search keywords provided that optimise opportunities for reuse?*	Our processed data is accessed only through our visualization tool, we do not provide search keywords, but the original data from WUR does.
Versioning *Do you provide unique version numbers?*	We only process the original WUR data for visualization, this original data assigns unique version numbers to all documents, datasets, and deliverables.
Standards for metadata creation? *What metadata is created? If there are no metadata standards in your discipline, please describe what kind of metadata is created and how.*	We do not create additional metadata.

ACCESSIBLE: Making data open and accessible	
Openly available and closed datasets *Which data created and/or used in the task are made openly available by default?* *If certain datasets or parts of them cannot be released (or need to be released only under restrictions), explain the reasons, clearly separating legal and contractual reasons from voluntary restrictions (e.g. ethical reasons, personal data rules, intellectual property, commercial reasons, data protection, security reasons, etc.).*	All data that we use is made publicly accessible using the 4Growth visualization tool.
Data Repository *How will the data be made accessible (e.g. by depositing it in a repository)?* *Where will the data and associated metadata, documentation and code be deposited?*	Data will be accessed using our visualization tool. Code and documentation is stored in a github repository. The database is stored in a secure AWS server and the database is not exposed to the internet. Communications with the application are secured with HTTPS and JSON web token. The users are stored in our database and the user passwords are hashed.

Conditions of access *What methods or software tools are needed to access the data?* *If there are restrictions on use, how will access be provided?* *Are there well-described conditions for access (e.g. a machine-readable licence)?*	Data will be accessed using our visualization tool. It can be used by any public user with no restrictions. Any standard web browser can be used to access our tool.
Identity verification *How will the identity of the person accessing the data be ascertained?*	The website is public, and no identity verification is required to use it.

INTEROPERABLE: Making data interoperable	
Interoperability of data generated *Do the data enable the exchange and reuse of data between researchers, institutions, organisations, countries, etc. (i.e. adherence to standards for formats, compatibility with available (open) software applications to the greatest extent possible and, in particular, facilitation of recombinations with different datasets from different origins)?*	The data is accessible using the 4Growth visualization tool, there is not a mechanism in our tool to download the whole database and use it as a whole in other tools. This is not necessary because all the data we use is provided by WUR and it is accessible in their repositories.
Vocabularies *What data and metadata vocabularies, standards or methodologies will the task follow to make the data interoperable?*	The project employs the SAREF4AGRI ontology, designed to ensure seamless data exchange and integration within the agricultural sector.

REUSABLE: Making data reusable	
Licence *How will the data be licenced to enable the widest possible reuse?*	We keep the different kind of licenses of the original data from WUR: • Open access (Creative Commons Attribution license (CC BY); anyone can access and reuse with attribution). • Restricted access (custom license text or data sharing agreement is required, dictating restrictions of access and reuse). When a data sharing

	agreement is required, the WUR Privacy Officer or WUR Information Security Officer will be consulted. • Closed access (only metadata published, data is not allowed to be requested or reused). For data that can be freely accessed, a Creative Commons license is typically preferred to encourage broad use and distribution.
Availability *When will the data be made available for reuse?* *How long should the data be available for reuse?If applicable, specify why and for what period a data embargo is needed.*	The data is accessible using the 4Growth visualization tool, there is not a mechanism in our tool to download the whole database and use it as a whole in other tools. This is not necessary because all the data we use is provided by WUR and it is accessible in their repositories with their availability policy.
Third parties *Are the data produced and/or used in the task useable by third parties, in particular after the end of the project? If the re-use of some data is restricted, explain why.*	The 4Growth Visualisation Platform, accessible via a free, open-access model, will function as the official website of the project. This platform will make all valuable information readily accessible to all interested parties, significantly enhancing the dissemination and communication strategy of the project. The reuse of raw data from surveys will be highly restricted to protect GDPR rights of survey fillers.
Data quality *How is the data quality assured?*	Data quality is primarily ensured by the WUR team, responsible for data collection and analysis. The WUR team implements stringent measures to validate and verify the data at various stages of collection and processing, ensuring accuracy, consistency, and reliability. This includes regular checks, peer reviews, and adherence to WUR internal data management protocol.

Allocation of resources	
Costs *What are the costs for storing the data. And how will these be covered?*	The cost of storing the data is included in the cost of the web server hosting and it will be covered by Vizzuality for the duration of the grant.
Responsibility for data management *Who will be responsible for data management in the task?*	Each WP leader is responsible for the data collected in their respective work package. Ultimately, the WUR and EVF coordination teams are responsible for overseeing data management across the entire 4Growth project. VIZ is responsible for the security of the database stored in AWS.
Costs and potential value of long-term preservation *What are the costs of long-term archiving? And who decides what data is kept and for how long?*	The original data used for the Vizzualization tool is archived for the long term by WUR, so it is not needed to store it long term again on our side.

Data Security	
Data security *What provisions are in place for data security (including data recovery and secure storage and transmission of sensitive data)?*	The database is stored in a secure AWS server and the database is not exposed to the internet. Communications with the application are secured with HTTPS and JSON web token. There will be an automatic backup system to preserve the data and allow data recovery.
Data storage *Is data stored securely in certified repositories for long-term retention and curation?*	The long-term retention and curation of the data is done by WUR, the owners of the original database.

Ethical Issues	
Ethical or legal issues *Are there ethical or legal issues that may affect data sharing?*	The type of data that we receive from WUR will include personal and private company strategic documentation and private code for digital products and services, which will remain confidential. We will filter out from that source data all the personal information that we don't need for the visualization of data in our tool. If there is any Personal data remaining it will be treated in strictest compliance with EU GDPR and IPR considerations as described in the consortium agreement are respected.
Personal data *Is informed consent for data sharing and long-term preservation included in questionnaires dealing with personal data? Do you comply with the GDPR concerning information provisions and access to personal data?*	We will filter out from that source data all the personal information that we don't need for the visualization of data in our tool. If there is any Personal data remaining it will be treated in strictest compliance with EU GDPR and IPR considerations as described in the consortium agreement are respected.

Other Issues	
Other methods of data management *Do you use other national/state/sectoral/departmental data management procedures? If yes, which ones?*	No.

5.8 Data Management Plan of ILVO

DATA SUMMARY

Purpose *Describe the purpose of data collection/generation and its relationship to the objectives of 4Growth?*	As part of WP2, the purpose of data collection and generation through ILVO as one of the observatories, is first as part of T2.1 to review and understand the current level of adoption of digital technologies by all actors in agricultural sector and to what extent they utilize Digital Technology which aligns with the objectives of the 4Growth project. Secondary with the generated data our purpose is to accelerate the digital transformation in agriculture by providing strong, data-driven insights and solutions by Identifying Barriers and Enablers, Developing Best Practices, Supporting Sustainable Practices and Creating a Knowledge Base. In T2.2 and T4.1 ILVO will also seek to expand its data sources, making the data gathered as representative as possible. In T4.2 ILVO will use the grid developed in T2.2 to obtain a consistent and unbiased report that covers all topics of interest. The data gathering will involve, where necessary, digital correspondence and in-person interviews with entities utilizing digital agriculture technologies. The main data collection by ILVO will be done in T4.2 in its role as a 4Growth observatory.
Types and formats of data *Describe what types/ formats of data the project will generate/collect?*	ILVO will collect and generate both qualitative and quantitative data through surveys and questionnaires, providing in-depth insights into user experiences and challenges. This will result in metrics and adoption rates gathered from virtual observatories, formatted as CSV and Excel files for systematic analysis.
Existing data and Origin *Will you reuse any existing data and how? What is the origin of the data?*	**Reusal**: We will mostly collect new data, if data is reused from ILVO data repositories, in line with the data sharing agreement that is applicable for the relevant data sets.
Size of the data *What is the expected size of the data?*	The expected size of the data in the 4Growth project by ILVO is anticipated to be relatively modest, likely under 10GB.
Usage of the data *To whom might it be useful ('data utility')?*	The data from the 4Growth project Will benefit consortium partners, researchers, academic institutions, developers, policymakers, and industry stakeholders by enhancing digital technology development, enabling in-depth analysis, and supporting strategic decisions in agriculture.

FINDABLE: Making data findable	
Provision of metadata *Is the data created and/or used in the task discoverable and identifiable through metadata?*	Yes, the data will be indeed discoverable and identifiable through comprehensive metadata. This ensures that all datasets are accessible and can be efficiently utilised for further research, analysis, and development activities.

Identification of the data *Do you make use of persistent and unique identifiers such as Digital Object Identifiers (DOI)?*	No
Naming conventions *What naming conventions are followed?*	In the 4Growth project, ILVO adheres to clear and systematic naming conventions for data and files to ensure consistency and ease of access. The naming conventions typically include key identifiers such as the project name, work package number, task number, type of data, and date of creation.
Search terms *Are search keywords provided that optimise opportunities for reuse?*	Yes
Versioning *Do you provide unique version numbers?*	Yes, ILVO assigns unique version numbers to all documents, datasets, and deliverables. Each document features a version section or header that specifies the date and version number. Additionally, the use of Microsoft Teams enhances version control by offering a "version history" feature for each document. This allows all project partners to access and review the evolution of documents, ensuring that everyone is working with the most current and accurate information.
Standards for metadata creation? *What metadata is created? If there are no metadata standards in your discipline, please describe what kind of metadata is created and how.*	ILVO adheres to established metadata standards suitable for digital agriculture and forestry research, ensuring data consistency, discoverability, and usability. Metadata includes descriptive elements like title, author, creation date, version number, and geographic location when applicable. It extends to data type (quantitative or qualitative), format (CSV, Excel, PDF), and content-related keywords for enhanced searchability. Each dataset is accompanied by documentation, such as readme files in MS Word format, detailing the data's origin, location, collection settings, and equipment used, which is essential for accurate data interpretation and reuse.

ACCESSIBLE: Making data open and accessible	
Openly available and closed datasets *Which data created and/or used in the task are made openly available by default?* *If certain datasets or parts of them cannot be released (or need to be released only under*	Not all data collected or generated by ILVO will be openly shared by default. Only data deemed useful for broader research or public interest will be considered for publication, ensuring that intellectual property (IP) and data protection regulations are meticulously observed before any data is made public. Aligned with an open access policy, the majority of non-sensitive data gathered through the project will be made

restrictions), explain the reasons, clearly separating legal and contractual reasons from voluntary restrictions (e.g. ethical reasons, personal data rules, intellectual property, commercial reasons, data protection, security reasons, etc.).	available via the **4Growth Visualisation Platform**. This commitment to open access facilitates broader dissemination and utility of research outcomes. However, stringent measures are taken to anonymise all data to safeguard user privacy and comply with ethical standards and legal requirements concerning data protection.
Data Repository *How will the data be made accessible (e.g. by depositing it in a repository)?* *Where will the data and associated metadata, documentation and code be deposited?*	Data will be managed using repositories. For internal use and collaboration within the consortium, data is stored on network storage solutions like Microsoft Teams, allowing controlled access among project partners. For public dissemination, particularly when linked to scientific publications, data will be uploaded to certified public repositories. This approach not only enhances discoverability but also ensures the integrity and citation of the data through associated publications. The use of public repositories, which are certified and secure, guarantees that published data complies with open access policies and is accessible to a broader audience.
Conditions of access *What methods or software tools are needed to access the data?* *If there are restrictions on use, how will access be provided?* *Are there well-described conditions for access (e.g. a machine-readable licence)?*	The required software tools are specified in the accompanying metadata and documentation, which includes readme files that detail the necessary software for each data type. Access to certain datasets is restricted and controlled through user credentials to ensure that only authorised individuals can access the data. This method helps maintain the integrity and confidentiality of the data, aligning with intellectual property and data protection standards. The data stored on the hard drives of the HTFP server will be secured by altering the built-in Windows Security rights of the files. This way only authorized people will be able to access the data. The individual files in the personal ILVO OneDrive folder will only be shared with the concerned group members via a temporary secured link/invite. All group members will also be advised to always log out of OneDrive when not using the files + to change their password every month.
Identity verification *How will the identity of the person accessing the data be ascertained?*	For restricted data, identity verification is managed through user credentials, ensuring that only authorised individuals have access.

INTEROPERABLE: Making data interoperable

Interoperability of data generated *Do the data enable the exchange and reuse of data between researchers, institutions, organisations, countries, etc. (i.e. adherence to standards for formats, compatibility with available (open) software applications to the greatest extent possible and, in particular, facilitation of recombinations with different datasets from different origins)?*	The data produced will be compatible with widely used open software applications, ensuring broad accessibility and usability. The project consortium will determine the specific data types to be employed for various tasks, promoting standardisation across outputs. Moreover, the project will feature a dedicated API (Application Programming Interface), allowing third parties to easily retrieve information. Metadata descriptors included with the data will enhance discoverability, enabling efficient search and integration through SPARQL queries, thus facilitating the exchange and reuse of data among researchers, institutions, organisations, and countries.
Vocabularies *What data and metadata vocabularies, standards or methodologies will the task follow to make the data interoperable?*	Data interoperability is prioritised through established agrifood sector vocabularies and ontologies. The project specifically employs the SAREF4AGRI ontology, which is designed to ensure seamless data exchange and integration within the agricultural sector.

REUSABLE: Making data reusable	
Licence *How will the data be licenced to enable the widest possible reuse?*	For each dataset, a decision is made at project level regarding the appropriate license type. For data that can be freely accessed, a Creative Commons license is typically preferred to encourage broad use and distribution.
Availability *When will the data be made available for reuse?* *How long should the data be available for reuse? If applicable, specify why and for what period a data embargo is needed.*	To be decided at project level.
Third parties *Are the data produced and/or used in the task useable by third parties, in particular after the end of the project? If the re-use of some data is restricted, explain why.*	To be decided at project level.
Data quality *How is the data quality assured?*	Data quality within ILVO is primarily ensured by the team responsible for data collection and analysis. ILVO team implements stringent measures to validate and verify the data at various stages of collection and processing, ensuring accuracy, consistency, and reliability. This includes regular checks, peer reviews, and adherence to established data management protocols.

Allocation of resources	
Costs *What are the costs for storing the data. And how will these be covered?*	The cost of storing data is covered by ILVO regarding the data collected.
Responsibility for data management *Who will be responsible for data management in the task?*	Each task participants are responsible for the data collected in their respective Task. Ultimately, WUR and EVF are responsible for overseeing data across the entire project.
Costs and potential value of long-term preservation *What are the costs of long-term archiving? And who decides what data is kept and for how long?*	N/A

Data Security	
Data security *What provisions are in place for data security (including data recovery and secure storage and transmission of sensitive data)?*	Data security provisions include secure storage on encrypted drives and cloud services with robust access controls. Data recovery plans involve regular backups stored in multiple locations. Only authorised personnel have access to sensitive data, with strict adherence to GDPR guidelines ensuring compliance with data protection standards. The project uses Microsoft servers, which include regular backups, firewalls, and access based on personal credentials. In most cases, two-factor authentication is required to access the network.
Data storage *Is data stored securely in certified repositories for long-term retention and curation?*	Yes, selected data is stored securely in certified repositories that ensure long-term retention and curation, guaranteeing access for over 15 years.

Ethical Issues	
Ethical or legal issues *Are there ethical or legal issues that may affect data sharing?*	The data collected by ILVO does not have ethical or legal issues that affect data sharing. Within the observatory, there are ethical and legal issues that may affect data sharing. These include compliance with GDPR regulations, ensuring informed consent for data collection and sharing, protecting the privacy of individuals, and safeguarding intellectual property rights. Ethical considerations also involve maintaining the confidentiality of sensitive data and adhering to ethical standards for research and data management.

Personal data *Is informed consent for data sharing and long-term preservation included in questionnaires dealing with personal data? Do you comply with the GDPR concerning information provisions and access to personal data?*	Yes, informed consent for data sharing and long-term preservation is included in questionnaires dealing with personal data. ILVO complies with the GDPR concerning information provisions and access to personal data.

Other Issues	
Other methods of data management *Do you use other national/state/sectoral/departmental data management procedures? If yes, which ones?*	ILVO follows the data management procedures outlined by the 4Growth project. And we adhere to national regulations and guidelines for data management in Belgium.

5.9 Data Management Plan of INTIA

DATA SUMMARY	
Purpose *Describe the purpose of data collection/generation and its relationship to the objectives of 4Growth?*	As a member of the observatory ecosystem of the WP4 "Observatory Data Collection and Analysis", INTIA is in charge of data collection recovering, using different methods such as digital and in-person data collection methods. A wide range of ground-truth data will be collected to identify key factors or constraints for uptake of digital solutions. In alignment with 4Growth goals, these data will fed into forecast modules to generate predictive models, offering insights into future market conditions and will be used to support policy making and wider adoption by value chain actors. INTIA also participates in the WP2 'Uptake of Digital Agriculture & Forestry Technologies' to capture the state-of-the-art with regards to the current level of adoption and uptake of digital agriculture solutions.
Types and formats of data *Describe what types/ formats of data the project will generate/collect?*	INTIA will be collecting various data types across multiple work packages to evaluate the uptake of digital technologies in the agricultural sector: **Quantitative Data:** Usage metrics and adoption rates gathered from our observatory, formatted as CSV and Excel files for systematic analysis. This quantitative data helps map the current landscape of technology adoption across regions. **Qualitative Data:** Insights from interviews and surveys are detailed in PDF, DOC and Excel formats. These qualitative assessments capture user experiences,

	barriers to technology adoption, and insights into the effectiveness of current digital tools. The data collection spans several work packages: **WP2 Uptake of Digital Agriculture & Forestry Technologies:** INTIA participates in T2.1 to produce a SOTA analysis in Excel format, which is crucial for documenting existing technology adoption levels. **WP3 Digital Agriculture & Forestry Uptake - Forecast & Foresight:** Utilising the SOTA analysis from T2.1, WP3 forecasts market dynamics such as user demographics, penetration rates, and economic impacts, which are essential for strategic decision-making. **WP4 Observatory Data Collection and Analysis:** INTIA is responsible for the data collection efforts within the agricultural observatory in our region that blend digital innovation hubs and stakeholder ecosystems to gather comprehensive data. This includes both digital and in-person data collection methods, ensuring a rich dataset.
Existing data and Origin *Will you reuse any existing data and how? What is the origin of the data?*	INTIA will use existing data from projects or platforms such as FAIRSHARE, to enrich the SOTA analysis in WP2, specifically in T2.1. Additionally, it will be used to calibrate and validate models and tools developed across the project, such as the Market Monitoring & Forecasting Tool (MMFT) in WP3 and WP4. This data will also be integrated with outputs from all work packages (1 to 5) to support the ongoing development of the 4Growth Visualisation Platform, ensuring the research is robust and comprehensive.
Size of the data *What is the expected size of the data?*	The expected size of the data in the 4Growth project by INTIA is anticipated to be relatively modest, likely under 10GB. The SOTA analysis, primarily in Excel format, and data recovered in the observatory, in Excel and Word formats, do not constitute a "data-heavy" collection. This suggests that while the project handles diverse data types, the overall data volume will remain manageable within this scope.
Usage of the data *To whom might it be useful ('data utility')?*	The data from the 4Growth project benefits consortium partners, researchers, developers, policymakers, farmers, advisors and industry stakeholders by enhancing digital technology development, enabling in-depth analysis, and supporting strategic decisions in agriculture and forestry.

FINDABLE: Making data findable

Provision of metadata *Is the data created and/or used in the task discoverable and identifiable through metadata?*	For INTIA, the data created and used is indeed discoverable and identifiable through comprehensive metadata. This ensures that all datasets are accessible and can be efficiently utilised for further research, analysis, and development activities. INTIA's data, particularly from tasks T2.1, T4.1 and T4.2, will include metadata detailing content, format, context, and usage to facilitate accessibility and interoperability across different platforms and among various stakeholders.
Identification of the data *Do you make use of persistent and unique identifiers such as Digital Object Identifiers (DOI)?*	Selected data and/or reports from the 4Growth project, particularly those intended for a wider audience, are published in journals or deposited in data archives where Digital Object Identifiers (DOIs) are assigned. This allows the data to be easily and uniquely identified and retrieved by others.
Naming conventions *What naming conventions are followed?*	In the 4Growth project, INTIA adheres to clear and systematic naming conventions for data and files to ensure consistency and ease of access. The naming conventions typically include key identifiers such as the project name, work package number, task number, type of data, and date of creation.
Search terms *Are search keywords provided that optimise opportunities for reuse?*	Documents, publications, and released records in the 4Growth project are tagged with appropriate keywords to facilitate searchability and reuse. A taxonomy, based on the data generated, is expected to be developed and utilised on the platform. This taxonomy will guide users in navigating and searching for information effectively, ensuring that relevant data can be quickly and easily accessed
Versioning *Do you provide unique version numbers?*	Yes, INTIA assigns unique version numbers to all documents, datasets, and deliverables. Each document features a version section or header that specifies the date and version number. Additionally, the use of Microsoft Teams enhances version control by offering a "version history" feature for each document. This allows all project partners to access and review the evolution of documents, ensuring that everyone is working with the most current and accurate information.
Standards for metadata creation? *What metadata is created? If there are no metadata standards in your discipline, please describe what kind of metadata is created and how.*	INTIA adheres to established metadata standards suitable for digital agriculture and forestry research, ensuring data consistency, discoverability, and usability. Metadata includes descriptive elements like title, author, creation date, version number, and geographic location when applicable. It extends to data type (quantitative or qualitative), format (CSV, Excel, PDF), and content-related keywords for enhanced searchability. Each dataset is accompanied by documentation, such as readme files in MS Word format, detailing the data's origin, location, collection settings, and equipment used,

	which is essential for accurate data interpretation and reuse

ACCESSIBLE: Making data open and accessible	
Openly available and closed datasets *Which data created and/or used in the task are made openly available by default?* *If certain datasets or parts of them cannot be released (or need to be released only under restrictions), explain the reasons, clearly separating legal and contractual reasons from voluntary restrictions (e.g. ethical reasons, personal data rules, intellectual property, commercial reasons, data protection, security reasons, etc.).*	Not all data collected or generated by INTIA will be openly shared by default. Only data deemed useful for broader research or public interest will be considered for publication, ensuring that intellectual property (IP) and data protection regulations are meticulously observed before any data is made public. Aligned with an open access policy, the majority of non-sensitive data gathered through the project will be made available via the project's Platform. This commitment to open access facilitates broader dissemination and utility of research outcomes. However, stringent measures are taken to anonymise all data to safeguard user privacy and comply with ethical standards and legal requirements concerning data protection.
Data Repository *How will the data be made accessible (e.g. by depositing it in a repository)?* *Where will the data and associated metadata, documentation and code be deposited?*	Data will be managed using repositories. For internal use and collaboration within the consortium, data is stored on network storage solutions like Microsoft Teams, allowing controlled access among project partners. For public dissemination, particularly when linked to scientific publications, data will be uploaded to certified public repositories. This approach not only enhances discoverability but also ensures the integrity and citation of the data through associated publications. The use of public repositories, which are certified and secure, guarantees that published data complies with open access policies and is accessible to a broader audience.
Conditions of access *What methods or software tools are needed to access the data?* *If there are restrictions on use, how will access be provided?* *Are there well-described conditions for access (e.g. a machine-readable licence)?*	The required software tools are specified in the accompanying metadata and documentation, which includes readme files that detail the necessary software for each data type. Access to certain datasets is restricted and controlled through user credentials to ensure that only authorised individuals can access the data. This method helps maintain the integrity and confidentiality of the data, aligning with intellectual property and data protection standards.

Identity verification *How will the identity of the person accessing the data be ascertained?*	For restricted data, identity verification is managed through user credentials, ensuring that only authorised individuals have access. For publicly accessible data in repositories or on open access platforms, the identity of users is not tracked by INTIA.

INTEROPERABLE: Making data interoperable	
Interoperability of data generated *Do the data enable the exchange and reuse of data between researchers, institutions, organisations, countries, etc. (i.e. adherence to standards for formats, compatibility with available (open) software applications to the greatest extent possible and, in particular, facilitation of recombinations with different datasets from different origins)?*	The data produced will be compatible with widely-used open software applications, ensuring broad accessibility and usability. The project consortium will determine the specific data types to be employed for various tasks, promoting standardisation across outputs. Moreover, the project will feature a dedicated API (Application Programming Interface), allowing third parties to easily retrieve information. Metadata descriptors included with the data will enhance discoverability, enabling efficient search and integration through SPARQL queries, thus facilitating the exchange and reuse of data among researchers, institutions, organisations, and countries.
Vocabularies *What data and metadata vocabularies, standards or methodologies will the task follow to make the data interoperable?*	Data interoperability is prioritised through established agrifood sector vocabularies and ontologies. The project specifically employs the SAREF4AGRI ontology, which is designed to ensure seamless data exchange and integration within the agricultural sector.

REUSABLE: Making data reusable	
Licence *How will the data be licenced to enable the widest possible reuse?*	For each dataset, a decision is made regarding the appropriate license type. For data that can be freely accessed, a Creative Commons license is typically preferred to encourage broad use and distribution.
Availability *When will the data be made available for reuse?* *How long should the data be available for reuse?If applicable, specify why and for what period a data embargo is needed.*	Data availability within the 4Growth project varies based on specific task requirements. Internally, data is accessible to consortium members immediately after collection. However, external availability is contingent upon conditions such as the acceptance of associated scientific publications or the completion of student theses. Consistent with INTIA's data policy, all project data will be retained for a minimum of ten years post-project to support ongoing research and verification. Specifically, personal data will be retained for the period stablished in the GDPR. Moreover, 4Growth commits to maintaining open access to its platform for seven years following the project's conclusion, primarily to support the drone community and integrate major findings into relevant EU

	projects under the "HORIZON-CL6-2023-GOVERNANCE-01-15: EU-wide inventory". To facilitate data reuse and ensure interoperability, 4Growth will implement several standards, including EIP-AGRI common formats and those recommended by SCAR SWG AKIS. Additional standards may be developed and adopted throughout the project's duration to accommodate the diverse activities of 4Growth, ensuring the data remains accessible and usable across various platforms and by multiple stakeholders.
Third parties *Are the data produced and/or used in the task useable by third parties, in particular after the end of the project? If the re-use of some data is restricted, explain why.*	Some data from the 4Growth project might continue to be useful beyond the project's timeline. Accordingly, we aim to publish selected datasets on certified long-term storage platforms to ensure their availability for future use. Additionally, the 4Growth Visualisation Platform, accessible via a free, open-access model, will function as the official website of the project. This platform will make all valuable information readily accessible to all interested parties, significantly enhancing the dissemination and communication strategy of the project.
Data quality *How is the data quality assured?*	Data quality within the INTIA's work is primarily ensured by the team responsible for data collection and analysis. The INTIA team implements stringent measures to validate and verify the data at various stages of collection and processing, ensuring accuracy, consistency, and reliability. This includes regular checks, peer reviews, and adherence to established data management protocols.

Allocation of resources	
Costs *What are the costs for storing the data. And how will these be covered?*	The cost of storing data falls under INTIA's institutional budget (overhead). The cost of depositing data, such as in Microsoft Teams, is covered by the coordinator.
Responsibility for data management *Who will be responsible for data management in the task?*	Each WP leader is responsible for the data collected in their respective work package. Ultimately, the WUR and EVF coordination teams are responsible for overseeing data management across the entire 4Growth project.
Costs and potential value of long-term preservation *What are the costs of long-term archiving? And who decides what data is kept and for how long?*	INTIA will comply with Spain's data policy and the GDPR,. The costs of long-term archiving fall under INTIA's budget. The decision on what data is kept and for how long is made in accordance with these regulations and project-specific needs.

Data Security

Data security *What provisions are in place for data security (including data recovery and secure storage and transmission of sensitive data)?*	Data security provisions include secure storage on encrypted drives and cloud services with robust access controls. Data recovery plans involve regular backups stored in multiple locations. Only authorised personnel have access to sensitive data, with strict adherence to GDPR guidelines ensuring compliance with data protection standards. The project uses Microsoft servers, which include regular backups, firewalls, and access based on personal credentials. In most cases, two-factor authentication is required to access the network.
Data storage *Is data stored securely in certified repositories for long-term retention and curation?*	Yes, selected data is stored securely in certified repositories that ensure long-term retention and curation, guaranteeing access for over 15 years. Specifically, personal data will be retained for the period stablished in the GDPR.

Ethical Issues	
Ethical or legal issues *Are there ethical or legal issues that may affect data sharing?*	The data collected by INTIA does not have ethical or legal issues that affect data sharing. Within the observatory, there are ethical and legal issues that may affect data sharing. These include compliance with GDPR regulations, ensuring informed consent for data collection and sharing, protecting the privacy of individuals, and safeguarding intellectual property rights. Ethical considerations also involve maintaining the confidentiality of sensitive data and adhering to ethical standards for research and data management.
Personal data *Is informed consent for data sharing and long-term preservation included in questionnaires dealing with personal data? Do you comply with the GDPR concerning information provisions and access to personal data?*	Yes, informed consent for data sharing is included in questionnaires dealing with personal data. INTIA complies with the GDPR concerning information provisions and access to personal data.

Other Issues	
Other methods of data management *Do you use other national/state/sectoral/departmental data management procedures? If yes, which ones?*	INTIA primarily follows the data management procedures outlined by the 4Growth project. Additionally, INTIA adheres to national and regional regulations and guidelines for data management, as well as institutional policies for data handling and preservation (such as secure storage protocols and data retention policies).

5.10 Data Management Plan of CTIFL

DATA SUMMARY	
Purpose *Describe the purpose of data collection/generation and its relationship to the objectives of 4Growth?*	CTIFL will contribute to generate data during the analysis of the state of the art (T2.1.), the assessment grid development (T2.2.) and the construction of the market monitoring and forecasting tool (T3.1.). CTIFL will also collect data via the French observatory ecosystem (T4.1.) by sending questionnaires and conducting interviews.
Types and formats of data *Describe what types/ formats of data the project will generate/collect?*	CTIFL will be collecting various data types across multiple work packages to evaluate the uptake of digital technologies in the agricultural and forestry sectors: **Qualitative Data:** Usage metrics and adoption rates gathered from virtual observatories, formatted as CSV and Excel files for systematic analysis. This quantitative data helps map the current landscape of technology adoption across regions. **Quantitative Data:** Insights from interviews and surveys are detailed in PDF and DOC formats. These qualitative assessments capture user experiences, barriers to technology adoption, and insights into the effectiveness of current digital tools. The data collection spans several work packages: **WP2 Uptake of Digital Agriculture & Forestry Technologies:** CTIFL is a partner of this WP and will help to produce a SOTA analysis in Excel format, which is crucial for documenting existing technology adoption levels. In T2.3, the data informs the 4Growth Visualisation Platform, providing an overview of technology uptake. WP4 Observatory Data Collection and Analysis: CTIFL will contribute for the data collection efforts within the agricultural observatory in France (and the broader Balkan region) that blend digital innovation hubs and stakeholder ecosystems to gather comprehensive data. This includes both digital and in-person data collection methods, ensuring a rich dataset
Existing data and Origin	No

Will you reuse any existing data and how? What is the origin of the data?	
Size of the data *What is the expected size of the data?*	The generated data formats are quite light. The total size of the data generated may be less than 10 GB.
Usage of the data *To whom might it be useful ('data utility')?*	The data from the 4Growth project benefits consortium partners, researchers, developers, policymakers, and industry stakeholders by enhancing digital technology development, enabling in-depth analysis, and supporting strategic decisions in agriculture and forestry.

FINDABLE: Making data findable	
Provision of metadata *Is the data created and/or used in the task discoverable and identifiable through metadata?*	The collected data we be associated with metadata detailing content to facilitate future analysis.
Identification of the data *Do you make use of persistent and unique identifiers such as Digital Object Identifiers (DOI)?*	Specific data or results will be published in journals or archives linked to DOIs
Naming conventions *What naming conventions are followed?*	
Search terms *Are search keywords provided that optimise opportunities for reuse?*	The documents generated during this project will be tagged with keywords.
Versioning *Do you provide unique version numbers?*	
Standards for metadata creation? *What metadata is created? If there are no metadata standards in your discipline, please describe what kind of metadata is created and how.*	Each dataset will be accompanied by documentation detailing the data's origin, location, collection settings.

ACCESSIBLE: Making data open and accessible

Openly available and closed datasets *Which data created and/or used in the task are made openly available by default?* *If certain datasets or parts of them cannot be released (or need to be released only under restrictions), explain the reasons, clearly separating legal and contractual reasons from voluntary restrictions (e.g. ethical reasons, personal data rules, intellectual property, commercial reasons, data protection, security reasons, etc.).*	Data deemed useful for broader research or public interest will be considered for publication, ensuring that intellectual property (IP) and data protection regulations are meticulously observed before any data is made public. Aligned with an open access policy, the majority of non-sensitive data gathered through the project will be made available via the project's Platform. This commitment to open access facilitates broader dissemination and utility of research outcomes. However, stringent measures are taken to anonymise all data to safeguard user privacy and comply with ethical standards and legal requirements concerning data protection.
Data Repository *How will the data be made accessible (e.g. by depositing it in a repository)?* *Where will the data and associated metadata, documentation and code be deposited?*	Data will be managed using repositories. For internal use and collaboration within the consortium, data is stored on network storage solutions like Microsoft Teams, allowing controlled access among project partners. For public dissemination, particularly when linked to scientific publications, data will be uploaded to certified public repositories. This approach not only enhances discoverability but also ensures the integrity and citation of the data through associated publications. The use of public repositories, which are certified and secure, guarantees that published data complies with open access policies and is accessible to a broader audience.
Conditions of access *What methods or software tools are needed to access the data?* *If there are restrictions on use, how will access be provided?* *Are there well-described conditions for access (e.g. a machine-readable licence)?*	The required software tools are specified in the accompanying metadata and documentation, which includes readme files that detail the necessary software for each data type.
Identity verification *How will the identity of the person accessing the data be ascertained?*	For publicly accessible data in repositories or on open access platforms, the identity of users is not tracked by CTIFL.

INTEROPERABLE: Making data interoperable

Interoperability of data generated *Do the data enable the exchange and reuse of data between researchers, institutions, organisations, countries, etc. (i.e. adherence to standards for formats, compatibility with available (open) software applications to the greatest extent possible and, in particular, facilitation of recombinations with different datasets from different origins)?*	The data produced will be compatible with widely-used open software applications, ensuring broad accessibility and usability. The project consortium will determine the specific data types to be employed for various tasks, promoting standardisation across outputs. Moreover, the project will feature a dedicated API (Application Programming Interface), allowing third parties to easily retrieve information. Metadata descriptors included with the data will enhance discoverability, enabling efficient search and integration through SPARQL queries, thus facilitating the exchange and reuse of data among researchers, institutions, organisations, and countries.
Vocabularies *What data and metadata vocabularies, standards or methodologies will the task follow to make the data interoperable?*	Data interoperability is prioritised through established agrifood sector vocabularies and ontologies. The project specifically employs the SAREF4AGRI ontology, which is designed to ensure seamless data exchange and integration within the agricultural sector.

REUSABLE: Making data reusable	
Licence *How will the data be licenced to enable the widest possible reuse?*	
Availability *When will the data be made available for reuse?* *How long should the data be available for reuse?If applicable, specify why and for what period a data embargo is needed.*	Data availability within the 4Growth project varies based on specific task requirements. Internally, data is accessible to consortium members immediately after collection. 4Growth commits to maintaining open access to its platform for seven years following the project's conclusion, primarily to support the drone community and integrate major findings into relevant EU projects under the "HORIZON-CL6-2023-GOVERNANCE-01-15: EU-wide inventory".
Third parties *Are the data produced and/or used in the task useable by third parties, in particular after the end of the project? If the re-use of some data is restricted, explain why.*	Some data from the 4Growth project might continue to be useful beyond the project's timeline. Accordingly, we aim to publish selected datasets on certified long-term storage platforms to ensure their availability for future use. Additionally, the 4Growth Visualisation Platform, accessible via a free, open-access model, will function as the official website of the project. This platform will make all valuable information readily accessible to all interested parties, significantly enhancing the dissemination and communication strategy of the project.

Data quality *How is the data quality assured?*	Data quality is primarily ensured by the team responsible for data collection and analysis. This includes regular checks and peer reviews.

Allocation of resources	
Costs *What are the costs for storing the data. And how will these be covered?*	The cost of storing CTIFL data will be covered by CTIFL.
Responsibility for data management *Who will be responsible for data management in the task?*	Each WP leader is responsible for the data collected in their respective work package. Ultimately, the WUR and EVF coordination teams are responsible for overseeing data management across the entire 4Growth project.
Costs and potential value of long-term preservation *What are the costs of long-term archiving? And who decides what data is kept and for how long?*	The cost of storing CTIFL data will be covered by CTIFL. The decision on what data is kept and for how long is made in accordance with CTIFL research program.

Data Security	
Data security *What provisions are in place for data security (including data recovery and secure storage and transmission of sensitive data)?*	RGPD
Data storage *Is data stored securely in certified repositories for long-term retention and curation?*	Yes, the selected data is stored in certified, secure repositories that comply with regulatory retention periods.

Ethical Issues	
Ethical or legal issues *Are there ethical or legal issues that may affect data sharing?*	The data collected by CTIFL does not have ethical or legal issues that affect data sharing.
Personal data *Is informed consent for data sharing and long-term preservation included in questionnaires dealing with personal data? Do you comply with the GDPR concerning information provisions and access to personal data?*	Yes, informed consent for data sharing and long-term preservation is included in questionnaires dealing with personal data. CTIFL complies with the GDPR concerning information provisions and access to personal data.

Other Issues

Other methods of data management *Do you use other national/state/sectoral/departmental data management procedures? If yes, which ones?*	CTIFL primarily follows the data management procedures outlined by the 4Growth project. Additionally, CTIFL adheres to national regulations and guidelines for data management in FRANCE (including the GDPR), as well as institutional policies for data handling and preservation (such as secure storage protocols and data retention policies)

5.11 Data Management Plan of VTT

DATA SUMMARY	
Purpose *Describe the purpose of data collection/generation and its relationship to the objectives of 4Growth?*	VTT will collect data to analyze the use of state-of-the-art digital technology, digital platforms, decision support systems in the forestry sector (T2.1). The data informs the 4Growth Visualisation Platform (T2.3), providing an overview of technology uptake. The Uptake Assessment Grid is the questionnaire-style framework (T2.2) which will be used to gather data via the observatories (T4.2). VTT task is to organize a virtual foresight observatory in forestry in Finland. VTT will collect forestry data via the observatory. This includes survey-based data collection and automated data collection (through scraping public information on websites). Automatic methods enable us to cover broader region of Europe for our analysis. This will involve analysing information from firms active in the forestry sector to ascertain the extent, manner, and methods by which they disclose the use of digital technologies in their operations and services in their publicly accessible websites. The aim is to enhance our understanding of digitalization's scope and penetration in the industry, complementing other metadata that VTT will collect through observatory. This big data driven approach contributes also to T2.4 that aims to study and understand various other types of innovative approaches to market analyses that could be used to monitor the uptake of digital technologies in agriculture and forestry. Data collections and analysis will support horizon scanning and monitoring task in Foresight Module (T3.2) contributing to Market Monitoring & Forecasting Tool (T3.1).
Types and formats of data *Describe what types/ formats of data the project will generate/collect?*	VTT will be collecting various data types across multiple work packages to evaluate the uptake of digital technologies in the forestry sector. In WP2 Uptake of Digital Agriculture & Forestry Technologies results of the State-of-the-art analysis is generated as Excel-file. In WP3 Digital Agriculture &

	Forestry Uptake - Forecast & Foresight data will be produced in Excel, CSV or JSON format. WP4 Observatory Data Collection and Analysis: VTT is responsible for the data collection efforts within the forestry observatory in Finland (and the broader Nordic region) that blend digital innovation hubs and stakeholder ecosystems to gather comprehensive data. This includes both digital survey, interview data and automatic data collection methods. Online digital survey is implemented by Wageningen University and data will be stored to the platform that they provide. For interviews Excel / Word will be used as initial data collection formats. Data will be transformed to the online survey platform provided by Wageningen University. Results of automatic data analysis will be collected in VTT's data storage infrastructure and then shared as Excel, CSV or JSON format.
Existing data and Origin *Will you reuse any existing data and how? What is the origin of the data?*	Existing data will be used for SOTA analysis (T2.1), observatory data collection (T4.2) and Synergy Building with other European Initiatives (T4.3) and to provide information to foresight module (T.3.2). Abstract and citation databases for academic search (e.g. Scopus, Web-of-Science, OpenAlex) is used for SOTA analysis. Project databases (e.g. Cordis) will be used to get information about projects and they results relating to Forestry. Orbis-database will be used to get company data. For statistical information data sources such as Statistics of Finland, Statista, EU Eurostat, Natural Resources Institute Finland (Luonnonvarakeskus) are relevant. Examples of Open data sources are: Forest Centre (metsäkeskus.fi): Open Forest and nature information, Forest based sector technology platform (forestplatform.org)
Size of the data *What is the expected size of the data?*	Volume of data including survey and SOTA data is anticipated to be relatively modest. Automatic data collection from websites will result in large volumes of data. Estimated volume is 2 GB.
Usage of the data *To whom might it be useful ('data utility')?*	The data benefits consortium partners, researchers, developers, policymakers, and industry stakeholders by enhancing digital technology development, enabling in-depth analysis, and supporting strategic decisions in forestry. Possibility to re-use any existing open research data will be examined carefully during the project.

FINDABLE: Making data findable	
Provision of metadata *Is the data created and/or used in the task discoverable and identifiable through metadata?*	Quality control measures will be taken to maintain the accuracy of data during the project. Discipline compliant metadata elements will be used describing the data to aid data discovery and potential re-use. Metadata of open data will be made available via FAIR compliant repository for research and re-use after project closure. Persistent identifiers provided by the repository will be used in linking to datasets.
Identification of the data *Do you make use of persistent and unique identifiers such as Digital Object Identifiers (DOI)?*	As part of data collection of scientific articles their publicly available DOIs are collected when information is available. So that content used is properly referenced and can be tracked by others. Selected data and/or reports from the 4Growth project, particularly those intended for a wider audience, are published in journals or deposited in data archives where Digital Object Identifiers (DOIs) are assigned.
Naming conventions *What naming conventions are followed?*	VTT adheres to clear and systematic naming conventions for data and files to ensure consistency and ease of access. The naming conventions typically include key identifiers such as the project name, work package number, task number, type of data, and date of creation.
Search terms *Are search keywords provided that optimise opportunities for reuse?*	Documents, publications, and datasets are tagged with appropriate keywords to facilitate searchability and reuse.
Versioning *Do you provide unique version numbers?*	VTT assigns unique version numbers to all documents, datasets, and deliverables. Each document features a version section or header that specifies the date and version number. Additionally, the use of company subscribed Microsoft Teams enhances version control by offering a "version history" feature for each document.
Standards for metadata creation? *What metadata is created? If there are no metadata standards in your discipline, please describe what kind of metadata is created and how.*	Documents, publications, and datasets are tagged with metadata elements to enhance enhanced searchability, accurate data interpretation and reuse. Metadata elements include information such as: General metadata: Workpackage, Resource type, Title, Version, Date of creation, Creator, Contributors, File location (file path), Software used to create data, Origin and method. Content description: Description and relation to the project objectives, Subjects (keywords), Geographical location, Code list used, List of variables, Metadata schema used.

	Technical description: Software used to create the file, File format, Necessary software, File size, Use / Users, Rights / Licence, Dissemination Sharing and preservation: Use / Users, Rights / Licence, Dissemination, Access, Restrictions, Repository for open data,Permanent identifier (e.g. DOI, URN)

ACCESSIBLE: Making data open and accessible	
Openly available and closed datasets *Which data created and/or used in the task are made openly available by default?* *If certain datasets or parts of them cannot be released (or need to be released only under restrictions), explain the reasons, clearly separating legal and contractual reasons from voluntary restrictions (e.g. ethical reasons, personal data rules, intellectual property, commercial reasons, data protection, security reasons, etc.).*	Not all data collected or generated by VTT will be openly shared by default. Decisions concerning the sharing of (selected) datasets will be taken during project. Collaboration with project partners we will take all the appropriate measures to make relevant data openly available and usable for third parties for study, teaching and research purposes. If, after project closure, permission to re-use the data is required, all requests for further use of data will be considered carefully and whenever possible approved by the project manager or the person mandated with the task. Permission for data use will be granted providing there are no IPR or confidentiality issues involved or any direct overlap of research questions with the primary research. Permission will be provided by contacting project manager. Contact information and appropriate procedure will be provided in connection with other metadata. Main focus in data sharing will be on the data underlying prospective scientific publications ensuring the validation of results presented in publications. Published and FAIR-compatible data will be archived in a common and open data repository. Recommended generic and certified repository services, either CSC's IDA or CERN's Zenodo, will be used to enhance long-term accessibility and re-usability of the data. Metadata of the datasets will be opened under public and open copyright license, CC0.
Data Repository *How will the data be made accessible (e.g. by depositing it in a repository)?* *Where will the data and associated metadata, documentation and code be deposited?*	Company specific subscription of Microsoft Azure is used for internal use to store data from automatic data collection and for content analyses. Data will be managed using repositories. For internal use and collaboration within the consortium, data is stored on network storage solutions like Microsoft Teams, allowing controlled access among project partners. Main focus in data sharing will be on the data underlying prospective scientific publications ensuring the validation of results presented in publications. Published and FAIR-compatible data will be archived in a common and open data repository. Recommended generic and certified repository services, either CSC's

	IDA or CERN's Zenodo, will be used to enhance long-term accessibility and re-usability of the data.
Conditions of access *What methods or software tools are needed to access the data?* *If there are restrictions on use, how will access be provided?* *Are there well-described conditions for access (e.g. a machine-readable licence)?*	The required software tools are specified in the accompanying metadata and documentation, which includes readme files that detail the necessary software for each data type. Access to certain datasets is restricted and controlled through user credentials to ensure that only authorised individuals can access the data. This method helps maintain the integrity and confidentiality of the data, aligning with intellectual property and data protection standards.
Identity verification *How will the identity of the person accessing the data be ascertained?*	For restricted data, identity verification is managed through user credentials, ensuring that only authorised individuals have access. For publicly accessible data in repositories or on open access platforms, the identity of users is not tracked by VTT.

INTEROPERABLE: Making data interoperable	
Interoperability of data generated *Do the data enable the exchange and reuse of data between researchers, institutions, organisations, countries, etc. (i.e. adherence to standards for formats, compatibility with available (open) software applications to the greatest extent possible and, in particular, facilitation of recombinations with different datasets from different origins)?*	Variables and value names will be constructed following general data processing conventions common to the research subject. List of value names and vocabulary used will be provided in a separate list. Examples of vocabulary information to be managed within the project will be e.g. number of variables / units of observation, list of variables with the name and label of each variable as well as its values and value labels, frequency distribution of each variable, information on the classifications used and meanings of abbreviations used.
Vocabularies *What data and metadata vocabularies, standards or methodologies will the task follow to make the data interoperable?*	The vocabulary selected for use in 4Growth ensure data interoperability. Data collected by VTT will be mapped based on a defined format. The formatting will also be agreed buy the users of the data if any.

REUSABLE: Making data reusable

Licence *How will the data be licenced to enable the widest possible reuse?*	Ownership of datasets will belong to project consortium after the project completion. Creative Commons licence CC-BY-SA or CC-BY will be used for any opened datasets, unless there are compelling reasons to select more restricted type of CC-licence. Creative commons licences will by default include also a disclaimer of liability for the re-use of opened data.
Availability *When will the data be made available for reuse?* *How long should the data be available for reuse?If applicable, specify why and for what period a data embargo is needed.*	Justification for possible case-specific embargo for published data will be decided by project consortium. Embargo will be sought, if necessary, in connection with possible IPR protection or any potential patent, utility mode etc. application based on project results. No definite period or time limit is planned for access to data. However, the opened data will be deposited in a repository, which guarantees for foreseeable future the data integrity on bit level. No perpetual data curation policy to guarantee full long-term digital preservation of datasets is planned at this point. 4Growth commits to maintaining open access to its platform for seven years following the project's conclusion.
Third parties *Are the data produced and/or used in the task useable by third parties, in particular after the end of the project? If the re-use of some data is restricted, explain why.*	Some data from the 4Growth project might continue to be useful beyond the project's timeline. Accordingly, we aim to publish selected datasets on certified long-term storage platforms to ensure their availability for future use. Additionally, the 4Growth Visualisation Platform, accessible via a free, open-access model, will function as the official website of the project. This platform will make all valuable information readily accessible to all interested parties, significantly enhancing the dissemination and communication strategy of the project.
Data quality *How is the data quality assured?*	Data quality will be assured by following appropriate quality control and curation methods e.g., rigorous control of any incoming data by well-managed data profiling (formats, value distributions and data consistency and completeness will be assessed for any incoming data); logically defined data pipeline with centralized data management preventing duplicate data entering the system; capturing and documenting data conditions and scenarios with their dependencies and conditions; maintaining data integrity with checksums and triggers, if necessary; enhancing data and metadata lineage traceability for the pipeline, thus enabling more effective data governance. Research teams will regularly check the quality of not just the data, but also related software, algorithms and workflows when and if changes are made in them.

Allocation of resources	
Costs *What are the costs for storing the data. And how will these be covered?*	Costs related to research data management and opening are eligible as part of the project grant. Cost allocation is based on the assumption that maximum of 5 % of total project costs will be needed to make research data quality-controlled, FAIR-compatible and as open as possible.
Responsibility for data management *Who will be responsible for data management in the task?*	During the project VTT will be responsible for managing and curating datasets at their possession. At the project ending each consortium member will take appropriate measures to ensure long-term preservation and sharing of opened datasets.
Costs and potential value of long-term preservation *What are the costs of long-term archiving? And who decides what data is kept and for how long?*	Retention time for project data for VTT participants is by default 20 year. The costs of long-term archiving fall under VTT's institutional budget. The decision on what data is kept and for how long is made in accordance with these regulations and project-specific needs.

Data Security	
Data security *What provisions are in place for data security (including data recovery and secure storage and transmission of sensitive data)?*	Data collected or acquired within the project will be stored in a secure IT environment behind a firewall at VTT's premises or in secure cloud environment provided by VTT's selected IT service providers. Access to it will need registration and authentication. Project manager will check applications for the use of data. Where access is granted to research data, this will be provided through secured telecommunications channels. Responsible project participant at VTT will check applications for the use of data. Where access is granted to research data, this will be provided through secured telecommunications channels. EU GDPR regulation will be followed in storage and transfer of sensitive or personal data.
Data storage *Is data stored securely in certified repositories for long-term retention and curation?*	Long-term and secure preservation of published research data will be ensured by using only certified and OpenAIRE guidelines compatible repositories.

Ethical Issues	
Ethical or legal issues *Are there ethical or legal issues that may affect data sharing?*	Within the observatory, there are ethical and legal issues that may affect data sharing. These include compliance with GDPR regulations, ensuring informed consent for data collection and sharing, protecting the privacy of individuals, and safeguarding intellectual property rights.

	Ethical considerations also involve maintaining the confidentiality of sensitive data and adhering to ethical standards for research and data management.
Personal data *Is informed consent for data sharing and long-term preservation included in questionnaires dealing with personal data? Do you comply with the GDPR concerning information provisions and access to personal data?*	Informed consent for data sharing and long-term preservation is included in questionnaires dealing with personal data. Privacy of data subjects will be secured by following closely the General Data Protection Regulation (Regulation (EU) 2016/679 of the European Parliament and of the Council). Processes that handle personal data have been designed and built with the GDPR principles taken into account. Processes provide safeguards to protect research data (e.g. using pseudonymization or full anonymization where appropriate), and use the highest-possible privacy settings by default. No person or organisation involved will unintentionally be identifiable directly or indirectly in the datasets.

Other Issues	
Other methods of data management *Do you use other national/state/sectoral/departmental data management procedures? If yes, which ones?*	VTT follows the data management procedures outlined by the 4Growth project and by VTT. VTT adheres to national regulations and guidelines for data management in Finland.

5.12 Data Management Plan of AFL

DATA SUMMARY

Purpose *Describe the purpose of data collection/generation and its relationship to the objectives of 4Growth?*	Main body of data shall be collected during the implementation of task T4.2 Data Collection via Observatories, which involves outreach and data gathering activities by 4Growth observatory partners within their ecosystems. AFL will lead data collection for one of the agriculture observatories, engaging stakeholders through surveys and interviews. AFL will gather insights, ensuring consistent reporting using the Uptake Grid. AFL will conduct both digital and in-person data collection, compiling reports and contributing to the co-creation and refinement of best practices. These efforts will directly support project analysis and forecasting tools. Interaction with users/stakeholders will occur during three data gathering waves through surveys and guided interviews using the Digital Agriculture and Forestry Uptake Assessment Grid. Insights will inform the 4Growth Visualisation Platform, policy recommendations, and best practices. Data collection will ensure consistency using the Uptake Grid, and methods include digital correspondence and in-person interviews. Reports on outreach and data synthesis will be produced at the end of each wave (D4.8, D4.9, D4.10) in M12, M21, and M30. Outputs will contribute to the MMFT (T3.1), foresight module (T3.2), and impact analysis (T4.3). AFL shall also contribute to public data collection in T4.3 Synergy building with other European initiatives, T2.1 Analysis of state-of-the-art.
Types and formats of data *Describe what types/ formats of data the project will generate/collect?*	AFL will be collecting various data in WP2, WP3 and WP4 (most data) evaluate the uptake of digital technologies in the agriculture sector, using Excel format files for WP2 and WP3. WP4 Observatory Data Collection and Analysis: AFL is responsible for the data collection efforts within the agriculture observatory in Lithuania (Poland, Hungary) that blend digital innovation hubs and stakeholder ecosystems to gather comprehensive data. This includes both digital and paper copies of digital survey in extra cases and interview data. Online digital survey is implemented by Wageningen University, and data will be stored on their platform. For interviews Excel / Word will be used as initial data collection formats. Data will be transformed to the online survey platform provided by Wageningen University.
Existing data and Origin *Will you reuse any existing data and how? What is the origin of the data?*	AFL is committed to the principles of Open Science and ensures that our data is findable, accessible, interoperable, and reusable (FAIR). This approach aligns with our objective to promote transparency, reproducibility, and collaborative efforts within the scientific community.

	In task T4.3, Synergy Building with Other European Initiatives, AFL together with other partners shall aim to build synergies with other Horizon Europe projects by reusing data of published deliverables. This effort not only enhances the impact of our research but also aligns with broader European Union policies on open access and data sharing.
Size of the data *What is the expected size of the data?*	Data is unlikely to exceed 20gb as most of the data will be in the form of excel sheets or online survey response databases.
Usage of the data *To whom might it be useful ('data utility')?*	The data from the 4Growth project benefits consortium partners, researchers, developers, policymakers, and industry stakeholders by enhancing digital technology development, enabling in-depth analysis, and supporting strategic decisions in agriculture.

FINDABLE: Making data findable	
Provision of metadata *Is the data created and/or used in the task discoverable and identifiable through metadata?*	The data created and used by AFL is discoverable and identifiable through comprehensive metadata. This ensures that all datasets are accessible and can be efficiently utilised for further research, analysis, and development activities. AFL data, particularly from tasks T2.1 and T4.4, will include metadata detailing content, format, context, and usage to facilitate accessibility and interoperability across different platforms and among various stakeholders.
Identification of the data *Do you make use of persistent and unique identifiers such as Digital Object Identifiers (DOI)?*	The datasets intended for a wider audience will be assigned a Digital Object Identifier (DOI) to ensure it is findable, accessible, and citable.
Naming conventions *What naming conventions are followed?*	A well-defined file naming strategy is essential for efficiently identifying, locating, and utilizing research data. An effective file name should act as a unique identifier, enabling readers to quickly discern the content, status, and version of a file. By adopting a consistent, logical, and predictable file naming convention, consortium members and users can effectively organize, distinguish, and share files, ensuring clarity and ease of understanding for all involved. AFL shall adhere to such policy.
Search terms *Are search keywords provided that optimise opportunities for reuse?*	To increase findability and reuse, search keywords are to be provided for all datasets and documents of the 4Growth project.
Versioning *Do you provide unique version numbers?*	A unique version identifier is going to be assigned to all documents, datasets and deliverables, ensuring a history of versions and traceability is available for all partners.

Standards for metadata creation? *What metadata is created? If there are no metadata standards in your discipline, please describe what kind of metadata is created and how.*	AFL will examine metadata guidelines and identify standards that are more convenient for digital agriculture research, ensuring data consistency, discoverability, and usability. Metadata should include elements, such as title, author, creation date, version number, geographic location, data type and keywords.

ACCESSIBLE: Making data open and accessible	
Openly available and closed datasets *Which data created and/or used in the task are made openly available by default?* *If certain datasets or parts of them cannot be released (or need to be released only under restrictions), explain the reasons, clearly separating legal and contractual reasons from voluntary restrictions (e.g. ethical reasons, personal data rules, intellectual property, commercial reasons, data protection, security reasons, etc.).*	Data collected by AFL will be examined and characterized as openly available or closed. Data protection and intellectual property (IP) will be ensured before any data is made public. Non-sensitive and/or publicly available data that are collected in 4Growth will be made available via the project's Platform, enabling better communication and dissemination of research and products. In addition, all data will be compliant with ethical standards and legal requirements concerning data protection.
Data Repository *How will the data be made accessible (e.g. by depositing it in a repository)?* *Where will the data and associated metadata, documentation and code be deposited?*	AFL will publish all data on online SharePoint solutions, like Microsoft Teams, allowing unrestricted access among project partners.
Conditions of access *What methods or software tools are needed to access the data?* *If there are restrictions on use, how will access be provided?* *Are there well-described conditions for access (e.g. a machine-readable licence)?*	As a part of the metadata standardization, AFL will accompany all data with proper documentation and readme files, which will highlight the required software tools and steps that are required to make use and interpret each dataset.
Identity verification *How will the identity of the person accessing the data be ascertained?*	All sensitive and/or restricted data will be accessible only after an identification of user credentials and permissions. Only users that pass the authentication process will have access. Publicly accessible data as designated by the consortium, will not have access restrictions.

INTEROPERABLE: Making data interoperable	
Interoperability of data generated *Do the data enable the exchange and reuse of data between researchers, institutions, organisations, countries, etc. (i.e. adherence to standards for formats, compatibility with available (open) software applications to the greatest extent possible and, in particular, facilitation of recombinations with different datasets from different origins)?*	All data produced will be compatible with widely-used open software applications and standardized according to specific formats. Documentation is going to be generated within the project for all data, in order to support interpretation and interoperability. Furthermore, elaborate metadata will be made available, following a standardized way, to ensure that datasets can be correctly understood, analyzed, and re-used. Modification of the above will be possible during the project lifespan, whenever new needs and specifications are identified.
Vocabularies *What data and metadata vocabularies, standards or methodologies will the task follow to make the data interoperable?*	An investigation will be performed for the use of standard vocabulary appropriate for all data types present in the various datasets related to the agriculture sector, enabling interdisciplinary interoperability.

REUSABLE: Making data reusable	
Licence *How will the data be licenced to enable the widest possible reuse?*	FAIR data management requires licensing to ensure data reusability. According to Horizon2020 guidelines, the preferred licenses are Creative Commons Zero (CC0) or Creative Commons Attribution (CC BY). CC0 is the most open, allowing anyone to use the data without attribution and to distribute, remix, adapt, and build upon it commercially. CC BY is similar but requires author attribution. If additional access restrictions are needed, other Creative Commons licenses can be considered.
Availability *When will the data be made available for reuse?* *How long should the data be available for reuse?If applicable, specify why and for what period a data embargo is needed.*	All data generated by AFL will be promptly accessible to the consortium. Upon completion of the consortium's internal quality assurance and validation processes, the data will be assigned a specific license, such as Creative Commons, and then distributed through the appropriate channels.
Third parties *Are the data produced and/or used in the task useable by third parties, in particular after the end of the project? If the re-use of some data is restricted, explain why.*	The 4Growth platform will serve as an open access portal, where all public project outputs generated by AFL will be displayed, effectively collecting all resources in a single place and promoting their dissemination. The 4Growth platform is planned to be accessible even after the end of the project for all interested third parties.
Data quality *How is the data quality assured?*	Data quality should be ensured by each individual partner at the different collection and processing stages. AFL also intends to implement various methods to validate and verify data to ensure accuracy and consistency.

Allocation of resources	
Costs *What are the costs for storing the data. And how will these be covered?*	The costs for storing the data in the official repository of the project is covered by the coordinator and the project budget. All extra costs for the local storing of data are covered by AFL.
Responsibility for data management *Who will be responsible for data management in the task?*	Each WP leader is responsible for the data collected in their respective work package. Ultimately, the WUR and EVF coordination teams are responsible for overseeing data management across the entire 4Growth project.
Costs and potential value of long-term preservation *What are the costs of long-term archiving? And who decides what data is kept and for how long?*	Eventual long-term storage and duration is going to be discussed among consortium members, based on the project needs and compliance with established data policies and GDPR.

Data Security	
Data security *What provisions are in place for data security (including data recovery and secure storage and transmission of sensitive data)?*	Data deposited to the consortium's platform or/and a certified data repository will be protected with the server's security protocol, and local backups are expected to be created in the consortium level in the project's lifespan. Sensitive data are going to be accessible only by the respective authorized personnel of AFL and proper secure communication channels will be established for all sensitive data transmissions.
Data storage *Is data stored securely in certified repositories for long-term retention and curation?*	All data will be securely stored in certified repositories. Long-term retention and curation will be determined based on the requirements determined by the consortium.

Ethical Issues	
Ethical or legal issues *Are there ethical or legal issues that may affect data sharing?*	AFL will maintain the confidentiality of all sensitive data and follow proper data management practices for all types of data collected. Furthermore, AFL will comply with data regulation and data collection policies, i.e. GDPR, to ensure privacy protection and intellectual property rights. Special consideration will also be given to the compliance with and European codes of scientific conduct and the H2020 research ethics standards.

Personal data *Is informed consent for data sharing and long-term preservation included in questionnaires dealing with personal data? Do you comply with the GDPR concerning information provisions and access to personal data?*	The questionnaires are properly formulated and inquire about the participants' permissions for the sharing and long-term storing of sensitive data. All information provisions and access to personal data will be compliant with GDPR, as per the European guidelines.

Other Issues	
Other methods of data management *Do you use other national/state/sectoral/departmental data management procedures? If yes, which ones?*	AFL primarily follows the data management procedures outlined by the 4Growth project. Also, AFL will adhere to national and regional regulations and guidelines for data management and institutional policies for data handling and preservation (such as secure storage protocols and data retention policies).

5.13 Data Management Plan of AUTH

DATA SUMMARY	
Purpose *Describe the purpose of data collection/generation and its relationship to the objectives of 4Growth?*	In WP2 (Uptake of Digital Agriculture & Forestry Technologies), AUTH contributes to the activities performed in the framework of Task 2.1 (Analysis of state-of-the-art) and Task 2.2 (Digital Agriculture & Forestry Uptake Assessment Grid). In particular, AUTH will collect data related to the current adoption of digital technologies within the forestry sector (T2.1) with the aim to analyse the current uptake of digital and data technologies in forestry and develop novel approaches to assess and visualise this uptake. The Digital Agriculture & Forestry Uptake Assessment Grid (T2.2) will be used for the collection of data through one of the two forestry observatories, which AUTH is responsible for (T4.2: Data collection via observatories). The collected data will be used for the set up and operation of a network of observatories across Europe, collecting and analysing ground truth data on the uptake of digital/data technologies in support of policy making and wider adoption by value chain actors. The collection of the aforementioned data is also related to the activities' implementation within WP3, aiming at the design of the Market Monitoring & Forecasting Tool and the Foresight Module (T3.1 and T3.2) and WP5 focusing on the dissemination actions.

Types and formats of data *Describe what types/ formats of data the project will generate/collect?*	The data collected in Task 2.1 (state-of-the-art analysis) will be recorded in Excel format, documenting existing digital technologies in the forestry sector. The collected data will next be employed for WP3 (Digital Agriculture & Forestry Uptake – Forecast & Foresight). With regard to WP4 (Observatory Data Collection and Analysis), AUTH is responsible for the data collection via the forestry observatory in Greece/Southern Europe. The data collection will be performed through online surveys or in-person interviews.
Existing data and Origin *Will you reuse any existing data and how? What is the origin of the data?*	AUTH will not reuse existing data within the framework of the 4Growth project.
Size of the data *What is the expected size of the data?*	The volume of the data collected by AUTH is not expected to exceed 10GB, given that the collected data will be mainly recorded in Excel files.
Usage of the data *To whom might it be useful ('data utility')?*	Apart from consortium partners, all data collected throughout the 4Growth project duration will be useful to a variety of stakeholders within the agriculture and forestry sector, including—among others—policymakers, researchers, professionals and managers.

FINDABLE: Making data findable	
Provision of metadata *Is the data created and/or used in the task discoverable and identifiable through metadata?*	AUTH aims to pair all data with proper and rich metadata, as they are essential for automatic discovery of datasets and services. The structure of the metadata is required to be standardized and machine readable. This will enable automated processes for the search, identification, use, reuse and preservation of the data.
Identification of the data *Do you make use of persistent and unique identifiers such as Digital Object Identifiers (DOI)?*	The datasets intended for a wider audience will be assigned a Digital Object Identifier (DOI) to ensure it is findable, accessible, and citable.
Naming conventions *What naming conventions are followed?*	A file naming strategy is critical for efficiency in the identification, location and use of research data. A good file name should function as a unique identifier, that allows readers easily to derive information regarding the content, status and version of a file. Consortium members and users will be able to organize, distinguish and share files effectively among them, using a proper file naming convention that is consistent, logical and predictable in order to be understood by everyone.

Search terms *Are search keywords provided that optimise opportunities for reuse?*	To increase findability and reuse, search keywords are to be provided for all datasets and documents of the 4Growth project.
Versioning *Do you provide unique version numbers?*	A unique version identifier is going to be assigned to all documents, datasets and deliverables, ensuring a history of versions and traceability is available for all partners.
Standards for metadata creation? *What metadata is created? If there are no metadata standards in your discipline, please describe what kind of metadata is created and how.*	AUTH will examine metadata guidelines and identify standards that are more convenient for digital forestry research, ensuring data consistency, discoverability, and usability. Metadata should include elements, such as title, author, creation date, version number, geographic location, data type and keywords.

ACCESSIBLE: Making data open and accessible	
Openly available and closed datasets *Which data created and/or used in the task are made openly available by default?* *If certain datasets or parts of them cannot be released (or need to be released only under restrictions), explain the reasons, clearly separating legal and contractual reasons from voluntary restrictions (e.g. ethical reasons, personal data rules, intellectual property, commercial reasons, data protection, security reasons, etc.).*	Data collected by AUTH will be examined and characterized as openly available or closed. Data protection and intellectual property (IP) will be ensured before any data is made public. Non-sensitive and/or publicly available data that are collected in 4Growth will be made available via the project's Platform, enabling better communication and dissemination of research and products. In addition, all data will be compliant with ethical standards and legal requirements concerning data protection.
Data Repository *How will the data be made accessible (e.g. by depositing it in a repository)?* *Where will the data and associated metadata, documentation and code be deposited?*	AUTH will publish all data on online SharePoint solutions, like Microsoft Teams, allowing unrestricted access among project partners. AUTH will also upload scientific publications and data to be publicly disseminated to certified public repositories, where all published data will comply with open access policies and will be accessible to a broader audience.
Conditions of access *What methods or software tools are needed to access the data?*	As a part of the metadata standardization, AUTH will accompany all data with proper documentation and readme files, which will highlight the required software tools and steps that are required to make use of and interpret each dataset.

If there are restrictions on use, how will access be provided? *Are there well-described conditions for access (e.g. a machine-readable licence)?*	
Identity verification *How will the identity of the person accessing the data be ascertained?*	All sensitive and/or restricted data will be accessible only after an identification of user credentials and permissions. Only users that pass the authentication process will have access. Publicly accessible data as designated by the consortium, will not have access restrictions.

INTEROPERABLE: Making data interoperable	
Interoperability of data generated *Do the data enable the exchange and reuse of data between researchers, institutions, organisations, countries, etc. (i.e. adherence to standards for formats, compatibility with available (open) software applications to the greatest extent possible and, in particular, facilitation of recombinations with different datasets from different origins)?*	All data produced will be compatible with widely-used open software applications and standardized according to specific formats. Documentation is going to be generated within the project for all data, in order to support interpretation and interoperability. Furthermore, elaborate metadata will be made available, following a standardized way, to ensure that datasets can be correctly understood, analyzed, and re-used. Modification of the above will be possible during the project lifespan, whenever new needs and specifications are identified.
Vocabularies *What data and metadata vocabularies, standards or methodologies will the task follow to make the data interoperable?*	An investigation will be performed for the use of a standard vocabulary appropriate for all data types present in the various datasets related to the forestry sector, enabling interdisciplinary interoperability.

REUSABLE: Making data reusable	
Licence *How will the data be licenced to enable the widest possible reuse?*	FAIR data management requires the assignment of a license to data to ensure the reusable principle. Based on the Horizon2020 guidelines, preferable licenses are either a Creative Commons Zero or a Creative Commons Attribution license to the data. More specifically, Creative Commons Zero is the most open license type that allows data to be used by anyone, it does not require author attribution and enables users to distribute, remix, adapt, and build upon the material in any medium or format and use the work commercially. Creative Commons Attribution is a license similar to Creative Commons Zero but requires author attribution. Alternative license options

	are provided under Creative Commons, if the consortium requires extra access limits for certain datasets.
Availability *When will the data be made available for reuse?* *How long should the data be available for reuse?If applicable, specify why and for what period a data embargo is needed.*	All data generated by AUTH will be immediately available to the consortium. With the completion of the consortium's internal quality assurance and validation processes, data will be characterized based on a specific license, i.e. Creative commons, and distributed to the proper channels accordingly.
Third parties *Are the data produced and/or used in the task useable by third parties, in particular after the end of the project? If the re-use of some data is restricted, explain why.*	The 4Growth platform will serve as an open access portal, where all public project outputs generated by AUTH will be displayed, effectively collecting all resources in a single place and promoting their dissemination. The 4Growth platform is planned to be accessible even after the end of the project for all interested third parties.
Data quality *How is the data quality assured?*	Data quality should be ensured by each individual partner at the different collection and processing stages. AUTH also intends to implement various methods to validate and verify data to ensure accuracy and consistency.

Allocation of resources	
Costs *What are the costs for storing the data. And how will these be covered?*	The costs for storing the data in the official repository of the project is covered by the coordinator and the project budget. All extra costs for the local store of data are covered by AUTH.
Responsibility for data management *Who will be responsible for data management in the task?*	Each WP leader is responsible for the data collected in their respective work package. Ultimately, the WUR and EVF coordination teams are responsible for overseeing data management across the entire 4Growth project.
Costs and potential value of long-term preservation *What are the costs of long-term archiving? And who decides what data is kept and for how long?*	Eventual long-term storage and duration is going to be discussed among consortium members, based on the project needs and compliance with established data policies and GDPR.

Data Security	
Data security *What provisions are in place for data security (including data recovery and secure storage and transmission of sensitive data)?*	Data deposited to the consortium's platform or/and a certified data repository will be protected with the server's security protocol, and local backups are expected to be created in the consortium level in the project's lifespan. AUTH is also planning to backup all data that are openly shared through the repository in appropriate time intervals. Sensitive data are going to be accessible only by the respective authorized personnel

	of AUTH and proper secure communication channels will be established for all sensitive data transmissions.
Data storage *Is data stored securely in certified repositories for long-term retention and curation?*	All data will be securely stored in certified repositories. Long-term retention and curation will be determined based on the requirements determined by the consortium.

Ethical Issues	
Ethical or legal issues *Are there ethical or legal issues that may affect data sharing?*	AUTH will maintain the confidentiality of all sensitive data and follow proper data management practices for all types of data collected. Furthermore, AUTH will comply with data regulation and data collection policies, i.e. GDPR, to ensure privacy protection and intellectual property rights. Special consideration will also be given to the compliance with and European codes of scientific conduct and the H2020 research ethics standards.
Personal data *Is informed consent for data sharing and long-term preservation included in questionnaires dealing with personal data? Do you comply with the GDPR concerning information provisions and access to personal data?*	The questionnaires are properly formulated and inquire about the participants' permissions for the sharing and long-term storing of sensitive data. All information provisions and access to personal data will be compliant with GDPR, as per the European guidelines.

Other Issues	
Other methods of data management *Do you use other national/state/sectoral/departmental data management procedures? If yes, which ones?*	AUTH will follow all data management procedures that are outlined by the 4Growth project. In addition, AUTH will adhere to all national and European regulations and guidelines for data management, as well as all internal institutional policies for data handling and preservation (such as secure storage protocols and data retention policies).

6. Next steps to the Data Management Plan

Deliverable D1.3, the 4Growth project Data Management Plan – Draft 2, is the second published version of the plan and is submitted at M18. It describes how research data collected or generated will be handled during the project and after its completion. It describes what data will be collected, what methodology and standards will be followed, what plans are in place for data sharing and open access, and how the data will be curated and preserved. The DMP is a living document that will be updated over the course of the project as significant changes occur, such as new data being collected, changes in consortium policy, or changes in consortium composition. The final version of the DMP (D1.4) will be delivered in M33, complying with the Horizon Europe regulation on the ORDP. It is important to update the DMP regularly to ensure that it reflects the status of the project and the plans for data management.

ANNEX 1

Data Management Plan of [Partner]

DATA SUMMARY	
Purpose *Describe the purpose of data collection/generation and its relationship to the objectives of 4Growth?*	
Types and formats of data *Describe what types/ formats of data the project will generate/collect?*	
Existing data and Origin *Will you reuse any existing data and how? What is the origin of the data?*	
Size of the data *What is the expected size of the data?*	
Usage of the data *To whom might it be useful ('data utility')?*	

FINDABLE: Making data findable	
Provision of metadata *Is the data created and/or used in the task discoverable and identifiable through metadata?*	
Identification of the data *Do you make use of persistent and unique identifiers such as Digital Object Identifiers (DOI)?*	
Naming conventions *What naming conventions are followed?*	
Search terms *Are search keywords provided that optimise opportunities for reuse?*	

Versioning *Do you provide unique version numbers?*	
Standards for metadata creation? *What metadata is created? If there are no metadata standards in your discipline, please describe what kind of metadata is created and how.*	

ACCESSIBLE: Making data open and accessible	
Openly available and closed datasets *Which data created and/or used in the task are made openly available by default?* *If certain datasets or parts of them cannot be released (or need to be released only under restrictions), explain the reasons, clearly separating legal and contractual reasons from voluntary restrictions (e.g. ethical reasons, personal data rules, intellectual property, commercial reasons, data protection, security reasons, etc.).*	
Data Repository *How will the data be made accessible (e.g. by depositing it in a repository)?* *Where will the data and associated metadata, documentation and code be deposited?*	
Conditions of access *What methods or software tools are needed to access the data?* *If there are restrictions on use, how will access be provided?*	

Are there well-described conditions for access (e.g. a machine-readable licence)?	
Identity verification *How will the identity of the person accessing the data be ascertained?*	

INTEROPERABLE: Making data interoperable	
Interoperability of data generated *Do the data enable the exchange and reuse of data between researchers, institutions, organisations, countries, etc. (i.e. adherence to standards for formats, compatibility with available (open) software applications to the greatest extent possible and, in particular, facilitation of recombinations with different datasets from different origins)?*	
Vocabularies *What data and metadata vocabularies, standards or methodologies will the task follow to make the data interoperable?*	

REUSABLE: Making data reusable	
Licence *How will the data be licenced to enable the widest possible reuse?*	
Availability *When will the data be made available for reuse?* *How long should the data be available for reuse?If applicable, specify why and for what period a data embargo is needed.*	

Third parties *Are the data produced and/or used in the task useable by third parties, in particular after the end of the project? If the re-use of some data is restricted, explain why.*	
Data quality *How is the data quality assured?*	

Allocation of resources	
Costs *What are the costs for storing the data. And how will these be covered?*	
Responsibility for data management *Who will be responsible for data management in the task?*	
Costs and potential value of long-term preservation *What are the costs of long-term archiving? And who decides what data is kept and for how long?*	

Data Security	
Data security *What provisions are in place for data security (including data recovery and secure storage and transmission of sensitive data)?*	
Data storage *Is data stored securely in certified repositories for long-term retention and curation?*	

Ethical Issues	
Ethical or legal issues *Are there ethical or legal issues that may affect data sharing?*	

Personal data *Is informed consent for data sharing and long-term preservation included in questionnaires dealing with personal data? Do you comply with the GDPR concerning information provisions and access to personal data?*	

Other Issues	
Other methods of data management *Do you use other national/state/sectoral/departmental data management procedures? If yes, which ones?*	

ANNEX 2

	4Growth_Data Protection Officers (DPOs)				
	Organisation (Short name)	DPO	DPO Name	e-mail	Notes
1	Wageningen Research (WUR)	YES	Frans Pingen	dpo@wur.nl	** For general privacy questions of Wageningen Research (WUR) please contact our Privacy Officer (PO -not our DPO)*
2	Evenflow (EVF)	YES	Nico THOM	dpo@evenflow.eu	
3	Agricultural University of Athens (AUA)	YES	Vagelis Mallios	vagelismallios@yahoo.gr	
4	FoodScaleHub (FSH)	YES	Agapi Tsakogianni	agapi@foodscalehub.com	
5	LE EUROPE (LEE)	NO			
6	FUTURE IMPACTS	YES	Cornelia Daheim	daheim@future-impacts.de	
7	SIMBIOTICA	YES	David Gonzalez	david.gonzalez@vizzuality.com	
8	Eigen Vermogen van het Instituut voor Landbouw- en Visserijonderzoek (ILVO)	YES	Bart Ampe	bart.ampe@ilvo.vlaanderen.be	
9	Instituto Navarro de Tecnologías e Infraestructuras Agroalimentarias SA (INTIA)	YES	Javier Bustos	jbustos@intiasa.es	
10	Centre Technique Interprofessionnel des Fruits et Légumes (CTIFL)	YES	Laurent Collot	laurent.collot@ctifl.fr	
11	Teknologian Tutkimuskeskus VTT Oy (VTT)	YES		tietosuoja@vtt.fi	*DPO and all other members of Data protection group at VTT*
12	AgriFood Lithuania (AFL)	YES	Vytautas Skipitis	vytautas.skipitis@agrifood.lt	*Responsible for data protection*
13	Aristotelio Panepistimio Thessalonikis (AUTH)	YES	Kornilia Vikelidou	data.protection@auth.gr	
*	*Wageningen Research (WUR)*	*PO*	*Lily Kampers and Erik Zweep*	*privacy.ssg@wur.nl*	