4Growth

D2.1 – Digital Agriculture & Forestry Uptake Assessment Grid – Draft 2

Work Package 2 – Uptake of Digital Agriculture & Forestry Technologies

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4Growth Consortium

	Participant organisation name	Short name	Country
1	STICHTING WAGENINGEN RESEARCH	**WR**	**NL**
2	EVENFLOW	**EVF**	**BE**
3	GEOPONIKO PANEPISTIMION ATHINON	**AUA**	**EL**
4	REFRAME FOOD ASTIKI MI KERDOSKOPIKI ETAIREIA	**RFF**	**EL**
5	LE EUROPE LIMITED	**LEE**	**IE**
6	DAHEIM CORNELIA	**FI**	**DE**
7	SIMBIOTICA SL	**VIZ**	**ES**
8	EIGEN VERMOGEN VAN HET INSTITUUT VOOR LANDBOUW-EN VISSERIJONDERZOEK	**EV ILVO**	**BE**
9	INSTITUTO NAVARRO DE TECNOLOGIAS E INFRAESTRUCTURAS AGROALIMENTARIAS SA	**INTIA**	**ES**
10	CENTRE TECHNIQUE INTERPROFESSIONNEL DES FRUITS ET LEGUMES	**CTIFL**	**FR**
11	TEKNOLOGIAN TUTKIMUSKESKUS VTT OY	**VTT**	**FI**
12	AGRIFOOD LITHUANIA DIH	**LITH**	**LT**
13	ARISTOTELIO PANEPISTIMIO THESSALONIKIS	**AUTH**	**EL**

Glossary of terms and abbreviations

List of Abbreviations and Acronyms	
AI	Artificial Intelligence
APIs	Application Programming Interfaces
DIHs	Digital Innovation Hubs
EU	European Union
GA	Grant Agreement
GDPR	General Data Protection Regulation
KPIs	Key Performance Indicators
ML	Machine Learning
MMFT	Market Monitoring & Forecasting Tool
SMFs	Small and Medium-sized farmers
UAVs	Unmanned Aerial Vehicles
WP	Work Package

Contents

Table of Figures

Executive Summary

This report is an accompanying document to D2.1 – Digital Agriculture and Forestry Uptake Assessment Grid – Draft 2. It presents the second iteration (D2.1) of the Digital Agriculture and Forestry Uptake Assessment Grid (The Grid), a questionnaire-style grid for use during observatory data collection, developed under 4Growth's WP2.

The Grid is intended to be filled out by agriculture and forestry value chain actors and is designed to gather information regarding their adoption and integration of digital technologies. It examines the types of technologies used in agriculture and forestry workflows, the specific functions they fulfil, and the barriers to further integration. The questionnaire also assesses technology performance, focusing on network connectivity and its reliability, as well as exploring whether improved connectivity would enable further adoption. The updated version incorporates lessons learned and feedback from the deployment of the first version (D2.0) to enhance usability and effectiveness. Its results are expected to contribute to the production of policy recommendations for governance actors and best practice guides for value chain actors to encourage and facilitate the adoption of digital technologies.

Key improvements in D2.1 include a significant reduction in the questionnaire length, addressing stakeholder concerns about complexity and respondent fatigue. The revised Grid emphasises streamlined data collection while maintaining analytical rigor. Additionally, sections on governance models, costs, and social impacts, previously part of the questionnaire, have been removed from the Grid and are now addressed through targeted bilateral interviews. This mixed-method approach ensures a holistic understanding of digital technology adoption.

The Grid is complemented by translations into multiple languages and a GDPR-compliant consent framework, ensuring accessibility and ethical data handling. These features support the project's objectives of fostering stakeholder engagement, improving market insights, and advancing the adoption of digital technologies in agriculture and forestry.

The iterative refinement process continues, with feedback from this version informing the final iteration (D2.2) scheduled for M21.

1. Introduction

This section provides an overview of the 4Growth project, focusing on its objectives, methodology and structure. The aim of this section is to highlight the project's key points for the reader to understand how the task of the Digital Agriculture and Forestry Uptake Assessment Grid described in the following sections fits within the overall project's structure.

1.1 Project Overview

4Growth is a Horizon Europe project comprising 13 partners from 9 EU Member States, all extensively involved in digital agriculture and forestry activities.

The objective of 4Growth is to understand **where, how and to what extent digital and data technologies and infrastructure in agriculture and forestry are being adopted as well as to look into the flows of data in the agricultural and forestry data market**. It will do so by collecting a wide range of ground truth data via distributed observatories across Europe and identifying key factors or constraints for uptake. 4Growth will showcase the uptake through the "4Growth Visualisation Platform" that will combine powerful storytelling with advanced visualisation of market data. This will contribute to a deeper knowledge of what influences market adoption, which in turn will allow 4Growth to develop robust forecasts to guide policymaking and increase further uptake.

1.2 Project Methodology

4Growth strives to (i) produce a solid understanding of the bigger picture of digital agriculture and forestry uptake as well as their fine details, (ii) make the collected insights accessible to the wider community, (iii) allow governance actors to make informed decisions based on solid data and projections and (iv) enable practitioners and value chain actors to adopt best practices and realise a wide range of socio-economic benefits.

This is pursued through a multi-actor approach, with farmers, forestry actors, policymakers, market experts, and researchers working together in unison. In that regard, 4Growth has not only brought together an excellent blend of skills and capabilities among a cohort of partners with years of experience in the sector, but also actively involves the wider community, linking with major projects, initiatives, and networks.

The activities of the project commenced with a dedicated effort to **understand the uptake of digital and data-driven solutions in agriculture and forestry (WP2)**. This entailed a thorough **state-of-the-art analysis (T2.1)** capturing the current level of uptake of the different technological solutions across the various applications in different agricultural and forestry disciplines. To that end, 4Growth leveraged the wealth of knowledge inside the consortium, e.g. having heavily contributed to SmartAgriHubs (WR/AUA) Smart-AKIS (AUA, WR, INTIA) and running the GSA/EUSPA market reports for years (LEE), enhancing it with rigorous desk research. The outputs of this activity directly informed the creation of a novel **Digital Agriculture and Forestry Uptake Assessment Grid (T2.2)**, designed as a tool for the assessment of how a given digital or data-driven solution is used at an individual case basis. In addition, 4Growth has set up and operated the **4Growth Visualisation Platform (T2.3)** – a platform developed by industry experts Vizzuality – to **"capture the state of play and future evolution of digital agriculture and forestry"**, showcasing market insights, promoting powerful storytelling, and enabling direct

interaction with data for value chain actors through dedicated widgets and APIs. In parallel to these tasks, 4Growth looked outward from its own activities to **analyse other innovative approaches to market monitoring (T2.4)** i.e., big-data enabled statistics, or the use of social media or online content mining to perform a rigorous review of the most suitable options for digital agriculture and forestry market analysis which could be utilised moving forward and could help address any gaps in the 4Growth approach.

The 4Growth Visualisation Platform strongly benefits from market insights (WP3) collected and interpreted by specialists in the consortium, who created the **Market Monitoring and Forecasting Tool - MMFT (T3.1)**. This ingested macro-level market data into a robust econometric model to produce an up-to-date and forward-looking picture of digital agriculture and forestry. The MMFT has global coverage with an increased focus on Europe. The development of the MMFT relies on the unique – industry wide – modelling tool built and maintained by LE-Europe on behalf of EUSPA for the last 10 years. To complement the MMFT, 4Growth has produced a **dedicated Foresight Module (T3.2)**, developed by foresight specialists - with strong track record in agriculture – Future Impacts.

In parallel to the aforementioned activities, 4Growth has been gathering "ground truth" data via the distributed **"4Growth Observatories" (WP4)**. The objective is to organise virtual observatories (T4.1) that operate at the juncture of two overlapping ecosystems:

  i.   **a data ecosystem** characterised by federated digital innovation hubs and data-sharing infrastructure and
  ii. **a triple-helix ecosystem** whereby practitioners, tech providers, researchers and institutional actors work hand in hand towards a more sustainable and digitally-driven agriculture and forestry sector.

The observatories clearly form an important basis for the analytical approach. They are existing, well-established networks that act as living labs in which various actors – including farmers and foresters – are co-creating and testing digital solutions in agriculture and forestry under changing farming conditions. 4Growth uses their experiences and digital solutions to collect data and analyse them. After synthesising this information, it will be fed back into the observatories and underlying networks so that they can use this to adapt their practices and strategies. In this way, a co-creation process between the 4Growth project and the observatories is established through which the 4Growth project will gradually become part of these living labs. Rather than conducting all data gathering at the beginning of the project, these analyses will be conducted in three "waves". This will ensure the project stays up to date with the latest and most-cutting edge developments in the world of digital agriculture and forestry throughout the three-year project duration. Data collection will be aided by the use of the aforementioned digital agriculture and forestry uptake assessment grid.
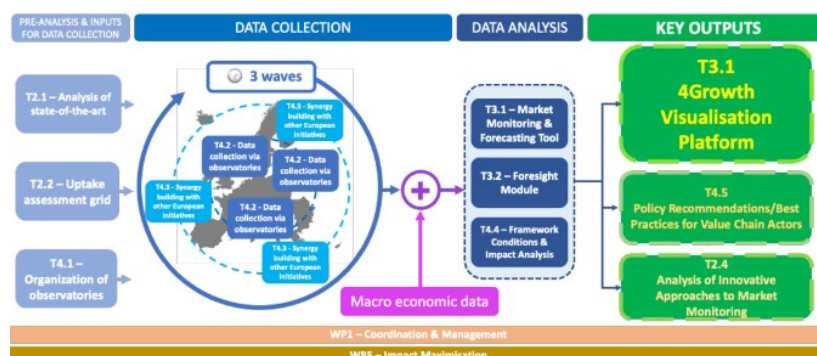

Figure 1: 4Growth overall methodology

2. Digital Agriculture & Forestry Uptake Assessment Grid (The Grid)

The Digital Agriculture & Forestry Uptake Assessment Grid (The Grid) serves as a comprehensive questionnaire-style framework developed under Task T2.2, led by RFF, for the systematic documentation and analysis of the adoption of digital technologies by diverse actors across the agricultural and forestry value chains. This tool functions as a data collection instrument while also facilitating capacity building, providing a standardised method to understand digital transformation across various regions and sectors.

Designed to capture a wide range of data points, the Grid addresses key factors such as governance models, data-sharing practices, and socioeconomic conditions, providing an adaptable and standardised approach for use across subsectors, applications, and regions. It is not only a tool for data collection via project observatories but also a capacity-building resource, enabling a deeper understanding of digital transformation dynamics. The insights gathered through the Grid feed into the project's Market Monitoring & Forecasting Tool and Foresight Module, refining assumptions and enhancing projections. Iterative updates to the Grid, informed by observatory feedback, ensure its continuous improvement and utility, culminating in its open-access availability for broader stakeholder benefit.

The first internal version of the Grid (D2.0) was developed and delivered in M3 in time for the preparation of the first wave of observatory data collection. This deliverable (D2.1) is the updated version of the Grid that incorporates the feedback from the first wave and the edits made to the Grid, ensuring its effectiveness. The updated grid will be available for the preparation of the second wave of observatory data collection. The same cycle will happen once more with the task delivering an updated and final version of the grid in M21 (D2.2), for use in the third wave of observatory data collection.

2.1 Approach and Methodology

The development of the Grid followed a structured, iterative process to ensure its relevance and adaptability in assessing the uptake of digital technologies in agriculture and forestry. Building on the foundational work of Shang et al. (2021)[1], the methodology was designed to create a robust framework for capturing adoption dynamics. The process included:

1. **Internal Needs Assessment**: The initial phase focused on defining the objectives and scope of the Grid through an internal consultation process. Insights from project partners were used to identify thematic areas, such as governance models, socioeconomic factors, and digital infrastructure, ensuring a comprehensive foundation. The process was coordinated by T2.2 leader, RFF, and took place in the context of WP2 regular online meetings.

2. **Design and Validation**: A structured framework and questionnaire was developed to capture quantitative and qualitative data. The draft version underwent internal validation to ensure it was relevant, clear, and applicable across diverse contexts.

3. **Pilot Testing**: The draft Grid was tested internally within the consortium to evaluate its usability and comprehensiveness. Feedback from this testing phase guided refinements to address any identified gaps or ambiguities.

[1] https://www.sciencedirect.com/science/article/pii/S0308521X21000275

4. **Deployment**: The first version of the Grid (D2.0) was deployed during the initial wave of data collection via the observatories organised under WP4 – Observatory Data Collection and Analysis and in particular under T4.2 – Data collection via observatories, which involves all 4Growth's outreach and data gathering activities. Efforts were made to engage a diverse range of regions and subsectors to gather representative data, supported by observatories and digital tools.

5. **Feedback and Iteration**: Insights gathered during the deployment phase informed iterative updates to the Grid, ensuring continuous improvement and alignment with project objectives and evolving technological landscapes. Feedback was received through the observatories responsible for disseminating the Grid. Respondents provided input either upon completing the questionnaire or when encountering issues during its completion, enabling targeted adjustments and improved usability.

This structured approach ensured the creation of a practical and adaptable tool to assess digital transformation dynamics, contributing to the broader objectives of the 4Growth project.

2.2 First version of the Grid (D2.0)

The first version of the Grid (D2.0) was developed to assess the adoption and integration of digital technologies across agricultural and forestry value chains. It was designed as a comprehensive, structured questionnaire to capture data on governance, technology use, socioeconomic impacts, and sustainability.

2.2.1 Key Features and Structure

The Grid is organised into thematic sections designed to comprehensively address key aspects of digital technology adoption in agriculture and forestry. These sections include variables such as integration into workflows, associated costs, organisational prerequisites, governance models, socio-economic benefits, and data-sharing practices. This thematic structure ensures a detailed analysis of factors influencing adoption, offering valuable insights for stakeholders across the value chain:

1. **General Information**: Collects basic details about the respondent and their organisation, including location, size, and sector focus (agriculture or forestry).

2. **Governance Model**: Explores decision-making structures, stakeholder involvement, and regulatory frameworks affecting digital technology adoption.

3. **Adoption of Digital Technologies and Technology Integration:** Examines the extent and type of digital technologies implemented, their integration into workflows, and compatibility with existing systems.

4. **Technology performance**: Assesses the functionality, reliability, scalability, and usability of the adopted digital solutions.

5. **Associated costs and prerequisites**: Captures financial investments, operational costs, and necessary infrastructure or skills required for implementing digital technologies.

6. **Data management and data sharing practices:** Investigates protocols for collecting, processing, and sharing data within and outside the organisation, focusing on privacy and security.

7. **Data storage and data flows**: Focuses on how and where data is stored (e.g., local, cloud, hybrid), the pathways of data flows, and compliance with legal requirements.

8. **Social benefits and impact**: Evaluates how digital technology adoption improves social aspects such as community engagement, labour conditions, and equity.

9. **Economic benefits and impact**: Assesses the financial advantages of digital technologies, including cost savings, increased productivity, and market competitiveness.

10. **Environmental and sustainability impact**: Analyses the contribution of digital solutions to environmental goals, including resource efficiency, biodiversity conservation, and carbon footprint reduction.

11. **Future Outlook**: Explores plans for future technology upgrades, anticipated challenges, and strategies for continued digital transformation.

12. **Additional Comments**: Provides respondents with an open-ended section to share insights, challenges, or recommendations not covered in the questionnaire.

Overall version D2.0 of the Grid consisted of 88 questions distributed in the 12 sections listed above. Where applicable, respondents are also able to provide multiple answers to questions. The Grid was also designed to branch into different types of questions depending on what type of stakeholder the respondent identified themselves as (i.e., farmer, forester, tech provider, data provider etc.) The questions were first developed in Excel and then transformed and hosted on WR's Qualtrics platform to allow for the questions to be answered online and shared via a link. The link to the questionnaire is also hosted on the homepage of the project website, for anyone to access when needed.
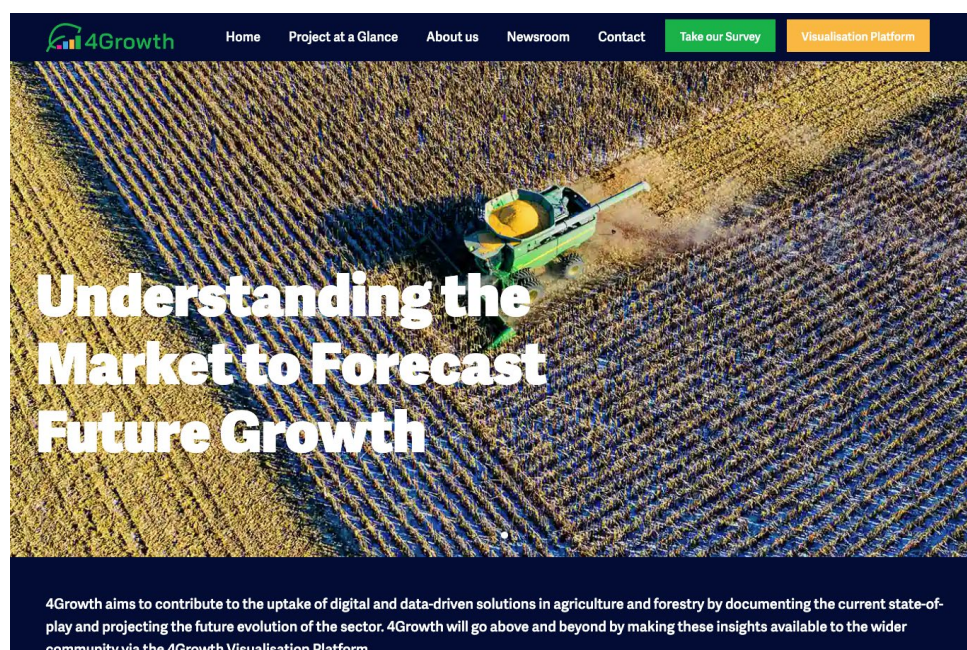

Figure 2: 4Growth project homepage with "Take our Survey" link

2.2.2   Observations and Lessons Learned

The deployment of the first version of the Grid (D2.0) provided critical insights into its strengths and areas requiring refinement. While the Grid served as an effective initial tool for documenting and analysing digital technology adoption, feedback from observatories and stakeholders underscored several challenges:

1. **Length and Complexity**: Respondents, primarily agricultural stakeholders and foresters, highlighted the excessive length of the questionnaire as a significant barrier to completion. With 88 questions spread across 12 thematic sections, the Grid's comprehensiveness often led to respondent fatigue, reducing engagement and data quality. It was noted that smaller farms, already constrained by limited time and resources, were disproportionately affected, resulting in lower response rates and incomplete data.

2. **Technical Nature of Questions**: A notable portion of the feedback indicated that many questions were overly technical or complex, creating difficulties for respondents with varying levels of familiarity with digital technologies. For example, technical terminology and detailed inquiries on data management and digital infrastructure were flagged as particularly challenging. A suggestion was about including clearer examples or explanatory notes to make the questionnaire more approachable for users unfamiliar with digital technology jargon.

3. **Limitations of Drop-Down Menus**: The response options provided in drop-down menus were frequently described as too rigid and complicated, failing to align with the realities and experiences of respondents. This rigidity restricted the ability to provide nuanced answers, limiting the utility of the data collected. Another issue was the lack of an "other" option in several sections prevented them from describing unique practices or tools specific to their operations.

These observations were instrumental in informing the design of the updated version of the Grid (D2.1). The feedback underscored the importance of creating a more user-friendly, streamlined, and accessible tool while maintaining its analytical rigor and alignment with project objectives.

Annex A provides visual representations of the Grid's first version (D2.0).

3.   Updated version of the Grid (M12) – D2.1

Following the feedback received from the deployment of the first version of the Grid (D2.0), significant revisions were undertaken to address the identified challenges and enhance the tool's effectiveness. This iterative process aimed to balance usability with the need to collect robust, actionable data that aligns with the overarching goals of the 4Growth project.

3.1 Key Revisions and Changes

1. **Reduction in Questionnaire Length**:

   o   The number of required responses was reduced from 88 to 33, effectively streamlining the Grid by nearly 63%.

   o   The reduction was achieved by consolidating overlapping questions and eliminating sections that were deemed less critical based on the analysis of the first wave of data collection.

2. **Simplification of Question Structure**:

   o   Questions were rewritten to remove overly technical language, ensuring accessibility for respondents with varying expertise in digital technologies.

- o Drop-down menu options were simplified and expanded to include more intuitive and context-relevant choices, addressing feedback regarding their rigidity and complexity.

3. **Targeted Data Collection Approach**:

- o Sections on governance models, associated costs and prerequisites, and social benefits and impacts were removed from the questionnaire.

- o To preserve the insights from these critical topics, they are now addressed through targeted bilateral interviews with agricultural stakeholders and foresters. This qualitative approach enables a more context-specific exploration of these themes.

4. **Enhanced Usability**:

- o The visual and navigational design of the Grid was updated to improve respondent experience. Efforts were made to ensure the tool was intuitive, with clear instructions and logical progression through sections.

3.2 Outcome of the Revisions

The updated version of the Grid (D2.1) reflects a more concise, practical, and stakeholder-oriented tool. The changes have directly addressed the challenges of respondent fatigue, complexity, and data quality observed in the first iteration. To ensure the removed topics are still addressed, the qualitative data previously covered by these sections will now be gathered through bilateral interviews with agricultural stakeholders and foresters. This complementary approach allows for the exploration of critical aspects such as governance, socio-economic impacts, and prerequisites for digital technology uptake in a more detailed and context-specific manner. By integrating insights from these interviews, the objectives of the Grid will remain intact while balancing the need for a more efficient and practical tool.

The second version of the Grid will be deployed during the second wave of observatory data collection. This iterative refinement process ensures the continuous evolution of the tool, aligning it with stakeholder needs and the dynamic technological landscapes within agriculture and forestry. Feedback from this deployment will further inform the development of the final version of the Grid (D2.2) in M21, ensuring its readiness for broad application and open-access availability. Continuous changes to the questionnaire are anticipated until its finalisation, based on ongoing feedback from respondents.

The list of revised questions of the Grid can be found in Annex B.

4. Compliance and Accessibility Components

In order to ensure both ethical standards and inclusivity, of the Grid the 4Growth partners involved in the Grid as well as in "4Growth observatory ecosystem" have worked together to provide translations of the survey into multiple languages to enable broader engagement and diverse stakeholders, as well as a consent form in line with the General Data Protection Regulation, safeguarding participant rights and privacy.

4.1 The Grid Translations

To ensure broad accessibility and facilitate data collection, the Grid has been translated into multiple languages. This effort is critical for supporting the dissemination of the Grid and enabling its effective use across diverse linguistic and cultural contexts within the observatories. By providing the Grid in local languages, the aim is to eliminate language barriers that could otherwise hinder engagement with key stakeholders such as farmers, foresters, and agricultural professionals.

The translation process involved collaboration with project partners to ensure accuracy, relevance, and cultural sensitivity. Each translation was reviewed and validated by native speakers and local experts within the consortium to ensure the terminology aligns with the specific agricultural and forestry contexts in each region.

The languages chosen for translation were determined based on the geographical scope of the project and the target regions of the observatories. The current languages include:

1. **English** (main language of the Grid)

2. **Spanish** (to support observatories in Spain)

3. **French** (to support observatories in France and Benelux region)

4. **German** (to support observatories in Benelux region)

5. **Greek** (to support observatories in Greece, Balkan region and Southern Europe)

6. **Lithuania** (to support observatories in Lithuania)

7. **Polish** (to support observatories in Poland)

8. **Hungarian** (to support observatories in Hungary)

9. **Finnish** (to support observatories in Finland and Northern Europe)

In case needed, additional translations of the Grid may be provided upon request.

By providing the Grid in these languages, we expect to enhance stakeholder participation, ensuring inclusivity and improving the quality of data collected. This multi-lingual approach also aligns with the project's commitment to fostering capacity building and facilitating the uptake of digital technologies in agriculture and forestry across diverse regions.
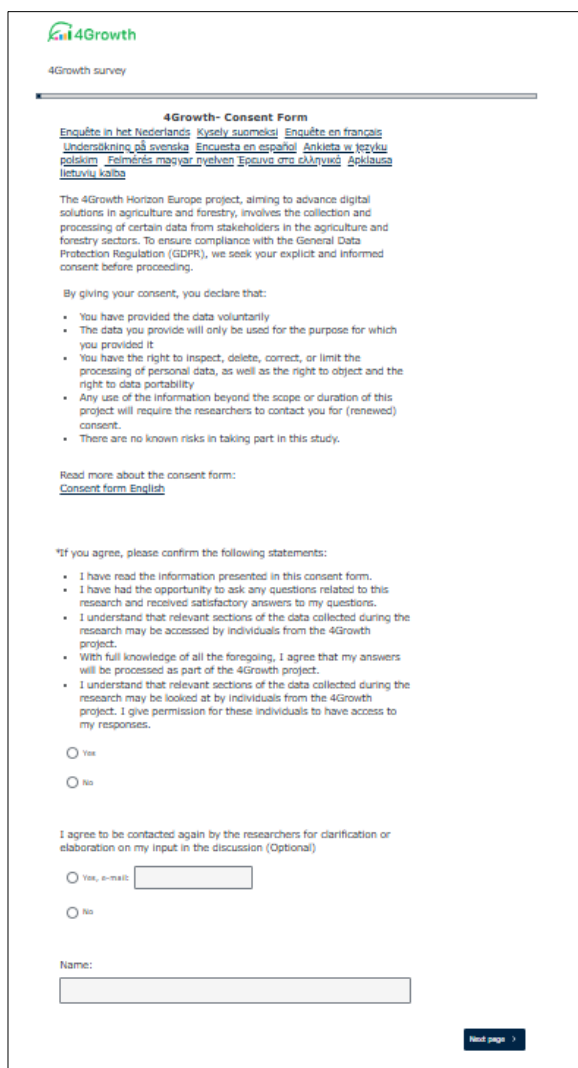
The translated versions of the Grid are available in both digital and printable formats, allowing observatories to tailor their dissemination strategies to local conditions and stakeholder preferences.

4.2 The Grid Consent Form

Through the dissemination of the Grid, 4Growth project will collect and process certain data from stakeholders in the agriculture and forestry sectors. To ensure compliance with the General Data Protection Regulation (GDPR), 4Growth seeks the explicit and informed consent from the Grid's respondents.

By giving their consent, they declare that:

- They have provided the data voluntarily
- The data their provide will only be used for the purpose for which they provided it
- They have the right to inspect, delete, correct or limit the processing of personal data, as well as the right to object and the right to data portability
- Any use of the information beyond the scope or duration of this project will require the researchers to contact them for (renewed) consent
- There are no known risks in taking part in this study.

Figure 3: Front page of 4Growth's consent form

The full consent form for the Survey, providing details about the project and the purpose of data collection, the deliverables, the data handling and security measures, the organisations and institutions involved, is available online and can be found here.

Consent Form for the Survey

Project details

Project name	Project number	Start and end date
4Growth	2282300621	01-02-2024 – 01-02-2028

Please take some time to read this information and ask questions if anything is unclear. Contact details can be found in this document.

Brief project information

Wageningen Economic Research is coordinating the **4Growth** Horizon Europe project and the research for this study is being undertaken by consortium partners. This survey is part of the activity *Observatory Data Collection and Analysis,* undertaken by *all partners except EVF,* This project is funded through the Horizon Europe funding program of the EU Commission (grant agreement No. 101016807). Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or Research Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.

The **4Growth** Horizon Europe project, aiming to advance digital solutions in agriculture and forestry, involves the collection and processing of certain data from stakeholders in the agriculture and forestry sectors. To ensure compliance with the General Data Protection Regulation (GDPR), we seek your explicit and informed consent before proceeding.

Purpose of Data Collection

The collected data will be used for the development and implementation of the Digital Agriculture & Forestry Uptake Assessment Grid. This tool aims to document various aspects of technology adoption, integration, costs, prerequisites, governance models, socio-economic benefits, and more. The insights gathered will contribute to advancing digital solutions in the agriculture and forestry sector. Aggregated data will be used for reporting and visualizations.

Deliverables

■ Paper ■Report ■ International research ■Other: Visualization dashboard.

Data Handling and Security Measures

We assure you that your data will be handled 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 information will be retained by *Wageningen Research* and will only be used for the purpose of research. 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 organization information security policy: e.g.: WUR information security policy* and the *organization data policy: e.g.: WUR data policy* for more details.

Which data is collected, where is it processed and for how long

Data category (you can add and delete)	Location/ country of processing	Storage period
Company Name	Netherlands	10yrs
Country of residence	Netherlands	10yrs
Survey/interview responses	Netherlands	10yrs

Figure 4: 1st page of 4Growth's consent form for the Grid

Organizations, institutions, and countries with which the data is shared

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, composed of the following organisations:

Organization/institutions which are part of the 4Growth Consortium	Countries within the EU (incl. NL)
EVENFLOW	BE
GEOPONIKO PANEPISTIMION ATHINON	EL
FOODSCALE HUB GREECE ASSOCIATION FOR ENTREPREUNERSHIP AND INNOVATION ASTIKI MI KERDOSKOPIKI ETAIREIA	EL
LE EUROPE LIMITED	IE
DAHEIM CORNELIA	DE
SIMBIOTICA SL	ES
EIGEN VERMOGEN VAN HET INSTITUUT VOOR LANDBOUW- EN VISSERIJONDERZOEK	BE
INSTITUTO NAVARRO DE TECNOLOGIAS E INFRAESTRUCTURAS AGROALIMENTARIAS SA	ES
CENTRE TECHNIQUE INTERPROFESSIONNEL DES FRUITS ET LEGUMES	FR
TEKNOLOGIAN TUTKIMUSKESKUS VTT OY	FI
AgriFood Lithuania DIH	LT
ARISTOTELIO PANEPISTIMIO THESSALONIKIS	EL

Contact details project leader, researcher(s) and data privacy officer

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Joep Tummers	Researcher	Joep.tummers@wur.nl	070 3358 330
Sinne van de Veer	Researcher	Sinne.vandeveer@wur.nl	070 3358 330

Research results

You may request a summary of the research findings by contacting the task leader, Lan van Wassenaar of the Wageningen Economic Research Lan.vanwassenaar@wur.nl. At any time, you are free to withdraw consent by contacting the task leader.

Concerns or complaints

If you have any concerns about the project, your involvement in it or this consent form, please discuss this with the researcher undertaking the *survey* to find out how your concern will be addressed. If your concern is not addressed you can contact the Data Protection Officer -DPO- who supervises the application of and compliance with the GDPR via: privacy@wur.nl

Figure 5: 2nd page of 4Growth's consent form for the Grid

Conclusion and next steps

The updated version of the Grid (D2.1) reflects significant improvements based on stakeholder feedback, enhancing its usability and ensuring alignment with project objectives. The streamlined design reduces complexity while maintaining the capacity to gather meaningful and actionable insights.
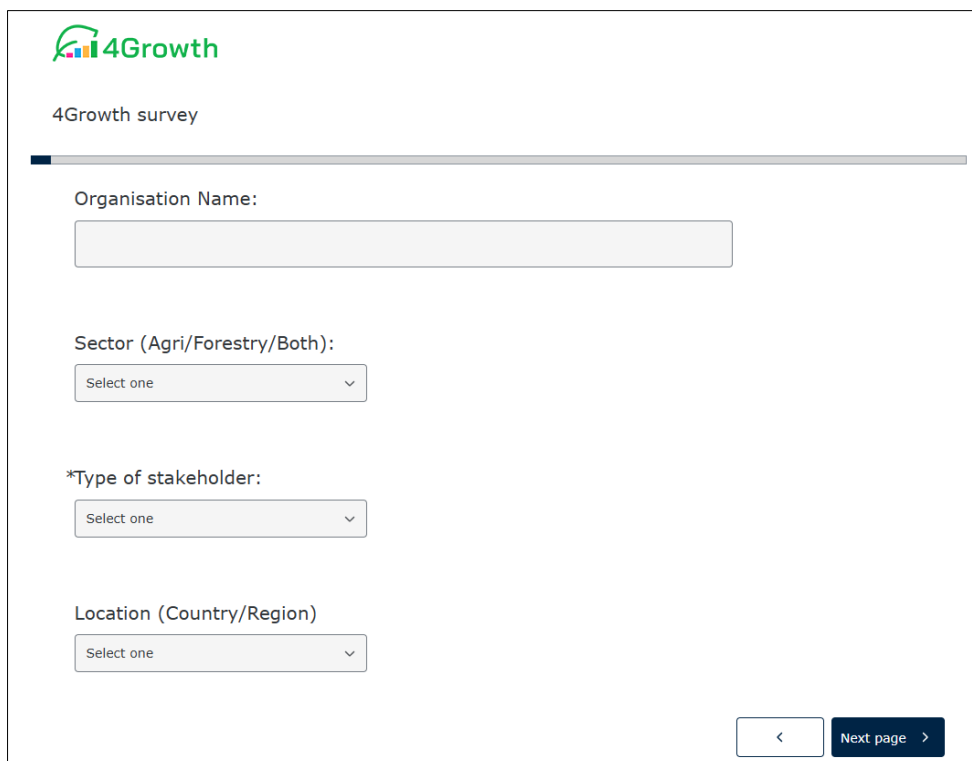
With its deployment in the second wave of data collection, the revised Grid will be assessed to confirm its effectiveness. Insights gathered from this process will guide the development of the final iteration, ensuring it meets the diverse needs of stakeholders and supports broader adoption.

Qualitative data will complement the Grid's findings through targeted bilateral interviews, offering deeper understanding of governance models, socio-economic impacts, and other critical factors. This dual approach ensures a comprehensive analysis of digital technology uptake.

The final version (D2.2) will incorporate all lessons learned, ready for open-access dissemination. Workshops and training sessions will further support stakeholders in leveraging the tool, with multilingual resources ensuring inclusivity across regions and sectors. These efforts will strengthen the role of the Grid in advancing digital transformation in agriculture and forestry.

ANNEX

Annex A: First version of the Grid (D2.0)

4Growth

4Growth survey

What type of digital technology has been used for agriculture?

- ☐ Precision farming
- ☐ Farm Management Information Systems
- ☐ Automated machinery and robotics
- ☐ Smart irrigation systems
- ☐ Monitoring and tracking of livestock/crops
- ☐ Smart-agri apps
- ☐ Other namely [   ]

What type of digital technology has been used for forestry?

- ☐ Forest Fire Prediction and Monitoring systems
- ☐ Automated machinery and robotics
- ☐ Drones for Forest Monitoring
- ☐ Forest Inventory Management Software
- ☐ Other namely [   ]

Were there specific goals or challenges that prompted the adoption of digital tools?

[Select one   ⌄]

‹   Next page ›

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How would you rate the level of digitalization in your farming/forestry practices on a scale of 1 to 5 (1 being low, 5 being high)

[Select one   ⌄]

What are the primary functions of these technologies in the agriculture or forestry value chain?

- ☐ Data management
- ☐ Harvesting and distribution
- ☐ Crop health and disease detection
- ☐ Planning and Management
- ☐ Decision-making
- ☐ Supply chain optimisation
- ☐ Monitoring
- ☐ Production phase
- ☐ On-farm activities

What is the adoption level of these technologies?

[Select one   ⌄]

Have you encountered challenges in the adoption of digital technologies?

[Select one   ⌄]

‹   Next page ›

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What are the most significant costs associated with the adoption of digital technologies in your organisation

- [ ] Initial investment
- [ ] Connectivity infrastructure
- [ ] Maintenance and upgrades
- [ ] Energy
- [ ] Integration with existing systems
- [ ] Training and skill development
- [ ] Data security and privacy measures
- [ ] Other namely [_____]

What is the level of direct costs?

[Select one ▾]

Unexpected or hidden costs?

[Select one ▾]

Have you identified organisational prerequisites (skills, workforce, education) necessary for successful technology integration?

[Select one ▾]

[‹] [Next page ›]

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Do data flows enhance productivity and efficiency in agriculture and forestry?

[Select one ▾]

Do you use data analytics for decision-making?

[Select one ▾]

Where do you receive data from and how much?

[_____]

What type of data do you receive or provide?

- [ ] Farm-level data
- [ ] Earth Observation (EO) data
- [ ] Environmental data
- [ ] Socio-economic data
- [ ] Supply chain data
- [ ] Research and Development data

Do you pay for this data?

[Select one ▾]

[‹] [Next page ›]

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Where and how do you store this data?

☐ On-premises servers/local storage facilities

☐ Cloud-based platforms

☐ Data warehouses

☐ Agricultural information management systems

☐ Geographic Information Systems (GIS)

☐ Hybrid storage solutions (on-premises and cloud)

☐ Secure data centres (advanced security measures)

What do you do with this data?

[   ]

To who and where do you send derived information or data?

[   ]

‹   Next page ›

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Have digital technologies contributed to sustainability and environmental practices?

[Select one   ⌄]

Have you observed positive impacts on resource conservation or environmental footprint?

[Select one   ⌄]

Have digital technologies contributed to energy efficiency?

[Select one   ⌄]

Have you observed any positive or negative effects on biodiversity in agricultural and forestry areas due to digital technology adoption?

[Select one   ⌄]

Do you use digital technologies to track and ensure adherence to sustainable farming practices and forestry activities?

[Select one   ⌄]

‹   Next page ›

Annex B: List of revised questions (D2.1)

T2.2 Digital Agriculture & Forestry Uptake Assessment Grid	
1	**General Information**
1.1	Organisation Name:
1.2	Sector (Agri/Forestry/Both):
1.3	Type of stakeholder:
1.4	Location (Country/Region):
1.5	Primary Area of Operation in agriculture:
1.5.1	If other, please specify:
1.6	Primary Area of Operation in forestry:
1.6.1	If other, please specify:
1.7	Agriculture/Forestry organisation size:
2	**Adoption of Digital Technologies and Technology Integration**
2.1	Has your organisation integrated digital technologies into its workflows?
2.2	What type of digital technology has been used for agriculture?
2.2.1	If other, please specify
2.3	What type of digital technology has been used for forestry?
2.3.1	Of other, please specify
2.4	What are the primary functions of these technologies in the agriculture or forestry value chain?
2.5	Are there specific barriers hindering further integration?

2.5.1	If yes, please specify
3	**Technology Performance**
3.1	Do you have network connectivity?
3.2	What network connectivity do you use?
3.3	How reliable is the current network connectivity?
3.4	Would you further adopt digital technologies if you had better network connectivity?
4	**Data management and data sharing practices**
4.1	What type of data sharing practices related to digital technology does your organisation use?
4.2	What type of data do you collect?
4.3	What type of tools/platforms do you use to collect data?
4.4	Do you pay for the tools/platforms you use to collect data?
4.5	Would you be able to operate without this data?
5	**Data storage and data flows**
5.1	How is this data stored?
5.2	If other, please specify
5.3	Do you share the data you have collected with others?
5.4	To who and where do you send this data?
6	**Economic benefits and impact**
6.1	Digital technologies have resulted in cost savings or increased efficiency in our operations.
7	**Environmental and Sustainability Impact**

7.1	Digital technologies have positively contributed to sustainability and environmental practices in our organization.
8	**Future outlook**
8.1	Our organization plans to expand or upgrade its current digital infrastructure in the near future.
9	**Additional Comments**
9.1	Please share any other input that could be relevant to the questionnaire