D9.1 Data management plan

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Disclaimer

List of Abbreviations

CFD	Climate Farm Demo
NC	National Coordinator
WP	Work Package
DMP	Data Management Plan
AKIS	Agriculture Knowledge and Innovation Systems
PDF	Pilot Demo Farmer
CFA	Climate Farm Advisor
DOI	Digital Object Identifier
FAIR	Findable, Accessible, Interoperable and Re-usable
GHG	Greenhouse Gases
CSF	Climate Smart Farming
GDPR	General Data Protection Regulation
EC	European Commission
HE	Horizon Europe
URL	Uniform Resource Locators
HTTP	Hypertext Transfer Protocol
JSON	JavaScript Object Notation

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Abstract

This document is the first version of the Climate Farm Demo Data Management Plan deliverable D9.1. It outlines the process of the data management, and the describes the data which will be reused, processed, collected, or generated within the Climate Farm Demo project.

Furthermore, defines a strategy to make the data within this project findable, accessible, interoperable, and reusable and to harmonize its activities with the principles of efficient data management which entail management of data at every stage of the data lifetime, from the early stages of data access, data collection, data reuse to the data storage, even rejection if necessary.

In compliance with the Open Access strategy of Horizon Europe, Climate Farm Demo will predominantly facilitate the re-use of data collected during the project, through data deposited on free data sharing platforms, making the dataset available on the project website, and proper metadata associated with datasets if relevant.

This document refers to all the data produced within or utilized by the project, being numerical information, which bears a value, or data which are grouped within various datasets. Each dataset is accounted for (purpose, origin, FAIR principles, security, ethics, etc.). The Data Management Plan is meant to convey an overall consistency of data produced and used in the scope of the project, consistent with the objectives of Climate Farm Demo, namely:

- to accelerate the adoption of Climate Smart Farming (CSF) practices and solutions by farmers and all actors of the Climate Smart Agriculture Knowledge & Innovation Systems",

- to increase knowledge exchange & cross-fertilisation to enable action on climate change adaptation and mitigation.

Data Management Plan is an evolving document and will be updated during the project as project progresses and the needs occur, to incorporate potential changes in the data management strategy, or decisions made for data management during the project, and of new datasets, either produced or used, which had not been foreseen at the early stage of the project.

The Horizon Europe Model Grant Agreement requires that a data management plan ('DMP') [1] *is established and regularly updated. The use of this template is recommended for Horizon Europe beneficiaries. In completing the sections of the template, the requirements for research data management of Horizon Europe as described in article 17 and analysed in the Annotated Grant Agreement, article 17, must be addressed.*

[1] https://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cutting-issues/open-access-data-management/data-management_en.htm

Chapter 1

1. Introduction

This deliverable D9.1 is the first version of the Climate Farm Demo Data Management Plan and will be revised during the project within the task 9.4. It outlines the strategy for data management as planned at the beginning of the project. This Data Management Plan details the approach planned to be used for the management of datasets anticipated to be generated or reused within the project.

This document sets out the management of data referring to the data which is foreseen to be collected, reused, or produced within the scope of the Climate Farm Demo project. Addressing FAIR principle (making data Findable, Accessible, Interoperable and Re-usable) will consider the following:

- management of data during the project lifetime as well as after the project's end
- protection and archiving of data during the project lifetime as well as after the project's end
- procedures for data collection, reuse and creation within the project
- data sharing or making data available to public (open access)
- standards for the handling the data and metadata
- description of datasets

This Data Management Plan comprises all data that will be generated or reused in this project like numerical information which convey value, or other data consistently organized as datasets, on which various management strategies may be applied. This document, further, anticipates management of the data beyond the life of this project. As a living document it will develop and expand and act in accordance with any modifications of the data that may occur during the course of the project.

Chapter 2

2. Climate Farm Demo Summary

Climate change and environmental degradation are an existential threat to Europe and the world. To prevent severe climate change, we need to rapidly reduce global greenhouse gas emissions. Between 1990 and 2018, greenhouse gas emissions in the EU were reduced by 23 per cent. A central objective of the EU Green Deal[2] is to set out the direction for the EU to be climate neutral by 2050. As a milestone towards this target, the EU Commission proposed a 2030 target to reduce greenhouse gas emissions by 55 per cent compared to 1990. To overcome these challenges, the European Green Deal will transform the EU into a modern, resource-efficient, and competitive economy, ensuring, no net emissions of greenhouse gases by 2050.

Agriculture is responsible for 10.1% of the European GHG emissions CH4, N2O, CO2) and contributes also to regulate the CO2 uptake via carbon sequestration in soils. A key challenge for the land use sector is to incentivize measures ensuring that EU activities on forests, soils and agriculture contribute to the Paris Agreement[3] goals. These measures should not threaten food production and should aim to balance anthropogenic emissions and removals by 2050, while conserving and enhancing carbon storage. In parallel, the agricultural sector must adopt best practices and solutions for climate change adaptation. For this purpose, innovative climate smart solutions need to be tested and implemented giving particular attention to their potential replication and transfer across regions and Member States.

Climate Farm Demo will strengthen European farmers' capacities to implement, demonstrate and uptake Climate Smart Farming (CSF) practices across the EU and reduce their GHG emissions along the project life thus achieving the EU 2030 Climate Target Plan.

[2] https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en
[3] https://climate.ec.europa.eu/eu-action/international-action-climate-change/climate-negotiations/paris-agreement_en

2.1 Data summary

This document profiles the steps and actions regarding the development of an extensive Data Management Plan (DMP), in the context of the HE Project Climate Farm Demo. This deliverable defines the strategy for all partners involved in the project, internal or external and which all project Stakeholders must implement and follow within the Climate Farm Demo project. It is paramount that the project complies with the rules for Open Access policy and the Open Research Data recommendations. This document is based on the EC Guidelines on Data Management in Horizon Europe.

This Data Management Plan sets out different types of data to be generated or processed within the Climate Farm Demo project: identification and description of datasets; data access; data storage and protection. It is foreseen that the following types of data will be generated or reused: a) documents (documents, measurements, interviews, surveys, reports, briefs, guidelines, publications) in .pdf, .pptx, .txt, .jpg, .png and similar formats; b) database in CSV format; c) videos in MP4 format; d) pictures, e) spreadsheets, f) web and social media contents. The project will comply with GDPR concerning processing of personal data, consent, breach notification, right to access and right to be forgotten. CFD will secure the highest ethical standards and legal restrictions regarding personal data. This DMP sets forth the guidelines of the procedures for the data collection, operation, and storage. Personal data will be processed according to the provisions of the GDPR. No processing of special categories of personal data as defined in Article 9 of GDPR[4] are anticipated to be collected.

This Data Management Plan is predominantly anticipated to act as a living document in which information may be made available in more details through regular updates coordinated with the progression of the project implementation and in occurrence of significant changes.

2.1.1 Data reuse

Related EU-funded projects

As stated in the Grant agreement Climate Farm Demo project aims to reuse existing datasets already produced in previous research projects, especially NEFERTITI, CLIENfarm, LIFE CARBON FARMING, FAIR SHARE and EJP SOIL as well as the “sister project” namely CLIMATE SMART ADVISOR and the project funded under “HORIZON-CL6-2023-CLIMATE-01-4: Demonstration network on climate-smart farming – linking research stations”. If so, a memorandum of understanding will be drawn up between the projects in which the reuse of these existing datasets will be outlined.

2.1.2 Types and formats of data generated by the project

General activities of the Climate Farm Demo consortium are expected to generate a large amount of data in various forms as well as sizes. Since the project is in an early stage (M4), it is unfeasible to

[4] https://gdpr-info.eu/art-9-gdpr/

provide exact list of data formats and data size. However, at this point the following data types are expected to be generated:

a) documents, measurements, interviews, surveys, reports, briefs, guidelines, publications in: .pdf, .pptx, .doc,.docx, .jpg, .jpeg,.png and similar formats

b) databases in: .csv

c) spreadsheets in: .xls/.xslx

d) pictures in: .jpg, .jpeg, .png

e) videos in MP4, WEBP formats

f) web and social media contents

This list is not final and through the course of the project it will presumably extend. The type and size of data expected to be generated in this project in each of the work packages at this point, is summarized in the Annex 1 of this document.

Regarding the expected outputs, as set in the Climate Farm Demo Grant Agreement, in the course of the project the following deliverables are to be delivered as summarized in the table below:

Table 1. List of project deliverables

Deliverable Number	Deliverable name	Data Type	Data Format
D1.1	Conceptual framework for network management and KE on CSF	Report	Report
D1.2	Database of 1,500 Climate Smart Farming Pilot Demo Farms	Table	Other
D1.3	Good practices for lighthouse farms development	Report	Report
D1.4	Recommendations for networking, KE & capacity building on CSF	Report	Report
D2.1	1,500 Adaptation and Mitigation Plans - AMPs	Report	Report
D2.2	Manual for application of AMPs on farm	Report	Report
D2.3	Recommendations for capacity building of advisors on climate smart farming	Report	Report
D2.4	Report on environmental & economic performance at farm, country, EU levels	Report	Report
D3.1	Protocol for Climate Smart Farming demonstration activities and campaigns	Report	Report
D3.2	Training module for Climate Smart Farming demonstration	Report	Report
D3.3	Database of the 6 annual demonstration campaigns and 4.500 demo-events	Table	Other
D3.4	Recommendations for Climate Smart Farming demonstration	Report	Report
D4.1	Methodological framework for supporting and running the 10 Living Labs	Report	Report

D4.2	Lessons learned on implementation of LL approach to co-create CSF solutions	Report	Report
D4.3	Recommendations for AKIS & future partnerships engaged in CSF innovation	Report	Report
D5.1	Digital repository for carbon & environmental models, methods & tools	Report	Other
D5.2	Farms GHG accounting methodology and guidelines	Report	Report
D5.3	Harmonized MRV framework and guidelines	Report	Report
D5.4	Techniques 'inventory and decision trees for Adaptation & Mitigation	Report	Report
D6.1	State of the art of existing and emerging rewarding mechanisms	Report	Report
D6.2	Rewarding needs assessment	Report	Report
D6.3	Capacity building toolbox on rewarding mechanisms	Report	Other
D6.4	Policy briefs for scaling CSF rewarding mechanisms	Report	Report
D7.1	Strategic Plan for the PIPs	Report	Report
D7.2	Policy briefs for policy links at EU, reginal and national level	Report	Report
D7.3	Sustainable Strategy for the network	Report	Report
D8.1	Dissemination, exploitation & communication Plan at EU & National level	Report	Report
D8.2	Online content repository (knowledge reservoir)	Web content (php)	Other
D8.3	Climate Farm Demo final training toolbox	Web content (php)	Other
D8.4	Digital and printed dissemination, exploitation, and communication material	Audio Visual materials, web contents, prints, etc.	Other
D9.1	Data management plan	Report	Report
D9.2	Interim and final reports	Report	Report
D9.3	Methodology to assess impacts related to the Work Program expected impacts	Report	Report

This list of data produced will be reviewed and updated periodically to ensure all data sets are included in the data management plan.

2.1.3 Purpose of data collection

Climate Farm Demo project aims at reducing the GHG emissions through Climate Smart practices. To enable and measure the results of that work large amounts of data is needed. More specifically data is needed to:

- complete the European network of demonstration farms inventoried through questionnaires
- connect farms actors on national and EU level

- create exchange of knowledge and relevant materials built on the CFD platform/website
- disseminate results to the relevant actors and stakeholders both at EU and national levels
- stimulate knowledge exchange and generate new climate smart solutions
- accelerate adoption of CSF practices
- design and promote new policy incentives that accelerate farmers engagement in climate smart farming and sustainable transition
- validate the rewarding mechanism framework and identify the missing elements
- analyse farmer and/or stakeholder needs and challenges regarding the use of rewarding mechanisms
- calculate carbon emission and removals and for the cost-benefit analysis on the influence of investments in carbon farming on the production costs of agricultural products
- identify the needs of CFD's partners in terms of organizing the project and planning in the initial years
- to foster peer to peer learning between the monitors and facilitators of the LL

Since this is the first version of the DMP, the list of data need and principle for data collection is only an establishment, it will develop and roll out through the project. Climate Farm Demo will both generate and reuse data.

The secondary data, or the data project partners will reuse during the Climate Farm Demo project are necessary for reaching projects goals. At this point the following data types are expected to be reused:

a) Literature review (for creating the conceptual framework and guidelines, comparisons of tools)

b) Interviews and surveys (for creating the conceptual framework and guidelines)

c) Data on demo farms from Nefertiti and other Farm Demo projects

d) Statistics and public databases (to ensure consistency)

e) Outputs from other demonstration and/or climate projects (for the purpose of synergies)

f) Online knowledge reservoir of Nefertiti project (as user requirements, training kit)

This list is not final and through the course of the project it is expected to extend or be modified. The type and size of data to be generated in this project in each of the work packages at this point, is summarized in the Annex 1 of this document.

2.1.4 Relation to the objectives of the project

The main objective of the Climate Farm Demo project is to enable European farmers' capacities across the EU to implement, demonstrate and uptake Climate Smart Farming (CSF) practices and thereby reduce their GHG emissions along the project life in accordance with the EU 2030 Climate Target Plan[5]. The main project aim is intended to be achieved through different project activities being to first (1) network Pilot-Demo-Farmers (PDFs) to boost climate smart farming knowledge exchange and cross fertilisation among agricultural sectors and EU and national Agriculture Knowledge and Innovation Systems (AKIS), then (2) support and advise Pilot-Demo-Farmers in implementing and demonstrating the Climate Smart Farming practices to increase innovation uptake and finally, (3) to incentivise the adoption of Climate Smart Farming practices across Europe thanks to standardized methodology and relevant rewarding mechanisms that will support farmers in their systemic transition.

2.1.5 Data size

At the time of drafting this document (approximately M4 of the project lifetime), Work Package leaders involved in tasks and activities that comprise data-related activities have made an estimate of the size of data to be generated as per WP, elaborated in Annex1. However, the exact sizes of data will be available as the project rolls out.

2.1.6 Data origin

Data origin is to be detailed in all deliverables individually. The reuse of existing data or the generation of data within the project will be clearly identified in the respective deliverable. Both new and reused data will be submitted to the ethical clearance by each work package leader and commented on.

2.1.7 Data utility

The data both generated and reused within the CFD project will be utilized by various users, from scientific community, other sister projects, policy makers and end-users. The detailed outline of the expected potential users of the data are outlined in the Annex 1 of this document. Nevertheless, All outputs that are to be made publicly available to the public (project reports, deliverables, scientific papers) will be incorporated on the Climate Farm Demo website. Results and other relevant outputs will be made public on the Farm Demo platform.

[5] https://climate.ec.europa.eu/eu-action/european-green-deal/2030-climate-target-plan_en

Chapter 3

3. FAIR data

The Climate Farm demo project will ensure that the data align with the FAIR principles and to be ‘findable, accessible, interoperable and reusable’. Applying the FAIR guiding principles will warrant that data can be discovered by both humans and machines; data is safely stored and can be made available using standard technical procedures; data can be exchanged and integrated with other data; data originated from the project are well documented and categorized and easily accessed and reused.

3.1 Making data findable, including provisions for metadata

In the Climate Farm Demo project, we will establish our organization for the unique identification of entities. This system will grant all project information and data to be easily found, interconnected, and evaluated.

All scientific publications (peer-reviewed or not) and results needed to validate the conclusions of scientific publications, except if exceptions apply, will be provided, and stored in the trusted repository Zenodo. A general online repository such as Zenodo opens an external URL in a new window. It may also be used for science-related publications, reports, presentations, videos, and other research data, and reserve and award DOIs.

Majority of data from WP8 Dissemination, Exploitation and Communication, will be easily findable, also at project online knowledge reservoirs, project website and platform. Data will be classified and searchable.

3.1.1 Naming conventions

The clear organization of files and assigned names are paramount for the consequent traceability of those files as well as the comprehension of their content. Thereupon, the names of the files need to be assigned in a consistent manner. What more, file names need to be intuitive enabling the user centric organization of files indicating where to find the particular data, as well as the very content of the file.

In the Climate Farm Demo due to the expected high diversity of data, the metadata standards, naming conventions and versioning of all types of data needs to be decided if to be set. Nevertheless, a set of considerations will be contemplated, and guidelines provided, especially recommendations for naming conventions, keywords, etc.

For more general file names of the objects, a naming convention will include information corresponding to and describing adequately the content and version of the object. The document version must accurately specify which version is being edited.

Recommendation is that standard naming conventions of the Climate Farm Demo project deliverables and publications will be used:

- CFD_DX.X_Deliverable Name_WP_VX.X

General files & working documents, should use the following naming convention:

- CFD _meeting_type of document_date

  (ex.: CFD_ExCom_agenda_17012023)

Naming the electronic records and/or files should comply with the following:

- use underscore_ instead of space

- preferably not exceed 250 characters (to ensure it is readable at 32bit and above operation systems)

- if the document is modified contains version number and the date of last modification contains all denominators required for identification of file content

3.1.2 Use of search keyword

With the aim to increase findability, a search keywords approach is strongly recommended for certain contents to enhance findability. The use of search keywords will be relevant and common in the field of competence the data they refer to. It will mainly be used for the web contents, social media posts, reports and, but not limited to, scientific articles.

3.1.3 Metadata creation

The metadata expected to be created during the Climate Farm Demo project will arise from the use of questionnaires. Consequently, all data collected in the questionnaires shall be deemed as metadata and denote a single pilot demonstration farm, experimental farm, or lighthouse farm. Each individual farm will consequently be denoted with the unique number (ex. 001), while metadata describing a particular farm shall use the same identifier - 001. Further, an identifier will be inserted to recognize the country, such as 058_FR; 127.

The demonstration events will be treated similarly, with each demonstration event being denoted with its own unique number, accompanied with the number of the farm where the particular demo event was executed.

This topic will be finalized as the needs for metadata creation within the project are clearly defined, but it will be paramount that the generated metadata is easily reachable and available for use by both humans and machines.

3.2 Making data accessible

Open access to scientific data, knowledge and tools enables their sharing with all relevant knowledge actors, industry, public authorities, academia, and end users as early as possible. It has the potential to increase the quality and efficiency of research and innovation which will lead to greater responsiveness to societal and environmental challenges. Therefore, open access is one of the pivotal requirements in Horizon Europe. Climate Farm Demo will ensure open access as set out in the Grant Agreement specifically detailed in Article 1.1.2.

All scientific publications (peer-reviewed or not) as well as results needed to validate the conclusions of scientific publications unless exceptions apply will be provided and stored in trusted repository Zenodo. General online repository such as Zenodo, opens an external URL in a new window can also be used for science-related publications, reports, presentations, videos and other research data, and reserve and award DOIs.

3.2.1 Openly available data

Data aimed to be accessible only for project consortium will be accessible via software for collaboration (like Teams). Project website will also have a content available for admin users only, while all other data aimed to be publicly available will be hosted at public pages of the project website.

Collection of the data uploaded on the project website will be openly available. This will include:

- Data concerning Pilot Demo farms, Experimental farms and Lighthouse Farms and their activities (including written consent from data owner)

- Data concerning demonstration activities, events, and other accompanying data about: venue, date of event, demonstration, participants, actors, etc.

3.2.2 Making data available

According to the project Grant agreement results are owned by the beneficiaries that generate them (Article 14). However, the beneficiaries must exploit (Article 16) and disseminate their results as soon as feasible, in a publicly available format and under the (Article 17). Consequently, the postulation for the further access rights and regulations are defined for the project partners (Article 17).

The Climate Farm Demo project will ensure that project partners provide mutual access to data in compliance with fair principles in case the necessity occurs to accomplish the project and exploit project results. To other parties, access may be provided in accordance with FAIR principles provided that their exploitation of results will contribute to execution of project aims and will respect confidentiality agreements.

The Climate Farm Demo project will apply the principle of responsible management of research data under the principle ‘as open as possible, as closed as necessary’. Information about the research outputs/tools needed to validate the conclusions of scientific publications or to validate/re-use research data will be stored in trusted federated repositories, including detailed description of the research output.

As stated in the article 3.2. Open access to all scientific publications as well as results, unless exceptions apply, will be provided, and stored in a trusted repository Zenodo. This is a research data repository, functioning on FAIR principles, providing the discovery of the research output by assigning a Digital Object Identifier (DOI) to every upload. It is free of charge enabling research community to share and maintain any research outputs in every size and format. Therefore, this repository represents the natural choice for preservation of research data.

Project deliverables and scientific publications will be made publicly available in the official project’s web site. The uploaded outputs will be named in accordance with the agreed project’s metadata standards.

3.2.3 Methods and tools needed to access the data

BioSense Institute will develop a project web site which will act as a knowledge reservoir for the project results and outcomes. It will also inventor the project deliverables, milestones, certain farm data, information about demonstration events and other project data intended to be publicly available.

A widely used software programs and solutions will suffice to enter the project database and/or platform. Anticipated tools necessary to access the project outputs will be a web browser.

On the contrary, to access the project material like word documents, adobe, mp4 or excel files, videos or pictures, regular Microsoft office system will be sufficient.

3.2.4 Access provision in case of restrictions and open access of sensitive data

Sensitive data concerning the demo farms involved in the Climate Farm Demo project as well as all the information in relation to the data collection (e.g., place and/or time the data was collected, etc) will not be made openly accessible.

In the process of registration of the farm or the demo event all farmers will sign the consent form allowing certain information about their farm data available for wider public on the project platform. Provided that consent form is not signed, all information possible to identify any physical person involved in the project, must be anonymized prior to uploading them on the platform.

Considering any business, economic data, details about the company (i.e. ownership data) and/or tangible assets (i.e. immovable assets, land) shall be deemed as sensitive and will be therefore excluded in the process of data anonymization.

3.3 Making data interoperable

3.3.1 Facilitate data interoperability

Interoperability[6] refers to the functionality of information systems to exchange data and to enable sharing of information. The importance of the interoperability feature of the data reflects in the fact that these data are easily accessible, transmitted and exchanged regardless of their origin or designer. This feature of data or datasets provides the possibility to find, investigate, and comprehend its composition and content. Achieving data interoperability means achieving higher efficiency as well as comprehensive and highly visible data.

Since various partners are involved in the project, which all differ in the data interoperability degree, four types of data interoperability need to be considered:

Foundational Interoperability

The basis of the interoperability of data feature is to establish the ground for data to be sent from one IT system and that the recipient of the data has the possibility to receive the data. This functionality does not require for data to be interpreted.

Structural interoperability

Once the data is sent and received, at this mid-level, it is very important to determine compatible protocols and formats which will facilitate readability of the information received. This entails the fact that data transferred is not altered and are moved in its entirety.

[6] https://edps.europa.eu/data-protection/our-work/subjects/interoperability_en

Semantic interoperability

Once the information is sent and received, it is paramount that the data are interpreted accurately. This feature is facilitated through the structured way in which data are exchanged, but also through coding the data, thus ensuring the computer systems will be able to interpret the data.

Organisational interoperability

Organisational interoperability of data refers mostly to establishing standardized practices as well as policies in the light of data governance. Structured and standardised way of data governance secures the harmonized and well-timed communication between the project partners encouraging seamless and coordinated cooperation.

In the Climate Farm Demo project, the data transmission standards will be ensured through the following:

Type of the data

As still being at the early stages of the project the data formats to be generated or reused throughout the work packages are anticipated, still, the exact data formats and types are yet to be determined as the project unfolds.

At this point anticipated, but not limited to, data format is text, numeric, audio, video, web data, images.

Format of the data

Table 2. Table of data formats

Data	Format	Standard
Text, numeric	Organizing format	.doc, .docx, .xls, .csv
	Encoding character set	ASCII, Unicode
Image	Raster	.jpg, .png, .webp
	Vector	.pdf
Audio	Uncompressed	.wav, .aiff, ,pcm
	Lossless Compressed	.flac, .alac, .mpeg-4, .sls
	Lossy compressed	.mp3, .acc, .wma
Video	Codec	.mp4
	Container	.mp4, .mov, .wav
Web data		.php

3. Transfer of the data

Data transmission in the Climate Farm Demo project will be ensured through the JSON files as the information carriers. JSON is a language-independent file format and is supported by a number of various programming APIs. These files are received and transferred to the recipients through HTTP requests, being common text files, using RESTful API architecture. This type of data transmission is widely accepted and broadly used, thus being compatible with the technologies used by project partners.

4. Rules for data storing and sharing

In the Climate Farm Demo project data will be stored and shared with respect of the GDPR principles.

The Climate Farm Demo project will develop guidelines for data interoperability as the data collected will originate from the diversity of sources. For example, all the tools are able to produce an .xls or .csv export file – especially in the case of WP5.

Interoperability with other related platforms is already considered while planning online reservoir infrastructure. Initiating meetings with projects we want to be interoperable were already held.

3.3.2 Interdisciplinary interoperability

Heterogenous data and datasets from different sources need to be framed to the extent to secure their reuse by various project partners.

In the previous article are stated the policies, principles and guidelines which will be followed in this project with the purpose to facilitate the data interoperability between the different actors and disciplines which make an integral part of the Climate Farm Demo project. Interchange of data will, however, go beyond the scope of this project, in terms of being useful to agricultural community, but will rather be relevant for the use in the other climate conscious sectors.

3.4 Increase data reuse

3.4.1 Data licence

As stated in the Grant Agreement immediate open access to the publications deposited via repository will be under the latest version of the Creative Commons Attribution International Public Licence (CC BY) or an equivalent licence with the possibility to exclude commercial uses and derivative works (e.g., CC BY-NC, CC BY-ND) for longer documents.

With the abundance of licences available it is paramount to opt for the ones that would best fit in the requirements set by the project. The lates versions of licences are listed in the official portal for European data licencing assistant[7].

Following the recommendations by Europe Commission the Climate Farm Demo project brought the unanimous decision to be guided by the rules of the licence CC-BY 4.0[8] by the Creative of Commons.

This licence will enable interested parties to use, reproduce and reorganize the data. However, the data will be available for the use under the obligation to assign proper credit to the author, designate any alterations of the respective document and while maintaining intact the copyright and licence notices.

3.4.2 Data availability for reuse

[7] https://data.europa.eu/en/training/licensing-assistant
[8] https://data.europa.eu/en/training/licensing-assistant?license_id=CC-BY4.0

Earliest project outputs are anticipated to be initiated with the commencing of the demonstration activities, that is in the Q4 of the 2023. The data deemed public shall be made available for re-use as soon as the content is uploaded on the Climate farm Demo website.

The content that is to be made available as the outputs of the Climate Farm Demo activities will comply with the requirements of the Creative Commons licence, as set out in the Grant Agreement. This will make the published material available for re-use with the binding obligation to clearly state the data source and not to be used for the commercial purposes.

3.4.3 Use of data after the end of the project by third parties

All data deemed to be available for the wider audience (e.g., climate smart solutions and practices) shall be published and made available for the further re-use on the project web site even after the project's end. The data to be made available shall comply with the licence as set out in the previous article.

3.4.4 Data quality control

The quality assurance of the data provided during the project will be secured through the operation of project consortium members. They will monitor all the data submitted by the farmers and partner organisations.

All the data provided by the farmers will be uploaded and updated on the project platform by the assigned Climate Farm Demo advisor and will later be maintained only by the persons registered on the platform.

3.4.5 Life span of data after project's end

The outputs will be distributed through trusted knowledge depositories and the project's knowledge reservoir which will be kept alive at least 5 years after the project 's end.

3.4.6 Allocation of resources

The Climate Farm Demo project will make the most use of the services and tools free of cost. Therefore, project partners foresee no costs will incur.

- The publicly available data stored on Zenodo (free of charge)
- Creative Commons copyright licensing (free of charge)
- Project Teams site (free of charge)
- Project web site and platform (free of charge)

Provided that some of the data needs to be stored in the repository unforeseen at this moment and some costs for the data storage still incur, project Executive Committee will bring the final decision whether the data should be stored in the respective repository which needs to be paid and whether the incurred costs will be eligible for reimbursement or not.

3.5 Data security

3.5.1 Secure storage and data recovery

The Climate Farm Demo project beneficiaries guarantee that all data collected during the project will be kept secure and unreachable by unauthorized persons. The data will be handled with appropriate confidentiality and technical security.

All data, as well as entire system will be stored at BioSense data centre. The basic characteristics of the Data Center, among others, are:

• Tier III reliability of the subsystem of power supply and air conditioning. 99.982% availability of the system.

• A diesel engine of 1.6 MW

• Redundant UPS devices in n + 1 configuration

• Dual power supply UPS, dual power supply of machine equipment and IT equipment

• Independent management of power cables and cables of the structural cable system

• Redundant connection to telecommunication infrastructure and multiple connections to international Internet hubs

The company has established Security Policy Information, where is unambiguously stated that the company monitors the process of information usage and prevents deliberate or accidental abuse of data stored in the system. In addition, the company follows ISMS - Information Security Management System - ISO/IEC 27001:2013.

For additional data security, BioSense Institute will run regular backup of all data on daily, weekly, and monthly basis. The data will be stored in the Institute's server, whose characteristics are presented below.

All generated/collected data will be stored on dedicated Data Storage System with dual controllers and dual power supply. Everything stored on those machines are copied on at least three Hard Disc Drives (HDD). In case of failure of one of the HDD, data are secured on two others and within 24 hours the replacement HDD is obtained from the manufacturer. In case of electricity cut offs, dual power supply enables continuum by automatically swapping from electric network to UPS with diesel aggregate.

The data stored in the BioSense Institute Data Storage System are not exposed directly to the end users/internet thanks to two line defence architecture (Figure 1). In the first line there is one Virtual Machine running as a Proxy server for all requests, also taking care of balance load. Calls are then forwarded to another Virtual Machine that can access to the stored data. Thanks to such architecture, even if someone manages to intrude into the Proxy machine, it will not have a direct access to the data, which are hidden behind another Virtual Machine. Moreover, University of Novi Sad proxy/firewall is placed in front of our infrastructure acting as additional protective layer.

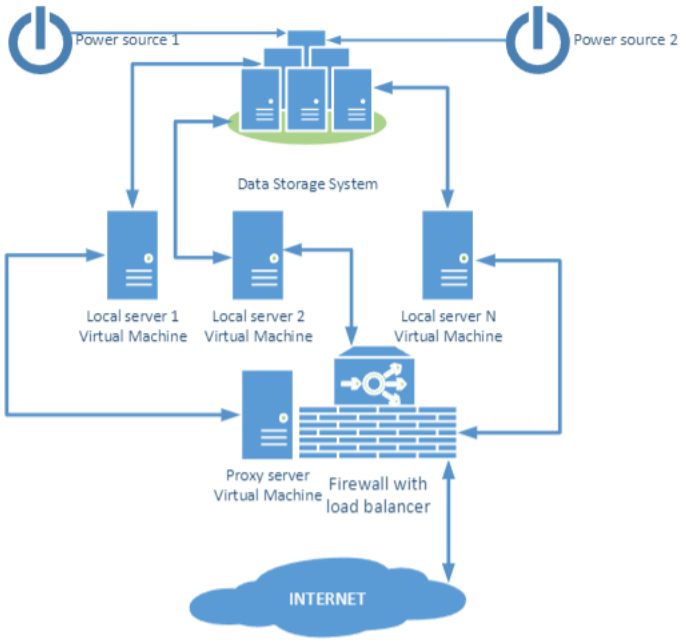

Figure 1. Architecture of the BioSense Institute Data Storage System

The protection of data will also be ensured through procedures and appropriate technologies, like the use of HTTPS protocol for the encryption of all internet transactions. In addition, the server onto which the data will be stored will have server-side encryption allowing administration personnel to generate private keys for data access without access the data themselves. That means that only authorized personnel will have access to the data and even in the case of a possible data leak or server hack the data stolen will be fully encrypted and thus non accessible.

3.5.2 Transfer of sensitive data

Data transfer to and from end-users (including transfer of sensitive data if allowed) is performed encrypted, either sent by encrypted ZIP or RAR files, or download directly as web-based services from servers (e.g. GeoServer). In any case strong password (more than 30 randomly generated characters in order to prevent dictionary or brute force attacks) is required for accessing transferred dataset and passwords must be sent separately from the dataset (preferably using also different channels of communication e.g. texts, Viber,..).

Prior to the sharing for the analysis all data containing sensitive personal information must be anonymized. Anonymization refers to removing any identifier that can reveal identity of the participants both from data and metadata.

Chapter 4

4. Ethics

4.1 Ethical requirements

All foreseen and proposed activities in the scope of the Climate Farm Demo project shall fully comply with the regulations, as set out in the Article 14 of the Grant Agreement. This article clearly states that all activities must be executed in compliance with ethical principles and applicable EU, international and national law, as well as the EU Charter of Fundamental Rights[9] and the European Convention for the Protection of Human Rights and Fundamental Freedoms and its Supplementary Protocols[10]. This article explicitly states that special attention shall be paid to the principle of proportionality, the right to privacy and protection of personal data, physical and mental integrity of persons, non-discrimination as well as the need to ensure protection of environment and high level of human health protection.

Actions regarding the compliance with the principles of confidentiality as set out in the Article 13 of the Grant Agreement, obligate all partners to comply with the EU standards regarding ethics and management of data.

Activities raising ethical issues, like conducting surveys or interviews which entail acquiring personal information, must comply with the additional requirements as set out in the Article 25 of the Grant Agreement.

All tasks as set out in the Climate Farm Demo project are foreseen to comply with the relevant laws and regulations. Where applicable all project partners will be mandated to obtain informed consent of the project participants. Project management will make certain that all needed procedures are carried out and followed, especially taking into consideration the signing, collection and preserving the consent forms from project participants before initiating the process of data collection.

At this stage of the project, as stated in Annex 2, it is anticipated that all work packages will gather some form of personal data and will carry out these activities by supplying additional informed Original hand written and hand signed consent forms from the parties involved. All electronic data shall be stored and protected in the respective online repository, whereas the paper consent forms will be signed by the farmers and safely stored in the office of the related Climate Farm Advisor. Whether anonymisation will be needed is still an open issue since the consent will be required for publishing any personal data.

Other types of forms of ethical issues are not foreseen, which does not liberate project partners from undertaking additional measures should other ethical issues arise during the lifetime of the project.

[9] https://commission.europa.eu/aid-development-cooperation-fundamental-rights/your-rights-eu/eu-charter-fundamental-rights_en
[10] https://www.echr.coe.int/Pages/home.aspx?p=basictexts&c

Chapter 5

5. Other issues

Up to now no other issues have been identified. Should any issues arise, partners will communicate them to the Executive Committee and appropriate measures will be undertaken to tackle the identified issues and the DMP will be updated. Provided that another procedure is to be adopted will be undertaken by the Executive Committee, at the ExCom meeting.

ANNEX 1

Data origin

Data	Which of the following contents do you plan to collect/ reuse	What type of primary data will your WP generate/ reuse?	What different data formats will you use/ reuse	How will the data be collected?/ source of secondary data	What is the purpose of collecting primary data/reusing secondary data?	Expected size of data	What software will be used to manage data?	To whom might the data be useful outside your project?
WP1 Network of Pilot Farms & knowledge exchange								
Primary data	Text Numeric Audiovisual	Interviews Surveys	.pdf .doc/ .docx .xls .csv	through surveys	Farmer data to build the PDF database	/	Microsoft Office	Some farmer data (name and name farm) to all visitors of the website/platform
Primary data # 2				videos, photos, webinar recordings, interviews	Attendance data will be registered at network activities The video and photo's will be used to report on the network activities + to generate comm-unication and training materials. The interviews - for evaluating the network activities for Task 1.6	<100MB	Microsoft Office	EU commision for reporting on the activities & visitors to the platform
Primary data # 3				videos, photos, webinar recordings,	to report on the network activities and to generate communication	>100MB	/	general public

					and training materials			
Primary data # 4				interviews done by NCs, CSAs, TLs and/or task contributors	for evaluating the network activities for Task 1.6	<100MB	Microsoft Office	researchers, if it will be provided on open resource data bases
Secondary data	Text Numeric Audiovisual	Interviews Surveys	.pdf .doc/ .docx .xls	Scientific and grey literature	Writing of the conceptual framework and guidelines	<100MB	Microsoft Office Adobe	
Secondary data # 2				Interviews and surveys	Writing of the conceptual framework and guidelines	<100MB	Microsoft Office Adobe	Researchers, advisors and people interested in (climate smart) KE networks
Secondary data # 3				Data on demo farms from Nefertiti and other FarmDemo projects	Building the platform	/	/	/
WP2 Putting into practice & Monitoring & Evaluation								
Primary data	Text Numeric Instrument-specific	Measurements Interviews Surveys	.pdf .doc/ .docx .xls .csv	From interwiews with farmers using: a specific questionnaire; report/registration made by the farmer for other purpose (e.g. from bookkeeping,	Calculation of carbon emission and removals, Cost-benefit analysis on the influence of investments in carbon farming on the production costs of	<100MB	Microsoft Office Open office	The project Advisors and farmers regulatory compliance, funding applications and environmental certification. The results

				annual inventories, loading and unloading documents)	agricultural products			can support regulatory bodies for better implementation or evaluation of national and EU policies on carbon farming and environmental regulation.
Secondary data	Text Numeric Instrument specific	Measurements Interviews Surveys Experiments	.pdf .doc/ .docx .xls .csv	Statistics and public databases national and EU Farm data from registry offices, technical assistance organisations	The two audits foreseen in the WP involve the collection of a range of consistency and production data that can be obtained in farm (Primay data), but also derived from sources fed with farm's data for other purposes (e.g. herd consistency, UAA, production qua).	<100MB	Microsoft Office	None, only the synthesis will be useful and some documents of the tools owners could be confidential
WP3 Supporting climate smart farming demonstration activities								
Primary data	Text Numeric Audio visual	Measurements Surveys	.doc/ .docx .xls	Pre-registation of events on the project platform Evaluation and report form M&E tools and/or checklists	The data regarding event delivery will allow for the generation on an annual ClimateFarmDemo event report (D3.3), while the data collected through the M&E process will allow for the publication	>100MB	Microsoft Office	Policy makers, advisory actors

					of an annual M&E report			
WP4 Co-Innovating & co-designing new solutions in 10 Living Labs								
Primary data	Text Audio visual	Interviews Surveys	.pdf .doc/ .docx .xls	semi-structured interviews, M&E tools, recordings	Interviews - to get an idea of their motives, hurdles and ambitions related to a new climate smart solution and will help to define the action plan of the living lab M&E tools - to evaluate the effectivity and efficiency of the Living Labs and to collect lessons learned to contribute to successful cocreation of climate smart solutions	≥100MB	Microsoft Office	Scientific publications about the use of Living Labs in cocreation of climate smart solutions in agriculture, Project partners
WP5 Carbon and climate toolbox								
Primary data	Text Numeric Instrument-specific	Measurements Interviews Surveys	.pdf .doc/ .docx .xls .csv	From a cross-analysis between the different tools to be used in the project. We will use the data set of 40 farms which could be	To make a comparison of the tools.	<100MB	Microsoft Office Open office	Guidelines to choose the best tool at farm level for reach the better result considering specific

				existing studies case or commercial farms from WP2				context and objective.
Secondary data	Text Numeric Instrument-specific	Measurements Interviews Surveys Experiments	.pdf .doc/ .docx .xls .csv	inventory of methods and tools, and litterature review	For the comparison of the tools (methodology, data collection, results, environnmental indicators, cost, users obligation, etc.)	<100MB	Microsoft Office	None, only the synthesis will be useful and some documents of the tools owners could be confidential.
WP6 Analysing and demonstrating rewarding mechanisms								
Primary data	Text Audio-visual	Interviews Surveys Other: workshops	.pdf .doc/ .docx .xls .csv	Online survey shared with national coordinators via email	To validate the rewarding mechanism framework (WP6 T6.2 milestone 1) and identify missing elements/collecting feedback	<100MB	Microsoft Office	Other EU projects working on rewarding mechanisms
Primary data # 2				Online survey shared with Pilot Demonstration Farms via email	Analysing farmer (and farm advisors if possible) needs and challenges regarding the use of rewarding mechanisms	<100MB	Microsoft Office	Other EU projects working on rewarding mechanisms

Primary data # 3				Interviews and workshop recordings	Analysing stakeholder needs and challenges regarding rewarding mechanisms for climate smart farming	≤ 100MB	Microsoft Office	Other EU projects working on rewarding mechanisms
Secondary data	Text Numerical Audio-visual	Measurements Interviews Surveys Experiments	.pdf .doc/ .docx .xls	Survey results, Interviews and workshop transcripts, Scientific literature, grey literature, public and private stakeholder communication material, national statistical offices	Survey results and bibliography analysis will be used to develop an assessment framework and a full state of the art/recommendations report on rewarding mechanisms for climate-smart farming. Workshop and interview transcripts, survey results, and literature will be used to analyse stakeholder needs and challenges regarding rewarding mechanisms for climate-smart farming	≤ 100MB	Microsoft Office Adobe	Other EU projects working on rewarding mechanisms
WP7 Linking and coordinating with other projects, initiatives and policy-makers (PIPs)								
Primary data	Text Numeric	Interviews	.pdf .doc/	Activities reports: The events, meetings,	Activities reports: To contribute to the enhancement and adaptation of	>100MB	Microsoft Office	Other projects, initiatives and

	Audiovisual Instrument-specific	Surveys Reports	.docx .xls	workshops and conferences organized will be monitored through indicators and templates checklists, reports. Interviews to WPLs, TLs and NCs: will be conducted through online meetings. Survey's collected: online, and in situ when events happen, online or written forms, facilitated discussions, etc	WP7 activities based on previous evaluations and reports. Interviews to WPLs, TLs and NCs: to summarize the inputs needed by these actors for the development of CFD. The data retrieved on these interviews will contribute to the planning of WP7 activities. Survey's collected: At first, to identify the needs of CFD's partners in terms of organizing the project and planning in the initial years. Towards the end, the sustainability of the network will be acessed through surveys. Interviews/meetings/workshops to policymakers.		Air Table	policymakers, European Comission, DGAgri and DGClima, Research institutes, organizations, universities
Secondary data	Text Numeric	Surveys	.pdf .doc/ .docx .xls	Outputs from other demonst. projects: AgriDemo, PLAID, Nefertiti. Outputs from projects and initiatives related to AM	Planning purposes of the synergies thematics. Contribute to the development of our project.	>100MB	Microsoft Office Air Table	Sister projects: ClimateSmart Advisors and Linking Research Stations

				to Climate Change: ClienFarms, IPMWorks, etc. Meetings with Projects, Initiatives and Policymakers.	Building the sustainability plan based on the outputs of FarmDemo Projects.			
WP8 Dissemination, Exploitation and Communication								
Primary data	Text Numeric Audiovisual Instrument specific	Interviews Surveys	.pdf .doc/ .docx .xls .csv MP4, JPEG, PNG, WEBP	questionnaires, physical and online events	User requirements for platform and website development Data for farm registration and demo events registration. Data for project events registration. Information about partners media channels and other. Information about project participants and web site visitors.	>100MB	Microsoft Office Adobe OpenOffice	
Primary data # 2				interviews, questionnaires and through in-person and online workshops	User requirements regarding Online knowledge reservoir to define the scope of the work which needs to be done	<100MB	Microsoft office Adobe	Potentially, to other topic-related project partners who will be developing similar online

					through a set of questions to be compared, analyzed and segmented for the proper development of project website and platform			infrastructure for purposes of their projects
Secondary data	Text Audiovisual Instrument specific	Data about registered Demo farms collected for purpose of other content-wise similar EU projects like Nefertiti, IPM Works, etc	.pdf .doc/ .docx .xls .csv	Online knowledge reservoir of Nefertiti project	Registered farms from topic-related projects will be used as a starting data point for Demo farms in CFD project before new Demo farms will be registered originally during the CFD project implementation. Data will include info about the registered Demo farm, topic of activities, its location, specialization, contact details (if approved) and other data.	>100MB	Microsoft office Microsoft Excel and Custom software for data transfer between old and new platform	for all partners and actors at the EU level who deals with demonstration events at european farms for knowledge exchange, innovation exchange and networking
Secondary data # 2				Online knowledge reservoir of Nefertiti project, and potentially some other similar project	Some tools, guidelines, and methods already developed during Nefertiti project, and some other similar projects could be of use for the Climate Farm Demo project goals. Example: Farm Demo Training Kit	<100MB	Adobe	all partners and actors at the EU level who deal with demonstration events at EU farms for knowledge exchange, innovation spreading and networking

ANNEX 2

Ethics

Informed consent	Other types of forms of ethical issues	Organisation and storage of consent files in paper form	The use of personal data	Pseudonymisation techniques and/or anonymisation softwares (e.g. Amnesia)
WP1 Network of Pilot Farms & knowledge exchange				
Yes	No	The paper forms will be signed by the farmers and safely stored in the office of the related CFA.	Yes	We don't know yet whether anonymisation will be needed (we will ask consent to publish personal data)
WP2 Putting into practice & Monitoring & Evaluation				
Yes	No	Electronic PDF documents To be defined	No	No
WP3 Supporting climate smart farming demonstration activities				
Yes	No	/	Yes	No
WP4 Co-Innovating & co-designing new solutions in 10 Living Labs				
Yes	No	Each individual LL will store these files	Maybe	No
WP5 Carbon and climate toolbox				
Yes	No	Electronic PDF document	Yes	Yes

		I don't know at this stage of the project		
WP6 Analysing and demonstrating rewarding mechanisms				
WP7 Linking and coordinating with other projects, initiatives and policy-makers (PIPs)				
Yes	No	The consent files will be in an online format	Yes	No
WP8 Dissemination, Exploitation and Communication				
Yes	No	/	Yes	No

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