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Second update of the Data Management Plan

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Brief Description	This document aims to be a master plan and a manual to guide and facilitate the Consortium on how to collect, produce, manage and reuse data of the Project "Demonstration of water loops with innovative regenerative business models for the Mediterranean region, HYDROUSA" Grant Agreement No 776643. The current version was created on the 60th month of the project and contains updated information.
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TABLE OF CONTENTS

Document Information 2
Table of Contents 4
List of tables 7
List of figures 7
Executive Summary 8
Abbreviations 9
1. Introduction 10
1.1 What is DMP 10
1.2 Purpose of Data Management Plan 10
1.3 Objective of the initial DMP 10
2. DATA SET NO 1: HYDROUSA MANAGEMENT DATA 11
2.1. Data Summary 11
2.2 Fair Data 12
2.2.1 Making data findable, including provisions for metadata 12
2.2.2 Making data openly accessible 13
2.2.3 Making data interoperable 13
2.2.4 Increase data re-use (through clarifying licenses) 13
2.3 Allocation of resources 13
2.4 Data security 13
2.5 Ethical aspects 13
2.6 Other issue 14
3 DATA SET NO 2: USER REQUIREMENTS AND CO- CREATION & TRAINING ACTIVITIES 15
3.1 Data summary 15
3.2 Fair Data 17
3.2.1 Making data findable, including provisions for metadata 17
3.2.2 Making data openly accessible 18
3.2.3 Making data interoperable 18
3.2.4 Increase data reuse (through clarifying licenses) 18
3.3 Allocation of resources 18
3.4 Data security 18
3.5 Ethical aspects 18

3.6 Other 19
4 DATA SET NO 3: DESIGN AND INSTALLATION DATA OF HYDRO 1-6 20
4.1 Data summary 20
4.2 Fair data 23
4.2.1 Making data findable including provisions for metadata 23
4.2.2 Making data openly accessible 24
4.2.3 Making data interoperable 24
4.2.4 Increase data re-use (through clarifying licenses) 24
4.3 Allocation of resources 24
4.4 Data security 24
4.5 Ethical aspects 24
4.6 Other 24
5 DATA SET NO 4: DISSEMINATION DATA 25
5.1 Data summary 25
5.2 Fair Data 27
5.2.1 Making data findable including provisions for metadata 27
5.2.2 Making data openly accessible 28
5.2.3 Making data interoperable 28
5.2.4 Increase data reuse (through clarifying licenses) 28
5.3 Allocation of resources 28
5.4 Data security 29
5.5 Ethical aspects 29
5.6 Other 29
6 DATA SET NO 5: PERFORMANCE DATA OF HYDRO1-6 30
6.1 Data summary 30
6.2 Fair Data 31
6.2.1 Making data findable including provisions for metadata 31
6.2.2 Making data openly accessible 32
6.2.3 Making data interoperable 32
6.2.4 Increase data re-use (through clarifying licenses) 32
6.3 Allocation of resources 33
6.4 Data security 33
6.5 Ethical aspects 33
6.6 Other 33
7 DATA SET NO 6: TRANSFERABILITY DATA 34

7.1 Data Summary 34
7.2.1 Making data findable including provisions for metadata 36
7.2.2 Making data openly accessible 36
7.2.3 Making data interoperable 36
7.2.4 Increase data re-use (through clarifying licenses) 37
7.3 Allocation of resources 37
7.4 Data security 37
7.5 Ethical aspects 37
7.6 Other 37
8 DATA SET NO 7: ENVIRONMENTAL, ECONOMIC, SOCIAL and CIRCULARITY ASSESSMENT DATA 38
8.1 Data summary 38
8.2 Fair Data 41
8.2.1 Making data findable including provisions for metadata 41
8.2.2 Making data openly accessible 42
8.2.3 Making data interoperable 42
8.2.4 Increase data re-use (through clarifying licenses) 42
8.3 Allocation of resources 42
8.4 Data security 42
8.5 Ethical aspects 42
8.6 Other 43
9 DATA SET NO 8: EXPLOITATION DATA 44
9.1 Data Summary 44
9.2 Fair Data 48
9.2.1 Making data findable, including provisions for metadata 48
9.2.2 Making data openly accessible 49
9.2.3 Making data interoperable 49
9.2.4 Increase data reuse (through clarifying licenses) 49
9.3 A Allocation of resources 49
9.4 Data security 49
9.5 Ethical aspects 49
9.6 Other 50

LIST OF TABLES

Table 1. Deliverables of Project Management (WP1) 11
Table 2. Summary of co-creation activities implemented within HYDROUSA project 15
Table 3. Deliverables related to data set No 2: User requirements and other workshops 16
Table 4. Deliverables that include design and installation data 20
Table 5. Deliverables of Communication, community building, dissemination (WP9) 26
Table 6. Metadata of dataset No 4 27
Table 7. Deliverable that includes performance data 31
Table 8. Deliverables that include transferability data 35
Table 9. Deliverable that includes circularity assessment data 40
Table 10. Data created / used for the development of the 6 exploitation scenarios 44
Table 11. Deliverables related to data set No 9 45

LIST OF FIGURES

Figure 1. Data life cycle 10

EXECUTIVE SUMMARY

The current document (D1.5) is the second updated version of the Data Management Plan (DMP) of the project ''*Demonstration of water loops with innovative regenerative business models for the Mediterranean region, HYDROUSA*" Grant Agreement No 776643''. This deliverable is based on the first and second versions of the DMP (D1.3 & D1.4) and has been updated in the light of progress made in the collection, production, management and reuse of HYDROUSA's project data.

This deliverable was formed in line with the "*Guidelines on Data Management in Horizon 2020*" (version 3 issued in July 2016) and the "*Guidelines on Open access to Scientific Publications and Research data in Horizon 2020 (version 3.2 issued in March 2017)"*.

The Data Management Plan (DMP) is not a fixed document but evolves as the project develops. More specifically, the first version of the DMP (D1.3) was delivered in the 6th month of the project (December 2018). To achieve proper management of the project's data, an overview of the data sets generated by the HYDROYSA project and the special terms that accompany them was presented. Then, in the 18th month of the project, the DMP was updated, while the first updated version was prepared and submitted as deliverable (D1.4) at month 30. During the second reporting period (up to M36), the data management plan of the project was updated again. Specifically, the level of storage and accessibility of the HYDROYSA project data was further enhanced through the development of an open access data repository. Zenodo is an innovative and easy to use web-platform supported by the EC (via the OpenAIRE projects) and CERN allowing researchers to maintain and share their research results without any restrictions on size and format. In order to promote knowledge-sharing, all academic publications developed by the partners of the HYDROUSA project are uploaded to the Zenodo platform. In addition, Zenodo allows the deposition of all types of digital content such as multimedia, software, presentations, etc., while a Digital Object Identifier (DOI) is provided to all uploaded data. The current document (D1.5), is the final version of the DMP of HYDROUSA project which include the different types of data that were generated and collected over the whole lifetime of the project, the standards used, the way in which the research data and parts of the datasets are preserved and distributed and reused.

HYDROUSA has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 776643.

ABBREVIATIONS

AGENSO	**AGRICULTURAL &ENVIRONMENTAL SOLUTIONS**
ALCN	**Alchemia Nova**
CO	**Coordinator**
DMP	**Data Management Plan**
DPO	**Data Protection Officer**
ExC	**Executive Committee**
GDPR	**General Data Protection Directive**
IHA	**Impact Hub Athens**
IP	**Intellectual Property**
NTUA	**National Technical University of Athens**
QRs	**Quarterly Reports**
SCADA	**Supervisory Control and Data Acquisition**
SME	**small and medium-sized enterprises**
WP	**Work Package**

1. INTRODUCTION

1.1 What is DMP

Figure 1 illustrates the complete life cycle of data generated throughout the project. The Data Management Plan (DMP) describes the different types of data that are generated and collected over the lifetime of the project, the standards used, the way in which the research data and parts of the datasets are preserved and then distributed and reused.

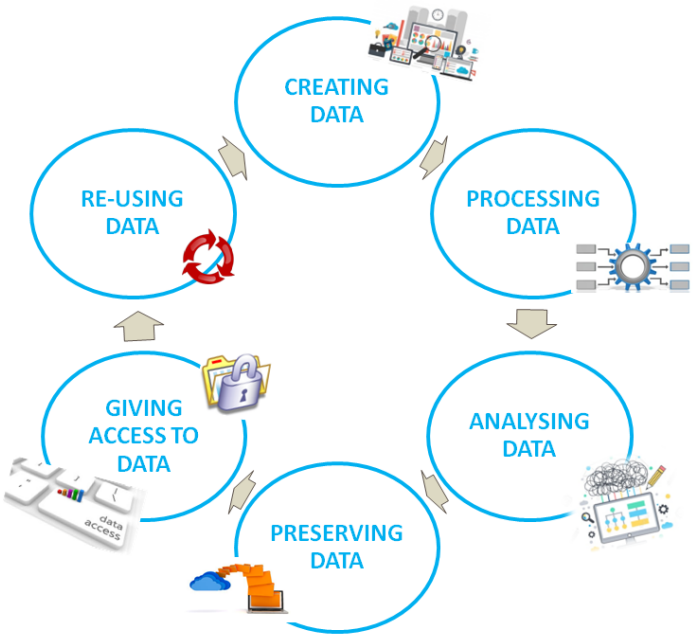

Figure 1. Data life cycle

1.2 Purpose of Data Management Plan

The DMP aims to provide an analysis of the key elements of the data management policy that is applied in the HYDROUSA project and is used by the Consortium regarding the project's data.

1.3 Objective of the initial DMP

The basic objective of the current document is to specify how data is collected, processed, monitored, catalogued and disseminated. It addresses: (i) data set reference and name, (ii) data set description, (iii) confidentiality, (iv) standards and metadata, (v) data dissemination and policies for data sharing and public access, (vi) plans for archiving and preservation, (vii) intellectual property (IP) protection roadmap, including selection of data streams for external publication, to avoid conflicts with IP protection. The DMP is not a fixed document but evolves as the project develops. More specifically, this document is the second updated version of the DMP, submitted in the 60th month of the project (June 2023). To achieve appropriate and effective project data management, an overview of the datasets generated by the HYDROUSA project and the specific terms that accompany them is provided below.

2. DATA SET NO 1: HYDROUSA MANAGEMENT DATA

2.1. Data Summary

The purpose of data collection is to document all data collected/generated during the project's implementation by the HYDROUSA consortium. The file formats generated and collected in this dataset are:

Presentations: Since the beginning of the project, many PowerPoint presentations were developed (project meeting presentations, presentation at conferences, workshops, seminars etc.) during the project's lifetime. Usually, these presentations were in the context of management, dissemination and exploitation activities. The files created by the responsible member of the project for each presentation were sent to the coordinator in the form of .pptx files using the Microsoft PowerPoint software. The size of presentations cannot be estimated, as it varies depending on the media it contains.
Meeting minutes: Within HYDROUSA project, a total of ten project management meetings were held, once every 6 months. At least one representative of each partner was present at these meetings, as important decisions were taken on the technical, financial, legal, administrative, dissemination and communication activities of the project, as well as on the resolution of conflicts. In addition, teleconferences of the Executive Committee (ExC) were usually held about every 2-3 months, attended by the leaders of all work packages (WPs) and chaired by the coordinator (CO). These meetings served to monitor the progress of the project and to avoid potential risks. During these meetings, minutes were kept as an official document recording all decisions made, members involved, meeting location and discussions held during the meeting. The minutes are saved as Word (.docx) and PDF (.pdf) files, stored on a private server by CO and used by the members of the HYDROUSA project as a reference for what was discussed and decided. The size of these documents does not exceed the storage space of 2 MB each.
Quarterly reports (QRs): The WP leader, together with the leaders of each task, prepared a quarterly report every three months to present the progress of their WP. All quarterly reports were submitted to the CO in the form of a document (.docx) for review. The final version was then saved on the private server as a PDF document (.pdf) so that each partner could be updated on the progress of the project. The size of each QR did not exceed 15 MB.
Deliverables: Project management (WP1) contains 7 deliverables that were successfully developed and submitted during the project, which are presented in **Table 1**.

Table 1. Deliverables of Project Management (WP1)

Deliverable	Title	Dissemination level	Scope
D1.1	Consortium Agreement	Confidential	The signed agreement among partners which specifies in detail the following: Monitoring project progress, Partner communication, Risk assessment and contingency planning, Decision making and conflict resolution, intellectual property rights and distribution of resources.
D1.2	Project Management Plan	Confidential	It consists of the project plan and structure, project governance, quality standards for project deliverables and procedures.

D1.3	Data Management Plan	Public	It specifies how data collected, processed monitored, catalogued and disseminated. It addressed: (i) data set reference and name, (ii) data set description, (iii) confidentiality, (iv) standards and metadata, (v) data dissemination and policies for data sharing and public access, (vi) plans for archiving and preservation, (vii) IP protection roadmap, including selection of data streams for external publication, to avoid conflicts with IP protection.
D1.4	First Update of the Data Management Plan	Public	As the DMP changed during the project, more extended versions were included as additional deliverables.
D1.5	Second Update of the Data Management Plan	Public	As the DMP changed during the project, the final version of the DMP was included as additional deliverable.
D1.6	Green event leaflet	Public	It supports all partners to hold green events for at least internal meetings. It sets guidelines for internal (among partners), but also external use.
D1.7	Risk management Plan	Public	It identifies the project risks, their probability of occurrence and their severity. It also describes proposed risk mitigation measures to achieve successful project implementation, including actions to mitigate the COVID-19 issues.

The responsible partner for each deliverable documented it and delivered it to the Consortium in the form of a document (.docx) for internal review before submission to the EU portal, while the final version was saved as a PDF (.pdf) document and stored in the CO's private server. The size of each deliverable was not constant, on average each deliverable was about to 4-5 MB.
The aforementioned data will not be reused in the future. In addition, the data contained in data set 1 was used as a reference, especially among the partners of the HYDROUSA project.

2.2 Fair Data

2.2.1 Making data findable, including provisions for metadata

The data that was collected in this set was saved as a PDF format, so this data cannot accept changes and formatting in the future (no versioning). Subsequently, metadata is not expected to be used, as it is confidential data stored on a private server and cannot be findable. Deliverables D1.3, D1.4, D1.5, D1.6 and D1.7 are available for access, as these deliverables are classified as ''public'' under grant agreement No. 776643. In addition to D1.5, which will be uploaded to the HYDROUSA website after the end of the project, the aforementioned deliverables have been uploaded to the project website (www.hydrousa.org), under the

tab RESULTS and any interested party is able to access them from the navigation menu. The name convection of the data determined is as follows:

- **HYDROUSA – Data management plan.pdf**
- **HYDROUSA – First update of data management plan.pdf**
- **HYDROUSA – Second update of data management plan.pdf**
- **HYDROUSA – Green event leaflet.pdf**
- **HYDROUSA – Risk Management Plan**

2.2.2 Making data openly accessible

As already mentioned, the data of this collection is confidential and is stored on a private server by the project coordinator. Only members of the consortium have access to this dataset. On the contrary, the deliverables that are openly available are stored in a pdf file format and then can be opened with the use of the "Adobe Acrobat Reader" software (free) without any restriction.

For example, deliverables D1.3, D1.4, D1.6 and D1.7 of WP1 are already available to the public through the project website (www.hydrousa.org).

2.2.3 Making data interoperable

The openly available deliverables were stored in pdf format and can only be used as a reference.

2.2.4 Increase data re-use (through clarifying licenses)

As specified in the Grant Agreement the data from Deliverables D1.1 and D1.2 are confidential; in extent, there can be no data re-use for it. The following deliverables are public: D1.3, D1.4, D1.5, D1.6 and D1.7. The above deliverables are openly available and can be used freely by any interested party, as they have already been uploaded on the HYDROUSA website (**www.hydrousa.org**). This way data reuse can be enhanced. For the deliverables that are openly accessible (D1.3, D1.4, D1.5 and D1.6), the 'Creative Commons Attribution-Non Commercial-No Derivatives 4.0 International Public License' will be used to allow potential parties to freely use them.

2.3 Allocation of resources

The cost of data collection has been included in HYDROUSA budget, specifically in WP1 as personnel cost.

2.4 Data security

The management dataset is stored on a private server and can only be shared with members of the HYDROUSA consortium. The publicly available deliverables are hosted on the server's website, following the host's security protocols. Periodically, the private server backs up all the files externally to ensure that the dataset is recovered safely.

2.5 Ethical aspects

The minutes of the project's meetings fall into the "ethical aspect" area, as the positions of each member are recorded. Accordingly, at the beginning of each meeting, all members were informed and, after giving their consent, the minutes were recorded.

2.6 Other issue

Not applicable

3 DATA SET NO 2: USER REQUIREMENTS AND CO- CREATION & TRAINING ACTIVITIES

3.1 Data summary

This section is related to the data collected from the co-creation and training activities carried out in the 6 demonstration areas of HYDROUSA project. These activities aimed at involving the community, collecting inputs, including the public and stakeholders in the decision-making process for the design specifications of the project systems and their participation in the evaluation process. Specifically, the purpose of the user-requirement dataset is to consider the requirements of end-users as well as stakeholders located in demonstration sites, regarding the concepts of agroforestry and fertigation, in terms of the online monitoring and control of irrigation systems. These requirements have been used in the design, performance and control of the aforementioned systems so as to truly meet the needs of end users as extensively described in Deliverable D5.3 - Updated user requirements and specifications definition. Following the requirements of the General Data Protection Regulation (EU) 2016/679 (GDPR), all participants were informed about the project as the Participant Information Sheet was given to them, and they were asked to fill in the consent form developed. These documents have been developed in Deliverable 10.2.

Table 2 presents the co- creation activities that were carried out within the HYDROUSA project.

Table 2. Summary of co-creation activities implemented within HYDROUSA project

Location of Event	Stakeholders	Type of community activities Activity	How activities shaped results
Lesvos HYDRO 1 & HYDRO 2	Municipalities, water utilities, farmers, farmers' associations, SMEs, citizens	Interviews Workshops Meetings Summer Schools Open Days Seminars Questionnaires	Plant selection in agroforestry Monitoring & controlling platform Data Repository and Application programming interface (API) Precision Irrigation Application permit for HYDRO1 Raising Awareness on reclaimed water
Mykonos HYDRO 3 & HYDRO 4	Municipalities, water utilities, farmers, SMEs, Ecotourist facilities, citizens	Interviews Summer Schools Workshops Open Days Seminars Questionnaires	Monitoring & controlling platform Data Repository and API Precision Irrigation Essential Oils extraction
Tinos HYDRO 5 & HYDRO 6	Municipalities, water utilities, farmers, farmers' associations, ecotourist facilities, public	Interviews Workshops Summer Schools Open Days Seminars Questionnaires	Monitoring & controlling platform Precision Irrigation "Market Garden" Permaculture Essential Oils extraction

Different approaches were used by the IHA team in each co-creation activity, depending on the objectives of each event, with the aim of the smooth integration of the community in the HYDROUSA project. In addition, a questionnaire was developed by ALCN in collaboration with the IHA team to understand local dynamics and

politics, the socio-cultural environment, the economic situation and the potential opportunities and obstacles that may arise. The questions contained in the questionnaire relate to water consumption in the demonstration areas, existing water and wastewater treatment methods, as well as water requirements for agricultural activities. The questionnaire was focused on qualitative data and was realised to individual live interviews during the visits of IHA and ALCN. The purpose was to identify the approach and the content that would be used for each local community, to ensure relevance and adaptability. The aggregated results of the data collected informed the content of the activities that were dedicated to the local community, including community building activities, stakeholders' meetings, seminars etc.) as analytically described in D9.6 Co-creation and training activities. The results of the interviews are also reflected to the chosen methodologies described in D4.1 Plan for participatory model for community engagement.

The process of determining the user's requirements was divided into 2 phases. The preliminary phase took place on the islands of Mykonos, Lesvos and Tinos through interviews. Questionnaires were designed by the AGENSO team, where stakeholders answered questions about the water and wastewater treatment / reuse system that will be developed at each demonstration site and the potential implementation of low-cost sensors. It is worth noting that the interviews were structured in such a way as to meet the different needs of each system.
These questionnaires provided the consortium with important information regarding:

- The measurements parameters and the automation capabilities that the various stakeholders are interested
- The platform functionalities
- The technical characteristics of the ICT components

The other seminars/workshops that were implemented where aiming at explaining the benefits arising by HYDROUSA technologies bringing together:

- Decision makers including water authorities, regional authorities, municipalities bringing their perspective on the current status quo, and
- Other stakeholders including industries, environmental companies, water and wastewater treatment plant operators, water utilities.
- General public

In addition, based on the results obtained from these surveys, the following deliverables were created and stored as pdf format (**Table 3**).

This data collection was particularly useful for the project consortium, but also for the efficient operation of HYDROUSA systems.

Table 3. Deliverables related to data set No 2: User requirements and other workshops

Deliverable	Title	Dissemination level	Scope
D4.1	Plan for participatory model for community engagement	Public	A comprehensive plan for the engagement of the community was developed through a participatory model. The focus of the model includes methods of engaging community members, including them in the decision-making process and evaluation of HYDROUSA activities and especially in co-creation

			activities. The plant was developed from the results of public workshops.
D4.3	Catalogue of selected plants, description, availability and product development options	Public	D4.3 includes a comprehensive catalogue of all the plants and crops that will be grown on the site. The catalogue was developed with the help of the local community through the participatory model defined in D4.1 and especially for the agroforestry system through co-creation workshops, interviews and questionnaires from which an ethnobotanical study was also created, as well as the soil analysis that was carried out. The catalogue includes the descriptions, availability, market price and prospects of the selected plants.
D5.2	User requirements and specifications definition	Public	It presents the conducted survey and focus groups results and focuses on the most important aspects users find useful.
D5.3	Updated user requirements and specifications definition	Public	It presents an updated version of D5.2 including the findings from the co-creation activities.
D9.6	Report on the co-creation and training activities	Public	We build social and physical on-site learning environments aiming to engage and connect directly with the local community with the HYDROUSA project. These co-creative activities (info points, summer schools, Hackathon, Residencies and workshops) were our point of monitoring and collecting user requirements that shape future development and scaling decisions. D9.6 provides information on all the workshop activities implemented for HYDROUSA.

3.2 Fair Data

3.2.1 Making data findable, including provisions for metadata

The data collected here is confidential and is stored on a private server by the project coordinator. Only members of the consortium have access to this dataset. However, the deliverables that have resulted from the analysis of the questionnaires are openly available. Specifically, D4.1, D4.3, D5.2 and D5.3 were stored as a pdf file and can be opened using "Adobe Acrobat Reader" software (for free) without any restrictions, while D9.6 will be available after the end of HYDROUSA project. Each interested party can locate the desired document using the navigational menu of the website (www.hydrousa.org), under the tab RESULTS.
Metadata will not be created, since this dataset will not be changed once the data is approved by the EC, thus, no versioning is required.
The name convection of the aforementioned data is as follows:

- **HYDROUSA - Plan for participatory model for community engagement.pdf**
- **HYDROUSA - Catalogue of selected plants, description, availability and product development options.pdf**
- **HYDROUSA - User requirement and specification definition.pdf**
- **HYDROUSA - Updated user requirement and specification definition.pdf**
- **HYDROUSA - Report on the co-creation and training activities.pdf**

3.2.2 Making data openly accessible

As already mentioned, this data set is confidential and is stored on a private server by the project coordinator. Only members of the consortium have access to the questionnaire results file, as it contains confidential information. However, the analysis of these results is part of D4.1, D4.3, D5.2, D5.3 and D9.6 which are /will be freely available in pdf format and can be opened using Adobe Acrobat Reader software (free) without restriction.

3.2.3 Making data interoperable

The deliverables file was stored in pdf format and can only be used as a reference.

3.2.4 Increase data reuse (through clarifying licenses)

The ''Creative Commons Attribution-Non Commercial-No Derivatives 4.0 International Public License'' is used for all deliverables that are openly available through the project website and belong to this dataset, so as to allow potential parties to freely use them.

3.3 Allocation of resources

The cost of this data collection has been included in HYDROUSA budget; specifically in the personnel cost of WP4, WP5 and WP9.

3.4 Data security

The publicly available deliverables are hosted on the server's website, following the host's security protocols. The data is also stored on the private server, which backs-up all files externally at regular intervals to ensure that the data set is safely retrieved.

3.5 Ethical aspects

The data obtained from the results of the questionnaires fall into the ethical area. The initial results of the questionnaire contain personal information of the participant and cannot be made public. In order to maintain the anonymity and confidentiality of the participants, the results of the questionnaires are private on the server and are even limited among the members of the consortium. Mr Zisis Tsiropoulos from the company AGENSO has been appointed as Data Protection Officer (DPO) of HYDROUSA project. According to the General Data Protection Directive (GDPR) 2016/679 he is responsible for maintaining the anonymity and distributes the file in the interested partners with caution. The SME AGENSO is a project partner and is dealing with the development of platforms for the management of data in the project. AGENSO has significant experience in the implementation of procedures for data management within existing HORIZON2020 projects. ***It is worth noting that the protocol and the criteria for the identification and recruitment of research participants***

described in the deliverables D10.2 (H – Requirement No.2) and D10.3 (POPD – Requirement No.3) were strictly applied.

3.6 Other

Not applicable

4 DATA SET NO 3: DESIGN AND INSTALLATION DATA OF HYDRO 1-6

4.1 Data summary

The purpose of this dataset is to collect the data required for the development of the HYDROUSA systems in the 6 demonstration sites, HYDRO 1-6. The origin of these data is personal work by the members of the consortium and therefore these cannot be re-used. The data contained in this set are technical descriptions and methodologies, calculations and flow charts.

The expected file size of this dataset cannot by accurately estimate. This data is saved in the project's private server and accessed only by the consortium members. This dataset is extremely valuable to the members of the consortium in general.

The formats of the files that were generated and collected in this dataset are:

- Microsoft Word documents (.docx) for the technical descriptions
- Microsoft Excel documents (.xlsx) for the calculations and for the flow charts (potentially)
- AutoCAD files (.dwg) for the drawings which were produced for the design of the systems.
- JPEG, PNG AND GIF formats for images from systems installation and running in demo sites

From this set of data, 13 deliverables will be developed as listed in **Table 4**. Out these deliverables, D2.1, D2.3, D2.5, D3.5, D3.6 and D4.2 are confidential, while D2.2, D2.4, D2.6, D3.1, D3.2, D3.3, D3.4 and D3.7 are public. Confidential deliverables are accessible only by members of the consortium. All the deliverables are stored on the private server as pdf format. The Deliverables, which are public, are available on the project's website freely available for download by the interested parties.

Table 4. Deliverables that include design and installation data

Deliverable	Title	Dissemination level	Scope
D2.1	Design of rainwater management system	Confidential	It consists of the development of the design methodology and drawings of the rainwater management systems HYDRO3&4, including technical description, methodology, calculations and drawings of the systems. The design concepts i.e. technical description, methodology, calculations, pictures and drawings were different for the two proposed rainwater management systems. The exact amount of recovered rainwater and surface runoff, the precise infrastructure location, the upgrade and maintenance of the configuration, the necessary treatment activities, as well as remote monitoring installations is determined in the scope of this deliverable report.
D2.2	Rainwater management systems	Public	The intended systems' function is described in a comprehensive report including the technical drawings of the design phase, several photographs of the construction process and description of the final setup.

	installed and running		
D2.3	Design of the Mangrove Still Upgrade	Confidential	The design concepts and prototypes were conceived according to the problem-solving method Biomimicry. The results from the workshop following this methodology and drawings of the Mangrove Still Upgrade, including technical description, methodology, calculations and drawings of systems were included in this deliverable.
D2.4	Mangrove Still prototype installed and running	Public	The Mangrove Still is up-scaled to a system, where saltwater is evaporated and condensed inside the structure. A greenhouse is fed with the produced water. The high humidity within the greenhouse allows tropical/subtropical growing conditions for plants. This deliverable includes details about the development and the prototype assembly process. The accompanying report contains photos, schemes and functions of the Mangrove Still and Greenhouse prototype.
D2.5	Upgrade of the decentralized ecotourism water management system	Confidential	Description of the implemented upgrade's in ELT overall water management plan, taking into account water collection, storage and use by the development of prototype systems. The difficulties of upgrading a running off-grid system are addressed and the overall system is outlined in drawings, pictures, and calculations. The benefits and drawbacks of the implementations are addressed.
D2.6	Demonstration of eco-tourist water loops	Public	This demonstrator is approved with photographs of the installed, prototype rainwater harvesting and storage systems and the established water vapour catchment systems.
D3.1	Design of the UASB and biogas upgrade	Public	D3.1 comprises the detailed design methodology of the upflow anaerobic sludge blanket, including sizing, electrical connections and preliminary control manoeuvres. It includes the technical description with methodology including a section on the benefits and limitations of the technology, preliminary design calculations with adequate explanations and drawings of the system. A list of the elements required for the build-up (brand, model, materials, main characteristics, power, etc.), as well as a P&ID were included as well. The design of the equipment attached to the UASB (namely the biogas storage and the biogas upgrade system), was described herein as well. Finally, a list of considerations for the operation of the systems (serving

			as a preliminary operation manual) and safety instructions were included.
D3.2	Design of the constructed wetlands	Public	D3.2 consists of the detailed design methodology and drawings of the full-scale wetland including technical description with methodology, detailed design calculations and drawings of the system. A list of the elements/materials required for the build-up as well as a P&ID were included as well. Furthermore, a description of the two pilot scale wetlands (bio-electrified wetland and aerated wetland) was included.
D3.3	UASB and biogas upgrade installed and operating	Public	D3.3 presents the developed and fully operative, prototype UASB system together with the attached equipment (biogas storage and upgrade systems), according to the calculations and additional information shown in D3.1. In D3.3 a series of photos, drawings and P&ID of all the different systems and sub-systems with appropriate description, including piping, electrical connections and 2-D and 3-D implementation plans were presented. A detailed list of every piece of equipment included in the plant (pumps, sensors, valves, etc.), together with their respective operating manuals and a description of their function within the plant were provided. The deliverable incorporates a description of the construction, installation, and start-up of the entire plant. Special attentions were paid to the preliminary hydraulic and safety tests, which were duly documented. It also describes the development challenges and how these were resolved. Finally, the Deliverable comprises an in-depth operation manual for the entire system and safety instructions for its use.
D3.4	Constructed wetland installed and operating	Public	The deliverable consists of the detailed description of the development of the full scale, prototype wetland in Lesvos as well as the installation of the pilot bio-electrified wetland and the aerated wetland. This deliverable includes a series of photos, drawings and P&ID of all the different systems and sub-systems with appropriate description, including piping, electrical connections and implementation plans. D3.4 includes photos from the installation of the systems and of the installed systems. It also includes a description of the start-up process.
D3.5	Upgrade of the decentralized ecotourism	Confidential	D3.5 describes the upgrades implemented in an eco-tourist facility for wastewater management. The report also includes a design methodology and appropriate calculations as well as drawings and P&ID of the

	wastewater management		prototype wastewater treatment systems implemented which include a small sedimentation tank, a reedbed system and UV disinfection unit.
D3.6	Design of the composting system	Confidential	The composting system was designed within a biomimicry design workshop, where biological processes are applied in technological systems. At this workshop many disciplines and academic levels come together to be initiated and further facilitate the innovation process. In D3.6 the methodology of this workshop together with the outcome was reported together with the technical drawings of the composting system, including technical description with calculations
D3.7	Composting reactor installed and running	Public	D3.7 provides photos of the construction of this prototype and the description of the start-up phase of the composting process used to treat sewage sludge from the UASB reactor and green material.
D4.2	Design of the preparation of sites	Confidential	D4.2 consists of a report that covers the design methodology for the preparation of the sites for the agricultural activities of the project. The design includes drawings showing the irrigation system and the placement of trees, bushes, and other crops. The report determines the different agricultural activities based on the different sources of water (e.g. collected rainwater, treated wastewater, desalination, etc.) available as well as the soil in the different regions.

4.2 Fair data

4.2.1 Making data findable including provisions for metadata

As described above, some of the deliverables developed from this dataset are confidential and are stored on a private server by the project coordinator. Only members of the consortium have access to this data. However, public deliverables of this dataset are saved in pdf format and can then be opened using the "Adobe Acrobat Reader" (free) software without any limitations. Any interested party can locate the desired document using the site's navigation menu (www.hydrousa.org),under the tab RESULTS.

Metadata will not be created, since this dataset will not be changed once the data is approved by the EC, thus, no versioning is required.

The name convection of the aforementioned data is as follows:

- **HYDROUSA - Rainwater management systems installed and running.pdf**
- **HYDROUSA - Mangrove Still prototype installed and running.pdf.**
- **HYDROUSA - Demonstration of eco-tourist water loops.pdf**
- **HYDROUSA - Design of the UASB and biogas upgrade.pdf**
- **HYDROUSA - Design of the constructed wetlands.pdf**
- **HYDROUSA-UASB and biogas upgrade installed and operating.pdf.**
- **HYDROUSA-Constructed wetland installed and operating.pdf.**

- **HYDROUSA - Composting reactor installed and running.pdf**

4.2.2 Making data openly accessible

As already mentioned, this data set includes both confidential and public data. The confidential data are kept on a private server by the project coordinator and only members of the HYDROUSA consortium have access to them. However, public deliverables are openly available in pdf format and can be opened with the use of "Adobe Acrobat Reader" (free) software without any limitation.

4.2.3 Making data interoperable

The publicly available deliverables' files are stored as pdf format and can only be used as a reference.

4.2.4 Increase data re-use (through clarifying licenses)

Regarding the deliverables that are available to the public, the 'Creative Commons Attribution-Non Commercial-No Derivatives 4.0 International Public License' is used so as to allow potential parties to freely use them.

4.3 Allocation of resources

The cost of data collection has been included in HYDROUSA budget, specifically in Work Package 2 & 3 as personnel cost.

4.4 Data security

The publicly available deliverables are hosted on the server's website, following the host's security protocols. The data are also stored on the private server, which backs-up all files externally at regular intervals to ensure that the data set is safely retrieved.

4.5 Ethical aspects

Not applicable

4.6 Other

Not applicable

5 DATA SET NO 4: DISSEMINATION DATA

5.1 Data summary

The main purpose of this data set is the development and collection of the data that used for the dissemination and communication activities of HYDROUSA project.

In particular, the following file types were produced and reused during the project:

- **Electronic PDF Documents:** leaflets, brochures, roll-ups, banners, e-newsletter and educational material in general that was created and is available in PDF format.
- **Videos:** description of HYDROUSA systems, but also a storytelling video and interviews are available in mp4 format for download. Videos have already been uploaded to the YouTube platform of HYDROUSA project for viewing and sharing.
- **Images:** images are provided with the most used formats, JPEG, PNG and GIF.
- **Presentations:** HYDROUSA presented in several Conferences, workshops, trade fairs, pitch events and other activities.
- **HYDROUSA's international conference:** In the framework of WIC conference, which was held in Athens at the end of project (7-9 June 2023) the main form of data collected is abstracts, which were submitted in PDF form by the participants and were less than 100 MB. Moreover, the participants' personal information was also collected in xlsx files, mainly for organizational reasons and were managed in accordance with General Data Protection Regulation (EU) 2016/679 (GDPR). A wrap up Video was also filmed during the conference capturing the 3 days flow, showcasing the different formats, from presentations and networking to posters and liason workshops.
- **Publications:** Scientific papers (PDF format) were developed and are expected to be published based on the results produced within the project. Consequently, the size of the document cannot be estimated, on average scientific papers is about 2 MB.
- **Press Releases:** On different HYDROUSA productions press releases were conducted to support the wide dissemination of the activity and the easy replication from media portals and journalists. The press release was conducted on word documents and was distributed through personal emails or uploaded in the form of blog post on HYDROUSA website.
- **Tables, diagrams etc.:** On a quarterly basis, the IHA team followed an internal process to report all dissemination and communication activities carried out during this period by all HYDROUSA partners. All activities were recorded in a xlsx file, which contains information about the type of activity, the date, etc., to be able to evaluate all activities qualitatively and quantitatively and to compare them statistically based on key performance indicators (KPI) of the project. Tables, Figures and charts were usually produced from statistical data processing.

Regarding the e-newsletter in the early stages of the project, the partners communicated the project through their own email to their distribution list, in order to create the initial awareness. At a later stage, dedicated e-newsletters were developed and distributed to contacts that had shown interest from HYDROUSA website.

From this dataset, 7 deliverables (D9.1, D9.2, D9.3, D9.4, D9.5, D9.6 and D9.7) were developed, as shown in **Table 5**. All deliverables are be stored on the private server as a pdf format and are/will be available on the project website, which is free to download from the public; the submitted deliverables are already available through the project website.

In total, the size of this dataset is more than 50 GB and it is constantly updated. Finally, this data collection is particularly useful for each interested party, but also for stakeholders and potential end-users of the HYDROUSA project.

Table 5. Deliverables of Communication, community building, dissemination (WP9)

Deliverable	Title	Dissemination level	Scope
D9.1	Dissemination and Communication plan	Public	A detailed study of the identified stakeholders groups was conducted and of the strategic activities and channels that were used towards them and towards the wide public. The vision for the activities undertaken as part of dissemination and communication is that they effectively engage a wide range of stakeholders, from senior levels in industry, regulation and government, to local people and schoolchildren. To achieve this, the strategy and plan for delivery is reported in D9.1 to ensure that project partners communicate a focused, coordinated message regarding the project to targeted stakeholders.
D9.2	HYDROUSA Brand Identity	Public	A common narrative was built by designing: (a) a visual identity, (b) the storyline that reflects on the innovative approach and the methodology of HYDROUSA and (c) a website that acts as the point of reference for the dissemination of the core values and objectives, for the dissemination of the progress – success stories and of plug-ins that citizens can act or participate.
D9.3	Report on Dissemination and Communication	Public	It is the 2-year evaluation describing the dissemination and communication activities implemented during the period M1-M24 and measuring the outcomes against the KPI. Potential weak points were identified to take action and increase the diffusion.
D9.4	Updated report on dissemination and communication	Public	D9.4 consists of the final report on the Dissemination and Communication activities of the project; the report evaluates all the relevant activities and their impact on the project against KPI; activities of the stakeholder panel are described along the actual outputs, outcomes and the foreseen impact.
D9.5	Report on the networking and marketing activities	Public	D9.5 summarizes all the networking, clustering and marketing activities which took place with particular reference to the end users and the

			impact of these activities. Liaison activities with other H2020 and other EU funded and National projects are reported.
D9.6	Report on the co-creation and training activities	Public	We build social and physical on-site learning environments aiming to engage and connect directly with the local community with the HYDROUSA project. These co-creative activities (info points, summer schools, Hackathon, Residencies and workshops) were our point of monitoring and collecting user requirements that would shape future development and scaling decisions. D9.6 provides information on all the workshop activities implemented for HYDROUSA.
D9.7	HYDROUSA game for increased public awareness	Public	A serious game was developed according to the different social – cultural – environmental challenges that HYDROUSA addresses that are connected to the water loop at the sites of the project.

5.2 Fair Data

5.2.1 Making data findable including provisions for metadata

The collected data is stored both at the private server and at HYDROUSA website, as it is available to the public. However, the data related to the dissemination material of the project, such as the leaflet, the brochure, the presentations, the educational material include metadata (**Table 6**), in order to ensure their quality.

Table 6. Metadata of dataset No 4

Creator	The HYDROUSA partner responsible of the creation of this dataset
Title	The label of this dataset
File type	The format of the dataset (pdf, pptx, jpeg etc.)
File Size	The size of the dataset
Version	The version number of the dataset
Date	The creation date

Regarding the Deliverables, D9.1 - D9.7 are/will be saved in pdf format and are/will be then opened using the "Adobe Acrobat Reader" (free) software. Any interested party is/will be able to find the desired document using the site's navigation menu (www.hydrousa.org). Metadata are not created, since this data set will not change in the future, so no version is required.

The name convection of the aforementioned data is as follows:

- **HYDROUSA - Dissemination and Communication plan. pdf**
- **HYDROUSA - HYDROUSA Brand Identity.pdf**
- **HYDROUSA - Report on Dissemination and Communication.pdf**
- **HYDROUSA - Updated report on dissemination and communication.pdf**
- **HYDROUSA - Report on the networking and marketing activities.pdf**
- **HYDROUSA - HYDROUSA game for increased public awareness. pdf**

5.2.2 Making data openly accessible

In HYDROUSA website, each interested party is able to find this data by following the menu. A general naming convention has been decided by HYDROUSA consortium, where the files use the following format HYDROUSA-{File Title as in metadata}.{Version as in metadata}.{file type extension} (i.e. HYDROUSA-Leaflet.01.pdf).
The set of this data is readily accessible through the project website without any restriction. In order to access the material of this collection, the individual conducting the search can find the file in the HYDROUSA website by opening the following programs:

- Adobe Acrobat Reader for .pdf files
- VLC media player for videos
- Windows Photos for images

The interested parties can access the HYDROUSA website through browsers such as Firefox, Chrome, Microsoft Edge, etc. and by going to **http://www.hydrousa.org**.

Regarding publicly deliverables (D9.1-D9.7), they are/will be saved in pdf format and then would be opened with the use of "Adobe Acrobat Reader" (free) software without any limitation. Moreover, most of the scientific publications that were published within HYDROUSA project are gold open access, while all academic publications developed by the partners of the HYDROUSA project are uploaded to the Zenodo platform.

5.2.3 Making data interoperable

The files of the publicly deliverables will be stored as pdf format and can only be used as a reference.

5.2.4 Increase data reuse (through clarifying licenses)

Regarding the deliverables that are available to the public, the 'Creative Commons Attribution-Non Commercial-No Derivatives 4.0 International Public License' is/will be used so as to allow potential parties to freely use them. ZENODO enables any interested party to access valuable open-access records that are derived by the project implementation. In terms of data reuse, exact reuse is not possible, however, protocols, methodologies and procedures could be reusable.

5.3 Allocation of resources

The cost of this data collection has been included in HYDROUSA budget, specifically in WP9.

5.4 Data security

The data are stored on the private server, which backs up all files externally at regular intervals to ensure that the data set is safely retrieved.
In addition, the publicly available deliverables are hosted on the server's website, following the host's security protocols. The data are stored on the private server, which backs-up all files externally at regular intervals to ensure that the data set is safely retrieved.

5.5 Ethical aspects

The personal data collected for the distribution of the e-newsletter was collected with the approval of the interested parties through the project website. In order to maintain the anonymity and confidentiality of the parties, the data is private on the server and is restricted even among the members of the consortium. Mr Zisis Tsiropoulos from the company AGENSO has been appointed as Data Protection Officer (DPO) of HYDROUSA project. According to the General Data Protection Directive (GDPR) 2016/679 he is responsible of maintaining anonymity and distributes the file to the interested partners with caution. The SME AGENSO is a project partner and is dealing with the development of platforms for the management of data in the project. AGENSO has significant experience in the implementation of procedures for data management within existing HORIZON2020 projects.

5.6 Other

Not applicable

6 DATA SET NO 5: PERFORMANCE DATA OF HYDRO1-6

6.1 Data summary

The purpose of data collection is to monitor and evaluate the efficiency and performance of the whole water supply chain that has been developed within HYDROUSA. Important parameters were monitored and related data were collected including:

i) water quantity and quality parameters that are required for the management of water and wastewater.
ii) crop monitoring and weather data for environmental monitoring and management
iii) parameters required for environmental and economic assessment (life cycle assessment and life cycle costing) such as greenhouse gas (GHG) emissions and energy consumption.
iv) data from controllers and actuators that were installed at the demo sites for controlling the water loops; achieving efficient irrigation; ensuring the smooth operation of the setting; preventing unexpected events.

All this data was collected in order to ensure the smooth operation and performance of the HYDROs. The datasets were stored in MySQL format to facilitate further processing.
The source of this data is from sensors, actuators and all other equipment attached to the SCADA system (HYDRO 1) and Control boxes (HYDRO 2-6) that were installed in all the demonstration sites and including:

- Date & timestamp of the readings
- Node coordinates
- Node IMEI
- Soil moisture
- Water tank level
- Water flowmeter
- Water temperature
- Water quality (pH, DO, TDS, Turbidity, COD, NH_4/NO_3, online E. coli, Conductivity)
- Weather station data (Temperature, Humidity, Rainfall/precipitation, Wind Speed, Wind Direction, Gust Speed, Light Intensity, UV index, Pressure, Battery Level)

The purpose of this data is to be used as input in the models that have been developed for the automation of irrigation or as a source of information for end users.
Data were also generated, based on the input of the data collected. More specifically, the aforementioned data refer to:

i. the evapotranspiration
ii. based on the evapotranspiration, the quantity of irrigation water needed in the HYDROs.

Regarding the data generated, no actual re-use is foreseen are they are based on weather and location specific conditions, thus unique.
The formats of the files that were generated and collected in this dataset are:

- Raw data in .csv format (semicolon separated)
- Excel files (.xlsx) for grouped (semi-processed data)

The exact file size of this data set cannot be estimated, but a brief estimation would be less than 500 MBs. This refers to both data collected and generated. Furthermore, this is saved in the project's private server and accessed only by the consortium members. The operation of HYDRO1-6 dataset will be reused for investigation purposes only by HYDROUSA Consortium members.

This dataset is the most important, as based on this collection the efficiency of the HYDROUSA systems assessed from environmental, economic and social perspective.

From this data set, a public deliverable was developed as shown in **Table 7**. D5.1 is stored on the private server in pdf format and will be available on the HYDROUSA website, where any interested party will be able to download it for free (after the end of the project).

Table 7. Deliverable that includes performance data

Deliverable	Title	Dissemination level	Scope
D5.1	Pilot Assessment Report	Public	D5.1 is a report on the 2-year operation of all the demonstration systems. The report describes the operating conditions of the systems, the performance in terms of pollutants removal. The report assesses the quantities of recovered water from the different non-conventional water sources, the water quality, which was obtained, and the crop yields delivered. Furthermore, the report assesses any operating problems which were experienced and how these were resolved.

6.2 Fair Data

6.2.1 Making data findable including provisions for metadata

The critical control data is protected by industrial standards and is only accessible to specified privileged individuals (e.g., site managers, engineers and experts supporting the system). There is a set of information on higher level performance that can be given access subject to consortium agreement and needs. All information and data series are tagged and stored in databases and are presented in designated GUI (graphical user interface) designed by experts of Z prime and AGENSO company.
In this context the first operational version has been delivered. Subject to post commercial arrangements and agreements with the sites (end-users), is possible continuous support and maintenance, with further updates and versions per need and demand. Key industrial and sustainability indicators that are function of multiple measurable parameters are well defined and described in form of metadata.

However, D5.1 is saved in pdf format and will then be opened using the "Adobe Acrobat Reader" (free) software without any limitations. Any interested party will be able to locate the desired document using the site's navigation menu (www.hydrousa.org) (after the end of the project).

In order to make data findable, a specific naming of files will be used, so as to ensure that data are easily findable. This will include the project name, the serial number of datasets, and the dataset title.
All datasets will properly be handled. Also, any IPR aspects will be handled in line with general Commission policies regarding ownership, exploitation rights and confidentiality in this task. Furthermore, any GDPR aspects will be handled with respect to the corresponding EU regulation for general data protection regulation assuring the protection of persons involved in the data acquisition and management process. GDPR regulation ensures the following rights:

- The right to access

- The right to rectification
- The right to erasure
- The right to restrict processing
- The right to object to processing
- The right to data portability

Data findability will be ensured by complying with the applicable national, European, and international framework, and the European Union's GDPR 2016/679.

6.2.2 Making data openly accessible

The information regarding performance and sustainability, subject to the agreement of the owners of the site and end-user and can be published by end-user's own media platforms if they choose to do so. The necessary and useful information is provided in the HTML format and accessible to all users. Control and monitoring critical functions are protected by necessary firewalls and precaution, as well as Intellectual Property protections.

The data is stored in a local database at servers of Z Prime and AGENSO. To access the database, the My SQL Workbench is needed where querying can be applied to retrieve the needed data. Additionally, the web interface Grafana platform is provided as a user-friendly environment where the approved users could simply have access, as it is available in every browser by providing internet address and digital signatures (username and password). Even though the relevant software for control system is not possible to be included as it is a third-party software, browsing the information is on open-source platform (i.e., accessible to stakeholders and if requested by public).

Moreover, the project website will be also used as an access portal/repository for project public documents such as outcomes and results. In addition to that, for internal access within the consortium members, the project repository will be used for the data storage that will be shared among the project partners ad-hoc.
In addition, weather data collected at the HYDROs are also open and available to the wide public through AGENSO's application meteoIoT in https://meteoiot.com/ where users can access real-time and historical data from the sites. This facilitates the accessibility of data and enables users to access understandable data (weather data), as data referring to irrigation and to more scientific aspects would not be understandable.

6.2.3 Making data interoperable

The data produced in the project are interoperable as the structure of the system is designed in a way that pending the type of user's access can be provided to all levels, e.g., SCADA system (raw Data) and KPI layer fused and processed information. In order to succeed OPC, HTML, CSS and similar technologies for architecture and implementation were used. As much as possible, most tagging is based on industrial network standards and understandable by specified users at various levels of access to allow inter-disciplinary interoperability.
During the project the overall data structure kept the same as it has been offered in earlier reports, and they are the same and communicable to all users.

The publicly deliverable file will be stored as pdf format and can only be used as a reference.

6.2.4 Increase data re-use (through clarifying licenses)

Any entity who wishes to access the information for the sites will contact the owners and the owners will validate and verify them, and based on the client's requirements, appropriate access level can be provided. The data are available for re-use upon the agreement of the consortium and during the project no embargo needed to be raised.

Apart from critical equipment that the OEMs have put restrictions, from Z Prime's point of view all the higher level KPI on industrial performance and sustainability can become available to potential users and interested parties, within and beyond the consortium.
As long as the maintenance and support arrangements are made with the owners of the systems and sites the data can remain re-usable.
Regarding D5.1 that will be available to the public, the 'Creative Commons Attribution-Non Commercial-No Derivatives 4.0 International Public License' will be used so as to allow potential parties to freely use them after the end of the project.

6.3 Allocation of resources

The cost for making data FAIR in the project has not yet estimated. Is needed to assess the scale and usage of the data, once that is ascertained through market research and end-user intentions, we will be able to estimate the cost of upkeeping and support.

6.4 Data security

At present the data are safe and secured within the servers of Z Prime and AGENSO and they meet all industrial standards vis-à-vis security, robustness and quality.
The protection of data is ensured through procedures and appropriate technologies, like the use of HTTPS protocol for the encryption of all internet transactions and appropriate European and Internet security standards from ISO, etc. Data stored will be encrypted and will be accessed only with a dedicated login following the SSL/TLS (https) protocols.

6.5 Ethical aspects

Not applicable (Confidential data)

6.6 Other

Not applicable (Confidential data)

7 DATA SET NO 6: TRANSFERABILITY DATA

7.1 Data Summary

The main purpose of this data set is to collect information on European, international, national and/or regional level on the legislative/institutional framework in order to determine both the enabling environment and institutional arrangement for the governance, regulation, funding, implementation and exploitation of the HYDROUSA water loops.

Enabling the environment is evaluated through a fitness check of the main policies in force and legal framework with the innovative aspect of the HYDROUSA solutions. Specifically, the main possible legislative gaps and barriers for the implementation of the HYDROUSA systems are evaluated.

Further, investments and financing structures are evaluated as supporting strategies for the implementation and management of innovative solutions for decentralized systems in small communities.

Local institutional arrangements in terms of regulation and compliance, regulatory bodies/enforcement agencies/local authorities as well as monitoring and evaluation bodies for water supply and sanitation services are identified.

Data collected will be used in the feasibility assessment of HYDROUSA technologies in different replication sites worldwide. The following main domains are assessed to address transferability and replicability of innovative solutions:

- Technical (indicators/information related to sizing criteria, mass flow analysis and resource requirements for evaluation of reliability, efficiency and flexibility)
- Economic (indicators/information related to Cost and Benefits Analysis, Return of Investments and Payback Period)
- Geographic/Environmental (indicators/information related to the local environmental conditions and sensitivity such as water stress)
- Social (indicators/information related to social benefits, community needs as well as support of local stakeholders)
- Institutional/Legislative/Regulatory (indicators/information related to regulatory framework and permitting pathways).

Data were collected for each replication site by means of specific excel files (.xlsx) prepared for each HYDRO and for different fields of analysis. Further, data from different replication sites were summarized and elaborated in a word (.doc) feasibility report and PowerPoint presentation (.ppt). Regarding the Replication tool implemented to increase the transferability of the HYDRO solutions (T7.6), the responses were collected in text files (.txt) that the user can voluntarily share with the consortium. These text files were discharged only to the user's computer so that they were free to keep this data as confidential. It is worth noting that the results did not contain any personal information or sensitive data. The Replication tool was also available for completion on the project website.

The expected file size of this data is variable according to the level of detail of the site feasibility assessment. Based on this data set the following confidential deliverables related to the feasibility studies (D7.3 - D7.5) were developed and stored in pdf format on the private server, accessible only to the members of the consortium. In addition, deliverables 7.1, 7.2 and 7.6, as indicated in **Table 8**, are public and freely available

on the project website and can be downloaded by interested parties (D7.6 will be available after the completion of the project).

Table 8. Deliverables that include transferability data

Deliverable	Title	Dissemination level	Scope
D7.1	HYDROUSA water loops in the context of the EU and international policy (including Innovation Deal)	Public	It aims to frame HYDROUSA water loops within the context of EU directives and ongoing policy initiatives. Further, it describes possible barriers for HYDROUSA replicability.
D7.2	Guidance methodology for replication assessment	Public	It details the methodology and the local regulatory frameworks to pave the way for the following replicability assessment.
D7.3	Feasibility studies in European replication sites	Confidential	It provides feasibility and assessment studies in European replication sites according to the methodology described in D7.2.
D7.4	Feasibility studies in MENA replication sites	Confidential	It provides feasibility and assessment studies in MENA replication sites according to the methodology described in D7.2.
D7.5	Feasibility studies in non-European replication sites	Confidential	It provides feasibility and assessment studies in non-European replication sites according to the methodology described in D7.2.
D7.6	HYDROUSA Service including transferability and replication plan	Public	It includes the manual to HYDROUSA service to rapidly evaluate the feasibility of HYDROUSA water loops as well as simulation of the HYDROUSA service in 10 follower sites. Furthermore, it includes the transferability and replication plan that includes standardization of activities and approaches that have been validated within the HYDROUSA actions and facilitates the replication and/or the transfer of the project results beyond the project, including other regions and countries.

Fair data

7.2.1 Making data findable including provisions for metadata

As already pointed out, this dataset is partially confidential especially for what concerns replication site local assessment. Data are accessible by the members of HYDROUSA Consortium. Data regarding Deliverables D7.1, D7.2 and D7.6 are openly available in pdf format, through the project website and any interested party can access them from the navigation menu. The name convection of the data is defined as follows:

- **HYDROUSA - HYDROUSA water loops in the context of the EU and international policy (including Innovation Deal). pdf**
- **HYDROUSA - Guidance methodology for replication assessment. pdf**
- **HYDROUSA - HYDROUSA Service including transferability and replication plan. Pdf**

Data regarding Deliverables D7.3, D7.4 and D7.5 are confidential and accessible by the members of HYDROUSA Consortium (available in pdf format in the private server). These deliverables also contain some annexes corresponding to the individual replication feasibility reports at each replication site, which are also confidential and stored on the private server in pdf format.

7.2.2 Making data openly accessible

This dataset includes both confidential and public data. As aforementioned, all data used in D7.1, D7.2, and D7.6 are openly available in pdf format, through the project website and any interested party can access them from the navigation menu. In addition, the scoring obtained from the evaluation of the replication sites, i.e., the data generated by applying the guidance methodology for replication assessment (D7.2) to each replication site, can be used in dissemination activities such as seminars, participation in congresses and scientific publications as long as it is allowed by the co-authors of the corresponding feasibility reports. It must be highlighted that these scores do not provide any relevant information regarding the design of the HYDRO solutions or data related to socio-economic and political issues of the sites, as that data could imply some ethical issues.

On the other hand, D7.3, D7.4, and D7.5, as well as their annexes, contain confidential information regarding both the sites (characteristic of the sites, financial strategies, legal analyses, etc.) and the HYDRO solutions (design parameters, performance indicators, CAPEX, OPEX and revenues). Confidential data are stored in the private server by the project coordinator and only members of the HYDROUSA consortium have access to them.

7.2.3 Making data interoperable

The public deliverables files (D7.1, D7.2 and D7.6) are stored as pdf format and can be used as a reference. They have been elaborated with the aim to be interoperable, that is, allowing data exchange and re-use between researchers, institutions, organizations, countries, etc. In D7.1, a legislative fitness-checked was developed within the European legal framework. So, this information was aimed to be shared with all EU partners and beyond. The replication methodology implemented in D7.2 is described in detail, so that it could be easily applied to other similar contexts or studies. Regarding D7.6, the main goal was to provide the HYDRO developers with a transferability and replication plan that enables them to replicate their solutions in any region that could be interested in doing so. So, all the instructions to implement the feasibility assessment is provided (including which kind of data must be collected from the site, scoring assessment, etc.).

With respect to confidential reports (D7.3, D7.4 and D7.5), in order to make them more understandable and to facilitate the comparison between the different socio-economic contexts, same format was used in all the general documents as well as in the annexes. In addition, the same naming was aimed, even though, this was not always possible due to the high cultural differences in some of the sites. Regarding the names of laws and public administration, they were translated to English in most of cases, or shown in both English and local language in those cases where the original names would facilitate the search for further information (if it were necessary).

7.2.4 Increase data re-use (through clarifying licenses)

As specified in the Grant Agreement the data from Deliverables D7.3, D7.4 and D7.5 are confidential; to this extent, there can be no data re-use for it. The following deliverables are not confidential: D7.1, D7.2 and D7.6. The above deliverables will be openly available and can be used freely by any interested party, as two of them have already been uploaded on the HYDROUSA website (www.hydrousa.org) and for at least 5 more years after the project's duration. D7.6 will also be available through HYDROUSA's website after the completion of the project. This way data reuse can be enhanced. The 'Creative Commons Attribution-Non Commercial-No Derivatives 4.0 International Public License' is used for openly available deliverables to allow potential parties to use them freely.
Apart from the deliverables, the replication tool developed within T7.6 is freely accessible on the project's website.

7.3 Allocation of resources

The cost of data collection has been included in HYDROUSA budget, specifically in WP7.

7.4 Data security

The public available deliverables will be hosted on the server's website, following the host's security protocols. The data are stored on the private server, which back-up all files externally at regular intervals to ensure that the data set is safely retrieved.

7.5 Ethical aspects

Not applicable

7.6 Other

Not applicable

8 DATA SET NO 7: ENVIRONMENTAL, ECONOMIC, SOCIAL AND CIRCULARITY ASSESSMENT DATA

8.1 Data summary

The data collected in this data set was used to create the models to evaluate the sustainability and circularity performance of each HYDRO as well as the whole water supply chain developed within HYDROUSA. The primary data was obtained mainly from Data set No 5 including processed data from the sensors, actuators, and controllers as well as direct user inputs from the technology providers and HYDRO leaders.

The data was used to develop the sustainability and circularity performance models, which provide the basis for the circularity and water-food-energy (WFE) nexus performance assessment. The required data for the assessment was derived from the data acquisition and monitoring system (ICT monitoring). The analysis provided feedback for the sustainability performance of each HYDRO as well as of the integrated HYDROUSA solution to reveal the potential for further technology innovation and optimization of the solutions.

The formats of the files generated and collected in this dataset were the followings:

- Raw data in .csv format (semicolon separated)
- Excel files (.xlsx) for grouped (semi-processed data), and circularity, environmental (generated from Simapro LCA software), and economic performance results.

The data collected from the relevant HYDROUSA partners include:

- Initial costs (preliminary studies, permitting, design, analysis, etc.)
- Cost of resources for site preparation and construction (e.g., earthworks)
- Bill of materials/costs for the main components/subcomponents.
- Transportation of materials and equipment to the sites (e.g., distance to the source materials and technology providers and type of transport)
- List of the electromechanical equipment and energy requirements (in energy units)
- List of consumable materials and their requirements (in mass units)
- Maintenance requirements
- Labour requirements
- Operational data (both online and offline) from sensors, actuators and HMI inputs

The file size of this data set ranged between 5 MB and 15 MB. Two main data streams can be identified. The first one comes from LCA templates (in the form of excel documents) through which data on the general description, equipment, materials, initial costs, etc. was collected. The latter took space; 5-15 MB (including some graphic material). The second data stream is related to the data from the operation of the demo sites (sensors, field measurements, lab data, HMIs), which can take a larger disc space. However, the raw data was stored in the repository of Data Set No 5 in the project's private server from where the necessary data was queried and processed.

The data collected for the social impact assessment models are grouped into two user personas based on their experience and involvement with HYDROUSA activities.

Section A: Participants in HYDROUSA Community Building, Co-creation & Training Activities

1. Demographic Information (Age, Gender, Profession, Educational Status)
2. Subjective Experiences (Personal and Professional Added-Value Based on Self-Assessment)
3. Feedback & Recommendations (Validation and Evaluation of Experience)
4. Challenge Awareness and Prioritization of Solutions for Natural Resource Management
5. Participation History (Reacquiring Participation)
6. Tangible Examples of Added-Value (Inspiration, Capacity Building, Networking, Future Possibilities)

The questionnaire begins by gathering data on participants' professions, providing insights into their background and expertise. This demographic information is valuable for understanding the composition of the audience and tailoring future activities or programs to specific professional groups while ensuring that our proposition is accessible and inclusive for all different audiences, as described in the DCP plan.

In the next stage, the questionnaire delves into participants' personal and professional experiences related to the HYDROUSA activity. It aims to collect subjective data on how individuals perceived and felt about their involvement while assessing the potential outcomes and impact after their interaction with HYDROUSA solutions based on their intentions. This can include their personal and professional growth, the impact on their lives, and the potential for undertaking future actions based on the principles and the approach to which they were exposed.

By asking about priorities within the water-food-energy nexus, the questionnaire gathers data on the values and interests of participants. It can help identify which aspects of resource management are most significant to the respondents, potentially guiding the focus of future activities or content.

The questionnaire collects data on participants' attendance at various HYDROUSA activities, providing insights into their engagement levels and the diversity of their involvement. Data on multiple participations indicate a deeper commitment.

The request for tangible examples of how participation in HYDROUSA was useful offers qualitative data that illustrates the practical impact of the activities on personal and professional life. This information provides concrete, real-world insights into the program's value.

Finally, questions about satisfaction with coordination, instructors, and sessions provide direct feedback on the quality and effectiveness of the HYDROUSA activity. Respondents' opinions and comments can highlight areas of improvement or strengths to build upon. At the same time, the questions about whether participants would recommend the experience to their network and if they are willing to participate in future related activities collect data on the likelihood of word-of-mouth promotion. This data is indicative of participants' satisfaction and willingness to endorse the activity to others and gives an estimation of returning users.

In summary, the questionnaire is designed to capture a wide range of data, including both quantitative (e.g., demographics) and qualitative (e.g., experiences and examples) information. This data is essential for evaluating the program's effectiveness, understanding participant perspectives, and making informed decisions for future activities and improvements while informing future potential replication sites of the data they need to evaluate and assess toward their impact goals as defined in the theory of change (ToC).

Section B. On going questionnaire for HYDROUSA targeting to the extended community and wide public. The questionnaire encompass various crucial aspects, ensuring a comprehensive dataset is collected:

- **Regional Priorities:** Prioritizing the top water-related priorities as perceived by participants. This information is vital for identifying the specific challenges that need to be addressed in each region or island.

- **Alignment with HYDROUSA Solutions:** A set of questions seek to gauge participants' views on the suitability of HYDROUSA solutions for their region and whether these solutions align with regional water needs. This insight helps in assessing the compatibility of HYDROUSA solutions with local requirements and their current understanding of the case (scale of the challenge, available related resources etc.)

- **Considerations:** Questions to collect data on certain "user pains" related to financing, funding, regulation validating the preconditions that need to be in place to reach ToC vision and objectives. Those provided data on the challenges identified while considering implementing HYDROUSA solutions can inform the strategies, ensuring that the right resources (knowledge, finance, capacity building) are available to support the project implementation.

- **Stakeholder Information:** The final section categorizes participants based on the type of stakeholder they represent. Understanding the roles and interests of different stakeholders is essential for collaboration and engagement. This data informs who is connected with project during the implementation.

Collectively, this dataset allows for a comprehensive assessment of user needs and priorities in the context of water management. It provides valuable information on how HYDROUSA solutions as they are currently communicated are aligned with the local needs, how resources can be allocated, and which stakeholders are the potential early-adopters to ensure successful implementation and scaling. This comprehensive understanding serves as a foundation for informed decision-making and strategic planning, enabling collaborators and stakeholders to address water challenges more effectively in diverse regions and islands.

From this set of data, 4 deliverables were developed as listed in **Table 9**. From these deliverables, D5.4, and D6.3 are confidential, while D6.1 and D6.2 are public. Confidential deliverables will be accessible only by members of the consortium and stored on the private server as pdf format. The public deliverables will be freely available on the project's website (in pdf format) for download by the public.

Table 9. Deliverable that includes circularity assessment data

Deliverable	Title	Dissemination level	Scope
D5.4	Models for measuring HYDROUSA systems performance	Confidential	D5.4 is a report on the data acquisition methods and the algorithms for measuring key performance of HYDROUSA technologies, with respect to environmental friendliness of the production process, low energy consumption, production yield, and

			reliability of the processes, resulting into a tool for decision making
D6.1	Functional and economic indicators	Public	D6.1 is a report on the (a) selection and description of operations, environmental and economic indicators -models of the HYDROUSA. (b) Input to the European debate on circular economy financing models.
D6.2	Social impact assessment models	Public	It is a report on social impact assessment, including: (a) Methodology for the social impact assessment for HYDROUSA systems and services. (b) Social indicators and factors, citizen engagement and customer satisfaction and public acceptance. (c) Results from the social impact Assessment models.
D6.3	Physical and virtual nexus model	Confidential	D6.3 is a report on (a) the methodology for physical & virtual model development. (b) The model results for the physical and virtual water-energy-food nexus of HYDROUSA systems. (c) Report b) Data Valorization to help system owners' operations (plant, land, material, logistics, and water systems) optimization and operations level and to advise stakeholders and citizens on good practices and achievements of circularity

8.2 Fair Data

8.2.1 Making data findable including provisions for metadata

This dataset is characterized as confidential (circularity analyses and results) and non-confidential (such as life cycle inventories (i.e., material and energy flows of HYDROs), sustainability analysis and results). The confidential part of data is stored in a folder on the HYDROUSA private server, which is available only for HYDROUSA partners, while the life cycle inventories, sustainability analysis and results will be shared with the public through D6.1 in pdf format and which can be opened using the "Adobe Acrobat Reader" (free) software without any limitations. Any interested party will be able to locate the desired document using the site's navigation menu (www.hydrousa.org). Moreover, D6.2 will be available as a pdf file and can be opened using "Adobe Acrobat Reader" software (for free) without any restrictions, after the end of HYDROUSA project. Each interested party can locate the desired document using the navigational menu of the website (www.hydrousa.org). Metadata will not be created, since this dataset will not be changed once the data is approved by the EC, thus, no versioning is required.

The name convection of the data determined to be given is as follows:

- **HYDROUSA - Functional and economic indicators. pdf**
- **HYDROUSA – Social impact assessment models. pdf**

8.2.2 Making data openly accessible

Data set No 7 includes both confidential and public data. The confidential data will be kept on a private server by the project coordinator and only members of the HYDROUSA consortium will have access to them. However, the analysis of these results is part of D6.1 and D6.2, which will be freely available in pdf format and can be opened using Adobe Acrobat Reader software (free) without restriction.

8.2.3 Making data interoperable

The public deliverables files will be stored as pdf format and can only be used as a reference. D6.1 contains data of the HYDROs which are normalized by the function of each HYDRO case. This data can be used by researchers for further LCA calculations.

8.2.4 Increase data re-use (through clarifying licenses)

Regarding D6.1 and D6.2 will be available to the public upon project completion, the ''Creative Commons Attribution-Non-Commercial-No Derivatives 4.0 International Public License'' will be used to allow potential parties to use them freely.

8.3 Allocation of resources

The cost of data collection has been included in HYDROUSA budget, specifically in WP 5 & 6 as personnel cost.

8.4 Data security

The publicly available deliverables will be hosted on the server's website, following the host's security protocols. The data are also stored on the private server, which will back-up all files externally at regular intervals to ensure that the data set is safely retrieved.

8.5 Ethical aspects

The data obtained from the results of the questionnaires fall into the ethical area. In order to maintain the anonymity and confidentiality of the participants, the results of the questionnaires are private on the server and are even limited among the members of the consortium. Mr Zisis Tsiropoulos from the company AGENSO has been appointed as Data Protection Officer (DPO) of HYDROUSA project. According to the General Data Protection Directive (GDPR) 2016/679 he is responsible for maintaining the anonymity and distributes the file in the interested partners with caution. The SME AGENSO is a project partner and is dealing with the development of platforms for the management of data in the project. AGENSO has significant experience in the implementation of procedures for data management within existing HORIZON2020 projects. ***It is worth noting that the protocol and the criteria for the identification and recruitment of research participants described in the deliverables D10.2 (H – Requirement No.2) and D10.3 (POPD – Requirement No.3) were strictly applied.***

8.6 Other

Not applicable

9 DATA SET NO 8: EXPLOITATION DATA

9.1 Data Summary

In order to support the exploitation of results along the 6 scenarios defined with the consortium partners, various data sets were used or generated using different formats, as described **Table 10** below:

Table 10. Data created / used for the development of the 6 exploitation scenarios

Purpose	Tools/method	Format
Review of stakeholders'/ main interests / motivations	surveys undertaken in coordination with IHA (Data set 2)	MS Word documents (.docx) and google forms for questionnaires MS Excel documents (.xlsx) that was the result
Market potential assessment	Processing land use GIS layers with various criteria	GIS layers (shape files) – using COPERNICUS (urban atlas) and CORINE datasets
	Data extraction on WWTP to generate tables, maps and graphs	Excel files with data extracted from EU reporting data on UWWD FAO Aquastat database UN Joint Monitoring Program on sanitation Eurostat
	Data extractions from eco-labeling databases	Excel files with data extracted from online databases offered by touristic eco-labels
Assessment of return on investment for end users	Economic models (CAPEX,OPEX, revenues and external benefits) for 6 exploitation scenarios	MS-Excel tables
Ex-ante evaluation of carbon sequestration	Use of UN-FAO tool EX-ACT	Ms-Excel file with input data and estimated GHG emissions and carbon sequestration based on land use changes
Environmental Technology Verification (ETV)	Assessment of existing operational data	MS Word documents (.docx) and MS Excel documents (.xls) MS Word documents (.docx) that was the result

Within the exploitation activities, data were also collected and compared on the current efforts for a circular water economy (in excel files) and combined to factsheets and a layman's leaflet (in pdf format) that will be publicly available on HYDROUSA website and have been distributed in events.

All data compiled or generated are integrated into 10 Deliverables (**Table 11**). Deliverables 8.1, 8.2, 8.7, 8.8, 8.9, 8.10 are confidential, while Deliverables 8.3, 8.4, 8.5, 8.6 are public. Confidential deliverables are accessible only by members of the consortium. Regarding public deliverables D8.3 and D8.4 will be freely

available on the project website (in pdf format) for download by the public after the project completion, while D8.5 and D8.6 are already available on HYDROUSA website.

These data sets produced is expected to be particularly helpful for the project consortium in particular for the technology providers for future exploitation of HYDROUSA results.

Table 11. Deliverables related to data set No 9

Deliverables	Title	Dissemination level	Scope
D8.1	HYDROUSA exploitation scenarios and market size	Confidential	It presents the 6 exploitation scenarios, related market segments and an estimation of its size as well as the competitive advantage of HYDROUSA. Data included: ○ resulting data on market sizing (tables, maps and graphs) resulting from the exploitation of datasets listed above ○ information on competing technologies
D8.2	Business Plan for Exploitation	Confidential	It presents the vision of the project, the proposed solutions (HYDROs), marketing pathways, the economic model (costs and revenues), socio-economic, legal and technical constraints and recommendations to overcome them. Data included: ○ economic models for each exploitation scenario (6 in total): CAPEX, OPEX, revenues, yield, productivity, payback period ○ carbon sequestration ex-ante estimation ○ sales forecasts

D8.3	Replicability and associated funding mechanisms	Public	It presents financing mechanisms that can support further exploitation of HYDROUSA and faster deployment for the targeted replication sites. It integrates additional and follow-up funding, financing and/or investment opportunities and mechanisms, adapted to different relevant European countries and regions and in general regarding the European Regional Development Fund (ERDF). It also includes blended instruments like NCFF (Natural Capital Financing Facility), InnovFin (EU Finance for innovators), the PRIMA Initiative; as well as alternative financing mechanisms through municipalities, community involvement (crowd-financing), institutional investors (World Bank, ethical banks, sustainable pension funds), private investors (venture capital donors), and infrastructure/energy/water utility organisations.
D8.4	Marketing activities	Public	It describes and assesses all the different marketing activities performed throughout the project (WP8) and their links to the Communication activities carried out under WP9. The achievement of objectives was reviewed and all the marketing support prepared (factsheets, questionnaires and synthesis results) are provided. Individual replies to surveys are not provided.
D8.5	Evidence matrix of circular economy facts and policy brief for use in WP7, WP8 and WP9	Public	This report brings together all current efforts with brief descriptions and links for a more circular water economy, showing barriers and possible ways to overcome them. Its purpose is to support all partners of the project by providing a strong evidence base together with a policy brief as resources for further interactions with stakeholders.

D8.6	Circular economy factsheet, layman's leaflet and basis for education material	Public	Based on the research for the evidence matrix in D8.6, factsheets and layman's leaflet were formulated as well. The circular economy layman's leaflet is the dissemination material for the broader community that can be used at all events and can even be distributed through further stakeholders. It provides a basic understanding for a transition towards circular economy.
D8.7	Evaluation report for the eco-tourist business case	Confidential	It provides a further analysis on the ecotourism and agroforestry business cases (included on D8.9) when integrated together. It includes possibilities and limitations of a small-scale collaborative network, the business opportunities which arise from direct marketing, low impact, high density and high diversity. The water loops within small eco-tourist facilities are analysed and displayed.
D8.8	Report on ETV activities	Confidential	This deliverable consists of a report on ETV results and activities, which were undertaken for selected HYDROUSA technologies. It includes a short description of the ETV procedure, the selection of the performance claims for selected HYDROUSA technologies, the quick scan with and its evaluation from the verification body and a description of the methodology and results undertaken for the systems which passed the quick scan.

D8.9	Final HYDROUSA exploitation scenarios and market size	Confidential	It describes and evaluate the opportunities for exploitation of the HYDROUSA services and sets the priorities for the market introduction, updated with the results after the full operation of the HYDROs. It includes 6 business cases (market size, competitors, constraints and enabling environment) based on a common circular economy framework: agroforestry, Mangrove still, ecotourism, constructed wetlands, UASB with biogas, and rainwater harvesting. All datasets produced for D8.1 have been updated with more recent data, when existing.
D8.10	Final business plan for exploitation	Confidential	This report presents the adaptive business model covering the elements presented at the canvas business model, the cost structure and the exploitation strategy. Based on the updated market sizes estimations (D8.9), 5 business exploitation scenarios are defined with cost and revenue estimations as well as investment requirements to address the different market segments identified.

9.2 Fair Data

9.2.1 Making data findable, including provisions for metadata

All data collected and generated for exploitation are confidential and stored on a SEMIDE private server with a backup facility. Exploitable data for the consortium are shared and stored on a private server by the project coordinator. They are mainly the economic models for each exploitation scenario. The naming convention is as follow:

- **HYDROxx_Eco_Vyy.xlsx**

Where,

- xx represents the exploitation scenario number
- yy represents the version number

The files contain for each data item its unit and a comment field explaining the hypothesis/calculation method and source of data.

As described above, some of the deliverables (D8.1, D8.2, D8.7, D8.8, D8.9 and D8.10) that have been developed from this dataset are confidential and stored on a private server by the project coordinator. Only members of the consortium have access to this data. However, public deliverables of this dataset D8.3 and D8.4 will be saved in pdf format and will then be opened using the "Adobe Acrobat Reader" (free) software without any limitations. Any interested party will be able to locate the desired document using the site's navigation menu (www.hydrousa.org), while deliverables D8.5 and D8.6 are already available on HYDROUSA website.

9.2.2 Making data openly accessible

Data set No 8 includes both confidential and public data. The confidential data is kept on a private server by the project coordinator and only members of the HYDROUSA consortium have access to them. Openly available data is saved in pdf format and then opened with the use of "Adobe Acrobat Reader" (free) software without any limitation. The evidence matrix itself (D8.5) is provided as a table in the D8.5 document and will additionally be shared in Excel format upon any request.

9.2.3 Making data interoperable

The public deliverable files are stored in pdf format and can only be used as a reference.

9.2.4 Increase data reuse (through clarifying licenses)

Regarding the public deliverables (D8.3, D8.4, D8.5 and D8.6) the 'Creative Commons Attribution-Non-Commercial-No Derivatives 4.0 International Public License' is used so as to allow potential parties to use it freely.

9.3 Allocation of resources

The cost of this data collection and production for exploitation was included in HYDROUSA budget. Only public datasets were used. SEMIDE as leader of exploitation activities (WP8) has securely archived the datasets listed above on its servers and backup facility after the end of the project. The resulting confidential datasets are stored with the confidential deliverables on a private server by the project coordinator.

9.4 Data security

The publicly available deliverables are hosted on the server's website, following the host's security protocols. The data sets are also stored on the private server, which backs up all files externally at regular intervals to ensure that the data set is safely retrieved.

9.5 Ethical aspects

When data obtained from the results of the questionnaires included personal information of respondents these datasets were not shared. In order to maintain the anonymity and confidentiality of the respondents, the results of the questionnaires have been stored privately on the server. Only anonymized datasets have been used for processing and analysis. Mr Zisis Tsiropoulos from the company AGENSO has been appointed as Data Protection Officer (DPO) of HYDROUSA project. According to the General Data Protection Directive (GDPR) 2016/679 he is responsible of maintaining anonymity and distributes the file in the interested partners with caution. SME AGENSO is a project partner and has been dealing with the development of platforms for

the management of data in the project. AGENSO has significant experience in the implementation of procedures for data management within existing HORIZON2020 projects.

9.6 Other

Not Applicable