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high-value products from agricultural
residues through sustainable chains

Deliverable D6.5- review REP2 Data management plan

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Dissemination Level

P	Public	☒
CO	<i>Confidential, only for members of the consortium (including the Commission Services)</i>	☐
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Type

R	Document, Report	☒
DEM	Demonstrator, Pilot, Prototype	☐
DEC	Websites, Patent Filings, Videos, etc	☐
Other	(Please describe the type)	☐



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Summary

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1. Executive Summary

Background	This document D6.5 review RP2 is the Data Management Plan (DMP) deliverable of the AGRILLOOP project, which is funded by the European Union's Programme under Grant Agreement #101081776. It complements D6.5 delivered in due time using the EC template.
Objectives	The main objective of this deliverable is- to manage the follow up of the AgriLoop data management plan (WP6). Open Access (OA) to research data via trusted repositories under the principle "as open as possible, as closed as necessary" following the FAIR (Findable, Accessible, Interoperable and Reusable) principles that must be ensured during and after the AgriLoop project. To reach this aim, the implementation steps of the Data Management Plan (DMP) is based on one hand on three main deliveries, DMP initialization version (M6), intermediate version (M24) and final version (M48) and on the other hand on a continuous effort of data "FAIRification" all along the project synchronized with AgriLoop project deliverable production. The purpose of the Data Management Plan (DMP) is to provide a global view of data collected/produced in the project. Detailed information is provided on the procedures that have been implemented for data collection, storage, protection, retention and destruction and confirmation that they comply with national and EU legislation.
Methods	A web survey has been designed by INRAE. It has been fulfilled by AGRILLOOP partners to collect the required information at the beginning of the project. A synthesis of information is provided in this document. This synthesis is updated twice by the partners at the middle (current report) and at the end of the project.
Results & implications	The DMP provides a global picture of types of data which are collected/produced in all the WPs. The list of partners who are concerned by ethic aspects (mainly about personal data management) has also been achieved. Those partners have provided information about their personal data management policy. INRAE has implemented a route implementing FAIR principles to manage data collected/produced during the project based on Recherche Data Gouv dataverse. Current version of the DMP includes 38 datasets with 9 opened, 13 under embargo and 14 confidential (1 for EU and 13 for CN).

2. Introduction

AgriLoop manages research data and other research outputs responsibly, following the FAIR (Findable, Accessible, Interoperable and Reusable) principles, using a Data Management Plan and providing OA to research data via trusted repositories under the principle “as open as possible, as closed as necessary”. To ensure AgriLoop results’ reproducibility, scientific process and data is documented at the early stage of research in a transparent way by each partner: successive raw data saved; lab notebooks to track reasoning, experimental, final protocol, deviations, linked to data files; operating protocols in tracked versions; protocols shared in supplementary files; statistics described and pilot processes quality-controlled.

To ensure a smooth management of AgriLoop’s data, T6.4 in WP6 is dedicated to specify how AgriLoop collected, processed or generated data are/will be handled by the consortium by following FAIR principles during the project in a Data Management Plan (D6.4, D6.5 and D6.6) and how to ensure their preservation beyond the project lifetime. The DMP has been generated at the start of AgriLoop and will evolve over the lifespan of the project.

AgriLoop will include the following data types: Stakeholders’ preferences about potential residues conversion pathways (WP1) - Data collection on volumes and compositions of primary and secondary residues - data on physical-chemical and functional properties of extracted/fermented compounds (from WP2 and WP3) and of end-products (WP4) from the agri-residues with identification of potential end-uses, and data on identified hazards (contaminants) in original residues and end-products - Estimated sustainability indicators of the circular solutions (climate, ILUC, effect on soil health - Experimental methods and processes set up for the residue valorisation pathways - Data on end-product purity and quality - Techno-economic data on the upscaling of the AgriLoop.

The first data management plan delivered in M6 has been revised by the partners at month M24 (D6.5), for an intermediate version and will be revised at month M48 (D6.6) for the final version. INRAE will use the collaborative platform to realize those revisions with partners.

The types of research data collected or generated along the project lie in the WPs listed in the following table:

WP Number	WP Title
WP1	Foundational circular & strategic flows
WP2	Upstream Proteins & Chemicals recovery
WP3	Microbial fermentations for proteins and PHA production
WP4	End-products and value chains
WP5	Communication, dissemination and exploitation
WP6	Coordination and project management

The list of partners, which participate to the project, are listed below:

Partner No	Short name	Full name	Type	Country
1	INRAE	Institut National de Recherche pour l'Agriculture, l'alimentation et l'Environnement	RE	FR
2	WR	Wageningen Research	RE	NL
3	SDU	University of Southern Denmark	RE	DN
4	ECOZEPT	Ecozept	SME	FR
5	ECOZEPT DE			DE
6	USC	University of Santiago de Compostela	RE	ES
7	FCAC	Federació de Cooperatives Agràries de Catalunya	Other	ES
8	UNIBO	University of Bologna	RE	IT
9	ITQB	Institute of Chemical and Biological Technology, Universidade NOVA de Lisboa	RE	PT
10	TOMA	TomaPaint SRL	SME	IT
11	NID	Innovation and Development Association, NOVA School of Science and Technology	RE	PT
12	UNIROMA	University of Roma	RE	IT
13	ENTO	ENTOMOTECH S.L.	SME	ES
14	CSIC	Consejo Superior de Investigaciones Biológicas	RE	ES
15	UGENT	University of Gent	RE	BE
16	UNIVR	University of Verona	RE	IT
17	BIO-MI	Bio-Mi	SME	HR
18	UM	University of Montpellier	RE	FR
19	AVECOM	Avecom	SME	BE
20	IT	INRAE Transfert	Other	FR
21	FHNW	University of Applied Sciences Northwestern Switzerland	RE	CH
22	BDC	Biorenewables Development Centre	Other	UK
23	DSS+	DSS Sustainable Solutions Switzerland SA	SME	CH
24	IFST-CAAS	Institute of Food Science and Technology, Chinese Academy of Agricultural Sciences	RE	CN
25	IARRP-CAAS	Institute of Agricultural Resources and Regional Planning, Chinese Academy of Agricultural Sciences	RE	CN
26	IFR-CAAS	Institute of Feed Research, Chinese Academy of Agricultural Sciences	RE	CN
27	BIOMA-CAAS	Biogas Institute of Ministry of Agriculture and Rural Affairs, Chinese Academy of Agricultural Sciences	RE	CN
28	HZAU	Huazhong Agricultural University	RE	CN

29	BTBU	Beijing Technology and Business Univ.	RE	CN
30	SJCOF	Shandong Jinsheng Cereals & Oils Foods Co.	SME	CN
31	SDIC	SDIC Zhonglu Fruit Juice Co.	SME	CN
32	SYBT	Shandong Youhe Bio Tech Inc	SME	CN
33	SCRG	Sichuan Runge Biology Science And Technology Co.	SME	CN
34	BJAMS	Beijing Long Age AMMS Biological Tech. Co.	SME	CN
35	NKU	Nankai University	RE	CN
36	HBNACOL	Hebei NACOL Biotechnology Co.	SME	CN

Section 3 explains how FAIR data management is implemented in AgriLoop project and section 4 the reasons why some datasets may remain confidential. In section 5 are listed data sets collected/produced in each of these WPs by partner, WP, and deliverables. Section 6 concludes the report and provides perspectives.

3. Methodology

WP6 concentrate data collection that is needed to ensure their preservation beyond the project lifetime. Data generated by WP1, WP2, WP3 and WP4 examined by the involved partners to decide which data should be made available on the data management platform following the principle ‘as early as possible, as open as possible’. Specifically, they decide of an action plan during deliverable production: which metadata and license associated with the data, what are the most appropriate open repositories / channels for exploiting those data during and after the end of the project including Research Data Gouv dataverse and OpenAIRE+ platforms.

More precisely, in Task 6.4, INRAE proposes a FAIR data management implementation to help AgriLoop partners to make their data durable. The solution is based on the notion of Digital Object Identifier - DOI, which is a persistent identifier used to uniquely identify objects, standardised by the International Organisation for Standardisation (ISO). DOIs are in wide use mainly to identify academic, professional, and government information, such as journal articles, research reports and data sets. AgriLoop partners have the possibility to upload in the Recherche data gouv dataverse their data files stored in a dataset, then automatically associated with a DOI. The stored datasets are automatically harvested to replicate their metadata to OpenAIRE. FAIR principles implementation are the following:

- Findable: Digital Object Identifier (DOI) including a unique identifier and metadata is associated with a given dataset. DOI creation allows metadata indexation by search engines (e.g. DataCite, Recherche data gouv dataverse);
- Accessible: Recherche data gouv guarantees at least 10 years of persistent storage for datasets;
- Interoperable: data files should be registered in open formats like CSV or common formats (e.g. Excel, Open Office); all datasets will be described using standard descriptive metadata, such as Dublin Core and DataCite
- Metadata Schema to ensure metadata interoperability for indexing and discoverability;
- Reusable: License terms for data sharing and reuse are associated with datasets (by example CC-BY 4.0).

INRAE sent a web survey to AgriLoop partners to build the first version of the DMP, which INRAE delivered in M6 (D6.4). Before each period of deliverable production, INRAE recalls the procedure to implement the data management plan to partners during monthly online meetings. INRAE created a dataverse dedicated to the Agriloop project on the Recherche data gouv dataverse platform ([link](#)). Partners in charge of deliverable writing are invited to add a specific DMP follow up section at the end of their deliverable in order to explain how the DMP has been implemented (mainly the DOIs of datasets

created on Recherche data gouv dataverse or other institutional dataverses). INRAE wrote and sent a short INRAE dataverse user guide to partners. It explains the procedure to create datasets, add metadata to them, upload data files in the datasets.

4. Confidential datasets

For European partners, potential commercial exploitation planned, sensitive data or publication expected, and therefore temporary embargo may explain that some datasets remain confidential or under embargo. As set out in the Grant Agreement, in Art 16 and Annex 5, AGRILLOOP beneficiaries are expected to protect and exploit their results the best of their capabilities, explaining the temporary closed access to certain datasets

Concerning Chinese (CN) partners, the China's [Data Security Law](#) imposes limitation on data use by other actors than CN. Open access, even in the framework of international research project such as AGRILLOOP, is rather an exception than a rule and is subject to the strict approval of higher CN authorities. Plus, obligations for Associated Partners in the Grant Agreement do not include the strict application of Open Access. Therefore, the consortium is in the incapacity to decide of the status of CN data and considers these legal questions to be resolved at higher levels.

5. AgriLoop data sets

The following datasets have been grouped by WPs. In the column *Repository planned*, the green cells contain datasets already in Open access mode as the orange ones contain datasets in embargo mode following partners' wishes.

WP	Responsible	Dataset title	Repository planned
WP1	ECOZEPT	Results of interviews conducted with different types of stakeholders	Confidential
WP1	INRAE	Agriloop Delphi interviews: Annotated expert insights on agricultural waste valorization	Recherche Data Gouv OpenAIRE https://doi.org/10.57745/91BXIY
WP1	INRAE	Agriloop qualitative criteria: Annotated named entities for expert interviews on the valorization of agricultural residues	Recherche Data Gouv OpenAIRE https://doi.org/10.57745/E6ZAG1
WP1	INRAE	Collection of expert rankings, justifications and their logical representations for multi-criteria decision analysis	Recherche Data Gouv OpenAIRE https://doi.org/10.57745/DRH5SK
WP1	WR	Estimates of residues volumes, compositions and of production potentials	Recherche Data Gouv OpenAIRE https://doi.org/10.57745/VFGJJJ
WP1	SDU	Input data received from all partners with regards to early sustainability assessment	Recherche Data Gouv OpenAIRE https://doi.org/10.57745/QBXNYC
WP1	SDU	Framework for Early Sustainability Guidance	Recherche Data Gouv OpenAIRE https://doi.org/10.57745/SW8QDJ
WP1	UNIROMA	Acidogenic fermentation of potato peels with contaminants: Malathion and Azoxystrobin	Recherche Data Gouv OpenAIRE https://doi.org/10.57745/S0YLFA
WP1	BTBU	Classic rural organic waste output, treatment methods, cost	Confidential
WP2	FHNW	Agro-residues pre-treatment for proteins and peptides content	Recherche Data Gouv OpenAIRE https://doi.org/10.57745/EUCME2
WP2	INRAE	Intermediate report on optimal processing workflow to maximise recovery of three distinct classes of targeted compounds	Recherche Data Gouv OpenAIRE

			https://doi.org/10.57745/VZQWZG
WP2	UNIBO-BIGEA	Tomato seeds enzymatic digestions and alkaline or neutral - acidic extractions	Recherche Data Gouv OpenAIRE https://doi.org/10.57745/SIW9L
WP2	TOMA	Tomato by-products characterization	Recherche Data Gouv OpenAIRE https://doi.org/10.57745/5UIK56D
WP2	INRAE	FTIR-spectra of tomato pomaces	Recherche Data Gouv OpenAIRE https://doi.org/10.57745/OSCA4I
WP2	INRAE	Effect of pomaces pretreatment	Recherche Data Gouv OpenAIRE https://doi.org/10.57745/N2STSV
WP2	IFST-CAAS	Peanut protein extraction technology, protein properties, peanut short peptide preparation technology	Confidential
WP2	IFST-CAAS	Analysis of basic components of raw materials. Green extraction process of polyphenols. Extraction characterization and biological activity.	Confidential
WP2	IFST-CAAS	Extraction of dietary fiber, soluble sugars, and peptides from potato processing waste	Confidential
WP2	IFST-CAAS	Pretreatment/drying conditions, extraction of the pectin/polyphenols,	Confidential
WP3	UNIROMA	Acidogenic fermentation batch tests performed with three agricultural residues	Recherche data gouv OpenAIRE https://doi.org/10.57745/EBFJX4
WP3	UGENT	Thermophilic enzymatic hydrolysis tests	Recherche Data Gouv OpenAIRE https://doi.org/10.57745/WTUQU4
WP3	NID	Agro-food Wastes pre-treatment - subcritical water	Recherche Data Gouv OpenAIRE https://doi.org/10.57745/5FOZS6I
WP3	UNIBO	Biopolymer (PHA) production from bacteria and Extraction	Recherche Data Gouv OpenAIRE https://doi.org/10.57745/PONHTT
WP3	IARRP-CAAS	Production of fungal protein are optimized according to agri-residues for food and animal feed.	Confidential
WP3	HZAU	Superfine grinding on a range of selected agri-residues feedstock; MP production is explored from brewers' spent grains	Confidential
WP3	IFST-CAAS	Ultrasound assisted acid extraction on a range of selected agri-residues feedstock (e.g. soybean meal oil extraction)	Confidential
WP3	IARRPP-CAAS	The conditions for the production of biofertilizer from agricultural wastes and the process guidelines for scale up.	Confidential
WP3	IFST-CAAS	Microbial fermentation of agricultural organic residues and high quality chemical components preparation technique and application research	Confidential
WP3	NKU	Microbial fermentation of biomaterial polyhydroxyalkanoates from agricultural wastes	Confidential
WP3	BIOMA-CAAS	The conditions for the production of biogas. The process guidelines for scale up.	Confidential
WP4	UNIVR	Production of PHAs with variable HV content from agricultural residues	Recherche Data Gouv OpenAIRE https://doi.org/10.57745/XLLAI6
WP4	UM	PHBV/peanut shells bio composites	Recherche Data Gouv OpenAIRE https://doi.org/10.57745/5MKVL9E
WP4	UM	Effect of PHAs purity on their processability through thermomechanical treatments	Recherche Data Gouv OpenAIRE https://doi.org/10.57745/5VIAI3F
WP4	UNIBO	Cutin/PHBV blends	Recherche Data Gouv OpenAIRE

			https://doi.org/10.57745/RKPR1T
WP4	FCAC	Collection of end-users needs regarding the use of plastics in the farming sector, technical visits in Catalonia (in June 2024)	Recherche Data Gouv OpenAIRE https://doi.org/10.57745/8ZO3CM
WP4	DSS+	Quantities of feedstock, typology of stakeholders to valorise these feedstock, stakeholders' preferences, valorization of the data key economic data	Not decided yet
WP4	WR	Cost-benefit estimates of circular value chains	Not decided yet
WP4	BTBU	Environmental, safety & economic-social assessment. Business concept of valuable sustainable of value chains	Confidential

Table 1: List of AgriLoop datasets

Dataset title	DL
Results of interviews conducted with different types of stakeholders	D1.1, D1.2, D1.3
Agriloop Delphi interviews: Annotated expert insights on agricultural waste valorization	D1.1, D1.2, D1.3
Agriloop qualitative criteria: Annotated named entities for expert interviews on the valorization of agricultural residues	D1.1, D1.2, D1.3
Collection of expert rankings, justifications and their logical representations for multi-criteria decision analysis	D1.1, D1.2, D1.3
Estimates of residues volumes, compositions and of production potentials	D1.4, D1.5, D1.6
Input data received from all partners with regards to early sustainability assessment	D1.9
Framework for Early Sustainability Guidance	D1.9
Acidogenic fermentation of potato peels with contaminants: Malathion and Azoxystrobin	D1.8
Classic rural organic waste output, treatment methods, cost	D1.1, D1.2, D1.3
Agro-residues pre-treatment for proteins and peptides content	D2.1
Intermediate report on optimal processing workflow to maximise recovery of three distinct classes of targeted compounds	D2.1
Tomato seeds enzymatic digestions and alkaline or neutral - acidic extractions	D2.2
Tomato by-products characterization	D2.1
FTIR-spectra of tomato pomaces	D2.1
Effect of pomaces pretreatment	D2.1
Peanut protein extraction technology, protein properties, peanut short peptide preparation technology	D2.1
Analysis of basic components of raw materials. Green extraction process of polyphenols. Extraction characterization and biological activity.	D2.1
Extraction of dietary fiber, soluble sugars, and peptides from potato processing waste	D2.1
Pretreatment/drying conditions, extraction of the pectin/polyphenols	D2.1
Acidogenic fermentation batch tests performed with three agricultural residues	D3.1
Thermophilic enzymatic hydrolysis tests	D3.1, D3.2
Agro-food Wastes pre-treatment - subcritical water	D3.1
Biopolymer (PHA) production from bacteria and Extraction	D3.2
Production of fungal protein are optimized according to agri-residues for food and animal feed.	D3.1, D3.2
Superfine grinding on a range of selected agri-residues feedstock; MP production is explored from brewers' spent grains	D3.1, D3.2
Ultrasound assisted acid extraction on a range of selected agri-residues feedstock (e.g. soybean meal oil extraction)	D3.1, D3.2
The conditions for the production of biofertilizer from agricultural wastes and the process guidelines for scale up.	D3.2
Microbial fermentation of agricultural organic residues and high quality chemical components preparation technique and application research	D3.2
Microbial fermentation of biomaterial polyhydroxyalkanoates from agricultural wastes	D3.2
The conditions for the production of biogas. The process guidelines for scale up.	D3.2
Production of PHAs with variable HV content from agricultural residues	D4.1
PHBV/peanut shells bio composites	D4.1
Effect of PHAs purity on their processability through thermomechanical treatments	D4.1
Cutin/PHBV blends	D4.1
Collection of end-users needs regarding the use of plastics in the farming sector, technical visits in Catalonia (in June 2024)	D4.1
Quantities of feedstock, typology of stakeholders to valorise these feedstock, stakeholders' preferences, valorization of the data key economic data	D4.4 (M48)
Cost-benefit estimates of circular value chains	D4.4 (M48)
Environmental, safety & economic-social assessment. Business concept of valuable sustainable of value chains	D4.4 (M48)

Table 2: Links between datasets and deliverables

6. Conclusion

All EU AgriLoop partners have fulfilled the web survey, which has been used to write the first version of the DMP. Tables of the DMP have been extended by the Chinese partners. It must be noticed that all EU respondent expressed the wish to use Recherche data gouv dataverse platform to manage their data for long term preservation. Consequently, a dataverse dedicated to AgriLoop project has been created (<https://entrepot.recherche.data.gouv.fr/dataverse/agriloop/>) and a short guide explaining how to use it has been written and sent to partner. Concerning data exchanges between EU and CN partners, INRAE proposed a template of data transfer agreement.

The current version of the DMP contains 38 dataset descriptions. 14 (including 13 CN datasets) are confidential mainly due to follow the Scientific Data Management Policy issued by the General Office of the State Council, P.R.China. The datasets already opened or that will be open after embargo period are automatically harvested by OPENAIRE. 22 datasets have already been uploaded on Recherche data gouv and 9 already opened and replicated on OPENAIRE for most of them. The next and final DMP update will take place at M48 of the project.