D1.2
DATA MANAGEMENT PLAN

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List of acronyms

Acronym	Description
CC BY	Creative Commons 'By'
CC BY-NC	Creative Commons 'By' Non-Commercial
CC BY-ND	Creative Commons 'By' No Derivatives
CC BY-SA	Creative Commons 'By' Share Alike
CC0	Creative Commons Zero
CCRI	Circular Cities and Regions Initiative
CERN	Conseil Européen pour la Recherche Nucléaire
DMP	Data Management Plan
DOI	Digital Object Identifier
ECSA	European Citizen Science Association
EU	European Union
EUPL	European Union Public License
FAIR	Findable, Accesible, Interoperable, Reusable
GDPR	General Data Protection Regulation
GNU	GNU's Not Unix
H2020	Horizon 2020
IPR	Intellectual Property Rights
JSON	JavaScript Open Notation
MIT	Massachusetts Institute of Technology
NDA	Non-Disclosure Agreement

OA	Open Access
OpenAIRE	Open Access Infrastructure Research for Europe
PDA	Project Development Assessment
PM	Person-Month
QA	Quality Assurance
R&D	Research and Development
RRI	Responsible Research and Innovation
TLBM	Tailored Lighthouse Business Model
UCBH	Urban Circular Bioeconomy Hub
WP	Work Package

1. EXECUTIVE SUMMARY

HOOP is a project based on information and data for providing project development assistance (PDA) to cities and regions. Therefore, it is essential for the success of HOOP to have a good Data Management Plan (DMP). DMP is the document which describes the management of the data collected, generated and processed along the project lifetime.

The DMP identifies the types of data from HOOP and classifies them according to different criteria (topic, origin, format). HOOP results are formed by PDA reports (many of which are deliverables), outcome of tools, multimedia material, scientific publications and databases. Most of these data are text and numerical (.docx, .xlsx, .pdf), but there is also a significant amount of images and videos.

The online platforms (Urban Circular Bioeconomy Hub and Virtual Academy) will be the main instrument for communication and dissemination of the public results of the project, making most of the data accessible. These platforms are intended to be available beyond project lifetime, but the data on them will be also accessible through the Circular Cities and Regions Initiative (CCRI) platform. The dissemination of results will follow the principle 'as open as possible, as closed as necessary'. In addition, a certain amount of peer-reviewed scientific publications will be generated, with special focus on citizen science actions.

HOOP Consortium will ensure that results are made findable, accessible, interoperable and reusable (FAIR), respecting the restrictions of IPR and ethics (personal data protection). Scientific publications, their related metadata and underlying data will be stored in a public and certified repository, adapting to the multidisciplinary character of HOOP (Zenodo). This repository will provide a safe long-term storage and backup of project results.

This deliverable is a first version but the DMP is a living document which will be updated along the project when significant changes take place.

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2. INTRODUCTION AND OBJECTIVES

Urban biowaste is an important environmental issue, as each European generates around 200 kg of urban biowaste per year. The current systems for urban biowaste treatment (i.e. composting) do not use their whole potential and the final products do not have a high added-value. Circular bioeconomy offers innovative solutions using biowaste as resources for obtention of high added-value bioproducts. However, their implementation on industrial scale faces important barriers, not only technical, but also economical, legal and administrative, among others. HOOP project offers project development assistance (PDA) and tools to overcome these barriers in 8 cities and regions of Europe.

The fact that PDA is the main topic of the project confers HOOP project a singular character, involving a multidisciplinary team with expertise in very different areas of knowledge. This variety implies that the nature of the data and strategies for management might vary significantly from work package to work package (WP).

HOOP project is different from conventional R&D urban circular bioeconomy projects, as it is not developing technologies, but the PDA required to bring those projects to the reality. This means that the main material of work is not physical, as in the case of pilots and experiments. The main material of work of HOOP is knowledge, which is intangible, expressed in the form of data of diverse nature. This means that the amount of data managed in HOOP is relatively large in comparison with conventional projects.

Another important feature in HOOP project is the development of online platforms to communicate and disseminate the results. The most important one is the Urban Circular Bioeconomy Hub (UCBH), a web-based platform which gives access to different kind of contents and hosts other online platforms, such as the HOOP Virtual Academy and the Virtual Network of Follower Cities. The UCBH will make accessible resources about urban circular bioeconomy to its users. The Virtual Academy (for Lighthouse and Follower Cities and Regions) will compile resources about urban circular bioeconomy (existing and original), including training materials in four topics of urban circular bioeconomy: stakeholder engagement, collection and transport, sorting, characterization and valorisation. The presence of these platforms makes that the dissemination of results finds alternative pathways than traditional scientific publications, providing means to arrive to broader public.

All the particular characteristics of HOOP project make that it is essential to manage the data in a suitable way and adapted to its features.

The objective of the present deliverable is to develop the Data Management Plan (DMP) of HOOP project. A data management plan describes the data management life cycle for the data. The structure is based on the recommended template in the Guidelines for H2020 Programme projects [9], but trying to adapt to the particular characteristics of HOOP project, which makes it unique. Data Management Plan is a document that provides the guidelines of how to manage the amount of data collected and generated from HOOP project. This means a first stage of identification of the data collected, processed and generated in the project (types, datasets,

formats) and a description of the measurements done for making the data findable, accessible, interoperable and reusable. The document also explains the plans for allocation of resources and provisions related to security and ethics (data protection, research with humans). In any case more detailed information about ethics (personal data protection) will be developed in the corresponding deliverables (D10.1 and D10.2)

3. DATA SUMMARY

3.1. Data Classifications

3.1.1. ORIGIN

The generation, collection and management of high-quality data is a crucial part of the success in HOOP project objectives. Therefore, the access to data of high quality and their processing is essential. In many cases the Lighthouse Cities and Regions are the main source of data. According to the origin of the data, they can be classified into:

- *Primary origin. These are data generated in the project. Typically, this relates to results from experiments or answers to interviews, but it can also be applied to reports generated by the partners as results of the application of their know-how or to the outcome of meetings.*
- *Secondary origin. These are data already existing, either from the partners either from other sources. These data relate to articles, databases, books, deliverables of related project, etc., but also to the outcomes of projects outside HOOP, mainly from the three mother projects (Scalibur, Valuewaste, WaysTUP!).*

The data will be mainly text, numerical and images. As most of the material generated in the project will be reports, the main formats will be .docx, .xlsx and .pdf. However, a relevant amount of multimedia material (images, videos, webinars, presentations) will be generated for communication through the online platforms, social media, etc., using formats such as .jpg, .png, .mp4, pptx.

3.1.2. PURPOSE

According to their purpose, the data managed in HOOP can be classified in another way:

- *Inputs. These are data required from the cities and regions or from other sources to provide the background for the generation of the PDA. This information is processed by HOOP partners to produce reports of high quality, including the deliverables of the project. Among these inputs they can be included:*
  - *Databases. Databases on different levels (local, regional, national, international) Generally, they are of open access (i.e. Eurostat).*
  - *Bibliography. This consists in scientific publications, conference contributions, websites, books.*
  - *Questionnaires and forms. This method is used to collect information requested from the Lighthouse Cities and Regions. The data are obtained through suitable procedures (spreadsheets, interviews, meetings).*
  - *Outcomes from previous projects. HOOP partners participating in other projects might use the reports or tools generated in them as part of the PDA development (i.e. Valuewaste, Scalibur, WaysTUP!, Power4BIO), as well as other open access material from other EU funded projects (i.e. Cityloops)*

- *Intermediate data (curated data). These are data which have been processed or generated during the PDA but which do not have enough entity to be presented as result. These data might include databases or different intermediate datasets. Intermediate data might be analyzed for the development of tools or know-how applied to the outcomes and reports from HOOP project.*

- **Outputs/results**. *These are the data generated by the project structured in such a way that can be published. HOOP public results will be made accessible through different channels, being the online platforms and the scientific publications the most important. Due to the characteristics of HOOP project, there will be different types of results:*

  - **Reports.** *PDA is developed mainly through reports. This might include studies, outcome of meetings and events, guidelines with recommendations for the cities, factsheets, best practices. Text is the main vehicle of expression of this knowledge. Reports include both deliverables and materials which are not deliverables but used in the online platforms.*
  - **Tools.** *One of the most interesting aspects in HOOP is the development of tools (methodologies, programs, software) to help the PDA of the cities and regions.*
  - **Scientific publications and conference participations.** *This is the most common mean of dissemination in science. It includes peer-reviewed articles in scientific journals and the participation in conferences with oral presentations or posters.*
  - **Multimedia materials.** *Videos, images, webinars are very important means of communication of the knowledge of both the experiences of the cities and the outcomes of HOOP. This will be also an important outcome of data, provided the scope of the UCBH and the challenges for events organization due to COVID-19.*

Regarding the results, it will be important to determine their degree of dissemination. In the case of deliverable reports, an important amount is categorized as confidential (only for the members of the Consortium and the European Commission). Intellectual Property Rights (IPR) will need also to be considered. As a general principle, the Consortium will follow the EC recommendations on open data and it will be "as open as possible, and as closed as necessary" to protect the associated exploitation rights when required. Confidential data, data subject to IPR and personal data will be treated according to the Grant Agreement and to the relevant legal framework.

3.1.3. TOPIC: THEMATIC DATASETS

The multidisciplinary character of HOOP project and the large amount of reports, deliverables and materials to be generated suggest a thematic approach for classification of the data into datasets. The tables with data identification and brief description are included in Annex 1 (Tables 3-9). The datasets are as follows and they almost fit with the WPs classification:

- *Technological dataset (WP2, WP3)*
- *Business models' dataset (WP4)*
- *Investment dataset (WP5)*
- *Public procurement dataset (WP5)*
- *Stakeholder engagement dataset (WP6)*
- *Replication dataset (WP7, WP8)*

- *Citizen Science dataset*
- *Management dataset (WP1)*

WP7 has been included as part of the replication dataset, as it develops online platforms where information is put to disposal of Follower Cities and potential followers. Management dataset includes the basic coordination and management tasks and deliverables, as well as the presentations and outcomes of meetings of management entities such as the Local HOOP Committees, Executive Board, General Assembly or Innovation Board

The interconnection between classifications according to purpose and according to the topic is plotted in Annex 1 (Figure 5).

3.2. Results

Results can have different nature (reports, tools, multimedia material, scientific publications). The large amount of expected results makes necessary a classification and the thematic criteria of datasets is a convenient choice. In order to summarize, the classification of reports into their dataset is plotted in Annex 1. This classification in Annex 1 tries to systematize the identifiable materials (especially deliverable reports) generated in HOOP. In the case of smaller groups of data, such as the tools, this is provided in the same table (Table 1). This same approach followed for databases (Annex 2), which are not a result of project, but a set of intermediate data. In the case of scientific publications, conferences, outcome of meetings and multimedia materials, their own topic suggest the thematic dataset they belong.

Generation of results might take place through different routes, depending on the requirement of external inputs, the participation of external partners or the use of tools. These routes are plotted in Annex 3 (Figures 6-9)

3.2.1. REPORTS

Reports are the main results of HOOP project, mainly in the form of deliverables. It is important to state that neither all the deliverables are reports nor all the reports are deliverables. Deliverables include outcomes of PDA, results from meetings and discussions organized in the framework of HOOP project about different disciplines (investment, stakeholder engagement, replication, etc.) and also other information relative to the developed tools.

It is clearly stated in the Gran Agreement which deliverables are confidential and which ones are public. These public deliverables will be accessible to the public through online platforms (UCBH), through the project website and the Circular Cities and Regions Initiative (CCRI). Public deliverables may be used also by the Commission and the Agency for communication and publicizing activities.

There are other reports and specific material generated to be accessible to the cities and regions and to public through the online platforms (i.e. Virtual Academy). These reports include best practices, factsheets, state of art reports, handbooks. Their main topics are related to areas such as stakeholder engagement, waste collection and transport, sorting, characterization and valorization.

Reports arising from data from Biowaste Clubs will feed the UCBH and will be accessible to all represented actors, properly managed by the project members and coordinated by each manager depending of the related area (Impact, Engagement and Responsible Research and Innovation (RRI), IPR and Exploitation, Communication and Dissemination or Scientific area).

The contents and reports besides the list of deliverables will depend on the outcomes of the project, the experiences and the knowledge shared in events such as Biowaste Clubs or National Replication Workshops. Although the list of materials is not set at this point of the project, all of them will fall within one of the categories of datasets stated also for the deliverables.

3.2.2. TOOLS

Another important outcome expected from HOOP are tools for evaluation of projects and circularity from different points of view. The description of the tools, the methodology and the results of their application to the particular cases of projects and cities are important data. Some of these tools are included in the UCBH, as for instance the Circularity Level required to determine the Urban Circular Bioeconomy Label. There are identified tools in HOOP as shown in Table 1, including also their thematic dataset in agreement with Annex 1. The Circularity Level has been included as part of replication dataset, as this tool is thought for Follower Cities and potential followers to evaluate their circularity. It might be possible that other kind of tools arise from the PDA.

Table 1. Tools developed in HOOP project

Name/Partner	Partner	WP	Dataset	Description
Circularity assessment methodology	ITENE	3	Technological	Evaluation of circularity from a unified approach environmental and techno-economical
The circular valuation method	Bax	4	Business models	Evaluation of circularity oriented to business models and bioproducts, considering economic factor and restorative material flows
Online self-assessment tool (Circularity Maturity Level)	RdA	5	Investment	Indicator of the bankability of a circular bioeconomy project
Citizen Science app	Science for Change	6	Citizen Science	App developed to tackle key issues and research questions in a citizen science approach. Data gathering on behaviour and acceptance through the app.
Circularity Level	SAV, ITENE CETENMA	7	Replication	Evaluation of the circularity of cities and regions, expressed as the Urban Circular Bioeconomy Label

The origin of the tools is mainly primary (developed by the partners), unless there are tools already existing from previous experiences. The tools include methodologies, formulas and eventually algorithms. For those tools that require the generation of code it is not possible to determine now its nature and format, but they will be selected according to the characteristics of the tool.

The outcome of these tools is normally numerical or categorical (i.e. the Label obtained from the evaluation of the circularity level in WP7). The methodology of some of the tools is described in some confidential deliverables (D3.5, D4.2, D7.1). The level of publicity of the outcome data will be studied case by case, according to the exploitation strategy, IPR and the communication strategy. Part of the results from the use of Citizen Science App will be disseminated in open access publications, as stated in the Gran Agreement.

3.2.3. PUBLICATIONS AND CONFERENCES

The project will generate scientific publications and conference contributions, both for presenting the project and for presenting its results. These publications are regulated by Article 29 in the Grant Agreement and are part of the dissemination strategy. They include:

- *Peer-reviewed publications in scientific journals.*
- *Contributions to scientific conferences (oral presentations, poster, etc.).*
- *Other scientific publications in any medium.*

The objectives of HOOP project in terms of scientific publications is to produce at least 10 peer-reviewed scientific publications and at least 25 conference presentations. It is important to notice that the dissemination of results should respect the obligations regarding result protection (Art 27), confidentiality (art 36), security (Art 37) and personal data protection (Art 39).

Article 29 of Grant Agreement establishes a protocol where any beneficiary intending to disseminate their results, must give advance notice to the other beneficiaries of at least 45 days, together with sufficient information on the results it will disseminate. Any other beneficiary may object within 30 days of receiving notification, if it can show that its legitimate interests in relation to the results or background would be significantly harmed. In such cases, the dissemination may not take place unless appropriate steps are taken to safeguard these legitimate interests (Art 29).

Besides this and based on the 10 Principles of Citizen Science, the Gran Agreement establishes that all the citizen-generated data must be FAIR (findable, accessible, Interoperable and reusable). In relation to other data generated by the project, it will be considered on a case by case basis, as indicated before, according to the provisions in Art. 29.1 of Grant Agreement.

The final publishable versions of scientific publications are normally text data (.docx, .xlsx, .pdf), but might also include images and diagrams. In the case of conferences, in addition to the text data (for the proceedings and books of abstracts) in typical text formats (.docx, .pdf), there might be also presentations (.pptx), images (.jpg, .png) and videos (.mp4).

In addition to the final results, scientific publications and conferences have data associated to validate the results, also called underlying data. Depending on the involved discipline, these data might be text, numerical or categorical with their corresponding formats (mainly .xlsx in the case of technical publications and .docx, .xlsx

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in the case of social research). As identified in the classification of data, the publications will also have intermediate data, comprising raw data and curated data depending on their level of processing. These data are expected to be mainly numerical and text.

In the particular case of Citizen Science, the interventions will be co-designed depending on the needs detected during the project for each Lighthouse City/Region. Therefore, the format of the associated data (underlying, curated, raw), as well as the strategy for collection and sharing will be decided along the project.

In addition to scientific journals, it will be also considered the publication in the new open access platform Open Research Europe. This platform is oriented to research coming from Horizon 2020 projects and offers the possibility of peer-review and complying with all the terms about open access. The peer-review process is open and it consists first in the publication of a first version of the article within ten days of submission. Then, expert reviewers are selected and invited, and their reviews and names are published alongside the article together with the authors' responses and comments from registered users. Once the articles pass the peer review they are sent to major indexing databases and repositories. The platform Open Research Europe is being launched formally on March 2021 [22].

3.2.4. MULTIMEDIA MATERIALS

In this category it can be included material in form of videos, webinars, images, graphs used for the dissemination and communication through different channels. The main materials generated will be hosted in the online platforms (UCBH, Virtual Academy), website and social media sites (i.e. LinkedIn). The most suitable formats will be selected on a case by case basis by the responsible partners in agreement with the WP leader and they are expected to have variable size depending on their duration and their degree of resolution.

Although not foreseen from the beginning, the situation with COVID-19 has meant that several of the key meetings of HOOP project need to be held through diverse online platforms (i.e. Microsoft Teams, Zoom). Some of these meetings have been recorded in video (Kick-Off Meeting) giving files with important size. In the unfortunate case that more of these important meetings (Biowaste clubs, Circular Investors Days, National Replication Workshops) need to be held online, the amount of data (video) with big size is expected to become higher.

3.3. Databases

HOOP project requires the identification of actual or potential entities, organizations, cities or persons in relation with the development of the PDA, stakeholder engagement and the replication strategy. This implies the constitution of several HOOP entities as part of PDA, which include external partners. The constitution of these entities requires the identification of potential members, so that databases are created before taking contact. These HOOP entities are as follows:

- *Local HOOP Committees*
- *Biowaste Clubs*
- *Circular Investors Board*
- *Network of Follower Cities*

In addition, it is included the participation of external partners in advisory tasks:

- *Legal Advisory Board*
- *Circularity Experts (Task 4.2)*
- *Experts from technology providers to support WP3*

It is desirable that these previous databases do not include personal data or that they include data publicly available from corporate websites.

The databases are not expected to have very large size. Therefore, the text data or numerical if required will be collected in spreadsheets (.xlsx) or text lists (.docx, .pdf).

In addition, databases will be generated for the events scheduled by HOOP project and for the participation in the online platforms. A more complete list of the expected databases is found in Table 10 in Annex 2. The management of the lists and their data will be done according to General Data Protection Regulation. A Plan for Protection of Personal Data will be developed as Deliverable D10.2.

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4. FAIR DATA

As part of the requirements of Horizon 2020 program, research results from the project need to be done FAIR, which is an acronym standing for Findable, Accessible, Interoperable, Reusable [24]:

- *Findable: this means that data are discoverable with metadata, identifiable and loctable by means of standard identification mechanism. (e.g. DOI). This implies naming conventions, keywords and version numbers.*
- *Accessible: this is related to the deposition in a repository or sharepoint. A repository is a software platform to store information and, according to the chosen accessibility conditions, made it accessible to other users.*
- *Interoperable: this is allowing data exchange and reuse between researchers, institutions, organizations, countries, etc. The general measures to make data interoperable is to follow standards for formats, facilitating recombinations with different datasets from different origins. Standard vocabularies and methodologies.*
- *Reusable. How the data will be licensed to be used after the end of the project.*

4.1. Making data findable

4.1.1. PERSISTENT IDENTIFIERS

Publications (peer-reviewed scientific articles, conference presentations) are identified by a persistent identifier such as Digital Object Identifier (DOI). These persistent identifiers, such as DOI, are generated by the publisher for scientific journals [11]. Some open access repositories, such as Zenodo, provide their own DOI since the moment of uploading the data [12]. It might happen that for open access publications there are available 2 DOI (one from publisher and one from repository).

Scientific publications, public reports and other material will be uploaded to the UCBH, where they can be found by use of their corresponding tab (i.e. *Publications*). DOI of publications will be provided for all the scientific publications. Materials different from scientific publications such as public reports, factsheets, good practices, etc. will be found through an open library tab from the Virtual Academy, hosted in the UCBH. It is highly recommendable to provide also a persistent identifier for these materials uploaded in the UCBH. This can be done by their DOI or link to open access repository.

Research data (underlying data) and other materials which are not uploaded in the UCBH but which are made open access need to have also their own persistent identifier, which might come from the open repository.

4.1.2. SCIENTIFIC PUBLICATIONS

4.1.2.1. Open access publication routes

According to Article 29.2 of Grant Agreement, and as part of H2020 Program, HOOP Project has the obligation to make the peer-reviewed scientific publications openly available or Open Access (OA). Open access means free of charge online access for any user. The files can not only be read online, downloaded and printed, but also copied, distributed, searched, linked, crawled and mined [10].

There are 2 main routes to open access [10]. Each beneficiary will choose the most suitable route to peer-reviewed scientific publications arising from the project.

- *Green open access. The author or a representative deposits the published article or the final peer-reviewed manuscript in and online repository before, at the same time, or after the publication. The publication is free of charge for the author, but some publishers request that the open access be granted only after an embargo period.*
- *Golden open access. The article is published immediately in open access mode. The most common business model is that the Article Processing Charges are paid by authors.*

The publisher will be chosen amongst those who respect both the authors' interests and accept the terms of open access publication (with an embargo period).

In case that the mean chosen for publication is Open Research Europe, open access is ensured by the own platform without any publishing fees or routes.

4.1.2.2. Public repository

Horizon 2020 is included in OpenAIRE platform, this means that in addition to publishers' webs and repositories, the scientific publications and associated bibliographic metadata in standard format need to be stored in an open access repository. This means a publicly maintained, long-term repository providing access without any user account or password.

According to Article 29.2 of Grant Agreement, a machine-readable copy of the scientific publications or final peer-reviewed manuscript accepted for publication must be deposited in a repository for scientific publications as soon as possible, not later than its publication date if an electronic version is made available for free by the publisher or within six months after publication date in any other case (12 months for social sciences). Previous versions of the publication might be stored previously in the repository.

Partners will use an open access repository, connected to the tools proposed by the European Commision, including the information requested by the EC. OpenAIRE tools allow finding a suitable certified repository for granting open access to different outcomes (publications, data, software) from a long list of potential repositories related with different disciplines [18]. However, in case that the topic of search does not match with any of the repositories in the list, OpenAIRE recommends the use of Zenodo [16, 18]. Zenodo is an open access repository operated by CERN. Data are stored in the same cloud infrastructure as CERN´s Large Hadron Collider and using the repository software Invenio [12].

HOOP project will generate publications in very different areas of knowledge. This means that although there are journals and repositories suitable for some of the data, there will be other publications and data not fitting into them. From a practical point of view, and considering that this Data Management Plan is a dynamic document, it might be recommendable the use of Zenodo as standard repository as a first approach. This selection might be later evaluated according to the needs and challenges observed along the project development related with deposit in public repositories.

4.1.2.3. Online platforms

In addition to the requirements of the repository, the scientific publications will be also accessible via the UCBH and website, following a user-friendly approach (tabs). All the users of UCBH, registered or not, will be able to access them.

4.1.3. METADATA

Metadata are a set a data associated to publications or any other material which allow its characterization by providing basic information such as title, authors, affiliation, abstract, etc. Metadata are useful for making the data findable for scholars and for their classification. Depending on the discipline, there are different standards of metadata, which provide different sets of information [5, 21]. One of the most known and widely used metadata standard is the Dublin Core Standard, which is a basic, domain-agnostic standard which can be easily understood and implemented [5, 21]. Publishers (journals) have normally their own standard of metadata. These metadata from publishers might have open access or not depending on the journal [11]. According to Grant Agreement (Art 29.2c) metadata of publications from HOOP must be open access.

In some open access repositories metadata are generated according to a standard since the moment of loading. For example, the repository Zenodo uses the standard JavaScript Open Notation (JSON) Schema for metadata [12] and complies with the Data Cite Schema.

According to Model Grant Agreement [7], the metadata from the publications generated in HOOP must be in a standard format and include all of the following (Art 29.2):

- *The terms European Union (EU) and Horizon 2020*
- *The name of the action, acronym and grant number*
- *Publication date and length of embargo period in case of green access*
- *Persistent identifier (for instance DOI)*

The rules for metadata from Article 29.2 in Grant Agreement are also applicable for other materials and research data which have associated metadata.

4.1.4. NAMING

Data must be easy to find. It is recommendable that the name of the file provides enough information to identify its content, especially for those to be uploaded in a repository. Due to the multidisciplinarity of the project, standard naming systems might be implemented within each WP, so that internal requirements for their functionality can be fulfilled. In general, the naming might include:

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- *Name of the project (HOOP). This allows distinguishing from other files inside the administration*
- *WP*
- *Task (in case the name is not descriptive enough)*
- *Description of the file*
- *Lighthouse City/Region (if applicable)*
- *Date (specifying date, month and year)*
- *Version (if applicable)*
- *Draft (if applicable)*
- *Deliverable number (if applicable)*

One example might be the Naming of files in WP6: "HOOP_WP6_*Description of content&relevant LH_Date of last edit (yy/mm/dd) Name of organization or person who last worked on it*". (i.e.: "HOOP_WP6_StakeholderMappingAlbano_210113_CSCP")

4.2. Making data openly accessible

4.2.1. RESULTS

In general, the results from HOOP will follow the rule 'as open as possible, as closed as necessary'. The deliverables classified as confidential (only for the members in the Consortium and the European Commission) will remain confidential unless the provisions indicated in the Grant Agreement (Art.36) and Consortium Agreement (§10) are fulfilled. Besides the confidentiality, the classification of the data restricted to public will be decided on a case by case basis, taking into account Intellectual Property Rights (IPR), protection of personal data, legitimate interests of the partners and other criteria to be further described in the dissemination and exploitation plan (D9.2).

Regarding open access, there will be 3 main ways for ensuring that the results from HOOP are made accessible:

- *Public repositories*
- *Open access routes for publications (including also Open Research Europe)*
- *Online platforms (UCBH, website, Virtual Academy)*

The data generated by HOOP (i.e. scientific publications, reports, public deliverables, citizen science outcomes) will be in general accessible to users of the UCBH, this will be further explained in Deliverable 7.2. The public deliverables will be available in the project website and/or the UCBH. The public deliverables can be also used by the European Commission in agreement Article 38.2 of Grant agreement about communication activities. Regarding the rest of the materials, their distribution among the different platforms will be decided in the corresponding deliverables for each of the platforms. However, before uploading the information there will be discussion with the involved partners to consent public accessibility when applicable.

The results of HOOP project will be also hosted by the CCRI. This is another way of ensuring reuse of the outcomes from HOOP in later circular bioeconomy projects, although further details will be known in future.

It is important to notice that as established in the Grant Agreement and following the 10 Principles of Citizen Science, the data generated by citizens must be publicly accessible, following the necessary provisions and measures (consent forms, anonymization) to ensure data protection. Citizen generated data will be also managed and shared through UCBH, via reports, publications and/or HOOP website interactive visualizations.

4.2.2. RESEARCH DATA

Research data refer to the data generated in the project on which scientific publications are based. They refer to underlying data, curated data and/or raw data [10]. As the program H2020 participates in the Open Research Data Pilot, and as stated in the Article 29.3 of Grant Agreement, in addition to the scientific publications, the following research data will be uploaded in a public repository:

- *All research data needed to validate the results presented in scientific publications, including the metadata that describe the research data deposited (underlying data). These data must be deposited as soon as possible and at the latest on publication.*
- *Any other data (for instance curated data not directly attributable to a publication, or raw data), including the associated metadata, as specified and within the deadlines laid down in the Data Management Plan.*
- *Information about the tools needed to validate the results, including access to them when possible. This might include specialized software or software code, algorithms and analysis protocols.*

This last point, which might also affect the software generated in the project, will be evaluated depending on the nature of the software and the components used. If it is open source, the software (including code) could be uploaded to the public repository. This is not applicable in case that the software or the components used are not open source.

As first approach proposal in this DMP, it would be recommendable to upload the underlying data of the publications in the same repository as the publication. This is also applicable to the information about tools needed to validate the results.

Regarding the category of any other data in Art 29.3, as a first approach they might be stored in internal repositories (sharepoints) from the Consortium either till they become underlying data for later publications or till the end of the project, provided that the internal repositories are operative till then. There is a common repository for all the partners based on Microsoft Office 365 and administrated by the Coordinator. In addition, there are also specific sharepoints (mainly based on Microsoft Office 365) for different WPs, administrated by the WP leader partner. It is important to notice that the accessibility of raw data and curated data should be in agreement with the IPR and personal data protection requirements.

4.2.3. OTHER MATERIALS

Materials from HOOP project such as videos, webinars, public deliverables, reports, etc., will be in general accessible to users of the UCBH. The contents and accessibility will be decided in a case by case basis by the administrators in agreement with the partners involved in the materials, depending on whether the user is registered or not and depending on the contents of the Virtual Academy. Besides the accessibility to these

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contents through the Hub, it might be recommendable to upload into a public repository in order to ensure its integrity beyond the lifetime of HOOP project, besides the fate of UCBH.

Along the lifetime of the project, sharing of files and data between partners will take place through suitable repositories, such as Microsoft Office 365 (OneDrive) and Microsoft Teams. The organization of these sharepoints will be done in a case by case basis by their administrator (coordinator, WP leaders) according to the particular needs (whole Consortium, some WPs, some partners). In general, these sharepoints will have an administrator granting the access to the contents. The Coordinator will be in general the administrator of sharepoints involving the whole Consortium.

4.3. Making data interoperable

Due to the multidisciplinarity of HOOP, it is essential to standardize concepts. As general approach, the common definition of concepts based on EU legislations will be preferred. In case of ambiguity, standardized vocabularies, such as EU Thesauri [23] and ontologies as EURIO (European Research Information Ontology) [2], available in the different languages from the EU, might be used. As an example, standardized questionnaires and spreadsheets are used for the data collection from the Lighthouse Cities and Regions, using definitions based on EU Legislation are used. If necessary, instructions and explanations (i.e. *Readme* files) will be provided to allow interoperability.

Formats such as .docx, .xlsx, .pdf, .pptx and different common image (.jpg, .png) and video (.mp4) compatible with Microsoft Office 365 is unavoidably required, the suitable provisions should be taken to ensure interoperability.

English is the official language in HOOP project documentation and the preferred vehicle of communication between partners from different languages. In case that the use of a language different than English is required, it must be ensured when necessary that the information is accurately translated or transposed (i.e. meetings and national workshops) from the local languages to English and viceversa. In a similar way, a proper English summary must be provided in case of publications in a language different than English, in order to ensure the interoperability.

4.4. Increase data reuse

4.4.1. PLATFORMS

Most of the data generated will be loaded into the HOOP UCBH, where they will be available to the public. The tools generated during the project will be also available in the UCBH for their use in future evaluations of circularity. The contents and tools from the UCBH will be reusable for a few years after the end of the project. In this sense, exploitation strategies will be developed from outcomes of Tasks 7.5 and 9.1, to make sure that the Hub and its contents are available and usable far beyond the end of HOOP. The results of HOOP project will be also hosted by the CCRI, which will also ensure future reuse.

4.4.2. DATA LICENSING

Although licensing of the data is a point to be developed in more detail in the framework of exploitation plan and intellectual property rights (IPR) strategy, it is important to ensure a balance between data protection and reusability of the data. This is especially important as open access is mandatory in Horizon 2020 program.

There are different options for licensing the publications in such a way that open access is provided. In this sense the licenses of Creative Commons (CC) are widely spread. Among them the most widely spread in the scientific community are [1, 3]:

- *CC BY. This license allows reusers to distribute, remix, adapt and build upon the material in any medium or format, so long as attribution is given to the creator. It allows commercial use.*

- *CC 0 (CC Zero). This is a public dedication tool, which allows creators to waive their copyright and put their works into the worldwide public domain. CC0 allows reusers to distribute, remix, adapt and build upon the material in any medium or format with no conditions.*

It must be stated that within the group of CC BY there are different versions, some of which only allow non-commercial use (CC BY-NC), some which oblige the adaptations and changes to be shared under the same terms (CC BY-SA) and other which does not allow modifications (CC BY-ND), and combinations of them. However, in their decision from 22nd February 2019 the European Commission has adopted Creative Commons as open license under the EC reuse policy [8]:

1. *Creative Commons Attribution 4.0 International Public License (CC BY 4.0) is adopted as an open license for the Commission's reuse policy under Article 6 of Decision 2011/833/EU*

2. *Without prejudice to the preceding article, raw data, metadata or other documents of comparable nature may alternatively be distributed under the provisions of the Creative Commons Universal Public Domain Dedication deed (CC0 1.0)*

Therefore, reusability of the data and material obtained can be ensured by licensing CC BY and this will be the preferred license in HOOP. CC0 will be used in case that a material or information is intended to be made of public domain. The way of application is by communicating the chosen CC license in a way that is clear for the ones who come across the work. A link to the license should be chosen. The most suitable way will be chosen case by case, under advice of communication responsible. In some of them it can be a short text stating and linking to the copyright notice [3]. As a first approach, the license CC BY 4.0 will be the chosen, following EU decision, although evaluation for public domain might be taken when required.

HOOP project might also generate software (tools, app citizen science) as outcome. The reusability of this software is expected to be ensured by the UCBH. The Creative Commons license is not suitable for software [4], as they do not contain specific terms about the distribution of source code, which is often important for ensuring the free reuse and modifiability of software. There are many different free and open source software licenses (i.e. MIT, Apache, GNU) with different characteristics [3]. The European Commission has developed their own open source software license EUPL (European Union Public License) for software developed for use in public institutions [13]. However, the Grant Agreement does not establish recommendations about licensing for software outcome in Horizon 2020 projects. Therefore, this issue will be decided in a case by case basis by

the responsible partner in agreement with the coordinator, the WP leader and other involved partners, and taking into consideration the IPR strategy and the nature of the software. Suitable open source licenses will be used in case of software and code deposited in repositories as for instance GNU General Public License 3.0.

If needed, Readme files will be created to ensure the reusability of the generated data, either for scientific publications or for software.

5. ALLOCATION OF RESOURCES

5.1. Costs associated with making data FAIR

Due to their lack of embargo period, the golden route will be the preferred in many cases for scientific publications. As explained, publication fees are covered by the author in the golden route. These costs are eligible under Other Goods and Services in HOOP project budget, according to the Grant Agreement.

Although they are not costs associated to HOOP project, it should be mentioned that the most common resource for making the data accessible between partners is the use of sharepoints from Microsoft Office 365 (OneDrive) and Microsoft Teams. Their use has associated costs, which are assumed by the partners as part of their regular operation besides HOOP.

5.2. Quality assurance

HOOP Project has a system for revision of deliverables in order to assure the required quality for submission to EC. This revision is essential to assure the interoperability of the materials generated by HOOP project. The deadlines are established as follows:

- *1st day of the month: WP leader circulates first draft to Coordinator and to other WP leaders for comments.*
- *7th day of the month: WP leader receives comments*
- *15th day of the month: WP leader sends definitive version to the Coordinator, who revises and may request further changes*
- *22nd day of the month: Coordinator sends to Communication Partner (G!E/Revolve) for final design and edit (public deliverables)*
- *29th day of the month: Coordinator receives the definitive version to submit and submits before deadline (end of the month)*

The different WP leaders will review deliverables from other WPs in order to assure that they agree with the general development of the project. This quality assurance system has been explained during the Kick Off Meeting and agreed by the Executive Board. The involvement of several WP leaders is justified by the interconnection among the different tasks in different WPs, so that the quality of the deliverables is high enough to provide the inputs needed for later tasks from other WPs. The time and effort required to the revision of the deliverables by the different WP leaders means the allocation of resources (PM) and eventually the consultation to external partners in case it is required to assure the quality and interoperability of the deliverables.

6. DATA SECURITY

The main issues regarding data security are to ensure that the information will not be lost in case of technical problems with computers. Therefore, a system for backup of all the project information is required. In addition, measurements should be taken in order to avoid piracy or the release of sensitive information either personal data or confidential data. In the case of online platforms, security measurements (i.e. firewalls, passwords, encryption) will be employed when handling personal and/or confidential data. HOOP will comply with GDPR. The provisions necessary to ensure data security will be applied both for internal and external communication.

6.1. Backup

The strategies of accessibility of the data provided previously (*Making data publicly accessible*) will ensure the backup of data in case of problems with personal computers. Therefore, backup will be provided by means of the use of repositories and online platforms, as well as the websites of the publishers in case of publications. The security and backup of HOOP data is ensured also by the use of public repositories, such as Zenodo, which is supported by CERN and has both the commitment to collect and store data and maintain them in over the next 20 years. In the highly unlikely event that Zenodo will have to close operations, it is guaranteed that all the contents will be migrated into suitable repositories. No link or citation will be affected, as all the material in Zenodo has DOI. [25, 26].

As indicated before, during the development of the project these materials will be stored in internal repositories mainly based on Microsoft Office 365 One Drive and Microsoft Teams. The use of the common sharepoint administrated by the Coordinator and the WP-specific repositories ensures that all data files are kept for HOOP Consortium use despite problems in personal computers. In addition to this, each partner will take appropriate technical and organization measures against accidental loss or destruction of project data.

6.2. Internal accessibility

Project documentation will be stored and exchanged through the use of a private, password protected secure and confidential platform administered by the Project Coordinator. HOOP Microsoft Office 365 One Drive, where there is information of all the WPs, will be only accessible by project partners upon the provision of user name and password. The Coordinator will administrate access to this sharepoint. Similar strategy might be applied to internal WP accessibility, with password-protected sharepoints administered by WP leader. In case of use of the platform Microsoft Office OneDrive, protection against viruses and data piracy is granted [15]. Security of internal mailing communication between Consortium will be also considered. In addition, each partner will take appropriate technical and organizational measures against information breach.

7. ETHICAL ASPECTS

All activities developed and implemented within HOOP will comply with fundamental ethical principles including those reflected in the Charter of Fundamental Rights of the European Union, European DIYbio code of ethics, European Citizen Science Association 10 principles of citizen science, and the code of ethics of the individual institutions that are involved in the consortium. HOOP activities will also reflect and comply with individual institutions' codes of conduct for research, stakeholder engagement activities and guidelines.

7.1. Personal data

7.1.1. MANAGEMENT

The management of personal data in HOOP project is specifically developed in the corresponding ethics deliverable D10.2 (Protection of Personal Data). This deliverable describes the technical and organizational measures to safeguard the rights and freedom of data subjects and research participants and prevent unauthorized access to personal data. HOOP project will fully comply with the General Data Protection Regulation (GDPR) 2016/679. In addition, each partner will take appropriate technical and organizational measures to ensure personal data protection.

Strategies for protection of sensitive data might include anonymization and pseudonymization. Anonymization is an irreversible procedure after which the data subject cannot be identifiable by the data anymore [20]. Zenodo gives the responsibility to the data uploaders to ensure that the sensitive personal data are either anonymized to an appropriate degree or fully consent cleared. When anonymization is required, tools such as OpenAIRE Amnesia (recommended by Zenodo) might be used [17]. In general, it is expected that the size and nature of the data obtained from HOOP do not require the use of these tools, but it might be considered in such case, especially regarding citizen science.

7.1.2. CONTACT DATA

Personal data collection will be required in some of the WPs for events organization or for committees' constitution (Local HOOP Committees, Biowaste Clubs, Circular Investors Board). These personal data, mainly professional, consist on names, e-mail addresses and organization. It is not required further sensitive details. The expected lists of contacts are as indicated in Table 2.

Table 2. Contact data required in HOOP project

WP	List	Expected required data
WP1	Key profiles for Local HOOP Committees	Name, e-mail, organization, position
WP1	Legal Advisory Board	Name, e-mail, organization
WP5	Circular Investors Board	Name, e-mail, organization
WP5	Circular Investors Days participants	Name, e-mail, organization
WP6	Stakeholders mapping	Name, e-mail, organization
WP6	Biowaste Clubs	Name, e-mail, organization
WP6	Participants in Citizen Science	Name, e-mail
WP7	Registered users in UCBH	Name, e-mail, organization
WP8	Follower Cities	Name, e-mail, organization
WP8	Participants in HOOP Cities Conference	Name, e-mail, organization
WP8	Participants in National Replication Workshops	Name, e-mail, organization, position
WP9	Newsletter subscriptors	Name, e-mail, organization

Contact with the potential members will be done according to GDPR. The same approach will be applied for registered users in online platforms, where the corresponding platform administrator will manage the access to the lists. Consent forms will be provided for the users registered in the online platforms to ask whether they agree with the terms. For the communication between registered users of the platforms:

- *In the case of the network of follower cities, if a system is set to allow followers to contact one another, it will be done without displaying contact details or personal information.*
- *Users of UCBH will see each other with the use of a user name.*

Data regarding online platforms will not be used by them for any purpose, unless user consents (i.e. receive informative e-mail).

7.2. Research with humans

The activities in events such as the Biowaste Clubs or networking of follower cities involve the participation of humans. The outcomes of these activities are results of the project, being made public in most cases in form of reports, although they might give scientific publications.

The procedures and criteria for the recruitment in these activities will be established according with ethic standards, ensuring equity and clarity. These criteria will be agreed upon by all involved partners in collaboration with and after consultation of their Research Ethics Departments.

Priority will be given to asking and obtaining the participants' signed forms of free, voluntary and informed consent and only in case where signing consent may put in danger their anonymity there will be an oral consent attentively asked for and taken from the participants. Besides the aspects related to personal data protection, these forms should explain that the outcomes of their participation in events might provide results for dissemination, although the reports or eventual scientific publications are not expected to involve personal data. In case of children and minors participation in educational or any other social sciences research activity planned by the project, detailed information will be provided to the parents with regards to research procedures and how the welfare of minors is ensured before their written consent is asked for. All the criteria, procedures and consent forms will be developed and explained in more detail in Deliverable D10.1 (H – Requirement No1).

7.3. Citizen Science

The fact that all the citizen science results need to be open access and FAIR implies that the treatment of these results requires the compliance with General Data Protection Regulation. This area of HOOP also involves human participation on research, and as indicated before, procedures and criteria for the identification and recruitment of volunteers for taking part in citizen science studies will be part of the Deliverable D10.1 (H – Requirement No1). Normally recruitment takes place in events, thus provisions will be made to develop a strategy adapted to the restrictions of COVID-19. Consent forms will be developed and put at disposal of the citizen volunteers to explain the research conditions and informing also about data protection. The English version of these forms will be part of the deliverable D10.1. HOOP partners need to avoid raising false expectations in the engaged citizens (i.e. it cannot be promised any solution or immediate changes due to their participation in the project).

Citizen science needs to follow the 10 principles of citizen science by ECSA [6]. These principles involve that citizen science results must be open access, because citizen generated data belong to the citizens. Mechanisms will be set in place for citizens to be able to access, modify or delete their research data. In addition, feedback about the project and proper acknowledgement will be provided. If agreed with citizen scientists, citizens scientists' names can be listed and formal acknowledgements for their efforts can be highlighted in HOOP scientific publications and platforms. Therefore, it is important to find a balance between personal data protection, acknowledgement and open access. This is done by means of proper anonymization of the data. The citizens will choose whether their data are anonymized and which of them.

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7.4. Confidentiality

The management of confidential data will follow what established in Article 36 of Grant Agreement and §10 of Consortium Agreement. In addition, each partner will take appropriate technical and organizational measures to ensure confidential data protection. When the task involves the management of confidential data measurements will be required to avoid information breach, especially for those activities where the participation of external advisors is required. The procedures for recruitment of external members will include provisions for confidentiality when required. One example of these provisions is the signature of a non-disclosure agreement (NDA) in the process of recruitment of members for the Circular Investors Board in WP5.

Besides the provisions for personal and confidential data, as established by the Grant Agreement in Article 29.1, any beneficiary intending to disseminate their results, must give advance notice to the other beneficiaries of at least 45 days, together with sufficient information on the results it will disseminate. In this way it is assured that every partner revise whether sensitive information is being published. The other beneficiaries have 30 days to object in case their legitimate interests would be significantly harmed. Appropriate measures will also be taken in case of materials uploaded to online platforms.

8. DATA MANAGEMENT OVERVIEW

The different types of data produced in HOOP will require a different management method, as indicated in the following Figures (1 to 4). Each partner will take the suitable technical and organizational measures to avoid accidental loss or destruction of project data. The evaluation of the data for their protection and potential exploitation is an important step, especially when activities of dissemination are involved. In the case of deliverables, the Grant Agreement establishes which of them are confidential and which of them will be made public. The management of data related to deliverables is plotted in Figure 1. Once that the deliverable report has been generated, it undergoes the quality assurance (QA) procedure of revision by the different WP leaders. Public deliverables are disseminated through online platforms. The storage of deliverables is assured through the repositories of the European Commission.

Figure 1. Flowchart of data management in deliverable reports
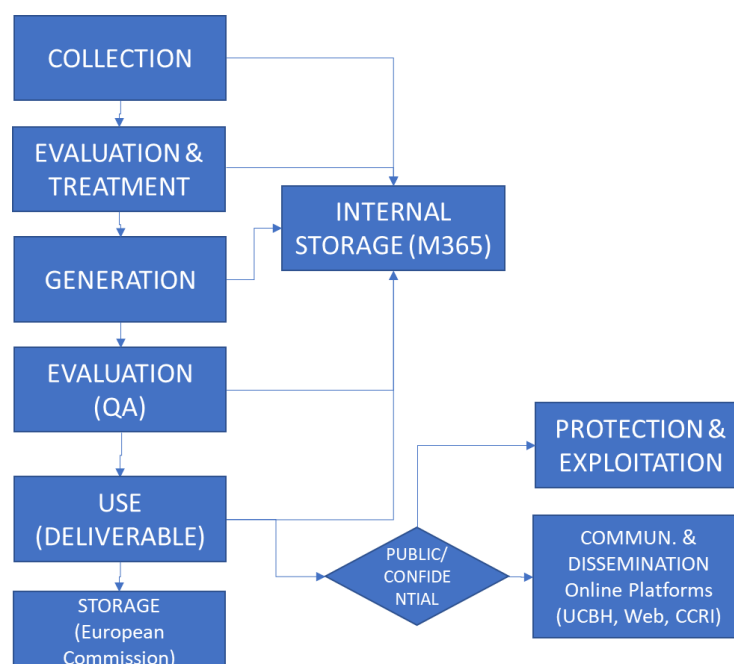
In the case of dissemination through scientific publications, the procedure is also specified in the Grant Agreement. Besides this, raw data, curated data and the final underlying data required for the publication are stored internally. In this case, it is important the agreement of all the partners to disseminate the results. This agreement comes before sending the draft manuscript to the journal. The manuscript will undergo a peer-review process and if accepted it must be decided the open access route. It is important to notice that although the publication will be available both in the web of the publisher and the UCBH, it is necessary to store it in an open

access repository (Zenodo), together with the underlying data, as shows Figure 2. In case of choosing Open Research Europe, the step of open access route selection is skipped.

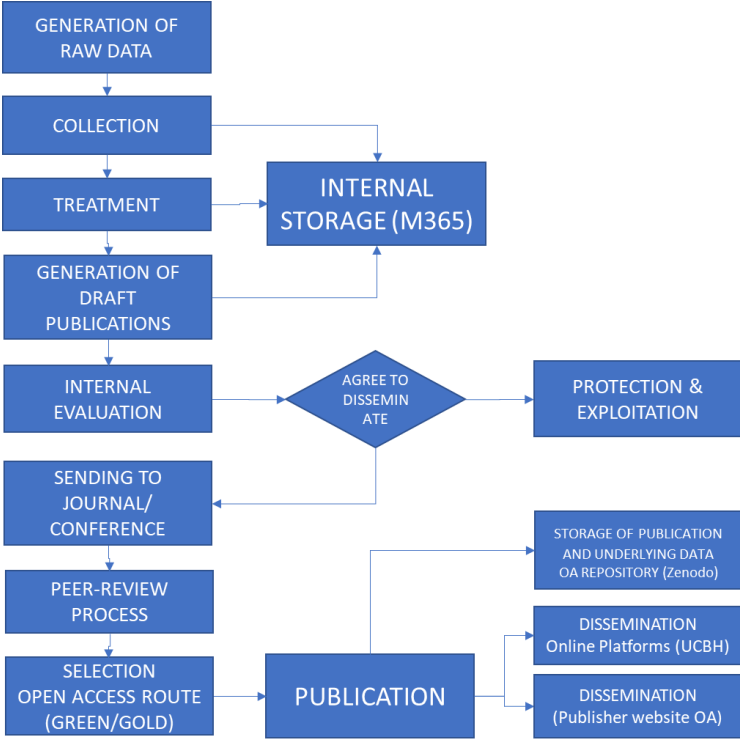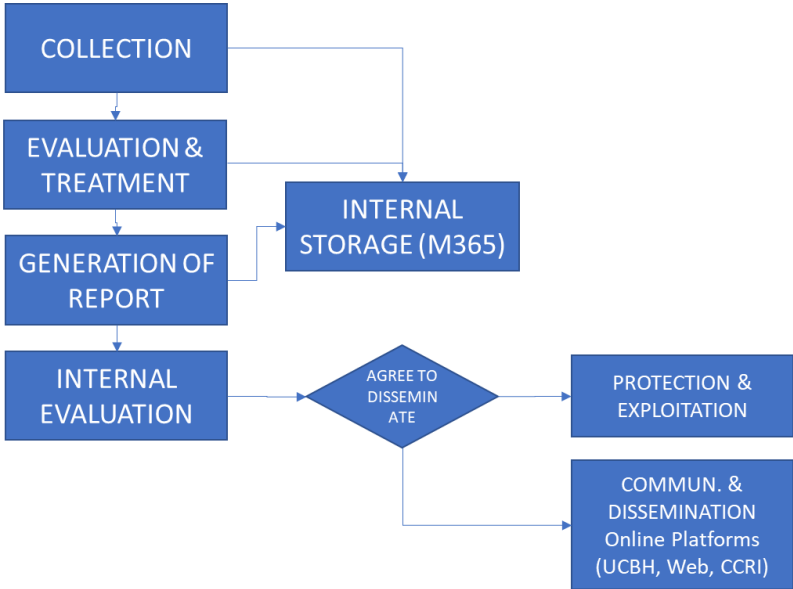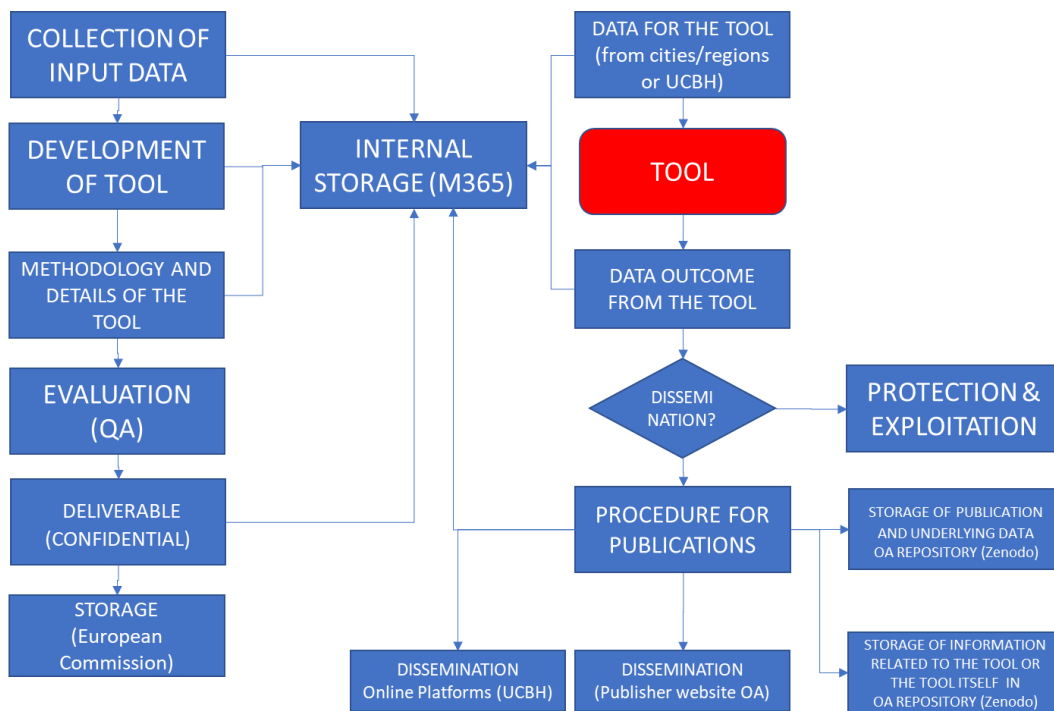Figure 2. Flowchart of data management in scientific publications

Figure 3. Flowchart of data management in non-deliverable reports and multimedia content

Regarding the data in form of reports or multimedia contents besides the deliverable schedule, the management procedure is different than the one for deliverables, as seen in Figure 3. In this case, it is required an evaluation and agreement from all the partners is necessary to disseminate the material. These materials are mainly thought to be accessible through the online platforms (UCBH, Virtual Academy). Although these materials are intended for dissemination, it is not compulsory according to Grant Agreement to store them in an OA repository. UCBH and eventually CCRI would provide the accessibility to these materials.

A different approach comes with data related to the tools developed during the project, as shown in Figure 4. Some information about the tools (i.e. methodology, software architecture) is required as deliverables, which are in most cases confidential. However, the tools are thought to provide an outcome when fed with data from cities and regions. The evaluation of these outputs must be done in order to provide enough protection of the data. In case that the outcomes from the tools are disseminated, it must be reminded that besides the storage in the public repository, information about the tools is also required.

Figure 4. Flowchart of management of data about and from tools

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9. CONCLUSIONS

This deliverable develops the data management plan of HOOP project. They have been identified and classified the different datasets of the project. These data comprise an important amount of PDA reports, classified according to their area of knowledge. The data are mainly in format text and numerical (.docx, .pdf, .xlsx), but it will be also generated multimedia materials (videos, webinars, presentations) and tools.

Most of the data are deliverable reports, whose classification is stated in the Grant Agreement. The reports and other materials falling outside this classification will be evaluated according to the exploitation plan (IPR) and ethical issues (protection of personal data) before making them public, but following the principles of "as open as possible, as closed as necessary". The main mean for making the results available to the public are the online platforms, being the Urban Circular Bioeconomy Hub the platform hosting others. HOOP is expected to generate a considerable amount of reports and materials.

Regarding scientific publications, it has been described the way to make the data findable, accessible, interoperable and reusable (FAIR) for different types of data, with special interest to citizen science. Due to the multidisciplinary character of HOOP project, Zenodo is the most suitable public repository, for the storage of peer-reviewed publications, underlying research data and bibliographic identifying the publication.

During the project, the internal storage of different data (final and intermediate) will be done in sharepoints, such as Microsoft Office 365 OneDrive or Teams. In addition, each partner will take appropriate technical and organizational measures against accidental loss or destruction of project data.

This deliverable is a first working version, which will be continuously updated along the project whenever significant changes happen. DMP will be a fixed agenda item at all management meetings. Therefore, DMPs will be provided with a clear version number, including a table of updates. At least, DMP should be updated in the context of periodic evaluation assessment of the project.

More detailed information will be available when the deliverables of ethics (D10.1, D10.2) and the dissemination and exploitation plan (D9.2) are developed. Ethics deliverables will develop both the project strategy for personal data protection to comply with GDPR (D10.2) and the management plan for the research involving human participation (D10.1). Regarding the dissemination and exploitation plan (D9.2) they will be developed the guidelines to determine what results to protect for their exploitation and what results to disseminate.

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11. ANNEX 1: DATASETS

11.1. Technological dataset

Table 3. Technological dataset details

WP	**WP2, WP3**
Deliverables	D2.1, D2.2, D2.3, D3.1, D3.2, D3.3, D3.4
Dissemination	Confidential
Partners	CETENMA, ITENE, CETAQUA, SAV, Research4Life
Nature	Mainly text reports. It comprises also spreadsheets and databases for the calculations required.
Origin	Primary. They are generated by the involved partners during the development of the PDA.
	The data required for their development is both primary (questionnaires and forms filled by the Lighthouse Cities and Regions, outcome of meetings) and secondary (bibliography, databases, websites)
Description	This dataset comprises the study of the current situations of the Lighthouse Cities and Regions based on urban metabolism analysis (D2.1) and baseline (D2.3), which require the use of databases and spreadsheets to determine the value of the corresponding indicators. A state-of-the-art study of the technologies (D2.2) for valorization of urban biowaste is run to determine the best available technologies. These inputs allow the selection of the investment projects (D3.1) and their corresponding technical and environmental studies (D3.2, D3.3, D3.4).
Purpose	Select urban bioeconomy projects for each Lighthouse City/Region based on their current status (baseline) and the best available technologies.
	Provide the technical and environmental studies required for those projects
Type	Text, numerical, categorical, databases, diagrams
Format	.docx, .xlsx, .pdf, .jpg

11.2. Business models dataset

Table 4. Business models dataset details

WP	WP4, WP7
Deliverables	D4.1, D4.2, D4.3, D4.4, D4.5
Dissemination	Confidential. Public D4.1
Partners	Draxis, Bax, RdA
Nature	Mainly text reports. It comprises also spreadsheets and databases for the calculations required.
Origin	Primary. They are generated by the involved partners during the development of the PDA. They include also the evaluation of the PDA implementation. The data required for their development is both primary (questionnaires and forms filled by the Lighthouse Cities and Regions, outcome of meetings) and secondary (bibliography, databases, websites, other HOOP reports)
Description	This dataset includes all the documentation (input, development and outputs) for the implementation of business models. Based on the existing novel circular business models (D4.1), the situation of the cities and regions and the outcomes of an evaluation (D4.2), they will be proposed the Tailored Lighthouse Business Models (TLBM) for each city (D4.3). The application of TLBM is later evaluated (D4.4, D4.5).
Purpose	Based on the available technologies and the situation of each Lighthouse City/Region select the most suitable business models for each of them, taking into account the nature of the generated bioproducts
Type	Text, numerical, categorical, databases, diagrams
Format	.docx, .xlsx, .pdf, .jpg

11.3. Investment dataset

Table 5. Investment dataset details

WP	**WP5, WP2, WP7**
Deliverables	D5.1, D5.2, D5.3, D5.5, D5.6, D5.7, D7.3
Dissemination	Confidential. Public D5.1, D5.3, D7.3
Partners	Bax, RdA, Draxis
Nature	Mainly text reports. It comprises also spreadsheets and databases for the calculations required.
Origin	Primary. They are generated by the involved partners during the development of the PDA and by the advice of experts (Circular Investors Board) in meetings. The data generated include also the evaluation of the PDA implementation. The data required for their development is both primary (questionnaires and forms filled by the Lighthouse Cities and Regions, outcome of meetings) and secondary (bibliography, databases, websites, other HOOP reports)
Description	This dataset provides assistance to the Lighthouse Cities and Regions to find the instruments to attract investors and the investment possibilities at local level (D2.4). This involves the advisory of experts (D5.1, D5.2), the outcomes of bankability evaluation methods (D5.3) and due diligence procedures (D5.5) so that all the necessary is ready in the moment of the investment (D5.6). The economic impact of this PDA is later evaluated (D5.7). An overview of tools for investment decision will be done (D7.3)
Purpose	To help Lighthouse Cities and Regions to find funding for urban bioeconomy projects through different investment sources (private and public)
Type	Text, numerical, categorical, databases
Format	.docx, .xlsx, .pdf

11.4. Public procurement dataset

Table 6. Public procurement dataset details

WP	WP5
Deliverables	D5.8, D5.9
Dissemination	Confidential 5.9. Public D5.8
Partners	Bedin Sara
Nature	Mainly text reports. It comprises also databases.
Origin	Primary. Report is generated by the partner during the development of the PDA and as outcome of the open market consultation procedure The data required for their development is both primary (questionnaires and forms filled by the Lighthouse Cities and Regions, outcome of meetings) and secondary (bibliography, other HOOP reports, advice from legal experts)
Description	This dataset provides the tools necessary for the cities to perform public procurement procedures of urban bioeconomy projects selected adjusting to the particularities of both cities and projects (D5.9), including the evaluation of what the market offers (open market consultation, D5.8)
Purpose	To help the cities to find the most suitable public procurement procedure according to the characteristics of the city/region, the project and the legal framework
Type	Text, databases
Format	.docx, .xlsx, .pdf

11.5. Stakeholder engagement dataset

Table 7. Stakeholder engagement dataset details

WP	WP6
Deliverables	D6.1, D6.2, D6.3, D6.5, D6.6, D6.7
Dissemination	Public. Only confidential D6.1, D6.6
Partners	CSCP, Science for Change, 2GO OUT
Nature	Text reports, databases, videos, webinars, presentations
Origin	Primary. Outcomes of Biowaste Clubs. Reports from the partners. Secondary. Experiences from Lighthouse Cities and Regions. The data required come from questionnaires to the cities, interviews, and the outcome from other HOOP reports
Description	This dataset is generated from the activities of engagement implemented through the Biowaste Clubs (D6.2, D6.3). The constitution and activities depend on the situation of each Lighthouse City and Region (D6.1) and the portfolio of stakeholders. Biowaste Clubs catalyze networking and creation by the different stakeholders, including education and awareness raising activities about the importance of selective collection and about the urban bioeconomy projects (D6.5). The effect of these engagement is later evaluated and set a plan (D6.6, D6.7). Meetings, webinars, reports about best practices comprise an important amount of newly generated data
Purpose	To increase the engagement of the different social sectors in waste management and circular economy.
Type	Text, databases, image, video, presentations
Format	.docx, .xlsx, .pdf, .jpg, .mp4, pptx

11.6. Replication dataset

Table 8. Replication dataset details

WP	WP7, WP8
Deliverables	D8.1, D8.3, D8.4, D8.5, D8.5, D8.6, D8.7, D8.8, D7.1, D7.2, D7.4, D7.5, D9.3. Materials for the Virtual Academy (best practices, state of art)
Dissemination	Public. Confidential D8.1, D7.1, D7.2, D7.4
Partners	ACR+, CSCP, SAV, Bax, Savonia, Greenovate! Europe
Nature	Text reports, databases, videos, webinars, presentations
Origin	Primary. Outcome of meetings and events. Reports made by the partners
	Secondary. Experiences of Lighthouse Cities and Regions
	The data required come from questionnaires, interviews, and the outcome from other HOOP packages (Biowaste Clubs)
Description	This dataset is an upscaling of the stakeholder engagement dataset and searches for the replicability of the experiences from Lighthouse Cities and Regions. There is a recruitment strategy (D8.1) to make a network of follower cities, using materials (best practices, factsheets, reports, etc) to be shared with them through the Virtual Academy. Part of the strategy of replication is thought for a national scale through the National Replication Workshops (D8.3). From these events and from the Biowaste Clubs will come outcomes and reports (D8.4, D8.5, D8.7) to make the network expand in each country. The replication takes also into account the individual connections of followers and lighthouses (D8.8). At the end of the project a big conference with cities will be hosted (D8.6). The contribution of HOOP to circular economy strategies will provide also information for replication (D7.5). The materials (methodology, characteristics, communication pack, business model) relative to UCBH and Urban Circular Biobased Quality Label (D7.1, D7.2, D7.4, D9.3) are also part of replication dataset.
Purpose	Increase the amount of cities and regions involved in circular bioeconomy projects and establish a network between them
Type	Text, numerical, databases, videos, images, presentations
Format	.docx, .xlsx, .pdf, .jpg, .mp4, pptx

11.7. Citizen Science dataset

Table 9. Citizen science dataset details

WP	WP6
Deliverables	D6.4
Dissemination	Public
Partners	Science for Change
Nature	Text reports. Multimedia content.
Origin	Primary. Results of the co-designed interventions.
Description	This dataset is based on research interventions in diverse fields of knowledge (either from technological or environmental disciplines or social sciences) where citizens take part. Citizen will also collaborate in the co-creation of the actions. The outcomes of these interventions will be a series of reports (D6.4) as well as expected scientific publications.
Purpose	Raise awareness on urban circular bioeconomy and engage the citizens by means of their participation and collaboration in the projects
Type	Text, numerical, databases, videos, images
Format	.docx, .xlsx, .pdf, .jpg, .mp4

The HOOP project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°101000836

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11.8. Management dataset

WP	**WP1, WP9, WP10**
Deliverables	D1.1, D1.2, D1.3, D9.1, D9.2
Dissemination	Confidential, Public (D1.2)
Partners	CETENMA, Greennovate! Europe
Nature	Text reports. Presentations. Multimedia material (videos)
Origin	Primary. Results of the coordination and management tasks. Outcome of meetings (Local HOOP Committees, Executive Board, General Assembly, etc.)
Description	This dataset comprises the basic tasks of coordination and management plans, including: quality and risks management (D1.3), data management plan (D1.2), ethics reports (D10.1, D10.2, D10.3), dissemination and exploitation plan (D.9.2) and communication strategy (D9.1). It is included all the material relative to management meetings (Executive Board, Kick-off Meeting, General Assembly, etc), such as presentations, reports and video records of events held online. This dataset also involves the communication with the Lighthouse Cities and Regions through the Local HOOP Committees, including their constitution (D1.1), presentations and reports.
Purpose	Project management and coordination
Type	Text, presentations, videos
Format	.docx, .pdf, .pptx, .mp4

11.9. Overview

Figure 5. Interconnection between thematic datasets and data classification according to purpose

12. ANNEX 2: DATABASES

Table 10. Overview of expected databases

WP	List / (Dataset)	Description	Purpose
WP1	Key profiles for Local HOOP Committees (Management dataset)	Personnel with expertise in disciplines related with HOOP but who either are not part of the team included by the Lighthouse City/Region partner or they belong to an external partner	Provide specific information, expertise and participate in thematic meetings
WP1	Legal Advisory Board (Public procurement dataset)	The Legal Advisory Board will be composed by at least 8 lawyers with expertise on the 8 national legal and procurement frameworks corresponding to the 8 HOOP countries	Legal assessment in public procurement
WP5	Circular Investors Board (Investment dataset)	Group of at least 20 experts in investment and financial	Provide PDA in financial and investment topics
WP5	Circular Investors Days participants (Investment dataset)	Investors, urban circular bioeconomy developers and other potential stakeholders related with financial and investment with interest in urban circular bioeconomy projects	Bring together investors and urban circular bioeconomy developers to test and fine-tune the financial PDA
WP5	Open Market Consultation participants (Public procurement dataset)	List of relevant companies related with a urban circular bioeconomy project selected by cities and with potential to present to procurement procedure	Map the market for project procurement
WP6	Stakeholders mapping (Stakeholder engagement dataset)	Relevant stakeholders (local, regional, national, EU) for each Lighthouse City/Region. Their description and categorization will be used for engagement, based on operational settings, relationships, interests, motivations and barriers among other aspects.	Overview of all relevant stakeholders in each Lighthouse city/Region
WP6	Biowaste Clubs (Stakeholder engagement dataset)	In each Lighthouse City/Region, the relevant stakeholders to participate in meetings and discussions on urban bioeconomy to identify the best practices, the challenges and possible solutions to improve circularity and awareness in the cities and regions	Find synergies and common solutions through the discussion of different actors

WP6	Participants in Citizen Science (Citizen science dataset)	List of volunteers taking part on scientific projects related to urban circular bioeconomy	Promote the engagement of the citizens in circular bioeconomy by their direct participation. Get another point of view in the research project.
WP7	Registered users in UCBH (Replication dataset)	List of stakeholders and public in general who have signed up to have access to UCBH contents totally or partially	Share outcomes from the project
WP8	Follower Cities (Replication dataset)	List of cities and regions interested in joining the network related to urban circular bioeconomy. Data will include information on the territory, the bioeconomy strategy, and the topics of interests, that will be used to identify comparable territories and identify matches	Establish a network of cities and regions taking benefit of the experiences of Lighthouse Cities and Regions on urban circular bioeconomy
WP8	Participants in HOOP Cities Conference (Replication dataset)	List of EU-wide stakeholders representing different cities with interest in urban circular bioeconomy	Export the knowledge from HOOP experience in EU level
WP8	Participants in National Replication Workshops (Replication dataset)	List of national stakeholders with interest in urban circular bioeconomy to take part in the events organized by the Lighthouse Cities and Regions	Export the knowledge from HOOP experience within the same country of the holding Lighthouse City/Region
WP9	Newsletter subscriptors (Replication dataset)	List of external stakeholders who have signed up to receive the project newsletter.	Share project news directly with interested stakeholders

13. ANNEX 3: ROUTES OF GENERATION OF RESULTS

Figure 6: Results generated by the partners with information from external inputs

Figure 7: Results generated by the partners without any external inputs

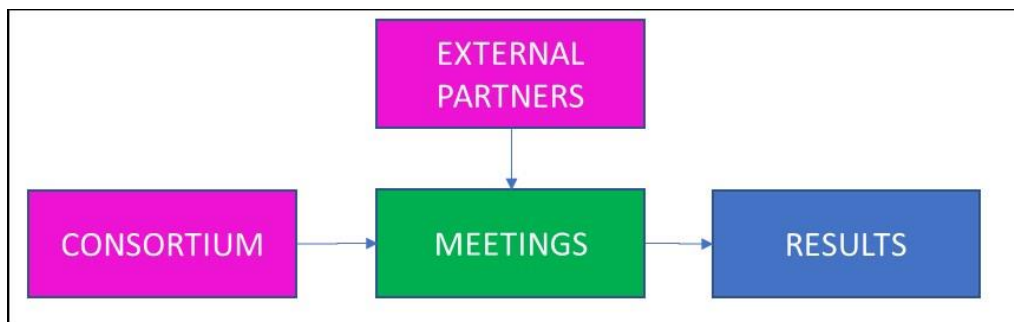Figure 8: Results generated from discussions and interaction with external partners (i.e. Biowaste Clubs, Citizen Science)

Figure 9: Results generated from tools developed in HOOP