



D.4.7 Data management plan – WP4

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Project Deliverable

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Abstract

This document defines and specifies the strategy to handle data in the NEXOGENESIS framework. Moreover, this document also describes the strategy about how to manage privacy and Ethics aspects. Finally, the document is envisioned to be a live document for the entire project. So, it will be incrementally enhanced at different stages of the project. This is the final version of the data management plan.

Keywords

Data source, accessibility, interoperability, allocation, security, ethics, IPR



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Abbreviations / Acronyms

API	Application programming Interface
BDG	BUSINESS DEVELOPMENT GROUP SRL
BEF	BALTIJAS VIDES FORUMS
CMCC	CENTRO EURO-MEDITERRANEOSUI CAMBIAMENTI CLIMATICI
DMP	Data Management Plan
EOSC	European Open Science Cloud
EOSC	Open Science Cloud
EURAC	ACCADEMIA EUROPEA DI BOLZANO
EUT	Eurecat Technology Centre
FAIR	Findable, accessible, interoperable, and re-usable
FTP	File Transfer Protocol
HTTP	Hypertext Transfer Protocol
ICO	Information Comissioner's office
IHE	STICHTING IHE DELFT INSTITUTE FOR WATER EDUCATION
JAWS	JONES AND WAGENER (PTY) LTD
JSON	JavaScript Object Notation
KWR	Water Research Institute
NTUA	NATIONAL TECHNICAL UNIVERSITY OF ATHENS



OA	Open Access
OGC	Open Geospatial Consortium
ORD	Open Research Data
UTH	PANEPISTIMIO THESSALIAS
UU	UPPSALA UNIVERSITET
WEFE	water-energy-food-ecosystem
XML	eXtensible Markup Language



1. Executive summary

This document presents the final version of the Data Management Plan (DMP) on open access data handling (see box 1) defined for NEXOGENESIS. The aim of the document is to consider the many aspects of data management, data and metadata generation, data preservation- maintenance- and analysis, whilst ensuring that data is well managed at present and prepared for preservation in the future. This Data Management Plan is compiled according to the [Guidelines on FAIR Data Management in H2020](#)¹, and the Guidelines to the Rules on the [Open Access to Scientific Publications and Open Data Access to Research Data in H2020](#)².

Complementary to this document, we have decided to use the Argos Tool to maintain the DMP online and dynamic for the entire duration of NEXOGENESIS. Specifically, the corresponding online version of the datasets utilised in NEXOGENESIS will be available in the following URL corresponding to the public online version of the DMP (see Box 2)

Box 1. Open Access

Open access (OA) refers to the practice of providing online access to scientific information that is free of charge to the end-user and reusable. 'Scientific' refers to all academic disciplines. In the context of research & innovation, 'scientific information' can mean: (1) peer-reviewed scientific research articles (published in scholarly journals) or (2) research data (data underlying publications, curated and raw data).

Box 2. NEXOGENESIS DMP IN ARGOS TOOL

ARGOS Tool is an online tool to create, link and share a data management plans. It is developed by OpenAire and permit to automate the process of cataloguing and sharing data between researchers, communities and funders. Moreover, ARGOS TOOL permit also to share data according to common standards and at the end, make the DMP machine-actionable.

For NEXOGENESIS, we have elaborated a data management in the following URL:

<https://argos.openaire.eu/plans/overview/99b7e81a-38cb-46e2-a42f-8eed4f10fd42>

Thus, the sections below present the lifecycle, responsibilities, review processes and management policies of research data, produced during the execution of NEXOGENESIS. The DMP reflects the agreement of the NEXOGENESIS consortium as well as the adopted measures concerning the control, protection, distribution and maintenance of the produced data.

For NEXOGENESIS, the DMP is defined as "*the development, execution and supervision of plans, policies, programmes and practices that control, protect, deliver and enhance the value of data and information assets*" obtained. Since the beginning of the project, the following processes and procedures for data management procedures are established:

- Data governance, such as standards management and guidelines.
- Data architecture, analysis, and design including data modelling.

1 http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-data-mgt_en.pdf

2 http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-pilot-guide_en.pdf



- Data maintenance, administration, and data mapping across building blocks and solution modules.
- Data security management including data access, archiving, privacy, and security.
- Data quality management including query management, data integrity, data quality, and quality assurance.
- Reference and master data management including data integration, external data transfer, master data management, reference data.
- Document, record, and content management.
- Metadata management, i.e., metadata definition, discovery, publishing, metrics, and standardization.

This is the final version of the data management plan.



2. Introduction

2.1. Scope

This document describes the final version of the Data Management Plan, a work performed inside WP4- “Nexus self-learning assessment engine development”, and specifically, in Task 4.6 entitled “Data Management Strategy”. The present document corresponds to the series of deliverables derived from D4.6.- “Data Management Plan – initial version” in which the initial version is published in M03. This is the final version of the data management plan.

Box 3. Data Management Plan

A Data Management Plan (DMP) is a key element of good data management; it describes the data management life cycle for the data to be collected, processed, and generated by a Horizon 2020 project.

As part of making research data findable, accessible, interoperable, and re-usable (FAIR), a DMP should include information on: (i) the handling of research data during and after the end of the project, (ii) what data will be collected, processed, and generated, (iii) which methodology and standards will be applied, (iv) whether data will be shared/made open access, and (v) how data will be curated and preserved (including after the end of the project). A DMP is required for all projects participating in the extended ORD pilot unless they opt out of the ORD pilot; however, projects that opt are encouraged to submit a DMP on voluntary basis.

The DMP provides a description about the procedures on how the research data is collected, processed, and generated. The DMP (see Box 3) establish the procedures on how to handle these data along the project and lastly, after finalization. Hence, the document (and the subsequent versions of it), represents the consortium agreement on the data plan and also a description of the main standards and methodologies that has been established for data collection, generation, sharing and preservation.

This document follows the template provided by the European Commission on DMP structure and guidelines³. This documented DMP is complemented also, by the publication of the datasets under the Argos Tool (see Box 2) published by Open Aire. The interrelation of the DMP with Open Aire allows NEXOGENESIS to be part also in the Open Research Data Pilot⁴ contributing as well to the Open Science Cloud (EOSC)⁵. All of these aspects have been materialized in this initial version of the DMP since the M03, where following action will be done:

³ Guidelines on Data Management in Horizon 2020,
http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-data-mgt_en.pdf

⁴ Open Access to Scientific Publications and Research Data in Horizon 2020 Guidelines,

https://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-pilot-guide_en.pdf

⁵ European Open Science Could, <https://eosc-portal.eu/>



- Regular update of the DMP (online and the present document) will be provided at **M6** with iterations on **M18, M30, M42**.
- The online DPM will add datasets at time as a Dataset is ready to be published.

2.2. Structure of the document

The DMP document has been structured according to the following sections:

- **Section 1** is the executive summary of the document.
- **Section 2** is the introductory chapter, which provides the scope of the deliverable and the main outline of the document.
- **Section 3** contains information about digital datasets generated or collected in NEXOGENESIS for each of the WPs and also, the sections also devoted to the preservation data mechanisms established within the project.
- **Section 4** Contains information about the FAIR data for NEXOGENESIS and will be updated at same time as the project evolves.
- **Section 5** Focuses on the allocation of resources to maintain the datasets and digital assets elaborated within NEXOGENESIS.
- **Section 6** Section devoted to the data security aspects.
- **Section 7** Address issues related to ethical aspects.
- **Section 8** Contains other related issues related to the data management.
- **Section 9** Focuses on the identification and description of external applications and services to ensure the correct elaboration of a DMP.
- **Section 10** Description of main conclusions and future work.



3. Data Summary

The main intention of the DMP is to present data management plan to the NEXOGENESIS Work Packages. The information listed below reflects the initial conception and thoughts of the individual Work Packages during the proposal stage corresponding to the datasets and their management flows in order to provide fast results and evidences. For that aim, the intention is to apply a fast-track application over an initial case study to be selected during the initial months of execution (Figure 1). The objective of the fast-track is to:

- Identify difficulties related to datasets collection from the different stakeholders and projects to run models and have a comprehensive view of all components in the area.
- Identify the obstacle and find solution to harmonize data at level of scale and spatial distribution.

After fast track application, NEXOGENESIS will apply the developments for the rest of case studies, applying the experience to the rest of case-studies.

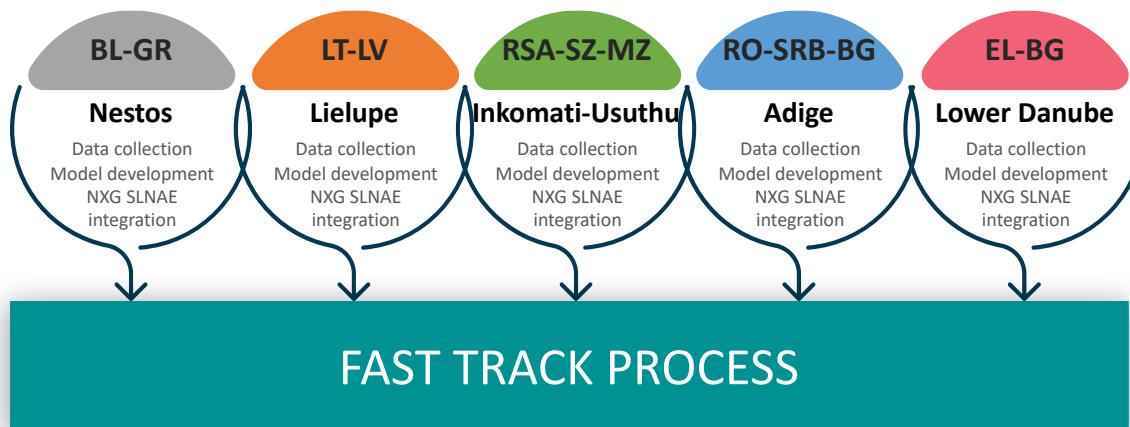


Figure 1. Fast-track development process

Considering this process, EUT will manage all data used for the implementation of NEXOGENESIS. The information flow is depicted in the following figure:



Figure 2. Preliminary Information Flow

Based on the image (see Figure 2), the case studies will develop socio-economic, bio-physical and complexity science models at a conceptual stage (Conceptual Model) to show interlinkages and synergies among the NEXUS components. The conceptual model will be developed at a higher level of integrating including lower level of detail, as needed for WP2-4.



Hence, the conceptual model will be transformed into different complexity science methodologies (System Dynamics Modelling, Cellular Automata, Fuzzy Cognitive Mapping and Material Flow Analysis) to be analysed and selected within the execution (“Task 3.1-Complexity Science Tools—Conceptual modelling”). This kind of modelling will be fed with climate, socio-economic, geospatial and other relevant information coming from the case-studies (derived from the national authorities, organizations, institutes and programmes like Eurostat, GISCO, GEOSS, Copernicus, INSPIRE, JRC (CORINE, USGS, etc.). The Complexity science models will be integrated, and the output will be provided through an API (application programming interface) to the NEXOGENESIS self-learning nexus assessment engine.

EUT will be responsible to communicate with the WP Leaders, co-leaders, case study leaders, modellers and the complexity science developers the different needs for data collection and information requirements. Assigned people for reporting and updating the above-mentioned datasets are shown in the following Table 1:

Table 1. NEXOGENESIS Work Packages leaders

WP	Assigned Institution
WP1	CMCC
WP2	KWR
WP3	UTH
WP4	EUT
WP5	UU
WP6	GAC
WP7	IHE

Table 2. Case-Study leaders

Case Study	Assigned Institution
Nestos River (Bulgaria/Greece)	NTUA
Lielupe River Basin (Latvia/Lithuania)	BEF
Inkomati-Usuthu (South Africa)	JAWS
Adige River (Italy)	EURAC
Lower Danube River Basin (Romania/Serbia/Bulgaria)	BDG

Considering this strategy to collect the information and put on demonstration the NEXOGENESIS tools, the purpose of this section is to provide a summary of the different NEXOGENESIS data addressing the following aspects:

- State the purpose of the data collection/generation
- Specify the types and formats of data generated/collected
- Specify if existing data is being re-used (if any)
- Specify the origin of the data
- State the expected size of the data (if known)
- Outline the data utility: to whom will it be useful
- Defines how this data is going to be accessible both for internal and/or public use



3.1. Data Assets and Preservation Procedures

This part of the document is mainly devoted to specifying the data assets that will be generated in NEXOGENESIS work-packages and the corresponding preservation procedures after the project ends. At this stage of the project, it is needed to mention that most of the information described corresponds to the consortium intention to publish/generate information. It is also worthy to mention that the datasets that are going to be generated during the project will be published in the following places:

Table 3 Repositories in which the generated NEXOGENESIS information is published

Data Repository	URL of the repository	Brief description of the datasets to be published
Zenodo	NEXOGENESIS Project Datasets Zenodo	A data repository to share datasets and other digital assets in open source.
Argos	https://argos.openaire.eu/plans/overview/99b7e81a-38cb-46e2-a42f-8eed4f10fd42	A tool used as a virtual data management plan. The main advantage is the publication of datasets directly on Zenodo and Open Aire.
Gitlab	https://ice.eurecat.org/gitlab/sms/nexogenesis	A code repository for the digital tools. This will serve to publish the NEXOGENESIS digital tools. After the finalization of the project WP4 leader along with coordinator will decide the platform to publish de source code in open access.

Complementing this information, there is envisioned that most of the tools and data generators were openly available for the community and scientist to future use (code shared through GitHub or Gitlab repositories). Specifically, tools that will be added during the



development of the project within next Table 4 will be openly available through open-source repositories portrayed in the next table template:

*Table 4 Summary of the potential tools to be published in open-source repositories**

Digital Tools	Code Repository	Repository URL
Simulator Policy Framework	GitLab	Smart Management Systems / nexogenesis · GitLab
SDM translator	Gitlab	https://ice.eurecat.org/gitlab/sms/nexogenesis/-/tree/dev/sdm_translator?ref_type=heads
Nexogenesis Data Lake	Sharepoint	https://eurecatcloud.sharepoint.com/sites/Nexogenesis-InternalDataRepository
Nexogenesis Nexus Ontology	WebOWL	https://nepat-dev.nexogenesis.eu/ontology/webowl/index.html
Nexogenesis Semantic Repository	Apache Jena Fuseki	https://nepat-dev.nexogenesis.eu/semanticRepository/
Nexogenesis Data Explorer and Visualizer	GraphDB	https://nepat-dev.nexogenesis.eu/visualizer/
Nexogenesis UI	Gitlab	Files · dev-ui · Smart Management Systems / nexogenesis · GitLab
Web Service API	Gitlab	backend · dev · Smart Management Systems / nexogenesis · GitLab

As described in the abovementioned tables, NEXOGENESIS contribution to provide open-data information, data catalogues and open-source tools are envisioned and agreed by the consortium. This subsequently implies to put hands on the wider community a set of data and digital tools to better understand industrial symbiosis and interlink between internal industrial processes to make efficient use of the resources.

Considering these descriptions, the Table 10 Metadata Information **Error! Reference source not found.** (Data sets generated in NEXOGENESIS) presents a data summary of all data assets that potentially have been and will be elaborated and delivered through NEXOGENESIS.

Considering the relevant datasets shown in Table 10 Metadata Information **Error! Reference source not found.**, there is remarkable the intention of the consortium to the high contribution to scientific community and the piloting research with potential reliable and curated information. This aspect will sustain future investigations in industrial symbiosis and zero-waste strategies. Moreover, it will permit the EU to reinforce open research community. Based on the potential datasets that could NEXOGENESIS produce, it is the intention of the consortium to maintain them after the project completion. Thus, the quality of data will be ensured for future research and studies. Thus, there is also the intention of the consortium to maintain the update of the digital tools in around 2-3 years according to the tasks depicted in the Table 5.

*Table 5 Maintenance and Data preservation of the data assets**

#	Identifier/Name	Responsible partner	part-	Maintenance and data preservation plan (2-3 years)
---	-----------------	---------------------	-------	--



1	TOOL-WP3-SIMULATOR-POLICY-FRAMEWORK	EUT	Check the appearance, stats of use and accessibility. Bug solving if something identified/notified. Server maintenance.
2	TOOL-WP3-SDM-TRANSLATOR	EUT	Check use and accessibility. Bug solving if something identified/notified. Server maintenance.
3	TOOL-NXG-DATALAKE	EUT	Revise and update if necessary. Check once a year
4	TOOL-NEXUS-ONTOLOGY	EUT	Revise and update if necessary. Check once a year
5	TOOL-NXG-SEMANTIC-REPOSITORY	EUT	Revise and update if necessary. Check once a year
6	TOOL-NXG-DATA_EXPLORER_& VISUALIZER	EUT	Check use and accessibility. Bug solving if something identified/notified. Server maintenance.
7	TOOL-NXG-UI	EUT	Check the appearance, stats of use and accessibility. Bug solving if something identified/notified. Server maintenance.
8	TOOL-WEB-SERVICE-API	EUT	Check stats of use and accessibility. Bug solving if something identified/notified. Server maintenance.

As a conclusion of this part of the document, NEXOGENESIS is committed with the open-source science through the initiatives of Open Pilot Research⁶, European Open Science Cloud (EOSC)⁷ and also, the digitalization of the data management plan inside the Argos Tool. Under these initiatives, the intention of NEXOGENESIS is to share relevant digital tools developed within the project, models and also referring output datasets regarding the AI driven tools processes (including curation and quality assurance). Moreover, the project is also committed to the maintenance of this assets during the project. Also, there is the intention to maintain those assets beyond the project span to ensure future research and also awareness of the society in industrial symbiosis and efficient use of the natural resources.

6 OpenAIRE

7 EOSC Portal (eosc-portal.eu)



Table 6 Overview of the datasets generated in Nexogenesis

#	Identifier/Name	Brief Description	Open Source	Repository	Additional Comments or justification of not Open Source
1	DS-WP3-Socio-Economic-GRDEM	Socio-economic modeling based on GRDEM model. Uses GTAP database and SSPs scenarios for projections.	Open	Zenodo	-
2	DS-WP3-WEFE-Policy-Assessment	Governance and Policy Assessment in Case Studies, methodology, and implementation across five regions.	Embargoed	Zenodo	Data contains policy-sensitive information.
3	DS-WP4-Bio-physical-Nexus-Vectors	Biophysical Nexus data vectors for case studies with climate, water, and agricultural projections.	Open	Zenodo	-
4	DS-WP4-Conceptual-Models	Conceptual models for all case studies identifying WEFE interconnections.	Open	Zenodo	-
5	DS-WP4-Sensitivity-Uncertainty-Analysis	Sensitivity and uncertainty analysis methods for System Dynamics Models (SDMs).	Open	Zenodo	-



6	DS-WP5-Policy-Inventory	Inventory of policies for the Nexus Governance framework.	Restricted	Zenodo	Contains confidential policy data.
7	DS-WP5-Policy-Package-Template	Policy package template for stakeholders to define and evaluate policies.	Restricted	Zenodo	Contains proprietary stakeholder engagement materials.
8	DS-WP5-Water-Energy-Food-Modeling	Statistical approach to quantify Water-Human Development relation.	Open	Zenodo	-
9	DS-WP5-NXG-Data	System Dynamic Model outputs for the Inkomati Case Study (climate/socio-eco-economic scenarios).	Restricted	Zenodo	Case study data, not open due to sensitivity.
10	DS-WP5-WP3-NbS-Assessment	Nature-Based Solutions assessment for flood risk management using Multi-Criteria Decision Analysis.	Open	Zenodo	-
11	DS-WP3-Climate-Water-Food-Nexus	Understanding climate-water-energy-food nexus and streamlining water-related policies.	Open	Zenodo	-



12	DS-WP3-Scientific-Quality-Plan	Scientific quality assurance plan and ethical considerations in project management.	Open	Zenodo	-
13	DS-WP3-Policy-Impact-Strategy	Strategies to align project research with policy impact and implementation.	Open	Zenodo	-
14	DS-WP3-Communication-Activities	Report on communication activities and dissemination efforts.	Open	Zenodo	-
15	DS-WP4-Data-Management-Plan	Initial data management plan for handling project data and metadata.	Open	Zenodo	-
16	DS-WP4-Nexus-Engine-Technical-Design	Self-learning Nexus engine specifications and technical design.	Open	Zenodo	-
17	DS-WP4-Stakeholder-Engagement	Stakeholders' co-creation approach for WEFE nexus governance.	Open	Zenodo	-
18	DS-WP5-Optimizing-WEFE-Nexus	Optimizing WEFE Nexus in the Mediterranean basin, policy recommendations.	Open	Zenodo	-
19	DS-WP5-Bio-physical-Nexus-Data	Biophysical Nexus data vectors from	Open	Zenodo	-



		case studies, climate and ecosystem projections.			
20	DS-WP5-Socio-Economic-GRDEM	Additional socio-eco-nomic modeling data from GRDEM model up-dates.	Open	Zenodo	-
21	DS-WP3-NXG-WP1-Intro-Presentation	Introductory presenta-tion to stakeholders on project goals and scope.	Open	Zenodo	-
22	DS-WP3-WP1-Policy-Instru-ments	Description and valida-tion of policy instru-ments for Nexus as-sessment.	Open	Zenodo	-
23	DS-WP5-Governance-Policy-Assessment	Governance and policy coherence assessment results from case studies.	Embargoed	Zenodo	Data contains policy-sensitive infor-mation.
24	DS-WP5-Stakeholder-Data	Stakeholder interaction and engage-ment data from work-shops.	Restricted	Zenodo	Contains sensitive stakeholder infor-mation.
25	DS-WP5-Cli-mate-Projec-tions	Climate sce-nario projec-tions used in case study modeling.	Open	Zenodo	-
26	DS-WP5-Deci-sion-Support	Decision Support Sys-tem func-tionali-ties for Nexus policy evalua-tion.	Open	Zenodo	-

27	DS-WP5-Nexus-Model-Validation	Validation of System Dynamics Models with real-world case study data.	Open	Zenodo	-
28	DS-WP5-Policy-Implementation-Results	Impact evaluation of implemented policies in case studies.	Open	Zenodo	-
29	DS-WP5-Cross-Case-Comparison	Comparative analysis of Nexus interactions across case studies.	Open	Zenodo	-
30	DS-WP5-Water-Demand-Analysis	Analysis of domestic, agricultural, and industrial water demand trends.	Open	Zenodo	-
31	DS-WP5-Sectoral-Impact-Study	Study on economic, environmental, and social impacts of Nexus policies.	Open	Zenodo	-
32	DS-WP5-NXG-WP3-Conference-Presentation	Conference presentation summarizing Nexus-related project results.	Open	Zenodo	-
33	DS-WP5-MCDA-Framework	Multi-Criteria Decision Analysis framework for policy evaluation.	Open	Zenodo	-
34	DS-WP5-Water-Storage-Analysis	Statistical evaluation of water storage and	Open	Zenodo	-

		use in case study regions.			
35	DS-WP5-Sce-nario-Analysis	What-if sce-nario testing results for Nexus poli-cies.	Open	Zenodo	-
36	DS-WP5-RCP-SSP-Projections	Representa-tive Concen-tration Path-ways (RCP) and Shared Socioeco-nomic Path-ways (SSP) projections.	Open	Zenodo	-
37	DS-WP5-Hu-man-Develop-ment-Indicators	Analysis of water access impact on human de-velopment.	Open	Zenodo	-
38	DS-WP5-NXG-WP3-Final-Pol-icy-Recommen-dations	Final policy recommen-dations de-rived from case study analyses.	Open	Zenodo	-



3.2. Purpose of the data collection/generation and relation to the objectives of the project

NEXOGENESIS aims to support the development of integrated, sustainable, and science-based policy recommendations to address the Water-Energy-Food-Ecosystems (WEFE) Nexus. Through participatory modeling, advanced AI-driven tools, and simulation approaches, the project enhances decision-making processes across multiple governance levels.

The project focuses on generating datasets that contribute to better understanding Nexus interactions, optimizing resource management, and improving policy coherence. The collected and generated data will support case studies spanning multiple geographic and socio-economic contexts, providing robust scientific evidence to inform policy recommendations and decision-support tools.

To achieve this, NEXOGENESIS integrates socio-economic modeling, system dynamics modeling, and machine learning techniques to analyze policy scenarios and their potential impacts. The project will generate datasets that include climate projections, socio-economic scenarios, governance frameworks, and policy assessments, among others. These datasets will be used to refine Nexus models, develop tools for stakeholders, and evaluate policy interventions.

The following table outlines the primary project objectives and how the generated datasets contribute to these goals:

Table 7. NEXOGENESIS project Objectives

#	Objective
1	Develop a framework for integrated Nexus policy assessment and governance enhancement (WP1)
2	Deliver methodologies and tools for evaluating the coherence and effectiveness of Nexus-related policies across sectors and scales (WP2)
3	Develop and apply System Dynamics Models (SDMs) to assess cross-sectoral policy impacts and trade-offs (WP3)
4	Generate socio-economic and biophysical datasets to support scenario-based policy analysis (WP3, WP4)
5	Develop a decision-support system for optimizing policy recommendations and stakeholder engagement (WP5)
6	Implement case studies to demonstrate the applicability and replicability of Nexus approaches (WP5, WP6)
7	Foster knowledge sharing, policy dialogues, and engagement with decision-makers at different governance levels (WP5)
8	Provide open-access data and tools to facilitate future research and stakeholder-driven policy design (WP6)
9	Disseminate scientific and technical results to ensure the long-term impact of the project (WP6)



Considering these objectives, NEXOGENESIS consortium has identified the following datasets and their potential contributions to the consecution of such objectives:

#	Input Dataset	URL	Objective Nº
1	DS-WP3-Socio-Economic-GRDEM	https://zenodo.org/records/13124475	2, 4, 5, 6
2	DS-WP3-WEFE-Policy-Assessment	https://zenodo.org/records/13133779	1, 2, 3
3	DS-WP4-Biophysical-Nexus-Vectors	https://zenodo.org/records/14257059	4, 5, 6
4	DS-WP4-Conceptual-Models	https://zenodo.org/records/13125109	1, 3, 5
5	DS-WP4-Sensitivity-Uncertainty-Analysis	https://zenodo.org/records/13125305	3, 4, 5
6	DS-WP5-Policy-Inventory	https://zenodo.org/records/14917456	1, 2
7	DS-WP5-Policy-Package-Template	https://zenodo.org/records/14917475	2, 3, 5
8	DS-WP5-Water-Energy-Food-Modeling	https://zenodo.org/records/13124953	4, 5
9	DS-WP5-NXG-Data	https://zenodo.org/records/13142474	3, 4, 5, 6
10	DS-WP5-WP3-NbS-Assessment	https://zenodo.org/records/14918199	3, 5
11	DS-WP3-Climate-Water-Food-Nexus	https://zenodo.org/records/13125742	1, 3, 6
12	DS-WP3-Scientific-Quality-Plan	https://zenodo.org/records/13125695	7, 9
13	DS-WP3-Policy-Impact-Strategy	https://zenodo.org/records/13125644	2, 6
14	DS-WP3-Communication-Activities	https://zenodo.org/records/13125536	7, 9
15	DS-WP4-Data-Management-Plan	https://zenodo.org/records/13125468	8, 9
16	DS-WP4-Nexus-Engine-Technical-Design	https://zenodo.org/records/13125394	4, 5, 6
17	DS-WP4-Stakeholder-Engagement	https://zenodo.org/records/13124913	5, 6, 7
18	DS-WP5-Optimizing-WEFE-Nexus	https://zenodo.org/records/8191792	3, 5, 6
19	DS-WP5-Biophysical-Nexus-Data	https://zenodo.org/records/14257059	4, 5, 6
20	DS-WP5-Socio-Economic-GRDEM	https://zenodo.org/records/13124081	2, 4, 5
21	DS-WP3-NXG-WP1-Intro-Presentation	https://zenodo.org/records/14917362	7, 9
22	DS-WP3-WP1-Policy-Instruments	https://zenodo.org/records/13133879	2, 3, 5



#	Input Dataset	URL	Objective Nº
23	DS-WP5-Governance-Policy-Assessment	https://zenodo.org/records/13133779	1, 2, 3
24	DS-WP5-Stakeholder-Data	https://zenodo.org/records/13124475	5, 7
25	DS-WP5-Climate-Projections	https://zenodo.org/records/13124953	4, 5
26	DS-WP5-Decision-Support	https://zenodo.org/records/13125394	5, 6
27	DS-WP5-Nexus-Model-Validation	https://zenodo.org/records/13125305	3, 4, 5
28	DS-WP5-Policy-Implementation-Results	https://zenodo.org/records/13125394	2, 3, 5
29	DS-WP5-Cross-Case-Comparison	https://zenodo.org/records/13124953	3, 5, 6
30	DS-WP5-Water-Demand-Analysis	https://zenodo.org/records/13124953	4, 5
31	DS-WP5-Sectoral-Impact-Study	https://zenodo.org/records/13124953	3, 5, 6
32	DS-WP5-NXG-WP3-Conference-Presentation	https://zenodo.org/records/14917362	7, 9
33	DS-WP5-MCDA-Framework	https://zenodo.org/records/14918199	2, 3, 5
34	DS-WP5-Water-Storage-Analysis	https://zenodo.org/records/13124953	4, 5
35	DS-WP5-Scenario-Analysis	https://zenodo.org/records/13125305	3, 5
36	DS-WP5-RCP-SSP-Projections	https://zenodo.org/records/13124953	4, 5
37	DS-WP5-Human-Development-Indicators	https://zenodo.org/records/13118953	2, 4, 5
38	DS-WP5-NXG-WP3-Final-Policy-Recommendations	https://zenodo.org/records/13124953	2, 3, 5, 6

This dataset collection will contribute to a better understanding of the WEFE Nexus and facilitate cross-sectoral policy coherence, supporting both scientific advancements and practical applications in policy-making.



3.3. Types and Formats of data generated/Collected

Considering the Table 10 Metadata Information, the datasets generated in NEXOGENESIS are related with: (i) Project publications (scientific articles, technical reports, and official deliverables) (ii) curated and/or raw data collected produced during the project.

The datasets collected and generated in NEXOGENESIS mainly originate from the following work packages (WPs):

- **WP1 (Co-creation of WEFE nexus governance and water policy streamlining):** Collects data related to the coherence and governance of Water-Energy-Food-Ecosystems (WEFE) Nexus policies within the project's case studies.
- **WP2 (Biophysical-human modelling):** Integrates biophysical, socio-economic, and climate data required for the modeling approaches in later stages of the project.
- **WP3 (Nexus System Thinking and Integration):** Generates scenario-based modeling outputs, sensitivity analyses, and policy impact assessments using system dynamics models (SDMs).
- **WP4 (Nexus self-learning assessment engine development):** Produces datasets related to AI-based decision-making tools, optimization models, and policy impact evaluations.
- **WP5 (Case study coordination):** Develops visualization tools and decision-support interfaces that consume processed data from WP3 and WP4 to enhance stakeholder engagement and policy formulation.

Considering the interconnection between WPs and the data flow, NEXOGENESIS deploys an advanced methodology combining stakeholder engagement, participatory modelling, and AI-driven tools to generate high-quality datasets. The project will produce curated datasets from:

- **Raw data collections**, including historical and real-time data from case studies.
- **Model-generated data**, derived from system dynamics simulations, policy impact models, and socio-economic scenario analyses.
- **AI-driven data outputs**, obtained through machine learning models applied to Nexus complexity analysis.

Based on this information, the main features and details about the data collected and generated is presented in the following table:

Table 8. Details about the data generated and collected

#	Identifier	Size	Type	Format
1	DS-WP3-Socio-Economic-GRDEM	1.35 MB	Dataset	XLSX
2	DS-WP3-WEFE-Policy-Assessment	8.5 MB	Report	PDF
3	DS-WP4-Biophysical-Nexus-Vectors	44.80 MB	Dataset	PDF
4	DS-WP4-Conceptual-Models	3.29 MB	Publication	PDF
5	DS-WP4-Sensitivity-Uncertainty-Analysis	1.29 MB	Publication	PDF
6	DS-WP5-Policy-Inventory	0.10 MB	Dataset	XLSX
7	DS-WP5-Policy-Package-Template	0.07 MB	Dataset	XLSX
8	DS-WP5-Water-Energy-Food-Modeling	0.96 MB	Publication	PDF
9	DS-WP5-NXG-Data		Dataset	XLSX
10	DS-WP5-WP3-NbS-Assessment	1.19 MB	Publication	PPTX
11	DS-WP3-Climate-Water-Food-Nexus	0.67 MB	Publication	PDF
12	DS-WP3-Scientific-Quality-Plan	0.59 MB	Publication	PDF
13	DS-WP3-Policy-Impact-Strategy	2.06 MB	Publication	PDF
14	DS-WP3-Communication-Activities	3.85 MB	Publication	PDF
15	DS-WP4-Data-Management-Plan	1.04 MB	Publication	PDF
16	DS-WP4-Nexus-Engine-Technical-Design	1.47 MB	Publication	PDF
17	DS-WP4-Stakeholder-Engagement	0.76 MB	Publication	PDF
18	DS-WP5-Optimizing-WEFE-Nexus	6.54 MB	Other	PDF

#	Identifier	Size	Type	Format
19	DS-WP5-Biophysical-Nexus-Data	44.80 MB	Dataset	PDF
20	DS-WP5-Socio-Economic-GRDEM	1.33 MB	Dataset	PDF
21	DS-WP3-NXG-WP1-Intro-Presentation	0.87 MB	Presentation	PPTX
22	DS-WP3-WP1-Policy-Instruments	2.19 MB	Report	PDF
23	DS-WP5-Governance-Policy-Assessment	8.5 MB	Report	PDF
24	DS-WP5-Stakeholder-Data	1.35 MB	Dataset	PDF
25	DS-WP5-Climate-Projections	0.96 MB	Publication	PDF
26	DS-WP5-Decision-Support	1.47 MB	Publication	PDF
27	DS-WP5-Nexus-Model-Validation	1.29 MB	Publication	PDF
28	DS-WP5-Policy-Implementation-Results	1.47 MB	Publication	PDF
29	DS-WP5-Cross-Case-Comparison	0.96 MB	Publication	PDF
30	DS-WP5-Water-Demand-Analysis	0.96 MB	Publication	PDF
31	DS-WP5-Sectoral-Impact-Study	0.96 MB	Publication	PDF
32	DS-WP5-NXG-WP3-Conference-Presentation	0.87 MB	Presentation	PPTX
33	DS-WP5-MCDA-Framework	1.19 MB	Publication	PPTX
34	DS-WP5-Water-Storage-Analysis	0.96 MB	Publication	PDF
35	DS-WP5-Scenario-Analysis	1.29 MB	Publication	PDF
36	DS-WP5-RCP-SSP-Projections	0.96 MB	Publication	PDF
37	DS-WP5-Human-Development-Indicators	2.22 MB	Journal article	PDF

#	Identifier	Size	Type	Format
38	DS-WP5-NXG-WP3-Final-Policy-Recommendations	0.96 MB	Publication	PDF

3.4. Outline the data: to whom will be useful?

The data generated within NEXOGENESIS is relevant for advancing knowledge in Water-Energy-Food-Ecosystem (WEFE) Nexus policy coherence, governance, and resource optimization. Most of the generated datasets and digital assets will be made publicly available to support scientific research, policy development, and stakeholder engagement. The majority of these datasets will be published on Zenodo for access by scientists, policymakers, industries, authorities, and other relevant stakeholders.

At present, a dedicated Zenodo community has been established for NEXOGENESIS, where datasets are progressively being uploaded to ensure open access and alignment with FAIR (Findable, Accessible, Interoperable, and Reusable) principles. Additionally, IT and digital tool development code will be made available through GitLab repositories, ensuring transparency, collaboration, and continuous improvement. Final versions of key digital assets will also be published on the NEXOGENESIS website for broad dissemination and user engagement.

Considering these aspects, the following table reflects the main stakeholders who could benefit from the various data assets generated by the project:

Table 9. Data utility by stakeholders

Stakeholders	Data utility
Scientists	Utilize datasets to conduct research on policy coherence, resource efficiency, and climate change mitigation using reliable, high-quality data from different regions and sectors.
Authorities & Regulators	Gain insights into governance, policy coherence, and WEFE nexus dynamics, supporting evidence-based policymaking and sustainable development strategies at local, national, and EU levels.
Environmental Researchers & NGOs	Access high-quality datasets for analyzing ecosystem interdependencies, sustainability indicators, and climate resilience, contributing to impact assessments and environmental planning.
Industrial Stakeholders	Enhance knowledge exchange and improve resource efficiency, policy adaptation, and nexus-based optimization strategies through sector-specific datasets and models.
Policy Makers	Utilize AI-driven models, historical datasets, and policy simulations to support regional and transboundary policy assessments, driving sustainable decision-making and regulatory coherence.



Stakeholders	Data utility
Society at Large	Increase awareness of the WEFE Nexus and its role in climate change mitigation, supported by user-friendly visualization tools, interactive decision-support platforms, and open-access educational resources.

4. FAIR data

This section provides a comprehensive overview of the FAIR (Findable, Accessible, Interoperable, and Reusable) data management principles applied in NEXOGENESIS. As a finalized version of the Data Management Plan (DMP), this document outlines the structured approach taken to ensure compliance with FAIR principles throughout the project.

Intellectual Property Rights (IPR) management in NEXOGENESIS plays a critical role in the governance of data and datasets generated, assembled, or collected. The project distinguishes between databases and data content to clarify access, usage, and reuse permissions for external users, ensuring transparency and compliance with data-sharing policies.

4.1. Making data findable, including provisions for metadata

The NEXOGENESIS project has ensured that all datasets generated during the project are easily findable, uniquely identifiable, and well-documented, following FAIR (Findable, Accessible, Interoperable, and Reusable) principles. This section describes the measures implemented to enhance data discoverability, including metadata provisions, unique identification mechanisms, and standardized naming conventions.

4.1.1. Making data openly accessible

All scientific data, models, and knowledge produced within NEXOGENESIS have been made accessible under Open Access, whenever possible.

To ensure broad accessibility, datasets have been classified and shared as follows:

1. **Data linked to scientific publications** – Supporting datasets for journal papers, deliverables, and conference proceedings. These datasets have been deposited in Zenodo, where the associated publication serves as the primary metadata reference.
2. **Curated and/or raw data** – Biophysical models, socio-economic analyses, simulation outputs, and system dynamics models collected and generated during the project. Where necessary, accompanying documentation has been provided to explain dataset structures, acquisition methods, and recommended usage.

All datasets adhere to the metadata standards of the selected repositories (Zenodo, OpenAIRE, and EOSC), ensuring that they are well-documented, searchable, and reusable by researchers, policymakers, and other stakeholders.



4.1.2. Making data identifiable

To facilitate dataset tracking and citation, all NEXOGENESIS datasets have been assigned persistent identifiers. Specifically:

- **Digital Object Identifiers (DOIs)** have been generated for each dataset upon publication in **Zenodo**, ensuring a **permanent and unique reference**.
- **Integration with the European Open Science Cloud (EOSC)** has enhanced dataset visibility within the **broader EU research infrastructure**.
- **OAI-PMH Protocol Support** – Zenodo's metadata is **harvestable via the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH)**, facilitating dataset discoverability across multiple platforms.

4.1.3. Naming and conventions used

To maintain consistency and clarity, all datasets uploaded to Zenodo and EOSC follow a standardized naming convention, structured as:

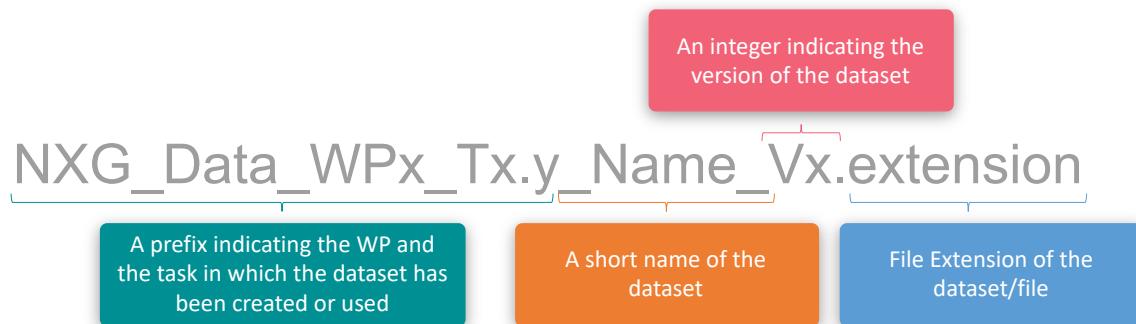


Figure 3. Tentative structure to name the files inside the repository

4.1.4. Approach towards search keywords

To enhance data discoverability and reusability, NEXOGENESIS datasets have been systematically labeled with search keywords relevant to their content. These keywords facilitate efficient search and retrieval of datasets across repositories like Zenodo and EOSC, ensuring that they are easily accessible to researchers, policymakers, and stakeholders.

Each dataset has been tagged with keywords aligned with its thematic focus, including but not limited to:

- **Water-Energy-Food-Ecosystem (WEFE) Nexus**
- **System Dynamics Modeling**
- **Climate Change Scenarios**
- **Water Governance and Policy**
- **Socio-economic Modeling**
- **Stakeholder Engagement**



- **Circular Economy and Resource Optimization**

4.1.5. Approach for clear versioning

To maintain data integrity and version control, all NEXOGENESIS datasets are stored in Zenodo, which ensures that each version of a dataset is uniquely identified and traceable.

- Each dataset version is assigned a DOI (Digital Object Identifier), ensuring that previous versions remain accessible and citable.
- Dataset updates are recorded, and changes between versions are documented in metadata descriptions.
- Naming conventions (as described in Section Naming and conventions used4.1.3) include version numbers (e.g., V1, V2, etc.), ensuring a clear historical record of modifications and improvements.

This approach guarantees transparency, reproducibility, and efficient management of evolving datasets.

4.1.6. Specify standards for metadata creation

To ensure data consistency, usability, and interoperability, NEXOGENESIS adheres to established metadata standards that:

- Provide a structured and standardized description of each dataset.
- Enable effective data sharing and integration within open science platforms like Zenodo, OpenAIRE, and EOSC.
- Support dataset interpretation by ensuring that users understand the context, content, and format of the data.

The metadata follows the standards recommended by Zenodo and includes detailed attributes, as specified in Table 10.

4.1.7. Type of metadata created and how

Along with the metadata described in Section 4.1.3 for the name of the datasets, metadata are also created for each dataset to describe the size of the file, its format, the data provider (owner), last update (date), time of update. In addition, a very short description of each dataset is also provided:

Table 10 Metadata Information

METADATA	BRIEF DESCRIPTION
Size (K)	Corresponds to the size of the file.
Format	Indicates the format of the represented information. It could be JSON, CSV, etc.
Short Description	A brief explanation of the dataset.
Data Provider	Name of the company and/or person who provides the information.



Last Update (data)	Date of the last update performed over the dataset.
Time of Update	Hour in which update has been performed.

4.2. Making data openly accessible

NEXOGENESIS has generated public datasets that are now available under Open Access (OA). Specifically, the project has published datasets covering socio-economic, biophysical, climatic, and geospatial information, all of which have been uploaded to Zenodo and EOSC for broader scientific and societal use.

Additionally, model outputs from CSs have been made available in OA upon receiving permissions from CS partners and data providers. The datasets have been structured to be accessible, assessable, and intelligible by ensuring compliance with FAIR (Findable, Accessible, Interoperable, Reusable) principles.

4.2.1. Specifics on data made openly available

The following table provides the indicative timeline for the public release of datasets in Open Access (OA):

Table 11. Indicative timeline for OA data release

INDICATIVE TIMETABLE FOR DATA RELEASE IN OA	
Month 14-16	First version of biophysical, socio-economic, and climate models for fast-track case studies.
Month 24-26	First version of biophysical, socio-economic, and climate models for all remaining case studies.
Month 42	Final model outputs, processed datasets, and reports from all case studies.

4.2.2. Closed data and justification

While most of the datasets generated in NEXOGENESIS are openly available, a subset of datasets remains restricted due to confidentiality, proprietary information, or data sensitivity concerns. Below is a summary of the restricted datasets and the rationale for their restricted access:

Table 12. Indicative timeline for OA data release

#	Dataset Identifier	Brief Description	Access	Repository	Justification
6	DS-WP5-Policy-Inventory	Inventory of policies for the Nexus Governance framework.	Restricted	Zenodo	Contains confidential policy data that is not intended for



					public disclosure.
7	DS-WP5-Policy-Package-Template	Template for stakeholders to define and evaluate policies.	Restricted	Zenodo	Contains proprietary stakeholder engagement materials.
9	DS-WP5-NXG-Data	System Dynamic Model outputs for the Inkomati Case Study.	Restricted	Zenodo	Case study data includes sensitive climate/socio-economic scenarios that cannot be publicly disclosed.

4.2.3. Methods for making data available

Data has been made available through Zenodo, which is compliant with Horizon Europe and Open Science regulations. The sharing of data follows the following process:

- Dataset Preparation: Data is curated, formatted, and structured according to metadata standards.
- Peer-Review & Approval: Before publication, datasets are reviewed and validated by project partners.
- Uploading to Zenodo: Each dataset is uploaded to Zenodo, where it receives a DOI (Digital Object Identifier) for referencing and citation.
- Linking to OpenAIRE: Once datasets are uploaded, they are linked to OpenAIRE for improved accessibility and interoperability.
- Project Website Integration: Relevant datasets have also been referenced on the NEXOGENESIS website, making them easier to find.

All published datasets follow anonymization and privacy protection measures in compliance with GDPR and ethical guidelines.

4.2.4. Methods and software needed to access data

The NEXOGENESIS datasets can be accessed using standard web services, open APIs, and common file formats. The data can be retrieved via:



- Zenodo's API, which allows for structured data querying.
- Web-based access, enabling users to directly download datasets in CSV, JSON, or XLSX formats.
- Standard tools, including:
 - Excel and CSV readers for structured data.
 - GIS tools (QGIS, ArcGIS) for geospatial datasets.
 - Python libraries (Pandas, NumPy, Geopandas) for data analysis.



4.3. Making data interoperable

To ensure data interoperability, NEXOGENESIS datasets comply with international standards. The NXG Knowledge Repository and Web Service API provide structured access, ensuring compatibility with external datasets and tools.

4.3.1. Interoperability of project data

All datasets use widely recognized formats (CSV, JSON, XLSX) to enable cross-platform usage and integration with external tools.

4.3.2. Specifics on data/metadata vocabularies, standards, methodologies followed

The initial description is provided in Section 4 of this Deliverable.

4.3.3. Use of standard vocabulary for all data types present to allow inter-disciplinary interoperability

The initial description is provided in Section 4.1 of this Deliverable.



4.4. Increase data re-use (through clarifying licences)

This section will be updated on next iterations at M6, M18, M30 and M42, to provide detailed information on how data will be made usable beyond the original purpose for which it was collected, and more in detail:

- Data licensing to permit the widest reuse possible
- Data availability for re-use
- Why and for what period a data embargo is induced
- Data useable by third parties after the end of the project
- Restriction of re-use of some data
- Data quality assurance processes
- Length of time for which the data will remain re-usable

As detailed in Section 4, all data, information, and knowledge considered relevant for the scientific community will be made accessible under Open Access. When a dataset is set to be accessible publicly, this information will be fulfilled and the DMP updated accordingly.

4.4.1. Data Licensing to permit the widest reuse possible

It is proposed to use Creative Commons Attribution Share-Alike 4.0 License as much as is possible and practicable, which allows sharing, remixing, transforming and building upon the material for any purpose. Products should be redistributed under the same license. It is not yet decided at this stage of the Proposal.

4.4.2. Data useable by third parties after the end of the project

Open Data used by third parties should be cited accordingly with the rules established by Zenodo/Argos in case of datasets and model outputs. These rules includes the name of the authors, the project, the DOI, the nature of the document and the year of publication:

AuthorSurname1, AuthorName1; AuthorSurname2, AuthorName2; ...; AuthorSurnameN, AuthorNameN (year). Title_of_dataset [dataset]. Zenodo. Doi

4.4.3. Restriction of re-use of some data

There will be no restriction of use for the dataset published in open access. For the other datasources it will be assessed with the consortium partners which rules to follow at M42.



4.4.4. Length of time for which the data will remain re-usable

According to the objectives described in Section 3.1, the data made openly accessible will be updated continuously within 2-3 years after NEXOGENESIS ends. After this period, the data will be maintained in Zenodo without any update. In case of the digital tools, it will be available within the same period. However, the services will be suspended for public use after that period if not acquired any income to maintain it according to the final exploitation plan.

5. Allocation of resources

5.1. Costs for making data FAIR in NEXOGENESIS

The cost is estimated at 1-person month per case study to making data FAIR and maintainable. Thus, the total cost is estimated at 30.100€ including travel, other costs (7 person/months @4.300/p-m). This amount is already covered by the NEXOGENESIS project budget.

5.2. How will these be covered?

During the project life, costs are covered by the NEXOGENESIS budget. Following project closure, this cost will be covered by the pilots or new applications (impact analysis) partners.

5.3. Who will be responsible for data management in your project?

EURECAT (EUT) will be responsible for the data management.

5.4. Resources for long term preservation

Long term preservation resources are:

- **Costs:** estimated as 10% (per year per case study) of the original costs (≈3.010€) for making data FAIR.
- **Potential value:** updated for 2 years after the project's completion. After this timeframe, the value of the preserved database will be questionable. It is a matter of the Project's exploitation.
- **Who decides and how:** the NEXOGENESIS Consortium decides on the duration of the long-term preservation of the data.
- **What data will be kept:** All the data used for the NEXOGENESIS application in the case studies.
- **For how long:** The data will be preserved for 2 years after project completion. After this period, the data has no value, and unless the project is exploited with additional applications, the database will be obsolete.

6. Data security

6.1. Provisions for data security (including data recovery as well as secure storage and transfer of sensitive data)?

All provisions for data security will be established by the following data repositories and digital assets:

- Zenodo: As wide used repository, have their own data securization, backup strategies and also data accessibility and authorship.

6.2. Is the data safely stored in certified repositories for long term preservation and curation?

According to [Zenodo](#) policies on longevity:

- **Versions:** Data files will be versioned. The uploaded data will be archived as a Submission Information Package. Derivatives of data files will be generated, but original content is never modified. Records can be retracted from public view; however, the data files and record are preserved.
- **Replicas:** All data files will be tentatively stored in CERN Data Centres, primarily Geneva, with replicas in Budapest. Data files will be kept in multiple replicas in a distributed file system, which is backed up to tape on a nightly basis.
- **Retention period:** Items will be retained for the lifetime of the repository. This is currently the lifetime of the host laboratory CERN, which currently has an experimental programme defined for the next 20 years at least.
- **Functional preservation:** Zenodo makes no promises of usability and understandability of deposited objects over time.
- **File preservation:** Data files and metadata are backed up nightly and replicated into multiple copies in the online system.
- **Fixity and authenticity:** All data files will be stored along with a MD5 checksum of the file content. Files are regularly checked against their checksums to assure that file content remains constant.
- **Succession plans:** In case of closure of the repository, best efforts will be made to integrate all content into suitable alternative institutional and/or subject based repositories.



7. Ethical aspects

7.1. General

Within NEXOGENESIS, only general ethical issues are concerned such as informed consent, anonymity and confidentiality associated with the voluntary involvement of human participants in the European Union. Types of such data collected in NEXOGENESIS are user interviews, opinions and reviews associated with project's components. Non-exhaustive list is as follows:

- Stored involvement of NEXOGENESIS self-learning assessment engine users to gain insight into the decisions and behaviours of the stakeholders and to allow further analysis for improve decision-making
- The graphical user interface - to collect information from users so that the self-learning assessment engine can learn from user decisions
- A series of interviews with stakeholders and decision makers
- Planned contacts with representative persons of targeted users. Interviews should be carried out by phone/online or face-to-face when convenient. Interviews should help define the expected functionalities/ services to be offered, test the price that could be acceptable and identify distribution channels to access these clients
- The end-users, potential developers, and partners, etc. will be provided the opportunity to test and review the latest products and services
- Methodology and procedures for sensitive data processing and storing will be specified as a part of the ethics. It is important to emphasize that special efforts will be devoted to anonymizing information and securing accessibility. Mechanisms to delete personal data will be provided in an easy and usable manner.

To strengthen further the commitment that the NEXOGENESIS partnership research approach follows good ethical practice and ensures fair and equal power relationships between researchers and participants, the consortium agrees to comply with the principles laid down in the European Code of Conduct for Research Integrity, published by the [European Science Foundation](#). These principles include:

- honesty in communication of the research's goals and intentions, in reporting methods and procedures and in conveying interpretations.
- reliability in performing research.
- objectivity, which requires facts capable of proof, and transparency in the handling of information.
- impartiality and independence.
- openness and accessibility.
- duty of care - all researchers have a duty of care for the humans, animals, the environment, or the objects that they study.
- fairness in providing references and giving credit for the work of others.
- responsibility for the scientists and researchers of the future.
- care will be taken to minimize the potential collection of personal data, i.e. while taking photos and/or videos during events.

In this regard, NEXOGENESIS will not involve any potentially vulnerable groups or people unable to consent (children, those with a learning disability or cognitive impairment, or individuals in a dependent or unequal relationship), and it will not involve sensitive topics which



might induce psychological stress, anxiety or humiliation, deception, or any potential increased danger to participants, or the collection of personal data from participants.

Further, it will not involve the collection or processing of the following types of data:

- Research involving sensitive topics - for example participants' sexual behaviour, their illegal or political behaviour, their experience of violence, their abuse or exploitation, their mental health, or their gender or ethnic status.
- Research involving groups where permission of a gatekeeper is normally required for initial access to members - for example, ethnic or cultural groups, native peoples or indigenous communities.
- Research involving deception, or which is conducted without participants' full and informed consent at the time the study is carried out.
- Research involving access to records of personal or confidential information, including genetic or other biological information, concerning identifiable individuals.
- Research which would induce psychological stress, anxiety or humiliation or cause more than minimal pain.
- Research involving intrusive interventions - for example, the administration of drugs or other substances, vigorous physical exercise, or techniques such as hypnotherapy. Participants would not encounter such interventions, which may cause them to reveal information, which causes concern, in the course of their everyday life.
- Research involving the tracking or observation of participants (e.g. surveillance or localization data, and WAN data, such as IP address, MACs, etc.). However, 'cookies' will be used in the website and the graphical user interface to help analyse how users behave while interact with the platform.
- A privacy statement will be put on the website regarding the use of services like Google Analytics to track how many people access the project website. A similar privacy statement will be put on the graphical user interface regarding the use of services like Google Analytics to track how many people access the game.
- Except for the privacy statements on the use of the website and of the graphical user interface none of the data collected by NEXOGENESIS will require a notification or authorization for the collection and/or processing of the personal data to authorities or other responsible entities.

In order to ensure that the NEXOGENESIS partnership's participatory research approach follows good ethical practice and ensures fair and equal power relationships between researchers and participants, the consortium will all agree that they will sign, make public and implement an ethics agreement, based on the European Code of Conduct for Research Integrity, published by the [European Science Foundation](#).

Moreover, NEXOGENESIS consortium also agrees to follow up the rules and guidelines of the GDPR EU regulation adhered to the data privacy and security of personal information across their digital and non-digital developments⁸. In this regards, the following conditions enables to elaborate the Data Impact Assessment⁹ to ensure correct protection of the users information:

- Using and elaboration of newer technology
- Track of people's location and behaviour.

⁸ <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32016R0679&from=EN>

⁹ <https://gdpr.eu/data-protection-impact-assessment-template/>



- Systematically monitoring a public accessible place on a large scale.
- Processing personal data related to “racial or ethnic origin, political opinions, religious or philosophical beliefs, or trade union membership, and the processing of genetic data, biometric data for the purpose of uniquely identifying a natural person, data concerning health or data concerning a natural person’s sex life or sexual orientation”.
- Data processing is used to make automated decisions about people that could have legal (or similarly significant) effects.
- Processing children’s data.
- Processing could result in physical harm to the data subjects if it is leaked.

7.2. Intellectual Property Rights (IPR)

Intellectual Property Rights (IPR) will receive special attention from the beginning. All rules regarding management of knowledge and IPR will be governed by the Consortium Agreement (CA). NEXOGENESIS will be initially based on DESCA (Consortium Agreement Model) H2020 model for the Consortium Agreement (CA). NEXOGENESIS will not act in contradiction with the rules laid down in Annex II of the Grant Agreement. The CA will address background and foreground knowledge, ownership, protected third party components of the products, and protection, use and dissemination of results and access rights.

The following principles will be applied:

- **Confidentiality:** During the project duration and beyond, the contractors shall treat any information, which is designated as property by the disclosing contractors, as confidential. They also shall impose the same obligations to their employees and suppliers.
- **Pre-existing know how:** Each Contractor is and remains the sole owner of its IPR over its pre-existing know-how. The Contractors will identify and list the pre-existing know-how over which they may grant access rights for the project. The Contractors agree that the access rights to the pre-existing know-how needed for carrying out their own work under the project shall be granted on a royalty-free basis.
- **Ownership and protection of knowledge:** The ownership of the knowledge developed within the project will be governed by an open source license.
- **Open data:** Data and results obtained during the project that are based on open public-sector data will be made available free of charge.

The procedures for the dissemination, protection and exploitation of intellectual property rights (IPR) will be covered in the Consortium Agreement (tentatively in Section 6: Governance Structure, Sub-section 6.2.4). The intention has been to balance the requirements necessary to protect such intellectual property and the foreseen dissemination objectives. IPR will be applied according to the rules of the employer under the applicable European and national laws and regulations.

8. Conclusions & Future Work

This section summarizes the main conclusions drawn from the development of this final version of the NEXOGENESIS Data Management Plan (DMP). Additionally, it outlines the future actions related to dataset management, ethical considerations, data security, and long-term data preservation beyond the project's duration.

8.1. Conclusions

The final version of the NEXOGENESIS DMP presents a comprehensive strategy for the management, preservation, and sharing of research data generated throughout the project. It ensures alignment with FAIR (Findable, Accessible, Interoperable, and Reusable) principles, promoting data openness and accessibility while safeguarding sensitive and proprietary datasets.

Key aspects of this final DMP include:

- Full integration of datasets into open research repositories (Zenodo, OpenAIRE), ensuring their long-term accessibility for the scientific community and policymakers.
- Clear guidelines for data classification into open and restricted-access datasets, guaranteeing compliance with privacy laws, proprietary constraints, and ethical requirements.
- Implementation of metadata standards, allowing datasets to be easily searchable, referenced, and reused across different domains and platforms.
- Integration of ethical and legal aspects, ensuring that data handling and processing comply with GDPR, EU regulations, and ethical research principles.
- Finalization of the digital version of the DMP, enabling seamless dataset linking and updating via platforms like Argos.
- Structured long-term data maintenance and preservation strategies, ensuring that project data remains available for future research, policy development, and innovation beyond the project's lifetime.



8.2. Future Work

While this document represents the final version of the NEXOGENESIS DMP, certain actions will continue beyond the project's formal completion to ensure ongoing data availability, compliance, and impact:

Table 13. Future Work Actions in relation to the DMP

Future Work Actions	Description
Long-term dataset availability and updates	Ensure that all published datasets remain accessible , with clear documentation, metadata, and licensing terms. Future research projects can build upon NEXOGENESIS data, extending its impact.
Data repository maintenance	Maintain Zenodo and OpenAIRE repositories, ensuring that datasets remain searchable and usable beyond the project's lifespan. Regular repository audits will help identify outdated or missing information.
Integration with EOSC and external platforms	Strengthen the link between NEXOGENESIS datasets and the European Open Science Cloud (EOSC), facilitating broader access and reuse by scientists, policymakers, and industry stakeholders.
Continued digital DMP maintenance	The Argos-based virtual DMP will be kept active and updated, ensuring that researchers and institutions can track dataset revisions, metadata updates, and citations in real-time.
Data security, ethics, and privacy compliance	Ensure that all user-accessible digital assets (e.g., WEFE visualization tools, decision-support platforms, and mobile apps) comply with EU data protection regulations (GDPR). Any new dataset additions must undergo privacy assessments to protect sensitive information.
Collaboration with future research initiatives	Foster cross-project data sharing, enabling synergies with other EU-funded projects (e.g., Horizon Europe, Green Deal, Water4All). Future updates could integrate machine learning and AI-based approaches to enhance dataset usability.

9. References

- [1] European Comission, "Guidelines on Open access to scientific and Research Data in Horizon 2020," Mar. 2017.
- [2] European Science Foundation, "European Code of Conduct for Research Integrity," 2017.
- [3] European Science Foundation, "RepoCode Of Conduct for Research Activities," 2011.



10. Appendix I. DATA SOURCE DEFINITION TEMPLATE



Table 14 Data Source definition template

Digital Object Identifier (DOI) <i>Did your publisher already assign a DOI to your upload?</i> <i>If yes, indicate it in the box aside.</i> <i>If not, ZENODO will automatically register a new DOI for your upload. A DOI allows others to easily and unambiguously cite your upload.</i>			DOI:	
1. Basic information *	Publication Date *	(YYYY-MM-DD) In case your upload was already published elsewhere, please use the date of first publication		
	Authors * Indicate the name of the persons who contributed to generate the data			
	Name	Affiliation	ORCID (Optional)	
Language				
Keywords *				
Additional notes				
2. Related / alternate identifier	Recommended <i>If your upload has related publications or datasets, please, fill in this section.</i> <i>Specify identifiers of related publications and datasets by filling in the chart below. Supported identifiers include: DOI, Handle, ARK, PURL, ISSN, ISBN, PubMed ID, PubMed Central ID, ADS Bibliographic Code, arXiv, Life Science Identifiers (LSID), EAN-13, ISTC, URNs and URLs.</i>			
	Identifier	Select the right description		
	e.g. 11.12354/identifier.56789 (add new rows if required)	<input type="checkbox"/> Cites this upload	<input type="checkbox"/> Is part of this upload	
		<input type="checkbox"/> Is cited by this upload	<input type="checkbox"/> Documents this upload	
		<input type="checkbox"/> Is supplemented by this upload	<input type="checkbox"/> Is documented by this upload	
		<input type="checkbox"/> Is a supplement to this upload?	<input type="checkbox"/> Is compiled/created by this upload	
3. References	Optional <i>Indicate the references cited in your upload.</i> e.g.: Hernandez, Eloy et al (202022)			
	Optional <i>Fill in it this section in case your upload was published in a journal</i>			
	Journal title :			
	Volume :			
Issue :				
Pages :				
5. Conference	Optional <i>Fill in it this section in case your upload was disseminated at a conference.</i>			
	Conference title :			
	Acronym :			
	Dates :			
	Place (City, Country):			
	Website :			
Session (number of session within the conference)				
Part (Number of part within a session)				
6. Chapter	Optional <i>Fill in it this section in case your upload is a book, report or chapter</i>			
	Publisher:			
	Place:			
	ISBN:			
	Book title (Title of the book/report which this upload is part of)			
	Pages:			
7. Thesis	Optional <i>Fill in it this section in case your upload is part of a thesis</i>			
	Awarding university:			
	Supervisors:			
	Name (add new rows if required)	Affiliation	ORCID	Role
				Contact person / data collector / data curator / data manager / editor / researcher / rights holder / sponsor / other



11. Appendix III. WEBSITE PRIVACY POLICY

11.1. Legal Warning

In compliance with the General Data Protection Regulation (GDPR) and applicable laws on Information Society Services and Electronic Commerce, the user is informed that the owner of the website <https://nexogenesis.eu> is IHE DELFT INSTITUTE FOR WATER EDUCATION (IHE Delft), with the following identification details:

- **Registered Office:** IHE Delft, Westvest 7, 2611 AX Delft, The Netherlands
- **Email Contact:** dmp-nexogenesis@eurecat.org
- **Website Hosting Provider:** OVH
 - OVH SAS
RCS Roubaix – Tourcoing 424 761 419 00045
Head office:
2 rue Kellermann – 59100 Roubaix – France.
FRANCE

11.2. ACCESS TO THE WEBSITE

This legal notice regulates the access and use of the website by Users and aims to inform about the services and products of the entity and allow general access for all Internet users. Any person who accesses or uses the Website is considered a User and accepts, without reservations of any kind, each and every one of these general conditions, as well as of other special conditions that, if applicable, govern the use of the Portal or the services linked to it. The User must carefully read the Legal Notice and the Privacy and Cookies Policies when they intend to use the Website, since IHE Delft reserves the right to make, at any time and without prior notice, any modification or update of the contents and services, of the present provisions for access and use and, in general, of all the elements that comprise the design and configuration of its Website. If you do not accept the conditions of access and use, please refrain from using the Website and its content.

11.3. USE OF THE WEBSITE

The User undertakes to make diligent use of the Website, as well as the information relating to its services and/or activities, in full compliance with the applicable regulations, ethics and generally accepted good practices and law and order, the conditions of access and use and any other conditions established on the Website.

In addition, the user agrees to refrain from using any of the content for illegal purposes or effects, prohibited in this document, which may be harmful to the rights and interests of third parties, or that in any way may damage, disable, overload, deteriorate or prevent the normal use of the content (hardware and software) of other Users or of any Internet user in general.

11.4. OPERATION OF THE WEBSITE

In the event of non-compliance with the conditions of the Legal Notice, or the Privacy and Cookies Policies, IHE Delft reserves the right to limit, suspend and/or exclude access to its website, adopting any technical measure necessary in this respect. IHE Delft will do everything possible to keep the website in good working order, preventing faults, or repairing them and keeping the contents up to date. However, IHE Delft does not guarantee the availability and continuity of access to the Website or the absence of errors in the content.

11.5. LIABILITY

The User is solely liable for the use that they may make of any information or mechanism of the Website.

IHE Delft will not be liable for any damage to the hardware and/or software of the User that may arise from access and use of the Website. Likewise, it will be not liable for damages or losses that may be caused by accessing and/or using the information on the Website, and specifically those that may occur in computer systems or those caused by computer viruses/attacks, crashes, interruptions, absence or defects in connectivity and/or the Internet. The User will be liable for the damages and/or losses that IHE Delft may suffer as a result of the breach of any of the obligations to which they are subject to through this Legal Notice, applicable regulations and the Privacy and Cookies Policies.

11.6. POLICY ON LINKS

11.6.1. Web linking:

Third parties who intend to include a link on this website must comply with current legislation and may not host content that is inappropriate, illegal, pornographic, violent, etc.

IHE Delft will in no case be liable for the content of that Website, nor promote, guarantee, supervise or recommend the content therein.

If the linking Website fails to comply with any of the above aspects, it will be obliged to delete the link immediately.

11.6.2. Linking website:

This Website may include links to third-party websites that allow the User to access them.

Nonetheless, IHE Delft is not liable for the content of these linked websites, but rather the User will be responsible for accepting and verifying access each time they connect.

These links or mentions have a use that does not imply the support, approval, commercialization or any relationship of this website and the persons or entities that own the site where they are located.

11.6.3. INTELLECTUAL AND INDUSTRIAL PROPERTY RIGHTS OF THE CONTENT

IHE Delft, or its licensors, are holders of all intellectual property rights over the Contents of the Website, understood as all the designs, databases, underlying computer programs (source code, included), as well as the different elements that make up the Website (texts, graphics, photographs, videos, colours, etc.), structure, layout, etc. The trademarks and trade names ("distinctive signs") are owned by IHE Delft or the licensors.

The use of the Website by the User does not imply the transfer of any intellectual or industrial property rights. The User is totally prohibited from reproducing, copying, distributing, making available or publicly communicating, transforming or modifying the Contents or Distinctive Signs in any way, unless the authorization of the owner of the corresponding rights is granted or it is legally permitted.

11.6.4. APPLICABLE LEGISLATION

The Legal Notice will be governed and interpreted in accordance with Spanish legislation.

Any conflict that may arise from accessing the website will be submitted to the relevant courts or tribunals for resolution in accordance with consumer and user regulations.

11.6.5. CONTACT

For any questions or comments on this Legal Notice you can contact us at j.susnik@un-ihe.org

12. Appendix IV. WEBSITE COOKIES POLICY

12.1. COOKIES

Cookies are small files that are downloaded to your computer when you visit a website to improve your experience. Almost all browsers support Cookies; however, you are able to set your preferences (decline or delete them) whenever you like. For more general information on cookies see the ICO's cookie page¹⁰.

12.2. HOW DO WE USE COOKIES?

We use cookies in order to manage functionality on our website and to have insights on how to improve our services for our users. When a cookie is not necessary, we give you the option to opt-out of it and disable it.

¹⁰ <https://ico.org.uk/for-organisations/guide-to-pecr/cookies-and-similar-technologies/>



12.3. WHAT TYPE OF COOKIES DOES THE WEBSITE USE?

We use two main types of cookies:

- Necessary cookies, which are essential for the operation of the website by enabling basic functions like page navigation and access to secure areas of the website.
- Statistic cookies, which allow us to see the number of visitors and they move around our website when they are using it. This helps us to improve the way our website works, for example, by ensuring that users are finding what they are looking for easily. The analytics solution we have opted for preserves our visitor's privacy by e.g. anonymising IP addresses. The information collected by these cookies is aggregated and therefore anonymous.

12.4. HOW TO MANAGE COOKIES?

Most web browsers allow some control of most cookies through the browser settings. To find out more about cookies, including how to see what cookies have been set, visit www.aboutcookies.org or www.allaboutcookies.org

By following the links below you can find out how to manage your Cookies preferences on popular browsers:

- Google Chrome
- Microsoft Edge
- Mozilla Firefox
- Microsoft Internet Explorer
- Opera
- Apple Safari



12.5. THIRD PARTY COOKIES

Third-party cookies are only generated with your agreement. We use third-party cookies to provide enhanced site functionality.

This site uses Google Analytics which is one of the most widespread and trusted analytics solutions on the web for helping us to understand how you use the site and ways that we can improve your experience. These cookies may track things such as how long you spend on the site and the pages that you visit so we can continue to produce engaging content. For more information on Google Analytics cookies, see the official Google Analytics page.

13. Appendix V. PRIVACY POLICY

13.1. WHO IS THE DATA CONTROLLER FOR YOUR PERSONAL DATA?

Data controller: FUNDACIÓ EURECAT (“EURECAT”)

Tax ID number: G66210345

Address: Parc Tecnològic del Vallès. Avinguda Universitat Autònoma, 23 08290 Cerdanyola del Vallès

Email address: legal@eurecat.org

Telephone: +34 93 238 14 00

Data protection delegate contact: dpo@eurecat.org

13.2. FOR WHAT PURPOSE WILL BE PROCESSED YOUR PERSONAL DATA?

Your personal data received through the contact form will be processed for the purpose of managing your query or request. However, the data collected as the result of the cookies installation, will be used for collecting statistical information on the browsing of users and improve the website based on their browsing habits. You may consult further information about the cookies purposes and its data treatment at the Cookies Policy.

On our website, there may be several forms that collects your personal data for specific purposes. In those cases, you will be previously informed about the specific data treatment information to each case, and your specific consent shall be sought.

13.3. IS IT MANDATORY TO PROVIDE ALL THE INFORMATION REQUESTED IN THE FORMS ON THE WEBSITE?

The user must complete the fields marked as “required”. Failure to complete the required personal information or to partially do so may mean that Fundació Eurecat cannot meet your requests and, consequently, Fundació Eurecat will be exempt from any liability for the non-provision or incomplete provision of the requested services.

The personal data provided by the User to Fundació Eurecat must be up to date so that the information in our records is current and without errors. The user will be liable for the veracity of the data provided.

13.4. HOW LONG WILL YOUR PERSONAL DATA BE RETAINED FOR?

The personal data obtained, will be kept for the duration of the purposes for which it was collected for and its erasure is not requested, and consent is not revoked. The personal data, also, will be kept, in any case, during the legal term applicable.

13.5. WHAT IS THE LAWFUL BASIS FOR US TO PROCESS YOUR PERSONAL DATA?

The lawful basis for the processing of your data is the consent provided through acceptance of the data processing clause.

13.6. WHAT RECIPIENTS WILL YOUR DATA BE SHARED WITH?

The Personal data received through the forms of the website may be shared with members of the project for the exclusive purpose of managing your query or request and be able to send you the latest news about the project through periodic newsletters. You may consult the list of members [here](#).

The personal data may be shared to third-parties whose develop services to the Data Controller, those ones who has access to the personal data will not treat the personal data for their own or different purposes and they will not sold or rent them.

The personal data will not be passed on to any other third-parties, unless there is a legal obligation to do so.



13.7. WHAT ARE YOUR RIGHTS REGARDING YOUR PERSONAL DATA?

The user may exercise their right to access their personal data, to request the rectification of inaccurate data and, where applicable, to request the data to be erased if it is no longer necessary for the purposes for which it was collected. The user may also exercise their right to data portability and to the restriction of or opposition to the processing of their data, in certain circumstances and for reasons related to their specific situation.

The user also has the right to revoke their consent at any time, without any retroactive effect on the processing of their personal data carried out until that point.

The user may exercise the aforementioned rights, under the terms provided for in current legislation, at the registered office of Fundació Eurecat or request to do so by sending an email to legal@eurecat.org.

Should the user not receive a satisfactory response, and should they wish to make a complaint or obtain more information on any of these rights, they may contact the Spanish Data Protection Agency (www.agpd.es - C/ Jorge Juan, 6, Madrid).

13.8. AUTOMATED DECISIONS

The personal data shall not be submitted to automated decisions.

The personal data may be processed to create profiles according to the cookies that has been consented to installed by the user.

13.9. INTERNATIONAL DATA TRANSFERS

The personal data shall not be submitted to international transfers out of the European Union. However, the Data Controller may have several suppliers that develop services out of the UE, in those cases, Fundació Eurecat shall assure that the personal data shall be treated with the legal requirements through agreement that may include standard contractual clauses or privacy certification.

13.10. WHAT SECURITY MEASURES HAS THE INSTITUTION IMPLEMENTED?

Fundació Eurecat declares that it has implemented the necessary technical and organisational security measures that guarantee the security of the User's personal data and avoid its alteration, loss, processing and/or unauthorised access considering the state of

technology, the nature of the stored data and the risks to which it is exposed, whether from human action or from the physical or natural environment, in accordance with the provisions of current regulations.

13.11. SOCIAL MEDIA

NEXOGENESIS, a project coordinated by IHE DELFT INSTITUTE FOR WATER EDUCATION (IHE) has a profile on Twitter and LinkedIn for publishing and disseminating information about the services provided through the website, interacting with users and acting as a customer service and social interaction channel.

The following are links to the privacy policies of the social networks on which NEXOGENESIS has an active profile:

Twitter: <https://twitter.com/en/privacy>



14. Appendix VI. PRIVACY INFORMATION CONTACT FORM

Pursuant to Regulation (EU) 2016/679, of 27 April 2016, on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and the relevant State regulations, FUNDACIÓ EURECAT, the controller, hereby provides the following basic information regarding data protection:

14.1. Controller:

FUNDACIÓ EURECAT

G66210345

Av. Universitat Autònoma, 23 – 08290 Cerdanyola del Vallès (Barcelona), Spain

legal@eurecat.org

Details of the data protection officer: dpo@eurecat.org

- **Purpose of the processing of your personal data:** Managing your request or queries
- **Legal Basis:** The basis for the processing is the specific consent granted by the data subject for this activity.
- **Recipients:** The data will be disclosed to the partners involved in the NEXOGENESIS project; you may consult them at: [IHE website, “Partners” section](#)
- **Rights:** You may access, rectify or erase the data and exercise your right to restriction of the processing and portability of the data by contacting the controller at its address or the email address legal@eurecat.org.
- **Storage:** The data will be stored for the term required to render the data treatment purpose

FUNDACIÓN EURECAT hereby informs you that it meets all the requirements stipulated by the data protection regulations and has in place all the technical and organisational measures to ensure the security of personal data. Moreover, in the event of any breach by the controller in the processing of your personal data, you are entitled to file a claim with the Spanish Data Protection Agency.