



## D8.2 – Data Management Plan - Initial

WP8 - Task 8.1  
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## Disclaimer

RAWCLIC is an EU funded project, developing knowledge on the future raw materials demand, supply and associated environmental impacts induced by the twin transition in the EU, and to support fact-based industry- and policy- decision-making enabling this transition.

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### Document change log

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V0.4	12.05.2025	Daria BARSUK (LGI)	Inventory table data completed; key deliverables and milestones table added on p.9; publication & dissemination trackers links added, p. 15	All partners
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## Summary

The deliverable D8.2 presents the initial version of the RAWCLIC Data Management Plan (DMP). It describes the guiding principles for data management and gives an overview of what data will be gathered and processed in the project, according to EC Fair Data Management principle, making data findable, accessible, interoperable and reusable. The document follows the model, provided by the EC <sup>1</sup>.

The purpose of the DMP is to contribute to good data handling through i) indicating which research and other satellite data the project expects to generate and ii) describing which parts of the data may be shared with the public. Furthermore, it gives instructions on naming conventions, metadata structure, storing of the research data and how to make public data available.

This deliverable will be regularly updated during the project life (D8.3 and D8.4).

## Keywords

RAWCLIC, data management plan, open data, research data, data repository, data storage, Zenodo, FAIR data

## Abbreviations and acronyms

Acronym	Description
CA	Consortium Agreement
DoA	Description of Action
DMP	Data Management Plan
EC	European Commission
GA	Grant Agreement
GeA	General Assembly
HE	Horizon Europe funding programme
IPR	Intellectual Property Rights
PMO	Project Management Office
PQP	Project Quality Plan
RM	Raw Material(s)
WP	Work Package
WPL	Work Package Leader

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<sup>1</sup> [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/temp-form/report/data-management-plan\\_he\\_en.docx](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/temp-form/report/data-management-plan_he_en.docx)

Term	Description
Gold Open Access	Gold Open access publishing means that an article is immediately provided in open access mode on the publisher or journal's website. Some publishers charge Article Processing Charges (APCs) to make articles open
Green Open Access	Self-archiving (green open access) means that a published article or the final peer-reviewed manuscript is archived (deposited) in an online repository before, alongside or after its publication. In some cases, the author can choose to delay access to the article (embargo period), however, HE rules require the publication be available in online repository at the same time as article's peer-reviewed publication. <sup>2</sup>
Personal Data	Personal data is any information that relates to an identified or identifiable living individual. Different pieces of information, which collected together can lead to the identification of a particular person, also constitute personal data. Personal data that has been de-identified, encrypted or pseudonymised but can be used to re-identify a person remains personal data and falls within the scope of the law. Personal data that has been rendered anonymous in such a way that the individual is not or no longer identifiable is no longer considered personal data. For data to be truly anonymised, the anonymisation must be irreversible
Zenodo	Zenodo is a catch-all research data repository that enables researchers, scientists, EU projects and institutions to share research results, make research results citable, and search and reuse open research results from other projects. Zenodo is harvested by the OpenAIRE portal and hosted by the CERN cloud infrastructure

<sup>2</sup> Fact Sheet Open Access to scientific publications and research data: <https://www.horizon-europe.gov.fr/sites/default/files/2021-07/h2020---ipr-helpdesk---open-access-3953.pdf>

# 1 Introduction

## 1.1 Objectives and scope of the document

This deliverable describes the data management life cycle for the data to be collected, processed and/or generated by the RAWCLIC project, as a Horizon Europe project. The DMP aims at defining the management strategy of data generated during the project with the purpose of making research data findable, accessible, interoperable and reusable (FAIR). The DMP addresses the following points:

- the handling of research data during and after the end of the project,
- what data will be collected, processed and/or generated,
- which methodology and standards will be applied,
- whether data will be shared/made open access, and
- how data will be curated and preserved (including after the end of the project).

## 1.2 Versioning

According to the EU’s guidelines on the DMP, this document will be updated during the project lifetime. The minimum requirement is that the DMP be updated for each periodic evaluation of the project. The DMP is intended to be a living document in which information can be made available progressively as the project advances. DMPs should, therefore, have a clear version number and include a change log table with modifications summary.

## 1.3 Structure of the deliverable

The document is structured following the guideline of Horizon Europe program on FAIR Data Management including the following information:

- Summary of the collected/generated data required to meet project objectives
- Data Management Policy: FAIR Data
- Data Security and dedicated Platforms
- Ethical aspects
- Resource allocation
- Conclusions

# 2 Data Summary

The RAWCLIC project main objectives are directly linked to develop knowledge on the future Raw Materials (RM) demand, supply and associated environmental impacts of the EU’s twin transition, supporting evidence-based industry and policy decisions. The main objectives, for which the dominant part of data is collected, generated or re-used within each WP (see category “Research and Scientific Data” in Table 1) are:

1. To harmonize modelling activities across WP2-6

2. To quantify the demand of materials and technologies required for the twin transition, considering key technologies for energy and digitalisation and their respective RMs needs
3. To develop a comprehensive understanding of the factors affecting future supply of primary and secondary RMs within EU/globally, in order to support the provision of short-, mid- and long-term projections of this supply as response to the twin transition in the EU
4. To assess the environmental impacts of current and future RMs supply, incl. LCA-based impacts and spatially explicit assessment of land use, water consumption and waste generation
5. To integrate the outcomes above to support EU-policy and industrial decision-making building on the RAWCLIC findings
6. To perform efficient communication, dissemination, exploitation, stakeholder engagement and management of the project.

Meeting these objectives requires the cooperative work of about 100 researchers from 17 partnering institutions across Europe and beyond. Each partner will collect or generate specific data related to their tasks as per the GA. This first version of the DMP is the result of the early-stage data inventory by the RAWCLIC partners. During the course of the Action, we have to correct the information given below so that it better reflects the real state of generated research and scientific data, produced by each partner, as well as data produced as a result of other support activities such as project management and dissemination. Some preliminary data summary is provided in Table 1 below.

It contains responses to the following questions, addressed by all partners and coordinated by each WPL:

- What is the purpose of the generated/collected data
- What types and formats of data will the project generate/collect
- Whether any existing data will be reused and what will be reused
- What is the origin/provenance of the data
- What is the expected size of the data that the project intends to generate or re-use
- What is the origin/provenance of the data
- What is the data utility - to whom might your data be useful outside the project

For readers seeking to deepen their understanding of the purpose and requirements of the Data Management Plan, up to date information and guidelines to better understand how to properly address the points above could be found through organisations such as [Research Data Alliance](https://www.rd-alliance.org/)<sup>3</sup> and [OpenAIRE](https://guidelines.openaire.eu/en/latest/)<sup>4</sup>. These platforms offer up-to-date tools, frameworks and community-driven best practices. While the Digital Curation Centre<sup>5</sup> (DCC) remains a valuable resource.

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<sup>3</sup> <https://www.rd-alliance.org/>

<sup>4</sup> <https://guidelines.openaire.eu/en/latest/>

<sup>5</sup> <https://www.dcc.ac.uk/guidance>

Data category	Data Purpose	Data Origin	Data Flow between WPs	Data Types	Data Formats	Existing data or data sets to be used or re-used	Estimated Data Size (project intends to generate or re-use)	Data Usability - to whom can your data be useful outside the project?	Long term storage of data is insured how?	Comments/Relevant Key Deliverable or Milestone	
Research & Scientific data	In WP1 (Harmonization of modelling activities) main data contributors are: Partner 1: BRGM: description of concepts, methods, models and procedures, implemented across WP2-6, in order to ensure their harmonization. Partner 2 UGENT (data on structured scenario narratives; comparative tables; categorised assumptions and drivers such as socio-economic trends, technological pathways, and policy directions; annotated literature review content; summary indicators or qualitative parameters, and synthesised storyline variants) <b>Collected data will be used for the development of specific demand and supply scenarios in WP2-6</b>	BRGM: - codelist repository initially building from the Horizon Europe project FutuRAM codelist, and expanding it through knowledge and expertise of RAWCLIC partners; - description of methods and models building from WP2-6 - data compiled from scientific literature for the selection of 5 additional Raw Materials, considering dedicated indicators UGENT: Public data and analyses from grey literature (IEA OWA 2024, global critical minerals 2024, IPCC AR6 2022, JRC Foresight study 2023), and peer-reviewed literature of scenarios or methodologies related to predictions of how the world will look in the coming decades UGENT: Data is expected to be collected from public reports, scientific articles, as well as IEA and JRC. Moreover, specific data will be collected from partners (companies experts in the sector, research partners involved in the WP such as BRGM regarding wind mills) and from people included in the ISG. Industrial partner ENGIE will provide data on - type of parts/components in the sub-technology that need replacement before EoL, total number of parts/components, required replacement of parts/components in terms units, mass, etc., per year, lifespan, performance characteristics for certain renewable technologies such as solar PERC/TopCON, wind technologies, NMC batteries, etc. Data shared are based on the internal ENGIE expertise and cover only non-confidential data.	RAWCLIC codelist repository to be used across WP2-6, building on expertise and developments from these WPs. List of 5 RMs to be considered in WP2-6. The harmonised narratives will be used for the development of demand and supply scenarios in WP2-6	BRGM: codelist repository; description of harmonized scope (raw materials, geographical, temporal coverage), methods and models; UGENT: analyses and derived data combining different data sources	BRGM: codelist repository initially building from the Horizon Europe project FutuRAM Codelist UGENT: Public data and analyses from grey literature (IEA OWA 2024, global critical minerals 2024, IPCC AR6 2022, JRC Foresight study 2023), and peer-reviewed literature of scenarios or methodologies related to predictions of how the world will look in the coming decades	BRGM: .xlsx, .ppt, .docx, .pdf, .pptx UGENT: .xlsx, .docx, .pdf, .ppt, .docx	100 MB < Data size < 500 MB	EU Institutions & Regulators Specialized public: Research peers, IPCC and academic community	BRGM: Data developed by the BRGM will be stored in a dedicated TEAMS folder, shared with BRGM team members. This TEAMS folder is secured by the BRGM IT department and Microsoft. Access rights to the TEAMS folder are controlled by the BRGM project manager, whose computer is backed up in real time on the One Drive/TH. The data will be stored in the Val-de-Loire DataCenter, certified by the Ministry of Higher Education and Research. BRGM is the technical operator of this data center. The data is distributed between two independent rooms to ensure redundancy. They have a 2-year backup history. The lead is distributed to allow, in the event of major problems, services hosted in production (and benefiting from the high availability option) to generate optimally on a single data center. Disaster recovery procedures are developed to plan the restart of equipment and applications.	UGENT: Report on harmonized narratives in scenario D01.2, month 24	
	In WP2 (Future demand of RMs) main data contributors are: Partner UGENT: Data collected will be used for the research of the digitalization demand scenarios as well as to estimate the material intensity regarding to the technologies included in the energy and digital transition. Partner PIK: data on aggregated energy demands corresponding to RAWCLIC scenarios; data on energy demand trends and techno-economic parameters of energy technologies) <b>Collected data will be used for the development of demand scenarios for energy and digital transition, as well as to estimate the RMs intensity demand for different technologies in the twin transition until 2070.</b>	UGENT: Public data and analyses from grey literature (IEA OWA 2024, global critical minerals 2024, IPCC AR6 2022, JRC Foresight study 2023), and peer-reviewed literature of scenarios or methodologies related to predictions of how the world will look in the coming decades UGENT: Data is expected to be collected from public reports, scientific articles, as well as IEA and JRC. Moreover, specific data will be collected from partners (companies experts in the sector, research partners involved in the WP such as BRGM regarding wind mills) and from people included in the ISG. Industrial partner ENGIE will provide data on - type of parts/components in the sub-technology that need replacement before EoL, total number of parts/components, required replacement of parts/components in terms units, mass, etc., per year, lifespan, performance characteristics for certain renewable technologies such as solar PERC/TopCON, wind technologies, NMC batteries, etc. Data shared are based on the internal ENGIE expertise and cover only non-confidential data.	The narratives defined in WP1 will be the basis for the scenarios developed in WP2. Additionally, WP2 will exchange information with WP3 regarding to the stocks of RMs in technologies. Then, WP3 will provide information to WPS to develop a roadmap for the twin transition	UGENT: Model output data PIK: model output data (tabular, and comparison plots)	UGENT: JRC foresight report and IEA reports. Scientific publications for technical parameters for the model developed. PIK: Public data, peer-reviewed as well as grey literature for techno-economic parameters; data from IEA and IRENA for historic energy trends and near-term ranges	UGENT: .csv, .pdf, .docx PIK: .csv, .pdf	100 MB < Data size < 500 MB	EU Institutions & Regulators Specialized public: Research peers, IPCC and academic community	UGENT: Collected public data, report and publication will be saved at local server from Ghent University and Zenodo. GTG: Collected public data and publications will be saved at Zenodo and additionally to EC server as a data product or publication. Interview data will be stored to Zenodo.	H57, M18 D2.1, M36 D2.2, M38 D2.3, M39 D2.4, M42 D2.5, M42	
	In WP3 (Secondary RMs supply) main data contributors are: Partner 1 EMPA Data collected will be used to quantify waste flows from society and their detailed composition (hierarchical composition) Partner 2 VITO Data collection will be used to map the existing recovery processes and facilities in Europe	EMPA: Data is expected to be collected from public reports, scientific articles, as well as related EU projects as FUTURAM. Moreover, specific data will be collected from partners (companies experts in the sector). VITO: Data is expected to be collected from scientific and public reports, public or commercial databases, company websites.	WP2: Demand data (technology & material) feeds into Task 3.1. WP4 Storage linkage identified between T4.3 and T3.2. Importance of mapping primary vs secondary refining integration. Secondary material supply informs the demand for primary materials. WPS: Information T3.2 feeds into WPS. WP6: T3.3 provides insights in the RM availability for the Energy transition modeled in WP6.	EMPA: Model output data and derived data from different datasources	EMPA: Composition data for relevant EU projects. Scientific publications for technical parameters for the model developed.	EMPA: .xlsx, .pdf, .lybn, .docx	100 MB < Data size < 500 MB	EU Institutions & Regulators Specialized public: Research peers, IPCC and academic community	LGI: once the project is finished - the content of the Teams collaborative space of the RAWCLIC remains available 1 year after the end of the project, then it is archived on a local server in Paris (except personal data which are destroyed) replicated on another site geographically, without time limit. PIK: Collected data will be stored and backed up on PSI servers and additionally on github and dropbox cloud storage spaces.	D1.1 D1.3	
	In WP4 (Primary RMs supply) main data contributors are: Partner GTK (data on mining, exploration and mineral deposits, emerging technologies, interviews) Partner BRGM (data on mineral waste, emerging technologies, interviews) Partner INTRAW (data on EU policy, geopolitics, market dynamics) Partner MUL (data on social acceptance, interviews) Partner PIK (data on risk assessment on climate change impacts) <b>Collected data will be used for studying different aspects regarding future production of primary raw materials.</b>	GTG: Public data and analysis from internet sources (government data, company data etc., research publications); non-public data from S&P Global IQ Pro will be used for analysis, but not published. Data will be also collected via interviews and workshops. BRGM: Public data from scientific literature and databases (e.g. CDOL, BRGM experts involved in the project, and possibly licensed data (e.g. S&P Global, Project Blue etc.) INTRAW: Data will be collected from public sources only MUL: Public data will be collected from scientific literature, policy documents, regulations international reports (e.g. UN, EU) and governmental and non-governmental websites. Datasets will also be derived from academic publications, public databases and literature including NGO reports and news media sources. Additionally, qualitative data will be collected through interviews. WU: Data on the location of mines and its production capacities will be collected from publicly accessible company reports, and possibly licensed data (S&P Global). PIK: Public data from ISMP and CMP projects	All work in WP4 will feed in To.1. Foresight for primary and secondary RMs supply. In addition T4.1 provides data on current primary RMs supply as a MS (M18) for the climate change risk assessment (T4.5), and for LCI in T5.2. T4.2 builds on policies identified and scenarios developed (EU and global levels) in T1.2. T4.3, will do close collaboration with WPS in regard to analysis and refining value-chain steps. T4.5 combines georeferenced information of current and future mining activity from T4.1, with information about mine-specific land use and water consumption from T5.1.	GTG: analysis and derived data combining different data sources MUL: survey data, interview transcripts, policy and legal document elements PIK: analysis and derived data combining multiple sources	GTG: Public data from internet sources (government data, company data etc., research publications); non-public data from S&P Global IQ Pro will be used for analysis, but not published. MUL: Public data from policy and legal documents, international reports, survey databases (e.g. Eurobarometer) and academic publications related to social acceptance of primary RMs production. Peer-reviewed articles and deliverables from previous EU projects (e.g. Horizon 2020 projects such as MIREU) will also be re-used. Relevant insights and datasets provided by project partners will be utilized where appropriate. WU: published data sets (e.g. mine-level production data) produced in previous projects	GTG: .xlsx, .docx, .pdf, .ppt etc. MUL: .xlsx, .docx, .ppt WU: .csv, .jpg, .tif, .json	100 MB < Data size < 500 MB	EU Institutions & Regulators Specialized public: Research peers & Students	EMPA: Collected public data, report and publication will be saved at local server at IEA and Zenodo. ENGIE: Once the project is finished, it will be archived on a local server of ENGIE without time limit.	D.4.1 - 4.5 MS 8	
	In WPS (Environmental impacts of current and future primary and secondary RMs supply) main data contributors are: Partner ULEI: future-oriented life cycle inventories datasets for primary RM supply and LCA-based environmental impacts for current and future RMs supply scenarios Partner EMPA: future-oriented life cycle inventories for secondary RM supply Partner BRGM: life cycle inventories for the current primary and secondary RM supply Partner WU: data on spatially-explicit land use, water consumption, and waste generation for primary RM supply Partner FSG: data on future background life cycle inventory databases <b>Collected data will be used to assess and compare the environmental impacts of current and future primary and secondary raw material supply chains through life cycle-based modeling and scenario analysis.</b>	ULEI: data required for modelling future-oriented life cycle inventories is expected to come from public reports, scientific literature, grey literature, data generated in WPs 3 and 4, and possibly licensed data (e.g., S&P database). Additional data required for the impact assessment will come from licensed databases (ecoinvent). WU: data on water use and waste generation by mine-site will be collected from publicly available company reports, and possibly licensed data (S&P Global). Data on mining land use will be generated based on satellite images (ESA Copernicus Programme/Sentinel).	WPS will use data from WP3 and WP4 regarding supply scenarios and technology information. LCA-based impact scores assessed in WPS can be used in WP6	ULEI: model output data and derived data from different data source	ULEI: public data, scientific literature, grey literature, licensed databases (e.g., S&P database) WU: published datasets (in particular, mining polygons) produced in previous projects	ULEI: .csv, .xlsx, .pdf, .ppt WU: .csv, .jpg, .json	100 MB < Data size < 500 MB	EU Institutions & Regulators Specialized public: Research peers, IPCC and academic community	MUL: All collected and processed data will be securely stored on institutional servers at Montanuniversität Leoben. Confidential or sensitive data (e.g. interview transcripts) will be stored in compliance with General Data Protection Regulation (GDPR). Trusted open-access repositories (e.g. Zenodo) will be used for scientific publications, datasets, in line with RAWCLIC data sharing policies/guidelines and permissions. INTRAW: N/A	MS5, MS9, DS.1-5.5	
	In WP6 (Integration of outcomes to support EU policy and industrial decisionmaking) main data contributors are: Partner 1 PIK (generated scenario data with integration of RM supply risks and environmental impacts) Partner 2 GTK (synthesized data on RM availability) <b>Collected data will be used for developing new energy transition scenarios with integration of RM supply risk and enabling decision-making support.</b>	PIK: Public data, peer-reviewed as well as grey literature for techno-economic parameters; data from IEA and IRENA for historic energy trends and near-term ranges; energy demand data from in-house model REMIND	Links to initial demand scenarios derived in WP2, RM supply as derived in WP3 & 4, associated environmental impacts in WPS	PIK: model output data (tabular, and comparison plots)	PIK: Public data, peer-reviewed as well as grey literature for techno-economic parameters; data from IEA and IRENA for historic energy trends and near-term ranges	PIK: .csv, .pdf	100 MB < Data size < 500 MB	EU Institutions & Regulators Specialized public: Research peers, IPCC and academic community Industrial Stakeholders	VITO: Data developed by VITO will be stored in a dedicated TEAMS folder, shared with VITO team members. This TEAMS folder is secured by the VITO IT department. Access rights to the TEAMS folder are controlled by the VITO project manager, whose computer is backed up in real time.	DS.1-6.3 MS12, MS13, MS14	
	For the WP7 (Communication, Dissemination, Exploitation and Stakeholders Engagement) see data category "Dissemination & Communication"		Data from all other technical WPs are feeding this WP7						ANGLO-AMERICAN: In the subsequent version VERKOR: in the subsequent version		
	For the WP8 (Project management and coordination) - all generated data is relevant to the MGMT & Legal data category below		N/A								
	Mgmt & Legal data	Some non-research data will be generated or reused to support the management and monitoring activities of the project	Data (templates) originates from the a) EU templates and guidelines b) Earlier company projects and dissemination of best practices and gained expertise (only relevant to generic, RAWCLIC non-specific data)		Consortium contacts, Monitoring and reporting files, Surveys, MS Office Templates	*.xlsx, *.doc, *.pdf, etc. Cryptographic data, such as signatures, proof requests, etc	Several procedural documentation templates, including legal, management files (CA, Deliverables) describing standard practices and legislation will be re-used in part and adapted to this project	100 MB < Data size < 500 MB	EU/MS governments, policy makers and institutions EU institutions & Regulators		
		For the WP7 (Communication, Dissemination, Exploitation and Stakeholders Engagement) main data contributors are: - LGI - All partners Data will be generated to support communication and dissemination of the project results and objectives	LGI: Photos, progress reports, project's events, stock images			LGI: Partners' logos and promotional images/tables, Web digital content, hard copies	*.xlsx, *.doc, *.pdf, *.ppt, etc. visual/image formats, *.png, *.jpg etc. *.json	LGI: No data from previous work will be used or re-used for the communication or dissemination purposes of this project	1 GB max	EU Institutions & Regulators General public Specialized public: Research peers & Students	
Personal Data	The project is gathering personal data such as email addresses through the newsletter or for the management and coordination purposes of the project. *The website does not use cookies **The project does not organize recruitment campaigns and does not generate or store candidates data During the interview/activity observations, WPS will gather information such as surname, first name, institution and career details.	Subscribers contacts Collaborators contacts Attendees contacts (in case of external events) Interviews		Email address/Names Partner Entity Role in the project Interview transcripts, Audio-video recordings	*.xlsx, *.doc, *.pdf, *.mp4, *.mov, *.wav, *.json etc.	No data from previous work will be used or re-used	Data size < 1.5 GB	By default any personal data will not be used outside the project. In case any part of personal data is to be used publicly, it will either be anonymized or a prior usage rights authorization will be obtained from any concerned private body. Collected data is GDPR compliant (see Section 5.2 of the DMP)	Personal data (except data required for auditing) is destroyed after the project end.		

Table 1: Data inventory

Table link: [DMP Data Inventory Table.xlsx](#)

\* file accessible to the project collaborators via SharePoint. Access to the EU body representatives can be provided upon request

As one may see from the table above, in particular the following project deliverables and milestones are relevant for this DMP:

WP/Task	DEL/MS	Description	Lead Partner
1	D1.2	Report on harmonized narratives in scenarios (M24)	UGENT
2	MS7	First draft of the base scenario with selection of 5 additional RMs to keep in scope in stage 2 (M18)	UGENT
2	D2.1	Report on the energy demand scenarios and technology demand scenarios (M36)	PIK
2	D2.2	Report on the digitization demand scenarios (M30)	UGENT
2	D2.3	Report on digitization technology demand scenarios (M38)	UGENT
2	D2.4	Report on material demand scenarios for EDS (M42)	UGENT
2	D2.5	Report on material demand scenarios for DDS (M42)	UGENT
4	D4.1	Mine-production related bottlenecks, barriers, and risks (M24)	GTK
4	D4.2	Policy, geopolitical, and economic dynamics affecting primary supply (M36)	INTRAW
4	D4.3*	Data for technological challenges and opportunities for primary RM supply (M36)	GTK
4	D4.4	Global assessment and future projections for social acceptance (M42)	MUL
4	D4.5	Report on climate change impacts on mining (M42)	WU
4	MS8	Data of the current primary supply to T5.2. and T4.5 (M18)	GTK
5	MS5	Preliminary LCI datasets for current RMs Supply (M14)	BRGM
5	MS9	Preliminary set of spatially-explicit factors for integration into T5.2 (M20)	LUT
5	D5.1*	Land, water and waste intensity factors per RM (M24)	WU
5	D5.2*	LCI datasets for current supply (M24)	BRGM
5	D5.3*	LCI datasets for future supplies (M38)	ULEI
5	D5.4*	Background LCI databases (M30)	PSI
5	D5.5*	LCA – based impact assessment results (M44)	ULEI
6	D6.1	Primary and secondary RMs supply for the twin transition (M42)	GTK
6	D6.2	Report on improved energy decarbonization pathways (M44)	PIK
6	D6.3	Report on a roadmap to the EU twin transition (M48)	BRGM
6	MS12	Model development to represent for risks related to RM supply (M30)	PIK
6	MS13	Data of the global future supply projections (M33)	GTK
6	MS14	Data of the European future supply productions (M36)	GTK

*\*The deliverables are Data including Datasets*

### 3 Data Management Policy: FAIR Data

RAWCLIC general data management policy that is presented in the subsequent chapters has been developed in accordance with Horizon Europe FAIR principles (Findable, Accessible, Interoperable and Reusable), open data requirements and implementation guidelines. It applies mainly to new results that are produced in RAWCLIC and that are to be made available by the project consortium as open source, open science and open data.

### 3.1 Making data findable

This section will provide insight into how RAWCLIC intends to make it easier to find data collected or produced by the consortium. The way to proceed in order to achieve this goal is to describe properly the content of the data sets using appropriate tools, regulations and standards as described hereafter. In collaboration with WP7, efforts have also been made to establish a common citation rule, ensuring that RAWCLIC reports are cited in a standardized format. This harmonized approach contributes to enhancing the findability of our data.

#### DIGITAL OBJECT IDENTIFIER (DOI)

All open data and closed data, publications, and open-source software generated within the RAWCLIC project will be identifiable through persistent Uniform Resource Locators (URLs). Whenever possible, these results will also be assigned a Digital Object Identifier (DOI) to ensure they are easily and uniquely citable.

For open results stored in the default Open Access repository (Zenodo, as described below), a DOI will be automatically generated, along with the added benefit of Zenodo’s DOI versioning capabilities.

Open results deposited in institutional repositories, publisher repositories, or other data and research archives will, at a minimum, have persistent URLs for identification. If the hosting institution collaborates with a DOI registration agency, a DOI will also be assigned.

The assignment of unique identifiers such as DOI, Publisher Item Identifier (PII), or International Standard Serial Number (ISSN) to scientific publications will depend on the open access approach (green or gold) selected by the authors. It will also vary based on the policies of the chosen scientific publisher and research repository.

#### METADATA

In order to keep data findable, it is necessary to provide its metadata. Metadata is a systematic data on the research data themselves. Author, date created, date modified, file size, number of rows and columns and their headers, validation rules (in case of a spreadsheet) are examples of very basic document metadata.

*Rawclie Data Management Plan, April 15<sup>th</sup> 2025, modified on 15th May 2025, format .docx, 250 MB.*

Metadata enables other researchers to find data in an online repository and is, as such, essential for the reusability of the dataset. By adding rich and detailed metadata, other researchers, can better determine whether the dataset is relevant and useful for their own research. Metadata will be uploaded in a standardized form. This metadata will be kept separate from the original raw research data. Further information is available in the Zenodo section below.

The following deposition metadata fields are mandatory for RAWCLIC project:

- the terms “European Union (EU)” and “Horizon Europe (HE)”;
- the name of the action, acronym and grant number;
- the title and description of the deposition metadata,
- the upload type (publication, dataset, software, ...),
- the publication date (ISO8601 format, YYYY-MM-DD), and length of embargo period if applicable;
- the creators/authors of the deposition,

- the persistent identifier (DOI),
- keywords.

## ZENODO

The RAWCLIC project will store its open data in Zenodo, an open-access online repository designed for research data: <https://zenodo.org/communities/rawclie>

The repository is managed centrally by LGI and Project's Coordinator, however, in specific cases of complex datasets, data owners will be invited to directly upload their documents to the RAWCLIC community in Zenodo. A dedicated memo is available for collaborators in WP7 of the Teams/SharePoint and via this internal [link](#) (access can be provided upon request).

The memo outlines the procedure for uploading scientific publications, public deliverables and datasets to Zenodo. Contributors are required to submit their outputs to both the RAWCLIC Community and the European Commission Funded Research (OpenAIRE) Community. The memo provides step-by-step guidance on account setup, metadata entry, file upload, community tagging, and licensing. Uploads should be completed promptly, ideally at the time of publication, with data controllers responsible for submitting datasets.

Zenodo's structure, features, and management adhere to FAIR data principles. As a service provided by OpenAIRE and hosted by CERN, Zenodo allows researchers to deposit both publications and datasets, offering tools to connect them using persistent identifiers and enabling proper data citation.

Zenodo is specifically designed to support the core principles of FAIR—making data findable, accessible, reusable, and interoperable—which are essential for Open Research Data (ORD) projects. It is a versatile repository that accommodates researchers, scientists, EU-funded initiatives, and institutions by offering the following benefits:

- Facilitating the sharing of research outputs in various formats, including text, spreadsheets, audio, video, and images, across all scientific disciplines.
- Enhancing visibility and recognition of research by making outputs citable and seamlessly integrating them into reporting systems for funding bodies such as the European Commission.
- Enabling easy access to and reuse of shared datasets.
- Automatically generating Digital Object Identifiers (DOIs) for all deposits.
- Connecting research outputs to the OpenAIRE portal for broader accessibility and integration.

Zenodo serves as a comprehensive platform to ensure RAWCLIC research data is well-managed, accessible, and aligned with open science principles.

## SEARCH KEYWORDS

Zenodo allows to perform simple and advanced search queries using the keywords. Zenodo also provides a user guide with easy to understand examples. In addition, the consortium will define a set of general keywords that should apply to corresponding public datasets, scientific publications and public deliverables. Example of such key words:

RAWCLIC, raw materials, environmental impacts, twins transition, industry, stakeholders, demand, supply, science

## OTHER REPOSITORIES

Examples of other repositories that will be used to make data openly available include: <https://hal.archives-ouvertes.fr>, <https://brgm.hal.science/>, [Recherche Data Gouv.](#)

### NAMING CONVENTIONS

Files and folders at data repositories will be versioned and structured by using a name convention as follows: FileType\_RAWCLIC[name of the document]\_Vxy. File Extension.

### VERSION NUMBERS

Individual file names and datasets will contain version numbers that will be incremented at each revision (Vxyz). For publications, versioning is in general not necessary.

Zenodo provides DOI versioning of all datasets uploaded to their communities, which allows us to edit and update the uploaded datasets after they have been published. This also allows us to cite specific versions of an upload and cite all versions of an upload.

## 3.2 Making data openly accessible

In order to maximise the impact of RAWCLIC research data, the results are shared within and beyond the consortium. Selected data and results will be shared with the scientific community and other stakeholders through publications in scientific journals and presentations at conferences, as well as through open access data repositories.

Moreover, in RAWCLIC, we have strived to make as many deliverables public as possible: 32 out of 37 deliverables will be open for public access.

The RAWCLIC project datasets are first stored and organized in a database by the data owners (personal computer, or on the institutional secure server) and on the project's SharePoint Repository and Project's website. All data are made available for verification and re-use, unless the task leader can justify why data cannot be made openly accessible. To protect the copyright of the project knowledge, Creative Commons license will be used when needed.

The RAWCLIC public datasets and deliverables<sup>6</sup> (data access policy unrestricted) will be accessible by:

- OpenAIRE, provided the data is deposited in repositories that communicate with it.
- Zenodo and its national homologues (as mentioned in the previous section) for ORDP data and datasets. The Zenodo repository will be accessible through the RAWCLIC project's official website: <https://www.rawclie.eu>
- Open access journals, for publications related to the project.

All data deposited on Zenodo are accessible without restriction to the public.

Exceptions are the following:

- Copyright and permissions for re-using third-party datasets
- Processing and combining input data from many different sources may lead to unclear IPR situations regarding the generated output data, therefore such repurposed data (e.g. model output data) can only be made open if any of the underlying data (e.g. model input data) is open, too.
- For this: potential users must contact RAWCLIC representatives or the data owner in order to gain access. If necessary, appropriate procedure (such as non-disclosure agreement - NDA) will be used.
- Personal data treatment and confidentiality issues.

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<sup>6</sup> Public datasets themselves will not be hosted directly on the project website but deliverables will be accessible, via Zenodo link.

- Datasets referring to the quality and quantity of certain elements at risk, such as people and critical infrastructures, are not open by default as their publication may pose privacy, ethical or security risks.
- Data-driven business models.
- Data that will be exploited commercially will not be made open.

### 3.2.1 Data Accessibility

RAWCLIC open results will be made accessible according to the Rules on Open Access to Scientific Publications and Open Access to Research Data in Horizon Europe.

**OPEN DATA:** All open results of the project—including data, software, and public documents—will be made openly accessible via an appropriate Open Access repository (e.g., Zenodo) as early as possible. Research data necessary to validate the findings presented in scientific publications will be deposited in a data repository concurrently with the corresponding publication. Non-public research data will be archived in the repository using restricted access settings when appropriate. This approach follows the principles outlined in the European Commission's Guidelines on FAIR Data Management in Horizon 2020 promoting transparency, reproducibility, and reusability of research outputs. The dedicated Zenodo-hosted RAWCLIC community is managed by the coordinator with the support of the Project Management Office (PMO). Each Partner is responsible for sending their respective files (publications, datasets, workshop materials, etc.) for which they are the primary authors or data owners.

**SCIENTIFIC PUBLICATIONS:** a dedicated memo on open science requirements is made available to the RAWCLIC partners in the WP7 Communication, dissemination and exploitation internal repository folder. The document summarizes the key obligations related to open access publishing, outlines the practical steps for ensuring compliance with Horizon Europe guidelines, and provides resources for selecting appropriate repositories and journals.

### 3.2.2 Provision of access for restricted data

Where a restriction on open access to research data is necessary, attempts will be made to make data available under controlled conditions to other individual researchers. In the case where restricted or embargoed data is stored in the Zenodo repository (under “restricted access” rights), information about the restricted data will be published in the repository, and details of when the data will become available will be included in the metadata. According to the Q&A session “Open Research Data in HE and Zenodo repository”, metadata for both open, closed, embargoed and restricted records are always publicly available in Zenodo. Data files and data sets for restricted access records are only visible to their owners and to those the owner grants access. Restricted access allows researchers to upload a dataset and provide the conditions under which they grant access to the data. Potential end-users wishing to request access must provide a justification for how they fulfil these conditions. The owner of the dataset gets notified for each new request and can decide to either accept or reject the request. If the request is accepted, the requester receives a secret link which usually expires within a defined period of time.

## 3.3 Making data interoperable

Partners will take into consideration the OpenAIRE guidelines for online data interoperability: <https://guidelines.openaire.eu/en/latest/> and apply metadata standards as outlined in the

[Metadata Standards Directory](#) (Engineering, Physical Sciences & Mathematics, and General Research Data categories) guidelines.

In practice, this means that metadata associated with datasets will follow established schemas (such as Dublin Core or DataCite), enabling seamless integration into OpenAIRE and other aggregators, and ensuring the data can be discovered, accessed, and reused across platforms.

RAWCLIC project members will be using standardized vocabularies for all data types. No datasets requiring the development of novel or domain-specific interoperability standards have been generated in the project to date. All datasets are expected to align with commonly used ontologies, facilitating ease of reuse and integration into existing knowledge graphs or domain-specific repositories.

### 3.4 Increase data re-use

This section outlines the foreseen licensing practices that support compliance with FAIR principles, and archival policies that will guide the responsible sharing and preservation of project data, balancing open access with necessary restrictions on protected datasets.

#### LICENSING

Where possible, RAWCLIC data will be licenced following the guidelines provided by CESSDA Training ([Licensing your data](#)) and Creative Commons Licence (<https://creativecommons.org/choose/>) or (<http://ufal.github.io/public-license-selector/>) by integrating the appropriate abbreviation into the shared file. According to RAWCLIC Grant Agreement, data and software are owned by the beneficiary that generates them. Nevertheless, the owners of open results arising from the project are encouraged to release their work preferably under a Creative Commons Attribution 4.0 (CC-BY-4.0). For datasets deposited on a public data repository (i.e. Zenodo), the access is unlimited. Restrictions on re-use policy are applied for all protected data, whose re-use will be limited within the project partners.

#### LONGEVITY

Data necessary to validate the results presented in the publication will be archived in a FAIR-compliant repository (in our case Zenodo) and be linked to the publication. Raw data not directly relevant to the publication will be stored securely and made available upon justified request. Data associated with public deliverables will be shared once the deliverable has been approved and accepted by the EC. For other public datasets not directly linked to a scientific publication or deliverable, such datasets will be made available upon assessment by the Executive Committee that it is ready for publishing, and in the final months of the project at the latest. Open data can be reused in accordance with the Creative Commons licences. The public data will remain reusable via Zenodo for at least 20 years, according to Zenodo's general policies (<http://about.zenodo.org/policies/>). Data classified as confidential will by default not be reusable due to privacy concerns.

Since no research data has been published within the project to date, the specific question of its re-usability by third parties or usability period is not fully developed in the current version of the DMP document but will be integrated in the subsequent version of the document.

### 3.5 DMP Quality review

Quality evaluation and reporting processes are implemented throughout the entire project to assess both project outputs (data/products) and overall progress (refer to Deliverable D8.1 - Project Quality Plan). All deliverables undergo an internal peer review to ensure high-quality standards. Deliverable leaders must submit their deliverables to their WP leader and the coordinator for quality checks.

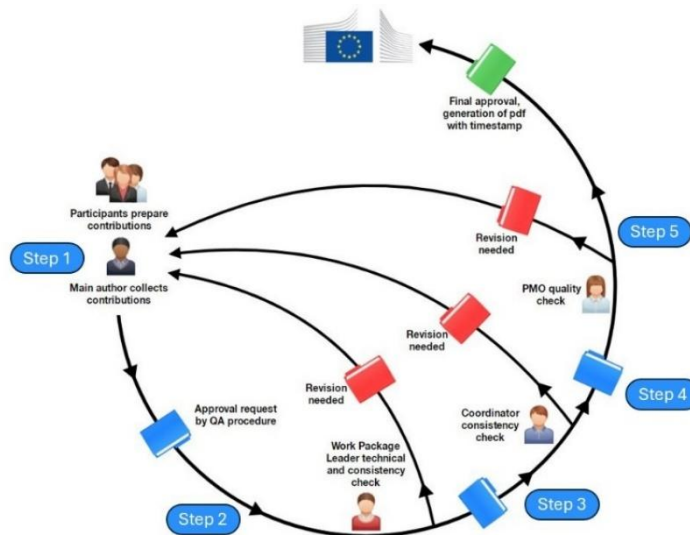


Figure 1 - Review process to ensure the quality of RAWCLIC deliverables

Project results and data will be continuously analysed and collected throughout the project duration. To support this, each partner will contribute to the updates of the Communication & Dissemination Plan (Deliverable D7.2), documenting articles, papers, and scientific publications. A dedicated folder in RAWCLIC Teams (WP7) will be used to record and track all research data and publications. WP leaders and publication authors are required to record their communication & dissemination activity via the dedicated submission forms: [publication tracker](#); [dissemination tracker](#). These forms enable the dedicated communication team to monitor progress, ensure consistency, and support effective reporting.

### 3.6 Management of other research outputs

Beyond data management, beneficiaries should plan for the management of additional research outputs generated or reused during their projects. These outputs may be mainly digital (e.g., software, workflows, protocols, models). In subsequent version of the RAWCLIC DMP, beneficiaries should evaluate which FAIR data principles apply to these outputs and provide detailed plans for their management, sharing, and reuse.

## 4 Data security and dedicated platforms

To increase data security, the following measures will be implemented:

- Generated data will be stored in a way resilient to the data carrier damage, loss or malfunctioning: on institutional servers of each partner and three online sites as described further in this section.

- Encryption will be applied if deemed necessary by the researchers involved.
- The use of USB flash drives will be minimized.
- Files will be labelled systematically to maintain consistency within the final dataset.

As for the estimation of the exact final volume of generated data – it is difficult to accomplish at this time since the data that will be initially included in the project has not been fully identified yet (currently in M6 of the project). An initial inventory of up to 6 Gb of data is identified by the Consortium in the Table 1. More exact estimation on the data size will be made closer to the project's mid-term.

Three data hosting sites will be used within the framework of this project: consortium internal platform Teams/SharePoint, project's website and the EU Zenodo platform.

All key public data produced by the project will be stored on Zenodo and a selection of files will also be made available on the project website.

Internal project data will be stored on Teams/SharePoint. It will not be accessible for individuals external to the project.

For each platform, we will outline the security and storage of the data hereafter:

#### TEAMS

Accessibility: RAWCLIC Teams is accessible only to the project consortium.

Data security will be ensured through established procedures and suitable technologies, such as the HTTPS protocol for encrypted internet transactions, alongside compliance with European and global security standards (ISO, ITU, W3C, IETF, and ETSI).

Frequency of backups: daily backups to a datacentre in France (*Linkwe* service provider).

The security standards you meet or apply: Security Information and Event Management (SIEM), as well as IDS and IPS systems and complies with GDPR rules for personal data management.

What happens to the data once the project is finished? The content of the Teams collaborative space remains available 1 year after the end of the project, then it is archived on a local server in Paris (except personal data which are destroyed).

Data archiving: after the project end the data is stored on a local server in Paris, replicated on another site geographically, without time limit.

Typical size of Teams repository at the start of the project is 30 Gb and can be extended to up to several hundreds of Gb according to the project needs.

#### ZENODO

Data Protection / Backup: Zenodo data is located in a CERN datacentre (European Union) and a daily incremental backup is installed (for more details on server management and backup see <https://about.zenodo.org/infrastructure/>).

Access security: access to Zenodo requires password authentication. Data security is guaranteed according to the platform description (see <https://about.zenodo.org/infrastructure/>).

Confidentiality of sensitive data: by its nature and design, Zenodo does not allow the storage of confidential data, the data is public and freely accessible. However, Zenodo allows users to

upload files under closed access, which means that the users will not be able to access the files you uploaded. The files are however stored unencrypted and may be viewed by Zenodo operational staff under specific conditions. This means that “closed access” on Zenodo is not suitable for secret or confidential data.

Data longevity: Zenodo supports long-term preservation of your data deposits, as the repository is projected to be maintained for the lifetime of the host laboratory CERN, defined as at least the next twenty years (see section 3.4 above).

## **RAWCLIC WEBSITE**

Frequency of backups: daily backup, replicated over 7 days.

The location of your storage centre: the storage centre is in Germany at IONOS in an ISO certified European datacentre.

The security standards you meet or apply: the website and applications do not use cookies. The access to the website and application is via an SSL certificate (https).

The website remains active for 3 years after the end of the project without content updates but with continued maintenance in operational condition. Then it is destroyed and the domain name terminated.

Data archiving: the data is stored on a local server in Paris, replicated on another site geographically, without time limit.

# **5 Ethical aspects**

## **5.1 General Data Protection Regulation**

Partners shall cooperate in order to enable one another to fulfil legal obligations arising under applicable data protection laws (the Regulation (EU) 2016/679 of the European Parliament and of the Council 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/or relevant national data protection law applicable to said Partner) within the scope of the performance and administration of the project and of the RAWCLIC Consortium Agreement; and comply with regulations on intellectual property rights (IPR).

Users wishing to utilize the TEAMS platform for the RAWCLIC project must register by creating an account. During registration, users are required to provide an email address and password and consent to the processing of their email address for account-related communication and management purposes. Users may withdraw this consent at any time, which will result in the deletion of their account.

## **5.2 Sensitive data**

Sensitive data is data that is either private or confidential and includes personal user data. The proper management of sensitive data is imperative to maintain the individual privacy and remain in compliance with both EU and international regulations.

In order to ensure sensitive data is properly managed, data that is considered sensitive should first be identified. Thus, the main ethical and privacy issues with sensitive data arise from ensuring the data remains private and that proper consent is obtained before the data is shared

or published in any way, as for example, in case of event pictures and promotional images depicting persons.

When possible, collected response data will be anonymized so that it cannot be directly attributed to the responder (for example, by delineating a numeric code to an individual). In addition, data will be reported in aggregated forms to further prevent any form or individual from being identified through their response. If anonymization is not possible, then the explicit permission will be received prior to the publication of sensitive data. In any case, sensitive data will always remain confidential. Lastly, personal or human-related data is not part of the core RAWCLIC's activities (as it is for example in medical or sociology domains etc.), which minimizes any possible risk of mishandling sensitive data.

To ensure proper communication with external audience, any person can subscribe for RAWCLIC Newsletter. The collected data represents a list of email address and names associated with them. The data is stored on Brevo's servers, which are GDPR compliant. More details can be found here:

<https://help.brevo.com/hc/en-us/sections/18503544961042-GDPR>.

At current stage of the project there are no plans to generate or re-use any other personal user data. If sensitive data generation is anticipated at later stage, the lead partner will take consultancy measures from their local data protection officer (DPO) regarding the following steps for the data use, storage and access.

## 6 Resource allocation

Effective data management is a critical aspect of the RAWCLIC project, encompassing both financial and non-monetary considerations. Estimating costs for data-related activities can be complex, as many tasks are integrated into standard research workflows. This section outlines the key cost elements associated with data collection, storage, and accessibility, as well as the responsibilities of different stakeholders in ensuring compliance with data management policies. It also details the financial aspects of making data FAIR and the roles of the consortium members in overseeing these processes.

### COSTS

Generally, the estimation of costs of data management activities is not straightforward, as many activities are integrated with standard research process and data analysis. Ideally, it is necessary to estimate the time-cost related to data collection, data entry and transcription, data validation and documentation and the cost of preparing data for archiving and re-use. Those resources that include time and effort costs (i.e. data records preparation, maintenance of technical infrastructure, individual preparation effort needed to use the infrastructure etc.) are so-called non-monetary costs. Since the researchers and the management team are the main generators of data in RAWCLIC, all these costs are related to them. The consortium expects that monetary costs for FAIR data will be mainly related to Open Access publication of papers (research articles and reviews), potentially combined with patent protection of exploitable results, and possibly maintenance of hosting infrastructure (servers) for data storage.

Monetary costs related to Open Access data in HE are eligible for reimbursement under the conditions defined in the GA, but also other articles relevant for the cost category chosen. Each

partner is responsible for managing the costs related to making data accessible to others beyond the consortium.

Some examples of costs for making data FAIR include:

- “Gold” Open access publication fees. The cost sharing, in case of multiple authors, shall be decided among the authors on a case-by-case basis. This point will be updated in the next version of the document, as the consortium will have more information on the number and cost of the “gold” open access publications;
- Data archiving at Zenodo and its national homologues: free of charge.
- Copyright licensing with Creative Commons: free of charge.
- RAWCLIC Website: 3000 €.

No immediate costs are anticipated for open data that is stored for long-term preservation. Additional details will be reported, as needed, in future versions of the DMP.

## RESPONSIBILITY

Data management activities concern the whole project and need to be coordinated and monitored both at project and WP level. Data management is also linked to publication of project results and thus dissemination activities.

The overall responsibility for data management lies with the project coordinator BRGM.

The members of the Executive Committee (i.e. WPLs) are also responsible of the Data Management of RAWCLIC datasets and research data in agreement with each organization’s internal process, outlined by their local Data Protection Officer (DPO).

The coordinator (project data manager) and WPLs (WP data managers) are responsible for:

- Co-developing and implementing the data management plan and policy with project management.
- Monitoring data collection, publication activities, and deadlines.
- Ensuring open results (data/software) are deposited in compliant repositories and linked to the project.
- Writing, updating and uploading the DMP.
- Advising on publication paths (green/gold open access) and offering customized help and further guidance for publishing scientific publications.
- Verifying journal compliance with HE open data policies before manuscript submission.
- Ensuring green access publications are deposited in repositories.
- Making publication metadata available in the F&T Portal and RAWCLIC website.
- Ensuring research data linked to publications is in repositories.
- Tracking embargo periods and notifying partners.
- Linking OpenAIRE publications with the Project.
- Describing data or publications (by means of appropriate metadata) per RAWCLIC policies and using project-provided templates/tools

## 7 Conclusion

This document outlines the core principles and guidelines for data management within the RAWCLIC project. As a dynamic document, it will be revised and updated throughout the project duration. In the future updates to the DMP, we plan to address progress regarding the online research data repository, including the collection, sharing, and detailed description of datasets and research data as they are progressively generated and gathered.