Midterm Update of Data Management Plan

November 2024

Deliverable D6.2

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Table of Abbreviations

CC BY	Common Attribution International Public License
DMP	Data Management Plan
DoA	Description of the Action
DOI	Digital Object Identifier
DSL	Data Security Law of the People's Republic of China
DSSs	Decision Support Systems
GA	Grant Agreement
GDPR	General Data Protection Regulation
GIS	Geographic Information System
ID	Identifier
IPR	Intellectual Property Rights
MEEF	Metadata Explanatory Entry Form
NBS	Nature-based solution
ORDP	Open Research Data Pilot
RS	Remote Sensing
SC	Steering Committee
SET	Social-ecological Transformation
SOPs	Standard Operating Procedures
trans4num	transformation for sustainable nutrient supply and management
UHOH	University of Hohenheim
WPs	Working Packages

Project Summary

The project “transformation for sustainable nutrient supply and management” (trans4num) aspires to substantiate and broadly promote Nature-based solution (NBS) innovations for sustainable agriculture in Europe and China. In particular, trans4num will focus on nutrient management (bio-based nutrient sources, sustainable crop rotations, optimization of nutrient flows) and will 1) develop a differentiated understanding of NBS potentials for achieving sustainable agricultural practices, 2) study the complexities of applying NBS, 3) develop a dynamic and smart nutrient management tool to support regional decision making for optimum nutrient supply, and 4) assess the (net) impact of technological and social innovations as well as policies related to NBS. To realize its objectives, trans4num will use a Social-ecological Transformation (SET) framework tailored to study 20 NBS farm-level innovations in 7 regions with intensive farming systems. The project will implement the multi-actor approach to consider various societal concerns and interests related to NBS in agricultural nutrient management and to identify promising transformation pathways for social innovations conducive to a wider acceptance and adoption of NBS. In the course of four years, the project will bring together experience, expertise and knowledge across different fields, technologies and disciplines from 22 partners in Europe and China and apply a range of methods and formats to advance and foster NBS implementation prospects (e.g., farmer discussion groups, stake-holder panels, hackathons) The results of the project are expected to contribute to the European Green Deal, Farm to Fork, and Zero Pollution ambition strategies as well as China’s policy: the 14th Five-Year Planning for Green Agriculture Development strategy with their ambition to halt pollution and limit N/P emissions.

Midterm Update of Data Management Plan and IPR Guidelines

Effective management and sharing of data during a research project offer numerous advantages. It ensures easy access to and understanding of data when needed, supports continuity when partners leave or new researchers join and avoids unnecessary duplication of efforts. A Data Management Plan (DMP) streamlines these processes, saving time and effort while facilitating compliance with regulations such as the General Data Protection Regulation (GDPR), the UK GDPR, and the protection of Intellectual Property Rights (IPR).

Deliverable 6.1, Data Management Plan and IPR Guidelines (Li, 2023), builds on the DMPs of previous EU projects (Hawke, 2021; Iannetta et al., 2019). It explains what data will be collected, processed or generated with which methodologies and standards, whether and how this data will be shared or made open, how it will be curated and preserved, and guidelines to protect intellectual property.

Based on D6.1, this updated DMP reflects the ongoing work and significant changes, providing an overview of the diversity, scale, and amount of data managed across the Working Packages (WPs). It addresses key aspects such as data description, access and ethical considerations, standards and metadata, data sharing, curation and preservation, and IPR guidelines. Key updates in this version include:

1. **Primary datasets**: all established primary datasets are presented in Annex 1 (https://cloud.lesprojekt.cz/index.php/apps/files/files/368643?dir=/trans4num/30_WPs/WP6/Data%20Management%20Plan/Annex). Primary data have been collected, with datasets yet to be established and scheduled for updates for the NBS sites in Denmark (DK), Hungary (HU), the Netherlands (NL), and the United Kingdom (UK).
2. **Overview of data and outputs**: Table 1: Overview of the Data to Be Collected and Table 2: Overview of Digital or Physical Research Outputs have been revised to reflect contributions and updates from WPs.
3. **Interlinkages between WPs**: Expected primary data and data gathering processes between WPs have been updated by, as described in Annex 4 (https://cloud.lesprojekt.cz/index.php/apps/files/files/368643?dir=/trans4num/30_WPs/WP6/Data%20Management%20Plan/Annex).
4. **Intellectual Property (New Innovations)**: At this stage, no intellectual property rights (e.g., demos or prototypes) need to be reported.

The DMP is a live document under the terms of the Open Research Data Pilot (ORDP) and will be revised during the lifetime of the project. It is available to view online via the project document repository (https://cloud.lesprojekt.cz/index.php/s/djG2QqZ7dfRJyjo), which can be accessed securely on the application and provision of a username and password (please contact info@trans4num.eu). Further updates will be discussed at each Steering Committee and Data Management Committee meeting and reviewed annually at the General Assembly. These will ensure the final update (D6.3) of the DMP.

1. Data Summary

The trans4num project collects and generates various primary data (Table 1) across WPs to build a database with associated Metadata Explanatory Entry Forms (MEEF) and Standard Operating Procedures (SOPs), identifying secure routes to exploit intellectual property (e.g., research publications, decision support tools, patents and copyrights). The project will ensure open access to project outputs under the conditions specified in the Grant Agreement (GA). Deliverables, practice abstracts, and presentations will be in open access and licensed under the latest version of the Common Attribution International Public License (CC BY), or an equivalent license, and will be made available via trusted repositories like ZENODO (https://zenodo.org/communities/trans4numproject/). Scientific publications will be accessible via green and gold open science access, aiming to ensure open science access to as many end-users as possible. A secure digital repository in NextCloud (https://cloud.lesprojekt.cz/index.php/apps/files/?dir=/trans4num&fileid=194120) is used by trans4num to enable partners and authorised third parties to access trans4num data. The project will also provide information about tools and instruments needed to validate the conclusions of scientific publications or to validate/re-use research data.

Table 1 Overview of the data to be collected and generated in different WPs

WPs	Type of Data	Format of Data
All	Reports, briefs, guidelines, practice abstracts	PDF
WP3	Database for remote sensing	GeoTiff, CSV, GeoJSON and others
WP2	Database for field experimentations	CSV, doe
WP3, WP4	Database for modelling	CSV, xlsx, db, Shapefiles, GeoJSON
WP5	Webinars	MP4
All	Images from the field and trans4num events	JPG, TIFF, PNG
All	Presentations	PPT
WP2	Database for NBS innovations	CSV, XLS
WP6	Partner data (including contact information)	CSV, XLS

Overall, the database will help meet the primary objectives of the trans4num project:

- To develop, practice and assess inter- and transdisciplinary, systemic research conducive to a transformative learning approach towards sustainable agricultural practices.
- To develop a differentiated understanding of NBS potentials for sustainable agricultural practices in the context of intensive farming systems.
- To understand and analyse the complex interdependencies of applying NBS as well as their effects on multi-level nutrient management.

- To develop a dynamic and smart nutrient management tool to support decision-making for optimum nutrient supply in diverse agricultural practices and at multiple intervention levels.
- To provide an integrated assessment of food systems, value chains and policy levels' leverage points for a robust transition to nature-based nutrient management in Europe and China.
- To develop evidence-based knowledge, create awareness for necessary conditions in a food system context, and disseminate up- and out-scale information and recommendations related to the design, development and implementation of NBS in different farming systems of intensive production character.
- To enhance Europe-China exchange and learning processes and promote synergy and alignment of agenda-setting on sustainable agricultural practices in intensive farming systems.

Given the multi-actors nature of the trans4num consortium, integrating farm organisations, extension/advisory services, social enterprises, research institutes, academia and policymakers, the breadth of the database will benefit a wide audience ranging from farmers, producers, agronomists and processors to policymakers, scientists, industry and the public at large.

Because data collection and creation are an ongoing process, questions such as the detailed description of the data nature, exact scale, to whom those data may be useful or if these data underpin a scientific publication will be answered in the updated versions of the DMP. Moreover, the question of the existence or non-existence of similar data and the possibilities for integration and reuse are not finally agreed upon between the consortium partners and will be reported later.

1.1 Type of Data

There are five types of data generated by trans4num from several sources (Figure 1). These include:

- Primary data derived by the trans4num consortium from field experiments, surveys, interviews, workshops, hackathons, webinars, Remote Sensing (RS), Geographic Information Systems (GIS) and new products (e.g., goods, tools and services), process and method, and modelling output (e.g., from DSTs and food system and agent-based modelling);
- Metadata including the MEEF which accompanies and explains a single primary dataset as well as the SOPs describing key techniques and processes relevant to research activities;
- Personal data which is the personally identifiable information of project partners as well as of the stakeholders and participants engaged in project events and activities;
- Reports including the policy briefs resulting from multi-stakeholder workshops and interviews as well as the research results written as public deliverables and milestones;
- Publications, such as peer-reviewed papers, abstracts, data highlights and key findings, images and videos, and other resources developed from social media-based activities and the implementation of Decision Support Systems (DSSs).

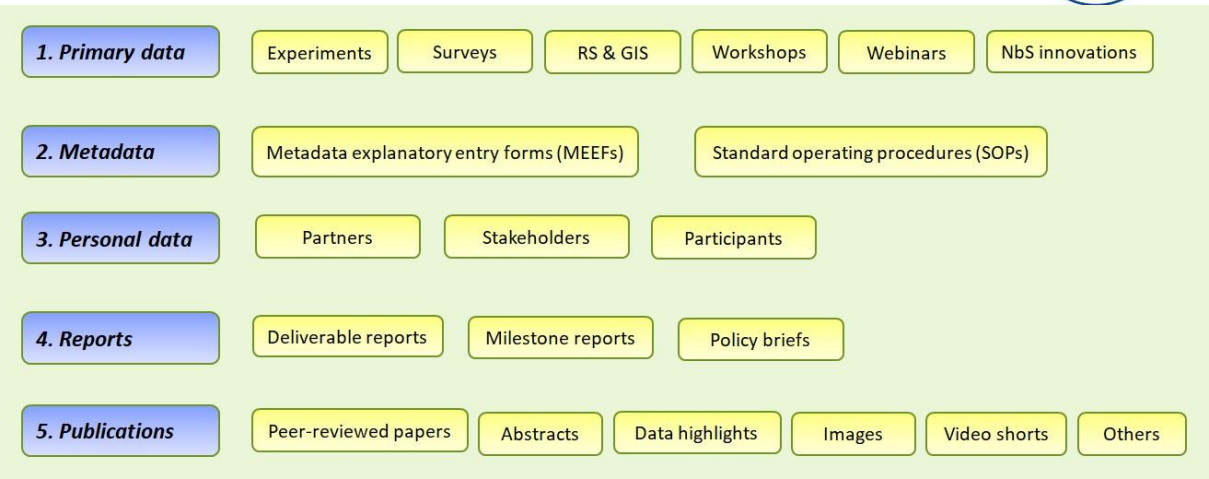

Figure 1 Types of data expected to be generated within the trans4num project

1.1.1 Primary Data

These data relate to relevant surveys, interviews, workshops, hackathons, webinars, RS, GIS and new products (e.g., goods, tools and services), processes and methods employed within the trans4num project. Annex 1 is a list of data that is expected to be generated during the project. The list includes the creator, types and formats of the data, size of data and sharing options. This list reflects the current status of knowledge and discussion within the consortium about the data to be produced within the project. This list will evolve and develop over the lifetime of the project and will be kept up to date on the document repository in NextCloud (https://cloud.lesprojekt.cz/index.php/apps/files/?dir=/trans4num&fileid=194120).

The primary data generated in a project task or study will initially be stored by the partner generating/acquiring the data and whenever possible it will be shared on the project repository, where it can be accessed by all consortium partners. Some primary data will also be made publicly available (e.g., https://zenodo.org/communities/trans4numproject/). The decisions on primary data publication and the level of accessibility will be taken per dataset and by the responsible consortium partner who created the dataset. It is noted that some of the primary data may also include personal data (see Section 1.1.3).

1.1.2 Metadata

"Metadata" means any data describing and documenting primary data. This may include (a) MEEF, accompanying information and description of a given primary dataset that allows for explaining the data collection, and (b) SOPs, describing key techniques and processes relevant to research activities.

The metadata of the primary data will be collected centrally. Each research party has the task of properly assembling the corresponding metadata and providing them to the trans4num Steering Committee (SC). The MEEF and SOPs are being provided by WP and NBS site leaders using trans4num templates (Annex 2 and 3) to capture experimental metadata. The metadata description must be sufficient so that the data collection and processing steps can be reproduced and the errors can be understood by any user. A single MEEF accompanies a single primary dataset, which is compiled through an iterative process. Some of the SOPs will be suitable to establish Practice Abstracts. The metadata are deposited to the trans4num database once received and checked.

1.1.3 Personal Data

Personal data are any information relating to an identifiable person who can be directly or indirectly identified, in particular by reference to an identifier such as a name, an email address, an identification number or a location. The tran4num project will collect personal data to build a database of project partners, event participants and stakeholders as well as to conduct research. Such personal data will be collected in compliance with the GDPR and the Data Protection Act 2018, protecting the personal information of individuals and giving them greater protection and rights. If a hard copy is held, it is placed in a secure cabinet. Whilst if it is an electronic copy, data holders are instructed to ensure it is cyber secure (i.e., held in an encrypted (password protected) drive and/or personal computer). In addition, mechanisms to allow access, removal and rectifications of the data held, upon request, have been put in place.

Data collection and analysis, such as interviews and surveys, will be done in an anonymous or at least pseudonymous way. Otherwise, explicit consent from the data subjects and a clear explanation of data use shall be provided by the research party. Data will be deleted or fully anonymized as soon as the relevant scientific and innovative purpose as stated in the Description of the Action (DoA) is fulfilled. The research party shall not contact data subjects for marketing purposes. In addition, the project will not collect personally sensitive data.

1.1.4 Reports

Deliverables, milestones and policy briefs submitted to the EU portal are considered project data. These reports provide essential information about the overall project and its progress.

1.1.5 Publications and Other Resources

The trans4num project considers publications, such as peer-reviewed papers, abstracts, data highlights and key findings, images and video shorts, as project data which distribute project work and results to the public. The project will ensure scientific publications are accessible via green and gold open science access. Other digital (e.g., software, workflows, protocols, models, etc.) or physical (e.g., new materials, samples, etc.) research outputs, will also be published. Table 2 is prepared concerning their description, the reason why they will be generated, their benefits, the interested stakeholders, the data format and size, the repository you will use and the time that they will be made available.

Table 2 Overview of the digital or physical research outputs

Work Package / Task	Research output	Brief Description	Type	Expected size	Interested stakeholders and benefits	Availability	Accessibility (repository)	Expected time for making open
WP2	xls	Model aimed at farmers for insights into economic–environmental effects of NBS	Digital document	< 1 GB	Farmers, advisors	On request (Danish language)	-	-
WP2	doc	Documentation of workshop	Digital document	<1 GB	Stakeholders and ministries	For participants	-	-
WP3 / T3.2	DSSs	We will develop a Decision Support Tools	Software / Digital documents	about 1 GB	Advisory Services	Open	-	31/07/2026

WP4 / T4.1	Agent-based Model code and outcome data	An agent-based diffusion of innovation model approach will be developed with the aim of conducting an ex-ante impact assessment of intervention scenarios.	Software interface, Model code, and Model documentation via ODD protocol (**O**verview, **D**esign concepts, and **D**etails)	≈ 1 GB, depending on the number of sub-modules used with the core model	Researchers, policymakers	Open	GitHub & CoMSES Model Library or Zenodo Repository	Fall 2026
WP4 / T4.2	Food System Model code and output data	An updated version of the food system model SOLm will be developed and made available as well as the results from various scenario runs	Software/model code / modelling output/documentation	Several dozen GB	Research, policymakers	Open	Likely Github	Mid-2026

These data will be licenced under the latest version of CC BY, or an equivalent licence via trusted repositories like ZENODO (https://zenodo.org/communities/trans4numproject/). All data will be uploaded annually to the database alongside information and media repository for translation and communication by WP5. The trans4num project website (https://trans4num.eu) and data repository in NextCloud (https://cloud.lesprojekt.cz/index.php/apps/files/?dir=/trans4num&fileid=194120) facilitate the data distribution and open access.

1.2 Collection of Data

To ensure all data generated are captured in a routine and systematic manner, Expected Primary Data Collection Form (Annex 4) is designed at the beginning of the trans4num project to monitor progress. All partners are asked to fill in the form, with a focus on the following questions:

- What primary data is expected from WPs?
- What primary data is expected from Project Sites?
- What primary data would you expect from China if possible?
- In which project year will you gather primary data?
- What primary data that you generated in previous projects will be used in trans4num?

The form will be updated to include specific sections related to data collection. Deadlines are also specified for deposition onto the database.

The data collected to date are being used to develop a strategy that will help ensure the IPR and innovations stemming from the project are properly exploited and protected. This will also help secure the project legacy and be used to showcase the varied type of outputs produced by trans4num. To gather all information for a robust Intellectual Property strategy, all partners have been asked to fill in an Innovation & Intellectual Property Rights Form (Annex 5) concerning:

- Does your study include the following activities and if so, how many of each?
- Will your study lead to launching one of the following into the market?

- Have you introduced or are you planning, to introduce innovations as a function of trans4num activities (within the project lifetime or 3 years thereafter)?
- What IPR do you report?
- What is the description of your IPR?

1.3 Receipt of Data

Upon receipt of the data, a sequence of validation and checking events will be exercised for MEEFs, associated datasets and SOPs. The checks will take place at the University of Hohenheim (UHOH), including:

a) Metadata (MEEF and SOPs) is posted from the WP and NBS site leaders to the trans4num data repository in NextCloud (https://cloud.lesprojekt.cz/index.php/s/i8gck4Lo4bbXjLg) and/or send to the trans4num coordination team at UHOH (trans4num-coordination@uni-hohenheim.de).
b) The trans4num coordination team acknowledges receipt of the metadata.
c) The trans4num coordination team logs the metadata with an identifier (ID):

   trans4num_Data_"WP No.Task No."_"Dataset No."_"Dataset Title"

   The ID must and will be used in all future communications concerning that dataset.

d) The metadata will be checked for compliance by the trans4num coordination team to ensure that:
   - All files stated in the submission exist;
   - All required fields are complete;
   - All rows and columns listed exist in the files and are correct.

2. FAIR Data Management

The trans4num project aims for 'FAIR' research data (FORCE11, 2020; Wilkinson, 2016), that is findable, accessible, interoperable and re-usable. The DMP is still evolving and will likely continue to do so over the lifetime of the project.

2.1 Making Data Findable, including Provisions for Metadata

To make data findable, a unique ID is given to every dataset stored in the well-structured pool in the project data repository. A comprehensive pattern for naming the produced datasets is developed, with an example presented in 1.3 Receipt of Data. The ID must and will be used in all future communications concerning that dataset.

The data repository in NextCloud is used to share and manage the collected and generated datasets within the project. It provides a well-organized structure to make it easy for research teams to find, better understand and reuse the various data by creating a consistent and well-structured research data pool.

The trans4num project will create diverse data to detail project content and to create data needed to enable other researchers to use and systematically regenerate output data. To enable a consistent description of all datasets provided by the project, templates are used to describe the metadata of each dataset (see Annex 2 and 3).

2.2 Making Data Openly Accessible

In principle, all data and metadata will be open access, following the gold model. However,

some datasets (or parts of datasets) will not be openly accessible due to GDPR, copyright or other IPR protection, and ethical concerns regarding personal data. Accessibility status will be specified in the Data Registration Form (Annex 6) including any reason why a specific dataset is not open to the public, such as:

- If any personal data is included;
- Legal properties (e.g., missing copyrights, participant confidentiality, consent agreements or IPR);
- Scientific and/or business reasons (e.g., pending publications, exploitation aspects);
- Technical issues (e.g., incomplete data sets).

Until the data are deposited into the repository as part of the ORDP, datasets can only be accessed by project partners. Nevertheless, upon request to the data owner, non-trans4num partners could be provided with specifications of the sharing term and conditions. When a specific task of the project is concluded, the scientific results will be published in international peer-reviewed journals. At this stage, data analysis will allow the partners to identify and select the most important data related to the specific publication.

One option considered for long-term data archiving and publication is ZENODO https://zenodo.org/. This is online, free-of-charge storage created through the European Commission's OpenAIREplus project and is hosted at CERN, Switzerland. It encourages open access deposition of any data format but also allows deposits of content under restricted or embargoed access. The uploaded data is archived as a Submission Information Package in ZENODO. Files stored in ZENODO will have MD5 checksum of the file content, and it will be checked against their checksum to assure that a file content remains correct. Items in the ZENODO will be retained for the lifetime of the repository which is also the lifetime of the host laboratory CERN which currently has an experimental programme defined for the next 20 years. Each dataset can be referenced at least by a unique Digital Object Identifier (DOI), in addition to other forms of identifications provided by ZENODO.

2.3 Making Data Interoperable

The trans4num coordination team at UHOH will ensure that data held on the database are provided in commonly used data formats and file types such as pdf, docx, xlsx, jpeg, mpg, etc. In addition, the unique ID of each dataset and Data Registration Form (Annex 6) will compose standard vocabularies for all data types, allowing interoperability.

2.4 Increase Data Re-use through Clarifying Licenses

The Data Registration Form (Annex 6) will specify any licensing requirements, embargo periods and other restrictions that may limit the re-use of the datasets. To further facilitate the process, the partners could use the dissemination and communication strategy developed in WP5 to promote the availability of the data. In addition, the MEEF and SOPs will ensure that experimental, methodological or survey data are easily interpreted to increase the re-use of data. Some of the anonymised primary data will be publicly available at the end of the project, which will be determined per dataset by the responsible consortium partner who created the dataset.

3. Allocation of Resources

The costs of short-term data storage, and of preparing data and documentation for long-term storage will be borne by the project partners. This is already budgeted in the personnel costs included in the project budget. The permanent costs of preserving metadata in the repository

are free of charge for UHOH members.

The management of the DMP is the responsibility of the Project Coordination team at UHOH, while Communication and Dissemination are carried out with WP5.

4. Data Security

The decisions on primary data publication and the level of accessibility will be taken per dataset and by the responsible consortium partner who created the dataset. The data have different levels of open accessibility:

- Data with restricted access to the consortium partner creating this data set;
- Data with restricted access to trans4num project partners;
- Data that is to be published and shared as open source to researchers only;
- Data that is to be published and shared as open source to everyone.

These will be documented in future versions of the data management plan. The updated version of the DMP shall detail the information on data sharing, including access procedures, embargo periods, and outlines of technical mechanisms for the dissemination of openly accessible data sets. The metadata (MEEFs and SOPs) will be stored at UHOH and shared with all partners. The repository is hosted on servers at P4All. Data backs up automatically for data recovery and data protection.

5. Ethical Aspects

The tran4num project will comply with the GDPR and the Data Protection Act 2018. In detail, the following principles will guide all data activities:

- No human trials;
- To be as sensitive as possible about collecting, storing and using personal data;
- To keep personal data anonymised and not retractable;
- To use correct citations (‘credits’) to the data originator;
- Based on legal conditions (right to use/edit/publish the data).

All data collected will be stored and transmitted by following the European Union’s Data Protection Directive (Directive 95/46/EC on the protection of individuals about the processing of personal data and on the free movement of such data). Data collection and analysis, such as interviews and surveys, will be done in an anonymous or at least pseudonymous way. Otherwise, explicit consent from the data subjects and a clear explanation of data use shall be provided by the research party. Data will be deleted or fully anonymized as soon as the relevant scientific and innovative purpose as stated in the DoA is fulfilled. The research party shall not contact data subjects for marketing purposes unless explicit consent was given. In addition, the project will not collect personally sensitive data. Data which will be imported to/exported from the EU will be listed in the Attachment. Adequate authorisations, if required, will be provided by the relevant consortium partner.

6. IPR Guidelines

IPR promotes innovation and creativity and enables authors, artists, designers, inventors and other IPR users to prevent others from wrongly profiting from their creations or inventions. According to the European Economic and Social Committee (EESC, 2018), tran4num proposes the following types of protection for IPR:

- **Patents**: An exclusive right granted for a new technical invention. A patent holder can grant a licence to somebody wishing to produce copies of the invention against payment of a fee (or royalty), thus obtaining a return on the investment.
- **Trademarks (or 'brands')**: A word, logo or symbol that competitor companies may not use once it has been protected.
- **Copyright**: It ensures that authors, composers, artists, filmmakers and other creators receive recognition, payment and protection for their works.
- **Designs**: The outward appearance of a product.
- **Geographical indications**: The name of a location associated with a product which gives an assurance that the product has been produced in a particular place, often according to traditional practices or recipes.
- **Trade secret**: A valuable piece of know-how and business information that is treated as confidential because it gives the company a competitive advantage.

The best way to protect IPR is to register it with the government and enforce its ownership rights. Beyond registration and enforcement, the following means can protect certain types of intellectual property (Siege Media, 2023):

- Documenting discoveries
- Using digital rights management
- Opting for strong nondisclosure agreements
- Creating strong access credentials

7. Other Issues

The data capture and storage mechanisms described above have been developed as standard practice at UHOH, where considerable experience exists in dealing with data from existing and previous experimental platforms and/or projects. A data management committee is set up to deal with IPR, develop a common protocol and guidelines for IPR, and advise partners.

The Data Security Law of the People's Republic of China (DSL), effective from September 1, 2021, introduces significant implications for collaborating with Chinese partners (http://en.npc.gov.cn.cdurl.cn/2021-06/10/c_689311.htm). It mandates the localization of certain data, particularly "important" data or those involving national security, within China, making cross-border transfers subject to rigorous scrutiny, risk assessments, and government approvals, which may delay collaboration or limit data sharing. Compliance becomes more complex as EU partners must align with both the DSL and GDPR, and Chinese stakeholders may require additional assurances, adding administrative burdens. Research on sensitive topics or involving real-time data exchange may face restrictions under the DSL, potentially limiting the scope of empirical analyses with Chinese stakeholders. Divergences between the EU's emphasis on transparency and data openness under GDPR and China's DSL could necessitate tailored data-sharing agreements. To mitigate these challenges, trans4num partners should establish clear data-sharing protocols, consider localized data storage in China, engage legal experts familiar with both regulations, and adopt compliant collaboration tools, ensuring smooth, compliant, and effective partnerships.

8. Annexes

Annex 1: List of Primary Data

Nr	Reference	DATA SET - name	DATA SET Type - nature of data	Lead partner	WP	Task/ Deliv.	authors	Type of data	data format	expected size of data	Publication Date	Source of data	how is the data generated/collected	where is data stored	how is the data processed	Restriction on using the data	to whom will data be useful	standards	data sharing	preservation and backup	duration of preservation (short-term, long-term, ...)	Metadata related	underpins scientific publication
Explanation & filling examples	DOI		eg. interviews, survey results, software prototypes, software, publications, production, test data, conceptual framework, modells, ...	partner name	1...6			audio, video, text, pictures, code, models...	xls, docx, jpeg, pdf, ppt, mp3 ...,	MB, GB		Origin		partner name, EU and/or China		open access, open to qualified researchers, confidental - only for consortium partners	e.g. stakeholders, other research groups, users of ...	Reference to existing suitable standards of the discipline	Description of how data will be shared, including access procedures, embargo periods (if any), outlines of technical mechanisms for dissemination and necessary software and other tools for enabling re-use, and definition of whether access will be widely open or restricted to specific groups. Identification of the repository where data will be stored, if already existing and identified, indicating in particular the type of repository (institutional, standard repository for the discipline, etc.). In case the dataset	Description of the procedures that will be put in place for long-term preservation of the data (e.g., digital perservation, archives, portals, directories).	Indication of how long the data should be preserved, what is its approximate end volume, what are the associated costs and will they be covered	Metadata Explanatory Entry From (MEEF) accompanies and explains a single primary dataset; Standard Operating Procedures (SOPs) describe key techniques and processes relevant to research and activities.	
Dataset 1																							
Dataset 2																							
Dataset 3																							
Dataset 4																							
Dataset 5																							
Dataset 6																							
Dataset 7																							
Dataset 8																							

The file is available in the project repository:
https://cloud.lesprojekt.cz/index.php/apps/files/files/368643?dir=/trans4num/30_WPs/WP6/Data%20Management%20Plan/Annex

Annex 2: Template for Metadata Explanatory Entry Form

1. Brief Description

Please include in < 200 words, details on (i) experimental/ survey aims; (ii) the purpose of the work; (iii) years when carried out; (iv) material/ object; (v) sites; (vi) methods; (vii) main findings; (viii) whether complete or in progress and (ix) consequences for policy.

2. Methodology

2.1 Summary

Please summarise your experimental/ survey methodology, covering the location, dimensions of the experiments, what was sampled, the detection methods used, etc.

2.2 Details of location

Please the table below to provide details of the location.

Details of location	
Name of the place	
Latitude	
Longitude	
Altitude	
Map reference and coordinate system	
Any other relevant information	

2.3 Plan of Fields or Experimental/Survey Area

Maps or diagrams could be provided to show the complete area covered by the experiment/ survey. This might be a region, a field, or a plot. Use the table below to list the submitted items' file names (and sheet names if appropriate).

Item	File name	Sheet name
(add more rows if needed)		

2.4 Timescale of Chronology of the Experiment/Survey

List dates and main events from the beginning (including ground preparation) to the final measurements.

dd/mm/yyyy	Event

2.5 Details of Material/ Object Studied

The information provided here will differ greatly depending on the study. In some instances, there will be specific **crops, fertilizers or populations**. The role of each type should also be described – for example, one type might be a cover crop. Another type might be a group of stakeholders.

Please use the table below to list the types of material/ object studied.

Name/type	Role in Experiment/ Survey
(use more rows if needed)	

Then for each type of material/ object listed above, provide details in the table below (**one table per type of material/ object**). The items in the left-hand column are indicative – add more items if needed. If information is unknown or not measured, enter "unknown" or other comments. If you wish to submit detailed information on any item, add the file name and sheet name.

Item	Brief description	File-name	Sheet-name
Size (area)			
Species/type			
Variety			
Supplier/source			

Characterisation			
Methods used to estimate or compare			
Management of the material			
Phenology, growth and Yield			

2.6 Sampling

Use the table below to indicate the full sampling methodology. Define your methods in terms of a set of discrete protocols, which can be submitted as accompanying files. Please include the following:

- all dimensions and sampling loci
- all times of sampling
- numbers of samples
- measurements made at each locus and time
- processing of sampled material.

Protocol name	File-name	Sheet-name
(use more rows if needed)		

2.7 Other Methodology

Please indicate details of any other methods and protocols used in the study.

3. Data

3.1 Conditions Relating to the Use of Your Data

In some instances, there might be a need to place special conditions on how the data will be used. Please indicate such conditions in a concise paragraph.

3.2 Summary of Data Structure

Please write a brief description (<200 words) of the type of data arising from the experiment/ survey.

3.3 Data Sheets and Defining Rows and Columns

Most data will be submitted in standard spreadsheets. First, list in the table below the spreadsheets that contain your data.

File-name	Sheet-name

Please define all rows and columns for each spreadsheet, especially where calculations have been made in a row or column. Use copies of the tables below to define columns and rows for each sheet.

File-name	
Sheet-name	

Column	Units	Description
A		
B		
C		
D		
E		
F		
G		
H		
Etc.		Extend the table as necessary

File-name		
Sheet-name		
Column	Units	Description
A		
B		
C		
D		
E		
F		
G		
H		
Etc.		Extend the table as necessary

3.4 Data Checking by Author

Please describe the methods that you used to check your data for errors and "sign off" your data.

3.5 Warning and Caution

Please indicate any concerns you have or any limitations you have recognised.

4. Interpretation and Outputs

4.1 Summary of Findings

Provide a brief, bulleted summary of the main findings.

4.2 Implications and Consequences

Please give a brief account of how your study has been used to influence management or policy.

- Specific end-users of your data.
- Indicate how your data might be of wider use in trans4num.

4.3 Outputs

List refereed papers, reports, and conference proceedings, including live links.

The file is available in the project repository:
https://cloud.lesprojekt.cz/index.php/apps/files/files/368643?dir=/trans4num/30_WPs/WP6/Data%20Management%20Plan/Annex

Annex 3: Template for Standard Operating Procedures

1. Purpose

A brief description of the purpose of the SOP should describe why the SOP is required (e.g. compliance with GCP and other internal procedures and guidelines).

Any regulations or procedures referred to in the "Purpose" section should be identified. The source should be given in the reference section rather than direct quotes.

2. Introduction

A general introduction, with a statement of rationale.

3. Scope

A statement that outlines the areas and context covered by the SOP.

If there are any areas in which this SOP specifically does NOT apply, these should also be mentioned.

4. Definitions

When appropriate, a list of definitions should be included for terms used in the SOP. Acronyms and abbreviations should be explained at the point of use within the SOP and not listed in this section.

5. Responsibilities

A summary of the roles listed in the procedure and the responsibilities of each role holder for the procedures detailed in the SOP.

The details of the responsibilities should be a brief list of the key tasks performed. This section should not be a complete summary of the SOP.

6. Specific procedure

This section is the main text of the SOP. It details the procedure for the task to be performed.

There should be sufficient detail, clearly expressed, to enable a trained person to perform the procedure without supervision.

There should also be sufficient detail to enable a trained person to use the document to train others to perform the task.

The use of tables and figures may be useful, especially in complex procedures.

Table 1 Use of tables

Figure 1 Use of charts

7. Forms/templates to be used

Where Forms/Templates are referenced in the text, the numbers and titles are listed under this section.

8. Internal and external references

This section is used to list all controlled internal references (e.g. SOPs and Deliverables) and external references referred to within the text of the SOP only.

8.1 Internal References

Insert relevant references as required, sufficient for the user to find the source document.

8.2 External References

Insert relevant references as required, sufficient for the user to find the source document. Web references should be included where possible.

CTRG Template SOP Version 2.1. The University of Oxford, 2009.

The file is available in the project repository:
https://cloud.lesprojekt.cz/index.php/apps/files/files/368643?dir=/trans4num/30_WPs/WP6/Data%20Management%20Plan/Annex

Annex 4: Expected Primary Data Collection Form

1. What primary data do you expect from the WP?

Please list the primary data that you expect from your own WP and other WPs

WP	Lead institution	Data Expected

2. What primary data do you expect from the project site?

Please list the primary data that you expect from the project site in Europe

Project site	Lead institution	Data Expected

3. What primary data would you expect from China if possible?

Please list the primary data that you might expect from the project site in China and the Chinese co-lead of WPs

WP	or Project site	Lead institution	Data Expected

4. In which project year will you gather primary data?

Please indicate the project year and provide a brief description

Project year	Description of data collection

5. What primary data that you generated in previous projects will be used in trans4num?

Please provide the data code, project name and a brief description. Data can be coded as "WP No.Task No."_"Dataset No."_"Dataset Title"

Data code	Name of the previous project	Data Description

The file is available in the project repository:
https://cloud.lesprojekt.cz/index.php/apps/files/files/368643?dir=/trans4num/30_WPs/WP6/Data%20Management%20Plan/Annex

Annex 5: Innovation & Intellectual Property Rights Form

1. Does your study include the following innovation activities and if so, how many of each?

Activities Developed	Number	Description
Prototypes		
Testing activities (feasibility/ demo)		

2. Will your study lead to launching one of the following into the market?

Activities Developed	Yes/ No	Description
New product (good, tool or service)		
New process		
New method		

3. Have you introduced or are you planning, to introduce innovations as a function of trans4num activities (within the project lifetime or 3 years thereafter)?

Title	Description

4. What Intellectual Property Rights (IPR) do you report?

Title of the IPR A title of 4-8 words is recommended.	**Type of IPR** -Material transfer agreement -Know-how -Trademarks -Registered design -Confidentiality agreement or Non-disclosure agreement -Utility model	**Application reference**	**Application date** (dd/mm/yy)	**Applicants/ Inventors** (name & affiliation)	**Co-Applicants/ Inventors (name & affiliation)**	**Has IPR protection been awarded?** (Y / N)

5. What is the description of your IPR?

Motivation for the invention (e.g., the problems it solves or opportunities it addresses)	**General utility of the invention**	**Advantages and disadvantages in comparison to current and potential alternatives to the invention**	**Drawings, schematics and flow diagrams as appropriate**	**References to relevant publications and patents**

The file is available in the project repository:
https://cloud.lesprojekt.cz/index.php/apps/files/files/368643?dir=/trans4num/30_WPs/WP6/Data%20Management%20Plan/Annex

Annex 6: Data Registration Form

ID	DATA SET - name	DATA SET Type - nature of data	Lead partner	WP	Task/ Deliv.	authors	Type of data	data format	expected size of data	where is data stored	Location in the data repository	Accessibility	Reason	duration of preservation (short-term, long-term, ...)
Given by the UHOH coordination team		Please see the photo and choose: Primary data Metadata Personal data Reports Publications and others	partner name	1...6			audio, video, text, pictures, code, models...	xls, docx, jpeg, pdf, ppt, mp3 ...,	MB, GB	partner name, EU and/or China	NextCloud link or external links	Please choose: Confidential Open to tran4num Public	why this dataset is not open to the public	Indication of how long the data should be preserved, what is its approximate end volume, what are the associated costs and will they be covered

The file is available in the project repository:
https://cloud.lesprojekt.cz/index.php/apps/files/files/368643?dir=/trans4num/30_WPs/WP6/Data%20Management%20Plan/Annex

References

EESC (2018). Factsheet - The protection of Intellectual Property, latest update 05/02/2018, https://www.eesc.europa.eu/en/documents/factsheet-protection-intellectual-property

FORCE11 (2020). The FAIR Data Principles, The Future of Research Communications and e-Scholarship discussion forum, https://www.force11.org/group/fairgroup/fairprinciples

Hawke, C. (2021). Submit DMP, Data Management– Update in Month 41 (D6.5) for the EU-H2020 funded project, 'Transition towards urban sustainability through socially integrative cities in the EU and in China' (TRANS-URBAN-EU-CHINA), under Grant Agreement Number 770141. http://transurbaneuchina.eu/fileadmin/user_upload/tuec/files/Deliverables/TRANS-URBAN-EU-CHINA_D6.5_TUD_Updated_Data_Management_Plan.pdf

Iannetta, P.P.M., Tran, F., Young, M., Ntatsi, G., Savvas, D. (2019). Submit DMP, Database Populated – Update for Year IV (D2.5) for the EU-H2020 funded project, 'Transition paths to sustainable legume-based systems in Europe' (TRUE), under Grant Agreement Number 727973.

Li, Q. (2023). Data Management Plan and IPR Guidelines (D6.1) for the EU-Horizon funded project, 'Transformation for sustainable nutrient supply and management' (trans4num), under Grant Agreement Number 101081847. https://zenodo.org/records/7997903

Siege Media (2023), How to protect your intellectual property: Learn how to protect your intellectual property rights—from copyrights to patents, a contributor to LegalZoom, updated May 11, 2023. https://www.legalzoom.com/articles/how-to-protect-your-intellectual-property

Wilkinson, M., Dumontier, M., Aalbersberg, I. et al. (2016). The FAIR Guiding Principles for scientific data management and stewardship. Sci Data 3, 160018. https://doi.org/10.1038/sdata.2016.18