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# Final Update of Data Management Plan

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Deliverable D6.3

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## Table of Abbreviations

| | |
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| CC BY | Common Attribution International Public License |
| DMP | Data Management Plan |
| DoA | Description of the Action |
| DOI | Digital Object Identifier |
| 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) aims to substantiate and broadly promote Nature-based Solution (NBS) innovations for sustainable agriculture in Europe and China. In particular, trans4num focuses on nutrient management, including bio-based nutrient sources, sustainable crop rotations and optimisation of nutrient flows. The project aims to: (1) develop a differentiated understanding of the potential of NBS to support 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 optimal nutrient supply; and (4) assess the net impacts of technological and social innovations and policies related to NBS. To achieve these objectives, trans4num applies a Social-ecological Transformation (SET) framework tailored to study 20 farm-level NBS innovations in seven regions characterised by intensive farming systems. A multi-actor approach is used to incorporate societal concerns and interests related to NBS in agricultural nutrient management and to identify promising transformation pathways that can support wider acceptance and adoption of NBS. Over its four-year duration, the project brings together experience, expertise and knowledge from 22 partners in Europe and China and applies a range of methods and engagement formats, including farmer discussion groups, stakeholder panels and hackathons. The project results are expected to contribute to relevant European and Chinese strategies for sustainable agriculture, pollution reduction and improved nitrogen and phosphorus management.

## Final Update of Data Management Plan and IPR Guidelines

Effective management and sharing of research data provide benefits throughout the lifecycle of a research project. They help ensure that data remain accessible, understandable and reusable when needed, support continuity when project partners or researchers change, and reduce unnecessary duplication of effort. A Data Management Plan (DMP) provides a structured framework for these processes, improving efficiency while supporting compliance with relevant legal and regulatory requirements, including the General Data Protection Regulation (GDPR), the UK GDPR and provisions concerning Intellectual Property Rights (IPR).

Deliverable D6.1, Data Management Plan and IPR Guidelines (Li, 2023), established the initial framework for data management in trans4num and built on approaches adopted in previous EU-funded projects (Hawke, 2021; Iannetta et al., 2019). It described the data expected to be collected, processed or generated; the methodologies and standards to be applied; arrangements for data access, sharing and openness; approaches to curation and preservation; and guidelines for the management and protection of intellectual property.

Building on D6.1 and the midterm update D6.2, this deliverable (D6.3) provides the final project-level update of the trans4num Data Management Plan and IPR Guidelines. It reflects the development of project activities and the data generated and managed across the Work Packages (WPs), and provides an updated overview of the diversity, scale and status of project data and research outputs. The DMP addresses data description and access, ethical considerations, standards and metadata, data sharing, curation and preservation, and IPR management. Key updates in this final version include:

1. **Primary datasets**: Annex 1 has been updated to reflect established primary datasets and the information available at the time of this final update (https://cloud.lesprojekt.cz/index.php/apps/files/files/368643?dir=/trans4num/30_WPs/WP6/Data%20Management%20Plan/Annex). In addition to modelling datasets already identified at midterm, project-site and stakeholder-engagement data have been generated and documented. For example, the Hungarian NBS site now has a completed Metadata Explanatory Entry Form (MEEF) describing soil, plant, yield, $CO_2$-emission and remote-sensing data from the Kimle demonstration site, while stakeholder-engagement records and survey analyses provide primary data from activities in Hungary, the Netherlands and the United Kingdom.
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 reviewed and revised to provide a project overview without assuming completion or public availability where this has not been confirmed.
3. **Intellectual Property (New Innovations)**: The project-specific IPR status has been reviewed through the DMP process. Based on the information available for this final update, no additional intellectual property requiring formal reporting under Annex 5, such as a newly registered demonstrator, prototype or other protected right, has been identified. The general IPR guidance remains applicable to project outputs and any subsequent exploitation activities.

Throughout trans4num, the DMP has been treated as a living document and updated as project activities and datasets developed. Updates were discussed through the project's data-management and governance processes and supported by the central project repository (https://cloud.lesprojekt.cz/index.php/s/djG2QqZ7dfRJyjo), which can be accessed securely via the application and the provision of a username and password (please contact info@trans4num.eu). D6.3 consolidates these developments and constitutes the final project-level update of the Data Management Plan and IPR Guidelines. Dataset-specific responsibilities for access, sharing, preservation and any restrictions remain with the responsible data owners and are documented, where available, through MEEFs, SOPs and Data Registration Forms.

# 1. Data Summary

The trans4num project has collected and generated diverse primary data across WPs and project sites (Table 1), supported by Metadata Explanatory Entry Forms (MEEFs), Standard Operating Procedures (SOPs) and other documentation where applicable. The data-management framework is intended both to support scientific quality and reuse and to identify appropriate routes for protecting and exploiting intellectual property, including research publications, decision-support tools, software, models, know-how and other project results. Project outputs are shared in accordance with the Grant Agreement (GA), applicable data-protection and IPR requirements, and dataset-specific access decisions. The secure project repository in NextCloud is used for internal storage and exchange (https://cloud.lesprojekt.cz/index.php/apps/files/?dir=/trans4num&fileid=194120), while suitable public outputs and datasets may be deposited in trusted repositories such as the trans4num Zenodo community (https://zenodo.org/communities/trans4numproject/). Information needed to understand, validate and, where permitted, reuse research data is provided through associated metadata and documentation.

*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 experiments | 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 |
| WP1/2 | Stakeholder-engagement records and survey data | XLSX, DOCX, JPG/other event documentation |

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-actor 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.

By the time of this final DMP update, the project has moved from planning expected data collection to documenting established datasets and research outputs. The level of detail available differs between datasets because responsibility for data generation, documentation, access and publication remains with the relevant partners. Annex 1, therefore, records the information available for identified primary datasets and indicates where specific attributes, such as final size, publication date, repository location or long-term access conditions, have not yet been confirmed in the source material supplied for D6.3.

## 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).

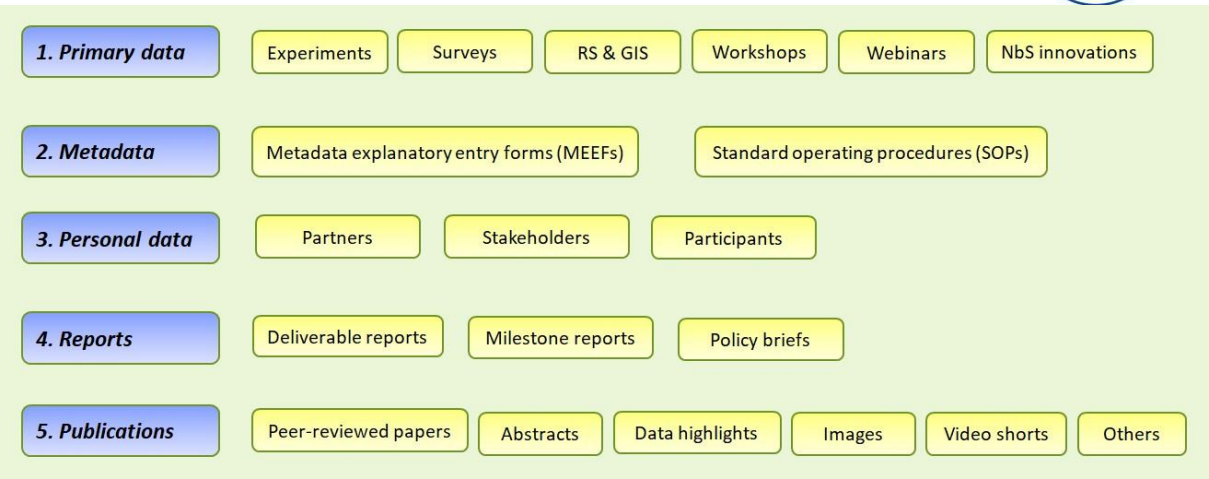



*Figure 1. Types of data expected to be generated within the trans4num project*

### *1.1.1 Primary Data*

Primary data comprise data generated through project research and engagement activities, including field experiments, surveys, interviews, workshops, webinars, remote sensing (RS), Geographic Information Systems (GIS), modelling and the development or testing of project tools and methods. Annex 1 provides the project-level list of identified primary datasets and records, where available, their creators, formats, sources, collection methods, storage, processing, access conditions, preservation arrangements and associated metadata. In D6.3, this list is treated as a final-project snapshot rather than a forecast of data expected to be generated (https://cloud.lesprojekt.cz/index.php/apps/files/?dir=/trans4num&fileid=194120).

Primary data are initially managed by the partner responsible for generating or acquiring them and, where appropriate, are shared through the project repository for consortium use. Decisions on publication and the level of accessibility are made on a dataset-by-dataset basis by the responsible partner, taking account of the Grant Agreement, GDPR and other data-protection requirements, participant consent, copyright and IPR, publication plans, and technical completeness. Where suitable, anonymised or non-personal primary data may also be made publicly available through a trusted repository (e.g., https://zenodo.org/communities/trans4numproject/). Some primary datasets, particularly stakeholder surveys and engagement records, may originate from activities involving individuals and therefore require careful separation of research data from directly identifying information.

### *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.

Metadata for primary data are assembled by the responsible research partners using the trans4num templates where applicable and are provided to the project coordination/data-management process. MEEFs document the context, methodology, sampling, data structure, quality checks, limitations and outputs associated with individual primary datasets, while SOPs describe relevant techniques and procedures. The completed Hungarian NBS-site MEEF demonstrates this approach in practice: it documents the Kimle field experiment, soil and plant sampling, soil $CO_2$ measurements, drone monitoring, data structures, quality checks and interpretation. Metadata are retained with the associated project data so that collection and processing steps can be understood and, where feasible, reproduced.

### *1.1.3 Personal Data*

Personal data are information relating to an identified or identifiable person, including names, email addresses, identification numbers and other direct or indirect identifiers. trans4num has processed personal data for project administration, stakeholder engagement and research activities. Such data are managed in accordance with applicable data-protection requirements, including the GDPR and, where relevant, the UK GDPR and UK Data Protection Act 2018. Hard-copy records containing personal data should be kept securely, while electronic records should be protected through appropriate access controls and secure storage.

Research activities involving interviews, stakeholder events and surveys are designed to use anonymous or pseudonymised data wherever practicable. Where identifiable personal data are required, the responsible partner must provide appropriate information to participants and establish a lawful basis for processing, including consent where applicable. The stakeholder-engagement sources used for this final update include event-level records and aggregated survey analyses. D6.3 does not treat attendance records or survey responses as openly reusable personal data; any public sharing must use anonymised or sufficiently aggregated information and respect the original consent and purpose of collection.

### *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*

trans4num treats peer-reviewed papers, abstracts, data highlights, key findings, images, videos and other dissemination resources as project outputs. Digital research outputs also include software, workflows, protocols, models and modelling outputs, while physical outputs may include samples or materials where relevant. Table 2 summarises the outputs documented in D6.2 and their stated access arrangements. Where the five update sources supplied for D6.3 do not confirm a changed status, the entry is retained as the latest documented project information rather than being presented as independently verified completion.

*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 |

Project outputs and datasets are shared under licences and access conditions appropriate to the individual output and consistent with the Grant Agreement, copyright, IPR and data-protection requirements. The trans4num website, NextCloud project repository, and the trans4num Zenodo community provide complementary routes for dissemination, internal exchange and, where appropriate, long-term public access. Dataset-specific publication and licensing decisions remain the responsibility of the relevant data owner.

## 1.2 Collection of Data

To capture data generation systematically, the Expected Primary Data Collection Form (Annex 4) was introduced at the beginning of trans4num as a planning and monitoring instrument. It asked partners to identify primary data expected from WPs and project sites, possible data

contributions from China, the timing of data collection and relevant data from previous projects. During implementation, this planning information was complemented by dataset-level records, MEEFs and stakeholder-engagement reporting. For D6.3, Annex 1 provides the consolidated snapshot of primary datasets identified from the information available to the coordination team.

- 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?

At the final-update stage, Annex 4 should be read primarily as the project's original data-planning and monitoring instrument. The definitive status of individual datasets is documented through Annex 1 and the corresponding dataset-specific metadata and registration information, where these have been supplied.

Information collected through the DMP process also supports the identification, exploitation and protection of project results. Partners were asked to use the Innovation & Intellectual Property Rights Form (Annex 5) to report potentially protectable results and relevant IPR information. Based on the material available for this final DMP update, no additional project-specific IPR requiring formal reporting has been identified; however, partners remain responsible for protecting background, results, confidential information and other intellectual assets in accordance with the Grant Agreement and Consortium Agreement.

- 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

trans4num applies the FAIR principles—Findable, Accessible, Interoperable and Reusable—to research data to the extent appropriate for each dataset (FORCE11, 2020; Wilkinson et al., 2016). D6.3 records the final project-level framework and the status information available at the time of preparation. FAIR does not imply that all data must be openly accessible: access may be restricted where required by data protection, participant confidentiality, copyright, IPR, contractual obligations, publication plans or other legitimate constraints.

## 2.1 Making Data Findable, including Provisions for Metadata

To support findability, datasets stored in the project data pool are organised using structured naming and identification conventions. The project naming pattern described in Section 1.3 supports consistent communication about datasets. MEEFs, SOPs and Annex 1 provide additional descriptive information that helps partners locate and understand data and their provenance.

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 project has generated diverse data and documentation to enable research outputs to be understood and, where permitted, reused or reproduced. Standard templates for MEEFs and SOPs provide a consistent structure for documenting dataset context, methods, variables, quality checks and limitations. The level of metadata completeness varies by dataset and is recorded through the available dataset-specific documentation.

## 2.2 Making Data Openly Accessible

The project follows the principle of making research outputs as open as possible and as closed as necessary. Not all data or metadata can be made openly accessible. Restrictions may arise from GDPR or UK GDPR requirements, participant confidentiality and consent, copyright or other IPR, pending scientific publication or exploitation, or technical issues such as incomplete datasets. Dataset-specific accessibility and reasons for restriction should be recorded in Annex 1 and/or the Data Registration Form (Annex 6).

- 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).

During the project, working datasets may be restricted to the generating partner or the trans4num consortium. External access can be considered by the responsible data owner under defined terms and conditions. Where a dataset is suitable for public release, the responsible partner should ensure that personal or confidential information is removed or appropriately protected and that the dataset is accompanied by sufficient metadata and licensing information.

Zenodo is one suitable option used by trans4num for long-term archiving and public dissemination of eligible research outputs. It supports persistent identifiers such as Digital Object Identifiers (DOIs), versioning and open, restricted or embargoed access. Selection of Zenodo or another repository is made according to the nature of the output, disciplinary practice, data volume, access requirements and the responsible partner's preservation arrangements.

### 2.3 Making Data Interoperable

Interoperability is supported by using commonly used and, where appropriate, open file formats, including CSV, XLSX, GeoTIFF, GeoJSON, PDF, DOCX, image formats and model-specific files. Dataset identifiers, structured metadata and clearly defined variables and units further support interpretation and exchange. The Hungarian NBS-site MEEF, for example, defines variables, units and sampling structures for soil, leaf, yield and $CO_2$ datasets.

### 2.4 Increase Data Re-use through Clarifying Licenses

Reuse is supported by documenting licensing, access conditions, provenance, methods, variable definitions and known limitations. MEEFs and SOPs help users interpret experimental, methodological and survey data. Before any public release, the responsible partner determines whether data can be shared openly, require an embargo or controlled access, or must remain restricted. Anonymised or aggregated primary data may be made publicly available where this is compatible with participant information, consent, IPR and other applicable requirements.

## 3. Allocation of Resources

Costs associated with short-term data storage and with preparing data and documentation for longer-term preservation are borne by the responsible project partners and are covered

through project resources where applicable. Repository and preservation arrangements depend on the responsible institution and the selected repository. The Project Coordination team at UHOH oversees the project-level DMP, with dissemination and communication supported by WP5.

Responsibility for the accuracy, documentation, lawful processing, access decisions and preservation of individual datasets remains with the partner that generates or controls the data, supported by the project-level coordination and data-management procedures described in this DMP.

## 4. Data Security

Publication and accessibility decisions are made per dataset by the responsible partner. Depending on the nature of the data, access may be restricted to the generating partner, restricted to trans4num partners, made available to qualified researchers under defined conditions, or made openly available to the public.

- 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 access levels are documented, where available, in Annex 1, MEEFs and Data Registration Forms. The project NextCloud repository provides controlled internal storage and sharing, while public repositories may be used for eligible outputs. Metadata and supporting documentation are retained with the relevant project records. Backup, recovery and security arrangements follow the technical procedures of the hosting infrastructure and the responsible partner institutions. Sensitive or personal data must not be placed in publicly accessible locations unless they have been appropriately anonymised and cleared for release.

## 5. Ethical Aspects

trans4num processes research and stakeholder data in accordance with applicable ethical and data-protection requirements, including the GDPR and, where relevant, the UK GDPR and Data Protection Act 2018. The following principles guide project 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).

Data involving stakeholders, interviews or surveys are handled using data minimisation,

appropriate information and consent procedures, and anonymisation or pseudonymisation where practicable. Direct identifiers should be stored separately from research data where needed and access should be limited to authorised personnel. Data should be retained only for as long as justified by the research, legal and contractual purposes. Any transfer of personal data between jurisdictions or organisations must follow the applicable legal and contractual safeguards. The stakeholder-engagement reporting and aggregated survey analyses used in D6.3 are treated as research documentation; public dissemination should rely on anonymised or aggregated results unless the responsible partner has a clear lawful basis and appropriate participant permissions for more detailed disclosure.

## 6. IPR Guidelines

Intellectual Property Rights (IPR) support the protection and responsible exploitation of project results. In trans4num, IPR management is considered alongside open-science and FAIR-data objectives: openness is pursued where appropriate, while confidential information, background, commercially sensitive results and protectable innovations are safeguarded in accordance with the Grant Agreement and Consortium Agreement. Depending on the nature of a result, relevant forms of protection may include:

- **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.

Protection should be selected according to the nature of the result and the applicable legal framework. Practical measures may include documenting the development and ownership of results, controlling access to confidential information, using appropriate licences and contractual terms, applying digital access controls, and using confidentiality or non-disclosure agreements where justified. Registration with the relevant authority may be required for certain registered rights. At the time of this final DMP update, the source material supplied for D6.3 does not identify additional project-specific IPR requiring formal reporting in Annex 5.

- 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 in this DMP build on established institutional practices and project-specific procedures. The trans4num data-management governance arrangements support partners on data documentation, access, IPR and related issues. Following project completion, responsibility for individual datasets and outputs remains with the relevant data owners and repositories, subject to the Grant Agreement, Consortium Agreement, applicable law and the preservation arrangements recorded for each dataset.

# 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 | | SOLm_InputData | Biophysical agricultural and food-system mass/nutrient-flow and production/process input data | FiBL | WP 4 | Task 4.2 | | Numeric | CSV, XLSX, DB | Several GB | | Project/partner data and model inputs | Compiled for SOLm modelling | Partner/project storage | Processed as inputs to the SOLm food-system model | Dataset-specific; not specified in supplied update sources | Researchers; policy makers; model users | Model-/discipline-specific conventions; structured tabular data | Access/publication status to be determined by data owner | Partner/project backup arrangements | Not specified | Dataset documentation/registration where available | Supports SOLm modelling outputs |
| Dataset 2 | | SOLm_OutputData | Biophysical agricultural and food-system mass/nutrient-flow and production/pr | FiBL | WP 4 | Task 4.2 | | Numeric | CSV, XLSX, DB | Several GB | | SOLm scenario runs | Generated by SOLm model runs | Partner/project storage | Model outputs processed for | Dataset-specific; not specified in supplied update sources | Researchers; policy makers | Model-/discipline-specific conven | Planned/open status as documented for WP4 outputs; final repository to | Partner/project backup arrangements | Not specified | Dataset documentation/registration where | Supports SOLm modelling and |

| | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ocess output data | | | | | | | | | | | | scenario analysis | | | tions; structured tabular data | be confirmed by data owner | | | available | publications |
| Dataset 3 | | Hungarian NBS Site Monitoring Dataset | Field experiment and monitoring data | SZE | WP2 | Hungarian NBS demonstration site | | Széchenyi István University | Numeric, spatial, images/remote sensing | Spreadsheet/tabular data; drone/remote-sensing files | Not specified | | Kimle NBS demonstration site, Hungary | Soil and leaf sampling; yield measurement; closed-chamber soil $CO_2$ measurements; drone/satellite monitoring; soil-profile survey | Project/partner data files and trans4num repository as applicable | Compiled, quality-checked and analysed across NBS and conventional treatments | No specific use restriction stated in MEEF; interpret with experimental metadata and field heterogeneity | Farmers, advisers, researchers and trans4num partners | WGS84 for location; defined variables/units and replicated sampling in MEEF | Dataset-specific sharing subject to responsible partner decision | Project/partner storage and backup arrangements | Not specified | MEEF HU 01, version 1.0 (19 Aug 2026) | Related technical report and listed scientific outputs |
| Dataset 4 | | Netherlands Local Stakeholder Engagement Reporting | Event-level stakeholder-engagement records | SPNA | WP1 / WP2 | Local stakeholder engagement | | Tabular records | XLSX | Not specified | | | Local stakeholder events at Netherlands NBS site | Event reporting covering dates, formats, themes, attendance categories, survey use and recording status | Country/project stakeholder-engagement folder / NextCloud as indicated in reporting guidance | Compiled in consolidated event-reporting spreadsheet | Participant-level personal data, if any, must be protected; public use should rely on aggregated/non-identifying information | NBS teams, stakeholder-engagement researchers, project coordination | Common stakeholder-engagement reporting template | Internal project sharing; public sharing only where data protection/consent permit | Project repository / responsible partner backup | Not specified | Stakeholder Engagement Reporting workbook and process guidance | Supports stakeholder-engagement analysis and reporting |
| Dataset 5 | | National Stakeholder Engagement Reporting 2026 | Event-level stakeholder-engagement records | SPNA, PKE/SZE, RRes | WP1 / cross-WP | National stakeholder engagement | | Tabular records, notes, photographs, survey records | XLSX and associated event files | Not specified | | | National stakeholder events in NL, HU and UK | Consolidated reporting of event description, attendees, recording status, data collected and database links | Project/local stakeholder-engagement folders | Compiled from national event reports | Potential personal/confidential information must be protected; use aggregated/non-identifying information for public dissemination | Project partners, stakeholder-engagement researchers, policymakers and NBS stakeholders | Common national stakeholder-engagement reporting template | Internal project sharing; external sharing subject to data protection, consent and data-owner decisions | Project repository / responsible partner backup | Not specified | National Stakeholder Engagement Reporting 2026 workbook | Supports stakeholder-engagement reporting and project evaluation |
| Dataset 6 | | Hungary | Primary survey | PKE | WP2 | Local | | Numeri | DOCX / | Not | | | Hungar | Analysis | Project/p | Aggreg | Public | Research | Survey- | Dataset- | Project/part | Not | Survey- | Supports |

| | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Stakeholder Survey | from local stakeholder engagement | | | stakeholder pre-/post-event surveys | | c/tabular aggregated survey results | source survey files | specified | | ian stakeholder surveys | of selected survey questions, including NBS use/preferences and perceived advantages/disadvantages of regenerative agriculture | artner storage | ated counts analysed by country and respondent group (e.g., farmers/non-farmers) | sharing should use anonymised/aggregated results and respect participant consent | ers, NBS teams, advisers, farmers and project partners | question categories and aggregated counts | specific; anonymised/aggregated results may be shareable subject to data-owner approval | ner backup arrangements | specified | analysis document; underlying survey metadata where available | stakeholder-engagement analysis and reporting |
| Dataset 7 | | UK Stakeholder Survey | Primary survey analysis from local stakeholder engagement | RRes | WP2 | Local stakeholder pre-/post-event surveys | | Numeric/tabular aggregated survey results | DOCX / source survey files | Not specified | | UK stakeholder surveys | Analysis of selected survey questions, including NBS use/preferences and perceived advantages/disadvantages of regenerative agriculture | Project/partner storage | Aggregated counts analysed by country and respondent group (e.g., farmers/non-farmers) | Public sharing should use anonymised/aggregated results and respect participant consent | Researchers, NBS teams, advisers, farmers and project partners | Survey-question categories and aggregated counts | Dataset-specific; anonymised/aggregated results may be shareable subject to data-owner approval | Project/partner backup arrangements | Not specified | Survey-analysis document; underlying survey metadata where available | Supports stakeholder-engagement analysis and reporting |

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 | |
|---|---|
| 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 3 Use of tables

| | |
|---|---|
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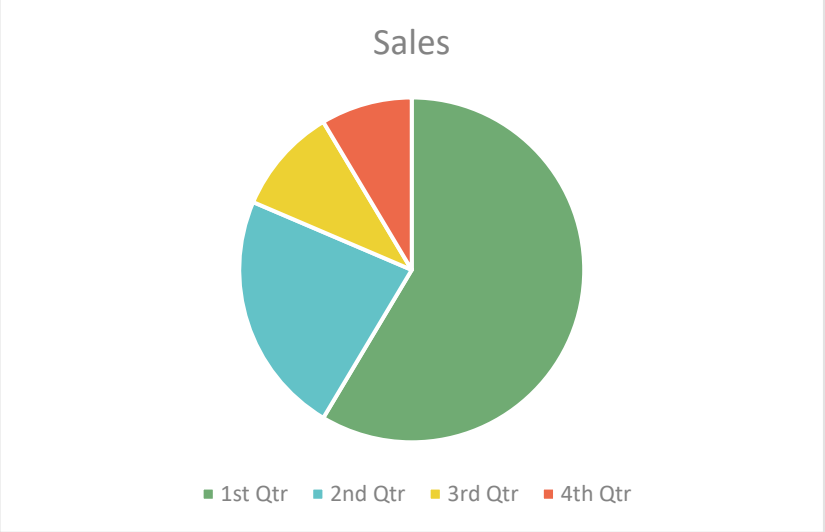



*Figure 1 Use of charts*

## 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 |
|---|---|---|---|
| | | | |
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| | | | |

### 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 |
|---|---|
| | |
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### 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 |
|---|---|---|
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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 |
|---|---|
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**4. What Intellectual Property Rights (IPR) do you report?**

| **Title of the IPR**<br>A title of 4-8 words is recommended. | **Type of IPR**<br>-Material transfer agreement<br>-Know-how<br>-Trademarks<br>-Registered design<br>-Confidentiality agreement or Non-disclosure agreement<br>-Utility model | **Application reference** | **Application date**<br>(dd/mm/yy) | **Applicants/ Inventors**<br>(name & affiliation) | **Co-Applicants/ Inventors (name & affiliation)** | **Has IPR protection been awarded?** (Y / N) |
|---|---|---|---|---|---|---|
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**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** |
|---|---|---|---|---|
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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:<br>Primary data<br>Metadata<br>Personal data<br>Reports<br>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:<br>Confidential<br>Open to tran4num<br>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 |
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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

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