# Deliverable 1.1
# Data Management Plan

December 2019

**Version 2.0**

**Abstract:**
Final release of the its4land Data Management Plan

**Project Number:** 687828
**Work Package:** 1
**Lead:** University of Twente
**Type:** Report
**Dissemination:** Public
**Delivery Date:** 01 May 2016
**Actual Delivery Date:** 30 April 2016
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The its4land consortium consists of the following partners:

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KU Leuven (KUL)
Westfaelische Wilhelms-Universitaet Muenster (WWU)
Hansa Luftbild AG (HL)
Institut d'Enseignement Superieur de Ruhengeri (INES)
Bahir Dar University (BDU)
Technical University of Kenya (TUK)
ESRI Rwanda (ESRI).

# Summary

The its4land project participates in the "Open Research Data Pilot" and therefore maintains a Data Management Plan (DMP). This report is the final revision of the DMP. It is in accordance to the guideline provided by the EC.

# Contents

# 1 Introduction

The H2020 project *its4land* is participating in the "Open Research Data Pilot". To this end, the initial creation and maintenance of a Data Management Plan (DMP) is obligatory. Following the Grant Agreement, the initial DMP (Deliverable 1.1) was submitted in month 3. The DMP was updated regularly and sent to the EC as an independent deliverable.

This document presents the final DMP. It has several parts which are in accordance with the DMP online tool, as advised in the corresponding EU documents. Some sections created within this tool, however, are of a general nature, in particular the technical data handling. Therefore, those parts are described first (Section 2), while in Section 0 the individual datasets are described. In those descriptions reference is made to the overall part, or additional remarks are given, when appropriate.

## 1.1 Project description in brief

The aim of its4land is to develop an innovative suite of land tenure recording tools inspired by geo-information technologies that responds to end-user needs and market opportunities in Sub-Saharan Africa (SSA), specifically reinforcing an existing strategic collaboration between EU and SSA.

### 1.1.1 Objectives

- to capture the specific needs, market opportunities, and readiness of end-users in the domain of land tenure information recording
- to co-design, adapt, integrate, demonstrate, and validate a land tenure recording suite based on small unmanned aerial vehicles (UAVs), smart sketch maps, automated feature extraction, and geocloud services
- to develop and valorise a governance model that realizes the innovation process by aligning end users' conditions, technological opportunity, business models, and capacity building requirements

## 1.2 its4land Information Structure

Data information management within its4land rests on 3 pillars: a) EU-directed project management, b) data production and storage, and c) results from dissemination. While a) refers to the communication and data exchange between the project management and the EC (e.g. through Sygma), b) resembles the project internal data infrastructure. Access to data is restricted to project partners. Public dissemination refers to our actions and measures for representing the project to people other than project partners. Figure 1 illustrates these three pillars and their relationship with other aspects of the project. The DMP refers mainly to b): data production and storage, but also partly to c) results dissemination.

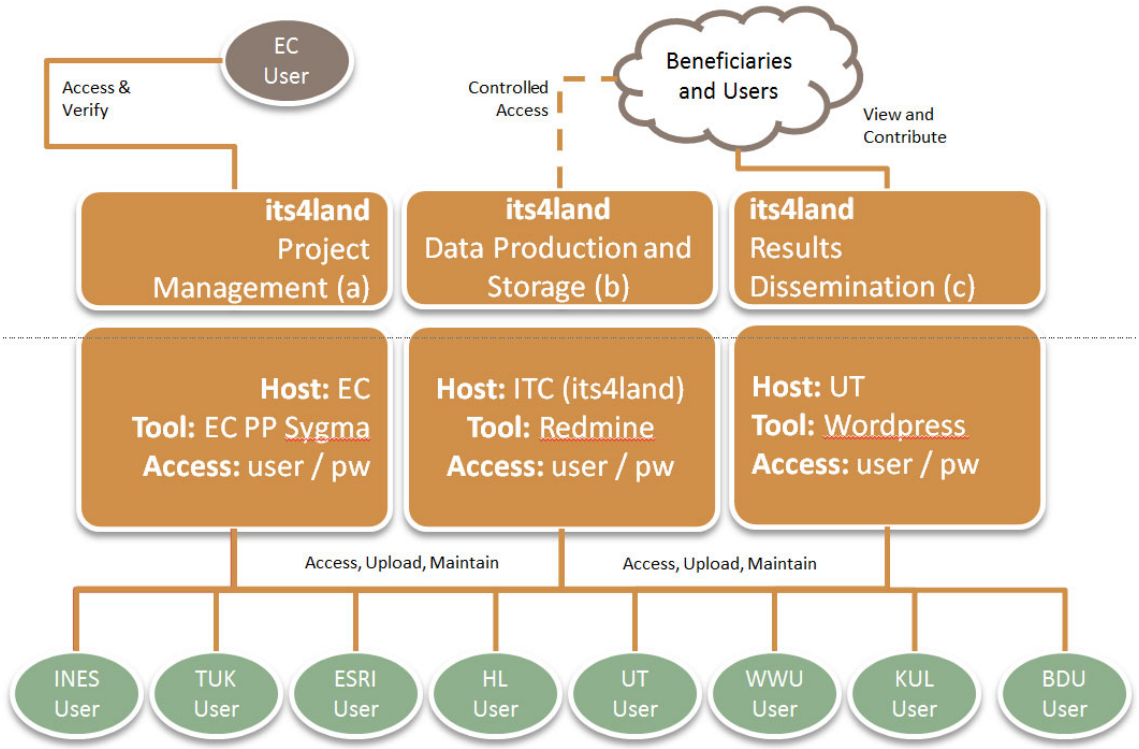


**Figure 1: Data and Information pillars: project management (a), data production and storage (b), results dissemination (c)**

# 2 General notes on data sharing, security, backup and archiving

The project coordinator and project manager (ITC) are responsible for the technical data maintenance (pillars b and c), while pillar a (refer to Fig. 1) is handled by the Sygma-system. The latter is not discussed in this DMP.

## 2.1 Data production and storage (pillar b)

Within the consortium, a dedicated server (network attached storage, NAS) is available to all partners. The NAS not only provides access to storage in the sense of a file server but also comes with a data management tool that allows access and backup via several (secured) means. This server is located within the ITC building and is thus connected to the network of the University of Twente.

### 2.1.1 Data sharing

All datasets and documents are stored on the server and are accessible via a so-called project management tool (redmine[1]), which is published under an open-source license. This tool is characterized by:

- File storage: files (documents, datasets) can be organized in several hierarchies, including
  - ✓ Versioning
  - ✓ Meta-Data descriptions (format can be freely defined)
- User and permission schemes: users (i.e. the project participants) can be grouped and each individual group or user retrieves permissions according to usual levels (read-only, read-write, administrator, etc). The user management will be done centrally at ITC
- Hyperlink access to individual files/directories: if needed, a URL can be shared with other users or externals to ease dissemination

Data and documents are organized generally per administrative items, achievements, and *working packages* (WP), including individual files shared by participants, and deliverable documents in progress. Within the WP structure, a sub-division according to tasks might be appropriate.

Such a structure enables easy permission issuance, for instance, partners involved in a certain WP will get full access rights, while others might only able to read the data. This is a common mechanism to prevent unintended data manipulation. Data security is enforced because the server frontend is only accessible via an encrypted https connection and only to the partners within the consortium.

[1] http://www.redmine.org/

### 2.1.2 Archiving and preservation (including storage and backup)

Several strategies are implemented to guarantee that no data gets lost. Since the mentioned project management software comes with a versioning system that is embedded in a MySQL database, archiving of historic data takes place implicitly.

Therefore, it is only necessary to ensure that the entire database and the underlying files are kept safe. This is done in three ways:

- Use of a redundant storage system: the data server used runs a RAID system with redundancy enabled. This means that in case of a hard drive failure, the system will still be operational and no data will be lost.
- Regular backup to an external hard drive: as the first security instance, the database and underlying data gets stored regularly (at least once a week) to external hard drives, which are located in the same room as the server
- Regular backup to a cloud service: in order to prevent data loss in case of emergency situations that make the physical data server inaccessible, data will be stored using a cloud service at regular intervals (once a week), as well. The final decision on which cloud service to choose is pending, although we tend towards the Hubic[2] service.

## 2.2 Results dissemination (pillar c)

The website (http://its4land.com) has been online since month 1 of the project. Besides general information on the project, partners, and so on, it contains a menu item “Output” (https://its4land.com/things/) Within this section, scientific publications (open access), deliverables and the Land Administration Toolbox are published as well as a description of the its4land capitalization strategy. Finally datasets are available in the DANS online repository (https://easy.dans.knaw.nl/ui/home). The Digital Object Identifiers (DOI) of the datasets are listed on the ‘output’ section of the its4land website.

## 2.3 Self-assessment questions

The Guidelines on Data Management in Horizon 2020[3] give some general information on how to setup the DMP. One major task is to describe the different datasets in detail, see the next chapter. In annex 2 of the guidelines document a couple of self-assessment questions are posed. In the following we respond to those questions. The purpose is to centrally summarize mean properties of our DMP.

Data produced in its4land is:

[2] www.hubic.com

[3] http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-data-mgt_en.pdf (last visited November 2019)

1. Discoverable
*DMP question*: Are the data and associated software produced and/or used in the project discoverable (and readily located), identifiable by means of a standard identification mechanism (e.g. Digital Object Identifier)?

*Its4land-answer*: YES- publications and final datasets which are made available to the public are assigned a digital object identifier (DOI).

2. Accessible
*DMP question*: are the data and associated software produced and/or used in the project accessible and in what modalities, scope, licenses (e.g. licencing framework for research and education, embargo periods, commercial exploitation, etc.)?

*Its4land-answer*: Yes and partially - data produced is made available to the public taking into account 1) ethical considerations (see D9.1 to 9.7), and 2) any patent issues. Specific requests are handled within the Management Team (MT) of its4land – with reference to the relevant ethics documents (Work Package 9) and legal requirements (i.e. Consortium Agreement).

3. Assessable and intelligible
*DMP question*: Are the data and associated software produced and/or used in the project assessable for and intelligible to third parties in contexts such as scientific scrutiny and peer review (e.g. are the minimal datasets handled together with scientific papers for the purpose of peer review, are data provided in a way that judgments can be made about their reliability and the competence of those who created them)?

*Its4land-answer:* Partially - restrictions as listed under requirement 2 apply here as well.

4. Useable beyond the original purpose for which it was collected
*DMP question*: Are the data and associated software produced and/or used in the project useable by third parties even long time after the collection of the data (e.g. is the data safely stored in certified repositories for long term preservation and curation; is it stored together with the minimum software, metadata and documentation to make it useful; is the data useful for the wider public needs and usable for the likely purposes of non-specialists)?

*Its4land-answer:* Partially - the aim is to keep the data server and the website online beyond the lifetime of the project. In this regard, interested researchers can access the public data, or request additional information from a contact person for the online repository.

After the project ends, the partners will follow the existing agreements per institution and will transfer the data to a trusted repository in DANS with restricted access and strictly following the ethical consideration stated in WP9 and GDPR rules

Backups will still be available from the contact person following GDPR rules, if needed.

5. Interoperable to specific quality standards
*DMP question*: Are the data and associated software produced and/or used in the project interoperable allowing data exchange between researchers, institutions, organisations, countries, etc. (e.g. adhering to standards for data annotation, data exchange, compliant with available software applications, and allowing recombinations with different datasets from different origins)?

*Its4land-answer:* Yes, since the aim is to use standard file formats and interfaces for all data. For instance, images are stored in jpg or tiff format, including standardized header information, like EXIF or GeoTIFF. Final text documents are provided in PDF format, or simple txt, geographic data is provided in formats readable by many systems, e.g. as. KML or Shapefiles.

# 3 Individual dataset descriptions

The section is composed according to the description in the Guidelines on Data Management in Horizon2020, see above. Each dataset is presented in a separate subsection that is structured according to the guide. We also provide information per subsection in the form of a checklist to assist readers in gaining a more comprehensive understanding of each dataset. The checklist is adapted from the DMP template provided by the University of Twente[4]. If applicable, a reference to the general description in the previous section is provided.

## 3.1 Stakeholders needs data analysis

### 3.1.1 Data set reference and name

The Stakeholders need analysis data are captured via semi-structured interviews, focus group and (online) survey.

### 3.1.2 Data set description

o How will data be collected?
**Semi-structured interviews, focus groups and individual interviews.**

o Will you also use pre-existing data? From where?
**No**

o What type of data will be collected? (measurements, observations, questionnaires, models, etc.)
**Qualitative data (notes and transcripts of interviews; list of ideas from workshops); quantitative data (voting scores, analysis of individual workshops); field images; interview recordings (where consent was provided); signed consent forms**

o In what file formats?
**Mainly in MS Word formats and standard formats like PDFs (digital copies of notes), jpg (image files) and mp4 (audio files)**

o Which tools or software are needed to create, process and/or visualize the data?
**MS Word and Excel and R for textual coding**

o Do the data have a specific character in terms of reproducibility, confidentiality (e.g. privacy, see next question), etc.? What does this mean for the management of the data?

[4] https://www.utwente.nl/ub/en/services/MAIN/research-datamanagement/rdm/datamanagement-plan/ (accessed in April 2016)

**Yes, most of the data are privacy sensitive – so the accessibility of the data has to be discussed at the MT – with reference to its4land ethical frameworks (See Work Package 9)**

o What is the estimated total size of the data, and what growth rate? What is the estimated number of files and the maximum file size?
**WP2 has now concluded. The estimated total size of the data is 2.4GB**

o How do you handle version control to maintain all changes that are made to the data?
**No relevant for this type of data**

### 3.1.3 Standards and metadata

MS Word and Excel are used.

### 3.1.4 Data sharing

Technically the common description above applies.

o How will you manage copyright and Intellectual Property Rights issues? E.g. Who owns the data? How will the data be licensed for reuse?
**The IP rules will be followed as stated in the Consortium agreement. If needed then additional agreements between the partners will be concluded.**

o Are there any limitations on the access of your data?
**No – but privacy conditions and** GDSPR rules **need to be respected**

o What are the access criteria for the data (open/restricted access, embargo period, etc.)?
**During the runtime of the project data are only accessible to project members.** After the project ends, the partners will follow the existing agreements per institution and will transfer the data to a trusted repository in DANS with restricted access and strictly following the ethical consideration stated in WP9 and GDPR rules

o Who controls data access (e.g. PI Principal Investigator, student, lab, university, funder)?
**The WP leader or a person to be in charge and nominated by the concerned WP leader**

### 3.1.5 Archiving and preservation (including storage and backup)

The common description above applies.

## 3.2 UAV imagery data

### 3.2.1 Data set reference and name

Images captured with an unmanned aerial vehicle, including geo-referenced metadata and GNSS measurements of ground control points.

### 3.2.2 Data set description

o How will data be collected?
**Unmanned aerial vehicles, equipped with a imagery sensor (i.e. camera)**

o Will you also use pre-existing data? From where?
**No**

o What type of data will be collected? (measurements, observations, questionnaires, models, etc.)
**aerial images, including (approximate) georeferencing information, derived from a GNSS device mounted on the UAV. GNSS measurements of ground control points**

o In what file formats?
**Common image file formats like jpg or tif, ASCII text files for georeferencing information**

o Which tools or software are needed to create, process and/or visualize the data?
**Standard image viewers, state-of-the-art photogrammetric image processing software**

o Do the data have a specific character in terms of reproducibility, confidentiality (e.g. privacy, see next question), etc.? What does this mean for the management of the data?
**Data can be processed to obtain a high resolution orthomosaic which represents everything from the bird eye perspective. Data should only be released for verified uses since images may infringe privacy of people. Partially, UAV regulations mandate specific data handling. Thus, data may be handled differently in different countries. Ethical considerations as stated in WP9 are followed.**

o What is the estimated total size of the data, and what growth rate? What is the estimated number of files and the maximum file size?
**Per image flight around 500-1000 images, each image 10MB, i.e. 5-10GB per flight, several flights during the project. An exact number cannot be given. Processed data exceeds the size of the raw data.**

o How do you handle version control to maintain all changes that are made to the data?
**After image capture no update needed/possible. If the same area is captured again, if will be stored as an independent dataset.**

### 3.2.3 Standards and metadata

Common image file formats like jpg or tif, ASCII text files for georeferencing information are used. Metadata is stored as standard EXIF or GeoTIFF header

### 3.2.4 Data sharing

Technically the common description above applies.

o How will you manage copyright and Intellectual Property Rights issues? E.g. Who owns the data? How will the data be licensed for reuse?
**The IP rules will be followed as stated in the Consortium agreement. If needed then additional agreements between the partners will be concluded.**

o Are there any limitations on the access of your data?
**Yes, see next questions**

o What are the access criteria for the data (open/restricted access, embargo period, etc.)?
**During runtime of project only accessible to project members. After the end of the project the data will be stored in a DANS repository with restricted access.**

o Who controls data access (e.g. PI Principal Investigator, student, lab, university, funder)?
**The WP leader or a person to be in charge and nominated by the concerned WP leader**

### 3.2.5 Archiving and preservation (including storage and backup)

The common description above applies.

## 3.3 Feature Extraction Quantitative Data and Results

### 3.3.1 Data set reference and name

The delineation tool encompasses algorithms for image segmentation, boundary classification and an interactive delineation plugin that runs in QGIS. These algorithms are publically available as open-source code. Example applications that investigate the usability of the tool are published in open access publications.

### 3.3.2 Data set description

o How will data be collected?
**No data is collected.**

o Will you also use pre-existing data? From where?
**WP5 uses UAV data captured in WP4.**

o What type of data will be collected? (measurements, observations, questionnaires, models, etc.)
**No data is collected. Source code will be generated.**

o In what file formats?
**The delineation tool is implemented in Python and Matlab. File formats are thus textfiles.**

o Which tools or software are needed to create, process and/or visualize the data?
**Matlab, Python, QGIS**

o Do the data have a specific character in terms of reproducibility, confidentiality (e.g. privacy, see next question), etc.? What does this mean for the management of the data?
**The source code is publically available and can be used and modified by everyone. It will be published under the MIT License.**

o What is the estimated total size of the data, and what growth rate? What is the estimated number of files and the maximum file size?
**All source code including test data and manuals amounts to 840MB.**

o How do you handle version control to maintain all changes that are made to the data?
**New versions of the code are uploaded in GitHub and indicated as such by creating a new folder with the name v2.0 etc.**

### 3.3.3 Standards and metadata

Standard coding rules and styles are applied. For this, an experienced programmer from WP6 revised all source code.

### 3.3.4 Data sharing

The source code will be shared on GitHub.

o How will you manage copyright and Intellectual Property Rights issues? E.g. Who owns the data? How will the data be licensed for reuse?
**MIT License. The copyright is held mostly by Sophie Crommelinck and the University of Twente.**

o Are there any limitations on the access of your data?
**No**

o What are the access criteria for the data (open/restricted access, embargo period, etc.)?
**MIT License**

o Who controls data access (e.g. PI Principal Investigator, student, lab, university, funder)?

**Until the end of the project, the principal investigator of WP5 will rest responsible to maintain the source code and provide access to it.**

### 3.3.5 Archiving and preservation (including storage and backup)

The source code can stay on GitHub once the project ends without further costs. A backup is stored on the cloud server share4land and locally with Mila Koeva and Sophie Crommelinck.

## 3.4 Sketch maps and ontologies for land rights and tenure records

### 3.4.1 Data set reference and name

The datasets contain raster images of sketch maps drawn on plain paper, symbols for a visual language, written descriptions of terms/concepts used in identifying land parcels, local domain models (LDMs), a generic adopter model, and audio recordings of interviews. The collected datasets are available on cloud server share4land. The source code of algorithms are available on its4land's GitHub repository. A backup is stored on the cloud server share4land and locally on WWU's server.

### 3.4.2 Data set description

o How will data be collected?
**Via interviews and exercises with groups and individual citizens in the study areas. Pen, plain papers of different sizes (A4, A3, and A1), are used to collect free hand sketches voice recorders are used for interviews with participants. Base maps is derived from various sources of spatial data such as topographic maps and aerial images.**

o Will you also use pre-existing data? From where?
**Yes, topographic maps provided TUK and orthophotos provided by BDU.**

o What type of data will be collected? (measurements, observations, questionnaires, models, etc.)
**Sketch maps and verbal and/or textual descriptions obtained through group or individual exercises.**

o In what file formats?
**Common raster image file formats like JPG or TIFF, vector image file formats SVG and shape files, JSON format for base map, XML and JSON files for structured data, ASCII text files for unstructured data, mp3 files for audio data.**

o Which tools or software are needed to create, process and/or visualize the data?

**Standard image viewers, custom file processors, shape and symbol recognition tools, web-browser, and Notepad++.**

o Do the data have a specific character in terms of reproducibility, confidentiality (e.g. privacy, see next question), etc.? What does this mean for the management of the data?
**Sketch maps and textual descriptions describe individual rights and therefore privacy issues are addressed in the data storage.**

o What is the estimated total size of the data, and what growth rate? What is the estimated number of files and the maximum file size?
**The collected data vary widely. Per participant we expected to store up to 1 GB including scanned images, audio files, video files, intermediate result and final results of the system, vector data and metadata. The actual total size of the data has however been much less than the anticipated, 150 GB.**
**Field data: 931.5 MB**
**Domain models: 7.5 MB**
**Existing 3rd party data: 3.42GB**
**Source code: 58 MB**

o How do you handle version control to maintain all changes that are made to the data?
**For the base maps, change reports are attached to each new generated map. A list of base maps prepared for each exercise and task are stored in a table with data such as date, task, etc. No automated versioning is used.**

### 3.4.3 Standards and metadata

Common raster image file formats like JPG or TIFF, vector image file formats SVG and shape files, JSON format for base map, XML and JSON files for structured data, ASCII text files for unstructured data, mp3 files for audio data. Embedded in each file.

### 3.4.4 Data sharing

Technically the common description above applies.

o How will you manage copyright and Intellectual Property Rights issues? E.g. Who owns the data? How will the data be licensed for reuse?
**The IP rules will be followed as stated in the Consortium agreement. If needed then additional agreements between the partners will be concluded.**

o Are there any limitations on the access of your data?
**No – but privacy considerations need to be taken into account**

o What are the access criteria for the data (open/restricted access, embargo period, etc.)?
**A selection of appropriately anonymised data may be open to access. The default is that data are only accessible to project members during the course of the project.**

o Who controls data access (e.g. PI Principal Investigator, student, lab, university, funder)?

**WP leader or person in charge, nominated by the WP leader will maintain the code and data until the end of the project.**

### 3.4.5 Archiving and preservation (including storage and backup)

The source code can stay on its4land GitHub repository once the project ends. As a backup source code will be stored at cloud server share4land and locally on WWU's server.
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## 3.5 Stakeholders perspectives data on governance and capacity development of the its4land tools

### 3.5.1 Data set reference and name

The data of stakeholders perspectives on governance and capacity development of the its4land tools are captured via semi-structured interviews, focus groups and online surveys through written descriptions and/or audio recordings.

### 3.5.2 Data set description

o How will data be collected?
**The data is collected through literature studies, semi-structured interviews, focus groups and an online survey with key stakeholders.**

o Will you also use pre-existing data? From where?
**Data from relevant previous studies are used for the research design process and to develop the questionnaires/survey.**

o What type of data will be collected? (measurements, observations, questionnaires, models, etc.)
**Existing data from previous studies, interview data and questionnaires.**

o In what file formats?
**Audio recordings and MS Word formats.**

o Which tools or software are needed to create, process and/or visualize the data?
**MS Word and NVIVO for textual coding.**

o Do the data have a specific character in terms of reproducibility, confidentiality (e.g. privacy, see next question), etc.? What does this mean for the management of the data?

**Yes, most of the data are privacy sensitive – so accessibility of the data has to be discussed at the MT – with reference to its4land ethical frameworks (See Work Package 9) and following GDPR rules.**

o What is the estimated total size of the data, and what growth rate? What is the estimated number of files and the maximum file size?
**With an estimation of around 100 participants, we expect to collect around 2GB of files through the collection of Ms Word files (500kb/pp), Nvivo files (1MB/pp) and audio files (estimation of 20MB/pp). The estimated number of files will be somewhere in the hundreds or thousands.**

o How do you handle version control to maintain all changes that are made to the data?
**Not relevant for this type of data.**

### 3.5.3 Standards and metadata

MS Word is used. Metadata is also stored, its format will be defined.

### 3.5.4 Data sharing

Technically the common description above applies.

o How will you manage copyright and Intellectual Property Rights issues? E.g. Who owns the data? How will the data be licensed for reuse?

**The IP rules will be followed as stated in the Consortium agreement. If needed then additional agreements between the partners will be concluded.**

o Are there any limitations on the access of your data?
**No – but privacy conditions need to be respected.**

o What are the access criteria for the data (open/restricted access, embargo period, etc.)?
**Because of the sensitivity of the data, the access of the data is restricted - in full confidentiality- to project members.**

o Who controls data access (e.g. PI Principal Investigator, student, lab, university, funder)?
**The WP leader or a person to be in charge and nominated by the WP leader.**

### 3.5.5 Archiving and preservation (including storage and backup)

The common description above applies.

# 4 Spatial Metadata in its4land

Publish and Share is used for disseminating spatial data to internal and external stakeholder. Spatial data which are disseminated by Publish and Share are created by the tools developed in the work packages 3,4 and 5. Publish and Share itself created no data by its own.
The Publish and Share platform will disseminate 4 classes of spatial data sets. The following table list these spatial data set including their source and the storage device used in Publish and Share.

| Data set | Source | Storage | |
|---|---|---|---|
| Orthomosaic | WP4 | Publish and Share object storage.<br>Index data required for the Public API are stored in the Publish and Share PostgreSQL database | See chapter 3.2 |
| Boundary Face Strings | WP5 | Stored as vector geometries in the Publish and Share PostgreSQL database with the PostGIS extension. | See chapter 3.3 |
| Spatial Units | WP3 | Currently stored as egg yolk vector geometries in the Publish and Share PostgreSQL database with the PostGIS extension.<br><br>This may change in D6.3 | See chapter 3.4 |
| MetricMapFeature | WP5 + WP3 | Stored as vector geometries in the Publish and Share PostgreSQL database with the PostGIS extension. | See Chapter 3.3, 3.4 and D6.2 |

**Table 1: Disseminated Data Sets in Publish and Share**

The data of the Public and Share platform is currently stored in the Amazon Cloud (AWS). It can be accessedvia standard web-services. All four classes of spatial data sets are accessible via OGC (open Geospatial Consortium) WMS services. One service per class exists. Vector data sets like Boundary Face Strings, Spatial Units and MetricMapFeature are furthermore accessible via WFS services. Both OGC services provide by default the GetCapablities method to retrieve technical metadata.

Information about the identification, the extent, the quality, the spatial and temporal aspects, the content, the spatial reference, the portrayal, distribution, and other properties of disseminated will be encoded following the OGC Catalogue Services. The following table describes the minimum attribute set for describing a data set in Publish and Share.

| Name | Description | Data Type |
|---|---|---|
| Subject | The topic of the content of the resource b | CharacterString |
| Title | A name given to the resource | CharacterString |
| Abstract | A summary of the content of the resource | CharacterString |
| Format | The physical or digital manifestation of the resource | CharacterString |
| Identify | An unique reference to the record within the catalogue | Identifier |
| Modified | Date on which the record was created or updated within the catalogue | Date-8601 |
| Type | The nature or genre of the content of the resource. Type can include general categories, genres or aggregation levels of content. | CodeList |
| BoundingBox | A bounding box for identifying a geographic area of interest | BoundingBox, |
| CRS | Geographic Coordinate Reference System (Authority and ID) for the BoundingBox | Identifier |
| Subject | The topic of the content of the resource b | CharacterString |
| Title | A name given to the resource | CharacterString |

**Table 2: Minimum attribute set for describing a disseminated data set (modified form OGC® Catalogue Services 3.0 - General Model)**

The OGC catalogue service (CS) is part of the DDI server in Publish and Share. CS can be used by tools running on Publish and Share to publish meta data.