My Sustainable Forest

Earth observation services for silviculture

D1.11 DATA MANAGEMENT PLAN

OPERATIONAL SUSTAINABLE FORESTRY WITH SATELLITE-BASED REMOTE SENSING

Project no.	776045
Project title	Operational sustainable forestry with satellite-based remote sensing
Project acronym	MySustainableForest
Start date of project	1 November 2017
Duration of project	36 months
Deliverable	D06 D1.11
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Organisation name of lead contractor for this deliverable	GMV
Dissemination level	PU

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TECHNICAL REFERENCES

Project Acronym	MySustainableForest
Project Title	Operational sustainable forestry with satellite-based remote sensing
Project Coordinator	Julia Yagüe GMV mjyague@gmv.com
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Workpackage	WP 1 Coordination & Management
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Lead beneficiary	GMV
Contributing beneficiary (ies)	RAIZ CFRI UFE FORESNA FOAL CNPF MADERA+ FORA EFI GUK
Due date of deliverable	28/02/2018
Actual submission date	20/09/2018

DOCUMENT STATUS SHEET

Version	Date	Pages	Changes
V1	20/09/2018	55	First version of the document

TABLE OF CONTENTS

LIST OF TABLES AND FIGURES

1. INTRODUCTION

1.1. PURPOSE

This document corresponds to the Data Management Plan for H2020 MySustainableForest Project (ID No. 776045). Specifically, this is Deliverable D06 - D1.11 - Data Management Plan (v1). The goal of this document is to describe the types of data, usage of data sets to be performed during the 36-month project.

MySustainableForest seeks the provision of geo-information services for integrated forest management, at pre-commercial stage, through a web service platform. Services combine in-situ data, satellite images from Copernicus satellite missions and other, LIDAR, airborne data and sound wave wood quality data. Services address issues beyond wood production and industrial transformation, such as : forest conservation, needs and requirements relative to climate change adaptation measurements, guidelines for national forests plans, national reporting obligations to the EU, biomass and CO2 stock counts, long lasting drought impacts, rising public awareness with reference to these new technologies in the wood sector. These issues are part of the demonstration cases in Portugal, Spain, France, Croatia, the Czech Republic and Lithuania, across Atlantic, Mediterranean and continental forest types. Data sets cover the needs of 14 areas of interest (AOIs) in 6 countries.

Project data sources originate from multiple sources: statistical, field data records, multiple satellite data missions, photogrammetry, weather data records, LiDAR flights, wood biometrics, and others; furthermore, these data are replicated with specific characteristics for each of the six AOIs defined by the partners and stakeholders. Moreover, many of these data need to be kept and handled under multitemporal records.

The variety of data sources indicates that the data management plan is not trivial and truly complex. The data management plan needs continuous check outs against data availability and updates according to services and products requirements.

Special mention should be made to satellite data; MySustainableForest seeks to increase the use of free satellite data, particularly those of the European Sentinel Missions, in forest management services. Aligned with the free Sentinel data, the project makes use of VHR satellite images provided by ESA through the Copernicus Data Warehouse; availability and coverage of the AOIs with VHR images is limited, and therefore VHR data will be used for high quality sample products, validation, change control and quality control. The Consortium hereby acknowledges the great value of the VHR images facilitated through the Copernicus ESA DWH.

The data management plan is also crucial regarding the design and dimensioning of the services Platform. MySustainableForest services and products will eventually be processed and delivered through an on-line ewb platform; data fluxes, pull and push data volumes, data storage options and issues of this sort are key for operations and success.

It is also worth noting the transverse character of this document: all partners have had notable contributions, in relation to the data of their AOI or to specific data sources (i.e: LiDAR, Wood Biometrics, Satellite data). Reference to specific data sources follow:

Table 1-1. Partners sharing in MySustainableForest Services

	POR	CRO	CZE	SPA	SPA	LIT	FRA	FIN	ESP	ESP
	RAIZ	CFRI	UFE	FORESNA	MADERA+	FOAL	CNPF	EFI	FORA	GMV
Forest Site Characterization	X	X	X	X		X	X			X
Wood Characterization		X	X	X	X					X
Biomass and CO2 stocking	X	X	X	X		X	X			X
Forest Condition	X	X	X	X			X			X
Ecosystem Vulnerabilities	X	X	X	X		X				X
Socioeconomic Functions and Conditions				X				X		X

	POR	CRO	CZE	SPA	SPA	LIT	FRA	FIN	ESP	ESP
	RAIZ	CFRI	UFE	FORESNA	MADERA+	FOAL	CNPF	EFI	FORA	GMV
LiDAR		X	X	X					X	
Satellite	X	X	X	X	X	X	X	X	X	X
Field /weather	X	X	X	X	X	X	X	X	X	X

The Consortium acknowledges that All Horizon 2020 projects starting from January 2017 are by default part of the Open Research Data Pilot (ORDP). The ORDP aims to make the research data generated by selected H2020 projects accessible with as few restrictions as possible, while at the same time protecting sensitive data from inappropriate access.

During the project lifetime, 36 months from November 2017 to October 2020, the DMP will be issued and updated in three documents:

Table 1-2. MySustainableForest DMP versions planned

Number	Relative Number in WP	Title	Lead Beneficiary	Type	Dissemination Level	Due Date (in months)
D06	D1.11	Data Management Plan (v1)	GMV	ORDP	PU	4
D16	D1.12	Data Management Plan (v2)	GMV	R	PU	12
D30	D1.13	Data Management Plan (v3)	GMV	R	PU	24

1.2. SCOPE

This document is structured according to the following sections:

- Section 1 (present chapter) defines the purpose of the document and the project overview.
- Section 2 includes the list of applicable documents and additional references to be taken into account during the project life cycle. It also contains the definitions and acronyms used in this document.
- Section 3 presents the project data record.
- Section 4 describes the implementation of the data management plan carried out up to date.
- Section 5 presents the future steps to be taken concerning project's data management.
- Annex A provides a glossary of terms
- Annex B records the tables which crosses questions of FAIR data management plan template with the contents of current MSF data management plan.

2. APPLICABLE AND REFERENCE DOCUMENTS

2.1. APPLICABLE DOCUMENTS

The following documents, of the exact issue shown, form part of this document to the extent specified herein. Applicable documents are those referenced in the Contract or approved by the Approval Authority.

Table 2-1. Applicable Documents

Ref.	Title	Code	Version	Date
[AD.1]	Grant Agreement Nº 776045—MySustainableForest	Ares(2017)5215238	1.0	25/10/2017
[AD.2]	Copernicus Space Component Data Access Portfolio: Data Warehouse 2014 - 2020	DAP	2.0	05/04/2018
[AD.3]	Signed_ESA_DWH_License_MSF		1.0	17/04/2018

2.2. REFERENCE DOCUMENTS

The following documents, although not part of this document, amplify or clarify its contents. Reference documents are those not applicable and referenced within this document. They are referenced in this document in the form [RD.X]:

Table 2-2. Reference Documents

Ref.	Title	Code	Version	Date
[RD.1]	Relevant terms and definitions used for the updated pan-European indicators for sustainable forest management http://www.foresteurope.org/sites/default/files/3AG_UPI_Updated_Terms_Definitions.pdf		1.0	03/06/2015
[RD.2]	EC guidelines on Data Management in Horizon 2020: http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-data-mgt_en.pdf		3.0	26/07/2016

2.3. ACRONYMS AND DEFINITIONS

The following acronyms have been used across this document:

Table 2-3. Acronyms

Acronym	Full term
AD	Applicable document
AOI	Area of Interest
CSCDA	Copernicus Space Component Data Access
DAP	ESA Data Access Protocol
DMP	Data management plan
DTM	Digital Terrain Model
DWH	European Space Agency Data Warehouse
EEA	European Environmental Agency
EFH	European Forestry House
EO	Earth Observation
ESA	European Space Agency

Acronym	Full term
EVI	
FAIR	Findable, accessible, interoperable, and reusable
FTP	File Transfer Protocol
FTPS	Secure File Transfer Protocol
GDAL	Geospatial Data Abstraction Library
GEMET	GEneral Multilingual Environmental Thesaurus https://www.eionet.europa.eu/gemet/en/about/
GEOSS	Global Earth Observation System of Systems
GIS	Geographical Information System
GMET	General Multilingual Environmental Thesaurus
GNU	Open Source Unix-like operative system
HR	High Resolution
HTTPS	Hypertext Transfer Protocol Secure
INSPIRE	Infrastructure for Spatial Information in the European Community
IPRs	Intellectual Property Rights
IT	Information Technologies
LIDAR	Light Detection and Ranging
LULC	Land Use Land Cover
MIT	Massachusetts Institute of Technology
MSF	MySustainableForest Project
OGC	Open Geospatial Consortium
ORDP	Open Research Data Pilot
OS	Operative System
OSS	Open Source Software
OTH	Other items (WRT the project's documentation nomenclature)
PAN	Panchromatic
PR	Progress Report
QGIS	Quantum GIS. Free and Open Source Geographic Information System
RD	Reference document
RS	Remote sensing
SAR	Synthetic Aperture Radar
SBAs	Societal Benefit Areas
SFM	Sustainable Forest Management
SSL	Secure Sockets Layer
TBC	To be confirmed
TBD	To be defined
ToR	Terms of reference
URL	Uniform Resource Locator

Acronym	Full term
VHR	Very High Resolution
WP	Work Package
WRT	With reference to
XML	Extensible Markup Language

Table 2-4. Definitions

Concept/Term	Definition
Service	In the context of MySustainableForest project, a "service" is an assembled system of products that support Sustainable Forest Management (SFM) and good forest practices. The project focusses upon six SFM services : 1. Forest Site Characterization 2. Wood Characterization 3. Biomass and CO2 stocking 4. Forest Condition 5. Ecosystem vulnerabilities 6. Socioeconomic Functions and Conditions
Product	In the context of MySustainableForest project, a "product" is an independent and complete component of a service; products are complete in themselves and provide a full set of information. However, single products, however valuable, have a limited usage and scope within SFM practices. Products are defined by the input data, the algorithms that process those data and the output type required by the end user E.g.: Service 1 "Forest site Characterisation" counts with 12 products :
Building Block	In the context of MySustainableForest project, "building blocks" are the processing components of products. Building blocks types are: ■ Auxiliary data ■ Derived products ■ EO input data ■ LIDAR-based models ■ Non EO input data ■ Satellite-based models ■ Socio-economic models ■ Wood quality models

PRODUCT ID Nº	PRODUCT NAME
S1 P1	Forest mask
S1 P2	Stand delineation
S1 P3	Forest infrastructures
S1 P4	Main forest types
S1 P5	Stand height
S1 P6.1	Forest age year of reference
S1 P6.2	Forest age biannual updates
S1 P7.1	Burnt scars reference
S1 P7.2	Burnt scars 6- months updates
S1 P8.1	Clear cuts reference
S1 P8.2	Clear cuts bi-annual update
S1 P9	Elevation
S1 P10	Slope
S1 P11	Aspect
S1 P12	Site Index

3. DATA RECORD

MSF project plans to handle a large volume and a wide variety of data. These data estimations have been calculated on the basis of:

- The multiple territorial AOIs: fourteen AOIs in six European countries,
- The variety of data sources: multiple satellite missions, LIDAR, weather, in situ and statistical data,
- The processes data will have to undergo for products generation as input, intermediate or output data; and
- The volume of data assigned by the ESA Copernicus Space Component Data Access (CSCDA) Data Warehouse (DWH) to MSF project.

Table 3-1. Assigned EO data by the CSCDA

Dataset Title	Quota (km2)
Archive_standard_Optical_HR1	3,072
Archive_standard_Optical_VHR1	3,072
Archive_standard_SAR_HR1	7,500
Archive_standard_SAR_VHR1	5,400
New acquisition_standard_Optical_VHR1	3,072
New acquisition_standard_SAR_VHR1	5,400

These data components produce a complex data management plan that cannot be improvised during the development of services and products. Therefore, the required data management plan is summarised in this section. Another factor that obliges a priori data management plan is the presence of intellectual property rights (IPRs) on the input data particularly on site specific data (AOIs). IPRs are restrictions that determine the security needs and access protocols of the data storage and the disclaimers over the output data. These security needs, access protocols and disclaimers must be taken in consideration before starting the data processing or the design of the platform.

3.1. PRINCIPLES FOR RECORDING PROJECT DATA

This section presents the principles which have guided the registering of the project data record. These principles are hierarchical, i.e: the relevance order decreases top to bottom.

- **Data availability:** Data availability refers to the current status of each dataset. This status can change along the project. Since “data availability” is the most important principle in the DMP, it determines the way project data are registered. Four possible “data availability” status are considered:
  - Available data: this data status is applied to the information provided by consortium’s partners at the beginning of the project.
  - Copernicus EO data: this data status is applied to any Copernicus satellite mission data, either freely available like Sentinel or provided through the Copernicus DWH.
  - Expected data: It refers to the datasets that will be acquired during project development by consortium partners.
  - Data needs: This category contains the information needs of the consortium partners to develop the different products and services.
- **AOI:** Each dataset matches a single AOI; datasets cannot be shared between several AOIs. All MSF data sets are geocoded, meaning that data are geo-localised to x, y, z coordinates (latitude, longitude and relative height to the ocean)
- **Data role in the products:** Four possible status of data role are identified:
  - Input.
  - Intermediate.
  - Validation.
  - Output.

Unlike in the AOI principle, one dataset can have different data roles. Output data of a certain product can be a mandatory input data for another product.

- **Data accessibility and storage:** this principle is related with the IPRs and it is defined as follows: data accessibility and storage must be designed in accordance to IPRs restrictions. i.e. restricted data cannot be stored in a public platform.
- **Technical attribution:** This principle provides the information necessary for the correct processing of the data. This information includes references on data format, production date and data quality standards.
- **Data volumes:** the data volume should be surveyed to evaluate the size of project storage capabilities. Data volumes should include the provision of data growth.
- **Interoperability:** The datasets involved in MSF project should be available for different software and operative systems. Output products of MSF will be delivered in OGC complain formats and its metadata will be provided complain with the international standards of INSPIRE and ISO19139. The forestry terms and vocabulary of MSF will be standardized using the standard of "Forest Europe" association [RD.1] and other recognised thesauri.

3.2. INDEXING PROJECT'S DATA: DATA RECORD TABLE

Project data has been catalogued in an ad-hoc data base or catalogue called "Data Record Table". The Data Record Table is used as the Project's database and it shall be updated as necessary, to keep track and record of data needs and evolution. The Data Record Table contains the following data sheets and information:

3.2.1. GLOSSARY

The "glossary" data sheet compiles the definitions of the terms used in the Data Record Table. These terms are further used to name the sheets and sheets' fields.

Sheet's fields' definitions include the justification of their relevance and constrains of their values. Another relevant aspect in the definitions are the relations and dependencies between attributes. I.e. there are several spatial accuracy attributes of the sheet "available data records" but these fields must be filled in accordance with the "type" attribute (vector, raster, map). The glossary has been added to this document in Annex A below.

3.2.2. DATA AVAILABLE AT THE BEGINNING OF THE PROJECT

The "available data record" sheet lists the data provided by MSF partners relative to their selected AOIs, already available at the begining of the project. Fields of this sheet describe data characteristics listed in section 3.1 above. Specifically, the information is the following:

Table 3-2. Information fields indexing data provided by MSF partners at the beginning of the project

- Partner acronym
- AOI acronym
- [Data set type] Classification
- [Data set usage] Input / Validation / Output
- [Data set] Access level (open / restricted)
- Reception date
- Final data location (platform / owner)
- Current data location
- [Data set] Name
- [Data set] Format
- [Data set] Size
  - File quantity
  - Current volume (Gb)
  - Yearly volume growth (Gb)
- [Data set] Georreferencing
  - Georreferenced (y/n)
  - Geographic system Surface (ha)
  - Surface (Km2)
  - AOI fully covered? (y/n)
- [Data set] Spatial accuracy
  - Cartographic scale
  - Sampling scale
  - Sampling method
  - Minimum Mapping Unit
  - Pixel size (meters)
  - LIDAR pulse density
- Acquisition date
- Notes

The technical attributes of data format and georreferencing are very relevant for the future data processing in the MSF platform.

3.2.3. DATA TO BE COLLECTED DURING THE PROJECT

The "data provision" sheet lists the planned data that will be colected by MSF partners during the project's life time. Copernicus EO data are not included in this sheet because they will be indexed in the sheet "Copernicus Data Request" (3.2.4). The fields of this "data provision" sheet are the same as the fields of "available data" sheet.

The type of data to be gathered includes:

- Airborne imagery
- Airborne LIDAR
- Biodiversity monitoring
- Biomass data
- Biotic damages and forest vitality
- Dendrochronology
- Digital elevation model
- Erosion data
- Forest inventory
- Ground survey
- Hydrology
- Meteorological data
- Plant communities/invasive species survey
- Softwood Density
- Stiffness data
- Wood density

3.2.4. COPERNICUS EO DATA

The "Copernicus EO data" sheet records the requests of Copernicus EO data. These requests include the free Copernicus data (Sentinel) and the restricted Copernicus data ESA CSCDA. For now this sheet is empty because no request was done. The fields of this sheet describe the requisites of the EO data requests like sensor, acquisition date, AOI or imagery product. More specifically, the information contained is the following:

Table 3-3. Information fields indexing the requests of Copernicus EO data

- Acquisition code
- DAP Code
- Partner acronym
- AOI acronym
- Request date
- Reception date
- Download link
- Current data location
- Quota / No quota
- Dataset title
- Archive / New acquisition
- Optical / SAR
- Surface (Km2)
- DAP consumption
- Sensor
- Product
- Cloud cover
- Process level
- Acquisition start date
- Acquisition end date
- Cloud cover
- Image IDs
- Applicable services and products
- Notes

3.2.5. ESTIMATION OF FUTURE DATA NEEDS

The sheet "data need" registers an estimation of data needs foreseen by the partners, based on the expected services and products. These data estimation needs will be checked against the sheets "Available data record", "Data provision" and "Copernicus EO data" to verify if they can be fulfilled or not. The fields of the "data needs" sheet are similar to the fields of "available data record" and "data provision" sheets. Three additional fields were added for monitoring data needs:

- Petitionary partner.
- Request date.
- Responsible partner to fulfil the request.

3.2.6. OTHER ITEMS INDEXED

3.2.6.1. AOI Traceability

The "AOI traceability "sheet describes MSF project's AOIs. AOIs have a unique acronym:

<Partner_short_name_AOI_number>. E.g: <RAIZ1>, <FORESNA1>, etc.

The AOI acronym identifies any data set to its spatial location. Other information includes: AOI country, local name, total surface, forest type and dominant tree species.

The number of AOIs to service is 16, covering 17.000 Km2 across the six participating countries

3.2.6.2. Species

The "species" sheet records all relevant tree taxa across project's AOIs. The taxa are defined by the Linnaean taxonomy in the "full name" attribute column and the specific names of the taxon ranks: genus, species, sub species, variety. Tree species taxonomy can easily be mixed up by national languages and even local words. The use of the scientific nomenclature is meant to prevent miss-references.

3.2.6.3. Service Portfolio and platform components

The Data Record table contains all the information relative to the Service Portfolio (6 services, 40 products) and the platform components (46 workflows and 200 building blocks, specifying the automation degree of the process: automatic, semi-automatic or manual).

4. DATA MANAGEMENT TO DATE

This section presents the up to date status of the data management plan.

4.1. SURVEY OF PARTNERS' DATA AVAILIBITY

Partners were surveyed about the availability of data over the AOIs, in terms of existence, accessibility and technical characteristics. The objectives of the survey were:

- To gather data sizes to estimate data storage and transmission volumes.
- To determine platform requirements according to the specifications of the data (formats, accuracy).
- To plan the deployment of MSF services and products by AOIs.
- To identify data needs.

GMV carried out the survey between 15/03/2018 and 14/04/2018. Actions taken were:

- Preliminary data record. GMV analysed AOI descriptions provided per partner to identify possible data sets. This analysis helped develop the structure of the data record table and define its fields.
- First inquiry. Each partners validated the preliminary data record in their AOIs and added new records to the database.
- Second inquiry: GMV requested a new inquiry. This second inquiry was guided to certain questions to complete the void fields and eliminate discrepancies.

The survey gathered 112 entries of data available at the beginning of the project, 42 entries of data to be gathered during the project's lifetime and 40 entries of data estimations or other information needs (Table 4-1. Results of the data survey).

Table 4-1. Results of the data survey per AOI.

Partner acronym	AOI	Data available at the beginning	Data to be collected	Data estimation
CFRI	CFRI1	13	1	0
	CFRI2	5	5	8
CNPF	CNPF1	7	0	0
	CNPF2	7	0	0
FOAL	FOAL1	6	2	1
	FOAL2	7	1	1
FORESNA	FORESNA1	44	9	5
MADERA+	MADERA+1	0	0	5
RAIZ	RAIZ1	6	5	5
	RAIZ2	3	3	5
	RAIZ3	5	7	5
	RAIZ4	0	6	5
UFE	UFE1	9	3	0

4.2. EO DATA REQUEST PROCEDURE

Consortium partners must register on the ESA Copernicus Space Component Data Access (CSCDA) to distribute the Earth observation data of restricted access (Table 3-1. Assigned EO data by the CSCDA). The consortium leader (GMV) has the master role with which it can make data search, request and downloads. Other consortium partners have clients' roles with which it can only can download the data. This centralised structure allows to keep record and monitor all requests.

The data request of EO data are recorded in the following table. This table is sent to MSF partners to check the validity of the restrictions and characteristics of data request:

Table 4-2. EO Data Request Form in MSF project

Acquisition code:		*e.g. FOAL1-20180724-0001*	
Partner acronym:		*e.g. CFRI*	
AOI acronym:		*e.g. FORESNA2*	
Request date:			*20180724*
Applicable services and products			
S1 P1 Optical			
Quota	X	**No quota**	X
Archive	X	**New acquisition**	X
Optical	X	**SAR**	X
DAP consumption:	*e.g. Archive VHR 50 Km2*		
Sensor:	*e.g. Worldview 2 VHR; TerrasarX*		
Product:	*e.g. Bundle (PAN + MS); single shot SAR*		
Process level:	*e.g. Orthorectifie; Interferometric*		
Pixel size:	*e.g.: 5 x 20 meters*		
Acquisition start date:	*20180801*	**Acquisition end date:**	*20180930*
Image Ids			
Notes			

4.3. ESTIMATION OF EO DATA SIZE PER AOI AND SENSOR

Size estimations are done by real requests of EO data in ESA CSCDA and ESA SCI-hub platforms. The estimations are done in each AOI and separated in several categories:

- Sensor (Sentinel 1, Sentinel 2, Landsat, HR optical, VHR optical, HR SAR, VHR SAR).
- Raw datasets or processed datasets that are ready to be ingested in MSF platform.

The following table resumes the results of data size estimations:

Table 4-3. Data size estimations (Gb) by sensors, products and AOIs.

					Partner acronym	RAIZ				CFRI		UFE	FORESNA		FOAL		CNPF		MADERA
					AOI acronym	RAIZ 1	RAIZ 2	RAIZ3	RAIZ4	CFRI1	CFRI2	UFE1	FORESNA1	FORESNA 2	FOAL1	FOAL2	CNPF1	CNPF2	MADERA+1
	Sensor	Acquisition mode	Resolution Pixel size (meters)																
Raw data	Sentinel 1	IW	5m x 20m	Min size		1.610	1.610	1.610	1.610	1.610	1.610	1.610	3.220	1.610	1.610	1.610	1.610	1.610	3.220
				Max size		7.450	14.900	14.900	14.900	7.450	14.900	14.900	14.900	7.450	14.900	7.450	7.450	7.450	29.800
	Sentinel 2	1C	10 - 60m	Min size		0.806	0.806	0.806	0.806	0.806	3.224	0.806	3.224	0.806	1.612	0.806	0.806	1.612	4.836
				Max size		1.190	1.190	1.190	1.190	1.190	4.760	1.190	4.760	1.190	2.380	1.190	1.190	2.380	7.140
	Landsat 5	L1TP	30m	Min size		0.480	0.480	0.480	0.480	0.480	1.920	0.480	1.920	0.480	0.480	0.480	0.480	0.480	1.920
				Max size		0.520	0.520	0.520	0.520	0.520	2.080	0.520	3.120	0.520	0.520	0.520	0.520	0.520	2.080
	Landsat 8	L1TP	15m - 30m	Min size		1.540	1.540	1.540	1.540	1.540	6.160	1.540	6.160	1.540	1.540	1.540	1.540	1.540	6.160
				Max size		1.800	1.800	1.800	1.800	1.800	7.200	1.800	10.800	1.800	1.800	1.800	1.800	1.800	7.200
	VHR SAR		<1m	Min size		0.290	1.254	0.010	0.020	0.017	2.468	0.019	1.626	0.145	0.028	0.009	0.035	0.128	0.073
				Max size		1.358	6.274	0.044	0.086	0.088	12.855	0.004	7.542	0.563	0.141	0.007	0.165	0.640	0.363
	HR SAR		1m - 5m	Min size		0.016	0.044	0.001	0.001	0.001	0.146	0.000	0.094	0.010	0.002	0.001	0.002	0.009	0.004
				Max size		0.096	0.249	0.002	0.005	0.004	0.800	0.001	0.334	0.027	0.005	0.000	0.006	0.036	0.013
	VHR optical		<1m	Min size		0.931	3.540	0.985	2.325	1.939	55.196	0.549	47.631	4.249	10.117	0.447	1.204	3.891	2.435
				Max size		0.968	3.658	1.002	2.327	2.029	61.487	0.563	49.995	4.411	10.790	0.461	1.251	4.078	2.534
	HR optical		1m - 5m	Min size		0.121	0.471	0.124	0.278	0.245	7.201	0.075	6.347	0.528	1.202	0.055	0.159	0.498	0.287
				Max size		0.123	0.497	0.137	0.293	0.267	7.265	0.075	7.016	0.579	1.239	0.056	0.159	0.511	0.311
Proc	Sentinel 1	IW	5m x 20m	Min size		0.085	0.329	0.003	0.005	0.005	0.694	0.001	0.421	0.036	0.008	0.002	0.011	0.033	0.020
				Max size		0.394	1.524	0.012	0.024	0.021	3.212	0.001	1.949	0.168	0.037	0.002	0.049	0.155	0.093

					Partner acronym	RAIZ				CFRI		UFE	FORESNA		FOAL		CNPF		MADERA
					AOI acronym	RAIZ 1	RAIZ 2	RAIZ3	RAIZ4	CFRI1	CFRI2	UFE1	FORESNA1	FORESNA 2	FOAL1	FOAL2	CNPF1	CNPF2	MADERA+1
	Sensor	Acquisition mode	Resolution Pixel size (meters)																
	Sentinel 2	1C	10 - 60m	Min size		0.005	0.020	0.006	0.013	0.011	1.698	0.012	1.031	0.089	0.203	0.009	0.026	0.082	0.049
				Max size		0.008	0.030	0.009	0.019	0.016	2.507	0.017	1.522	0.131	0.299	0.013	0.038	0.121	0.072
	Landsat 5	L1TP	30m	Min size		0.005	0.021	0.006	0.013	0.011	0.324	0.003	0.286	0.025	0.056	0.002	0.007	0.023	0.014
				Max size															
	Landsat 8	L1TP	15m - 30m	Min size		0.007	0.028	0.008	0.017	0.015	0.422	0.037	3.256	0.280	0.640	0.028	0.081	0.259	0.155
				Max size		0.007	0.028	0.008	0.017	0.021	0.624	0.042	3.721	0.320	0.640	0.028	0.093	0.028	0.177
	VHR SAR		<1m	Min size		0.271	1.218	0.009	0.020	0.016	2.467	0.017	1.509	0.140	0.028	0.008	0.034	0.125	0.070
				Max size		1.336	5.856	0.040	0.081	0.080	12.389	0.004	6.822	0.521	0.137	0.007	0.152	0.603	0.362
	HR SAR		1m - 5m	Min size		0.014	0.041	0.001	0.000	0.001	0.132	0.000	0.089	0.009	0.001	0.001	0.002	0.008	0.004
				Max size		0.090	0.246	0.002	0.005	0.004	0.773	0.001	0.316	0.027	0.004	0.000	0.005	0.033	0.013
	VHR optical		<1m	Min size		0.930	3.484	0.895	2.102	1.833	54.149	0.527	46.979	3.979	9.109	0.421	1.087	3.889	2.295
				Max size		0.908	3.423	0.962	2.124	1.856	57.040	0.524	48.258	4.142	10.647	0.454	1.238	3.930	2.327
	HR optical		1m - 5m	Min size		0.109	0.454	0.119	0.270	0.225	6.821	0.069	6.146	0.509	1.165	0.053	0.150	0.475	0.265
				Max size		0.115	0.467	0.128	0.264	0.248	6.917	0.070	6.951	0.526	1.161	0.050	0.148	0.470	0.304

4.4. DATA STANDARIZATION

This section presents the decisions and actions taken to guarantee the standardization of all data in MySustainableForest. In particular the following actions were addressed:

- Metadata standardization.
- Naming convention.
- Glossary.

4.4.1. METADATA STANDARDS

My Sustainable forest metadata for geospatial data will follow the metadata standard INSPIRE to ensure the discoverability of data. INSPIRE metadata standard follows ISO 19139 that is an internationally-adopted standard of geographic information metadata in XML encoding. ISO 19139 is derived from ISO 19115. ISO/TS 19139 was established in 2007 by the International Standardization Organization and it was reviewed in 2012.

Table 4-4. ISO 19139 Metadata Standard Summary

Characteristic	Description
Standard website	https://www.iso.org/standard/32557.html
Specification	http://standards.iso.org/iso/19139
Subjects	Physical Sciences & Mathematics
Disciplines	Cartography, Climatology, Geography, Geology, Geoscience, Glaciology, Hydrogeology, Hydrography, Marine Science, Meteorology, Oceanography, Topography
Extensions	■ INSPIRE Metadata Regulation. A profile of ISO 19139:2007, adopted in 2007 as the common metadata standard for the Infrastructure for Spatial Information in the European Community (INSPIRE). The other profiles of ISO 19115 in use in European Member States have been made compliant with INSPIRE. https://inspire.ec.europa.eu/id/document/tg/metadata-iso19139 ■ ISO 19115-2 - Imagery and gridded data. An extension of ISO 19115 defining the schema required for describing imagery and gridded data. https://www.iso.org/standard/57104.html

4.4.2. NAMING CONVENTION

The naming convention to be used for the MySustainableForest products will adhere the following structure:

<MSF>_<producer>_<AOI>_<service>_<product>_<date>_<version>_<productionDate><.fileExt>

The components of this naming convention are described in the table below:

Table 4-5. Naming convention of MSF project

Component	Description
<MSF>	Project acronym
<producer>	Corresponds to the acronym of MSF partner in charge of the generation of the product or dataset. In case of nested products, resulting out from the fusion of various producers' inputs, the acronym will identify the entity responsible for the generation of the final product.
<AOI>	Geographic location of the area of interest according to data needs record (3.2.6.1)
<service>	Code of the service to which the dataset corresponds. Service codes are listed in D09_D2.2_Service Requirements and Validation of Use Cases
<product>	Code of the product to which the dataset corresponds. Product codes are listed in D09_D2.2_Service Requirements and Validation of Use Cases

Component	Description
<date>	Date and/or time, including time-range, of the product, as defined by date-time of the input(s) involved in its generation. Date/and or time will be in compliance with ISO 8601, Data elements and interchange formats – Information interchange – Representation of dates and times, that is an international standard covering the exchange of date- and time-related data. Double entry indicates time interval, e.g. 201801_201803 (January-February-March 2018)
<version>	Two digits version correlative numbering, the first digit corresponds to a major version, the second one correspond to minor versions
<productionDate>	Date/and or time will be designated following the ISO 8601 encoding
<.fileExt>	Optional, file extension

An example of MSF data code follows:

MSF_GMV_CFRI2_S1_P4_201806-201808_v1_20180905.tif

Which correspond to:

- MySustainableForest product (MSF).
- Produced by GMV (GMV).
- For an area of interest in Croatia 2 (CFRI2).
- Product belongs to Service 1 Forest Site Characterization.
- Product 4 Main Forest Types.
- For 2018 summer (201806-201808).
- First version (v1).
- Produced on 5th of September 2018 (20180905).
- Product format is tiff (tif).

4.4.3. THESAURUS

Controlled vocabularies and thesauri help researchers, users or general public, to clearly identify the nature of the data that they are retrieving through querying data repositories. At the same time a controlled vocabulary or thesaurus allows the removal of ambiguities resulting from the use of the terms that would arise in a non-controlled keyword search, such as in the case of natural language. In addition, controlled vocabularies and thesaurus provide contextual information that allow the user better understand the nature of the data subject to exploration.

On the side of the data provider, dictionaries and thesauri ensure that the data is listed in a consistent and structured manner, easing, a part of data sharing and discoverability, the traceability and maintenance of data, including versioning.

To ensure data standardization MSF consortium will adopt the terms and definitions provided by recognized thesaurus that maintain “controlled vocabularies” in the field(s) of study of the project: forestry, ecology, wood parameters, earth observation and geoinformation, amongst others. The following table summarizes the glossaries selected for this purpose. In the event that throughout the lifecycle of MySustainableForest the list of resources requires updating the table will be updated accordingly in subsequent releases.

Table 4-6. Data glossaries

Resource	Summary	Resource details	
Ministerial Conference on the Protection of Forest in Europe	Since the first set of Pan-European Indicators for Sustainable Forest Management in 1998 and its improvement in 2003, experience has shown that criteria and indicators are a very important tool for European forest policy. Based in the	**Creators(s):**	Ministerial Conference on the Protection of Forest in Europe
		Type:	Controlled Vocabulary
		Contact:	liaison.unit.bratislava@foresteurope.org
		Date:	03/06/2015
		Language:	English

Resource	Summary	Resource details	
	improvement of knowledge and data collection systems as well as the current and upcoming information needs an update of the indicators is needed. Thus, the Expert Level Meeting (ELM) on January 2015 decided to update the existing set of Pan-European Indicators for SFM.	**URL(s):**	https://www.foresteurope.org/sites/default/files/3AG_UPI_Updated_Terms_Definitions.pdf
		Domain:	Forestry
GEOSS Earth Observation Vocabulary	The GEOSS Earth Observation Vocabulary, is a controlled vocabulary established by combining existing and well-established dictionaries with the aim of improving data discovery through GEOSS. By selecting those terms that best describe the resource being registered, the probability of this resource being retrieved in a relevant query is higher.	**Creators(s):**	Group on Earth Observations
		Type:	Controlled Vocabulary
		Contact:	secretariat@geosec.org
		Date:	01/05/2011
		Language:	English
		URL(s):	http://api.geodab.eu/api-demo.html
		Domain:	Earth Observation
GEOSS Societal Benefit Areas Taxonomy	The Societal Benefit Areas (SBAs) are eight environmental fields of interest, all of which relate to climate, around which the Global Earth Observation System of Systems (GEOSS) project is exerting its efforts. Around the SBAs a preliminary hierarchical vocabulary has been created.	**Creators(s):**	Group on Earth Observations
		Type:	Controlled Vocabulary
		Contact:	secretariat@geosec.org
		Date:	25/08/2010
		Language:	English
		URL(s):	https://www.earthobservations.org/sbas.php
		Domain:	Earth Observation
GMET	The GEneral Multilingual Environmental Thesaurus, is an indexing, retrieval and control tool for the European Topic Centre on Catalogue of Data Sources and the European Environment Agency (EEA). GEMET is conceived as a "general" thesaurus, aimed to define a common general language, a core of general terminology for the environment.	**Creators(s):**	European Environment Agency (EEA)
		Type:	Thesaurus
		Contact:	helpdesk@eionet.europa.eu
		Date:	29/08/2017
		Language:	37 (multi language)
		URL(s):	http://www.eionet.europa.eu/gemet/
		Domain:	Natural resources, earth & environment
GeoNames	The GeoNames geographical database contains over 10 million geographical names and consists of over 9 million unique features whereof 2.8 million populated places and 5.5 million alternate names. All features are categorized into feature classes and further subcategorized into feature codes.	**Creators(s):**	GeoNames is a project of Unxos GmbH
		Type:	Geographical database - gazetteer
		Contact:	info@geonames.org
		Date:	
		Language:	67 (multi language)
		URL(s):	http://www.geonames.org/
		Domain:	Geographical database - gazetteer

Table 4-7. GEO Societal Benefit Areas Taxonomy

Societal Area	Keywords
Disasters	Pollution events, coastal hazards, tsunami, sea and lake ice, tropical cyclones, extreme weather, floods, landslides, subsidence, volcanoes, volcanic ash, aerosols, earthquakes, wildland fires
Health	Infectious diseases, cancers, respiratory problems, environmental stress, nutrition, accidental death and injury, birth defects
Energy	Oil & gas exploration, refining and transport operations, renewable energy operations, electricity generation, global energy management
Climate	Understanding, assessing, predicting, adapting to, mitigating
Water	Water cycle research, resource management, impacts of humans on water cycle, global biogeochemistry, ecosystem and water quality assessment, land use planning, production of food, weather prediction, heavy rainfall flood prediction, drought prediction, climate prediction, human health, fisheries and habitat, management, telecommunication - navigation
Weather	Nowcasting forecasts (0 - 2 hours), very short-range forecasts (2 - 72 hours), medium-range forecasts (3 – 10 days), extended forecasts (10 – 30 days)
Ecosystems	Land, river, coast & ocean management, agriculture, fisheries, forestry, carbon cycle
Agriculture	Food security, fisheries, timber, fuel and fiber, agricultural economy and trade, grazing systems
Biodiversity	Conservation, invasive species, migratory species, natural resources and services

Table 4-8. GEO Societal Benefit Areas Taxonomy

Main Theme	Sub-theme
Atmosphere	Surface Air Temperature, Surface Wind Speed, Surface Wind Direction, Surface humidity, Evapotranspiration, Aerosol Properties
Biosphere	Vegetation Cover, Vegetation Type, Biomass, Enhanced Vegetation Index (EVI), Soil Adjusted Vegetation Index (SAVI), Non-native Species, Forest Litter, Chlorophyll, Stand Density/Height/Volume, Biodiversity, Net Primary Production, Gross Primary Production, Ecosystem Function Dynamics, Water Bodies (location), Forest Cover, Non-native Species
Human dimensions	Land Use, Field Cover (Continuous), Land Cover, Cultivation, Fuel Load/Characteristics, Deforestation, Burned Area/Fires
Land surface	Soil Composition, Soil Type, Soil Moisture, Soil Carbon, Carbon (stores, uptake, flux), Soil Thickness, Land Use, Field Cover (Continuous), Land Cover, Cultivation, Elevation, Fraction of Photosynthetically Active Radiation (fPAR), Emissivity, Erosion (reefs, sandbars), Slope
Terrestrial hydrosphere	River Flow Observations

4.5. SOFTWARE TOOLS FOR GEOSPATIAL DATA ANNALYSIS

Georeferenced data, whether they are in raster or vector format, can be read, handled and analysed by using open source software (OSS) for geospatial data visualization and processing. Hereafter is a list of the most well-known OSS packages for this purpose. MSF will use OSS tools to design the services, products and building blocks of the platform. All the tools identified provide the users with documentation and users guides about how to get the install files as well as how to operate them:

Table 4-9. Open Source Software tools for geospatial data analysis and processing

Suite	Description
QGIS	QGIS is a user friendly Open Source Geographic Information System (GIS) licensed under the GNU General Public License. QGIS is an official project of the Open Source Geospatial Foundation (OSGeo). It runs on Linux, Unix, Mac OSX, Windows and Android and supports numerous vector, raster, and database formats and functionalities - https://www.qgis.org/en/site/

Suite	Description
GDAL	GDAL is a translator library for raster and vector geospatial data formats that is released under an X/MIT style Open Source license by the Open Source Geospatial Foundation. As a library, it presents a single raster abstract data model and single vector abstract data model to the calling application for all supported formats. It also comes with a variety of useful command line utilities for data translation and processing. - https://www.gdal.org/
GRASS	Geographic Resources Analysis Support System (GRASS-GIS), is a free Geographic Information System (GIS) software used for geospatial data management and analysis, image processing, graphics/maps production, spatial modelling, and visualization. GRASS GIS is an official project of the Open Source Geospatial Foundation (OSGeo) - http://grass.osgeo.org/
SAGA	SAGA is the abbreviation for System for Automated Geoscientific Analyses. It is a Geographic Information System (GIS) software which has been designed for an easy and effective implementation of spatial algorithms. SAGA offers a comprehensive, growing set of geoscientific methods. http://www.saga-gis.org/en/index.html
OTB	Orfeo Toolbox (OTB), developed for object-based image analysis (OBIA) is an open-source project for state-of-the-art remote sensing. Built on the shoulders of the open-source geospatial community, it can process high resolution optical, multispectral and radar images at the terabyte scale. A wide variety of applications are available: from ortho-rectification or pan-sharpening, all the way to classification. https://www.orfeo-toolbox.org/

4.6. QUALITY ASSURANCE

MSF validation and verification will be based on multiple detection by independent methods of geographically consistent events, with weight driven by geographic precision of detection and completeness of information. Ranking will be based on the statistical and geographical reliability of individual detections. The validation procedure includes:

- Using ground based measurements collected by end-users and/or project partners.
- Using VHR resolution images.
- Using data coming from other reliable sources.

Overall the products generated alongside the project lifecycle will be subject to quality assurance protocol that will enclose the following criteria:

- The validation of each product will carried out in, at least, one of the areas of demonstration of that specific product, depending on the resources available.
- The products will met a pre-defined minimum accuracy threshold (estimated vs real/independent value) and precision (repeatability/reproducibility).
- The first phase of the validation will be of technical and scientific nature, to ensure the quality of the results and the final product obtained; the second phase will involve the participation of the users, to verify the compliance of the products with their requirements.
- The applicability (possibility of integration in the operational chain of service) of the final products will be tested and confirmed by, at least, one end-use.
- The validation procedure will be flexible allowing for error verification and improvements whenever required.
- The sustainability of the processing chain of the product, that end is to be confirmed by the assessment of the costs (time/data/people) needed to develop the same product for another area.

For each product, a validation protocol will be defined, describing the data used. To harmonize the description of the validation protocol the following table outlines a preliminary approach to the quality control:

Table 4-10. Draft quality assurance sheet for products

Product		
1	Product	Name of the product
2	Product version	Version of the product

3	Description	Brief description of the product being checked
4	Keywords	Search keywords according to the thesauri defined for the project
5	Partner	The responsible partner for developing the product
6	Input data	Identification of the input EO and non-EO data used to compute the product
7	Area of interest	The area of interest covered by the product
Validation		
8	Procedure	The stage within the product development process that requires validation, or the type of processing step that is validated.
9	Ancillary data	Independent/external data required and their sources
10	Methodology	Methods (statistical or others) applied for validation; describe the set of methodological steps to carry out
Description		
11	Detailed description of the validation methodology and activities to carry out and their results (qualitative and quantitative)	

5. FORWARD DATA MANAGEMENT PLAN

The following actions are planned to continue the data management plan:

- Calculation of the total data size required per product and AOI. The total data size will be calculated with the results of the previous action “Estimation of the size of EO data by AOI and sensor “. These calculations will include intermediate data and output data sizes.
- Develop quality control procedures for EO observation data and partners’ data. Quality control procedures will consist in checklist with different steps according to the data type. The requirements of MSF products and services will determine the minimum quality thresholds of checklist step.

ANNEX A. DATA RECORD TABLE

A.1. GLOSSARY

Table A-1 Data sheets in the data record table

Data Sheets	Contents
Available_datad	The sheet "Available_data " lists all partners' datasets which are already acquired before MSF project
Copernicus_EO_data	The sheet "Copernicus_EO_data" records all requests of satellite Earth observation data. These requests include both free data (Sentinel) and restricted (ESA CSCDA)
Data_provision	The sheet "Data_record" records the data provisions of the partners which will be acquired during the project development
Data_needs	The sheet "Data_needs" records the partner's requests of data and their information needs

Table A-2 Data fields considered in the data sheets of the record table

Data Fields	Contents
Access level (open / restricted)	In sheets "Available_data ", "Data_provision" and "Data_needs" the field " Access level (open / restricted)" contains the property rights and delivery restrictions of the data. This field can have the following values: 1. Open: it allows free distribution and use of the dataset. 2. Restricted: it indicates the presence of a license which limits the dataset use and distribution.
Acquisition code	In the sheet "Copernicus_EO_data" the field "Acquisition code" is a unique identifier of each acquisition. It is formed by the following fields: "AOI acronym" and "Request_date".
Acquisition date	In sheets "Available_data ", "Data_provision" and "Data_needs" the field "Acquisition date" indicates the date when the data was produced, recorded or obtained.
Acquisition end date	In sheet "Copernicus_EO_data" the field "Acquisition end date" indicates the most recent date when ended the data recording.
Acquisition start date	In sheet "Copernicus_EO_data" the field "Acquisition start date" indicates the oldest date when started the data recording.
AOI acronym	In sheets ""Available_data ", "Copernicus_EO_data", "Data_provision" and "Data_needs" the field "AOI acronym refers to the AOI where the data belongs to. A data record only can be assigned to a single AOI.
AOI fully covered? (y/n)	In sheets "Available_data_record", "Data_provision" and "Data_needs" the field "AOI fully covered? (y/n)" specifies wether the dataset covers the entire AOI (y) or not (n).
Archive / New acquisition	This field "Archive / New acquisition" of the sheet "Copernicus_EO_data" specifies if the EO data request is for file data (Archive) or future acquisitions (New acquisition).
Cartographic scale	In sheets "Available_data ", "Data_provision" and "Data_needs" the field "Cartographic scale" is the ratio of a distance on the map to the corresponding distance on the ground. This field only is applicable to vector or map data.
Classification:	In sheets "Available_data ", "Data_provision" and "Data_needs" the field "Classification" refers to the thematic category of the data. This field can have the following values: 1. Airborne imagery 2. Airborne LIDAR 3. DTM 4. Forest inventory 5. Forest maps 6. LULC 7. Soil map 8. Terrestrial LIDAR 9. Other"
Cloud cover	In sheet "Copernicus_EO_data" the field "Cloud cover" contains the percentage of EO optical data surface masked by clouds. This field only is applicable to optical data.

Data Fields	Contents
Current data location	In sheets "Available_data", "Copernicus_EO_data", "Data_provision" and "Data_needs" the field “Current data location" presents the locations where are stored the data. This field must be filled only by the consortium coordinator.
Current Volume (Gb)	In sheets "Available_data", "Data_provision" and "Data_needs" the field "Current Volume (Gb)" refers to dataset's size in Gigabytes of computer memory.
DAP code	In sheet "Copernicus_EO_data" the field “DAP code” records the unique identifier that DAP provides to each request.
DAP consumption	In sheet "Copernicus_EO_data" the field "DAP consumption" records the consumed quota of DAP in square kilometers
Dataset title	In sheet "Copernicus_EO_data" the field "Dataset Title" contains the full name of MSF quota datasets from ESA CSCDA that each quota EO data are assigned Table 3-1.
Download link	In sheet "Copernicus_EO_data" the field "Download link" records the url to download the imagery data. This field is filled if it is applicable.
File format	In sheets "Available_data_record", "Data_provision" and "Data_needs" the field “File format” refers to the file extension in which the data is stored. I.e.: tiff, jp2000, shp, access, xls…
File quantity	In sheets "Available_data_record", "Data_provision" and "Data_needs" the field “File quantity" indicates the number of files which constitutes the dataset.
Final data location (platform / owner)	In sheets "Available_data_record", "Data_provision" and "Data_needs" the field “Final data location” informs if the data are stored in the storage of their owner partner (Owner) or in MSF storage (Platform).
Geographic system	In sheets "Available_data ", "Data_provision" and "Data_needs" the field "Geographic system" contains the name and specifications of the geographic system in which the data are projected.
Georreferenced (y/n)	In sheets "Available_data ", "Data_provision" and "Data_needs" the field "Georreferenced (y/n)" indicates if the data are georeferenced (y) or not (n).
ID	Unique identifier of each sheet record. This field must be filled only by the consortium coordinator.
Image Ids	In sheet "Copernicus_EO_data" the field "Image Ids" contains the unique identifications of the images that constitute the datasets
Input / Validation / Output	In sheets "Available_data_record", "Data_provision" and "Data_needs" the field "Input / Validation / Output" indicates the role of the data in MSF products and services. This field can have the following values: 1. Input data: Datasets ingested in the platform to produce output data. 2. Validation data: Datasets ingested in the platform to check the accuracy of output data. 3. Output data: Final products of the platform."
LIDAR pulse density	In sheets "Available_data_record", "Data_provision" and "Data_needs" the field "LIDAR pulse density" provides the number of LIDAR pulses per surface unit, generally square meters.
Minimum Mapping Unit	In sheets "Available_data_record", "Data_provision" and "Data_needs" the field "Minimum Mapping Unit” contains the lower surface / length threshold used to discriminate if a certain element is incorporated in the data or not. This field applies to vector or map data.
Name	In pages "Available_data_record", "Data_provision" and "Data_needs" the field “Name" is the name used to identify a certain set of data.
Notes:	Free text to describe any relevant information which cannot be described with other fields.
Optical / SAR	This field "Optical / SAR" of the sheet "Copernicus_EO_data" records the EO sensor type which acquired the data. This field has two possible: optical or SAR.
Partner acronym	In sheets "Available_data", "Copernicus_EO_data" and "Data_provision" the field "Partner acronym" indicates the consortium member responsible of the sheet entry (AOI, data). The consortium member is identified by its acronym.

Data Fields	Contents
Petitionary partner	In sheet "Data_needs" the contents of field "Petitionary partner" refer to the consortium member which requested the Earth observation data. The consortium member is identified by its acronym.
Pixel size (meters)	In sheets "Available_data ", "Data_provision" and "Data_needs" the field "Pixel size (meters)" contains the dimensions on the ground of a single pixel of the raster data. This field only is applicable to raster data and it is measured in meters.
Process level	In sheet "Copernicus_EO_data" the field "Process level" contains the applied corrections to EO data before their delivery to MSF consortium. This field values depends on the field "Sensor" because the applied corrections changes from one sensor to other. I.e.: For Sentinel 2 sensor the field “Process levels” has the following values: S2MSI1C, S2MSI2A or S2MSIAp.
Product	In sheet "Copernicus_EO_data" the field "Product" describes the format used to deliver the data. This field values depends on the field "Sensor" because each Sensor has its specifications. I.e.: bundle, panchromatic, HH polarization…
Quota / No quota	This field "Free (Sentinel) / Restricted (DAP)" of the sheet "Copernicus_EO_data" shows the source of the EO data. This field has two possible values: free sentinel data and restricted use data from ESA CSCDA.
Reception date	In sheets "Available_data”, “Copernicus_EO_data", "Data_provision" and "Data_needs" the field "Reception date indicates the date when the data are available for MSF partners. This field must be filled only by the consortium coordinator.
Request date	In sheets "Copernicus_EO_data" and "Data_needs" the field "Request date" records the date when an application of information is done.
Responsible Partner	In sheet "Data_needs" the contents of field "Responsible Partner" refer to the consortium member which provides a certain Earth observation dataset. This consortium member is identified with its acronym.
Sampling method	In sheets "Available_data ", "Data_provision" and "Data_needs" the field "Sampling method" contains the strategy of measurement distributions which was used to acquire the data. This field is only applicable to forest inventories and land survey data.
Sampling scale	In sheets "Available_data ", "Data_provision" and "Data_needs" the field "Sampling scale" contains the distance between measurements which was defined in data acquisition methodology. This field applies to forest inventories and land survey data.
Sensor	In sheet "Copernicus_EO_data" the field "Sensor" contains the commercial name of the sensor which was used to acquire the dataset. Examples of sensors: Rapideye, Worldview, Sentinel2, Radarsat...
Surface (ha)	In sheets "Available_data ","Copernicus_EO_data", "Data_provision" and "Data_needs" the field "Surface (ha)" contains the area covered by data measured in hectares.
Surface (Km2)	In sheets "Available_data","Copernicus_EO_data", "Data_provision" and "Data_needs" the field "Surface (ha)" contains the area covered by data measured in square kilometres.
Type (map, vector, raster, LIDAR…)	In sheets "Available_data ", "Data_provision" and "Data_needs" the field “Type (map, vector, raster, LIDAR…)” refers to classification of the data according to GIS terminology. This field can have the following values: 1. Vector 2. Raster 3. LIDAR
Yearly volume growth (Gb)	In sheets "Available_data ", "Data_provision" and "Data_needs" the field "Yearly volume growth (Gb)" contains the expected increase of the data size per year.

A.2. DATA AVAILABLE AT THE BEGINNING OF THE PROJECT

Table A-3 Available data In MSF project

ID	AOI acronym	Classification	Input / Validation / Output	Access level (open / restricted)	Name	Acquisition date	Notes
1	UFE1	AIRBORNE LIDAR	Input	Open	LIDAR	17/09/2014 - 18/09/2014	Sensor Leica ALS70 / Flight speed (ms−1) 70 / Flying altitude (m a.g.l.) 700 / Pulse repetition frequency (kHz) 301.8 / Pulse density 7.8 / Half scan angle (deg.) 24
2	UFE1	DIGITAL ELEVATION MODEL	Input	Open	DTM	17/09/2014 - 18/09/2014	
3	UFE1	FOREST INVENTORY DATA	Validation	Open	Ground data of forest stand from management plan	2012	Stand level. Age, stand, species, species composition%, Mean DBH(cm), Mean height (m), Mean stem volume (m2), Standing volume per 1 ha / total (m3), Standing volume to be harvested (m3)
4	RAIZ1	FOREST INVENTORY DATA	Input / Validation	Restricted	Sampling-base field forest inventory	2002-2017	In 2016: 6 plots with: measurement tree coordinates, DBH and height. All other years: DBH and height.
5	RAIZ1	TERESTRIAL LIDAR	Validation	Restricted	Terrestrial Laser Scanning (TLS)	2016	Leica system on 6plots - each plot with 4 full scans -October 2016
6	RAIZ1	AIRBORNE LIDAR	Validation	Restricted	Airborne Laser Scanning (ALS)	2016	October 2016
7	RAIZ1	AERIAL IMAGES	Validation	Restricted	Photogrammetry dataset	2016 - 2017	October 2016 and July/August 2017
8	RAIZ1	SOIL MAP	Input	Restricted	Soil Characterization and Stratification	on-going sampling	
9	RAIZ1	LULC	Input / Validation	Restricted	Land Use Land Cover changes (The Navigator Company)	on-going sampling	
10	RAIZ2	FOREST INVENTORY DATA	Input / Validation	Restricted	Sampling-base field forest inventory	2017	plot georrefering, tree DBH and height. land use characterization

ID	AOI acronym	Classification	Input / Validation / Output	Access level (open / restricted)	Name	Acquisition date	Notes
11	RAIZ2	LULC	Input / Validation	Open	Land Use Land Cover 2010 (COS 2010)		
12	RAIZ2	FOREST INVENTORY DATA	Input / Validation	Auxiliar data	Nacional Forest Inventory (NFI)		
13	RAIZ3	FOREST INVENTORY DATA	Input / Validation	Restricted	Sampling-base field forest inventory	2002-2017	All other years: DBH and height in each tree within each plot/parcel
14	RAIZ3	FOREST INVENTORY DATA	Input / Validation	Restricted	Permanent forest sample plots	2010-2017	All other years: DBH and height in each tree within each plot/parcel
15	RAIZ3	SOIL MAP	Auxiliar data	Restricted	Soil Characterization and Stratification		
16	RAIZ3	METEOROLOGICAL DATA	Input / Validation	open	Meteorological Data (weather station)	2012-2017	
17	RAIZ3	LULC	Input / Validation	Restricted	Land Use Land Cover changes (The Navigator Company)		
18	CNPF1	LULC	Input	Open	Raster CES OSO (Cesbio-Theia)	2016	
19	CNPF1	LULC	Input	Restricted	Vector Carto (IGN*)	2017	
20	CNPF1	FOREST MAPS	Input	Restricted	Vector BD Foret (IGN*)	2017	
21	CNPF1	AERIAL IMAGES	Input	Restricted	Raster BD Ortho	2015	
22	CNPF1	SOIL MAP	Input	Open	Vector Predictive soil (CNPF)		
23	CNPF1	FOREST MAPS	Input	Open	Management data: Vector Forest plot (main forest types, ages)		plots (main forest types, ages)
24	CNPF1	FOREST INVENTORY DATA	Input	Open	Forest inventory data at individual tree and plot level	2008	density, height
25	CNPF2	LULC	Input	Open	Raster CES OSO (Cesbio-Theia)	2016	

ID	AOI acronym	Classification	Input / Validation / Output	Access level (open / restricted)	Name	Acquisition date	Notes
26	CNPF2	LULC	Input	Restricted	Vector Carto (IGN*)	2017	
27	CNPF2	FOREST MAPS	Input	Restricted	Vector BD Foret (IGN*)	2014	
28	CNPF2	AERIAL IMAGES	Input	Restricted	Raster BD Ortho	2015	
29	CNPF2	FOREST MAPS	Input	Open	Management data: Vector Forest plot (main forest types, ages)	2016	plots (main forest types, ages)
30	CNPF2	FOREST INVENTORY DATA	Input	Open	Forest inventory data at individual tree and plot level	2015-2017	density, height
31	CNPF2	DIGITAL ELEVATION MODEL	Input	Open	Raster Digital Height model	2015	
32	CFRI1	AERIAL IMAGES	Input	Restricted	Digital stereo aerial images	summer 2011	Aerial images from regular topographic survey, UltraCam X, CIR stereo images with ≈70% forward and ≈30% side overlap
33	CFRI1	AERIAL IMAGES	Input	Restricted	Digital stereo aerial images	summer 2015	Aerial images from regular topographic survey, UltraCam Xp, RGB stereo images with ≈60% forward and ≈30% side overlap; images provided by Croatian State Geodetic Administration within the project of Croatian Science Foundation (project leader: Ivan Balenović)
34	CFRI1	DIGITAL ELEVATION MODEL	Output	Open	DSM	summer 2015	Produced from digital stereo aerial images, optimal pixel size will be define (e.g. 0.5 m to correspond with LiDAR DSM) ; photogrammetric processing and testing ongoing
35	CFRI1	DIGITAL ELEVATION MODEL	Output	Open	CHM	summer 2015	Produced from digital stereo aerial images, optimal pixel size will be define (e.g. 0.5 m to correspond with LiDAR CHM); photogrammetric processing and testing ongoing
36	CFRI1	AIRBORNE LIDAR	Input	Restricted	LiDAR	summer 2016	Already classified LiDAR data provided by Hrvatske vode Ltd. for the purppose of the project of Croatian Science Foundation (project leader: Ivan Balenović); Sensor: Optech ALTM Gemini 167; Flying date: 29 June - 25 August 2016
37	CFRI1	DIGITAL ELEVATION MODEL	Output	Open	DSM	summer 2016	Produced from LIDAR data; the data are currently in grid format of 0.5 m, 1 m, 2 m, 5 m. The raster format will be generated after decision on resolution to be used
38	CFRI1	DIGITAL ELEVATION MODEL	Output	Open	DTM	summer 2016	Produced from LIDAR data; the data are currently in grid format of 0.5 m, 1 m, 2 m, 5 m. The raster format will be generated after decision on resolution to be used

ID	AOI acronym	Classification	Input / Validation / Output	Access level (open / restricted)	Name	Acquisition date	Notes
39	CFRI1	DIGITAL ELEVATION MODEL	Output	Open	CHM	summer 2016	Produced from LIDAR data; the data are currently in grid format of 0.5 m, 1 m, 2 m, 5 m. The raster format will be generated after decision on resolution to be used
40	CFRI1	VHR SATELLITE IMAGES	Input	Restricted	VHR Satellite stereo images	summer2017	Worldview3 stereo images acquired within the project of Croatian Science Foundation (project leader: Ivan Balenović)
41	CFRI1	DIGITAL ELEVATION MODEL	Output	Open	DSM	summer 2017	Produced from VHR Satellite stereo images
42	CFRI1	DIGITAL ELEVATION MODEL	Output	Open	CHM	summer 2017	Produced from VHR Satellite stereo images
43	CFRI1	FOREST INVENTORY DATA	Validation	Restricted	Regular forest inventory (stand level)	summer 2013	Data collected within regular forest inventory for creation of forest management plans: stand delineation, stand level forest variables – stand height, mean dbh, annual increment, stand volume
44	CFRI1	FOREST INVENTORY DATA	Validation	Open	Forest inventory data at individual tree and plot level	2017-2018	RTK GNSS records of plot centers (SD≤10 cm), tree position (azimuth and distance from plot center), diameter at breast height, tree height, crown diameter (in 2 or 4 directions), qualitative characteristics, tree cores, etc.
45	CFRI2	FOREST INVENTORY DATA	Validation	Restricted	Regular forest inventory		This relates to operational map used by Croatian State forests for construction of the forest managerial plans (To be improved by MySF). Additional supplementary plot scale information are available.
46	CFRI2	SOIL MAP	Validation	Restricted	Plot scale soil		This relates to operational map used by Croatian State forests for construction of the forest managerial plans (To be improved by MySF). Additional supplementary plot scale information are available.
47	CFRI2	PLANT COMMUNITIES MAP	Validation	Restricted	Plant communities maps		This relates to operational map used by Croatian State forests for construction of the forest managerial plans (To be improved by MySF). Additional supplementary plot scale information are available.
48	CFRI2	ECOSYSTEM MAP	Validation	Restricted	Forest ecosystem maps		This relates to operational map used by Croatian State forests for construction of the forest managerial plans (To be improved by MySF). Additional supplementary plot scale information are available.
49	CFRI2	HYDROLOGY	Validation	Open	Groundwater monitoring data on 55 locations	1998-	
50	UFE1	AERIAL IMAGES	Input	Open	Aerial photos	2014	

ID	AOI acronym	Classification	Input / Validation / Output	Access level (open / restricted)	Name	Acquisition date	Notes
51	UFE1	OTHER FOREST MAPS	Validation	Open	UFE_Maps of management plan	2012	
52	FOAL1	AOI	Input	Open	AOI		
53	FOAL2	AOI	Input	Open	AOI		
54	UFE1	FOREST INVENTORY DATA	Input	Open	UFE_Permanent_plots_Borky	2003, 2008, 2012	
55	UFE1	FOREST INVENTORY DATA	Input	Open	UFE_Permanent_plots_Sobesice	2013	
56	UFE1	MANAGEMENT PLAN OF FOREST UNITS	Validation	Open		2012	
57	UFE1	AOI	Input	Open	UFE1_AOI_UTM33N_WGS84		Produced 28/02/2018
58	CNPF1	AOI	Input	Open	zonesCentreL93		
59	CNPF2	AOI	Input	Open	zone_NA		
60	FORESNA1	FOREST MAPS	Input	Open	OCUPAC_Pol_MCA_VE2012	2012	
61	FORESNA1	AOI	Input	Open	AOI_FORESNA_UTM_30N_ETRS89		
62	RAIZ1	AOI	Input	Open	CasePilotRAIZ_DataSites		
63	CFRI1	AOI	Input	Open	CFRI1_AOI_UTM33N_WGS84		
64	CFRI2	AOI	Input	Open	MSF_AOI_2_Croatia_EPSG_4326		
65	FORESNA1	TOPOGRAPHIC	Input / Validation	Open	Topográfica_CAD_1/5000	1990-1998	

ID	AOI acronym	Classification	Input / Validation / Output	Access level (open / restricted)	Name	Acquisition date	Notes
66	FORESNA1	TOPOGRAPHIC	Input / Validation	Open	Topográfica_CAD_1/10000	1990-1998	
67	FORESNA1	TOPOGRAPHIC	Input / Validation	Open	Topográfica_SIG_1/5000	1999-2013	
68	FORESNA1	TOPOGRAPHIC	Input / Validation	Open	Topográfica_SIG_1/10000	1999-2013	
69	FORESNA1	TOPOGRAPHIC	Input / Validation	Open	Topográfica_Continua_SIG_1/5000	1999-2013	
70	FORESNA1	TOPOGRAPHIC	Input / Validation	Open	Topográfica_BTA_1/5000	2014	
71	FORESNA1	TOPOGRAPHIC	Input / Validation	Open	Topográfica_BTA_1/25000	2014	
72	FORESNA1	TOPOGRAPHIC	Input / Validation	Open	Topográfica_BTA_BASE_1/25000	2014	
73	FORESNA1	TOPOGRAPHIC	Input / Validation	Open	Mallas_cartografia	2014	
74	FORESNA1	GEOLOGY	Input	Open	Mapa_Geologico_25000	2010	Mask of Geologic
75	FORESNA1	GEOMORPHOLOGY	Input	Open	Mapa_Geomorfológico	2007	Map
76	FORESNA1	FOREST MAPS	Input / Validation	Open	Mapa_Forestal	2014	Map
77	FORESNA1	FOREST INFRASTRUCTURES	Input / Validation	Open	Pistas_forestales	2011	Forestal roads clasified by road conditions and use
78	FORESNA1	NPA	Input	Open	ZEC	2011	Mask of NPA
79	FORESNA1	NPA	Input	Open	ZEPA	2011	Mask of NPA
80	FORESNA1	NPA	Input	Open	ENP	2011	Mask of NPA

ID	AOI acronym	Classification	Input / Validation / Output	Access level (open / restricted)	Name	Acquisition date	Notes
81	FORESNA1	PLANT COMMUNITIES MAP	Input	Open	Mapa_series de vegetacion	2011	Mask of vegetation
82	FORESNA1	VEGETATION POTENTIAL	Input	Open	Mapa_vegetación potencial	2011	Mask of vegetation
83	FORESNA1	ECOSYSTEM MAP	Input	Open	Hábitats de interés comunitario HIC	2011	Mask of HIC
84	FORESNA1	LULC	Input/Validation	Open	Mapa cultivos y aprovechamientos	2012	Divided in 7 regions
85	FORESNA1	LULC	Input	Open	Mapa cultivos y aprovechamientos cambios 1956/2008	2012	Divided in 7 regions
86	FORESNA1	LULC	Input	Open	Mapa de pastos	2012	Mask of vegetation
87	FORESNA1	AERIAL IMAGES	Input	Open	Photogrammetry dataset	1929-2017	Ortophoto from years 1929, 1946, 1956, 1966, 1967, 1969, 1970,1971, 1982, 2003, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2017
88	FORESNA1	AIRBORNE LIDAR	Input	Open	LIDAR	2011-2012	-
89	FORESNA1	DIGITAL ELEVATION MODEL	Input / Validation	Open	MDS	2012-2014	-
90	FORESNA1	DIGITAL ELEVATION MODEL	Input / Validation	Open	MDT	2012-2014	-
91	FORESNA1	DIGITAL ELEVATION MODEL	Input / Validation	Open	DTM slopes	2014	Produced from LiDAR data of 2011-2012
92	FORESNA1	DIGITAL ELEVATION MODEL	Input / Validation	Open	DTM orientation	2014	Produced from LiDAR data of 2011-2012
93	FORESNA1	GEODESIC POINTS	Input	Open	Geodesic points network	2010	-
94	FORESNA1	METEOROLOGICAL DATA	Input	Open	weather station	2010	Mask of water station localization

ID	AOI acronym	Classification	Input / Validation / Output	Access level (open / restricted)	Name	Acquisition date	Notes
95	FORESNA1	METEOROLOGICAL DATA	Input	Open	Meteorological Data	1974-2017	Meteorological network from navarra
96	FORESNA1	HYDROLOGY	Input	Open	Hidrographic network	2010	Mask of hidrographic network
97	FORESNA1	HYDROLOGY	Input	Open	Hidrometric network	2010	Mask of hidrometric station localization
98	FORESNA1	FOREST INVENTORY DATA	Input / Validation	Open	Type of stand	2010	Map
99	FORESNA1	FOREST INVENTORY DATA	Input / Validation	Open	Specie	2010	Map
100	FORESNA1	FOREST INVENTORY DATA	Input / Validation	Open	wood volume	2010	Map
101	FORESNA1	FOREST INVENTORY DATA	Input / Validation	Open	CO2 stocks	2010	Map
102	FORESNA1	FOREST INVENTORY DATA	Input / Validation	Open	fuel model	2010	Map
103	FORESNA1	FOREST INVENTORY DATA	Input / Validation	Open	Nacional Forest Inventory (NFI)	2009	Public archives from the Ministery of environment of Spain
104	FORESNA1	FOREST INVENTORY DATA	Input / Validation	Open	Forestal Damages Inventary (IDF)	Anualy	Public archives from the Ministery of environment of Spain
105	FORESNA1	SOIL MAP	Input / Validation	Open	Nacional soil erosion inventary (INES)	2016	Public archives from the Ministery of environment of Spain
106	FORESNA1	FOREST INVENTORY DATA	Input / Validation	Restricted	Forest inventory data at plot level	2010-2017	Age, stand, species, species composition%, Mean DBH(cm), Mean height (m), Mean stem volume (m2), Standing volume per 1 ha / total (m3), Standing volume to be harvested (m3)
107	FORESNA1	FOREST INVENTORY DATA	Input / Validation	Restricted	Ground data of forest stand from management plan	2010-2017	Age, stand, species, species composition%, Mean DBH(cm), Mean height (m), Mean stem volume (m2), Standing volume per 1 ha / total (m3), Standing volume to be harvested (m3)
108	MADERA+1	AOI	Input	Open	Northwestern Spain Plots	2018	38 circular sample plots (r = 14.1 m) ocated in northwerstern Spain (Galicia)

ID	AOI acronym	Classification	Input / Validation / Output	Access level (open / restricted)	Name	Acquisition date	Notes
109	UFE1	METEOROLOGICAL DATA	Input	Open	Meteorological data from microstations	continuously	8 microstations
110	FORESNA2	AOI	Input	Open	AOI_FORESNA_2_UTM_30N_ETRS89		Pirinean AOI of Pinus Sylvestris
111	FOAL1	FOREST INVENTORY DATA	Input	Restricted	State stand-wise forest inventory data	2008-2009 (2017)	Standard data based on State stand-wise forest inventory and available from Lithuanian state forest cadastre. Free for research projects if special licence agreement with State forest service is concluded. Data collected in 2008 and 2009, attribute component updated to represent 2017
112	FOAL1	AERIAL IMAGES	Input	Restricted	CIR orthophotos used for stand-wise forest inventories	2016 (73 mapsheets), 2017 (177 mapsheets)	CIR orthophotos used to conduct state stand-wise forest inventories. Available at State forest service for free for research, copies at FOAL, images acquired using frame camera in summer season. TIFF files are also available. Mosaics and georeferenced images.
113	FOAL1	AERIAL IMAGES	Input	Restricted	CIR orthophotos used for stand-wise forest inventories	2007	CIR orthophotos used to conduct state stand-wise forest inventories. Available at State forest service for free for research, copies at FOAL, images acquired using frame camera in summer season. TIFF files are also available. Mosaics and georeferenced images.
114	FOAL1	FOREST INVENTORY DATA	Validation	Restricted	Data of stand-wise forest inventory data for selected private forest owners	2010-2018	Data from stand-wise forest inventory of private forest estates, based on the State stand-wise forest inventory data (as described elsewhere). Created by FOAL partners and used to develop forest management plans for private forest owners
115	FOAL1	DIGITAL ELEVATION MODEL	Input	Open	DTM based on ALS data from National Land Service	2010	Raster DTM developed using ALS-based terrain models available from www.geoportal.lt
116	FOAL1	TOPOGRAPHIC	Input	Open	Geo-reference data set from National Land Servics	since 2000	Various geographic datasets available from www.geoportal.lt, including orthophotos (every 3-5 years), georeference background data (roads, waters, etc.)
117	FOAL2	FOREST INVENTORY DATA	Input	Restricted	State stand-wise forest inventory data	2012 (2017)	Standard data based on State stand-wise forest inventory and available from Lithuanian state forest cadastre. Free for research projects if special licence agreement with State forest service is concluded. Data collected in 2012, attribute component updated to represent 2017
118	FOAL2	FOREST INVENTORY DATA	Input	Open	Stand-wise forest inventory data	2002	Data from previous stand-wise inventory (carried-out in 2002)
119	FOAL2	AERIAL IMAGES	Input	Restricted	CIR orthophotos used for stand-wise forest inventories	2010	CIR orthophotos used to conduct state stand-wise forest inventories. Available at State forest service for free for research, copies at FOAL, images acquired using frame camera in summer season. Mosaics and georeferenced images.

ID	AOI acronym	Classification	Input / Validation / Output	Access level (open / restricted)	Name	Acquisition date	Notes
120	FOAL2	AERIAL IMAGES	Input	Restricted	CIR orthophotos used for stand-wise forest inventories	2001	CIR orthophotos used to conduct state stand-wise forest inventories. Available at State forest service for free for research, copies at FOAL, images acquired using frame camera in summer season. Mosaics only
121	FOAL2	TOPOGRAPHIC	Input	Open	Geo-reference data set from National Land Servics	since 2000	Various geographic datasets available from www.geoportal.lt, including orthophotos (every 3-5 years), georeference background data (roads, waters, etc.)
122	FOAL2	DIGITAL ELEVATION MODEL	Input	Open	DTM based on ALS data from National Land Service	2010	Raster DTM developed using ALS-based terrain models available from www.geoportal.lt
123	FOAL2	PROTECTION STATUS	Input	Restricted	Protected areas and compartments with any management restriction	2017	Dataset based on information available from several databases, identifying management restrictions due to focus on other than timber supply ecosystem services and natural disturbance regime. The database is developed using the information from State forest cadastre and assigning all management restrictions to each compartment
124	RAIZ4	AOI	Input	Open	RAIZ4_ZIF_APFC_Grid.shp	2018	
125	CFRI2	HR SATELLITE IMAGES	Input	Open	planet_order_112366	29/07/2017	

A.3. DATA TO BE COLLECTED DURING THE PROJECT

Table A-4 Data provisioned to be acquired during MSF project

ID	AOI acronym	Classification	Input / Validation / Output	Access level (open / restricted)	Name	Acquisition date	Notes
1	CFRI1	Forest inventory	Validation	Open	Forest inventory	2017-2018	Data collection still ongoing (expect to be finished by the end of the March 2018)
2	UFE1	LIDAR	Input		Repeated LIDAR	2018	
3	UFE1	Ground survey	Validation		Ground survey (GPS)	2018- 2020	Ground survey (GPS) of bark beetle trees as a verification for remote sensing

ID	AOI acronym	Classification	Input / Validation / Output	Access level (open / restricted)	Name	Acquisition date	Notes
4	UFE1	Forest inventory	Validation		Repeated survey (Ground tree data from permanent plots)	2018-2019	Circular permanent plots (500 m2 each) in statistical grid (ca 120 x 120 m), fixed in forest. Measurements: Tree coordinates, DBH, height, crown base, tree layer classification, demages, stumps, dead wood, regeneration, etc
5	RAIZ1	DIGITAL ELEVATION MODEL	Input/validation	Restricted	DEM point validation	2018 (May/June)	Assess the distributions of the differences between terrain points and control points.
6	RAIZ1	LULC	Input/calibration/validation	Restricted	Land Use Training Areas, Test Areas, validation areas	2018-2020	
7	RAIZ1	FOREST INVENTORY	Input/validation	Restricted	Sampling-base field forest inventory for training and for validation	2018-2020	
8	RAIZ1	BIOMASS DATA	Input/validation	Restricted	Sampling-base tree volume and biomass components measurement for training and for validation	2018-2020	
9	RAIZ1	METEOROLOGICAL DATA	Input/calibration/validation	Open	Meteorological Data (new and old weather station)	2018-2020	
10	RAIZ2	DIGITAL ELEVATION MODEL	Validation	Restricted	DEM point validation	2018 (May/June)	Assess the distributions of the differences between terrain points and control points.
11	RAIZ2	LULC	Input	Restricted	Land Use training areas, test areas, validation areas	2018-2020	
12	RAIZ2	FOREST INVENTORY	Input	Restricted	Sampling-base field forest inventory for training and for validation	2018-2020	
13	RAIZ3	DIGITAL ELEVATION MODEL	Validation	Restricted	DEM point validation	2018 (May/June)	Assess the distributions of the differences between terrain points and control points.
14	RAIZ3	LULC	Input/calibration/validation	Restricted	Land Use training areas, test areas, validation areas	2018-2020	
15	RAIZ3	FOREST INVENTORY	Input	Restricted	Sampling-base field forest inventory for training and for validation	2018-2020	

ID	AOI acronym	Classification	Input / Validation / Output	Access level (open / restricted)	Name	Acquisition date	Notes
16	RAIZ3	BIOMASS DATA	Input	Restricted	Sampling-base tree volume and biomass components measurement for training and for validation	2018-2020	
17	RAIZ3	METEOROLOGICAL DATA	Input/calibration/validation	Open	Meteorological Data (new and old weather station)	2018-2020	
18	RAIZ3	EROSION	Input/calibration/validation	Restricted	Erosion monitoring	2018-2020	
19	RAIZ3	BIODIVERSITY MONITORING	Input/calibration/validation	Restricted	Biodiversity monitoring focus on forest conservation and protection areas	2018-2019	
20	RAIZ4	DIGITAL ELEVATION MODEL	Validation	Restricted	DEM point validation	2018 (April)	Assess the distributions of the differences between terrain points and control points.
21	RAIZ4	LULC	Input/calibration/validation	Restricted	Land Use Training Areas, Test Areas, validation areas	2018-2020	
22	RAIZ4	FOREST INVENTORY	Input	Restricted	Sampling-base field forest inventory for training and for validation	2018-2020	
23	RAIZ4	BIOMASS DATA	Input	Restricted	Sampling-base tree volume and biomass components measurement for training and for validation	2018-2020	
24	RAIZ4	METEOROLOGICAL DATA	Input/calibration/validation	Open	Meteorological Data (new and old weather station)	2018-2020	
25	RAIZ4	BIOTIC DAMAGES AND FOREST VITALITY	Input/calibration/validation	Open	Biotic damages and forest vitality	2018-2020	
26	CFRI2	Meteorological data	Validation	Open	5 Field automatic weather stations	2018	Only for the Nasice forest administration. Croatian forests Ltd.

ID	AOI acronym	Classification	Input / Validation / Output	Access level (open / restricted)	Name	Acquisition date	Notes
27	CFRI2	Hydrology	Validation	Open	22 automatic groundwater monitoring divers/loggers	2018	Only for the Nasice forest administration. Croatian forests Ltd.
28	CFRI2	Plant communities/invasive species survey	Validation	Open	Mapping of the plant communities/invasive species	2018	Only for the Nasice forest administration. Detail field asessment of plant occurence and abundancy, forest type definition and mapping. CFRI
29	CFRI2	Dendrochronology	Validation	Restricted	Dendrochronological asessment on 10 plots	2018	Only for the Nasice forest administration/ Koska forest office. Croatian forests Ltd.
30	CFRI2	LIDAR	Input	Restricted	LIDAR for detail DEM generation (winter survey)	2018	Only for the Nasice forest administration/ Koska forest office. Croatian forests Ltd.
31	FORESNA1	Airborne LIDAR	Input	Open	LIDAR	2017	It will be available before june 2018
32	FORESNA1	Meteorological data	Input	Open	Meteorological Data	2018/2020	Meteorological network from Navarra
33	FORESNA1	Forest inventory	Validation	Restricted	Type of stand	2010	Shapefiles correponding to Plan Comarcal maps
34	FORESNA1	Forest inventory	Validation	Restricted	Specie	2010	Shapefiles correponding to Plan Comarcal maps
35	FORESNA1	Forest inventory	Validation	Restricted	wood volume	2010	Shapefiles correponding to Plan Comarcal maps
36	FORESNA1	Forest inventory	Validation	Restricted	CO2 stocks	2010	Shapefiles correponding to Plan Comarcal maps
37	FORESNA1	Forest inventory	Validation	Restricted	fuel model	2010	Shapefiles correponding to Plan Comarcal maps
38	FORESNA1	Forest inventory	Input	Restricted	Ground data of forest stand from management plan	2008-2017	Some files from forest management plans of Navarra
39	FORESNA1	Forest inventory	Input/validation	Restricted	Forest inventory at plot level	2018-2020	Collection of forest inventory data at individual tree and plot level definied during the project
40	MADERA+1	Wood density Eucalyptus	Output	Restricted	Eucalyptus wood density model		

ID	AOI acronym	Classification	Input / Validation / Output	Access level (open / restricted)	Name	Acquisition date	Notes
41	RAIZ?	Wood density Eucalyptus	Validation	Open	Wood density predictions		Validation prediction model results (MADERA+) with real wood density value obtainded by cores extraction from RAIZ plots (RAIZ?). Added by Madera+.
42	FORESNA?	Pinus Stiffness	Input	Restricted	Sampling-base field forest inventory for training and for validation		Added by Madera+.
43	FORESNA?	Softwood Stiffness	Output	Restricted	Softwood Stiffness predictions		
44	FORESNA?	Softwood Density	Input	Restricted	Sampling-base field forest inventory for training and for validation		
45	FORESNA?	Softwood Density	Output	Restricted	Softwood density predictions		
46	CNPF?	Softwood Stiffness	Validation	Open	Pinus pinaster Stiffness predictions		Validation prediction model results with dynamic stiffnes value obtainded by sonic methods from CNPF pinaster pine plots (MADERA+).
47	UFE?	Softwood Density	Validation	Open	Picea density predictions		Validation prediction model results (MADERA+) with real wood density value obtainded by cores extraction from UFE plots (UFE?).
48	FOAL1	Forest inventory	Validation	Restricted	Stand-wise forest inventory data	2018	Stand-wise forest inventory for state owned forests in the CSA area, to be started in summer 2018.
49	FOAL1	Forest inventory	Validation	Open	Stand-wise forest inventory in private forests data	2018-2019	Stand-wise forest inventory for private owned forests in the CSA area, to be carried-out by FOAL partners during coming years
50	FOAL2	Airborne imagery	Validation	Open	Multitemporal airborne CIR and hyperspectral images, hybrid photogrammetric and LiDAR point clouds	2017-2018	As the FOAL2 AOI serves as a research polygon for numerous other studies, some materials already collected of to be collected may be also available for validation of the products developed in MySustainableForests

A.4. COPERNICUS EO DATA

Table A-5 Copernicus EO data MSF project

ID	Acquisition code	DAP code	AOI acronym	Quota / No quota	Archive / New acquisition	Optical / SAR	Surface (Km2)	Sensor	Product	Process level	Acquisition start date	Acquisition end date
1	CFRI1-20180727-0001	OF#D2_MG2b_MYFO_011a#0001	CFRI1	Quota	Archive	Optical	100	Optical VHR1	Bundle (Panchro. + 8MS)	Ortho ready	20180401	20180826
2	CFRI1-20180727-0002		CFRI1	No quota	Archive	Optical	137	Sentinel2		1C	20171224	20180705
3	CFRI1-20180727-0003		CFRI1	No quota	Archive	SAR	137	Sentinel1	IW		20171226	20180708
4	CFRI1-20180727-0004		CFRI1	No quota	Archive	Optical	137	Landsat		L1TP	19840415	20030603
5	CFRI1-20180727-0005		CFRI1	No quota	Archive	Optical	137	Landsat		L1TP	20130729	20130830
6	CFRI2-20180727-0006	OF#D2_MG2b_MYFO_011a#0002	CFRI2	Quota	Archive	Optical	1103	Optical VHR1	Bundle (Panchro. + 8MS)	Ortho ready	20180401	20180826
7	CFRI2-20180727-0007		CFRI2	No quota	Archive	Optical	1103	Sentinel2		2A	20180520	20180530
8	CFRI2-20180727-0008		CFRI2	No quota	Archive	SAR	1103	Sentinel1	IW		20180521	20180521
9	CFRI2-20180727-0009		CFRI2	No quota	Archive	Optical	1103	Landsat		L1TP	19840620	20080622
10	CFRI2-20180727-0010		CFRI2	No quota	Archive	Optical	1103	Landsat		L1TP	20130620	20131026
11	FORESNA2-20180727-0011	OF#D2_MG2b_MYFO_011a#0003	FORESNA2	Quota	Archive	Optical	950	Optical VHR1	Bundle (Panchro. + 8MS)	Ortho ready	20180401	20180826
12	FORESNA2-20180727-0012		FORESNA2	No quota	Archive	Optical	950	Sentinel2		1C	20170310	20170822
13	FORESNA2-20180727-0013		FORESNA2	No quota	Archive	SAR	950	Sentinel1	IW		20170307	20170822
14	FORESNA2-20180727-0014		FORESNA2	No quota	Archive	Optical	950	Landsat		L1TP	19840421	20080626
15	FORESNA2-20180727-0015		FORESNA2	No quota	Archive	Optical	950	Landsat		L1TP	20080407	2008062

ID	Acquisition code	DAP code	AOI acronym	Quota / No quota	Archive / New acquisition	Optical / SAR	Surface (Km2)	Sensor	Product	Process level	Acquisition start date	Acquisition end date
16	CFRI1-20180830-0016	OF#D2_MG1_MYFO_015a#0002	CFRI1	Quota	Archive	SAR	137	Radar VHR1	SAR Multi Look		20180401	20180826
17	CFRI2-20180830-0017	OF#D2_MG1_MYFO_013a#0001	CFRI2	Quota	Archive	SAR	1103	Radar VHR2	SAR Multi Look		20180401	20180826
18	CFRI2-20180830-0018	OF#D2_MG2_MYFO_009a#0001	CFRI2	Quota	Archive	Optical	1103	Optical HR1	Multispectral 5 bands	Ortho ready	20180401	20180826
19	FORESNA2-20180727-0019	OF#D2_MG1_MYFO_013a#0002	FORESNA2	Quota	Archive	SAR	950	Radar VHR2	SAR Multi Look		20180401	20180826
20	FORESNA2-20180727-0020	OF#D2_MG1_MYFO_015a#0001	FORESNA2	Quota	Archive	SAR	950	Radar VHR1	SAR Multi Look		20180401	20180826
21	FORESNA2-20180727-0021	OF#D2_MG2_MYFO_009a#0002	FORESNA2	Quota	Archive	Optical	9506	Optical HR1	Multispectral 5 bands	Ortho ready	20180401	20180826

A.5. ESTIMATION OF FUTURE DATA NEEDS

Table A-6 Needs of data proposed by MSF projects

ID	Petitionary partner	Responsible Partner	AOI acronym	Classification	Input / Validation / Output	Access level (open / restricted)	Name	Acquisition date	Notes
1	MADERA+	GMV?	MADERA+1	Satellite	Input		SENTINEL 2		Sentinel 2 Satellite data
2	MADERA+	FORA?	MADERA+1	LiDAR	Input				Statistic LiDAR data
3	MADERA+	GMV?	MADERA+1	Meteorological	Input				
4	MADERA+	GMV?	MADERA+1	Altimetry, Physiography	Input				
5	MADERA+		MADERA+1	Age	Input				
6	MADERA+	GMV?	FORESNA1	Satellite	Input		SENTINEL 2		Sentinel 2 Satellite data

ID	Petitionary partner	Responsible Partner	AOI acronym	Classification	Input / Validation / Output	Access level (open / restricted)	Name	Acquisition date	Notes
7	MADERA+	FORA?	FORESNA1	LiDAR	Input				Statistic LiDAR data
8	MADERA+	GMV?	FORESNA1	Meteorological	Input				
9	MADERA+	GMV?	FORESNA1	Altimetry, Physiography	Input				
10	MADERA+		FORESNA1	Age	Input				
11	FOAL		FOAL1	Satellite	Input				
12	FOAL		FOAL2	Satellite	Input				
13	CFRI	GMV	CFRI2	Satellite	Input	Restricted	VHR RAPIDEYE		
14	CFRI	GMV	CFRI2	Satellite	Input	Restricted	ALOS PALSAR		High-sensitive mode Full (Quad.) polarimetry
15	CFRI	GMV	CFRI2	Satellite	Input	Restricted	Worldview		
16	CFRI	GMV	CFRI2	Satellite	Input	Restricted	Sentinel 2		
17	CFRI	CFRI/GMV	CFRI2	Satellite	Input	Restricted	Sentinel 1		
18	CFRI	CFRI/GMV	CFRI2	Satellite	Input	Restricted	Landsat 4-5,7,8		
19	CFRI	GMV	CFRI2	Satellite	Input	Restricted	Sentinel 3		
20	CFRI	GMV	CFRI2	Satellite	Input	Restricted	VHR Spot		
21	RAIZ	GMV	RAIZ1	Satellite	Input	Restricted	TerraSAR-X data	April/ July/October (from 2018 to 2020)	
22	RAIZ	GMV	RAIZ2	Satellite	Input	Restricted	TerraSAR-X data	April/ July/October (from 2018 to 2020)	

ID	Petitionary partner	Responsible Partner	AOI acronym	Classification	Input / Validation / Output	Access level (open / restricted)	Name	Acquisition date	Notes
23	RAIZ	GMV	RAIZ3	Satellite	Input	Restricted	TerraSAR-X data	April/ July/October (from 2018 to 2020)	
24	RAIZ	GMV	RAIZ4	Satellite	Input	Restricted	TerraSAR-X data	April/ July/October (from 2018 to 2020)	
25	RAIZ	GMV	RAIZ1	Satellite	Input	Restricted	VHR RAPIDEYE	April/ July/October (from 2018 to 2020)	
26	RAIZ	GMV	RAIZ2	Satellite	Input	Restricted	VHR RAPIDEYE	April/ July/October (from 2018 to 2020)	
27	RAIZ	GMV	RAIZ3	Satellite	Input	Restricted	VHR RAPIDEYE	April/ July/October (from 2018 to 2020)	
28	RAIZ	GMV	RAIZ4	Satellite	Input	Restricted	VHR RAPIDEYE	April/ July/October (from 2018 to 2020)	
29	RAIZ	GMV	RAIZ1	Satellite	Input	Restricted	VHR SPOT	April/ July/October (from 2018 to 2020)	
30	RAIZ	GMV	RAIZ2	Satellite	Input	Restricted	VHR SPOT	April/ July/October (from 2018 to 2020)	
31	RAIZ	GMV	RAIZ3	Satellite	Input	Restricted	VHR SPOT	April/ July/October (from 2018 to 2020)	
32	RAIZ	GMV	RAIZ4	Satellite	Input	Restricted	VHR SPOT	April/ July/October (from 2018 to 2020)	
33	RAIZ	GMV	RAIZ1	Satellite	Input	Restricted	VHR WORLDVIEW	April/ July/October (from 2018 to 2020)	
34	RAIZ	GMV	RAIZ2	Satellite	Input	Restricted	VHR WORLDVIEW	April/ July/October (from 2018 to 2020)	
35	RAIZ	GMV	RAIZ3	Satellite	Input	Restricted	VHR WORLDVIEW	April/ July/October (from 2018 to 2020)	
36	RAIZ	GMV	RAIZ4	Satellite	Input	Restricted	VHR WORLDVIEW	April/ July/October (from 2018 to 2020)	

ID	Petitionary partner	Responsible Partner	AOI acronym	Classification	Input / Validation / Output	Access level (open / restricted)	Name	Acquisition date	Notes
37	RAIZ	GMV	RAIZ1	Satellite	Input	Restricted	ALOS PALSAR DATA	April/ July/October (from 2018 to 2020)	
38	RAIZ	GMV	RAIZ2	Satellite	Input	Restricted	ALOS PALSAR DATA	April/ July/October (from 2018 to 2020)	
39	RAIZ	GMV	RAIZ3	Satellite	Input	Restricted	ALOS PALSAR DATA	April/ July/October (from 2018 to 2020)	
40	RAIZ	GMV	RAIZ4	Satellite	Input	Restricted	ALOS PALSAR DATA	April/ July/October (from 2018 to 2020)	
41	MADERA+	GMV?	MADERA+1	Satellite	Input		SENTINEL 1		IW mode retrodispersed
42	MADERA+	GMV?	FORESNA1	Satellite	Input		SENTINEL 1		IW mode retrodispersed

ANNEX B. COMPLIANCE MATRICES OF FAIR DATA MANAGEMENT PLAN

This annex presents the data management plan adjusted to [RD.2]. EC guidelines on Data Management follow a set of questions. The answers refer to sections of this document or other project documents. Optional explanations are included to clarify the answers. The following notation has been used:

C: full compliance | PC: partial compliance | NC: non-compliance | NA: Not applicable

B.1. DATA SUMMARY

Table B-1 Questions and answers to section "data summary"

Self-assessment	Compliance	Comments and cross references
1. What is the purpose of the data collection/generation and its relation to the objectives of the project?	C	1. : *"MySustainableForest seeks a new form of sustainable forest management that operatively incorporates satellite-derived information into the everyday decision-making processes of foresters"* **Explanation:** Data collection/generation is key to the project since the main objective seeks the integration of satellite data into the decision making processes of any agent involved in the following forest related subjects can request MySustainableForest Services: Sustainable forest management, protective functions, forest damage, health and vitality, age and condition, biotic agents; biological biodiversity and forest fragmentation; monitoring systems and climate change adaptation; recreation, leisure and tourism; forest policy, forest management plans; protection of water and soil ecosystems; productive functions of forests, felling, roundwood, non-wood forest goods; mapping and landscape architecture; environmental protection and impact assessment, biomass stock and carbon sequestration, forest related labour force, labour risks and employment; rural employment sustainability; wood import-export; renewable energy targets; cultural heritage; cross-sectoral cooperation; innovation and technological development; forest education and professional training..
2. What types and formats of data will the project generate/collect?	C	1. : *"Project data sources originate from multiple sources: statistical, field data records, multiple satellite data missions, photogrammetry, weather data records, LiDAR flights, wood biometrics, and others"* *Data Formats shall include: Vector (shp; csv; xlsx), Raster (img, jpeg, geotiff, tiff, geopdf), Lidar (laz), numeric ((Xlsx, csv).*
3. Will you re-use any existing data and how?	C	3.2.2: *"The "available data record" sheet lists the data provided by MSF partners at the beginning of the project".* **Explanation:** Most validation data and an important share of input data, will be provided by MSF consortium partners. These data were already acquired before the start of the project and they will be reused in MSF project.
4. What is the origin of the data?	C	1. : *"Special mention should be made to satellite data; MySustainableForest seeks to increase the use of free satellite data, particularly those of the European Sentinel Missions, in forest management services. Aligned with the free Sentinel data, the project makes use of VHR satellite images provided by ESA through the Copernicus Data Warehouse";* 3.2.2: *""Available data record" sheet lists the data provided by MSF partners in at the beginning of the project"* **Explanation:** The data have three origins: 1st Sentinel missions for Copernicus free data; 2nd ESA Copernicus Data Warehouse for VHR satellite images; 3rd Project partners for proprietary site specific data.
5. What is the expected size of the data?"	PC	4.1: *"Gather up individual data sizes to calculate the requirements of the MSF data requirements";* 4.4: *"Forward data management plan… Estimation of the size of EO data by AOI and sensor ...Calculation of the total data size required per product and AOI"* **Explanation:** In the current DMP individual size data are recorded. These data were provided by the consortium partners. A complete estimations of data size is proposed in future DMP.

Self-assessment	Compliance	Comments and cross references
6. To whom might it be useful ('data utility')?	C	1. :" *MySustainableForest seeks a new form of sustainable forest management that operatively incorporates satellite-derived information into the everyday decision-making processes of foresters, whatever management perspective they prioritize at each site (productive, conservational, recreational…).*" **Explanation:** The output data of MSF project will be useful to forestry stakeholders. See answer to question 1 above

B.2. FAIR DATA

B.2.1. MAKING DATA FINDABLE, INDLUDING PROVISIONS FOR METADATA

Table B-2 Questions and answers to section "making data findable"

Self-assessment	Compliance	Comments and cross references
1. Are the data produced and/or used in the project discoverable with metadata, identifiable and locatable by means of a standard identification mechanism (e.g. persistent and unique identifiers such as Digital Object Identifiers)?	C	See section 4.4.1, 4.4.2 above
2. What naming conventions do you follow?	C	The naming conventions in datasets were established in Annex A as follows: *"Acquisition code: In the sheet "Copernicus_EO_data" the field "Acquisition code" is a unique identifier of each acquisition. It is formed by the following fields: "AOI acronym" and "Request_date"."*. A general naming convention of MSF products was established in 4.4.2: **Explanation:** The naming convention were only stablished for the requests of satellite data because the importance of EO data in objective of MSF. The code of satellite data request must include its location and date in order to keep trace of the data source in the output and intermediate data.
3. Will search keywords be provided that optimize possibilities for re-use?	C	Refer to Annex A for a full list of keywords
4. Do you provide clear version numbers?	C	A version number was stablished in the naming convention of MSF products was established in 4.4.2: **Explanation:** The version number only will be stablished only for output data of MSF project. Version numbering is not needed input or validation data because each dataset is considered independent. Version numbering is needed for MSF output data because project services will be deployed repeatedly in different project phases (D01_D1.1_Project Plan figure 3-8).
5. What metadata will be created?	C	The metadata characteristics was established in 3.1 and 4.4.1 **Explanation:** Metadata only will be produced for the output data because the input and validation data came with metadata from their original providers and sources.

B.2.2. MAKING DATA OPENLY ACCESSIBLE

Table B-3 Questions and answers to section "making data openly accessible"

Self-assessment	Compliance	Comments and cross references
1. Which data produced and/or used in the project will be made openly available as the default? If certain datasets cannot be shared (or need to be shared under restrictions), explain why, clearly separating legal and contractual reasons from voluntary restrictions.	C	The open data was established in 3.1 as follows: *"Data accessibility and storage: This principle is related with the IPRs and it is defined as follows: data accessibility and storage must be designed in accordance to IPRs restrictions. i.e. restricted data cannot be stored in a public platform. Annex A "Access level (open / restricted)"* **Explanation:** According to the grant agreement only output data will be make openly available and published. Input and validation data will be not make openly available.
2. How will the data be made accessible (e.g. by deposition in a repository)?	C	The data accessibly was established in the 1. as follows: *"MySustainableForest services and products will eventually be processed and delivered through an on-line platform"*
3. What methods or software tools are needed to access the data?	C	MSF project data are remote sensing and GIS data. GIS and remote sensing applications are needed to access, explore and read the data. See 4.5 for further details.
4. Is documentation about the software needed to access the data included?	C	Documentation of MSF platform are recorded in document D10_D2.3_Architectural Design.
5. Is it possible to include the relevant software (e.g. in open source code)?	C	The part of the software (the data access platform) that is loaded into the user browser is open source. The part of the software that is executed into the server is in part open source and in part closed source. Open source components are public (4.5), while closed source code is not available (D10_D2.3_Architectural Design)
6. Where will the data and associated metadata, documentation and code be deposited? Preference should be given to certified repositories which support open access where possible.	PC	4.4: "*Evaluation of open data repositories for registering, dissemination and publish MSF data."* **Explanation:** Currently no open data repository was chosen to register MSF data. An open repository will be selected in future DMP. A repository with public or restricted data, metatada and documentation will be setup, hosted by GMV or on an online repository platform (e.g. github).
7. **"**Have you explored appropriate arrangements with the identified repository?	PC	Arrangements with public repositories will be explored in further DMP versions.
8. If there are restrictions on use, how will access be provided?	C	3.1 **Explanation:** The restrictions on use will be implemented through selective access using personal accounts.
9. Is there a need for a data access committee?	NA	
10. Are there well described conditions	C	D10_D2.3_Architectural Design.

Self-assessment	Compliance	Comments and cross references
for access (i.e. a machine readable license)?		**Explanation:** It is part of the data access policy.
11. How will the identity of the person accessing the data be ascertained?	C	D10_D2.3_Architectural Design. **Explanation:** User are authenticated using a personal username and a password.

B.2.3. MAKING DATA INTEROPERABLE

Table B-4 Questions and answers to section "making data interoperable"

Self-assessment	Compliance	Comments and cross references
1. "Are the data produced in the project interoperable, that is allowing data exchange and re-use between researchers, institutions, organizations, countries, etc. (i.e. adhering to standards for formats, as much as possible compliant with available (open) software applications, and in particular facilitating re-combinations with different datasets from different origins)?"	C	3.1*"Interoperability: The datasets involved in MSF project should be available for different software and operative systems. Output products of MSF will be delivered in OGC complain formats and its metadata will be provided complain with the international directives of INSPIRE and ISO19139."* 4.4
2. "What data and metadata vocabularies, standards or methodologies will you follow to make your data interoperable?"	C	3.1: "*Output products of MSF will be delivered in OGC complain formats and its metadata will be provided complain with the international directives of INSPIRE and ISO19139."* 4.4.1
3. "Will you be using standard vocabularies for all data types present in your data set, to allow inter-disciplinary interoperability?"	C	3.1: "*The forestry terms and vocabulary of MSF will be standardized using the standard of "Forest Europe" association*."
4. "In case it is unavoidable that you use uncommon or generate project specific ontologies or vocabularies, will you provide mappings to more commonly used ontologies?"	C	3.2.1 "Glossary". Refer to Annex A

B.2.4. INCREASE DATA RE-USE

Table B-5 Questions and answers to section "increase data re-use"

Self-assessment	Compliance	Comments and cross references
1. How will the data be licensed to permit the widest re-use possible?	C	In MSF projects only output data will be licensed for re-use with a provision which certifies the protection of the copyrights by the re-users ([AD.1] section 3)
2. When will the data be made available for re-use? If an embargo is sought to give time to publish or seek patents, specify why and how long this will apply, bearing in mind that research data should be made available as soon as possible.	C	The availability of the data was established in MSF grant agreement ([AD.1] article 29.3) as follows: *"the beneficiaries must: deposit in a research data repository and take measures to make it possible for third parties to access, mine, exploit, reproduce and disseminate — free of charge for any user — the following: the data, including associated metadata, needed to validate the results presented in scientific publications as soon as possible;"*. **Explanation:** MSF consortium will publish project data in open access as soon as possible in order to validate the results presented in scientific publications
3. Are the data produced and/or used in the project useable by third parties, in particular after the end of the project? If the re-use of some data is restricted, explain why.	C	The dissemination and open access of MSF data are regulated in MSF grant agreement ([AD.1] section 3). These provisions guarantee the free distribution of the results (output data), data protection of input and validation data and the provision of copyrights for data re-use.
4. How long is it intended that the data remains re-usable?	C	The period of data re-usability was established in MSF grant agreement ([AD.1] article 28.1) as follows: *"Each beneficiary must — up to four years after the period set out in Article 3 — take measures aiming to ensure 'exploitation' of its results"* **Explanation:** The results of MSF project will be re-usable up to four years after the project ending.
5. Are data quality assurance processes described?	C	Yes, the quality assurance processes were described in the Project Plan document (D01_D1.1_Project Plan section 9).

B.3. ALLOCATION OF THE RESOURCES

Table B-6 Questions and answers to section "allocation of resources"

Self-assessment	Compliance	Comments and cross references
1. What are the costs for making data FAIR in your project?	C	The costs for making data FAIR were not broken down in MSF budget ([AD.1] Annex 2) but the effort (person-month) to making data FAIR was considered in the estimations of Work package 1 ([AD.1] Annex 1 Section 1.3.3 Work package 1.1).
2. How will these be covered?	C	The costs for making data FAIR will be covered with the grant payment of MSF project ([AD.1] Annex 2)
3. Who will be responsible for data management in your project?"	C	The responsible of data management of MSF project was established in the grant agreement ([AD.1] Annex 1 section 1.3.3, WP1.1) as follows: *"WP1 - Coordination & Management [Months: 1-36] GMV, RAIZ, CFRI, UFE, FORESNA, FOAL, CNPF, MADERA+, FORA, EFI T1.1 Project Control, Quality Assurance & Configuration Management (GMV, RAIZ, CFRI, UFE, FORESNA, FOAL, CNPF, MADERA+, FORA, EFI). The Project Control, Quality Assurance and Configuration Management describes the strategy, resource and calendar in management, quality and configuration of the project to control project finance, contractual issues and programmatic, to ensure the achievement of required quality and to ensure configuration procedures are established and properly used."*. **Explanation:** The entire consortium is the responsible for data management of MSF project.

Self-assessment	Compliance	Comments and cross references
4. Are the resources for long term preservation discussed (costs and potential value, who decides and how what data will be kept and for how long)?	C	The conditions long term resources preservation was established in the grant agreement ([AD.1] article 28.1) as follows: *"Each beneficiary must — up to four years after the period set out in Article 3 — take measures aiming to ensure 'exploitation' of its results"* **Explanation:** MSF partners must be preserve the data during at least four years after MSF project ending to ensure the exploitation of the data.

B.4. DATA SECURITY

Table B-7 Questions and answers to section "data security"

Self-assessment	Compliance	Comments and cross references
1. What provisions are in place for data security (including data recovery as well as secure storage and transfer of sensitive data)?	C	D10_D2.3_Architectural Design **Explanation**: Data is transferred on the network using SSL-ciphered protocols (e.g. HTTPS, FTPS). Data is protected on the storage facility by authorization and authentication mechanism. Data integrity is guaranteed through replication and appropriate back-up policies.
2. Is the data safely stored in certified repositories for long term preservation and curation?	C	**D10_D2.3_Architectural Design** **Explanation** Long-term data preservation is guaranteed by having at least two copies of the data to be preserved: an on-line copy and an off-line copy. Repository certification in the frame of long-term preservation and curation has not been addressed.

B.5. ETHICAL ASPECTS

Table B-8 Questions and answers to section "ethical aspects"

Self-assessment	Compliance	Comments and cross references
1. Are there any ethical or legal issues that can have an impact on data sharing?	C	The legal issues of data sharing was established in MSF grant agreement ([AD.1]) articles: 27 (protection of the results), 29 (dissemination of results), 36 (confidentially obligations) and 37 (security obligations).
2. Is informed consent for data sharing and long term preservation included in questionnaires dealing with personal data?	C	MSF forest data are spatial data which do not contain any personal data. In the case that any personal data will be processed it will be done according to the Article 39 of the Grant agreement [AD.1] and the European General Data Protection Regulation.

My Sustainable Forest

Earth observation services for silviculture

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