

RESEARCH PROGRAM ON Forests, Trees and Agroforestry

# THE GEOSPATIAL DATA QUALITY AND METADATA

Handbook | 2021

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foreststreesagroforestry.org

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## Preface

## What is the purpose of this handbook?

This handbook is intended to provide guidance on geospatial data quality and metadata management. While it can provide the reader with answers to basic questions on the latter, it does not have all the answers. The reader should also find the information and guidance helpful when dealing with important questions on geospatial data quality and metadata.

## Who should use this handbook?

The CGIAR-FTA Researchers and GIS Officers will find this handbook beneficial, particularly those who are not familiar with geospatial data management including metadata creation and standardization in data quality. Thus, it can support decision making at CGIAR-FTA, especially in activities related to forests, trees and agroforestry.

## How should this handbook be used?

This handbook does not need to be read from beginning to end because it has been arranged based on topics that are in accordance with geospatial data quality and metadata management. If the reader is not familiar with geospatial data quality and metadata management, it is necessary to read from the beginning to the part that is really needed. If readers are familiar with geospatial data quality and metadata, they can go directly to the topic they need. We want this handbook to be a general guide in geospatial data quality and metadata, not only within the scope of CGIAR-FTA.



# Geospatial Data Quality

## What is meant by spatial data quality?

Spatial data quality can be described as a character of the data that allows users to evaluate 'fitness to use'. Usually specified along with information about the completeness, consistency and accuracy of the data.

## Why is the quality of geospatial data important?

Spatial data quality is a pillar in the implementation of GIS and its applications where reliable data will enable data users to obtain satisfactory and appropriate results for the intended use of the data.

## How to examine geospatial data quality

One element to check the data quality is topology consistency. A tool for this has been provided in the ArcGIS toolbox. We can use this tool to test the completeness and consistency of features using the following steps:

1. Topology error check should be conducted in a 'file geodatabase'. To start the topology check, we need to create a geodatabase in ArcCatalog. Figure 1 is a sample of the pages used to create a topology error geodatabase.

File Edit View Go Geoprocessing Customize W	Windows Help
: 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	
Catalog Tree 4 ×	× Contents Preview Description
<ul> <li>□ Folder Connections</li> <li>□ C:\</li> <li>□ D:\</li> <li>□ D:\CIFOR\Cek_Topology</li> <li>□ C:\</li> <li>□ D:\CIFOR\Cek_Topology</li> <li>□ D:\CIFOR\Cek</li></ul>	Name Paste Ctrl+C Paste Ctrl+V Rename F2 Disconnect Folder Refresh F5 New Folder Properties Personal Geodatabase Database Connection
Catalog Tree	Preview         Description
<ul> <li>□ Folder Connections</li> <li>● □ C:\</li> <li>● □ D:\</li> <li>● □ D:\CIFOR\Cek_Topology</li> <li>● □ G:\</li> <li>● □ Z:\</li> </ul>	Name Topologi_Error.gdb
Figure 1. The creation of a 'file geoda	database' in ArcCatalog for checking topology errors

2. We then need to create a new feature class inside the topology error geodatabase ( Figure 2).

Catalog Tree	Ψ×	Contents	Preview	Description			
Catalog Tree Folder Connections C:\ C:\ C:\ C:\ C:\ C:\ C:\ C:\	# x	Contents Name	Preview Copy Paste Delete Rename Refresh Adminis Distribut	Description tration ed Geodataba	Ctrl+C Ctrl+V F2 F5		
Ready-To-Use Services     Interoperability Connections			New		•	망	Feature Dataset
Tracking Connections			Import		•		Feature Class
			Export		•		Table
Name: 1							
		< Ba	ck N	ext >	Cancel		

Figure 2. The creation of a feature dataset

3. Setting the coordinates is an essential step in a topology check. We need to define the coordinate system to be used in the processing. We can use WGS 1984 as the coordinate system, which is the most frequently used in mapping. (Figure 3)

ew Feature L	)ataset						2
Choose the	coordinate system that	at will be used for	r XY coord	linates	in this	data.	
Geographic ( of the earth' transform la	coordinate systems us s surface. Projected d iitude and longitude c	e latitude and lo coordinate system oordinates to a t	ngitude co ms use a r wo-dimen	oordina mathem sional l	tes or natical inear s	n a spher convers system.	ical model ion to
₩. •	Type here to search	1	~ @		6	• 🕁	
	avorites						
	🕑 WGS 1984						
6	WGS 1984 UTM 2	Zone 49N					
(	🗊 WGS 1984 UTM 2	Zone 49S					
6	🖗 WGS 1984 UTM 2	Zone 50N					
6	🖉 WGS 1984 UTM 2	Zone 50S					
(	WGS 1984 World	Mercator					
E 🔁 (	Geographic Coordin	ate Systems					
+ 🖬 I	Projected Coordinat	e Systems					
Current co	oordinate system:						
GCS_WG	S_1984						~
WKID: 4	326 Authority: EPSG						
Angular I Prime Me Datum: D Spheroi	Jnit: Degree (0.0174 ridian: Greenwich (0.0 )_WGS_1984 d: WGS_1984	;32925199433) ))					
Semim	ajor Axis: 63/8137.0 inor Axis: 6356752.3: e Flattening: 298.257	14245179 7223563					~

Figure 3. Setting the coordinate system

4. The next step is to import the feature class (polygon) that will be checked for topology errors. (Figure 4)

Catalog Tree	부× Con	tents	Preview Description	
<ul> <li>Folder Connections</li> <li>C:\</li> <li>C:\</li> <li>D:\</li> <li>D:\CIFOR\Cek_Topology</li> <li>Topologi_Error.gdb</li> <li>Topology_Error</li> <li>Z:\</li> <li>Toolboxes</li> <li>Database Servers</li> <li>Database Connections</li> <li>GIS Servers</li> <li>GIS Servers</li> <li>My Hosted Services</li> <li>Ready-To-Use Services</li> <li>Interoperability Connections</li> <li>Tracking Connections</li> </ul>	Na	me	Copy Ctrl+C Paste Ctrl+V Delete Rename F2 Refresh F5 Manage • New • Import • Export •	Feature Class (single) Feature Class (multiple)

Figure 4. Import the feature class for data input

5. We then need to specify the name and enter this in the output feature class (Figure 5)

Feature Class to Feature Class			×	(
Input Features				~
D:\CIFOR\2020_11_Database\2016\YLamonier\IDNSeram_VegetationCoverExtent_	CIFOR_2010	.shp	0	
Output Location				
D:\CIFOR\Tulisan_Topology\Topologi_Error.gdb\Topology_Error			B	
Output Feature Class				
IDNSeram_VegetationCoverExtent_CIFOR_2010				
Expression (optional)				
			SQL	
Field Map (optional)				
⊕ OBJECTID (Long) ⊕ CLASS_2010 (Text)			+	~
OK Cancel Environ	mente	Show H		-
OK Cancer Environ	ments	SHOW H	eip >>	

Figure 5. Entering the name of the data input

6. After completing the import process, we can check the feature class IDNSeram\_VegetationCoverExtent\_CIFOR\_2010 has been imported into the file geodatabase of the topology error (**Figure 6**).

Image: Polder Connections       Nar         Image: Image: Polder Connections       Nar         Image: Image: Polder Connections       Image: Polder Connections         Image: Polder Connections       Image: Polder Conneconnections         Image: Polder Conne	ame ]]IDNSeram_VegetationCoverExtent_CIFOR_2010	Type File Geodatabase Feature Class	
--	--	--	--

Figure 6. The results of importing data for checking topology

7. We can then start to check the topology using a right click on the feature class > new > topology > (Figure 7)



Figure 7. The first step for checking topology

8. We need to set the name of the output of the topology processing and set the cluster tolerance (Figure 8).

Topology_Seram_VegetationCover	_20 10
Enter a cluster tolerance:	
0.000000008983152841195215	Decimal Degrees
are considered identical, or coincider	it, veruces and enupoints failing wid in the
cluster tolerance are snapped togeth	her.
cluster tolerance are snapped togeth The default value is based on the XY cannot set the cluster tolerance sma	her. ' tolerance of the feature dataset. You Iller than the XY tolerance.

Figure 8. Entering the name and cluster tolerance

9. Click > next > tick the feature that will participate in the topology processing click > next click > next (Figure 9).

🗹 🖾 IDNSeram_Veg	etationCoverExtent <u></u>	CIFOR_2010		
				Select All
				Clear All
<			>	

Figure 9. Tick the feature that will be used in the topology check

10. We need to add the rules of the topology check. Set the rules for checking the topology errors- we can explore the explanation of the 'rules' in the rule description. Add rules that we would like to use click > next click > OK > next (Figure 10).

New Topology		×
Specify the rules for the topology:		
Feature Class Rule	Feature Class	Add Rule
		Remove
		Remove All
		Load Rules
		Save Rules
	< Back	Next > Cancel
d Rule		>
atures of feature class:	Rule Description	
NSeram_VegetationCoverExtent_Cll 💌		An area must not overlap another area from the same layer.
le:		Any area where features overlap
ust Not Overlap ust Not Have Gaps ust Not Overlap With ust Be Covered By Feature Class Of ust Cover Each Other ust Be Covered By pundary Must Be Covered By	Show Errors	
ea Boundary Must be Covered by Boundar ontains Point ontains One Point		OK Cancel
New Topology		×
Specify the rules for the topology:		
Feature Class	Rule	Add Rule
IDNSeram_VegetationCoverExtent	Must Not Overlap	Domouro
I IDNSeram_VegetationCoverExtent	Must Not Have Ga	ps
		Remove All
		Load Rules
		Save Rules
<		>



Note: In our case study, we will use two rules for checking topology errors: 'must not overlap' and 'must not have gaps'

11. Once the topology check has finished processing, we will need to validate the new topology click >yes (Figure 11)

ĺ	New Top	ology				×
i	Creating	g new topolog	jy			
	L				Canc	el
lew T	opology					
The n	new topolo	gy has been	created.	Vould vou lik	e to validat	e it now?
The n	new topolo	gy <mark>h</mark> as been	created. \	Vould you lik	e to validat	e it now?
The n	new topolo	gy has been	created. \	Vould you lik	e to validat	e it now?

Figure 11. Validation for checking topology

12. The results of the topology check can then be explored with a new topology file of validation created in the file geodatabase (**Figure 12**).

Catalog Tree 🛛 🕂 🗙	Contents Preview Description	
<ul> <li>□ Folder Connections</li> <li>⊕ □ C:\</li> <li>⊕ □ D:\</li> <li>□ D:\CIFOR\Cek_Topology</li> <li>□ Topologi_Error.gdb</li> <li>□ Topology_Error</li> <li>□ IDNSeram_VegetationCoverExtent_CIFOR_2010</li> <li>☆ Topology_Seram_VegetationCover_2010</li> <li>⊕ □ Z:\</li> </ul>	Name IDNSeram_VegetationCoverExtent_CIFOR_2010	Type File Geodatabase Feature Class File Geodatabase Topology

Figure 12. Topology error results

Note: If the validation procedure has been skipped in the processing, we can validate again with a right click on the topology feature and click validate (**Figure 13**).

Contents	Preview	Description
Name	eram_Vege	etationCoverExtent_CIFOR_2010
EI Topol	ogy_Serai	n_VegetationCover_2010
		Rename F2 Analyze
		Create Layer
		🗳 Validate
		Properties

Figure 13. Revalidate the results of the topology error

13.We can check the topology results and properties with a right click > properties. Click errors to find the numbers of errors in the layer based on the rules (**Figure 14**).

Generate Su	mmary			Бф	ort To File	
Rule				Errors	Exceptions	
Must Be Larg Must Not Hav	er Than C ve Gaps	luster T	olerance	0	0	
IDNSeram_V Must Not Ove	egetatior erlap	CoverE	xtent_CIFOR_2	4	0	
IDNSeram_V	egetatior	CoverE	xtent_CIFOR_2	0	0	
Total				4	0	

Figure 14. Checking the number of errors in the topology results

14. We can review the results by adding the topology error features to the ArcMap. To add a topology layer click > yes ('yes' will popup when you finish checking the topology errors) Results can be seen in ArcMap (**Figure 15**).



Figure 15. Topology error results displayed in ArcMap

15. We can change the symbology of the topology results to explore the errors including the gaps and overlapping (Figure 16).



Figure 16. The detailed results of the topology error check

Note: In this sample we conclude that the gaps that are categorised as errors are the small islands. Thus, there are **no topological errors** in this dataset including overlapping and gaps.



## Geospatial Metadata

## What is meant by metadata?

Metadata is information about data. In general, the geospatial metadata stores essential information about the: who, what, when, where, how and why of the data.

## Why is metadata important?

Metadata provides important information about data. This information makes it easier to find specific data.

## How can we access the metadata of geospatial data?

We can use ArcCatalog in ArcGIS to access the metadata. To check metadata in the ArcCatalog:

 Open the ArcCatalog click > Menu customise click > ArcCatalog options. Then the ArcCatalog options dialog box will appear click > Metadata (menu). In the Metadata Style section there are various options related to the Metadata style, click > ISO 19139 Metadata Implementation Specifications (Figure 17).

Rast	er	CAD	[	)ata Interoperab	ility
General	File Types	Contents	Connections	Metadata	Tables
Metadata The style validated	Style determines how , and which pag	v metadata is vi es appear wher	ewed, exported, n editing metadata	and a.	
ISO 191	39 Metadata Im	plementation S	pecification	~	
Metadata An item's can be up	Updates intrinsic propert dated automati	ties such as its r ically in the met	name or number o adata.	f features	
Matadata	Upgrade Notify	- when metadat	a is vieweu.		
The interr FGDC-for this conte	nal storage form matted metadat ent must be upg	at for metadata ta in the display raded before it	a has changed. Yo as read-only info is available for ed	ou can see rmation, but liting.	
Show	metadata upgra	ade prompt.			
About ma	naging FGDC m	<u>etadata</u>			

Figure 17. The metadata options in the metadata menu

 To view the metadata of shapefile/raster data in ArcCatalog click > the file (yellow box) in the catalogue's tree column, in the left column and click > Description in the right column. If you want to create or change the metadata click > Edit (red box – Figure 18).



Figure 18. Viewing metadata in ArcCatalog

3. After 'Edit' has been clicked, the metadata-editing menu will be displayed on the right side of the metadata. There are three sections: overview, metadata and resource. We can save the editing by clicking > Save (red box – **Figure 19**).



Figure 19. Editing metadata in ArcCatalog

## How can we create metadata in ArcCatalog?

To create metadata in ArcCatalog click > edit in the metadata menu. There are three sections where we can enter information.

#### **OVERVIEW SECTION**

In the overview menu add information in the following:

- d. Item Description
  - Title: title of data
  - Thumbnail: screen view of results of the overall data display, with file sizes usually not large (\*.png, \*.jpg, etc.). To upload the results of the screen view click a folder with the words Update.
  - Tags: keywords in general. For example: data related keywords, data year, activity/project, location, donor.
  - Summary (Purpose): summary of the data
  - Description (Abstract): information related to the data, including an explanation of the data content, brief process of obtaining the data, pixel resolution (for raster data)/data scale, name/purpose of data activity. (Figure 20)

Overview	Item Description
Item Description	Title Industrial Oil Palm Plantation (Simplified Class) of Borneo 2013
🗊 Topics & Keywords	
Citation	
Citation Contacts	
Contacts Manager	
Locales	Thumbanil
Metadata	
🗊 Details	
Contacts	
Maintenance	X Delete
Constraints	
Resource	I ags Industrial, Oil Palm, Plantation, IOPP, Borneo, Indonesia, 2013, Atlas Borneo, Value Chain, Finance & Investments (VFI), Flagship 3: Sustainable value chains and
Details	investments to support forest conservation and equitable development, Flagship 4 : Landscape dynamics, productivity and resilience, Biodiversity, safeguarding and conservation, Climate change adaptation, Landscape governance, Livelihood trajectory modelling and assessment.
Extents	
Points of Contact	
Maintenance	Summary (Purpose) Industrial Oil Palm Plantation (Simplified Class) of Borneo developed by CIEOR in 2013
Constraints	
Spatial Reference	

Figure 20. Overview section with focus on Item Description

• Use limitation: description about limitations or protection for using the data (Figure 21).

Note: Example of a limitation statement for data that belongs to CIFOR

'The information contained in this dataset is the exclusive property of the Center for International Forestry Research (CIFOR) – Headquarters and any respective copyright owners. This work is protected under international copyright treaties and convention. All uses for commercial purposes require the written permission of the Center for International Forestry Research (CIFOR) – Headquarters and any graphic outputs (on screen or on paper) produced from this dataset must carry the following acknowledgement the Center for International Forestry Research (CIFOR) – Headquarters'.

Overview	<u>^</u>	Use Limitation															
Item Description		в	7	п	4*	.*	:=	1=	1	-	Ξ	=	=	DE	de.	5	
🗊 Topics & Keywords		The in	forma	ation c	ontain	ed in t	• his dat	aset is	s the e	exclusiv	ve prop	perty o	of Cent	er for			-
Citation		Intern owner	ationa rs. Thi	al Fore	stry R	esear	ch (CIF d unde	OR) -	Head	quarte al copy	rs and right t	any re reaties	espect s and (	ive cop conver	pyright ntion. A	t All	
Citation Contacts		uses for commercial purposes require the written permission of Center for International Forestry Research (CIFOR) - Headquarters and any graphic outputs (on screen or on															
Contacts Manager		Intern	ationa	al Fore	stry R	esear	set in	OR) -	Head	quarte	rs.	ALIOWI	cuyen	ient Ci	enteri	UI	

Figure 21. Entering data using limitation rules for CIFOR's data

- e. Topics and Keywords
  - Topic Categories: spatial themes of related data. Each theme has a detailed description on the website https://apps. usgs.gov/thesaurus/thesaurus-full.php?thcode=15. When selecting the topic categories, you can have more than 1 theme or topic (**Figure 22**).
  - Content type: whether the data can be downloaded or not (example: downloadable data)
  - Place Keywords: keywords for the data collection site(s) or locations
  - Temporal Keywords: keywords for the time of the data. Usually, the year the data is entered here.

Save X Exit		
Overview	Topics and Keywor	ds
Item Description		
📑 Topics & Keywords	Topic Categories	
Citation	Farming	Military & Intelligence
Citation Contacts	Biota	Inland Waters
Contacts Manager	Boundaries	
	Atmospheric Sciences	
	Economy	✓ Planning & Cadastral
Metadata	Elevation	Society
Details	Environment	Structure
💱 Contacts	Geoscientific	Transportation
Maintenance	Health	Utilities & Communication
Constraints	Imagery & Base Maps	
Resource		
Details	Content Type Downloadat	ole Data
Extents	🕂 New Theme Keywords	
Points of Contact		
Maintenance	+ New Place Keywords	
Constraints		
🗊 Spatial Reference	+ New Temporal Keywords	

Figure 22. Entering topics and keywords in metadata

Other Keywords: other keywords can be added, such as FTA related keywords, project and donor names, GACS. Keywords can be classified according to need (Figure 23). To add new keywords, click > New Other Keywords (red box – Figure 23)

🔚 Save 🗙 Exit		
Overview ^	Other Keywords	× ^
Item Description	Flagship 3 FTA	
🗊 Topics & Keywords	Forestry trees and Agroforestry Landscape management for Ecosystem services	
Citation	biodiversity conservation	
Citation Contacts		
Contacts Manager		
Docales	+ Add Thesaurus Citation	
Metadata		
Details	Other Keywords	×
💟 Contacts	COLUPSIA	
Maintenance	CIRAD	
Constraints		
Resource		
Details		
Extents	Add Theorem Chains	
Points of Contact		
Maintenance		
<li></li>	New Other Keywords	~
Keywords that don't fit into other catego no associated MD_KeywordTypeCode	ories that describe characteristics of the resource, but which may be derived from a thesaurus. Data type: I . From: ISO 19115:2003.	MD_Keywords;

Figure 23. Entering other keywords in ArcCatalog

#### f. Citation

• Resource Citation - Title: data title

Overview	Pesource Citatio	n
Item Description	Resource Citatio	
Topics & Keywords	Titles: Industrial Oil	Palm Plantation (Simplified Class) of Borneo 2013
Citation	Title	Industrial Oil Palm Plantation (Simplified Class) of Borneo 2013
Citation Contacts	Alternate Title	
Contacts Manager	Collective Title	

Fig 24. Resource citation in ArcCatalog

• Presentation form: data form- enter digital map

Overview	Presentation Form	Digital Map	Ŷ			
Item Description Topics & Keywords	FGDC Geospatial Data Presentation Form	Digital Document Hardcopy Document	^	+	×	
Citation	+ New Identifier	Hardcopy Image				
Circles Contrata		Digital Map				
Contacts Manager	ISBN	Hardcopy Map Digital Model Hardcopy Model Digital Profile				
Metadata	(▼) Dates	Hardcopy Profile				
🗊 Details		Ugital Table Hardcopy Table				
Contacts	☑ Edition	Digital Video Hardcopy Video	~			

Figure 25. The options for data presentation in ArcCatalog

• Dates: enter the date the data was created, published and/or revised.



Figure 26. Entering dates to specify the data's information about time of data

- g. Citation Contacts
  - Citation Contacts Resource citation contacts: information regarding the individual contacts responsible for creating the data. In this column there is: name, organization of origin, position/title, role, email address and office address. Role: enter key contacts (Point of contact).

Item Description				
Topics & Keywords	Contact: Yves La	umonier (Point of Contact)		×
Citation	Name	Yves Laumonier		
Citation	Organization	Center for International Forestry Research (CIFOR)		
Citation Contacts	Position	c/o Project Team Leader		
Contacts Manager	Role	Role Point of Contact		v
Locales	Contact Inform	nation		
Metadata	Email Y	.laumonier@cgiar.org	×	+
📑 Details	- New Online	a Resource		
Contacts	_			
Maintenance	Address T	ype Both		×
Constraints	Address	Jalan CIFOR, Situ Gede, Sindang Barang, Bogor Barat	×	+
Resource	City	Bogor		
Details	State	West Java		
	Postal Coo	de 16115		
Extente	Country	INDONESIA		*
Extents				
<ul> <li>Extents</li> <li>Points of Contact</li> </ul>			×	+
<ul> <li>Extents</li> <li>Points of Contact</li> <li>Maintenance</li> </ul>	Phone ·	+ 62-251-8622-623		
<ul> <li>Extents</li> <li>Points of Contact</li> <li>Maintenance</li> <li>Constraints</li> </ul>	Phone Fax +62	+ 62-251-8622-623 2-251-8622-100	×	+

Figure 27. Entering the contact details of data producers

#### **METADATA SECTION**

- a. Details Metadata details: in this section enter:
  - File identifier = name of data
  - Language = the language used in these examples is English
  - Character set = utf 8

Metadata	N		etails	
📝 Details	IV		etalis	
Contacts		File Identifier	Vegetation Cover Extent in Seram 2010	Create
🗊 Maintenance		Parent Identifier		
🗊 Constraints		Dataset URI		
Resource		Date Stamp	2021-11-12 15	×
🗊 Details		anguage	English	v
Extents		Character Set		~
Points of Contact			uno	
Maintenance		Hierarchy Level	Dataset v	× +
Constraints	1.11	Hierarchy Level N	Name dataset	× +

Figure 28. Details about metadata

 b. Contacts – Metadata contacts: information regarding the contact responsible for creating the metadata. As an example, the Center for International Forestry Research (CIFOR) has been entered as the contact for distributing organization (Figure 29).

Metadata ^	Metadata Conta	acts		
Details				
Contacts	Contact: - (Distribu	utor)		×
Maintenance	Name	-		
💱 Constraints	Organization	Center for International Forestry Research (CIFOR)		
Resource	Position	-		
Details	Role	Distributor		~
Extents	Contact Informa	ation		
Points of Contact	Email -		×	+
Maintenance	+ New Online	Resource		
Constraints	Address Ty	pe Both		~
Spatial Reference	Address	Jalan CIFOR Situ Gede, Sindang Barang,Bogor Barat 16115	×	+
💱 Spatial Data Representa	City	Bogor		
Content	State	West Java		
Quality	Postal Code	e 16115		
🗊 Lineage	Country	INDONESIA		¥
Distribution	Phone +	62-251-8622-623	×	+
🗊 Fields	Fax +62	-251-8622-100	×	+

Figure 29. Entering the contact details of the metadata

c. Maintenance: information related to the frequency of maintenance/data updates. If you don't know, you can choose 'unknown' (Figure 30).

Metadata	^		
Details	Metadata Main	itenance	
Contacts	Update Erequency	Liokaowa	v
Maintenance	Custam Eraguesery	Empty	
Constraints	Next Update	Continual Daily	
Resource		Weekly	
Details	🕂 New Scope	Fortnightly Monthly	
Extents	🕂 New Scope Descri	Quarterly	
Points of Contact		Biannually Annually	
Maintenance	Load a contact: Yve	As Needed	
Constraints		Not Planned	
Spatial Reference	🕂 New Maintenance	Unknown	

Figure 30. Entering the update frequency

#### **RESOURCE SECTION**

 a. Spatial Reference – Reference System: this is the information related to the coordinates and projection system used. Usually, this is entered automatically by the system if the coordinate system in the data is defined. For example, using the WGS 1984 coordinate system, the EPSG code 32752 is defined (Figure 31).

Detaile	Reference Sys	tems	
Extents	Reference System	n	,
Points of Contact	Code	32752	
Maintenance	Code Space	EPSG	
Constraints	Version	6.14(3.0.1)	
Spatial Reference	🕂 New Authority	Citation	

Figure 31. Entering the reference system

### Does a data quality report need to be generated in metadata?

Yes, it is necessary. As one of the pillars in using the data, this quality data report can be written as more than one type, depending on the findings of the curator regarding the attributes of the data. The data quality can be entered as follows (**Figure 32**):

Resource Data Quality Details Extents Scope Level Dataset v Points of Contact Dataset Series Maintenance + New Level Desci Non-geographic Dataset Constraints **Dimension Group** Feature Hew Extent Spatial Reference Feature Type Property Type 🗊 Spatial Data Representa Field Session Report Content Software Service Report Quality Model Tile 🔰 Lineage Hew Report Initiative Distribution Stereomate

b. Quality – Data Quality – Scope level: Dataset

Figure 32. Entering the scope of the data quality report

- c. Quality Data Quality Report: information/records related to the attributes of the data after checking, using the GIS Curator.
  - To add information: (Report) click 'new report' (red box Figure 33).

Resource	
🕃 Details	Data Quality
💱 Extents	Scope Level Dataset Y
Points of Contact	
Maintenance	+ New Level Description
Constraints	
Spatial Reference	- New Extent
🗊 Spatial Data Representa	
Content	Report X
関 Quality	Report X
🕃 Lineage	, ↓ New Report
< >	

Figure 33. Adding a new data quality report

• Report – Report Type: type of report/notes related to findings from curation. There are various options available here, for example, in the data there is a record for the type Conceptual Consistency (**Figure 34**).



Figure 34. To specify the Report Type of data quality

• Report – Dimension: dimension of the check results. For example, the dimension is the horizontal dimension of the data (**Figure 35**).

Maintenance	either a conforman	ce result or a quantitative result is rec	quired
🗊 Constraints			
Spatial Reference	( Report		×
Spatial Data Representation	Report Type	Conceptual Consistency	Ŷ
Content	Dimension	Empty	*
Quality	🕂 New Meas	Empty	
Lineage	• Measure	vertical	
Distribution	<ul> <li>Evaluation</li> </ul>	Method	
💱 Fields	- Now Confo	rmanos Pasult	
References	T New Conto	Induce Nesul	
Geoprocessing History	🕂 New Quant	itative Result	

Figure 35. Entering the dimension of the data quality report

 After entering information related to the Report type and Dimension, there will be a warning at the top that will ask for information to be entered, namely a conformance result (yellow box). To add a Conformance Result click > New Conformance Result (red box - Figure 36)

🗊 Maintenance	^	! either a conformance	e result or a quantitative result is requ	uired
🗊 Constraints	1			
Spatial Reference		<ul> <li>Report</li> </ul>		×
Spatial Data Representation		Report Type	Conceptual Consistency	*
Content		Dimension	Empty	~
Quality		🕂 New Measu	Empty	
Lineage		✓ Measure	vertical	
Distribution		<ul> <li>Evaluation</li> </ul>	Method	
🗊 Fields		- New Confor	mance Result	
🗊 References		- Hew contor		
Geoprocessing History	~	🕂 New Quanti	tative Result	

Figure 36. Adding New Conformance Result(s) for data quality

After the Conformance Results appear, enter the following:

- Report **Conformance Result** Pass: pass/fail. If there is no problem with the data in terms of the report type, enter ([]) in the pass box. If there is a problem with the data leave the 'pass' box blank.
- Report Conformance result Explanation: the curator can enter an explanation regarding the data attribute. Example: conceptual consistency was passed because the information available in the attribute data is clear and there is no overlapping (**Figure 37**).

information on table attribute

Figure 37. Pass for Conformance Results with some explanations of data quality

Report – Conformance Result – **Specification** – Titles: enter a minus sign (-) in all as a default, namely Title, Alternate Title and Collective Title (Figure 38).

Specification		
<ul> <li>Titles: -</li> </ul>		
Title	-	
Alternate Title	-	
Collective Title	-	

Figure 38. Title of Data Conformance Result Specification

• Report – Conformance Result – Specification – **Dates**: the time the report was generated following the curation results (date, month and year) (**Figure 39**).



Figure 39. Date of data quality report

- If the Conformance Result Menu has not been completed, warnings will appear as in **Figure 40**, which means they need to be completed.
- If the pass column is blank/not marked (2) due to poor data attributes (yellow box), the warnings can be ignored (Figure 40).

	either a conformance result or a quantitative result is required conformance result explanation is required conformance specification is required
1	conformance pass value is required
	title is required at least one date is required

Figure 40. Warnings of data quality specifications

Note: The Data Quality Report can be implemented using several quality elements (Figure 41).

		×
Report Type	Conceptual Consistency	v
Dimension	horizontal	~
🕂 New Mea:	sure Date	
Measure		
🕑 Evaluatio	n Method	
Conformation	ince Result	×
🕂 New Quar	titative Result	
Report		×
Report Report Type	Topological Consistency	*
Report Report Type Dimension	Topological Consistency horizontal	× ~ ~
<ul> <li>Report</li> <li>Report Type</li> <li>Dimension</li> <li>New Mease</li> </ul>	Topological Consistency horizontal sure Date	× •
<ul> <li>Report</li> <li>Report Type</li> <li>Dimension</li> <li>New Measure</li> <li>Measure</li> </ul>	Topological Consistency horizontal sure Date	× •
<ul> <li>Report</li> <li>Report Type</li> <li>Dimension</li> <li>New Measure</li> <li>Measure</li> <li>Evaluation</li> </ul>	Topological Consistency horizontal sure Date n Method	× 

Figure 41. Data Quality Report with some elements: conceptual and topological consistency

## Why is lineage essential information in metadata?

A lineage statement is an explanation or information regarding how to obtain data, data quality attributes and notes from the researchers themselves regarding the data. A sample of lineage can be seen in **Figure 42**.

Resource	Linoago
Details	Lineage
Extents	Statement
Points of Contact	The primary logging road dataset were digitized by visually analyzing of 268 I ANDSAT images acquired over 1972-2010. Wide logging
Maintenance	roads were readily detectable in the LANDSAT imagery visually and most of logging road under persistent haze was capable to detect by
Constraints	zooming in closely and applying a local contrast enhancement. The expansion of the road network overtime was observed for c. 1973.
Spatial Reference	1990, 2000, and 2010. Imagery acquired a year or two before and after these nominal years served to reduce cloud contamination. We
Spatial Data Representation	also inspected imagery from ca. 1995 and 2005 to better detect disused logging roads less visible due to rapid forest re-growth. The
Content	LANDSAT 587 (TM and ETM+) images were viewed as band 4- 5-3 (or 5-4-3) false color composites enhanced to optimize road
Quality	detection. Likewise, LANDSAT MSS images were viewed as band 4-3-2 (or 3-4-2). Ancillary public-road maps from the Indonesian
🗊 Lineage	Ministry of Public Works and the Sabah-based NGO HUTAN for Sarawak and Sabah were used to help distinguish unpaved public
Distribution	roads from logging roads.

Figure 42. Statement of data lineage

## How important distribution information is entered into metadata

The distribution of information describes the product specifications when distributed such as:

- Distribution Distribution Information Distribution Format Format Name: information on the format of the file being distributed.
- Distribution Distribution Information Distribution Format Format Version: the version of the data being distributed if the data has multiple versions. If it does not exist, it can be entered using a minus sign (-) (Figure 43).

Spatial Reference	Distribution Informat	ion	
Spatial Data Representation	Distribution mornat		
💱 Content	<ul> <li>Distribution Format</li> </ul>		×
🔋 Quality	Format Name	Shapefile	
🖞 Lineage	Format Version		
Distribution	Amendment Number		
Fields	Specification		
References	Decompression Technique		
Geoprocessing History	Information Content		

Figure 43. Distribution information about the data format

• Distribution – Distribution Information – Distributor: contact information regarding the agency that will distribute the data (**Figure 44**).

Contacts	O Distributor	×
Maintenance	Contact: - (Distributor)	×
Constraints	Name -	
Resource	Organization Center for International Forestry Research (CIFOR)	
Details	Position -	
Extents	Role Distributor	*
Points of Contact	Contact Information	
Maintenance	Email - X	+
Constraints	+ New Online Resource	
Spatial Reference		
Spatial Data Representation	Address Type Both	~
Content	Address Jalan CIFOR Situ Gede, Sindang Barang, Bogor Barat 10115	÷
🗊 Quality	State West Java	
📑 Lineage	Postal Code 16115	
Distribution	Country INDONESIA	~
Fields		
References	Phone + 62-251-8622-623	+
Geoprocessing History	Fax +62-251-8622-100	+

Figure 44. Information about the data distributor

## How data attributes can be explained in metadata

Fields – Entity and Attribute Information: provide detailed information related to the attribute table, especially the column Attribute Field. This is how the title of the data attributes is inserted into the metadata and the data Shapefile (**Figure 45**).

<ul> <li>Maintenance</li> <li>Constraints</li> </ul>	Entity	and Attribute Information		
Resource	🔿 De	tails: IDN_Seram_VegetationCoverExtent	CIFOR_2010	×
🗊 Details		Label IDN_Seram_VegetationCoverEx	tent_CIFOR_2010	
Extents	•	) Entity Type		
Points of Contact				
💱 Maintenance	•	) Attribute: FID	2	
Constraints				
💱 Spatial Reference	$\odot$	) Attribute: OBJECTID	*	
🗊 Spatial Data Representat	ion			
Content	۲	) Attribute: Shape	*	
Quality		Au 1 . 01400 0010		
🗊 Lineage	٢	Attribute: CLASS_2010	,	
Distribution	G	Attribute: CODE		
Fields	C	Alabate. OODE	e	
References	Q	) Attribute: VEG	*	
Geoprocessing History	~			
FID Shape *	OBJECTID	CLASS_2010	CODE	VEG
0 Polygon	1	Back mangrove and nipa swamp	3	F
1 Polygon	4	Cloud	57	NF
2 Polygon	5	Coastal (beach) forest	12	

Figure 45. Entering information about data Attributes in metadata

- Information needs to be entered into each column (Field Attributes), for example:
  - » The CLASS\_2010 column and its illustrations (Figure 46)
  - » Attribute: class\_2010:
    - Definition: description related to the column CLASS\_2010
    - Definition Source: the source of the information is obtained from the definition column. If the source is not known, enter a minus symbol (-).
    - Enumerated Domain: enter a minus symbol in all as the default for value, definition and definition source. Enumerated Domain filled to system request.

Note: Enumerated Domain is not required for Entity Type, FID, OBJECTID and Shape.

Label	CLASS_2010					
Alias	CLASS_2010					
	Code of Vegetation Class in 2010					
Definition						
Definition Source						
Туре	String					
Width	100 0					
Precision						
Scale	0					
Indexed						
Value Explanation						
Value Accuracy						
Value Measurement Frequer	cy Empty					
Beginning Date of Values	15					
Ending Date of Values	15					
Enumerated Domain		1				
Value -						
Definition -						
Definition Source						

Figure 46. Detailed information for each field of data attributes

Fields – Entity and Attribute Information – Entity Type: enter '-' as default for definition and definition source (Figure 47).

) Details: IDN_Seram_V	egetationCoverExtent_CIFOR_2010	×
Label IDN_Serar	n_VegetationCoverExtent_CIFOR_2010	
Entity Type		
Object	Feature Class	
Object	T Catare Olass	
Count	40	
Count Definition	40	

Figure 47. Details about entity and attribute information

## How can we export metadata to xml format?

Metadata can be exported in xml format using the following steps:

Open ArcCatalog and click > the Shapefile and the metadata will be exported. Then click > the Description menu, next click > the Export menu on the toolbar (**Figure 48**).



Figure 48. Exporting metadata

After that, the Export Metadata dialog box will appear, then specify the location of the folder as an output and enter the XML file name in the Output file column with \*\*.xml format, (**Figure 49**), then click > OK.

Export Metadata		
ource Metadata		
D:\CIFOR\Metadata\IDN_Seram_VegetationCoverE	xtent_CIFOR_2010.shp	
ranslator		
C:\Program Files (x86)\ArcGIS\Desktop10.7\Metada	ta\Translator\ArcGIS2ISO19139.xml	
output File (optional)		
D:\CIFOR\Metadata\IDN_Seram_VegetationCoverE	xtent_CIFOR_2010.xml	6
	OK Cancel Environ	ments Show Help >>

Figure 49. The specifications for exporting metadata

ArcGIS will automatically process the data and the screen in Figure 50 will be displayed.

ecuting Prep Metadata for Export Canc	el
<< De	ails
Close this dialog when completed successfully	
\Metadata \IDN_Seram_VegetationCoverExt.xml # Start Time: Wed Jul 14 14:56:47 2021 Succeeded at Wed Jul 14 14:56:47 2021	^

Figure 50. View of Export Metadata screen

After that, a new \*.xml file will appear, which can be checked in ArcCatalog using the display below (red box - Figure 51).



Figure 51. Exporting results in the xml format

When viewed from Windows Explorer, the screen view will be displayed as in the red box in Figure 52.

Name	Туре	Size
IDN_Seram_VegetationCoverExtent_CIFOR_2010.xml	XML Document	23 KB
IDN_Seram_VegetationCoverExtent_CIFOR_2010.shp.xml	XML Document	140 KB
DN_Seram_VegetationCoverExtent_CIFOR_2010.shx	SHX File	1 KB
IDN_Seram_VegetationCoverExtent_CIFOR_2010.shp	SHP File	1,059 KB
IDN_Seram_VegetationCoverExtent_CIFOR_2010.sbx	SBX File	1 KB
IDN_Seram_VegetationCoverExtent_CIFOR_2010.sbn	SBN File	1 KB
IDN_Seram_VegetationCoverExtent_CIFOR_2010.prj	PRJ File	1 KB
IDN_Seram_VegetationCoverExtent_CIFOR_2010.dbf	DBF File	6 KB
DN_Seram_VegetationCoverExtent_CIFOR_2010.CPG	CPG File	1 KB

Figure 52. The xml format in the file folder

## Is there a tool for developing metadata?

Yes, we recommend you use CatMDedit as one of the open source tools to create metadata as it conforms to the ISO 19115 standards. The steps are as follows:

- The first step is to create a folder in Windows Explorer, for example: D:\CIFOR\FTA\_Geoportal
- The next step is to open > the CatMDEdit application and click > Add/delete repository (red box with a hand symbol and a folder) (**Figure 53**).

<b>10</b>	atMI	DEdi	t				-	-								
File	Tools	Wir	dow	He	lp											i
1	訇	M	ď	RS	s	m			FC							
*	Resour	ice B	rows	ser												
	Reposi	torie	s			ŵ	¢,	List	t Thumbnails	Geographic Selec	tor					
	etadati	а				_	۲		Standard	Unique Id	Languag	je	Title	Hierarchy Level	Subject	
												-		-	-	
1									Dublin Core	1-metadato_Du	UNKNOWN	_	Cartografía		Pokrycie lądu	Ramón
1									ISO19115	spaignCuadricul	Spanish		Cuadrícula del Mapa Topográfico Nacional 1:25.000	dataset	location	Institu
•									ISO19119	spaignwms_cua	Spanish		Cuadrículas cartográficas (servicio de visualización)	service	Servicio de acces	Institut
1								*								
1									<	_	1111					2
								Rec	ords count 3							

Figure 53. Adding metadata to CatMDedit

• Then the Repository Manager (and then the Repository Creation) dialog box will appear > click the repository folder that has been created (Example: D:\CIFOR\FTA\_Geoportal) (**Figure 54**)

metada	
	Load Cancel
epositor	v Creation
Directory	D:\CTEOR\FTA_Genortal
Create	the metadata associated to the files in the selected directory
Genera	Description (metadata template) Select
Genera	Description (metadata template) Select Dataset Collection
Genera	I Description (metadata template) Select Dataset Collection rie
Genera Create Spatial Se Genera	I Description (metadata template) Select Dataset Collection erie I Description (metadata template) Select

Figure 54. Loading metadata in CatMDedit

• Then click > OK > Load and the FTA\_Geoportal will appear in the repository list. After that click> the FTA\_Geoportal folder and wait until it turns blue and an empty list column (Left) will appear, because it does not have an XML data list (**Figure 55**).

Cath	4DEdit														
	IDEUIL														
File Too	ls Window	w Help													
1 1	M	r RSS	1			FC									
🞓 Reso	urce Brov	wser													
Rep	sitories		Ŕ		List	Thumbnails	Geographic Select	tor							
e metad	ata					Standard	Unique Id	Lan	guage	1	Title	Hierarchy Level	Subject		
	eoportal								-			-		•	
1				1	*									_	
i															
1															
1															
i –															
1															
1															
1															
1						\$									2
1				F	Reco	ords count 0									

Figure 55. Results of folder creation in CatMDedit

### Can metadata in XML format be edited in CatMDEdit?

Yes, metadata in xml format such as the results from ArcCatalog can be edited using CatMDedit.

 Once the Repository is available (example-FTA\_Geoportal) click and wait > the Repository in question will turn blue then click > import (red box - Figure 56)

CatMDEdit								
File Tools Window Help								
🖹 🗐 🕅 💣 RSS 🛍	FC	1						
🖈 Resource Browser								
Repositories	List Thumbnails Geographic Selector							
🗃 metadata	Standard Unique Id Langu	age						
TA_Geoportar		-						
	*							
1		i						
1								
i	1	;						

Figure 56. Importing a file to CatMDedit to specific folders

• The Import dialog box will then appear click > add to click the XML file to be imported. After clicking the XML file click > Open then click > Import (Figure 57).

Import	×	🕼 Open 🛛 👋
Metadata to import:		Look In: 🧰 Metadata 💽 📩 🏠 📺 🕮
Selected metadata	Add Remove	DN_Seram_Vegetation_CoverExtent_CIFOR_2010.xml DN_Seram_VegetationCoverExtent_CIFOR_2010.shp.xml
		File Name:       IDN_Seram_Vegetation_CoverExtent_CIFOR_2010.xml         Files of Type:       XML (.xml)
Create new file identifier		Open Cancel
Standard:		Metadata to import:           Selected metadata         Add           IDN_Seram_Vegetation_CoverExtent_CIFOR_2010.xml         Remove
Import	Close	

Figure 57. Process of adding the xml file to catMDedit

• After clicking Import, the data will be automatically added to the list and you can click > Close (red box - Figure 58):

Vetadata to import:	
etadata to import.	
Selei IDN Soram Vagatation Co	ted metadata Add
	Kemove
Create new file identifie O Default format	r
O User selection	
Standard:	
IDN_Seram_Vegetation_C	overExtent_CIFOR_2010.xml [OK]

Figure 58. Closing the importing process after finished and OK

• The repository display for FTA\_Geoportal, after XML data has been entered, will look like the screen view in Figure 59.

🕝 C	atMD	Edit															
File	Tools	Winde	w	Help													
1	1	M	ď	RSS	m		]	FC									
	<b>∕</b> ₹ Re	esourc	e Br	owse	er 👘												
	R	eposito	ories			Ć	6	Lis	st Thumbnail	Geographic Selec	tor:						
	i me	tadata	ertel						Standard	Unique Id	Lang	uage	Title	Hierarchy Level	. Subject		
		ң_Geop	ortai									-		-		-	
	!								ISO19115	Vegetation Cov	English		Vegetation Cover Extent in Seram 2010	dataset	environment	C	Center
	i i							*	1								
	!																
	!																
	i i																
	!																
	i i																
	!								<								>
	1							1	ecord(s) select	ed of 1							
	L								ccord(o) select								

Figure 59. The results of importing an xml file to a specific folder

• In addition, in Windows Explorer, from the example: D:\CIFOR\Repository, it will automatically add 1 new file (Figure 60).

$\leftarrow$ $\rightarrow$ $\checkmark$ $\uparrow$ $\blacksquare$ > This PC > DATA (D:) > CIFOR > 1	TA_Geoportal	   
V 📙 CIFOR	^	Name
📜 FTA_Geoportal		vegetation cover extent in seram 2010
L <mark>_</mark> _%_%_%_*_i_~		

Figure 60. The xml file can be read in Windows Explorer.

### How to edit Metadata in CatMDEdit following ISO 19115 standards

When the XML data in CatMDEedit appears > double-click on the data > metadata will be entered.

• A new toolbar will appear containing the HTML menu, ISO 19115 etc. Because the metadata used is ISO 19115 click > the ISO 19115 menu. Information from the metadata has 3 classes: mandatory, optional and conditional. In Figure 61, there is a screen view of what it will look like.

🗯 Edition: Vegetation Cover Extent in Se	eram 2010 - Ve	egetation Cover Extent in Seram 2010	_ 7 🗙
HTML ISO 19115 NEM Profile CORE Profile	INSPIRE Profile	WISE Profile	
	(2) Metadata Element definiti unique identifie Vegetation Cov	ta file identifier tion: er for this metadatafile.	
Mandatory Optional Conditional			
		Edit Save Cano	el Validate

Figure 61. The ISO 19115 elements in the metadata standards

- To change the metadata click >Edit at the bottom (red box), 'Save' and > 'Cancel' will be activated automatically (**Figure 61**). Here's an explanation:
  - » Metadata file identifier: Information regarding the identification code for the data. If the identification code does not exist, a data title can be added/entered, for example 'Vegetation Cover Extent in Seram 2010'. (**Figure 62**)

HTML	ISO19115	NEM Profile	CORE Profile	INSPIRE Profile	WISE Profile	
	Metadata file in Language Character set Parent identifie Hierarchy level Hierarchy level Contact Metadata date Metadata stan	dentifier er name stamp dard name		(2) Metadat Element definit unique identifie Vegetation Co	ta file identi ion: er for this metad wer Extent in Se	fier atafile. :ram 2010

Figure 62. A unique identifier that can be implemented in the dataset

» Language: this is the language used in the metadata, for example, English (Figure 63)

HTML	ISO19115	NEM Profile	CORE Profile	INSPIRE Profile	WISE Profile	
	letadata file ic anguage haracter set arent identifie lierarchy level	dentifier er		(3) Languag Element definit language used	<b>ge</b> tion: I for documentin	ng metadata.
	iontact letadata date letadata stan	stamp dard name		English		

Figure 63. Entering the language of the metadata

- » Character set: using utf8
- » Metadata date stamp: this is the date the metadata was created (this is required information red mark) (Figure 64).

HTML	ISO19115	NEM Profile	CORE Profile	INSPIRE Profile	WISE Profile	
	letadata file io anguage Character set Iarent identifie lierarchy level lierarchy level Contact letadata date letadata stan	dentifier er name stamp dard name		(9) Metadat Element definit date that the m 2021-07-14	ion: netadata was cr	np reated.

Figure 64. Entering the date stamp

» Metadata standard name: ISO 19115 Geographic information – Metadata (Figure 65)

HTML	ISO 19115	NEM Profile	CORE Profile	INSPIRE Profile	WISE Profile				
	letadata file ide anguage	entifier		(10) Metada	ata standaro	1 name			
Character set				Element definition:					

- Character set	Element definition:
– 🗌 Parent identifier	name of the metadata standard (including profile name) used.
— 🔄 Hierarchy level	
— Hierarchy level name	
E Contact	ISO 19115 Geographic Information - Metadata
— Metadata date stamp	
— Metadata standard name	
Metadata standard version	

Figure 65. Entering the metadata standard name

» Metadata standard version: ISO 19115:2003 (Figure 66)



Figure 66. Entering the standard version of the metadata

» Contact: enter the contact information of the metadata creator (required information - red mark) (Figure 67)



Figure 67. Entering the contact and responsible party

» Organization name: the organization where the creator of the metadata works, example: Center for International Forestry Research (CIFOR) (**Figure 68**).



Figure 68. Entering the organization's name

» Phone – CI\_Telephone: telephone number and fax number of the metadata generator. Example: CIFOR agency telephone number (as the place of work of the metadata creator) (**Figure 69**)



Figure 69. Entering the telephone number

» Address - Cl\_Address: office address, city, province, postal code and country (Figure 70)

HTML ISO19115 NEM Profile CORE Profile	INSPIRE Profile WISE Profile
Hierarchy level name  Contact  CI_ResponsibleParty  Individual name  Organisation name  Position name  Contact information	(381) Contact.CI_ResponsibleParty.Contact information.CI_Contact.Address.CI_Address.Delivery point Element definition: address line for the location (as described in ISO 11180, Annex A).
- CI_Contact	Delivery point
Phone     Address     CI_Address     CI_Address     CI_Address     City     Administrative a     Postal code     Country     Electronic mail ar     Online resource     Ontro of service     Contact instructions     Role	Jalan CIFOR Situ Gede, Sindang Barang,Bogor Barat 16115

Figure 70. Entering the address

» Role: Distributor; if the one who manages the metadata is the CIFOR management team, enter CIFOR as the data distributor. If the situation is different, this can be adjusted using the available options (**Figure 71**).





» Dataset URI: link for the uploaded data on CIFOR geonode website (https://geonode.cifor.org) (Figure 72)

HTML	ISO19115	NEM Profile	CORE Profile	INSPIRE Profile	WISE Profile
	Vetadata file in anguage Character set Parent identific dierarchy leve dierarchy leve Contact Vetadata date Vetadata date Vetadata stan Dataset URI	dentifier er name stamp dard name dard version		(11.1) Data Element definit Uniformed Res https://geono	aset URI ition: source Identifier (URI) of the dataset to which the metadata applies. ode.cifor.org/layers/datastore:geonode:idn_seram_vegetationcoverextent_cifor_2010

#### Figure 72. Entering the URI

» In code, enter the Reference System Information – MD ReferenceSystem – RS Identifier – Code and then click > Code Space: coordinate system used in Shapefile/raster data, WGS 1984 – EPSG 4326 (Figure 73).



Figure 73. Entering the system projection code

» Metadata Maintenance > MD\_MaintenanceInformation > Maintenance and Update Frequency: the frequency of metadata repair if the time is known, otherwise click/enter > Unknown. (Figure 74)



Figure 74. Entering the maintenance information

» Click > Identification Information > MD\_DataIdentification > CI\_Citation > Title: Data title, for example 'Extent of vegetation cover in Seram 2010' (information required – red mark) (Figure 75)

HTML	ISO19115	NEM Profile	CORE Profile	INSPIRE Profile	WISE Profile	
	letadata exte dentification I MD_DataIder Citatio CI_CI_C	nsion informati information ntification in itation Title Alternate titl Date Edition	ion 🛕	(360) Ident Element definit name by which Vegetation Co	ification Inf ion: the cited resou ver Extent in So	formation.MD_DataIdentification.Citation.CI_Citation.Title

Figure 75. Entering the title of data.

» Click > MD\_DataIdentification > CI\_Citation > Date > CI\_Date > Date\_type: data related information created, published or revised. Example: 'Creation' (information required – red mark) (Figure 76)



Figure 76. Entering the date type

» MD\_DataIdentification - CI\_Citation - Date - CI\_Date - Date: time information that supports Date Type, for example: data created on 31 December 2010 (required - red mark) (Figure 77)

HTML ISO 19115 NEM Profile CORE Profile	INSPIRE Profile    WISE Profile
	(394) Identification Information.MD_DataIdentification.Citation.CI_Citation.Date.CI_Date.Date Element definition: reference date for the cited resource.
Alternate title  Alternate title  CI_Date  CI_Date  Date  Date  Date  Date  EDate  Date  Date  CI_Date  Date  Date Date	2010-12-31

Figure 77. Enter the date

» Click MD\_DataIdentification > Citation > CI\_Citation > Date: the CI\_Date information can be entered more than once. If there is information on the time of data creation and publication, the CI\_Date list will contain two items, as shown in Figure 78.

Metadata extension information     Metadata extension information     Mo_DataIdentification     Otation     CI_Citation		(362) Identification Information.MD_DataIdentification.Citation.CI_Citation.Date Element definition: reference date for the cited resource.
Title  Totate  Totate	=	Values Type CI_Date CI_Date *

Figure 78. Date can be entered more than once based on the type of date

» Abstract: information related to the summary of the contents of the data (required - red mark) (Figure 79).



Figure 79. The abstract is basic information about the dataset

» The Purpose of the data is then entered (Figure 80)

HTML	ISO19115	NEM Profile	CORE Profile	INSPIRE Profile	WISE Profile	
	etadata exte dentification I MD_DataIder Citatio B Abstra	nsion informat nformation ntification n act se	tion 🔼	(26) Identif Element definit summary of the	ication Info ion: e intentions with	rmation.MD_DataIdentification.Purpose
	<ul> <li>☐ Credit</li> <li>☐ Status</li> <li>☐ Point c</li> <li>☐ Resou</li> </ul>	of contact rce maintenan	ce	Vegetation Co	ver in Seram de	veloped by CIFOR in 2010 (COLUPSIA project)

Figure 80. The purpose of data creation.

» Credit: creator and person in charge of data (Figure 81).

HTML	ISO19115	NEM Profile	CORE Profile	INSPIRE Profile	WISE Profile	
	letadata exte dentification I MD_DataIder	nsion informat nformation ntification n ict	tion 🔼	(27) Identif Element definit recognition of	ication Info ion: those who conti	rmation.MD_DataIdentification.Credit
	Credit     Credit     Status     Purpos     Credit     Status     Point c     Resou	e of contact rce maintenan	ce	CIFOR. La	aumonier, Y, 20	Credit 10

Figure 81. Credit data producers and creators, including the owner of the dataset

Point of contact: information about the person in charge of the data

» Cl\_ResponsibleParty > Individual name: enter the individual's name (Figure 82).



Figure 82. Name of person in charge of the dataset

» Cl\_ResponsibleParty > Organization name: organization's name and that of the person in charge. (Figure 83).

HTML	15019115	NEM Profile	CORE Profile	INSPIRE Profile	WISE Profile		
		of contact esponsiblePart Individual na Organisation Position nam Contact info	ty ame n name ne rrmation	(376) Ident contact.CI_ Element defini name of the re	tification Inf Responsible tion: esponsible organ	ormation.MD_DataIdentification Party.Organisation name zation.	n.Point of
	⊕ Resour ⊕ Graphi	Role rce maintenan c overview	ce	Center for Int	ternational Fores	try Research (CIFOR)	

Figure 83. The organization of the responsible party

» CI\_ResponsibleParty > Position name: position and person in charge (Figure 84)



Figure 84. The position of the responsible party.

- » CI\_ ResponsibleParty > Contact information > CI\_ Contact > **Phone**: information regarding the telephone number and facsimile of the person in charge of the data. Example: CIFOR office telephone number (as place of work)
- » CI\_ ResponsibleParty > Contact information > CI\_Contact > **Address**: office address, city, province, postal code, country and email address of the person in charge of the data
- » CI\_ ResponsibleParty > Role: the role of the person in charge. Example: as the main contact related to data, click > PointofContact (Figure 85).

HTML	ISO19115 NEM Profile CORE	Profile	INSPIRE Profile	WISE Profile	
	Point of contact      CI_ResponsibleParty      Individual name      Organisation name      Organisation name      Organisation name      Organisation name	~	(379) Identi contact.CI_I Element definiti function perform	tification Information.MD_DataIdentification.Point of ResponsibleParty.Role tion: rmed by the responsible party.	
	CI_Contact     Role     Resource maintenance     Graphic overview     Resource format     Descriptive keywords     Resource specific usage     Resource constraints     Aggregation Information     Spatial representation type		pointOfConta originator owner pointOfConta principalInves processor publisher resourceProvi user	act act istigator	

Figure 85. The role of responsible party for the dataset

» Resource maintenance > MD\_ MaintenanceInformation > Maintenance and update frequency: information related to data update frequency. If it is not known whether the data has already been updated or not, click > unknown (**Figure 86**)



Figure 86. Maintenance statement of the dataset

» Descriptive keywords > MD\_Keywords: enter keywords/keywords related to data. Keywords can be entered as groups (Figure 87).

HTML	ISO19115	NEM Profile	CORE Profile	INSPIRE Profile	WISE Profile	
	Graph     G	ic overview rce format ptive keyword Keywords Keywords Keywords Keywords	s	(33) Identif Element definit provides categ	ication Info ion: ory keywords,	rmation.MD_DataIdentification.Descriptive keywords theirtype, and reference source.
	🗄 📒 Resou	rce specific us	age			Туре
	🗄 📘 Resou	rce constraints	s	MD_Keyw	ords	
	🗄 📒 Aggre	gation Informa	ation	MD_Keyw	ords	
	- Spatia	Spatial representation type		MD_Keyw	ords	
	🛨 🚺 Spatia	l resolution		MD_Keyw	ords	
	Character set     Discrete Control Contro Control Control Control Control Control Control			*		

Figure 87. Keywords of the datasets in the descriptive format

Example: the location keyword (place) and a location name (keyword) Example: keywords for FTA, Flagship (**Figure 88**).

HTML	ISO19115 NEM Profile CORE Profile	INSPIRE Profile WISE Profile
	Graphic overview     Graphic overview     Resource format     Descriptive keywords     M_Keywords     Keyword     Type	(53) Identification Information.MD_DataIdentification.Descriptive keywords.MD_Keywords.Keyword Element definition: commonly used word(s) or formalised word(s) or phrase(s) used to describe the subject.
į –	MD Keywords	Keyword
1	MD_Keywords	Maluku
i l	MD_Keywords     Resource specific usage	Seram
į –		Indonesia
į	🕀 🗧 Aggregation Information	
HTML	ISO19115 NEM Profile CORE Profile	INSPIRE Profile WISE Profile
	Graphic overview     Grap	(54) Identification Information.MD_DataIdentification.Descriptive keywords.MD_Keywords.Type Element definition: subject matter used to groupsimilar keywords.
	Thesaurus name     D-MD_Keywords     MD_Keywords     MD_Keywords     MD_Keywords	place

Figure 88. The dataset keywords to help the users find a dataset specific to the place of the dataset

» Resource constraints – MD Constraints – Use Limitations: description of the scope of data usage. Here is an example (**Figure 89**):

The information contained in this dataset is the exclusive property of the Center for International Forestry Research (CIFOR) Headquarters and any respective copyright owners. This work is protected under international copyright treaties and conventions. All use for commercial purposes requires the written permission of the Center for International Forestry Research (CIFOR) Headquarters and any graphic outputs (on screen or on paper) produced from this dataset must carry the following acknowledgment Center for International Forestry Research (CIFOR) Headquarters.

HTML ISO 19115 NEM Profile CORE Profile	INSPIRE Profile WISE Profile
Point of contact     Point of contact     Graphic overview     Graphic overview     Descriptive keywords     Resource specific usage	(68) Identification Information.MD_DataIdentification.Resource constraints.MD_Constraints.Use limitation Element definition: limitation affecting the fitness for use of the resource or metadata. Example, "not to be used for navigation" <
	Use limitation The information contained in this dataset is the exclusive property of Center for International Fore *
Spatial representation type     Spatial resolution     Language     Character set     Topic category     Environment description     Extent     Supplemental information     Distribution information	Use limitation: The information contained in this dataset is the exclusive property of Center for International Forestry Research (CIFOR) - Headquarters and any respective copyright owners. This work is protected under international copyright treaties and convention. All uses for commercial purposes require the written permission of Center for International Forestry Research (CIFOR) - Headquarters and any graphic outputs (on screen or on paper) produced from this dataset must carry the following acknowledgement
I	Center for International Forestry Research (CIFOR) - Headquarters.

Figure 89. Enter the statement of Use limitation in the metadata field

» Topic category: categories of themes based on spatial data, more than 1 theme can be clicked (Figure 90).

HTML	ISO19115	NEM Profile	CORE Profile	INSPIRE Profile	WISE Profile	
	Point c     Point c     Point c     Graph     Graph     Cascu     Descri	of contact irce maintenan ic overview irce format ptive keyword	ce	(41) Identif Element definit main theme(s)	fication Info tion: of the dataset.	rmation.MD_DataIdentification.Topic category
	Resou     Resou     MD_     Md_	rce specific us rce constraints Constraints Use limitatio LegalConstrain gation Informa I representatio I resolution age	aye s nts ation on type	environm location planningC * Topic category	ent Cadastre	Topic category
į	– 🗌 Chara – 🗌 Topic (	cter set category				

Figure 90. The topic category of the dataset

- » Extent > Ex\_Extent > Geographic element > EX\_GeographicBoundingBox: information related to coordinates for east, west, north and south boundaries (required red mark)(**Figure 91**).
  - West bound longitude: West longitude coordinates
  - East bound longitude: East longitude coordinates
  - South bound latitude: South latitude coordinates
  - North bound latitude: North latitude coordinates



Figure 91. Geographic boundary elements

» Supplementary information: contains information related to the publication of research results, reports and websites related to the data (Figure 92).

Spatial resolution     Language     Character set     Topic category     Environment description     Extent     Supplemental information	(46) Identification Information.MD_DataIdentification.Supplemental information Element definition: any other descriptive information about the dataset.
Ontent information     Distribution information     Distribution information     Data quality information     ortrayalCatalogueInfo     Metadata constraints     Application schema information     Metadata maintenance	Reference: FINAL REPORT - Collaborative Land Use Planning and Sustainable Institutional Arrangements for strengthening land tenure, forest and community rights in Indonesia. https://www1.cifor.org/fileadmin/subsites/colupsia/document/Final_Narrative_ COLUPSIA_2014.pdf
🖶 Mandatory 💽 Optional	https://www1.cifor.org/colupsia/

#### Figure 92. Supplementary information important for the dataset

Note: The users can refer to this supplementary information if they have a question about the dataset.

## How to enter the data distribution in CatMDedit

We can click on the distribution information and select several options to define the distribution of data including:

- Distribution format MD\_Format: format of data and version that has been used, i.e., Shapefile format.
- Distributor MD\_Distributor\_Distributor contact CI\_ResponsibleParty: information about the contact details of the responsible party, including the organization's name, position, contact information and role.



Figure 93. CI Responsible Party Elements

Transfer options – MD\_DigitalTransferOptions – On-line resource – CI\_OnlineResource – Linkage: website address where
data has been uploaded.

For example, the website address on the CIFOR geonode:https://geonode.cifor.org/layers/geonode:idn\_seram\_ vegetationcoverextent\_cifor\_2010 (**Figure 94**)



Figure 94. Online dataset resource

## How to enter the data quality information in CatMDedit

• Data quality information – DQ\_DataQuality – Scope: this is information related to the data coverage. There are many options when entering data quality information. One example for spatial data is the Dataset as in **Figure 95**.



Figure 95. The scope of the data quality report including the dataset

 Data quality information – DQ\_DataQuality – Report: this is where data quality may be entered, when viewed from the spatial data. Here you can enter more than one category.

For example, after the data has been examined, there are notes in terms of ConceptualConsistency and TopologicalConsistency (**Figure 96**).

HTML	ISO19115	NEM Profile	CORE Profile	INSPIRE Profile	WISE Profile	
	Metadata file i Language Character set Parent identifi Hierarchy leve Hierarchy leve Metadata star Dataset URI Spatial repress Metadata star Dataset URI Spatial repress Metadata exte Identification 1 Distribution inf Data quality in DQ_DataQua DQ_DataQua DQ_DataQua DQ_DataQua DQ_DataQua DQ_DataQua DQ_DataQua DQ_DataQua DQ_DataQua DQ_DataQua DQ_DataQua DQ_DataQua DQ_DataQua DQ_DataQua DQ_DataQua DQ_DataQua DQ_DataQua DQ_DataQua DATASCA Application sch Metadata mair	dentifier er d name e stamp idard name idard version entation inform tem information information form	nation on tion insistency nsistency ion			(80) Data quality information.DQ_DataQuality.Report         Element definition:         quantitative quality information for the data specified by the scope.         Values         Type         DQ_ConceptualConsistency         DQ_TopologicalConsistency         *         Or Type         DQ_TopologicalConsistency         Values         Type         DQ_TopologicalConsistency         Values         Values         Type         DQ_GriddedDataPositional Accuracy         DQ_NonQuantitativeAttributeAccuracy         DQ_QuantitativeAttributeAccuracy         DQ_TemporalConsistency         DQ_TemporalConsistency         DQ_TemporalValidity         DQ_TemporalValidity         DQ_TemporalConsistency         DQ_TemporalConsistency         DQ_TemporalConsistency         DQ_TemporalConsistency         DQ_TemporalConsistency

Figure 96. Type of data quality report

 DQ\_Data Quality – Report – DQ\_ConceptualConsistency – Results – DQ\_Conformance Result – Explanation: contains an explanation regarding the attributes of the data after it has been checked and/or corrected by the curator, in terms of conceptual consistency. (Figure 97)



Figure 97. Conceptual consistency results entered in the metadata

 DQ\_DataQuality - Report - DQ\_ConceptualConsistency - Result - DQ\_ConformanceResult - Pass: contains a choice, whether this data is acceptable or not in terms of quality, based on Conceptual consistency.

For example: if this data can be accepted, then click > 'True', this means it has been passed. (Figure 98)



Figure 98. Data quality ConformanceResult - Pass - True, False or No value for the quality standards

 DQ\_DataQuality - Report - DQ\_ConceptualConsistency - Result - DQ\_ConformanceResult - Specification CI\_Citation -Title: enter a minus symbol (-)



#### Figure 99. Citation title of data quality

DQ\_DataQuality - Report - DQ\_ConceptualConsistency - Result - DQ\_ConformanceResult - Specification - Cl\_Citation - Date: enter the date the metadata was created and/or revised.

Example for Date: enter 24 June 2021

Example for Date Type: enter Creation, because 24 June 2021 is the date the metadata was created. (Figure 100)

Result  DQ_ConformanceResult  Specification  CI_Citation  CI_Citation  CI_Citation  CI_Cate  CI_Date  Date  Date  Date  Date  CI_Date  CI_Date CI_Date  CI_Date  CI_Date CI_Date CI_Date CI_Date CI_Date CI_Date CI_Date CI_Date CI_Date CI_Date CI_Date CI_Date CI_Date CI_Date CI_Date	(394) Data quality information.DQ_DataQuality.Report.DQ_TopologicalConsistency.Result.DQ _ConformanceResult.Specification.CI_Citation.Date.CI_Date.Date Element definition: reference date for the cited resource.
Result     DQ_ConformanceResult     Specification     OT CI Citation     OTtle     Alternate title     Date     Otate     Date     Da	(395) Data quality information.DQ_DataQuality.Report.DQ_TopologicalConsistency.Result.DQ _ConformanceResult.Specification.CI_Citation.Date.CI_Date.Date Type Element definition: event used for reference date.

Figure 100. Enter the data for the specific type of date including creation, publication or revision

## How to validate Metadata if it has been entered completely

This metadata validation aims to see the completeness of the metadata according to ISO 19115.

• When opening metadata, click > Validate in the lower right corner (red box - Figure 101)

🗯 Edition: Vegetation Cover Extent in Se	eram 2010 - Vegetation Cover Extent in Seram 2010	
HTML ISO19115 NEM Profile CORE Profile	INSPIRE Profile WISE Profile	
Metadata file identifier  Character set Parent identifier Hierarchy level Characthy level Characthy level Characthy level Metadata date stamp Metadata standard name Metadata standard version Dataset URI Spatial representation information Metadata extension information Metadata extension information Metadata extension information Metadata extension information Data guality information Data quality information Metadata constraints Metadata maintenance MD_MaintenanceInformation Metadata MD_MaintenanceInformation	(2) Metadata file identifier Element definition: unique identifier for this metadatafile. Vegetation Cover Extent in Seram 2010	
Mandatory     Optional     Conditional		
	Edit Save Cancel	Validate

Figure 101. Validation conducted after completing the metadata

Metadata is considered as valid following ISO 19115 standards if the validation result reads,

'The metadata is valid' (Figure 102)

Metadata validation	×
The metadata is valid	
OK	

Figure 102. The results of the metadata validation

If the validation result provides information 'not valid', we need to recheck the metadata entry (Figure 103).



Figure 103. Metadata is not valid

The red text shows the elements of information that need to be entered to complete the metadata.





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