A GUIDE TO DATA ENTRY AND LAYER STYLING TECHNIQUE FOR MASPAWIO/GEONODE USERS

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Contents

1. CHAPTER ONE: Document Overview

This document has been prepared as a user guide manual targeted for Marine Spatial Planning Atlas of the Western Indian Ocean (MASPAWIO) platform users. It describes the general user interface (GUI) of the standard Geonode platform and also documents the essential steps involved in data/layer upload as well as maintenance and management of the metadata. It also explains simple layer styling techniques as used in most web mapping services.

This document assumes that the user is familiar with Geographical Information System terminologies and can navigate the Geonode interface from their preferred web browser. The term layer and data have been used interchangeably to refer to spatial and non-spatial data.

1.1. Introduction

The Marine Spatial Planning Atlas of the Western Indian Ocean (MASPAWIO) has been developed through International Union for the Conservation of Nature (IUCN) and Coastal Oceans Research and Development in the Indian Ocean (CORDIO), with funding from the French Development Agency (AFD). Geonode (geo.maspawio.net) has been selected as the platform to host the Atlas, making the geographically explicit information available for users over the internet.

An illustration of the GUI of the MAPSPAWIO is shown in (Figure 1.1) and a description of the different tabs are given in (Table 1.1**)** (to be reviewed after anticipated customization)

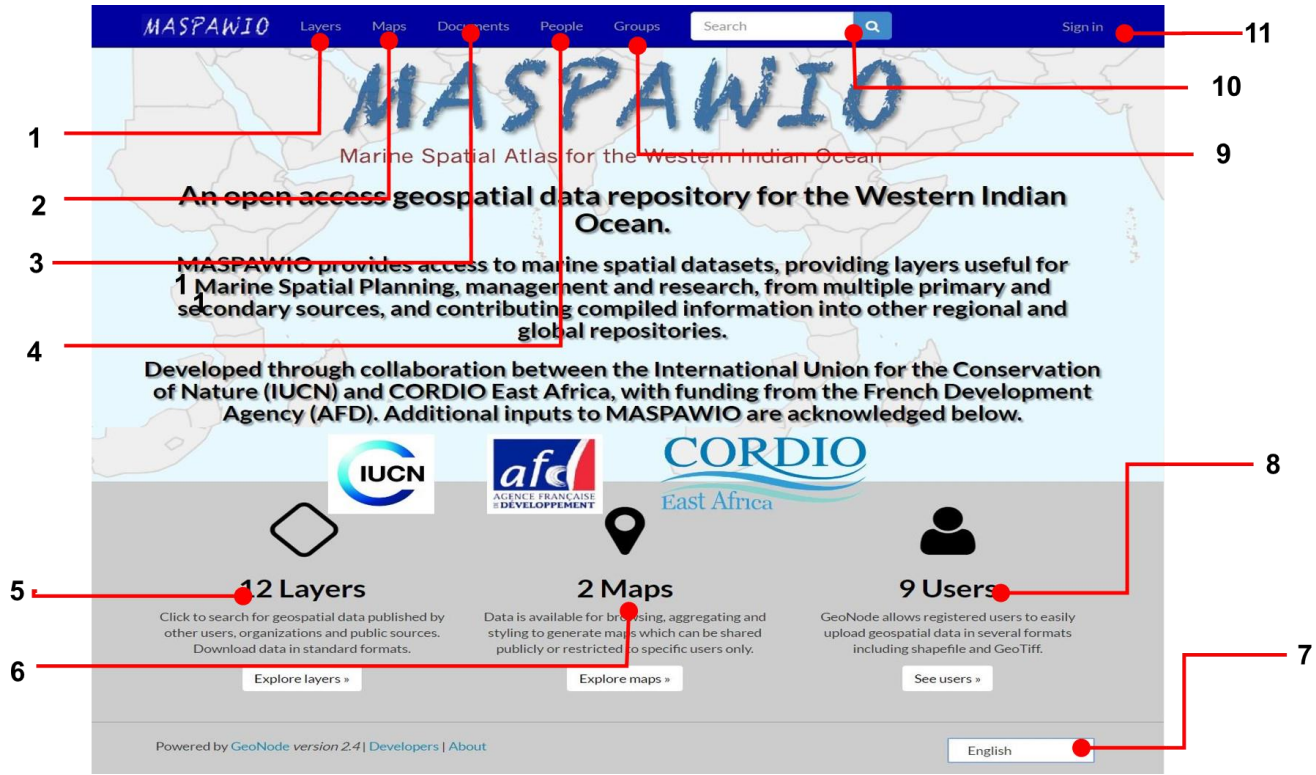

Figure 1.1: Standard GUI for the MASPAWIO platform powered by Geonode (will change after customization)

Table 1.1: Description of the different tabs on the MASAPWIO general user interface

Tab Number	Name	Description
1	Layers	An action tab used for displaying available layers
2	Maps	An action tab used to navigate to available maps created by different users
3	Documents	An action tab used to browse through the available resources/documents
4	People	Action tab used to open/display the registered user list and their profiles
5	Layers	Similar to action tab no 1 though displays summary of the number of layers currently available in the system
6	Maps	Similar to action tab no 2
7	Radio Button	Drop down menu used to select alternative system language by selecting desired language from the drop down list (default is English)
8	Users	Performs similar action as tab no 4
9	Groups	This action tab displays available registered user groups in the system
10	Search Box	Text box used for searching system resources by typing in the keywords.
11	Sign In	Action tab used by registered users to log into the system.

2. CHAPTER TWO: Data Upload into Geonode.

This section describes the steps to follow to ensure successful data upload into Geonode and also describes the various types of data that can be uploaded into the system. The section also documents some common errors plus possible solution that can be undertaken to clear them.

2.1. Introduction

Data upload or entry into Geonode is an essential process meant to provide primary resources for a functional system and can only be performed by a registered user.

Both spatial and non-spatial data can be uploaded into Geonode in form of layers (GIS files) or in form of documents for the latter. Specific file formats for uploading documents are outlined in appendix 1. For the layers, both vector and raster data are accepted provided that the projections are well defined.

2.2. Uploading layers/documents

Layers/document upload into Geonode requires internet connection and takes approximately less than 5 minutes to upload a single layer. However, this is dependent on pre-organization of data, the strength of the internet signal and the user experience. Basically the following steps are involved:

2.2.1. Step 1: Sign in to Geonode

To sign into Geonode, launch your preferred browser and type the MASPAWIO url geo.maspawio.net in the address bar and hit "ENTER" on the keyboard. If successful, this action opens up Geonode graphical user interface (GUI) as illustrated in (Figure 2.1)

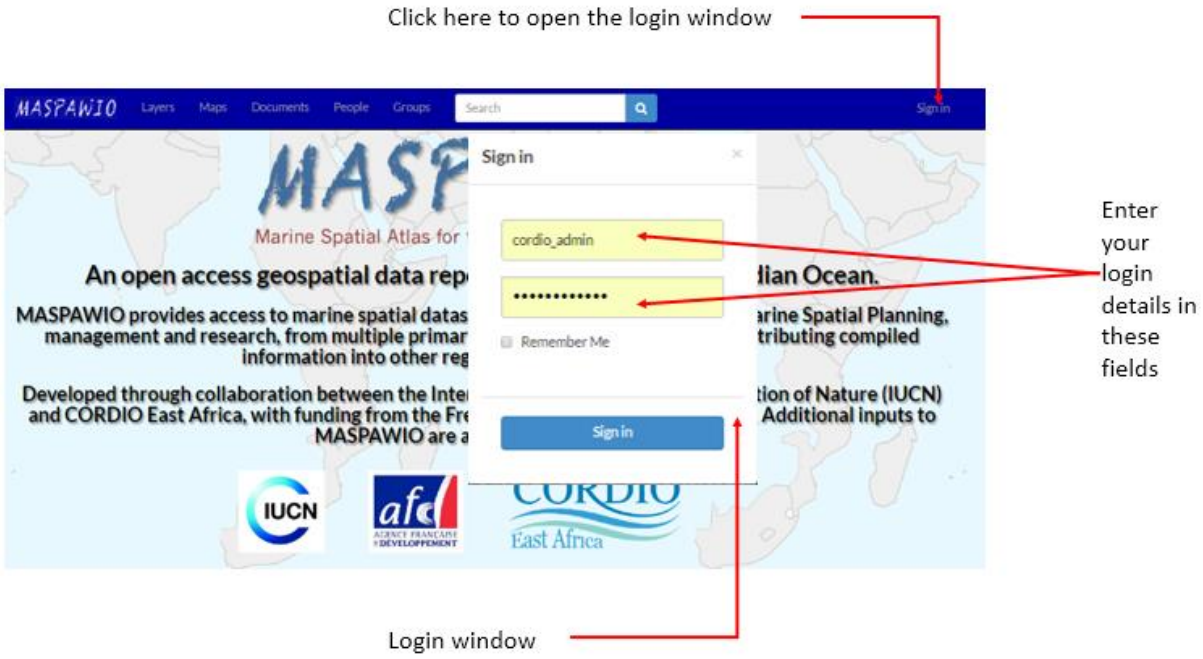

Fig 2.1: Graphical User Interface of Geonode illustrating the sign in button

On the top right hand corner of this page, click on the **sign in** action tab shown in (Figure 2.1) above and enter your logging details. Alternatively, you can click on the layers tab and then click on the upload button and you will still be prompted to sign in.

Once logged in, you will notice that the sign in button now displays your **user name** instead of the usual **sign in** text. You will also have several other privileges of editing, removing, updating and managing a layer properties provided you remain signed into the system.

Note: *Logging details are provided by the* ***system administrator*** *upon formal request.*

Possible errors; *the user may receive the following feedback while attempting to log into the system* ***"the user name and/or password you specified are not correct"****. This may be caused by a typo error, mismatch of the user name and password or basically nonexistence of such a user account. To correct this, confirm your login details or ensure that you are registered as a user. For further assistance contact the system administrator.*

2.2.2. Step 2: Launch the explore layer window

From the login page, click on **layers tab** to open the **explore layers window** {*the explore layers window displays all the existing layers in Geonode as contributed by different users*} as shown in (Figure 2.2)

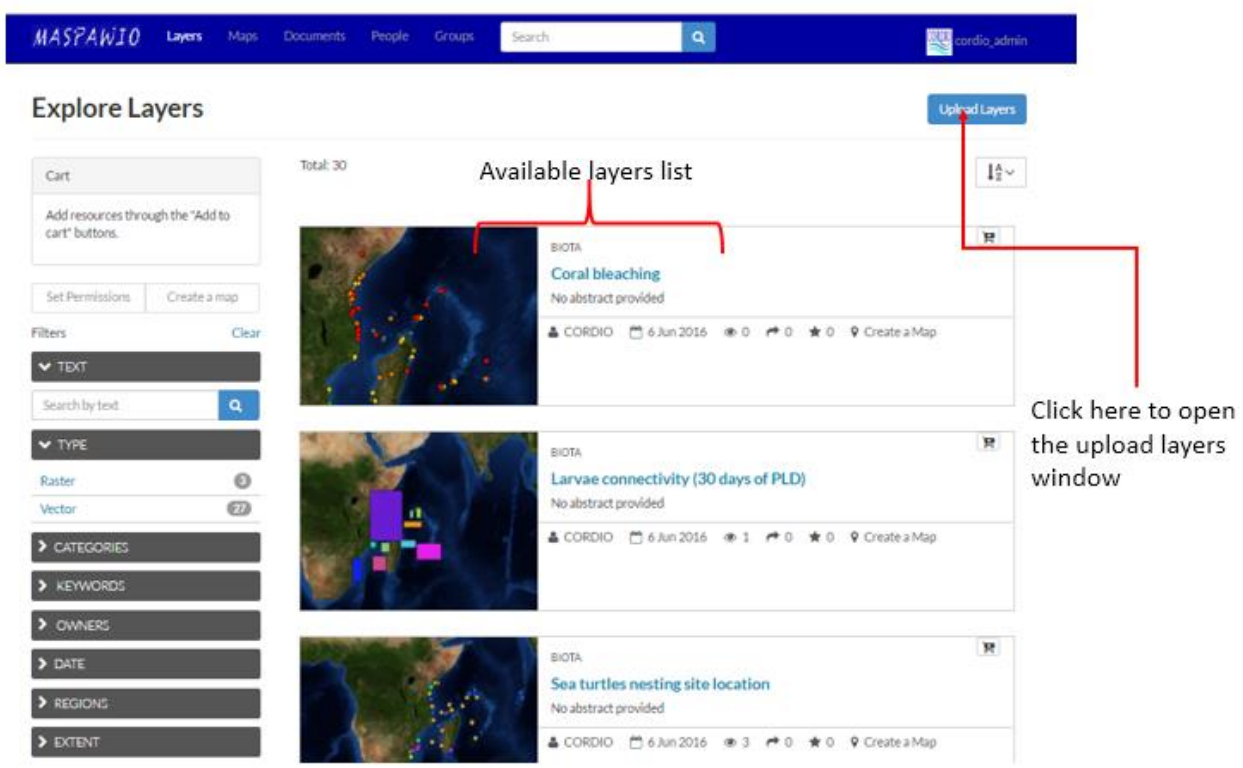

Fig 2.2: Illustration of the explore layer window showing the upload data action tab on the top right hand corner

The essence of opening the explore layers window is to gain access to the upload layers tab located on the upper right hand corner of this page.

2.2.3. Step 3: Launch the upload layers window

From the upper right hand corner of the "explore layer window", click on the **"Upload Layers "** action tab to launch the upload layers window (Figure 2.3) and proceed to upload layers as follows:

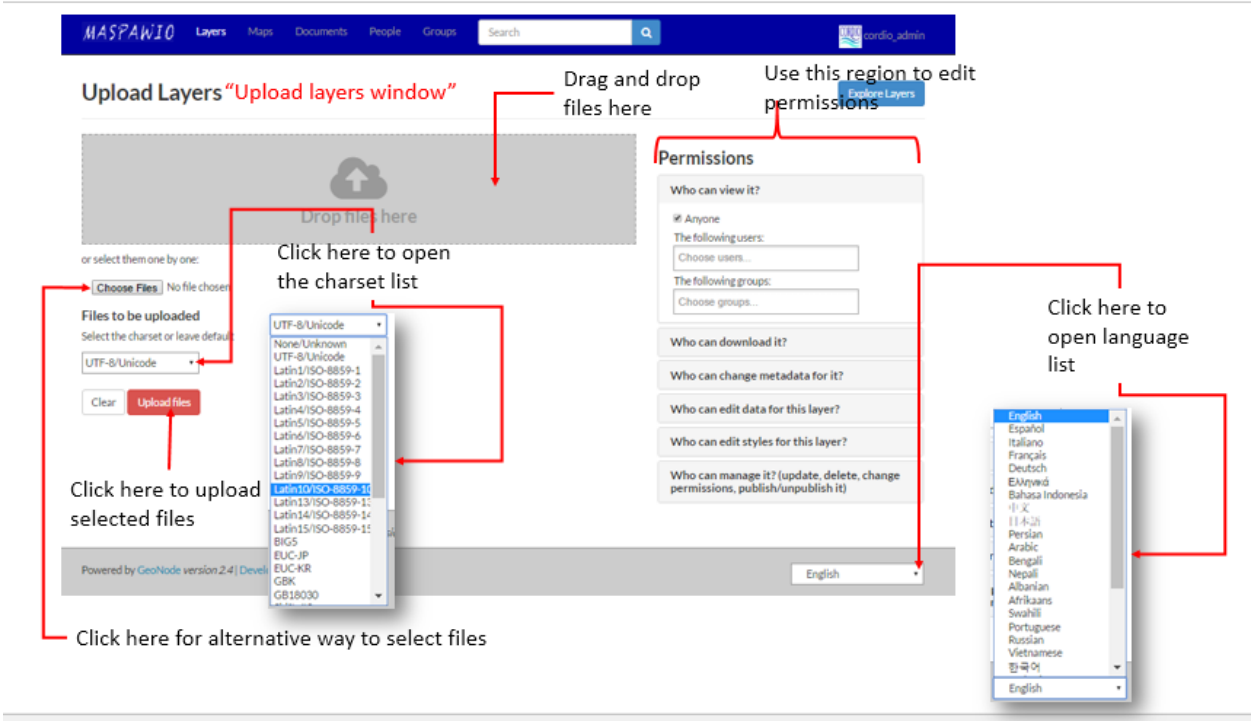

Fig 2.3: Different features of the upload layers window

Steps in uploading layers from the upload layers window:

i. **Load files**: Open your files location and highlight the required files and drag drop them in the **"drop files section"**. Alternatively, click on the **"choose file"** action tab and navigate to your file location. Once selected, these files appears under the files to be uploaded section.

*The possible errors in this section may include **"unsupported file type"** the name of the unsupported file is given and named above the files to be uploaded heading. This error may arise if the file selected is not a spatial layer or due to undefined coordinate system. To fix this, confirm the format and projections of your file.*

ii. **Select charset:** Charset is used to specify character used for encoding HTML documents. The drop down menu provides an option to select pre-set charset already specified in Geonode. The default charset is **UTF-8/Unicode** and is most preferred to leave this as default since this charset is the most commonly and widely used since it is capable of encoding all possible characters for a quick glimpse on the UTF-8/Unicode see https://en.wikipedia.org/wiki/UTF-8

iii. **Defining permissions:** The permissions dialogue box on the right hand side of the upload layer window provide regulatory options used to define user/s rights over a resource/layer. This section contains six fields which must be filled appropriately. To define a control, click on a topic to open the text box and enter by typing the details of a particular user. Other than view and download permissions sections which provide an additional tick box for enabling non registered users to view or download, all other sections are set and limited for registered users only.

iv. **Upload files:** When all necessary information has been filled in/provided click on the **"upload files"** action tab to commence on data upload. This action initiate the process of data/document upload into the system and after some few minutes if not seconds, a status report plus three action tabs pops **(**Figure 2.4) up on the screen with the message "files upload successful" plus a dialogue box with options for preview of the data, edit the metadata and manage the style.

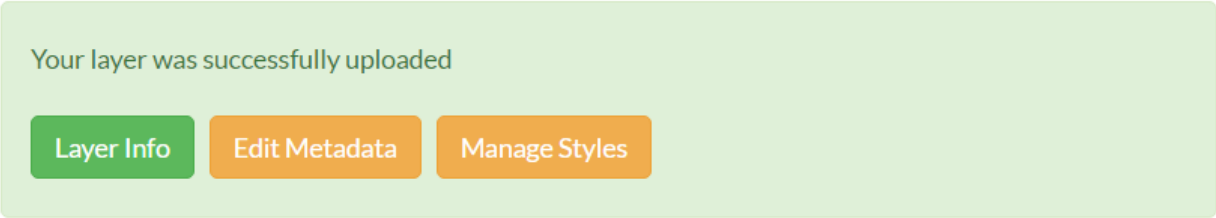

Fig 2.4: Status report message window showing three clickable action buttons

Possible error: "You are attempting to upload an incomplete set of files or not all mandatory options have been validated" Solution, review the errors in the form page and ensure that the file format you are trying to upload is acceptable.

2.2.4. Step 4: Confirming your upload

To confirm your upload, click on the layers tab and to open the explore layers window. Confirm by browsing through available layers to see whether the uploaded resource is featured among the available layers list.

By default, the layers are arranged from the latest to oldest and the most recent layer would thus feature on the first row.

2.2.5. Step 5: Viewing and editing layer properties

To view the layer properties, click on the specific layer from the explore layers window. This action opens the specified layer displayed in an interactive map (Figure 2.5). From this window, you can also examine, set and edit the layer properties as explained in the next step.

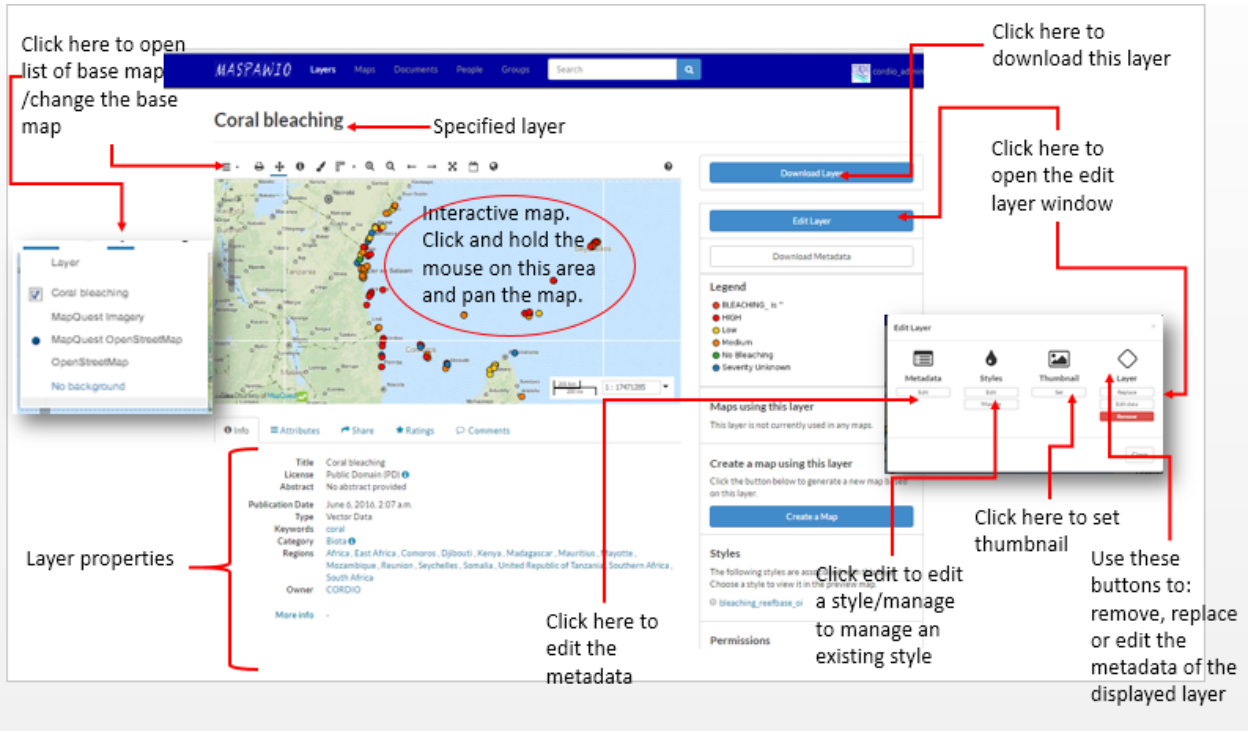

Fig 2.5: Layer property window illustrating different command options

2.2.6. Step 6: Editing the metadata, managing style and setting the thumbnail

To edit the layer properties, click on the **"edit layer"** action button shown on. This opens up the edit layer option window with four different action tabs as shown in (Figure 2.5) above.

To execute an edit function, select the appropriate action you want to perform by clicking on the specific action tab and proceed as explained in the following steps:

i. Editing the metadata.

To edit the metadata, click on the edit button below the metadata heading and fill in all the fields of the table that appears (see the summary of the table in appendix 1). Refer to chapter three of this document for guidance on the minimum details to fill this. Note that the rows of the attribute table at the end of the form are unique to each layer and should be filled appropriately. The columns are however standard and have been explained in (Table 2.1) below:

Table 2.1: Description of default columns of Geonode table of attributes

Column header	**Explanation**
Attribute	These are the default valuables headers as they appear in GIS attribute table. The characters are usually <10 and are separated by an underscore.
Label	This column is usually empty and is intended for use in the definition of attributes using their

	long name. In most cases, the attribute does not give meaningful name due to the limitation of characters and thus this should be addressed by defining the long name.
Description	This column is also empty and is meant for providing extra information describing the different valuables of the attributes. This may include information on i.e. units of measurements etc.
Display order	This column contains numerals which may be used to alter the sequence or arrangement of fields in the attributes table.

ii. Managing/editing style.

To manage/edit style, click on the appropriated (edit or manage style) action tab below the style icon and follow the layer styling techniques/procedure outlined in chapter 5

iii. Setting thumbnail.

Thumbnail is used to capture the screen shot of the layer extent and is used to display the resource in the explore layer window. To create a thumbnail, ensure that your display is correctly placed by moving around your map window to a desirable location by clicking on the map. To select your desired base click on the radio button shown in (Figure 2.5) above.

iv. Setting the thumbnail

Once the correct view and zoom level has been set, Click on "**set** "button under the set thumbnail text/icon. This automatically save the layer view at the selected scale and the effects updated on the explore layer window.

3. CHAPTER THREE: Annotating your data layers

This section provides a descriptive summary for the various terms and terminologies used in the standard Geonode metadata entry sheet. The objective of this section is to provide as much information about the requirements of each field so as to assist users to maintain consistency during the data/layer entry/uploading process.

3.1. Introduction

Careful description and presentation/styling of data are an essential requirement for any database or atlas. They not only enable effective discovery but also provide clear depiction of the data and descriptive details about them. To facilitate clear description of the data, metadata forms must be filled to capture the basic documentation required to interpret and describe the resultant data.

The following sections provides a brief guide to entering the minimum standard of data description (metadata) for any layers uploaded to MASPAWIO.

3.1.1. Metadata fields

A listing of the metadata fields available in Geonode are outlined in Appendix 1,(in Geonode this list is accessed from the edit layer window on the edit metadata menu) and a user should supply as much of this information as is possible. To facilitate comparability and sharing of data across different users in the region, this sections summarizes the minimum metadata requirements that all users must adhere to for their data layers to be accepted and made available to others. If any questions persist please contact the CORDIO GIS administrator for clarifications.

3.1.2. Minimum standards for metadata entry

Without clear metadata and descriptions, data layers will become unfindable as the Atlas grows, so minimum standards on initial submission of layers are essential. It is the responsibility of the user uploading data to ensure the metadata is accurate and permissions are obtained for open access as necessary. Any queries on the validity of data will require that it be removed from public access until such queries are resolved.

Table 1 lists 12 metadata fields out of the 26 available (see Appendix 2) that MUST be filled for each data layer that is uploaded. Layers will be put in a queue prior to approval for being made public, and any deficiencies in metadata entry will result in delays in completing this process.

Table 3.1 Minimum metadata required for uploading a GIS layer to MASPAWIO. For more formal descriptions of each

Field name	**Explanation**	**Comment**
Owner	This may be an organization or person	Provide a full name or recognized acronym, this field will be presented in all credits for the layer.

Title	A clear title for the layer, no more than 30 characters	This is the name of the layer that will appear in legends. It should be clear and not use unusual characters or fonts/styling
Date	Month and Year, day if desired	Year of publication or release of the layer
Abstract	Description of the data layer in up to 100 words.	This will appear in any pages describing the layer, and should explain any details of content, extent and time period, as well as any key importance/use of the layer.
Purpose	Use this to name the project and describe the purpose for compiling this layer, if appropriate	Additional to the Abstract, this helps assign layers to particular projects that provided layers.
Regions	Specifications of the extent of the layer.	Press the control button and select all countries that apply.
License	Any specific license/constraint of the data layer	If not specified, all layers will be presented as Creative Commons CC-BY
Distribution URL	The original location of the data layer	URL linking to the primary source of the product
Keywords	Important keywords relevant to the data layer, including project names	View existing keywords used for other layers to make the most of searches, and include key geographic, thematic and project names/terms that describe the layer
Category	Main theme(s) of the dataset	This is a standard thematic classification - choose one or more from the drop-down list
Attributes	Additional information about each spatial feature	
Point of Contact	The person/organization responsible for the metadata record	Email contact should be provided.

4. CHAPTER FOUR: Layer styling techniques

This section provides a brief guidance on styling of spatial data layers, to facilitate their visualization in Geonode. It describes the two stage process used to generate customized layers in Geonode.

4.1. Introduction

By default, Geonode just like most other Web Mapping Services (WMS) does not provide internal capabilities for styling layers. Layers/spatial datasets are thus stored using default styles that do not convey enough visual information. In an attempt to bridge this gap, several open source and commercial tools/applications have been developed for data/layer styling. This manual will focus on using QGIS as a layer styling tool due to its availability as an open source software and can be downloaded here. https://www.qgis.org/en/site/forusers/download.html

4.2. Layer styling in QGIS

Layer styling in QGIS is a two-stage process that require the use of extension tools that are freely available in the market. The first stage involves generating a Styled Layer Descriptor (.SLD) file/s and the second stage involves uploading the .SLD file into the Geonode for use in style management of specified layers.

4.3. Generating a Styled Layer Descriptor (.SLD file) using QGIS

Styled Layer Descriptor defines an encoding that extends the Web Mapping Services standard to allow user-defined symbolization and coloring of geographic feature and coverage data. SLD addresses the need for users and software to be able to control the visual portrayal of the geospatial data by defining an operation for standardized access to legend symbols. Generating .SLD file can be achieved as follows:

It is possible to generate the .SLD file for both raster and vector data using QGIS using the following steps:

4.3.1. Step 1: Installing SLD generator plugin for raster

SLD4raster plugin is used for generating .SLD file for raster data in QGIS. This extension is available in QGIS though it is not usually installed and must thus be made available via the plugin repositories installed from the software plugins store.

To install the SLD4raster plugin, start your QGIS application on your computer. From the GUI of the QGIS standard tool bar (Figure 4.1)**,** click on **plugins** action button and then click again on **manage and install plugins** option on the tab that appears. This opens up all plugins list window. From the search dialogue box of the plugins window, type “SLD4raster” to locate the plugin. Within a short time, the plugin will show up on the list. To enable the plugin, tick the checkbox or double click on the name “SLD4raster” and the plugin will automatically be installed on your QGIS tool bar (Figure 4.1)

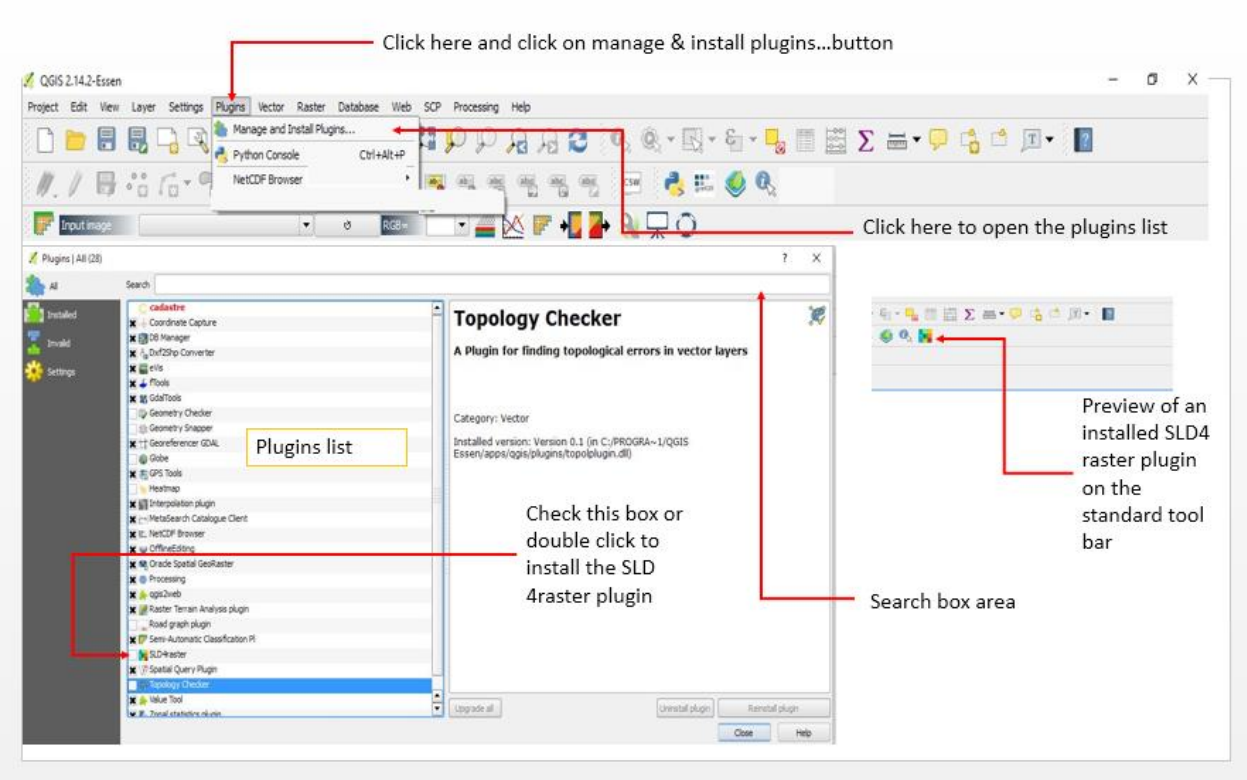

Fig 4.1: An illustration summarizing the authorization of the SLD4 raster plugin

4.3.2. Step 2: Styling a raster layer/data

To generate a styled file for a raster layer, import the raster data into the QGIS environment and edit the layer appropriately using preferred colors and styles. Once satisfied with all the symbolization and coloring, follow the steps below to accomplish the styling process. Refer to (Figure 4.2) for illustrations.

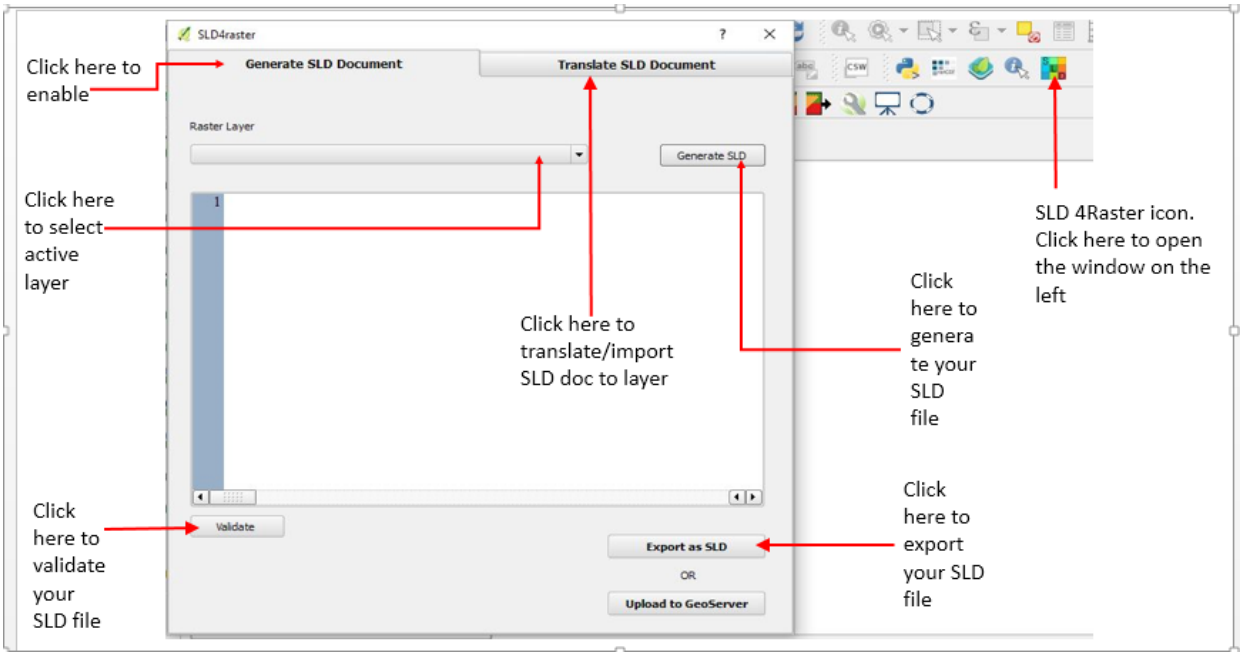

Figure 4.2: Illustration of the different components of the SLD4raster window

Steps to generate a styled data file for a raster layer using QGIS SLD4raster plugin

i. Click on the SLD4raster icon. This opens up the SLD4raster window
ii. Click on the generate SLD document action tab to enable it
iii. Click on the drop down radio button and Select your raster file as the input layer
iv. Click on generate SLD action button to commence the process.
v. Click on generate SLD action button to generate an SLD file and
vi. Click on export as SLD action tab to archive your .SLD file and save your file for the next step on uploading the SLD on Geonode.

4.3.3. Styling a vector layer/data

To generate style layer file for a vector data, import the vector file into the QGIS environment and perform all necessary customization on the vector data (Color mapping).

Once satisfied with the appearance and symbolization of the vector layer, right click on the layer from the table of content (TOC) to open on the layer properties window shown on (Figure 4.3) and proceed with the steps below.

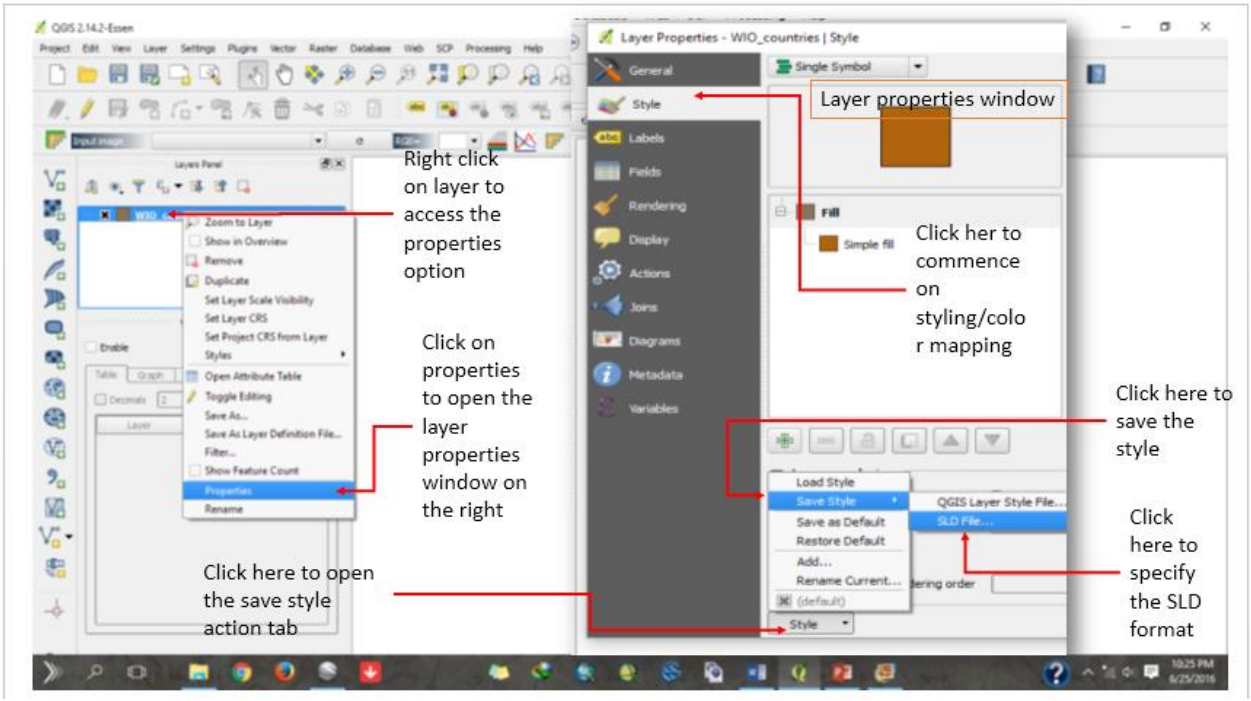

Fig 4.3: Summary of the vector layer styling procedure

Steps to generate a styled data file for a vector layer using QGIS

i. Right click on the layer on the specific layer on the table of content
ii. Click on properties from the drop down list to open the layer properties window
iii. From the layer properties window, click on “Style” action button denoted with a brush icon (this is the same window you used to perform color mapping and styling) to access the save style action tab.
iv. On the bottom left corner of the style window, click on the **style** radio button to open a drop down list. Scroll to **“save style as…”** click on **“SLD file**…” to specify that this is the format you wish to save your style in.
v. Navigate to your working folder and save your style for use in the subsequent steps.

5. CHAPTER FIVE: Adding styles/styling layers in Geonode

This section describes the process of uploading the SLD files generated in chapter 5 into Geonode and how to use these files in styling a layer.

5.1. Introduction

Layer styling for any web mapping service provides a clear visual interpretation of spatial data and details about them. To facilitate clear visualization of these data, layer styling must be performed to enhance the basic information required for the visual interpretation of the resultant data on the featured layer window.

In Geonode, uploading SLD files and styling a layer is a process that is only accomplished by registered system users. I.e. you must be logged in as an administrator for you to execute this function as follows:

5.1.1. Step 1: Adding SLD files in Geonode

As a user, you must add your SDL files into Geonode for you to be able to use them. To do this, log into Geonode as explained in previous section and follow the steps below. The steps are also summarized in Figure 5.1

i. Click on log in button (now displaying your user name). This will open up a list of items.
ii. From the list that appears, scroll to the title “Geo-server” also denoted with a 3 gear like signs and click it to open Geonode dashboard.
iii. On the left hand side of the geoserver window/dashboard, click on “**styles menu**” to open the **style window** and list of available styles on the right.
iv. Click on add **new style** hyperlink to open the **new style window.**
v. Scroll to the bottom of the new **style window** page and click on **“choose file”** action button
vi. Select the SLD input file from where you saved it.
vii. Once selected, click on **“upload”** button and “**submit”.** (You can also validate or preview the legend here)

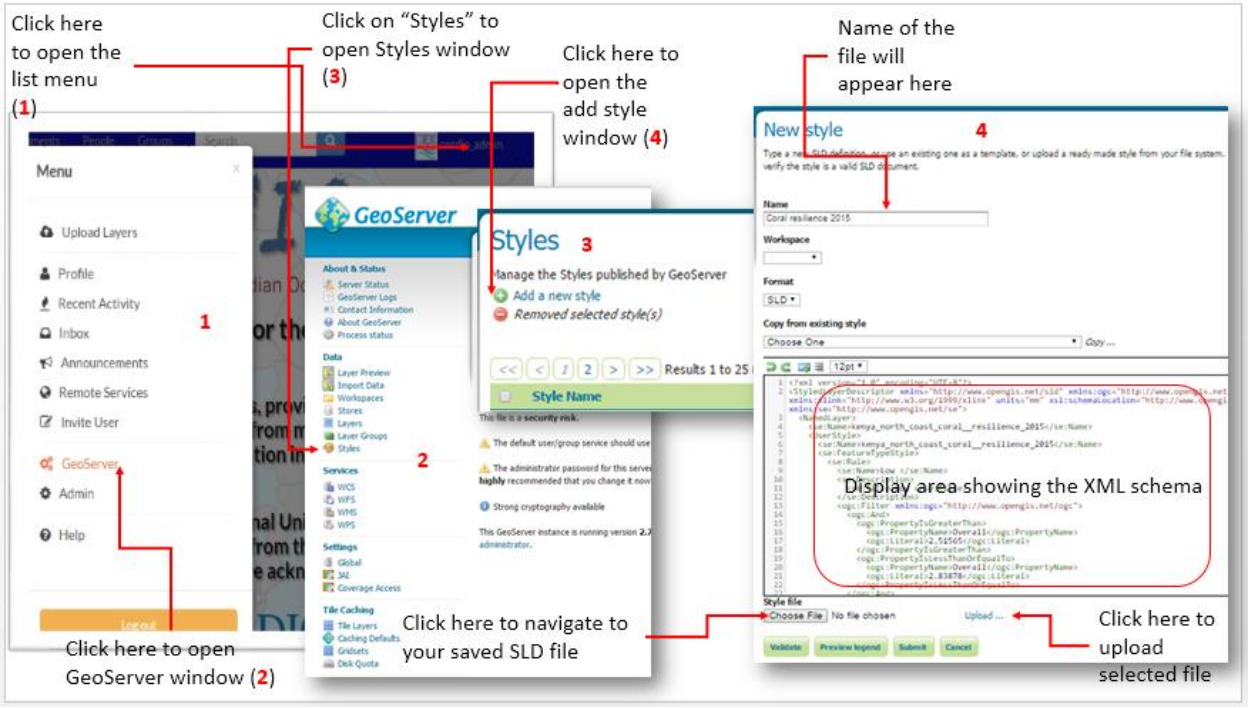

Fig 5.1: Illustration of the different windows and steps for uploading SLD files in Geonode.

Note: Successful upload will show the styled layer as an Extensible Markup Language XML schema file with several lines and codes in the view window. The name of the style will also appear in the name dialogue box above in a similar way that you saved it. Once successful procced to assigning the style to a defined layer.

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5.1.2. Styling a layer in Geonode

To style a layer in Geonode, Log in to Geonode and open the Geoserver window and proceed as follows:

Steps to styling a layer in Geonode:

i. From the Geoserver window, click on the **layers hyperlink** to open **"layers"** window. The layer window will display a list of all layers that are archived in the Geonode database.
ii. From the list, select on the specific layer by clicking on it to open the **layer editing window.** To confirm that you are editing the desired layer, the name of the layer is displayed in bold letters just below the edit layer text/heading.
iii. From the "**edit layer"** window click on the **Publishing** action tab.
iv. Click on the radio button below the **default style** heading and select the archived style you uploaded earlier. (This style is still identified by the same name as you saved it earlier).
v. Move down for **additional styles** and select the same style as for the default style by highlighting on it on the **available styles** list
vi. Use the forward arrow to move the selected style to the right and into the **selected styles** list.

vii. Scroll to the bottom of the layer editing window and click on **save** button and exit the dash board.

viii. Exit from the geoserver and refresh the system. The style will be automatically updated on the selected layer.

ix. Click on layers from the main menu to confirm whether the style has been updated.

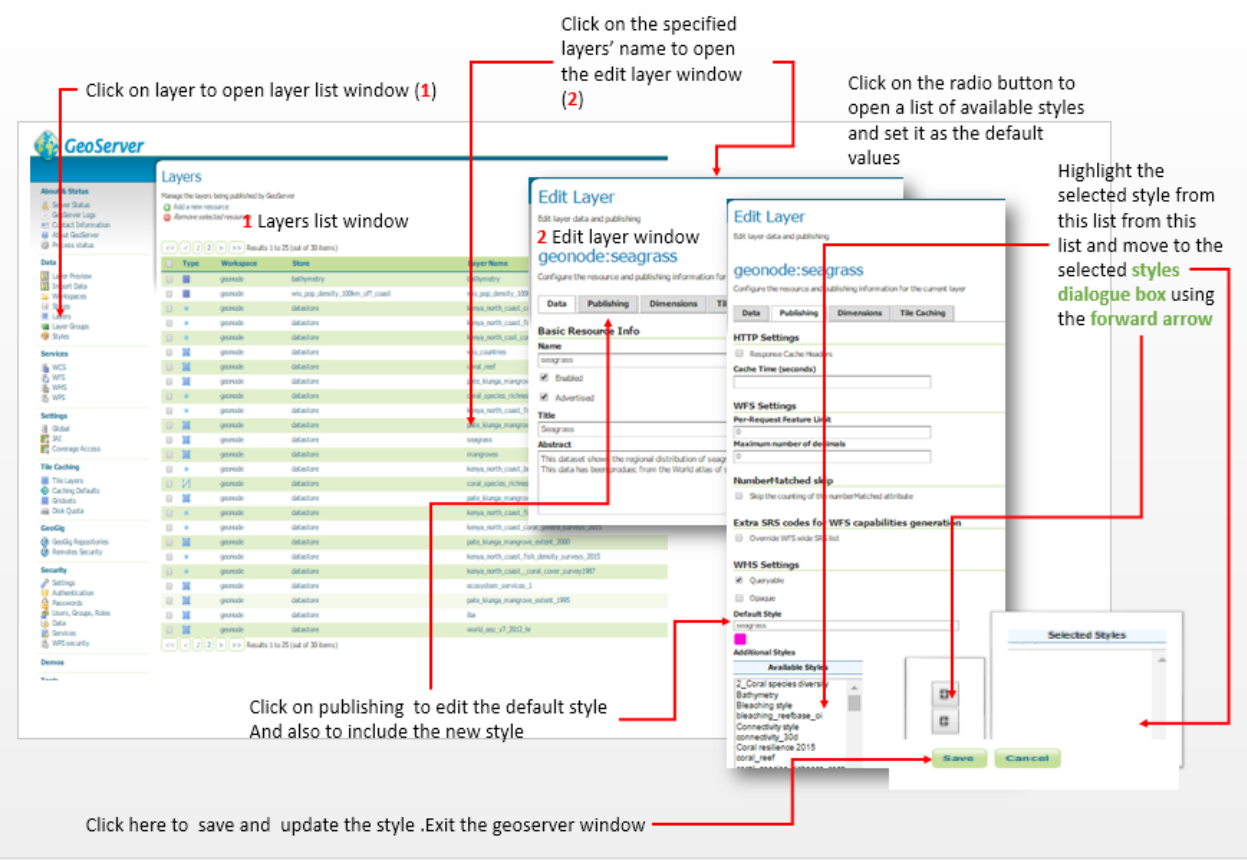

Fig 5.2: Summary of the layer styling steps

Possible errors. The style may not be effected. Try adjusting your zoom levels allowing enough time for changes to be seen.

6. Exiting the system

It is always good practice to log out from the system before you exit as this ensures that the system is safe from un-authorized access.

To log out, click on the log in button (now displays your user name) to open the drop down list and scroll down to “log out”.

It is advisable to browse the layers as a public user and also to download the contents/layers. This ensures that everything works smoothly as intended and also provide opportunities to identify any possible bug or errors.

7. List of Appendix

8. Appendix 1: Summary of allowed document file types up loadable in Geonode

File type	Explanation
.doc	Microsoft Word document
.docx	Office Open XML document
.gif	Graphics Interchange Format
.jpg	Joint Photographic Experts Group
.jpeg	Joint Photographic Experts Group
.ods	Open document spreadsheet
.odt	Open document text
.pdf	Portable Document Format
.png	Portable network graphics
.ppt	Microsoft PowerPoint Presentation
.pptx	Office Open XML Presentation
.rar	a compressed archive file format
.sld	Styled layer descriptor
.tif	Tagged image format
.txt	human-readable plain text,
.xls	Microsoft Excel worksheet sheet (97–2003)
.xlsx	Office Open XML worksheet sheet
.xml	Extensible Markup Language
.zip	a compressed archive file format

9. Appendix 2. Summary description of terms and vocabularies used in standard Geonode data entry forms

Field name	**Explanation**	**Comment**
Owner	Entity that can authorize or deny access to certain data, and is responsible for its accuracy, integrity, and timeliness.	This should be the name organization through which direct contacts can be made.
Title	The name by which the resource is known.	The title should describe the data resource, NOT the project that created the resource.

Date	The date in which the catalogue entry was created	Choose a date referring either to the publication, creation or revision of the dataset.
Date type	Defines the status of the resource	This should either be: a review date, publication or creation date as defined in the drop down menus in relation to the date entered above
Edition	Specific version of the product.	Should emanate from the lineage of publication i.e. 1st edition etc.
Abstract	A clear statement of the nature of the data resource	Should be clear and concise.
Purpose	The intended use/aim/ of the resource.	Describe the intentions for the data use in a few sentences.
Maintenance frequency	Number of times the updated data resource is made available to the user.	Data/resource may be updated continuously, but released to the user only monthly (pick one option from the drop down list)
Regions	A broad area/s distinguished by geographical location or political and economic treaties i.e. East African region defined by different countries etc.	Press the control button and select all countries that apply.
Restrictions	Any access constraints applied to assure the protection of privacy or intellectual property, and any special restriction or limitations on obtaining the resource or metadata	Any constraints applying to use of the resource must be documented/defined.
License	A grant by the holder of a copyright or patent to another of any of the rights embodied in the copyright or patent pertaining to the use of a defined product.	Specify using the drop menu whether the data is an open source, resource/public domain etc.

Language	Language used for documenting the resource.	English will be the default value for this field. Other languages can be selected from the drop down menu.
Spatial representation type	Element used to broadly categorize the spatial data of the resource being described	If your data resource is not spatial, do not include this element.
Temporal extent start	Defines the commencement date/time during which the resource is made available. (Relates to leased resources)	Insert date through the formatted option
Temporal extent end	Defines the expiry date for use of the product as may be defined by the owner. Defines the expiry day of the lease.	Insert date through the formatted option
Supplemental information	Any references to external information that are considered useful	This field is optional but worthwhile to include any other relevant information i.e. "For background information regarding to the Coral bleaching survey methods that apply to this dataset, please see (report/publication etc.)"
Distribution URL	A value uniquely identifying a resource within a given namespace	Ideally this should be a Uniform Resource Locator (URL) linking to the product.
Distribution description	The party from whom the data resource can be obtained. May be an individual, or a data center	
Data quality statement	The suitability of data for the intended use	May include a disclaimer
Featured	This relates to unpublished data	If unpublished, check the tick box.
Is Published	Defines whether the resource provided is published or not	I published, the tick box should be checked
Keywords	One or more terms likely to be employed by someone searching for this data resource	Keywords of the same type should be entered as a single comma separated list

Point of Contact	The name of the organization responsible for the metadata record	This should be an organization operating a helpdesk/enquiries service capable of responding to enquiries. Email contact should be provided.
Metadata Author	The person responsible for the catalogue metadata record describing the data resource. May be an individual, or a data center.	This should be an organization operating a helpdesk/enquiries service capable of responding to enquiries. Email contact should be provided.
Category	Main theme(s) of the dataset	An ISO standard thematic classification to assist in grouping and search of available geographic data sets. (Choose one or more from the drop-down list)
Attributes	Additional information about each spatial feature housed in tabular format	All headers in the attribute table of the resource appear usually limited to <10 characters. Their full names should thus be fully described in the description column of the matrix provided.