Food and Agriculture Organization of the United Nations

How to Create and Publish Geospatial Metadata
Best practices for metadata management

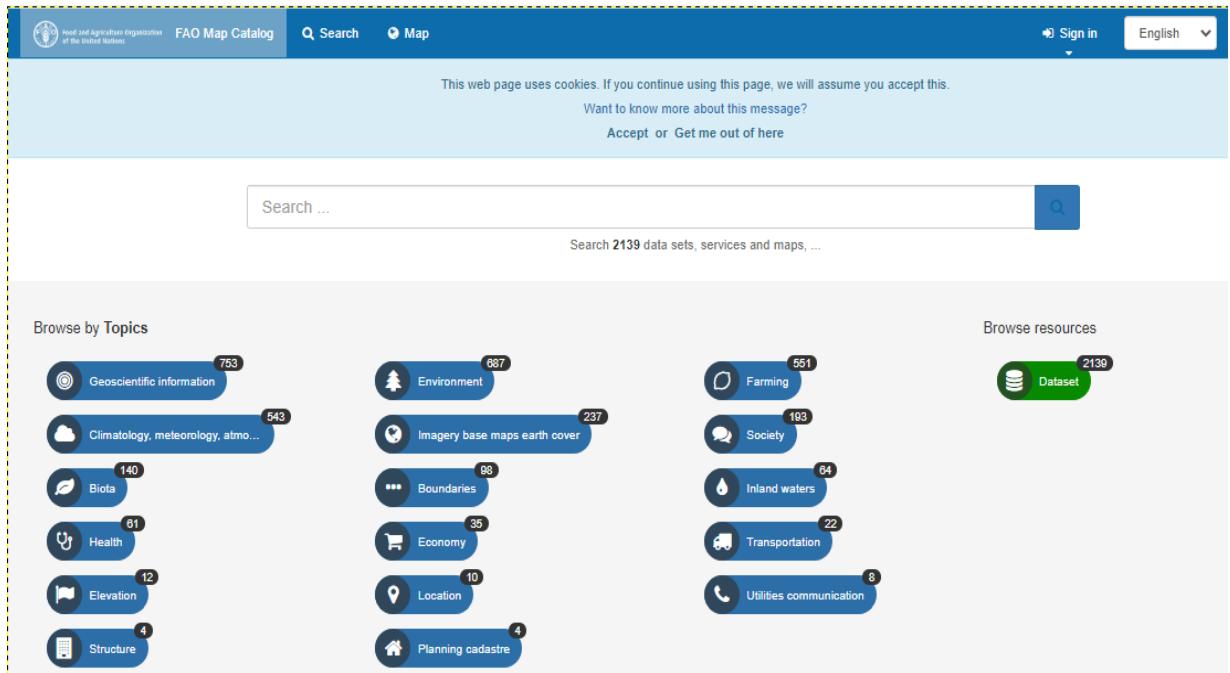2021

Table of Contents

Introduction

This guide provides instructions for data holders on how to publish metadata information associated with their geo-spatial resources through the FAO GeoNetwork metadata catalog. The FAO GeoNetwork metadata catalog is the collection point for the geographic information published through the Hand-in-Hand platform.

Users can use the catalog to consult and manage all available information, including all metadata records based on recognized International standards such as ISO19115 and Dublin Core.

Following this guide, users will be able to create standard metadata using the GeoNetwork online editor and learn how to make them available for dissemination. A specific section covers how to link metadata to Web Map Services and data for download. This includes the standard procedures to follow in order to facilitate data management and data discovery for better access and use of data content.

Access the catalog and explore the metadata resources: https://data.apps.fao.org/map/catalog

Access the Catalog and Explore the Metadata Resources:

Hint: There are several ways to browse the content

From the **homepage**, you have two options:

1. **Search by free text**: a full text search toolbox providing suggestions
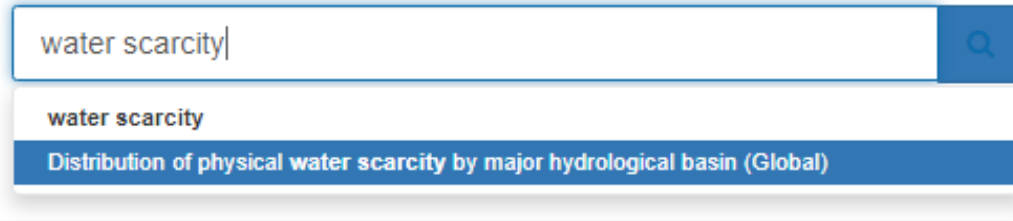
2. **Search by topics**: a list of ISO topic categories is provided to identify metadata content at macro level.

Other options from the **Search** tab include:

⊙ TYPE OF RESOURCES

☐ Dataset (2139)

⊙ AVAILABLE ACTIONS

☐ Downloadable (1416)
☐ Viewable (848)

⊙ TOPICS

☐ Geoscientific information (753)
☐ Environment (687)
☐ Farming (551)
☐ Climatology, meteorology, atmosphere (543)
☐ Imagery base maps earth cover (237)
all (17)

⊙ KEYWORDS

☐ Geoscientific information (753)
☐ Environment (687)
☐ Farming (551)
☐ Climatology, meteorology, atmosphere (543)
☐ Africa (393)
all (15)

⊙ CONTACT FOR THE RESOURCE

⊙ PROVIDED BY

⊙ YEARS

⊙ FORMATS

⊙ REPRESENTATION TYPES

⊙ UPDATE FREQUENCIES

⊙ STATUS

⊙ SCALE

⊙ RESOLUTION

1. **Search by group**: A menu containing groups that you can easily click on to browse the content of the catalog.

2. **Geographic search**: Spatial filter to choose information from specific areas using the drag and drop function to frame an area on the global map.
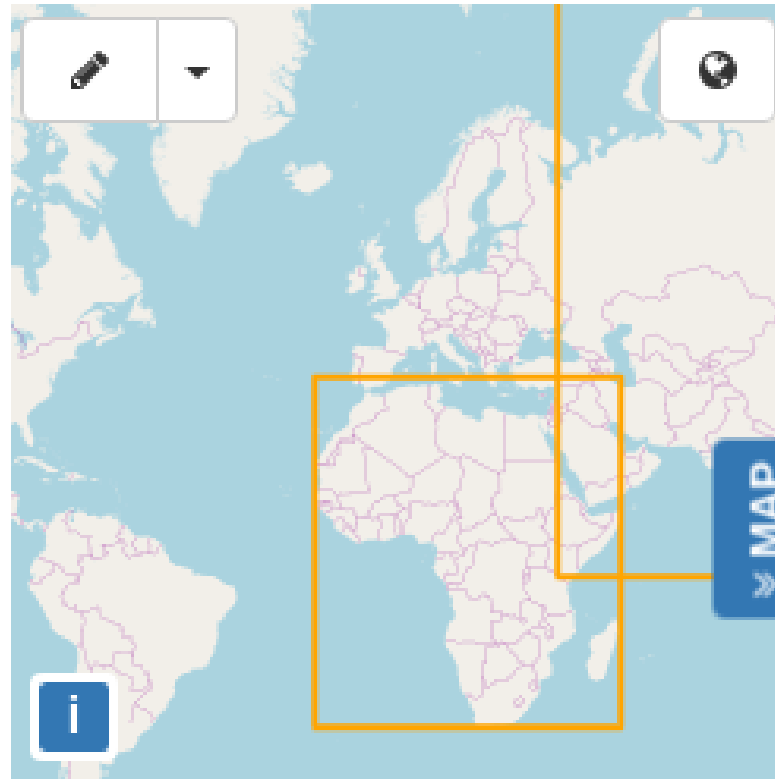
3. **Advanced search**: allows the use of specific search criteria, looking at the *What?* and *When?* Features of the content.

Search ...

What?

Categories

Keywords

Contact for the resource

When?

Resources created in the last▾

From

To

Records created in the last▾

From

To

Discover the Catalog Content

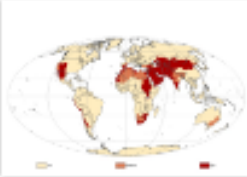When using the Search feature, the results display a short summary of each resource including title, abstract, categories, status, data provider and links.

☐ Categories 🌲   ☆☆☆☆☆

Distribution of physical water scarcity by major hydrological basin (Global)

This map provides a representation of levels of water scarcity by major hydrological basin, expressed in terms of the ratio between irrigation water that is consumed by plants through evapotranspiration and renewable fresh water resources. Contrarily to previous

Jippe Hoogeveen

Completed

☐ Categories •••   ☆☆☆☆☆

Agricultural Systems at Risk: human pressure on land and water (Global)

This map shows to which extent rainfed and irrigated agricultural systems as identified on SOLAW Map 1.3: "Major agricultural systems" suffer from land and / or water scarcity. Land scarcity in rainfed agriculture was assessed by comparing the rural population density, (obtained from

Jippe Hoogeveen

On going

☐ Categories 🌲   ☆☆☆☆☆

Total Actual Renewable Water Resources per Inhabitant

☐ Categories ○   ☆☆☆☆☆

Cubango-Okavango River Basin Water Audit Area

Click on the record to view more in-depth details about the resources:

- Citation information
- Technical information
- Download and links
- Metadata details

Download ⏷   Display mode ⏷

Distribution of physical water scarcity by major hydrological basin (Global)

This map provides a representation of levels of water scarcity by major hydrological basin, expressed in terms of the ratio between irrigation water that is consumed by plants through evapotranspiration and renewable fresh water resources. Contrarily to previo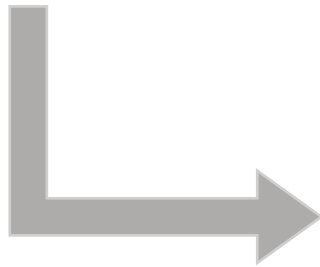us water scarcity maps, this map uses consumptive use of water rather than water withdrawal. Renewable fresh water resources as well as net irrigation water requirements in the river basin are calculated through a water balance model, with information regarding climate, soils and irrigated agriculture as input data.

Completed

Download and links

WMS	solaw:basins_ws_38002 Global distribution of physical water scarcity by major river basin https://data.apps.fao.org/map/gsrv/gsrv1/solaw/wms with layer name solaw:basins_ws_38002.	Add to map
	Downlaod - Global distribution of physical water scarcity by major hydrological basin (ESRI shapefile) https://storage.googleapis.com/fao-maps-catalog-data/geonetwork/aquamaps/1_2_ph_ws.zip	Download
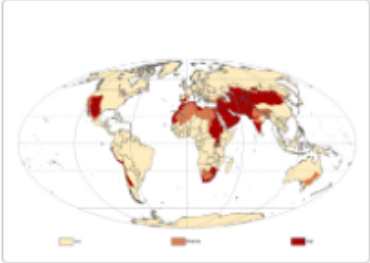
About this resource

Categories	🌲 Environment
Other keywords	• World Q

Overview
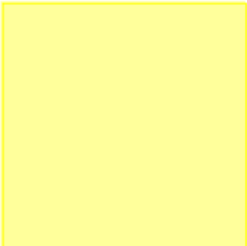
Global distribution of physical water scarcity by major hydrological basin - Large thumbnail (PNG)

No ratings ★

See all feedback   Add your review

Spatial extent

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Access Protected Information and Advanced Functionalities

There are no restrictions for users who want to search and access public information in the metadata catalog. However, when logged in, you may have access to additional confidential metadata (protected information) and to the *Editor board* with more advanced functionalities.

Hint: Credentials are provided by the GeoNetwork administrators.

The *Editor board* also has a *free text search* and a *search by group* feature to easily retrieve metadata from the catalog.

For each individual record, it is possible to set access privileges, to edit, delete, duplicate metadata as well as set parent/child relations.

Several functions can be also performed on a selection of multiple records.

Depending on your role within your Group when authenticated, users can perform different tasks in the catalog and on metadata records. Roles are hierarchical and based on inheritance. This means that a user with a *Content Reviewer* profile can perform the same functions as the *Editor* and/or as the *Registered User*.

See below the different user profiles and their hierarchy.

USER PROFILES

- Registered User ——————▶ - Rights to view and download protected data and metadata within own group

- Editor ——————▶ - Full rights to create/edit/delete metadata within own group

- Content Reviewer ——————▶ - Rights to review metadata content within own group and authorize its publication on the Intranet and/or Internet

- User Administrator ——————▶ - Full rights to create new users within own group

    - Rights to change users' profiles within own group

    - Full rights to create/edit/delete metadata within own group

- Administrator ——————▶ - Full rights to create new groups and new users

    - Rights to change users/groups profiles

    - Full rights to create/edit/delete metadata in the catalog

    - Perform system administration and configuration tasks.

Create your Metadata

1. From the home page, log-in with username and password on the top right corner.
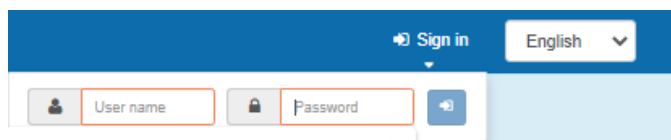
2. Once logged in, go to the Contribute section and then click on *Add new record.*
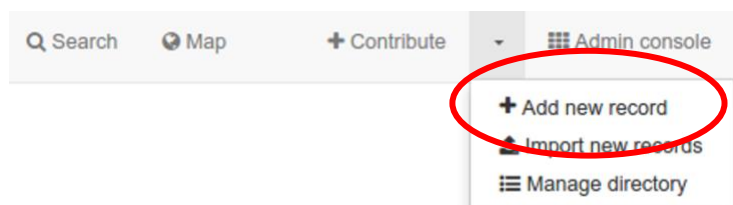
3. Select the metadata *template* to use.
4. Select the *group* the metadata will belong to. Please note that if you are not Administrator, only your group can be selected.
5. Click *create* to open a new metadata record.
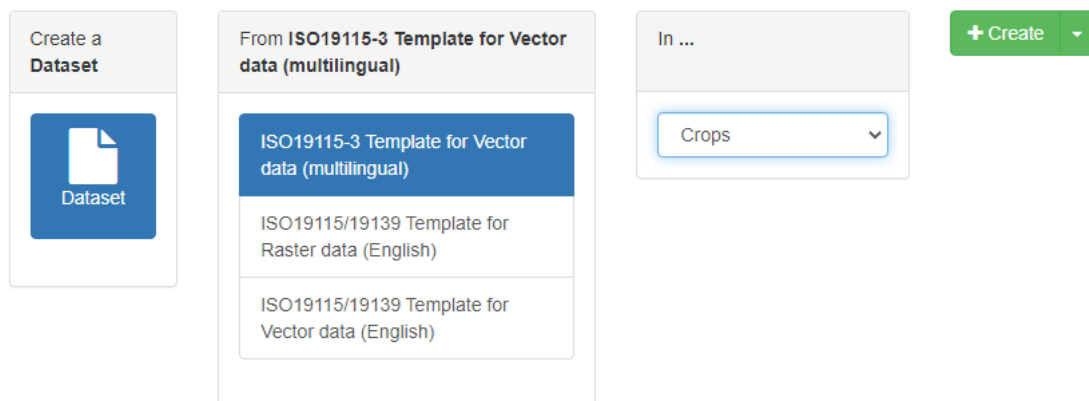
Editor Toolbar

The top editor toolbar shows the main actions:
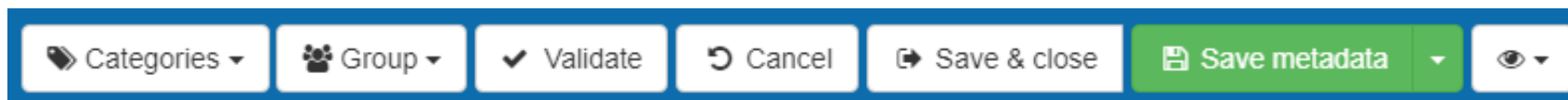
From left to right:

Categories	Set metadata categories to your metadata (i.e. Datasets, Maps & Graphics, Interactive resources, Audio/Video, etc…)
Group	Set metadata Group. You can use this function to change the group the metadata should belong to.
Validate	Metadata validation to check metadata against ISO standard validation rules.
Cancel	Cancel all changes made since the beginning of the editing session.
Save and close	This function refers to the editing session, allowing users to save, close and return to the session.
Save metadata:	This is a drop-down menu that allows you to save your metadata as a template or to select the *Minor edits* option to save the edits without updating the date of the metadata.
Eye (icon):	Change metadata view to *advanced editor* mode and enable *tooltips* for fields standard definition.

Editor Form

By default, the editor provides:

- A *Simple* view displaying a selection of metadata elements from the full content of the ISO 19115 standards, which are highly recommended to properly describe geospatial data.
- A *Full* view giving access to the full set of metadata elements available organized by different categories of information: Identification, Distribution, Quality, Spatial representation, Reference system, Metadata.
- An *XML* view displaying the actual XML coding of the metadata. This view is intended for use by XML experts only.

To switch from one view to another, click on the eye icon below in the figure on the bottom left

Identification info

Point of contact

Graphic overview

Resource constraints

Extent

Extent
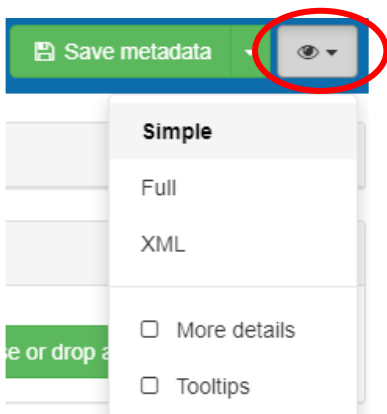
Advanced editing: This menu allows users to browse the list of fields to populate the metadata (*figure to the right*). Users can show or hide sections while editing and use the scroll-button on the lower right corner to quickly access a specific element of the metadata and to return to the top of the form.

In the event users need to personalize the *Simple view* form while editing, use the [x] and [+] buttons next to the element to remove existing fields from the form or add multiple fields of the same kind, respectively. Users can switch to specific sections of metadata in the *Full view* and add the elements that are not yet provided. The fields marked with a [*] symbol are mandatory or highly recommended, therefore they cannot be deleted. Any modifications will then be visible in the *Simple view*.

Reference System Information

Spatial representation info

Axis Dimensions Properties

Distribution Information

Distribution format

OnLine resource

Data quality info

Lineage

Metadata

Contact

Click on **Save Metadata** in order to save all changed made.

Guidance on Metadata Compilation in the Online Editor

Populating the catalog with new metadata requires users to log-in with an *Editor* profile or higher. Once logged in, users can create new metadata and edit existing ones, upload data, configure links to interactive map services and upload a static image to be used as an overview of the data.

Users can produce metadata for maps, vector or raster datasets, satellite imagery, and more, for any geographic information in the different domains by using standard templates.

A set of metadata templates based on International ISO standards is made available in the FAO catalog.

- ISO19115/19139 Template for Raster data (English)
- ISO19115/19139 Template for Vector data (English)
- ISO19115-3 Template for Vector data (Multilingual)
- Dublin Core Template

The production of standard metadata guarantees improved access and dissemination of the information by facilitating users in the evaluation of data suitability and usefulness.

Hint: To produce a good quality metadata record, always try to gather as much details as possible about the resource and ensure to fill out the metadata form using all collected information while avoiding duplications. To begin, add all the mandatory metadata elements: *Title, Date of Creation or Publication, Abstract, Language used for documenting data and metadata, Topic Category, Scale, Maintenance and Update Frequency, Metadata Point of Contact*.

It is also recommended that the optional fields are filled in when the information is available, such as *Keywords, Presentation Form, Spatial Representation Type, Geographic Location, Reference System Info, Temporal Extent, Data Quality Info, Access and Use Constraints, Point of Contact, Online Resources.*

Best practices

Pre-filled metadata fields: Complete the metadata fields using only the most useful information to identify the resource. Some fields in the form will be automatically pre-filled with the recommended choice. The code list fields are derived from the ISO19115 specifications.

Title: The information must be concise and consistent with the name of the resource. Any acronym or dimensions, when available, must be placed in brackets or in dash signs. Examples:
- Statistics (AQUASTAT)
- Global Agro-Ecological Zones - GAEZ 2015.

When using brackets, use a *comma* to separate elements of the same dimension and *dash* to distinguish between dimensions, according to the order: (*Area, Country – Time dimension – Resolution*). Example:
- Evaporation (Zankalon, Egypt - Annual - 30m)

A well-formatted title should also avoid special characters that may be misinterpreted by computer systems, such as *slash, back-slash*, *percentage symbol*, *quotation marks*, etc. In the following example, *slash* (in bullet point 1) could be easily replaced by *dash* (in bullet point 2):
- Global Agro-Ecological Zones - GAEZ v4 (Global/10km);
- Global Agro-Ecological Zones - GAEZ v4 (Global - 10km)

Data name: The title of the metadata and the name of the data package for download should be similar or consistent.
License: Provide information on license any time you grant data the download feature.

Metadata publication: Once a metadata record is completed, the *Editor* should inform the *Content Reviewer* who will be able to make the information visible to everyone (rather than to the editor's own *Group*, only) and to grant privileges to access the interactive map and the download function.

Illustrate Data with an Overview

In editing mode, a separate section is provided on the top right of the form to manage data *overviews* and add associated resources to the metadata.
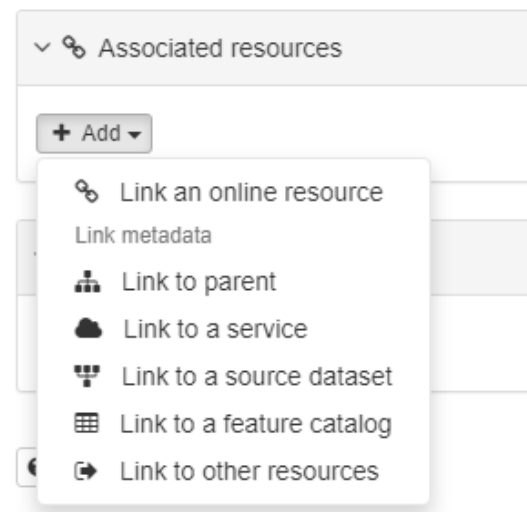
To facilitate the identification of the resource, create a graphic overview of the data and attach it to the metadata record. The thumbnail is then displayed in any search results and metadata views.

Thumbnails can be added using 3 sources:

- From a URL on the web
- From a local file attached to the metadata
- From a file generated using a visualization service

Option A: When the overview is available as an image on the web:

1. From the *Associated resources* panel on the top right of the editor, click on the *+Add* button

2. Open the *Link an online resource* wizard, from the menu (image below)

3. Select *Add a thumbnail* on the top left corner

4. Link the metadata to the image using the *URL* field

5. Add an optional resource name to describe the image

6. Click on *Add online resource* button.

Option B: When the overview is available on a local computer:

1. From the *Overview* section, click on *Choose or drop an image here* and choose a file or *drag & drop* a file on the button. The image will be automatically added to the *Metadata file store* in the *Link an online resource* wizard.

2. From the *Metadata file store*, you can perform the following actions:

   - Click the file name to check the URL for the current image attached
   - Click the eye icon to view the image
   - Click the locker to change the image visibility
   - Click the cross to remove the file

Option C: A thumbnail can be generated using the registered WMS layer in the metadata record on top of the base layer map:

1. From the *Link an online resource* wizard, select *Add a thumbnail* on the top left corner

2. From the *Generate thumbnail using the view service* tab, choose the area to be print.

3. Select *Overview* from the *Layout* menu

4. Choose the *Scale* from the drop-down list

5. Click on *Generate thumbnail* button to add the image created to the *Metadata file store*

From the Metadata file store:

6. Click the file name to set the URL for the current image to attach
7. Add the resource name to describe the image
8. Click on *Add online resource* button.

Generate thumbnail using the view service

All WMS layers registered in the metadata record are added to the map. Choose a layout (Thumbnail recommended), a scale, zoom to the area of interest to generate the thumbnail.

© OpenStreetMap contributors.

Layout

Overview

⚙ Generate thumbnail

Scale

1:100,000,000

Make the Data Available for Download

The GeoNetwork metadata editor tool provides uploading functions to make data available to others. Nevertheless, for data management reasons within the Organization, it is highly recommended to use external links to connect metadata with associated resources, including the actual data for download.
Hint: Exceptions can be made for overview images used as thumbnails.
A Google cloud storage console is used for uploading GeoNetwork data, with a size limit of 2GB and no restrictions on format: https://console.cloud.google.com/storage/browser/fao-maps-catalog-data/geonetwork
This bucket is publicly accessible to all users, but only authenticated users have editing permissions.

GIS data should be uploaded as a compressed (ZIP) file which should include the legend to help correctly interpret the dataset and its intended use.
In the bucket, content is organized in folders named according to topic categories, such as landcover, livestock, soils, etc. To store data as authenticated user, use an existing folder or upload a local folder. Then:

1. Select the folder where you want to place thedata;
2. Click *UPLOAD FILES* to locate the data.

As soon as data uploading is complete, a **Copy URL** button appears on the record line in order to associate it with the metadata.

From the Associated resources panel on the top right of the editor, click on Link an online resource wizard from the menu.

The following set of elements is made available by the wizard to register the online resources

Hint: fields marked with an asterisk are mandatory.

1. **Protocol** * : Set the protocol defining the type of service as Web address (URL)
2. **URL** * : Paste here the URL of the Google bucket copied
3. **Resource Name** : Identify the data with a name
4. **Description** : Provide more details about the data
5. **Function** : Set the link function as download
6. Click the *Add online resource* button to save the settings.

Link an online resource

⦿ ⌘ Add online resource ○ 🖼 Add a thumbnail

Protocol *   Web address (URL)

URL *   https://storage.googleapis.com/fao-maps-catalog-data/geo

Resource name   Drained organic soils

Description   FAOSTAT Area of drained organic soils

Function   Download

⌘ Add online resource

Link Other Associated Resources

Apart from the actual data, metadata records can be associated with other useful resources, including:

- Documents, publications, websites, web services (using URLs)

- Other metadata records (parent/child, source, associated dataset)

- Other types of resources (e.g. attributes table in a feature catalog)

Select the *+Add* menu to see the options available.

Link documents with a URL

A metadata record can be linked to online documents using a URL. Documents such as quality reports, publications, tables, images, websites, in different formats (e.g. png, jpg, pdf, html) may be associated.

Use the *Link an online resource* wizard and fill in the fields properties as follows:

1. Select the **protocol** as Web address (URL)

2. Use the **URL** field to type in the link to the target document

3. Provide in the **Resource name** a label to the associated resource

24
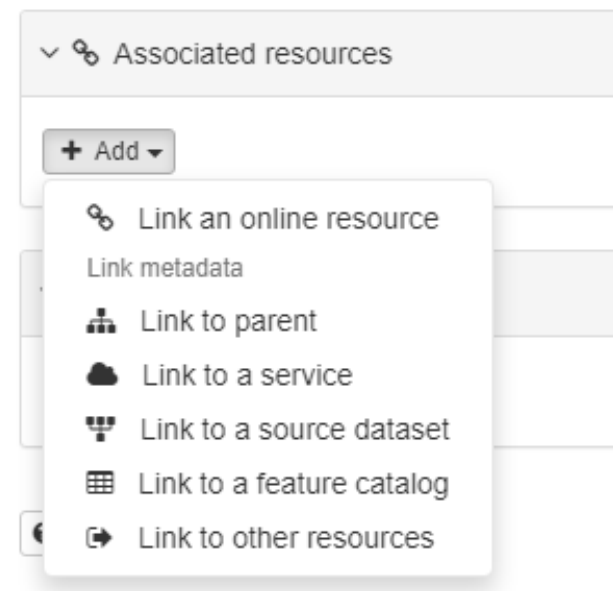
4. More details on the data can be included in the **Description** field

5. Click on the *Add online resource* button, to save the settings.

Link a Web Map Service

Note: This section does not apply to Dublin Core records. Only documents can be associated with Dublin Core standard metadata.

To be able to display data on a map viewer, add an online reference to the WMS service publishing the dataset.

For FAO internal WMS, the URL is provided by the Web Map Services Administrators.

To add a WMS layer, set the link properties as follows:

1. Choose the **protocol** OGC:WMS Web Map Service

2. Set the **URL of the service** and then choose a layer from the list provided by the wizard.

3. **Resource name** is set automatically after the selection of a layer, but you can also change it manually.

4. More details on the layer can be included in the **Description** field.

Link an online resource

⦿ % Add online resource ◯ 🖼 Add a thumbnail

Protocol   OGC Web Map Service (ver 1.3.0)   ⌄
  *

URL *   https://data.apps.fao.org/map/gsrv/gsrv1/gsoc/wms   ⟳

Available Water Storage Capacity (AWC_CLASS)

AWT_S_SOC (AWT_S_SOC)

Global Soil Organic Carbon Map V1.5 (GSOCmap) (GSOCmap1.5.0)

Soil or non-Soil Unit (ISSOIL)

Reference Soil Depth (REF_DEPTH)

Soil Quality: Obstacle to Roots (HWSD) (ROOTS)

Resource name   Name

% Add online resource

Associate Other Metadata Records

Metadata can be associated with other metadata records for several different purposes such as grouping datasets in a series, referencing sources and describing an attributes table in a feature catalog.

Sometimes a dataset is part of a collection of records that share the same specification. In order to group the set of records, a general description of the collection may be done in the parent metadata which can then be attached to each dataset of the series.

To set the **parent/child relation**, click on *Link to parent* and use the search tool provided to find and select target parent metadata.

When creating such relationship, users will be able to navigate between the records in the search and record view, as illustrated below.

Link a parent metadata record to the current metadata

agriculture stress index

23 records

ASIS: Agricultural Stress Index (ASI) - Annual Summary (Global - Annual -

Agricultural Stress Index System (ASIS)

ASIS: Mean Vegetation Health Index (Mean VHI) - Annual Summary (Globa

ASIS: Agricultural Stress Index (ASI) - Near Real Time (Global - Dekadal -

ASIS: Drought Intensity - Annual Summary (Global - Annual - 1 Km)

ASIS: Mean Vegetation Health Index (Mean VHI) - Near Real Time (Global

NDVI Anomaly for the Middle East & North Africa

Natural sensitivity index (2010) - ClimAfrica WP4

« ‹ 1 - 10 on 23 ▾ › »

Link to parent

Agricultural Stress Index System (ASIS)

Agricultural Stress Index System (ASIS) is a global agricultural drought monitoring system developed and operated by FAO which enables to monitor agricultural areas affected by dry spells, or severe drought in extreme cases, using satellite data. It provides a collective quick-look indicators that facilitate the early identification of cropland/gra... more

FAO

13 children
ASIS: Agricultural Stress Index (ASI) - Annual Summary (Global - Annual - 1 Km)
ASIS: Agricultural Stress Index (ASI) - Near Real Time (Global - Dekadal - 1 Km)
ASIS: Crop/Pasture Phenology: Progress of Season (Global - 1 Km)
ASIS: Crop/Pasture Phenology (Global - 1 Km)
ASIS: Drought Intensity - Annual Summary (Global - Annual - 1 Km)
8 more ...

When a dataset is derived from other datasets, this relationship can be indicated in the quality section of the metadata by adding sources through the *Link to a source dataset* function (image on the right).

An example of the results can be seen below:

Deleting a Record

There are different ways to remove records:

- From the metadata record view, click on the **Delete** button.
- From the search results, select one or more records and then select **Delete** in the **Selected** menu.
- In the **Contribute** section click the **Delete** button for a metadata record.

Multilingual Editing

A default ISO standard template is provided by the catalog to support multilingual metadata editing. Translations can be easily added to a default language metadata content.

To register a new language in a metadata record:

1. Define the default language in the metadata section
2. Add one or more languages

Once done, the editor form provides one field per languages registered. Two types of layout are available:

- One field per language displayed stacked below the others (i.e. default mode for title) in order to quickly view all translations available;
- One field per language with a list of languages to switch from one to another.

Identification info

Title *	Les informations géospatiales de AQUAMAPS	**Français**
	AQUAMAPS geo-spatial information	**English**
	AQUAMAPS地理空间信息	**中文**
	La información geoespacial de AQUAMAPS	**Español**
	AQUAMAPالسجيو-مكانية	**عربي**
	Геопространственная информация AQUAMAPS	**Русский**
		Deutsch

Users can switch from one mode to another using the **all** link.

When using the editor, layout language is the user's interface language, if such language is defined in the current record.

When viewing the record, if a translation exists in the user interface language, this translation is used. Otherwise, the main metadata language is used.

Tag Metadata with Categories

The FAO GeoNetwork catalog can define a set of categories to classify metadata records to simplify the search function or for management purposes. Categories will be associated with the metadata records although they may not be exported when the record is harvested.

Assigning categories to a metadata record can be done in two different ways:

1. Select one or more records in the search results and click **Update categories**. From here either replace categories or add new ones.

2. Open a metadata record from the search results and click on the **Categories** button. A drop-down menu appears to assign one or more categories using checkboxes.

Set Privileges to Metadata

Metadata privileges can be set on individual or multiple metadata records.

The Privileges button is accessible from the *Manage record* menu of the metadata view or in the search results when one or more records are selected, access privilege settings by clicking on *Selected*.
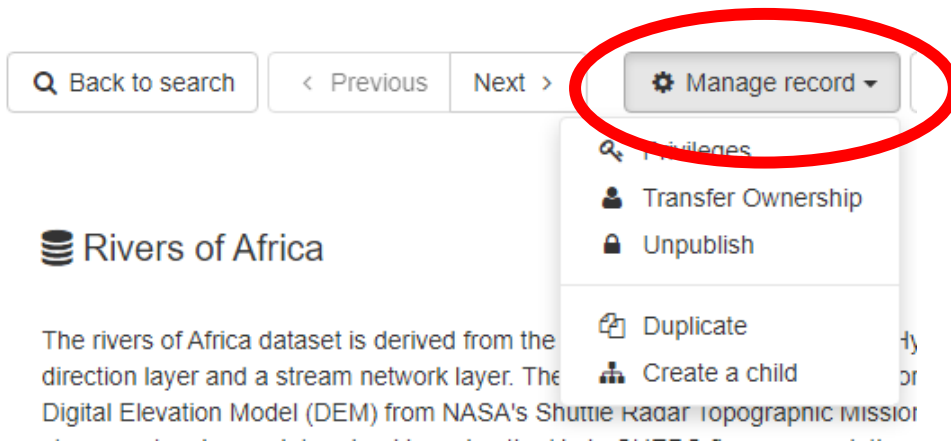
The privilege settings are available for   the
following user profiles:

- All *Administrators*
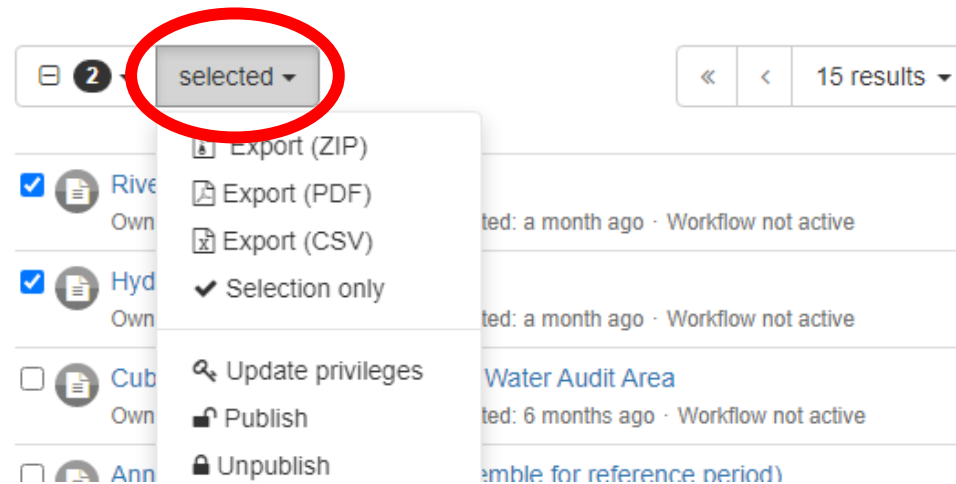- *Content Reviewers* who are members of the group assigned to the metadata
- The *Owner* of the metadata

Only *Administrators* and *Reviewers* can edit privileges for *All* and *Intranet* groups.

Setting Privileges on a selected set of metadata records

When setting the privileges on metadata, the following rules apply:

- The available groups are those the user belongs to;
- The privileges specified will only be applied to records the user has ownership of, or administration rights on - any other records will be skipped;
- The current records privileges will be reset and replaced by the selected privileges.

Privileges

Who has access

The privileges will be updated for all editable records in the selection. The privilege form is empty and does not reflect the selected records current privileges! Privileges are reset and replaced by the new one.

Filter | Filter groups ...

Groups ↓	Publish	Interactive Map	Download	Editing	Notify	Set all privileges
All	☑*	☑*	☑*			☑*
Intranet	☐	☐	☐			☐
Guest	☐	☐	☐			☐
Administrators	☐	☐	☐	☐	☐	☐

❓ | ✎ Replace by selected | + Add selected | ↺

Ready to get started?

Access the metadata catalog and start creating your metadata: https://data.apps.fao.org/map/catalog

For more information or to get involved contact fao-data@fao.org

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