FAO-MOSAICC

Modelling system for Agricultural impacts of climate change

Introduction to MOSAICC interfaces: tutorial

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May 2013

Content

1. Introduction

In this session you will be introduced to handle the basic functions on MOSAICC web interfaces:

1. Log-in and user account management
2. Data and experiment management through the utilisation of utilities

In order to go through this tutorial you need to copy on your local disk the following files:

1. The shapefiles *Maroc_National*, *Maroc_Provinces* and *Maroc_Communes*
2. The geotiff digital elevation map (DEM) *maroc_srtm.tif*

2. Home page: log in and user account

Open a web browser and insert the address http://81.192.163.58 *in the address bar.*

Entering the IP address in the web browser leads to the home page (Figure 1). MOSAICC users must identify themselves to have access to the system. If you don't have a personalized login yet, kindly send a request to Francois.Delobel@fao.org giving a username and an e-mail address. Your account will be created and a temporary password will be given.

User profiles are customized in order to make the relevant models available to who has the expertise and received the training to run them.

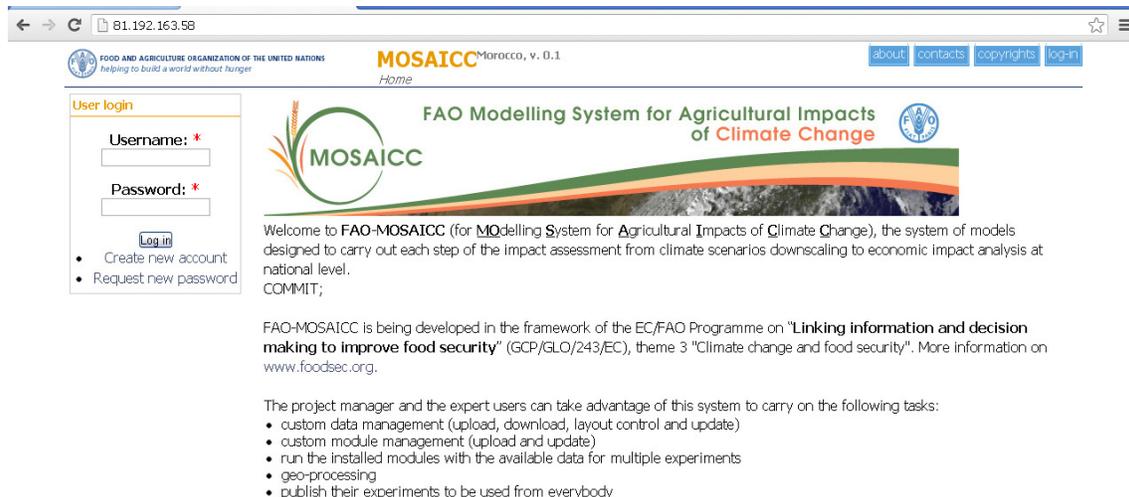*Enter the user name and password in the two text boxes on the left side of the screen.*

Figure 1 MOSAICC home page

Once the user is logged-in to the home page, the main menu bar appears, proposing 5 tabs:
1. "Home": to go back to the home page
2. "Functions": where models and utilities are available
3. "Data": where the database can be browsed and enriched by uploads, and where data can be referenced and downloaded
4. "Tools": where finished experiments can be consulted and managed
5. "Documentation": document repository on MOSAICC and the models.

This menu bar is always available on the screen when browsing MOSAICC interfaces.

On the left side of the home page, two links appear: "My account" and "Log out". Clicking on my account and then on the "Edit" tab allows the users to modify their e-mail address, password and local settings (Figure 2).
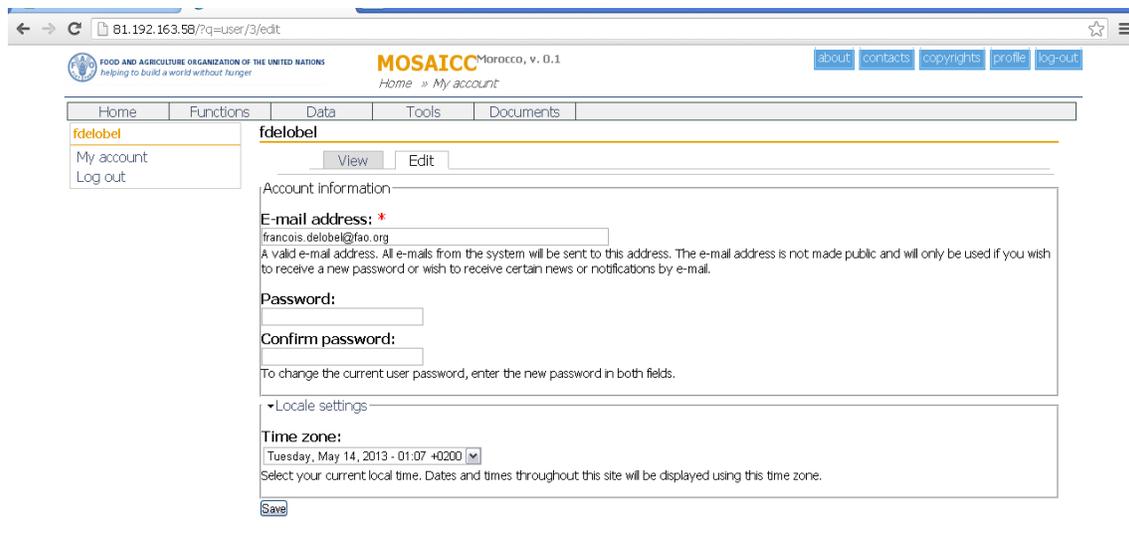

Figure 2 Account properties

It is also possible to log out from the system using the log-out button in the blue rectangle, upper right corner of the web page.

3. Upload data

3.1 Upload Morocco's administrative boundaries.

Click on the "Data" tab in the menu bar

The data management page is divided in several sections:
1. "Geographical data": to manage, reference and upload most types of data
2. "Climate data": to display stations and point observations time series, for weather data but also hydrological data
3. "Downscaling portal": data exchange with the downscaling server
4. "Support files": used for crop parameters files

MOSAICC comprises a referencing system to associate the data in the database to its original source. Indeed, the user can create a list of sources to which data can be related in their attributes in two steps. First the sources is defined (author, institution), then the reference (publication, year). Before uploading any new dataset, the user must make sure that the source of the data is already available in the list of references.

For this exercises, three files representing three different administrative levels are available:
- Maroc.shp
- Provinces.shp
- Communes.shp

Under "Geographic Data" in the left-side menu, click on "Sources & References" to create a new source.

This page will be displayed (Figure 3):

Figure 3 Sources and references

The list of sources previously defined is available on this page.

Click on "Add New" on the right side, create a new source and save it.

A source is entered as a free text. For this exercise write your own name as the source. Once the new source is saved, references can be set.

Click on "CCI data ref (X) in the grey rectangle below the newly create source, then "Add new". As for the source, the reference is entered as free text.

Enter "Moroccan administrative limits" as reference and save.

Once the reference is created, the new data file can be uploaded.

Go back to the data management page ("Data" in the menu bar), click on "Upload", in the geographic data section.

The upload window gives three options for data uploading, corresponding to the three formats possible for spatial data: grid, points and polygons (Figure 4). The associated data types are listed for each format. In the case of administrative boundaries in a shapefile format, the appropriate option is to work with polygons.
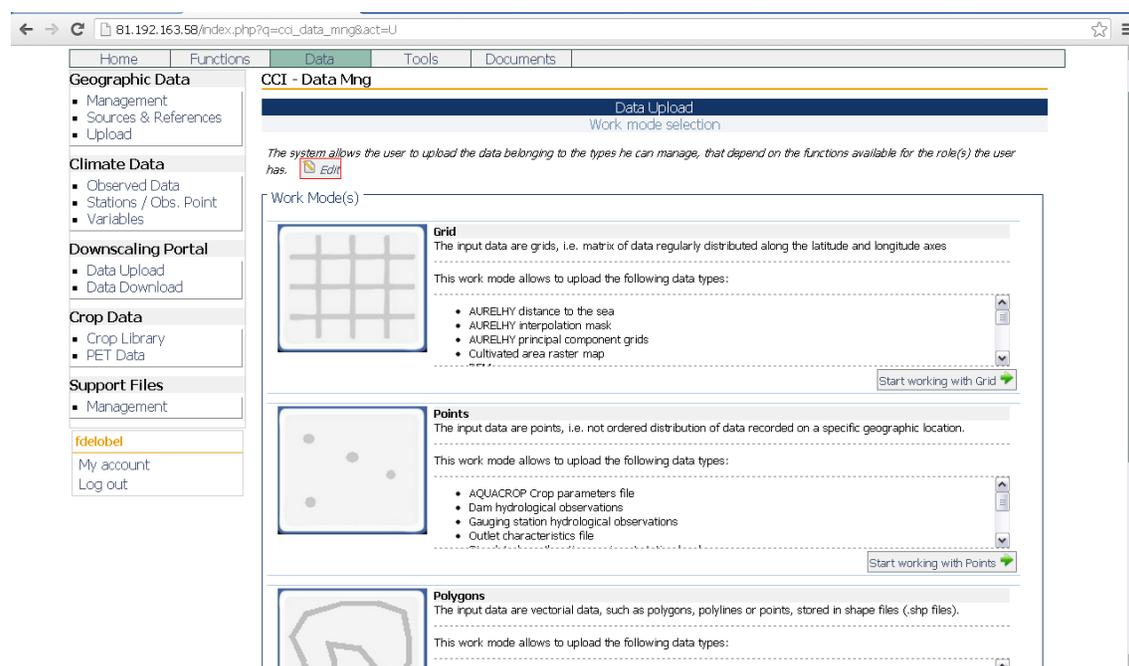

Figure 4 Data upload page and available formats

Choose one of the three administrative boundaries shapefiles and click on "Start working with polygons"

The form to upload data is common to all data format (Figure 5). The following pieces of information are needed:

1. *Dataset name*: the name entered in this box will be used to designate the file in throughout the system. This name must therefore be unique.
2. *Dataset description*: free text to describe the data
3. *Content type*: this menu lists the possible data types for the selected data format (here, *Polygons*). Select the item "Administrative boundaries"
4. *Data reference*: select the reference created earlier (based on your name)

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5. *Period of reference*: these two boxes are used to set the time span of the time series or the year of publication of for data without time reference. In this case simply enter "*2013*".

6. *Layer usage*: the new layer can either be a base layer (used as background) for maps in the system or a layer to overlay.

Figure 5 Data upload form

Data can be uploaded to the database of MOSAICC either by zip file or through ftp (large files). With the first option, the file can be directly selected from a local disk. With the second option, the file must first be uploaded on the FTP server with a FTP client and then selected from the server. In both cases the dataset must be stored in a zip archive.

Zip the chosen shapefile on your local disk, click on "choose file" button and select the zip archive on the local disk.

Once the form is completely filled in, click on "Upload"

To check whether the upload has been successful, click on "Management" (left side menu, section "Geographic data"). The uploaded layer must appear in the list of "Administrative boundaries", with the proper spatial extent.

3.2 Upload a digital elevation map (DEM)

This exercise requires the file "*Maroc_srtm.tif*".

Follow the same steps as for the administrative boundaries from setting the source till displaying the file in data management, taking into account that a DEM is a grid and not a polygon shapefile. The source for this data set is "*SRTM-CSI*" and the reference is "*Jarvis A., H.I. Reuter, A. Nelson, E. Guevara, 2008, Hole-filled seamless SRTM data V4, International Centre for Tropical Agriculture (CIAT), available from http://srtm.csi.cgiar.org*".

Include your own name in the name of your DEM.

When a DEM is uploaded, the system automatically processes it to derive a polygon file with the boundaries of the river basins. This operation takes a long time, but after a while you will see in the data management a new file called "Basins from [name_of_your_DEM]" in the River basins section.

Uploading data in MOSAICC requires following some rules regarding to the geo-referencing system and the data format. All data to upload must be geo-referenced according to WGS1984 and non-projected. Allowed formats are:

Spatial data type	Format
Raster	GeoTIFF, TIF, PNG and JPG with WLD file ArcGIS ASCII (asc)
Point	Shapefile (shp)
Polyline	Shapefile (shp)
Polygon	Shapefile (shp)
Table	Comma separated (csv)

4. Create a new study area

MOSAICC has got a utility to make unions of polygons from several layers in order to delimit study areas based on several criteria. This utility allows users to create study areas combining for instance several provinces or provinces with river basins. For this exercise, let's assume that we would like to start a study in the province of Settat. As our study will require projections of both crop yields and water resources, we would like to take into account the river basin contributing the most to the hydrology and the water use in the province: the Oum Er Rbia. Therefore, the two must be combined.

To start using the study area definition, go to the menu "Functions", then click on "Definition of the study area"
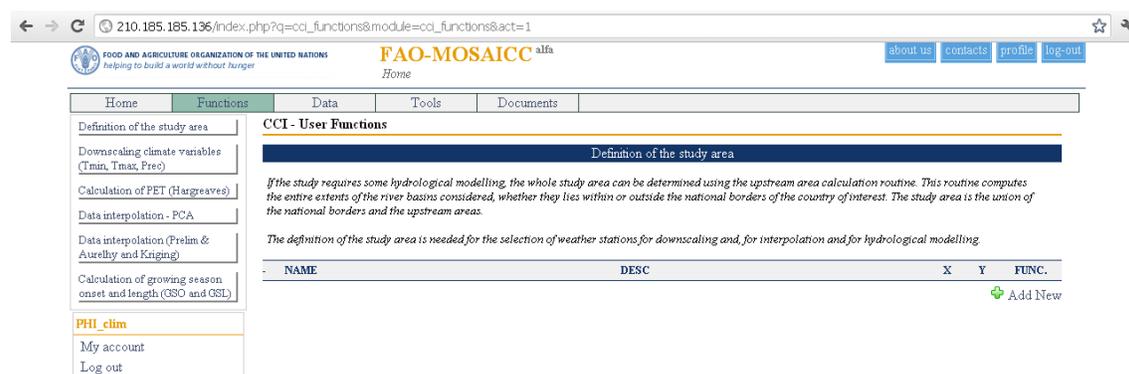

Figure 6 Study area main page

The main page displays a list of existing study areas (Figure 6).

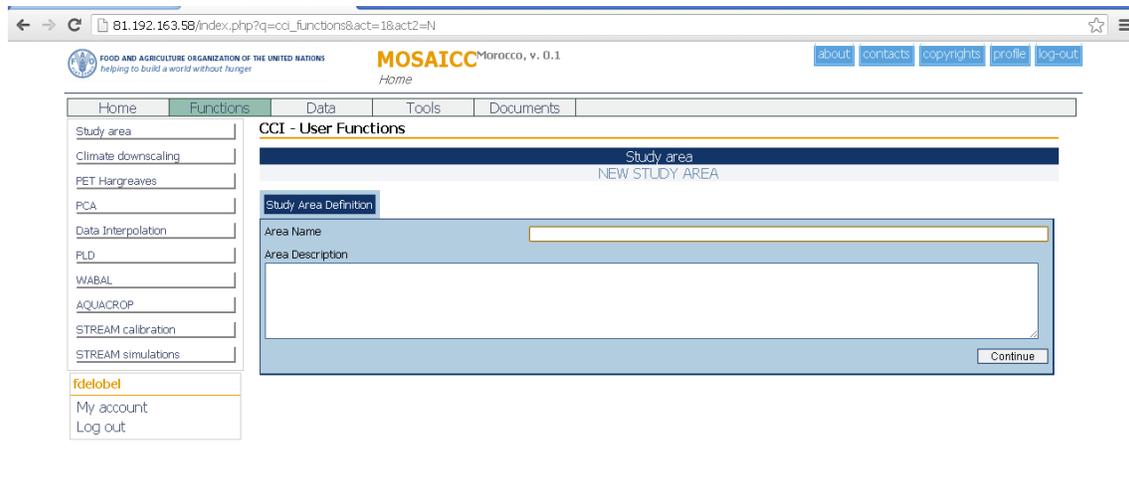*To create a new one, click on "Add New" on the right.*

Figure 7 Naming and description of a new study area

The second page gives the possibility to give a name and a description to characterize the new study area, which is useful for the creator of the map, to remember what was done, but also for other users (Figure 7).

Give a name to your study area and write a brief description then click to continue. Include your own name in the study area name.

The third screen contains a map and a menu on the right with two drop-down menus (Figure 8). Two types of layers can be used: administrative boundaries and river basins. The first drop down menu gives the option to select one of these two data types, and the second lists all the layers of the selected type available in the database. After selecting a layer, the user can select the polygons of interest by clicking on these polygon on the map and then on "Add to study area" on the right, below the information on the selected polygon. The process can be repeated with other polygons and other layers as much as necessary. After each addition, the updated study area is displayed on the map in pink. The study area is automatically saved.

The pink rectangle that appears on the map when opening the window can be removed by clicking on (+), right side of the map, and unselecting the current study area, which is empty.
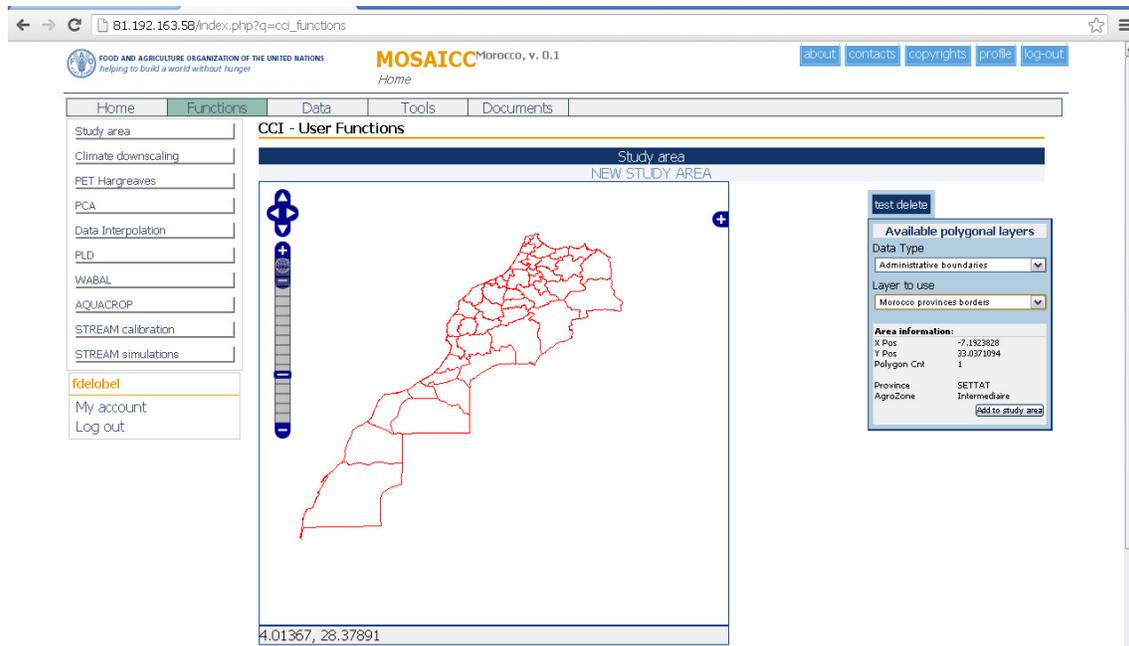
Figure 8 Adding polygons to a study area

Create a study area combining Settat province from the layer "Morocco provinces borders" and Oum Er Rbia river basin from the layer "Basins from ROI DEM".

To exit, return to the Functions page.

5. Data and experiment management

MOSAICC offers tools to manage data and experiments respectively under the entries "Data" and "Tools" of the main menu bar.

Click on "Data" in the menu bar.

As described above, the data management page includes a menu on the left side, divided in 5 sections: "Geographical data", "Climate data", "Downscaling portal", "Crop data" and "Support files" (Figure 9).
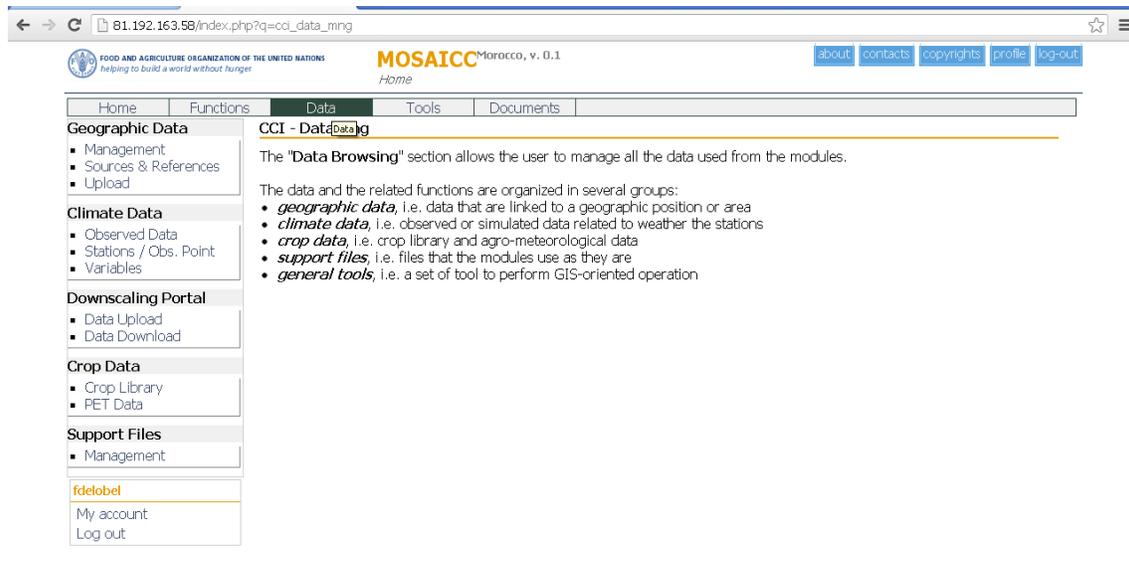
Figure 9 Data management page

Click on "Management", under "Geographic Data", on the left side menu.

Clicking on "Management" displays in page main body the list of all datasets available in the database, sorted by data type. Each dataset is displayed with its name, the description and the spatial and temporal references (x, y, z and t). On these datasets, four operations can be carried out. They correspond to the four icons on the right side, under the header "FUNC."

Frome left to right and top to bottom, these icons allow to:
1. Modify the name, the description of the layer and its attributes (icon on the right side)
2. Set the colour palette for displaying the data
3. Display the data
4. Delete the file

The first and the fourth icons are available only for the owner of the data. DEM have an additional icon form DEM processing, to use in case the river basins shapefile could not be derived. The icon looks like:

Click on the magnifying glass icon to display the layer of Morocco's provinces. The file is called "Morocco provinces borders" and can be found in the administrative boundaries.
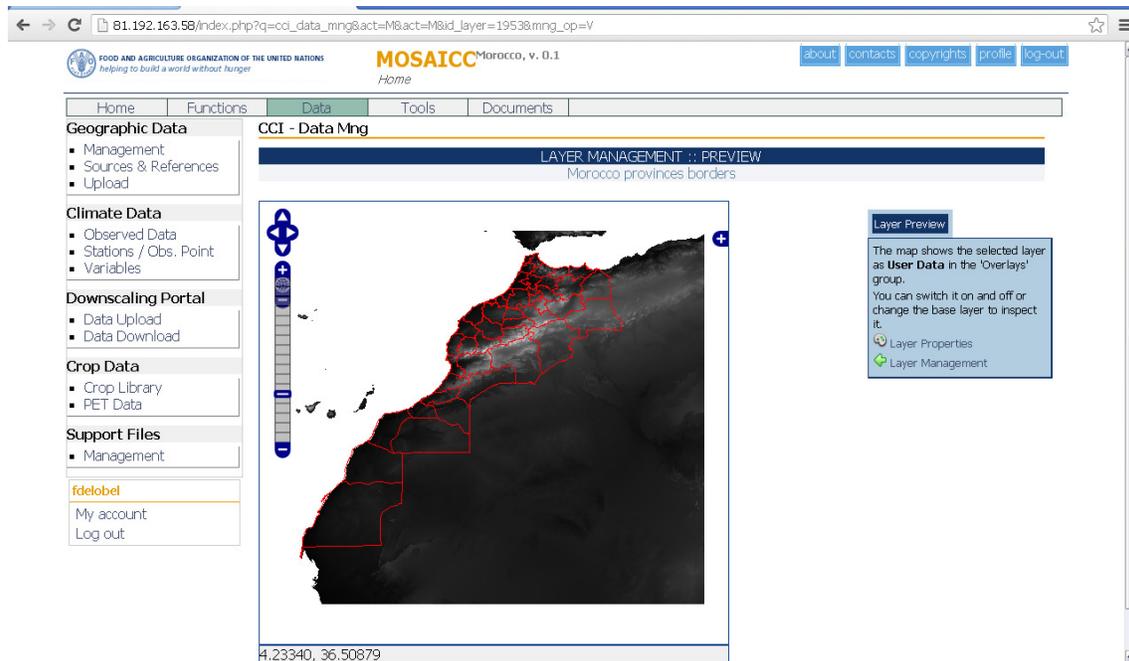
Figure 10 Displaying Moroccan provinces

A page opens with a map of the layer queried (Figure 10). By clicking on (+) in the upper right corner of the map, other layers such as the elevation can be added to the map.

As on the main data management page, display options can be modified by clicking on the palette icon on the right side. The colour of the contour can be modified, as well as its thickness. The colours are coded according to a RGB triplet. The triplet gives the intensity for each primary colour, in the order: Red, Green and Blue. The intensity varies between 0 (0% of intensity) to 255 (100% of intensity). The numbers are separated by a single space. As a result, red is obtained with the code "255 0 0", green with "0 255 0" and blue with "0 0 255". The code "0 0 0" corresponds to black and "255 255 255" to white. These modifications are only possible for the data that are owned by the user.

The layer management icon goes back to the data management page.

Go back to the main data management page by clicking on "Layer management".

Clicking on the "Edit" icon allows the user to rename the layer, add or modify the description, specify whether the layer is a base layer or an overlay, decide to share the dataset with other users and set the reference. Data sharing in MOSAICC is until now either with nobody or with everyone.

Share your study area with the other users.

Experiment management: displaying outputs from an experiment.

Data can also be displayed from the experiment management tool, if they have been inputs or outputs of experiments carried out in the system. Here follows an example to display raster data produced with PCA, the procedure to prepare input files for data interpolation based on a study area and an elevation map. This procedure is explained in detail in the training on interpolation.
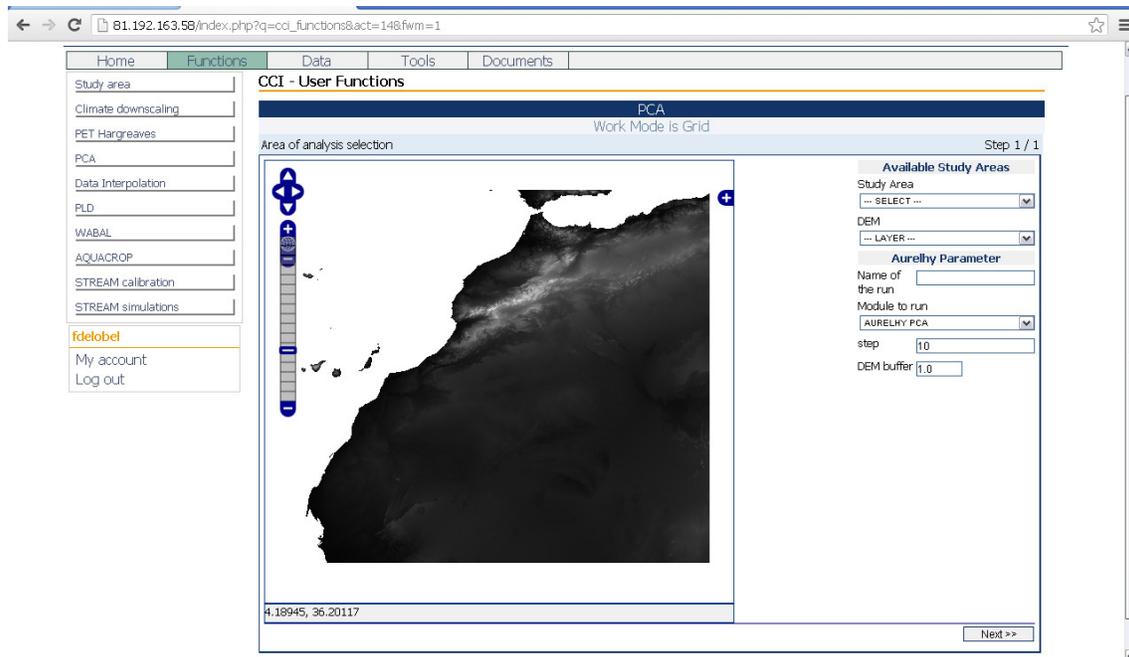
Figure 11 PCA experiment definition page

Go to "Functions" in the menu bar then to "PCA - Interpolation" in the left-side menu.

The experiment definition page for PCA includes a map, in which input files can be displayed, as well as a form to select the input files, give a name to the experiment and enter the parameters (Figure 11).

Select your study area in the first drop down menu.
Select the DEM called "ROI DEM with multi-thresholds" in the second drop down menu.
Give a name to your experiment (e.g. "PCA test your_name*")*
Enter "20" in the "Step" box.
Enter "2.5" in the "buffer" box.
Click on next to launch the job.

This experiment is rather quick to process.

Go to "Tools" in the menu bar then to "Experiment" in the left-side menu.

Your PCA experiment will be available under the section "Aurelhy PCA" with the date, the work mode, the name, the generated data and the completion time. Experiments can be filtered by function, work mode, module and run time (Figure 12). Clicking on the experiment number on the left allows the user to display the files associated with the experiment.

Figure 12 Experiment list

Click on the experiment number

In the experiment page, input and output data are listed (Figure 13 PCA experiment page). Clicking on the file names give the users the possibility to display and download the data. In this exercise, we will look at how raster data can be displayed.

Figure 13 PCA experiment page

Click on one raster file among the output data (with an .asc extension)

Grids can be displayed using colour scales (Figure 14). Three colour scales are available: greyscale, blueshades and red-blue. Other layers can be displayed by choosing other files in the menu "Variable". Clicking on refresh updates the map with the new settings.

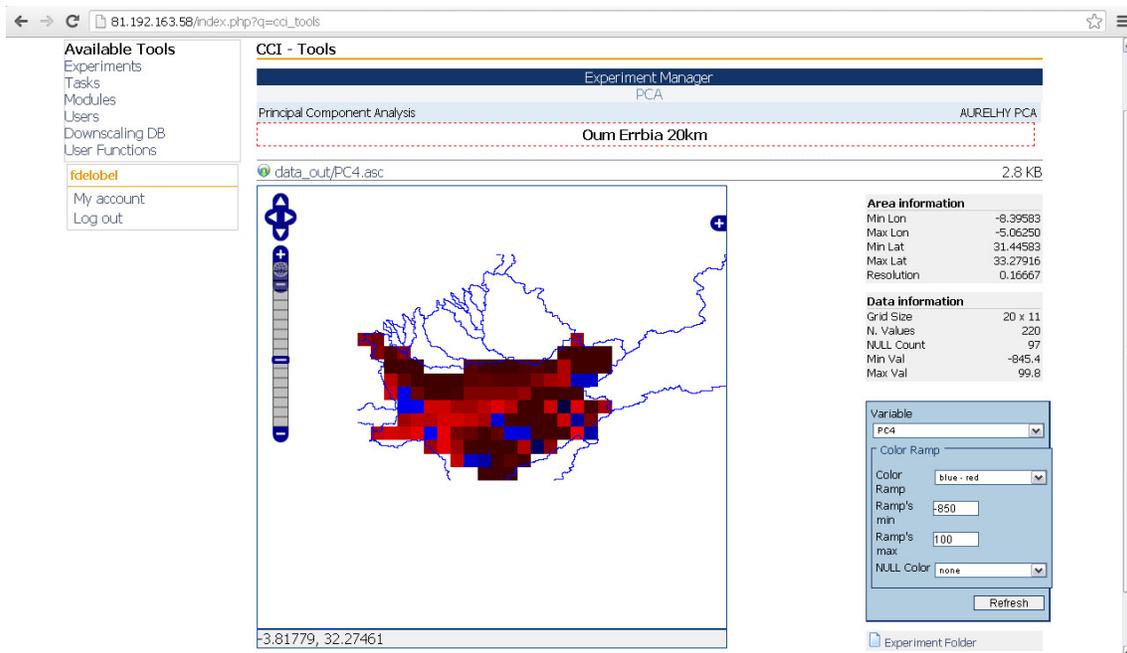*Set a colour palette for the uploaded file and display it on your screen.*

Figure 14 Grid display options

Further information is available in *FAO-MOSAICC - End-User Documentation*.
For any queries, please contact MOSAICC@fao.org.