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List of acronyms

AEZ    Agro-Ecological Zoning
FAO    Food and Agriculture Organization
GAEZ   Global Agro-Ecological Zoning
IIASA  International Institute for Applied Systems Analysis
UN     United Nations

Acknowledgements

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The current FAO GAEZ Data Portal (version 3.0) is an interactive web application designed to query, search, display, analyze and report on the current state and trends agricultural production and crop suitability under past, current and future climate. GAEZ website is designed to facilitate access to the GAEZ database and resources, provide data search, analysis, mapping, and reporting capabilities. The entire database and data model is fully documented. GAEZ documentation is available through the website as well.

The GAEZ website provides links to FAO and IIASA websites, as well as links to Disclaimer, Contact information and Frequently Asked Questions (designed to provide users with information and tips on how to best make use of the tools and functionality provided through the website.

The search toolbar, as well as web navigation tools are available through the GAEZ website. GAEZ banner can be collapsed to allow additional screen real estate to be used for the analysis, mapping and reporting requirements.

In addition Disclaimer, Contact information, Links to the FAO Natural Resources and Environment Management Department (NR) and FAO Land and Water Division are provided on the footer section of the website.

The GAEZ home page contains a brief introduction on GAEZ web site giving access directly to the data of the five main thematic areas:

- Land Resources
- Agro-climatic Resources
- Suitability and Potential Yield
- Actual Yield and Production
- Yield and Production Gaps
GAEZ is a multi-language application. The current release supports English and French languages while Spanish release will be available soon. The other three UN languages will be made available at a later stage.

GAEZ portal is being implemented at a phase approach and it is designed to be dynamic and updated frequently. Standards, Definitions, Assumptions and Limitation of the database are documented. Links to these documents are available through the GAEZ website.

It is recommended that GAEZ users consult the user’s manual and the model documentation prior to using the outputs of the database. Users need to consider limitations and constraints on using GAEZ products prior to further elaboration and use of the outputs.

All definitions used, database dimensions, units, variables, indicators, filters and their values are provided on the Annex at the end of this document.

- Please contact us at GAEZ@fao.org for any questions and suggestions you might have.

2.0 GAEZ Data Searching

GAEZ data search can be done either by navigation or by keyword search. The outputs of the search can be refined and narrowed down by the filters.

2.1 Navigation menu

The navigation menu enables to navigate and browse through the GAEZ database based on the theme/sub-theme structure and filtered by variables. The user selects the dataset either by clicking on the checkbox beside the data layer name or by clicking on the map itself. The navigation back and fourth is facilitated also by clicking on the sub-themes checkbox in addition to the scrolling through the vertical bar beside the navigation menu.

The Themes are accessible through the theme frame. The Navigation toolbar facilitates the navigation through the themes. The Search toolbar provides query and searching capabilities. The results are shown on the outputs window frame that includes the map overview on the left hand side of the frame, the map title and metadata on the middle section and the variables / filters on the right hand side. The results of the query or filter applied are showed on the outputs counter / filters section on top of the outputs window frame.
2.1.1 Theme Selection

The user can browse the database by navigation menu on the left-hand side of the GAEZ data portal. As mentioned above, GAEZ data layers are organized by Themes/Sub-Themes. Access to the Themes is also available through the icon bar at the top part of the main frame of the screen. User’s can navigate through the themes by simply clicking on the Themes on the left hand side or by simply clicking on the icon. Hints are provided for each theme and sub-themes group. Metadata is also provided for these groups.

2.1.2 Sub-Theme Selection

Once the theme is selected, the corresponding sub-themes are available from an interactive popup window, and additional options are displayed below the themes on the left of the page.

Hints are provided for each sub-theme in the popup box.

2.1.3 Dataset Selection.

The datasets can be selected through the section made on the expandable menu or by keyword search. The selected dataset record on the outputs window frame is highlighted. The user can access additional details by double-clicking it.

2.2 Search menu

The user can simply enter a keyword for example wheat and hits the Search button or hits <ENTER> on the keyboard and the search results are visualized on the main screen. The number of the results available in the database for the keyword is also displayed.
2.3 Search results

The results of a query or search are shown by a scroll-list of maps. They are shown twenty at a time and the total number of maps is highlighted at the top of the output window.

The results are shown based on the relevancy of the search and grouped by the filters. Each record includes an overview of the datasets, the name of the datasets and its path, as well as information on each of the variables (query filters) as well as a button for the metadata.

The number of available datasets per Theme/Sub-Theme/Data layers is indicated on the navigation tree.

The user can navigate to these records by using the database navigate control at the end of each page.

The number of the records for a selection is indicated.

The search results can be sorted by each of the filters by clicking on the combo box at the Sort by Field on the top bar of the results interface.

The output results window frame shows information for each of the datasets on each of the dimension variables (filters). Here is an example.

<table>
<thead>
<tr>
<th>Water Supply</th>
<th>Rain Fed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Level</td>
<td>High input level</td>
</tr>
<tr>
<td>Crop</td>
<td>Wheat</td>
</tr>
<tr>
<td>Time</td>
<td>2020</td>
</tr>
<tr>
<td>Scenario</td>
<td>Hadley CM3 B2</td>
</tr>
<tr>
<td>CO2 Fertilization</td>
<td>With CO2 fertilization</td>
</tr>
</tbody>
</table>

The user can also view the metadata by clicking on the metadata button.

2.4 Refine the selection

The results of query by either method can be refined by using the filters.

Depending on the sub-theme and parameter selected, additional options (filters) may become available in the left menu. By them the user can refine the selection of the query restricting the range of.

The filters (where available) are:

- themes
- water supply
- input level
- crop
- time
- scenario
- CO2 fertilization

*Note: Definition of these filters / variables are provided on the Annex.*

The search can be further narrowed down by these filters. The applicable filters will be enabled.
depending on the data type and content. A number of filters can be added to refine the selection applying additional selection criteria to further drill down through the data search.

Similarly the user removes filters by clicking the remove filter button.

Here is an example of the multiple filters applied. They can be removed by clicking on the remove button as explained above.

The user gets additional information, aggregated statics, maps and reports by double-clicking on the data layer of interest as described on the following session.

### 2.4.1. Adding and Removing Multiple Filters

It is possible add filters by clicking on the Add filter button.

The user selects the theme of interest by clicking on the check box beside it.
3.0 GAEZ mapping interface

The GAEZ mapping interface has the mapping information on the upper left hand corner; the map title and its theme / sub-theme group, on the top frame; the map display frame with data displayed in raster or vector format; the legend, navigation, pan and zoom tools, the map units, metadata as well as downloading tools.

In addition the interface provides the Table and Custom tabs that enable to display tables and charts as well as create customized reports.

The interactive map allows the user to visualize and interact with the selected data by specific tool.

In detail the user can:

- manage layers (switch on-off country boundaries, base layer and thematic layers)
- zoom to full extent

To get information about the data at a particular location, the user has just click directly on the map.

The Map information section on the top left corner provides capabilities to switch between datasets without the need to go back to the search section of the data portal. This is an important feature to allow to quickly accessing multi-dimensional database layers and switching between multi-dimension variables, particularly important for the time-series analysis.
The user can switch by simply clicking on the variable name and selecting the other variable. For example clicking on the water supply, it will open the dialog box and it will show the available values (the non applicable values for the dataset will be greyed out).

The use can simply switch to the other variable by clicking on it.

In the example above the user can select for Gravity Irrigation, Sprinkler Irrigation, Rain-Fed Irrigation and Drip Irrigation.

Similar windows are available for the following variables:

• Water Supply
• Input Levels
• Crop
• Time
• Scenario
• CO2 Fertilization
• Crop index

The user can view the units by looking at the unit field, get the metadata information by clicking at the metadata button as well as download the map as PNG or a ZIP format.

The map in PNG format is created dynamically maintaining the zoom and pan made by the user as per the area of interest. The Zip file provides the download packaged in a compressed format.
3.1 GAEZ data portal login and download

The users need to login to the GAEZ data portal when they need to download spatial datasets. The users may need to register (one time only) if they do not have an FAO or social network accounts (Facebook, Gmail or Twitter). Once the users obtain the account they can login to the GAEZ data portal clicking at Login menu.

The login is managed by the Common Authentication Framework (CAF) maintained by FAO and enables access to the download session.

The user should contact the account administrator at GAEZ@fao.org for any issues related to the FAO GAEZ data portal account.

4.0 Tables

The user can switch from maps to tables by clicking on the Table tab.

The aggregated tables are available by Region and Country at global level and by First Administrative Level for nine countries: Argentina, Brazil, Canada, China, India, Kazakhstan, Russian Federation, and United States of America.

In general there are two main types of datasets in the database:
- continuous values
- discrete values

The aggregation is performed for each datasets based on the data type and content of the database. The continuous dataset the values are aggregated by Total, Maximum, Minimum, Range and Standard Deviation.

The discrete datasets are aggregated by each class range by calculating the total values for each class.

The user can select the between Region, Sub Region, Income, Country and Province by clicking on the option beside the area of interest.

Note: The regionalization tables are provided on the annex below.
The user can loop through the records in the table. The entire values are provided to the user as hints while the user rolls over the field. The tables can be sorted by ascending or descending order by clicking on the right end of each field.

The user can select one record and visualize it on the chart below by simply clicking at it. The user can use <SHIFT + Click> to select multiple records and visualize them in the chart below.

The user can download the tables in comma separated values (CSV) or XML format.

5.0 Custom tables

The user has the option to customize the type of tables and charts and export the data and graphs for use in reports and documents.

The user clicks on the CUSTOM tab to switch to the custom tables mode.
The update results are displayed on the table. The user can switch between fields to display by selecting them on the combo box.

The user can select the type of Chart. (Bar, Graph or Pie charts are the available chart types)

The updated chart and the legend will be displayed as per the user selection. The results of the analysis can be downloaded.

<table>
<thead>
<tr>
<th>Region</th>
<th>Total Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central America and Caribbean</td>
<td>6.96 %</td>
</tr>
<tr>
<td>Europe</td>
<td>36.93 %</td>
</tr>
<tr>
<td>Northern Africa and West Asia</td>
<td>11.42 %</td>
</tr>
<tr>
<td>Northern America</td>
<td>2.03 %</td>
</tr>
<tr>
<td>Oceania</td>
<td>3.64 %</td>
</tr>
<tr>
<td>South America</td>
<td>2.23 %</td>
</tr>
<tr>
<td>Southern and Eastern Asia</td>
<td>16.70 %</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>12.06 %</td>
</tr>
<tr>
<td>Total Percent of Total</td>
<td>100 %</td>
</tr>
</tbody>
</table>