Eastern Nile Technical Regional Office
Nile Basin Initiative

Development of Nile Basin-wide Drought Early Warning System – Nile DEWS

Real-Time Drought Condition Summary Report at Different Temporal Resolutions During Last Six Months Across the Nile Basin

January 2025

For the attention of:

Company Information:	
Name	RMSI Private Limited
CIN	U74899DL1992PTC047149
Registered Office Address	RMSI Private Limited - 50/9, 1st Floor, Tolstoy Lane, Janpath, New Delhi, India – 110001
Corporate Office Address	A-8, Sector-16 NOIDA, 201 301 India Tel: +91 120 251 1102, 251 2101 Fax: +91 120 251 1109, 251 0963 E-mail: info@rmsi.com

Acknowledgments

Table of Contents

List of Figures

1 About the manual

(To be written by Uttam Sir)

1.1 High-level Features and Utilization of the DEWS

The following are the high-level features and utilization of the DEWS:

1.1.1 KEY MODULES OF DEWS

2 Getting Started

A web-based application has been developed with an interface to allow users to view the results generated from the DEWS application about the Nile basin-wide Early warning system.

2.1 Launching the application

- Open the internet browser (Internet Explorer, Google Chrome, Firefox, etc.) and enter the application URL. At the time of publishing this manual the URL is: https://webapps.rmsi.com/dews/Dashboard/Dashboard/

- Press the Enter key on the keyboard.
- The "Login screen" of the application is displayed to the user as shown in Figure 2-1.

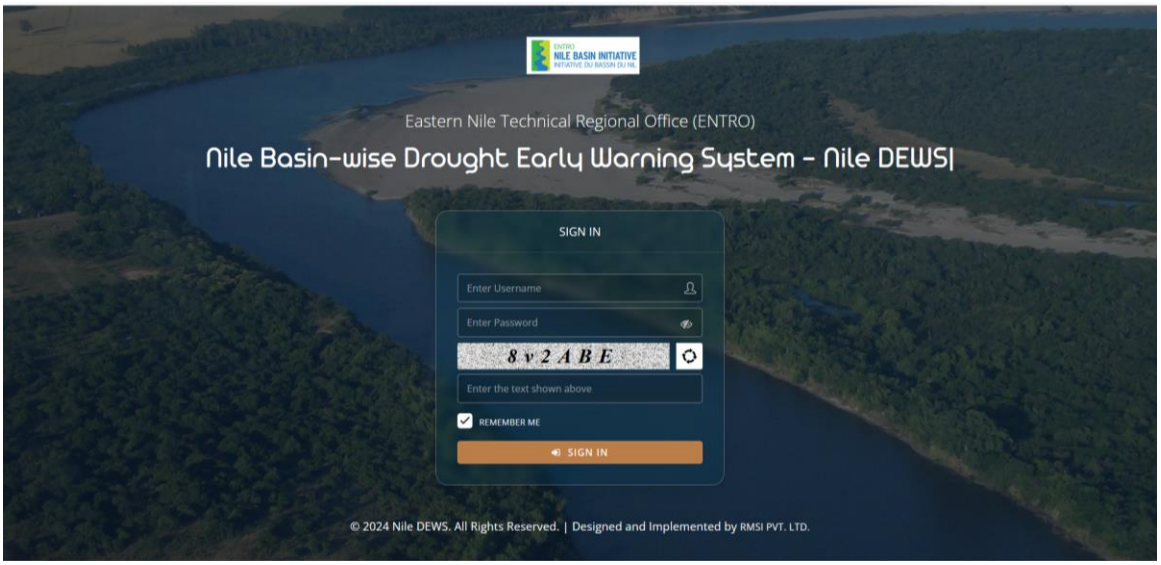

Figure 2-1: Sign In screen

- Enter the "Username" and "password" and click on the "Sign In" button to enter the application.
- The default dashboard screen is displayed to the user as shown in Figure 2-2.

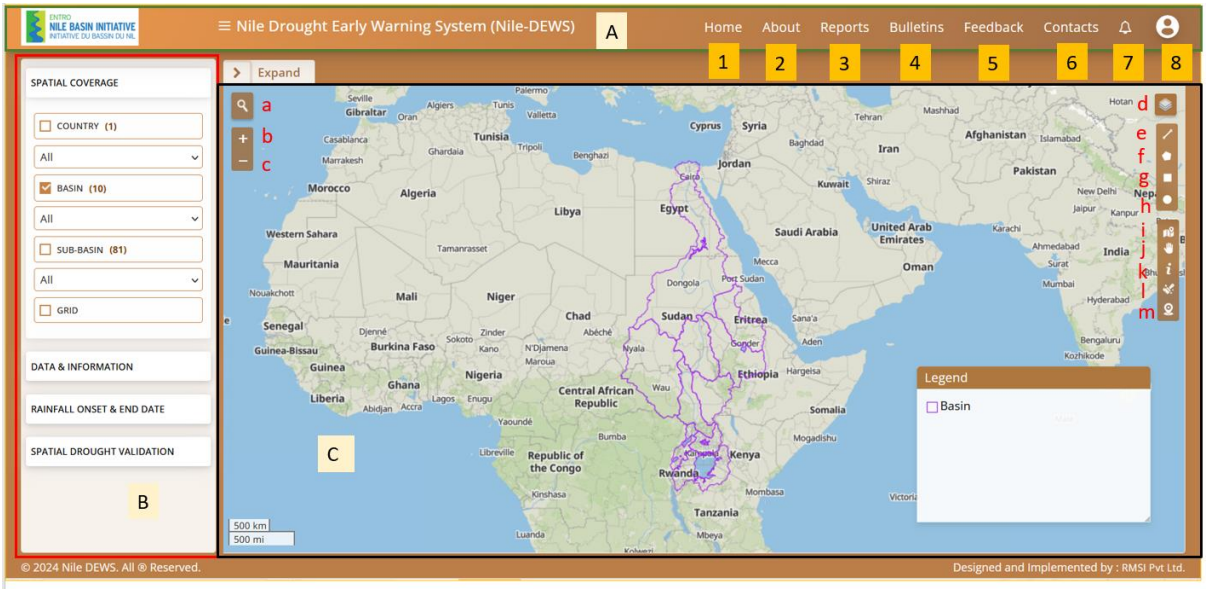

Figure 2-2: Default Dashboard screen

2.2 Top Menu Bar

- At the top menu bar, we have several tabs (numerically highlighted from 1 to 8). These are some of the links which display information about the Nile DEWS application to the users as shown in Figure 2-2.
- The tabs present on the "Top Menu Bar" are as follows:
    - Home [1]
    - About [2]
    - Reports [3]
    - Bulletins [4]
    - Feedback [5]
    - Contacts [6]
    - Alarm [7]
    - User Profile Logo [8]
- These tabs are discussed in the subsequent sections in detail.

2.2.1 HOME

2.2.2 ABOUT

2.2.3 REPORTS

2.2.4 BULLETINS

2.2.5 FEEDBACK

2.2.6 CONTACTS

2.2.7 ALARM

2.2.8 USER PROFILE

- Click on the "*Toggle"* button  on top left side of the default *"Nile Drought Early Warning System (Nile DEWS)"* header, highlighted by the alphabetical value [A] as shown in Figure 2-2 and Figure 2-3.
- It populates full page view of the Map Viewer window. Simultaneously, it hides the side bar on the left as shown in Figure 2-4

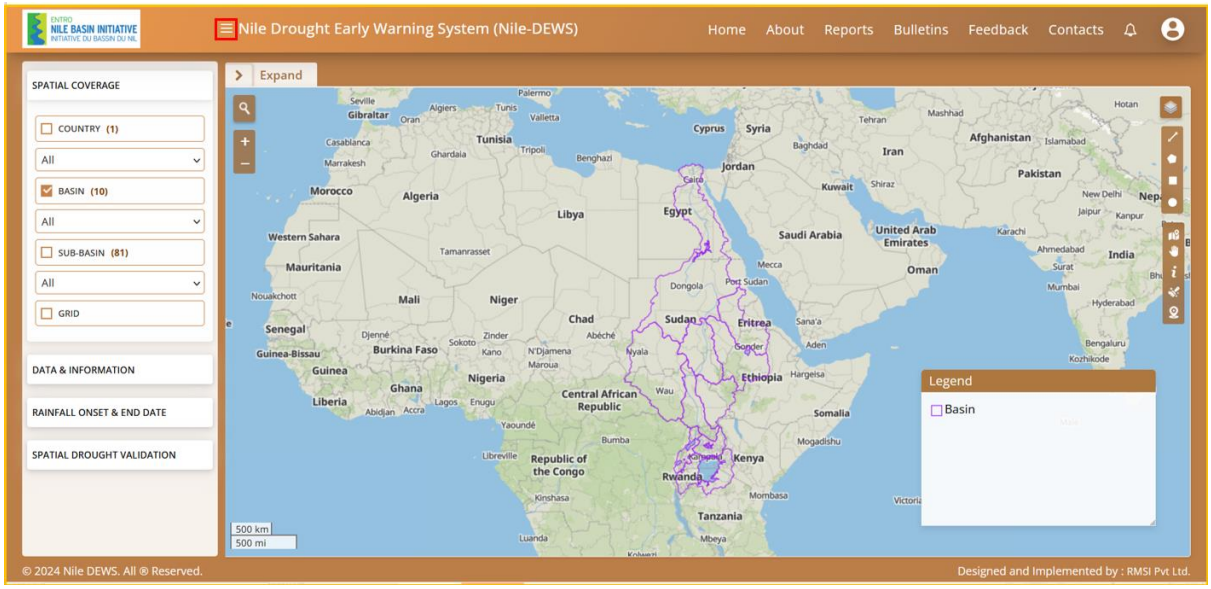

Figure 2-3: Screen displaying toggle button the top

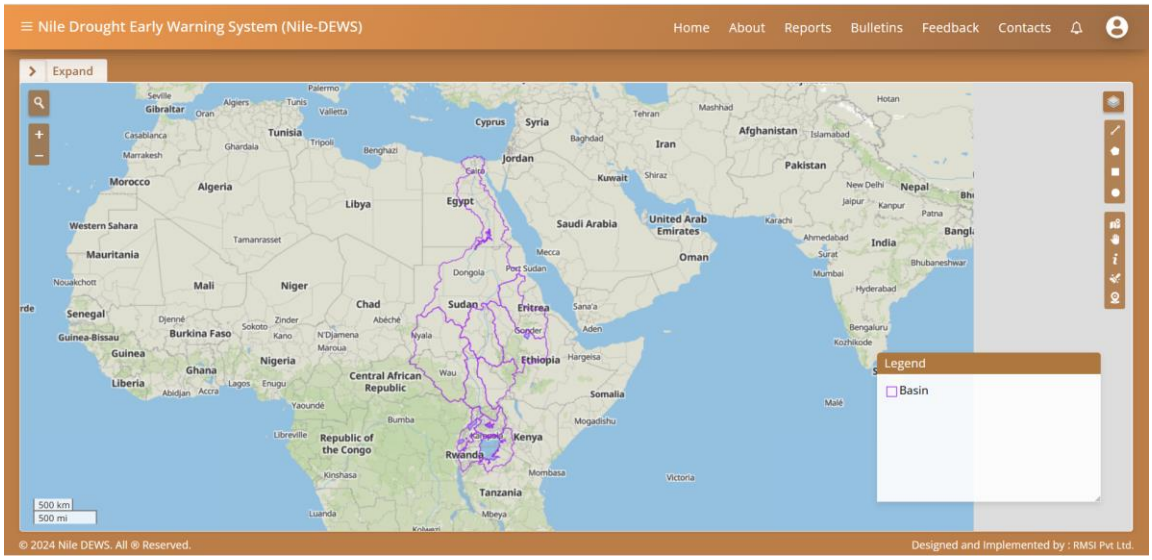

Figure 2-4: Map Viewer after clicking Toggle button

2.3 Left Sidebar

1 Click on the Sidebar on the left" highlighted by the alphabetical value [B] on the left side of the screen as shown in Figure 2-5.

2 The "Sidebar*" window* comprises of following different modules:

- ❖ Spatial Coverage
- ❖ Data & Information
- ❖ Rainfall Onset and End Date
- ❖ Spatial Drought Validation

Their respective functionalities are discussed in the subsequent sections in detail.

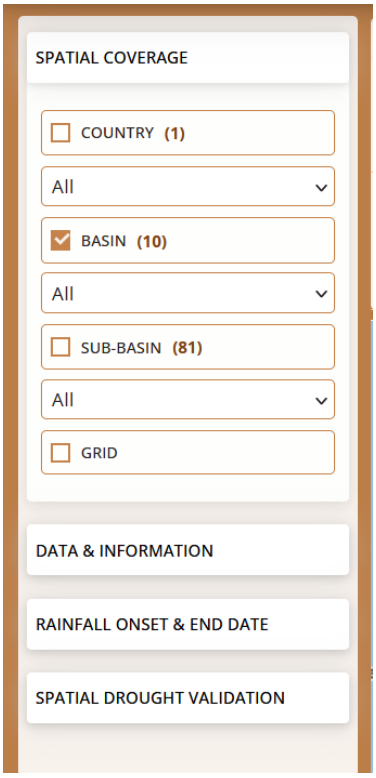

Figure 2-5: Left sidebar

2.4 Expand

- There is another toggle button just below the NILE – DEWS toggle button known as "Expand".
- The user clicks on the Expand button, the entire Expand menu populates as shown in Figure 2-6.

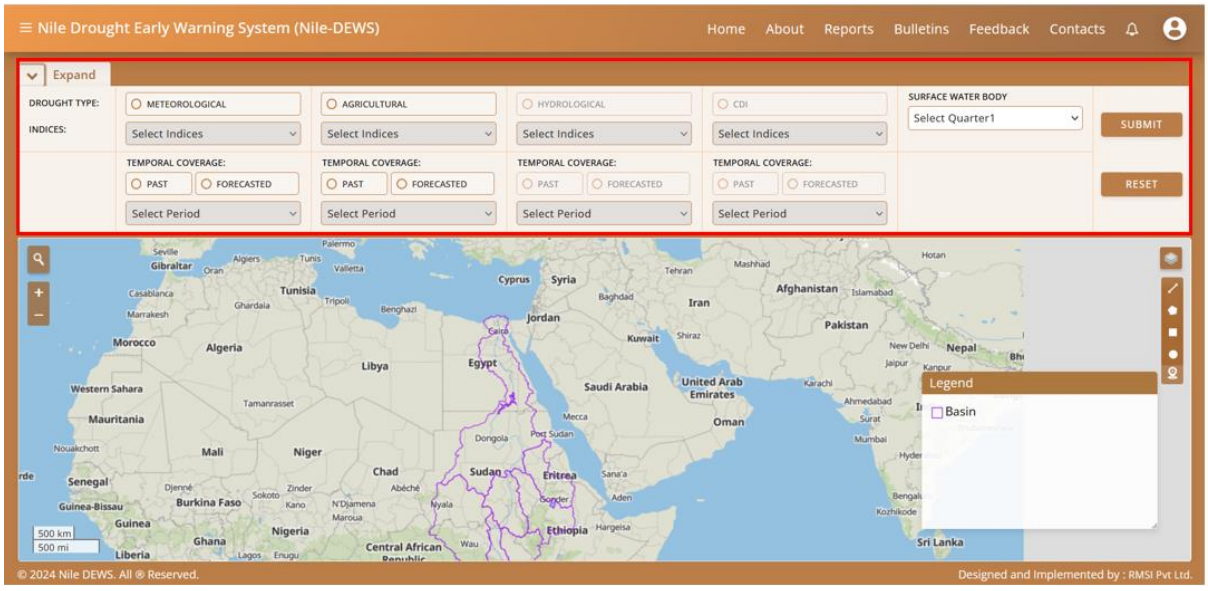

Figure 2-6: Expand functionality

- The functionality of each sub-menu option is discussed in detail in the subsequent sections.

2.5 Map Viewer

- The “Map Viewer” displays the open street map view in the window as shown in Figure 2-2.
- The Map Viewer has following components or parts:

a	Search button is highlighted by the alphabetical value [a]	
b	Zoom in button is highlighted by the alphabetical value [b]	
c	Zoom out button is highlighted by the alphabetical value [c]	
d	Base Map Layer is highlighted by alphabetical value [d]	
e	Fit to Extent is highlighted by the alphabetical value [e]	
f	Pan is highlighted by the alphabetical value [f]	
g	Info is highlighted by the alphabetical value [g]	
h	Reset Draw is highlighted by the alphabetical value [h]	
i	Clear Search locations is highlighted by alphabetical value [i]	
j	Draw a polyline is highlighted by alphabetical value [j]]	
k	Draw a polygon is highlighted by alphabetical value [k]	
l	Draw a rectangle is highlighted by alphabetical value [l]	
m	Draw a circle is highlighted by alphabetical value [m]	

- Their respective functionalities are described ahead.

2.5.1 Search

- User will be able to search any location on the Map Viewer using a search bar.

2.5.2 Zoom in and Zoom out

- User will be able to zoom in and zoom out the Map Viewer.

2.5.3 Base map gallery

- User will be able to change the base map on the Map Viewer using this function.

2.5.4 Fit to extent

- User will be able to reset the map on the Map Viewer extent from any other extent.

2.5.5 PAN

2.5.6 INFO

- Click on the Map Viewer and the info of the last selected layer will be displayed.

2.5.7 RESET DRAW LAYER

- User will be able to reset the selected layer on the Map Viewer.

2.5.8 CLEAR SEARCH LOCATIONS

- Clear search locations help the user to clear the last searched location on the Map Viewer.

2.5.9 DRAW A POLYLINE

- User will be able to draw a polyline on the Map Viewer.

2.5.10 DRAW A POLYGON

- User will be able to draw a polygon on the Map Viewer.

2.5.11 DRAW A RECTANGLE

- User will be able to draw a rectangle on the Map Viewer.

2.5.12 DRAW A CIRCLE

- User will be able to draw a circle on the Map Viewer.

3 Left Side bar

3.1 Data & Information

- Other than Spatial Coverage, we have Data & Information tab present on the left side bar.
- When the user clicks on Data & Information tab, a dropdown is displayed with data options namely:
    - E.T.
    - Land Surface Temperature
    - NDVI
    - Rainfall
    - Soil Moisture
    - TMax
    - TMin
- Also, the user has to select a period under temporal coverage as shown in
- As an example, we have selected Rainfall layer and fortnightly as temporal coverage layer. The image is shown below (Refer Figure 3-1 and Figure 3-2).

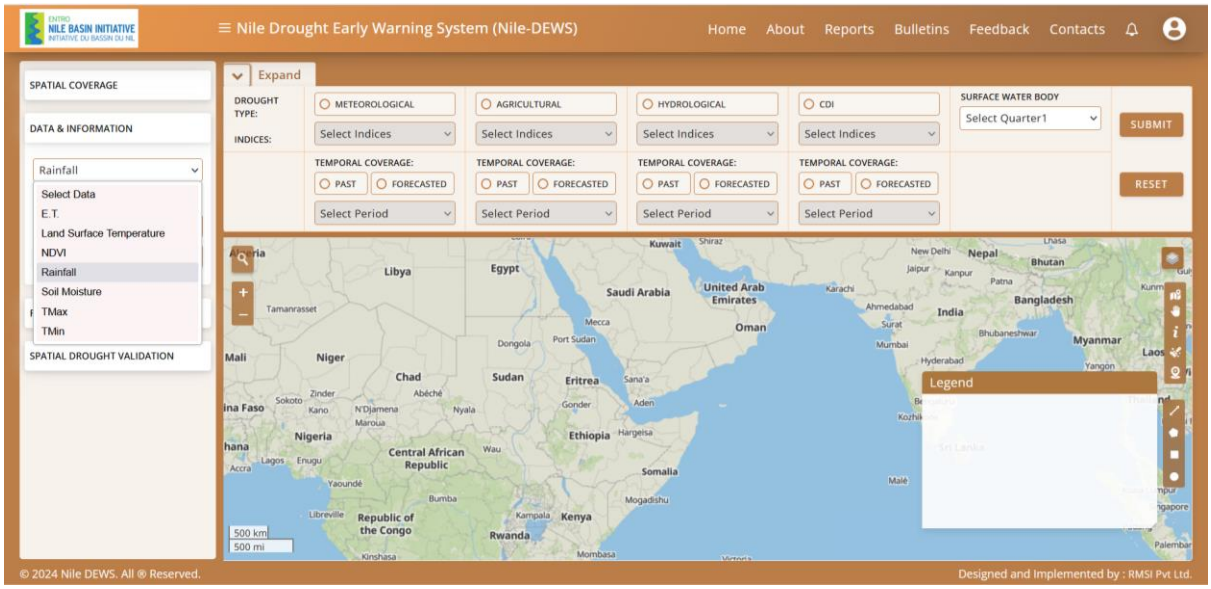

Figure 3-1: Dropdown displaying data options

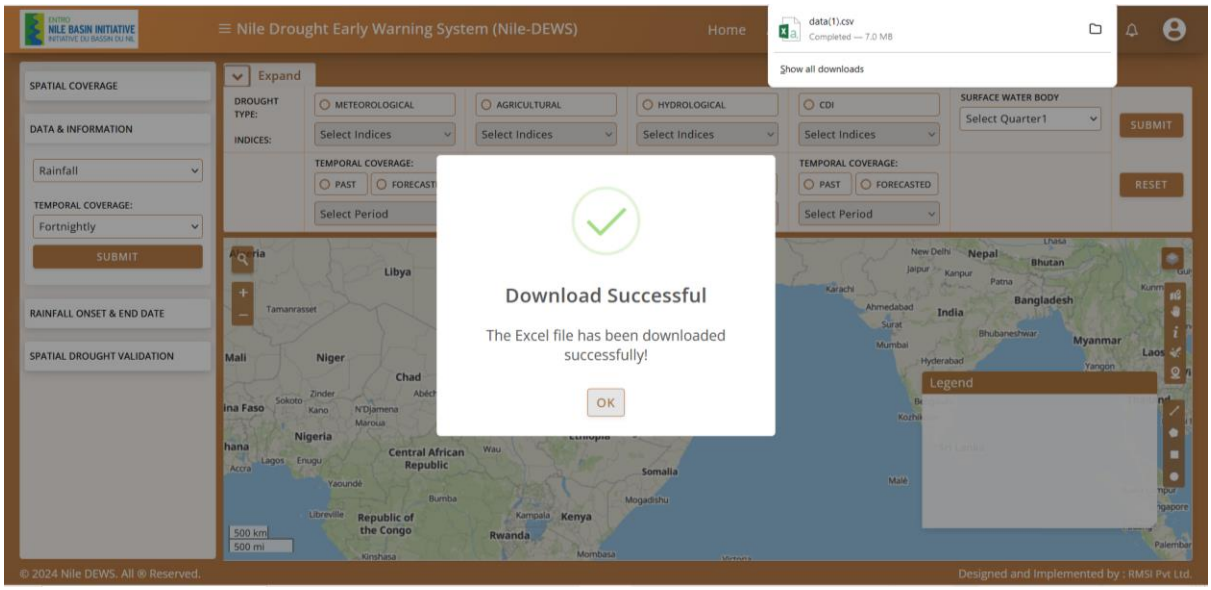

Figure 3-2: Message showing download is successful

- After the user has submitted his choices, an Excel file is downloaded. The user can view the Rainfall on a fortnightly basis.

3.2 Rainfall Onset and End Date

- Under this data layer, there are two radial buttons namely:
  - ❖ Onset Date
  - ❖ End Date
- The user selects any one of the radial buttons displaying locations with precipitation on the respective dates.
- Similarly, the user can view End dates and their respective rainfall on those locations. (Refer Figure 3-3 and Figure 3-4).

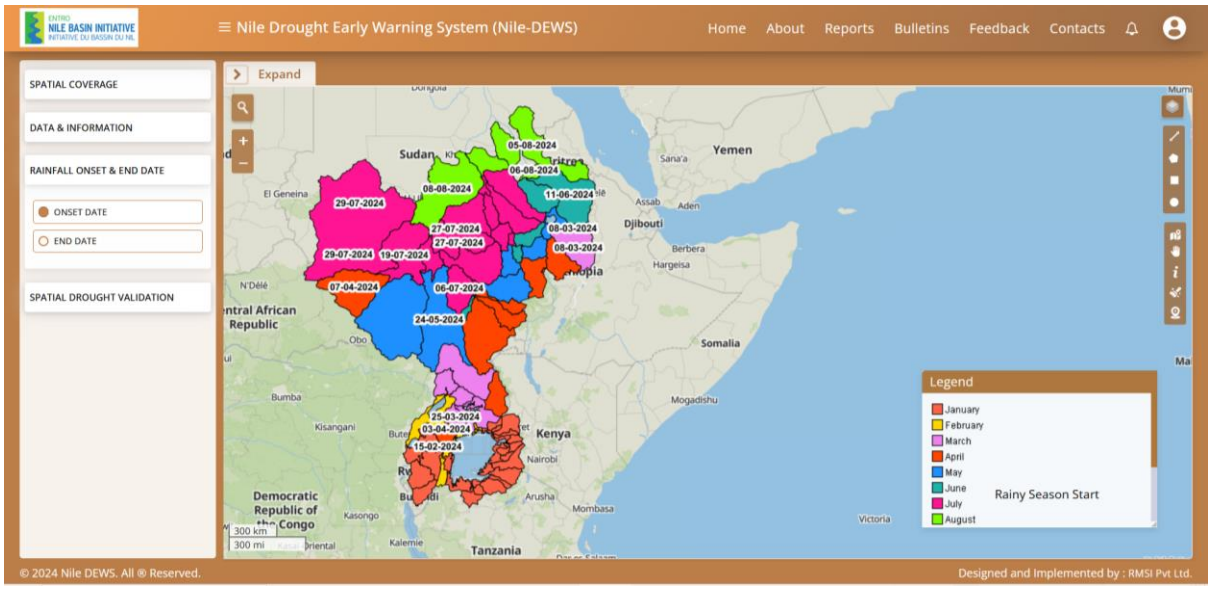

Figure 3-3: Onset dates for rainfall category with locations

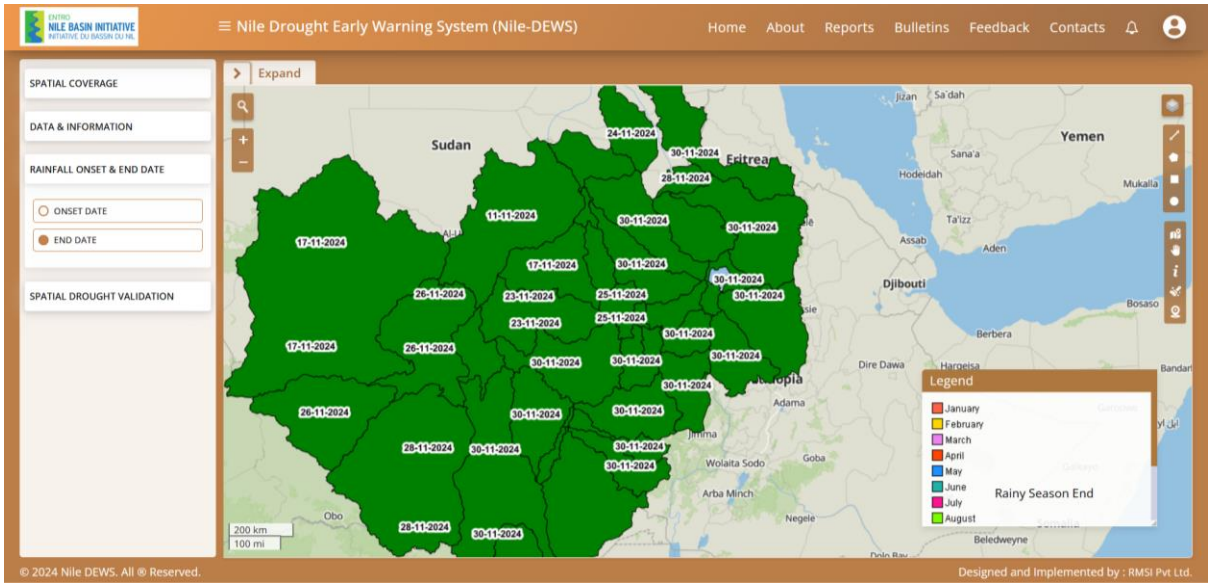

Figure 3-4: End dates for rainfall category with locations

3.3 Spatial Drought Validation

- This is the last data layer on the left side bar.
- There are three spatial levels namely:
  - ❖ Sub-basin level
  - ❖ Basin level
  - ❖ Country level
- Currently, there is no data within the fields.

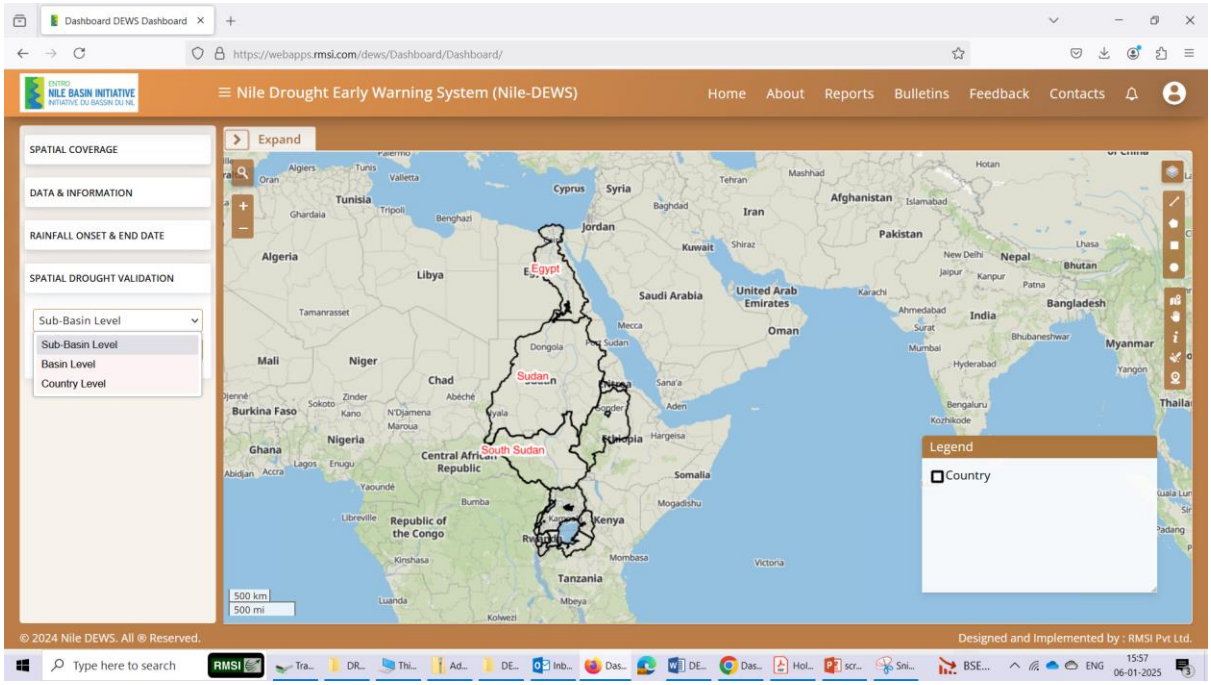

Figure 3-5: Spatial Drought Validation

4 Spatial Coverage Module and Expand Module

As we have seen in the previous chapter, the left side bar is visible on the default dashboard screen when the user logins. However, the Expand module populates only when the user clicks on the toggle button visible against it. These two modules have prefilled data layers. The user selects a combination of data layers and the resultant maps are generated on the Map Viewer page as shown in Figure 4-1.

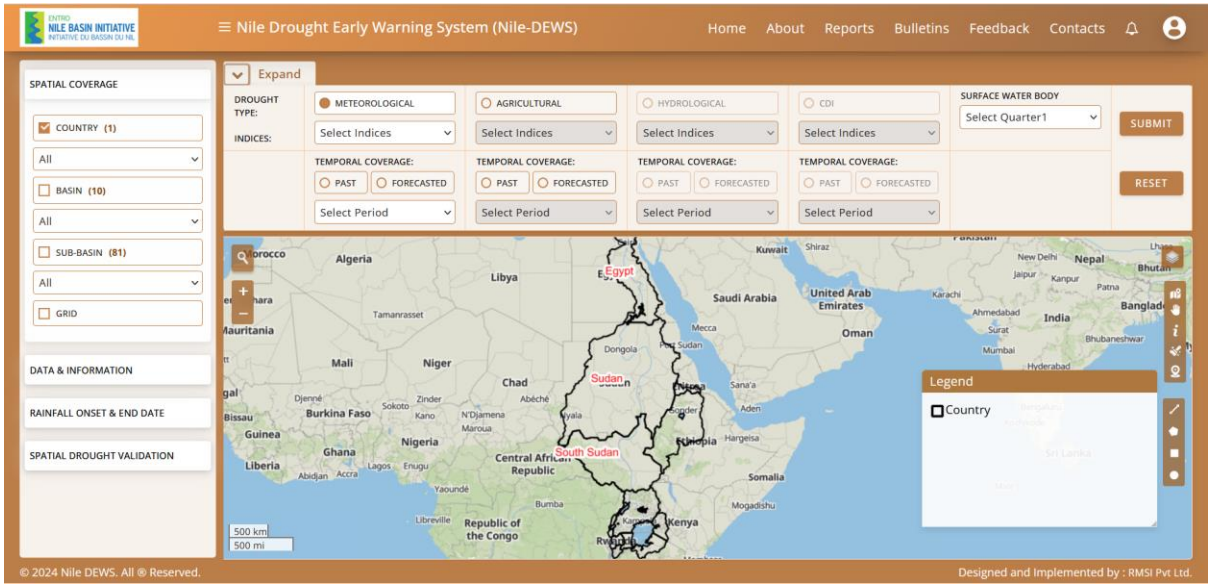

Figure 4-1: Dashboard displaying Spatial Coverage layers and Expand functionalities

4.1 Spatial Coverage Module

1. Go to “Spatial Coverage” module on the “left side bar” to display the different spatial coverage layers on the dashboard. The layers are as follows:
    - ❖ Country (highlighted with a green box)
    - ❖ Basin (highlighted with a red box)
    - ❖ Sub basin (highlighted with a blue box)
    - ❖ Grid (highlighted with a yellow box)

- The respective image depicting all four sub-layers under spatial coverage as shown in Figure 4-2.

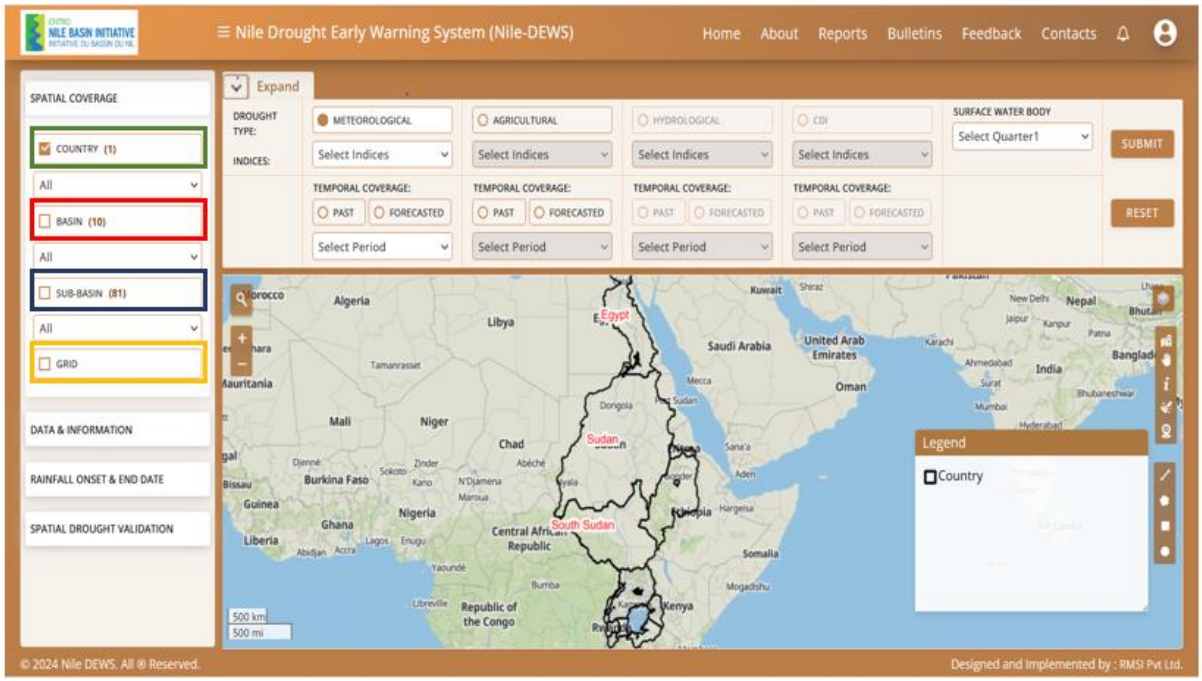

Figure 4-2: Left menu tab displaying Spatial Coverage sub-layers

- Click on either of the checkboxes under Spatial Coverage to filter the data at country, basin, sub-basin, or grid levels level as shown in Figure 4-1 .
- The country level is the largest and the grid level is the smallest unit for displaying data.
- Select one of the Analysis Parameters using the dropdown as mentioned below:
    - ❖ Country wide boundary is displayed here showcasing the Nile basin.
    - ❖ Basin wide boundaries are displayed here showcasing Nile basins over the entire country. There are a total of 10 basin boundaries displayed here.
    - ❖ Sub-basin wide boundaries capturing sub-basins of Nile river are displayed here. There are a total of 81 sub-basin boundaries displayed here. All the basin and Sub basin boundaries are interconnected.
    - ❖ Grid level, the smallest unit with a 5x5 km resolution at grid level is displayed here for the entire country.

Select any single checkbox using the dropdown This displays the analysis for the selected boundary level (s) on the Map Viewer as shown in

- Figure 4-3.

As an example, we have selected Blue Nile under Basin category and all 16 sub-basins under Nile Blue basin.

- Figure 4-3 displays all the sub-basin boundaries of Blue Nile basin. The basin and sub basins are highlighted in blue, green and red boxes on the left. The resulting basin and sub-basin boundaries for Blue Nile are displayed on the Map Viewer (encircled).

Figure 4-3: Basin>> Sub basin layers on Map Viewer

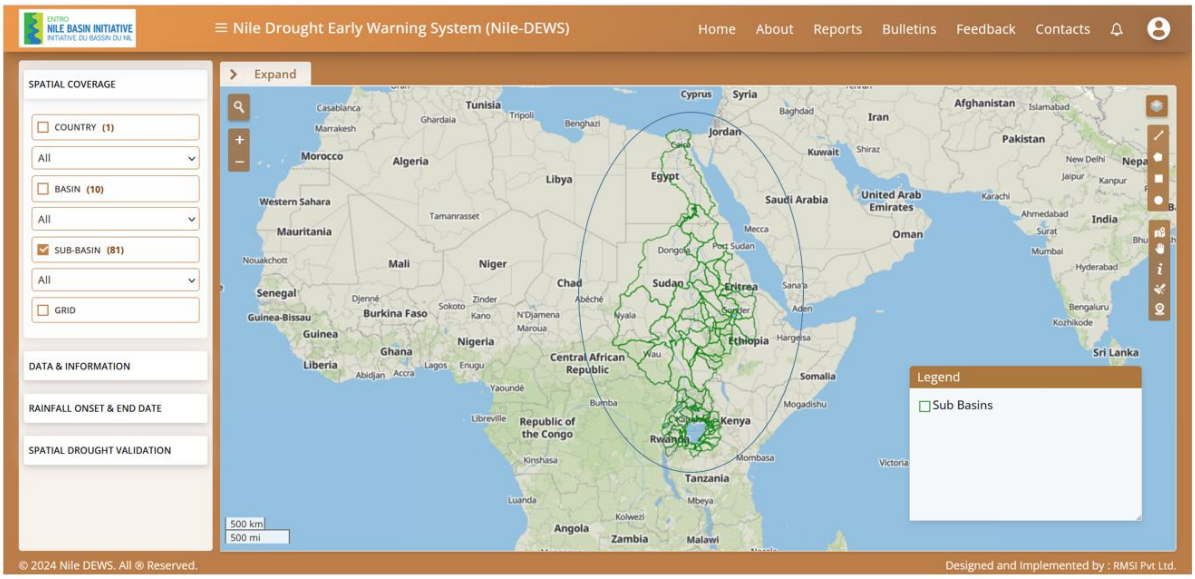

Figure 4-4: Sub-basin boundary

4.2 Expand Module

- There is another button at the top the of Map Viewer, namely Expand. Once the user clicks on it, the entire menu displays under Expand tab. Refer Figure 4-5 for more detail.

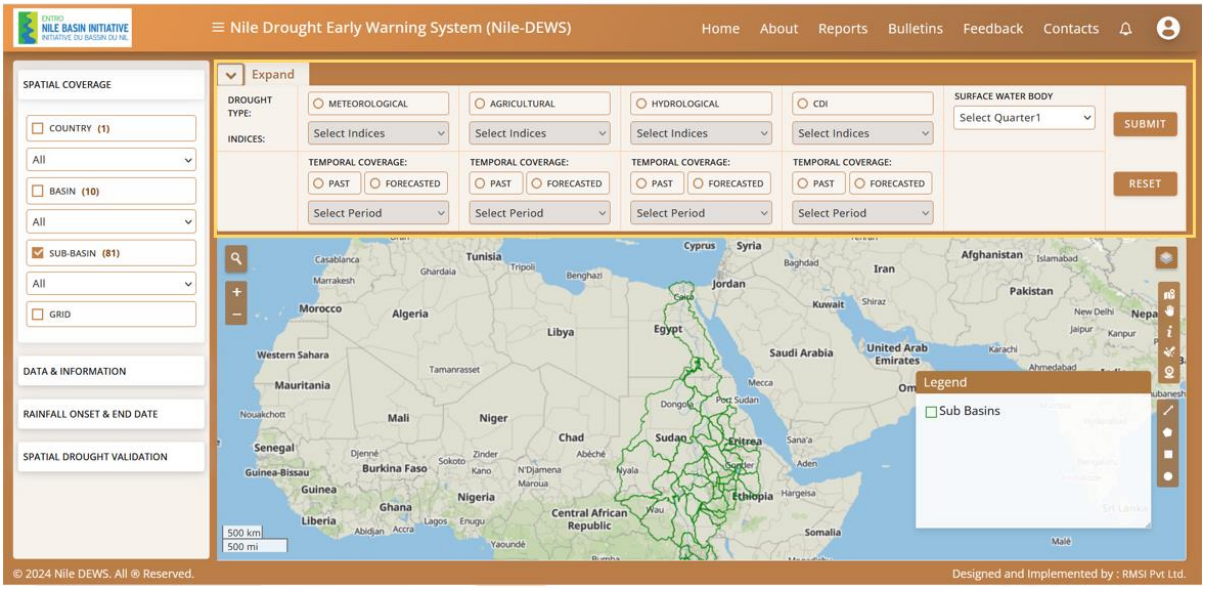

Figure 4-5: Expand sub-menu options

- There are 4 main sub-categories of drought types under Expand (highlighted with a yellow box).
- The sub-drought categories are:
  - ❖ Meteorological
  - ❖ Agricultural
  - ❖ Hydrological
  - ❖ CDI

- ❖ Surface Water Body (It is a separate category)

- Also, there are indices under each drought category. The user has to select any of the drought type and one of the indices under any category. Then, the user has to select either of the temporal coverage, and lastly select a period using a dropdown.

4.2.1 METEOROLOGICAL

- Under Meteorological Drought type, there are three types of indices namely:
  - ❖ SPI (Standard Precipitation Index)
  - ❖ SPEI (Standard Precipitation Evapotranspiration Index)
  - ❖ LSTCI (Land Surface Temperature Condition Index)
- The user has to select any of the indices using a dropdown to obtain a map on the Map Viewer page. Similarly, the user can select any of the period ranging from Fortnightly, Monthly, Quarterly, or Half-yearly as shown in Figure 4-6.
- The Meteorological layer is supported with all the spatial coverage layers.

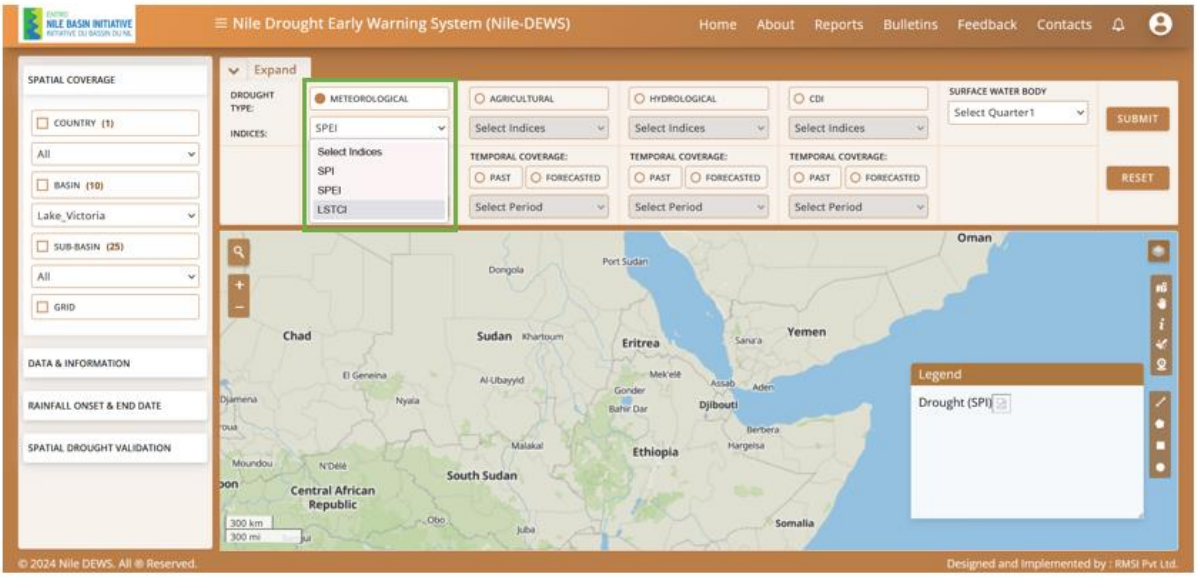

Figure 4-6: Meteorological Layer displaying all indices

- The user has to select Meteorological under drought types, SPI under indices, Forecasted under temporal coverage, and Fortnightly under period. Also, the user has to select any of the boundary types under spatial coverage at the same time to display the results on Map Viewer.
- Here, the Main_Nile has been selected under Basin category. All 7 sub-basin boundaries are displayed on the Map Viewer as shown in Figure 4-7. The resultant details of this meteorological drought are also displayed on the Dashboard.

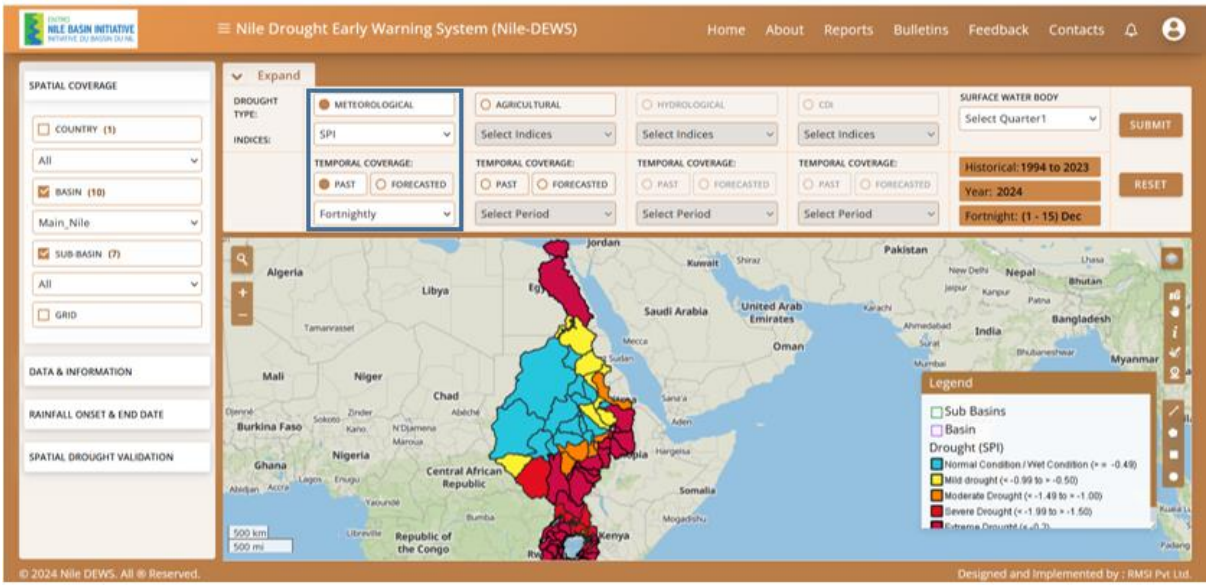

Figure 4-7: Meteorological Drought>>SPI Indice>>Past>>Forthrightly at Sub-basin level

- Also, the legends appear on the Map Viewer page for the selected spatial Coverage layer and drought type layers.
- Similarly, we can obtain basin, sub-basin boundaries, and grid layers for the other indice types under Meteorological Drought.

4.2.2 AGRICULTURAL

- Under Agricultural Drought type, there are three types of indices namely:
  - ❖ VHI (Vegetation Health Index)
  - ❖ SMAPI (Soil Moisture Anomaly Precipitation Index)
  - ❖ MAI (Moisture Adequacy Index)
- The user has to select Agricultural under drought types, VHI under indices, Forecasted under temporal coverage, and Fortnightly under period. Also, the user has to select any of the boundary types under spatial coverage at the same time to display the results on Map Viewer.
- Here, the Main_Nile has been selected under Basin category. All 7 sub-basin boundaries are displayed on the Map Viewer as shown in Figure 4-8. The resultant details of this agricultural drought are also displayed on the Dashboard.

Figure 4-8: Agricultural Drought>>VHI Indice>>Past>> Fortnightly at Sub-basin level

4.2.3 HYDROLOGICAL

- Under Hydrological Drought type, there is one type of indice namely:
  - ❖ SSI (The Standard Streamflow Index)
- The user has to select Agricultural under drought types, SSI under indices, Past under temporal coverage, and Fortnightly under period. Also, the user has to select any of the boundary types under spatial coverage at the same time to display the results on Map Viewer.
- Here, the Victoria_Nile has been selected under Basin category. All 8 sub-basins are displayed on the Map Viewer as shown in Figure 4-8. The resultant details of this agricultural drought are also displayed on the Dashboard.

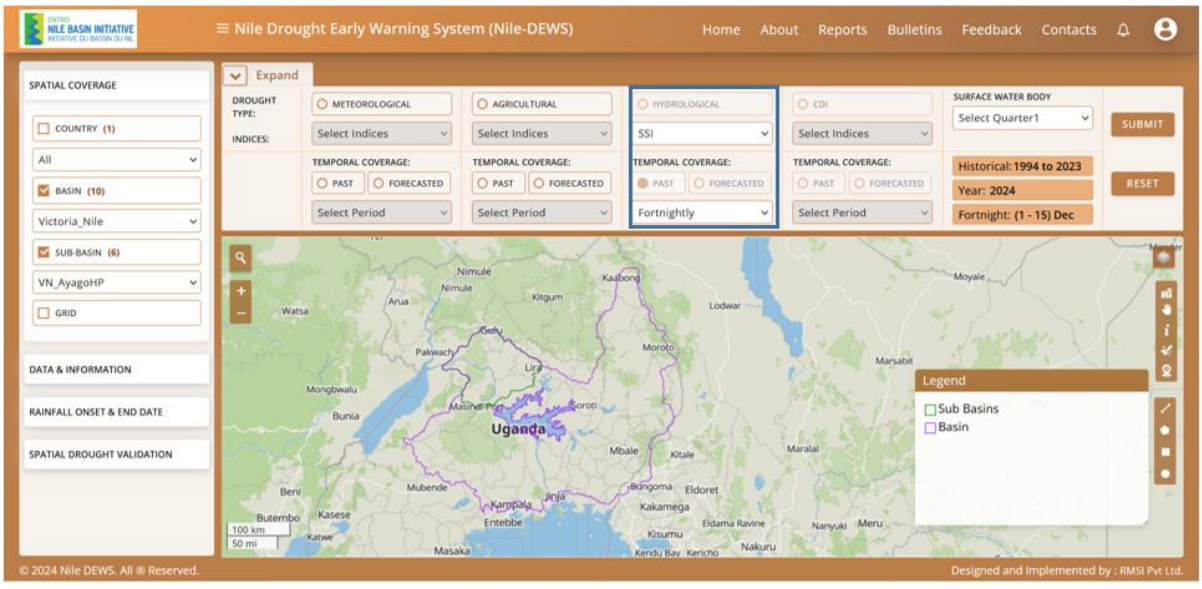

Figure 4-9: Hydrological Drought>>SSI Indice>>Past>> Fortnightly at Sub-basin level

4.2.4 CDI

- It stands for the Composite Drought Index.
- It has only one indice category “CDI” unlike other drought categories.
- The user has to select CDI under drought types, CDI under indices, Forecasted under temporal coverage, and Fortnightly under period. Also, the user has to select any of the boundary types under spatial coverage at the same time to display the results on Map Viewer.
- Here, the Victoria_Nile has been selected under Basin category. All 6 sub-basin boundaries are displayed on the Map Viewer as shown in Figure 4-8. The resultant details of this agricultural drought are also displayed on the Dashboard.

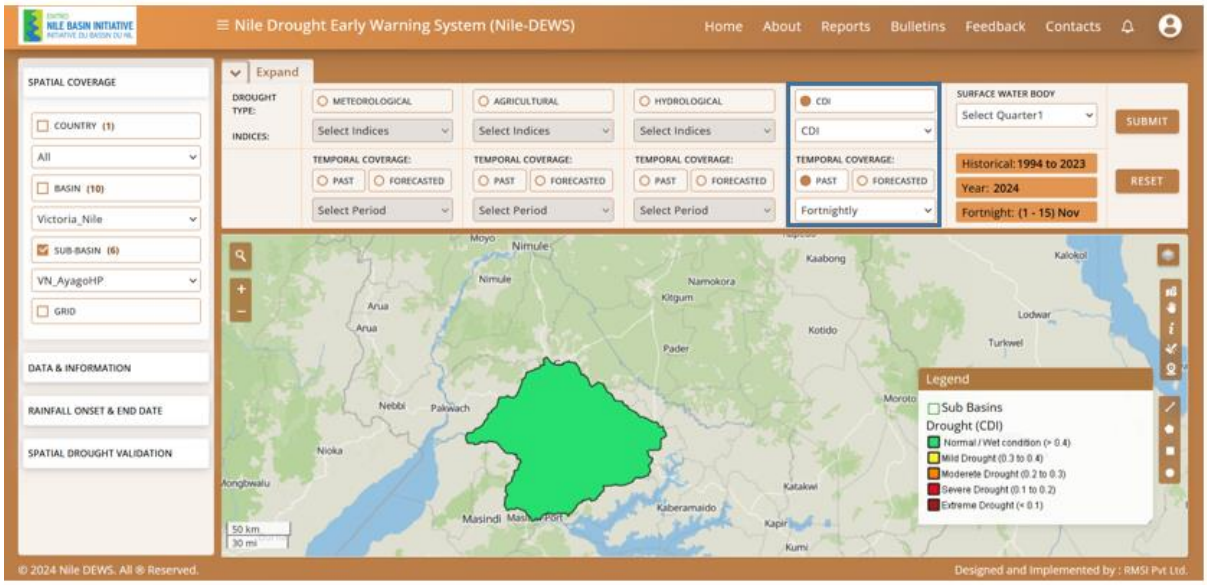

Figure 4-10: CDIt>>CDI Indice>>Past>> Fortnightly at Sub-basin level

4.2.5 SURFACE WATER BODY

- Unlike drought categories, it drills down data on a quarterly basis.

It is divided into 4 quarters namely:

- ❖ Quarter 1
- ❖ Quarter 2
- ❖ Quarter 3
- ❖ Quarter 4

- The user has to select any one quarter using the dropdown, and simultaneously select one of the spatial layers. Also, the user has to select one of the temporal coverages.
- As an example, we have selected Quarter 2 under Surface Water Body type, Grid under Spatial Coverage type, Agricultural Drought, VHI as indice, Past under Temporal Coverage, and Fortnightly under period.

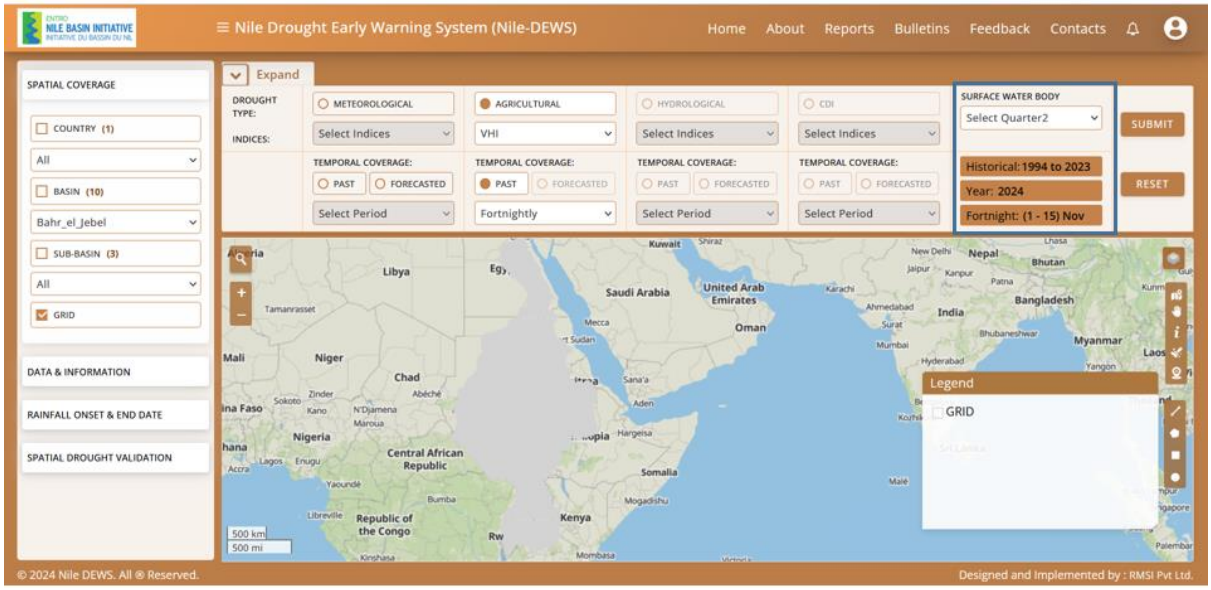

Figure 4-11: Surface Water Body