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NILE BASIN INITIATIVE
INITIATIVE DU BASSIN DU NIL

Eastern Nile Technical Regional Office
Nile Basin Initiative

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

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Nile Drought and Early Warning System (Nile DEWS)

Nile DEWS system provides drought warnings based on different types of meteorological, agricultural, and hydrological drought indices as well as using composite drought index (CDI) for both historical and forecasted periods at different spatial coverage (i.e., country, basin, sub-basin, and grid levels). It offers temporal coverage at various intervals, including fortnightly, 1-month, 3-month, and 6-month periods for both past and forecasted periods.

1)Meteorological Drought

A **Meteorological** drought is defined as a period of significantly below-normal precipitation and above-normal temperature, leading to a shortage of water. This type of drought is typically measured by comparing current rainfall and temperature levels to historical averages over a specific period. In this study, meteorological drought has been quantified using below given indices.

Standardized Precipitation Index (SPI)

SPI is a meteorological drought index which quantifies the drought and wet conditions over various timescales (e.g., weekly, fortnightly, monthly, seasonal, annual, or more) by calculating the deviation of observed precipitation from the long-term mean, using standard deviations after normalizing the precipitation data to a normal distribution.

Long daily time series historical (ideally 30 years) precipitation data is required to derive this index. Hence, in the current version of Nile DEWS, last 30 years (1994 to 2023) daily time series precipitation data (source: CHIRPS), has been used to derive the current time period SPI of different temporal resolutions (i.e., 15-day, 1-month, 3-month, and 6-month). The spatial resolution of CHIRPS data is 0.05° x 0.05°.
Range of SPI is from +3.0 to -3.0, in which positive SPI values indicate wet condition, negative values indicate drought condition, whereas SPI values in the range of ± 0.49 indicate normal condition. More the negative values of SPI, severe the drought condition.

Standardized Precipitation Evapotranspiration Index (SPEI)

SPEI is a meteorological drought index which quantifies the drought and wet conditions by considering both precipitation and potential evapotranspiration, reflecting the impact of temperature on water demand, and can be calculated over various timescales (e.g., weekly, fortnightly, monthly, seasonal, annual, or more).

Long daily time series historical (ideally 30 years) precipitation, maximum temperature, and minimum temperature data are required to derive this index. Hence, in the current version of Nile DEWS, last 30 years (1994 to 2023) daily time series precipitation (source: CHIRPS), and maximum & minimum temperatures (source: ERA5) data have been used to derive current time period SPEI of different temporal resolutions (i.e., 15-day, 1-month, 3-month, and 6-month). The spatial resolution of CHIRPS data is 0.05° x 0.05° and ERA5 is 0.25° x 0.25°, which has been regridded to 0.05° x 0.05° spatial resolution.

Range of SPEI is from +3.0 to -3.0, in which positive SPEI values indicate wet condition, negative values indicate drought condition, whereas SPEI values in the range of ± 0.49 indicate normal condition. More the negative values of SPEI, severe the drought condition.

Land Surface Temperature Condition Index (LSTCI)

LSTCI is a meteorological drought index that measures how hot or cold the earth surface would feel to the touch and calculated using Land Surface Temperature (LST). This index is directly related to develop the drought condition as higher LST causes more Evapotranspiration (ET) which leads to more removal of water from the land surface. It is calculated using the formula (LST Max – LST Current-time) / (LST Max – LST Min). Long time series past (ideally 30 years) land surface temperature data is required to derive this index. Hence, in the current version of Nile DEWS, last 30 years (1994 to 2023) daily time series LST data (source: ERA5) has been used to derive current time period LSTCI of different temporal resolutions (i.e., 15-day, 1-month, 3-month, and 6-month). The spatial resolution of ERA5 is 0.25° x 0.25°, which has been regridded to 0.05° x 0.05° spatial resolution.

Range of LSTCI is from 0 to 1, in which higher values (> 0.4) indicate no drought condition and lower values (< 0.4) indicate drought condition. Less the LSTCI value, severe the drought condition.

2)Agricultural Drought

An **Agricultural** drought occurs when there is insufficient soil moisture to support the growth of crops, leading to reduced agricultural productivity. This type of drought is characterized by a lack of precipitation, high temperatures, and increased evapotranspiration, which together result in adverse plant responses such as reduced crop yields or even total crop failure. In this study, agricultural drought has been quantified using below given indices.

Vegetation Health Index (VHI)

VHI is an agricultural drought index and is one of the most popular remote sensing-based drought monitoring indices. VHI is composed by using two indices i.e., Vegetation Condition Index (VCI) = 100 * [(NDVI Current-time - NDVI Min) / (NDVI Max - NDVI Min)] and Thermal Condition Index (TCI) = 100 * [(LST Max – LST Current-time) / (LST Max – LST Min)]. The algorithm of VHI = [a * VCI + (1-a) * TCI] (where ‘a’ = 0.5). Past 5 years NDVI and LST data are required to derive VHI. Hence, in the current version of Nile DEWS, last 5 years (2019 to 2023) NDVI (source: MODIS) and LST data (source: ERA5) have been used to derive VHI of just last fortnight only. The spatial resolution of NDVI is 1 km, which has been regridded to 5 km, ERA5 is 0.25° x 0.25°, which has been regridded to 0.05° x 0.05° spatial resolution.

Range of VHI is from 0 to 100, in which higher values (> 50) indicate no drought condition and lower values (< 50) indicate drought condition. Less the VHI value, severe the drought condition.

Soil Moisture Anomaly Percentage Index (SMAPI)

SMAPI is an agricultural drought index which is an indication of amount of water stored in a layer of soil. It is calculated using soil moisture data (m^3/m^3) i.e., SMAPI = 100 * [(Soil moisture Current-time – Soil moisture Normal value) / (Soil moisture Normal value)]. Long time series past (ideally 30 years) soil moisture data is required to derive this index. Hence, in the current version of Nile DEWS, last 30 years (1994 to 2023) daily time series soil moisture data (source: ERA5) has been used to derive current time period SMAPI of different temporal resolutions (i.e., 15-day, 1-month, 3-month, and 6-month) for the past time period only. The spatial resolution of ERA5 is 0.25° x 0.25°, which has been regridded to 0.05° x 0.05° spatial resolution.

Range of SMAPI is from -100 to +100, in which positive SMAPI values indicate wet condition, whereas negative values indicate drought condition. More the negative values of SMAPI, severe the drought condition.

Moisture Adequacy Index (MAI)

MAI is an agricultural drought index which is defined as the ratio of actual evapotranspiration (AET) to the potential evapotranspiration (PET) [i.e., MAI = 100 * (AET/PET)]. The moisture, that is necessary for the sustenance of a crop or a vegetation species, can be best derived from knowledge of the MAI and is a true representative of moisture effectivity. Only current time period AET and PET data are required to derive this index (i.e., just for the past fortnight). Hence, in the current version of Nile DEWS, only last fortnight AET and PET data (source: MODIS) has been used to derive MAI. The spatial resolution of AET and PET data are 0.5 km, which has been regridded to 5 km spatial resolution.
Range of MAI is from 0 to 100, in which higher values (> 75) indicate no drought condition and lower values (< 75) indicate drought condition. Less the MAI value, severe the drought condition.

3)Hydrological Drought

The **Hydrological** drought express anomalies in different ways. They can be defined with the use of absolute values or deviations such as a percentage deviation from a predefined threshold like annual average precipitation, streamflow, or other variables. There are several ways of expressing hydrological drought such as based on percentiles or standardized drought indices. Hence, in this study standardized based hydrological drought index has been used to quantified the hydrological drought using the streamflow variable as given below.

Standardized Streamflow Index (SSI)

SSI is a hydrological drought index which quantifies streamflow anomalies by standardizing observed streamflow values relative to their historical mean and variability, allowing for the assessment of streamflow conditions over various timescales (e.g., weekly, fortnightly, monthly, seasonal, annual, or more). Long time series past (ideally 30 years) stream flow data is required to derive this index. Hence, in the current version of Nile DEWS, last 30 years (1994 to 2023) daily time series streamflow data including observed station data and simulated hydrological model data have been used to derive current time period SSI of different temporal resolutions (i.e., 15-day, 1-month, 3-month, and 6-month).
Range of SSI is from +3.0 to -3.0, in which positive SSI values indicate wet condition, whereas negative values indicate drought condition. More the negative values of SSI, severe the drought condition.

4)Composite Drought Index (CDI)

The Composite Drought Index (CDI) has been developed using a combination of different meteorological and agricultural drought indices such asStandardized Precipitation Index (SPI),Vegetation Health Index (VHI),Land Surface Temperature Condition Index (LSTCI),andSoil Moisture Anomaly Percentage Index (SMAPI) by applying appropriate weights for the considered indices. CDI is suitable for drought monitoring across the Nile basin. Range of CDI is from 0 to 1, in which if CDI values greater than 0.4 indicate normal/wet condition, whereas CDI values ≤ (less than or equal) indicate drought condition.

Historical Data

Indices	Extreme	Severe
VHI		
SPEI		

SPI	VN_Agu (Victoria_Nile), VN_Kafu (Victoria_Nile), BAS_Agawi (Baro_Akobo_Sobat), BAS_Akobo (Baro_Akobo_Sobat), BAS_downstream K Nynding (Baro_Akobo_Sobat), BAS_K_Nanaam_Pibor (Baro_Akobo_Sobat), BAS_LowerBaro downstream machar (Baro_Akobo_Sobat), BG_Gel (Bahr_el_Ghazal), BG_Bahr el Ghazal_North (Bahr_el_Ghazal), BAS_Pibor_downstream (Baro_Akobo_Sobat), BG_Bahr el Arab (Bahr_el_Ghazal), BAS_LowerBaro adura (Baro_Akobo_Sobat), BG_Pongo (Bahr_el_Ghazal), BJ_Bahr el Jebel North (Bahr_el_Jebel), BN_Gummera (Blue_nile), BJ_Yei_Gol (Bahr_el_Jebel), BJ_Bahr el Jebel upstream Shukoli (Bahr_el_Jebel), BN DS Rehad (Blue_nile), BN DS Rosires 2 (Blue_nile), BN_Abay_at_Shegolie (Blue_nile), BN_Border (Blue_nile), BN_Blue Nile at Khartoum and Soba (Blue_nile), BN_Anger (Blue_nile), LA_LakeEdward_lower (Lake_Albert), BN_Beshilo (Blue_nile), BN_Beles (Blue_nile), BN_Dabus near Assosa (Blue_nile), BN_DS Roseries (Blue_nile), BN_Dinder (Blue_nile), BN_Diem_Roseries (Blue_nile), BN_Trib Below Beko Abo (Blue_nile), BN_Mendaya (Blue_nile), LA_AlbertNile_Laropi (Lake_Albert), LA_LakeEdward_upper (Lake_Albert), LV_Awach Kibuon (Lake_Victoria), LV_Isanga (Lake_Victoria), LV_Itare (Lake_Victoria), LV_Kagera_Akanyaru (Lake_Victoria), LV_Kagera_Kagera (Lake_Victoria), LV_Kagera_Mubarazi (Lake_Victoria), LV_Kagera_Mwisa (Lake_Victoria), LV_Katonga (Lake_Victoria), LV_LakeVic_WetArea_East (Lake_Victoria), LV_LakeVic_WetArea_North (Lake_Victoria), LV_LakeVic_WetArea_South (Lake_Victoria), LV_LakeVic_WetArea_West (Lake_Victoria), LV_Lisumu (Lake_Victoria), LV_Mamwe (Lake_Victoria), LV_Mara_central (Lake_Victoria), LV_Mbalageti (Lake_Victoria), LV_Migori (Lake_Victoria), LV_Nyando (Lake_Victoria), LV_Rubana (Lake_Victoria), LV_Rubare (Lake_Victoria), LV_Ruizi (Lake_Victoria), LV_Sare (Lake_Victoria), LV_Simiyu (Lake_Victoria), LV_Sio (Lake_Victoria), LV_Yala (Lake_Victoria), MN_Assuit_Cairo (Main_Nile), MN_Atbara_Sherieq (Main_Nile), MN_Dagash_Merwoe (Main_Nile), MN_Dal_Wadi_Halfa (Main_Nile), VN_Isimba (Victoria_Nile), MN_Khartoum_Tamaniat (Main_Nile), MN_Wadi_Halfa_Aswan (Main_Nile), MN_Nile Delta (Main_Nile), TA_DS Abu Gambil (Tekeze_Atbara), TA_Qash Trib (Tekeze_Atbara), TA_dsBurdana (Tekeze_Atbara), TA_KGDam (Tekeze_Atbara), TA_Rumela at Atbara (Tekeze_Atbara), TA_W Arab (Tekeze_Atbara), VN_AyagoHP (Victoria_Nile), VN_LakeKyoga (Victoria_Nile), VN_Malaba (Victoria_Nile), WN_Malakal Triangle (White_Nile), WN_Mogren_Khartoum (White_Nile), WN_Metut_Renk (White_Nile), WN_Renk_Kosti (White_Nile)	LV_Kagera_Mwisa (Lake_Victoria), MN_Khartoum_Tamaniat (Main_Nile)
CDI		

LSTCI	BAS_Agawi (Baro_Akobo_Sobat), BAS_Akobo (Baro_Akobo_Sobat), BAS_downstream K Nynding (Baro_Akobo_Sobat), BAS_K_Nanaam_Pibor (Baro_Akobo_Sobat), BAS_LowerBaro adura (Baro_Akobo_Sobat), BAS_LowerBaro downstream machar (Baro_Akobo_Sobat), BAS_Pibor_downstream (Baro_Akobo_Sobat), BG_Bahr el Arab (Bahr_el_Ghazal), BG_Bahr el Ghazal_North (Bahr_el_Ghazal), BG_Gel (Bahr_el_Ghazal), BG_Pongo (Bahr_el_Ghazal), BJ_Bahr el Jebel North (Bahr_el_Jebel), BJ_Bahr el Jebel upstream Shukoli (Bahr_el_Jebel), BJ_Yei_Gol (Bahr_el_Jebel), BN DS Rehad (Blue_nile), BN DS Rosires 2 (Blue_nile), BN_Abay_at_Shegolie (Blue_nile), BN_Aleltu East (Blue_nile), BN_Anger (Blue_nile), BN_Beles (Blue_nile), BN_Beshilo (Blue_nile), BN_Blue Nile at Khartoum and Soba (Blue_nile), BN_Border (Blue_nile), BN_Dabus near Assosa (Blue_nile), BN_Diem_Roseries (Blue_nile), BN_Dinder (Blue_nile), BN_DS Roseries (Blue_nile), BN_Gummera (Blue_nile), BN_Mendaya (Blue_nile), BN_Trib Below Beko Abo (Blue_nile), LA_AlbertNile_Laropi (Lake_Albert), LA_LakeEdward_lower (Lake_Albert), LA_LakeEdward_upper (Lake_Albert), LV_Awach Kibuon (Lake_Victoria), LV_Isanga (Lake_Victoria), LV_Itare (Lake_Victoria), LV_Kagera_Akanyaru (Lake_Victoria), LV_Kagera_Kagera (Lake_Victoria), LV_Kagera_Mubarazi (Lake_Victoria), LV_Kagera_Mwisa (Lake_Victoria), LV_Katonga (Lake_Victoria), LV_LakeVic_WetArea_East (Lake_Victoria), LV_LakeVic_WetArea_North (Lake_Victoria), LV_LakeVic_WetArea_South (Lake_Victoria), LV_LakeVic_WetArea_West (Lake_Victoria), LV_Lisumu (Lake_Victoria), LV_Mamwe (Lake_Victoria), LV_Mara_central (Lake_Victoria), LV_Mbalageti (Lake_Victoria), LV_Migori (Lake_Victoria), LV_Nyando (Lake_Victoria), LV_Rubana (Lake_Victoria), LV_Rubare (Lake_Victoria), LV_Ruizi (Lake_Victoria), LV_Sare (Lake_Victoria), LV_Simiyu (Lake_Victoria), LV_Sio (Lake_Victoria), LV_Yala (Lake_Victoria), MN_Assuit_Cairo (Main_Nile), MN_Atbara_Sherieq (Main_Nile), MN_Dagash_Merwoe (Main_Nile), MN_Dal_Wadi_Halfa (Main_Nile), MN_Khartoum_Tamaniat (Main_Nile), MN_Nile Delta (Main_Nile), MN_Wadi_Halfa_Aswan (Main_Nile), TA_DS Abu Gambil (Tekeze_Atbara), TA_dsBurdana (Tekeze_Atbara), TA_KGDam (Tekeze_Atbara), TA_Qash Trib (Tekeze_Atbara), TA_Rumela at Atbara (Tekeze_Atbara), TA_W Arab (Tekeze_Atbara), VN_Agu (Victoria_Nile), VN_AyagoHP (Victoria_Nile), VN_Isimba (Victoria_Nile), VN_Kafu (Victoria_Nile), VN_LakeKyoga (Victoria_Nile), VN_Malaba (Victoria_Nile), WN_Malakal Triangle (White_Nile), WN_Metut_Renk (White_Nile), WN_Mogren_Khartoum (White_Nile), WN_Renk_Kosti (White_Nile)	

Real time drought condition at different temporal resolutions during last six months across the Nile basin

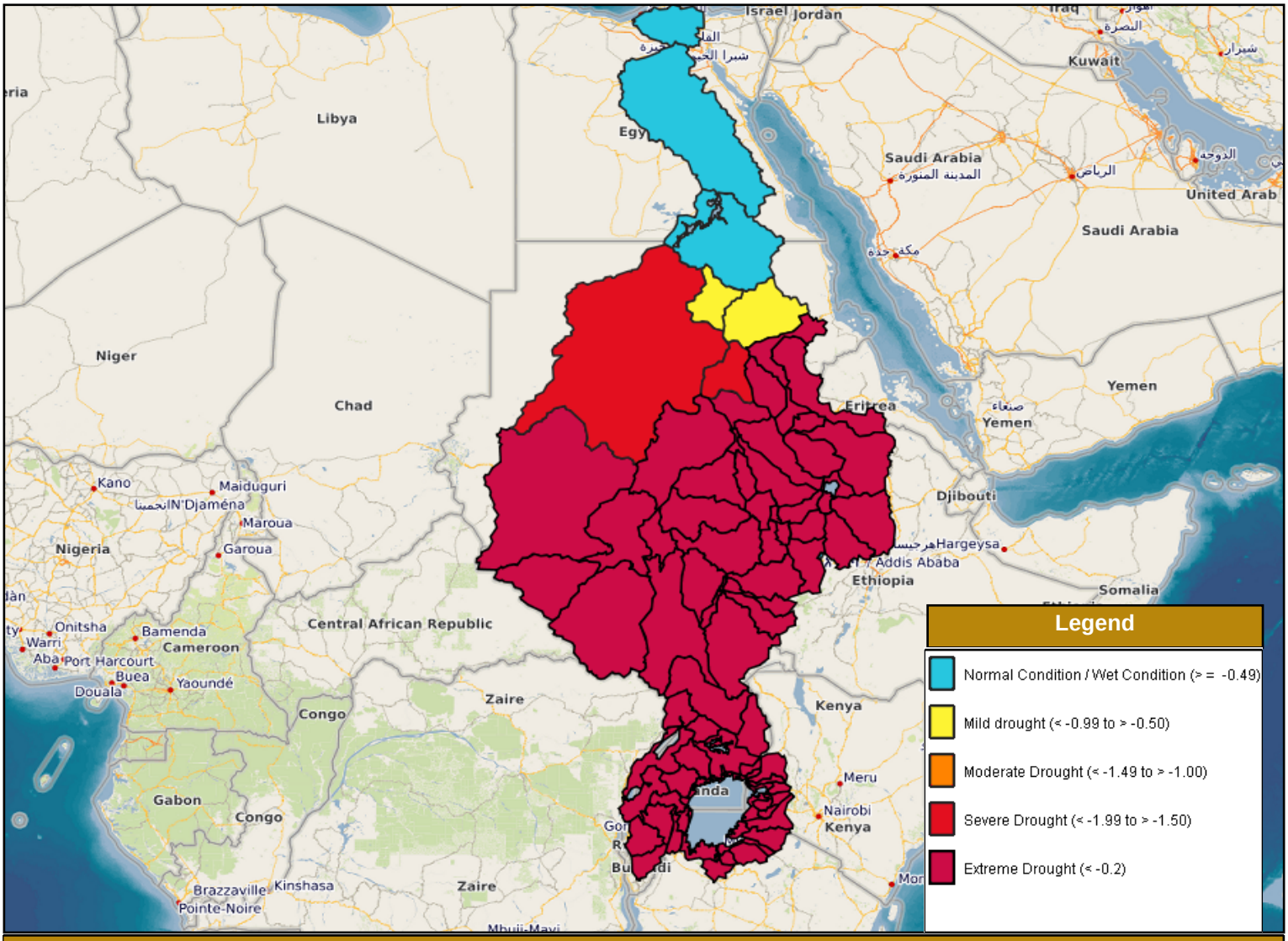

Figure 1: Spatial distribution pattern of SPI during the period from (1 -15) June 2025

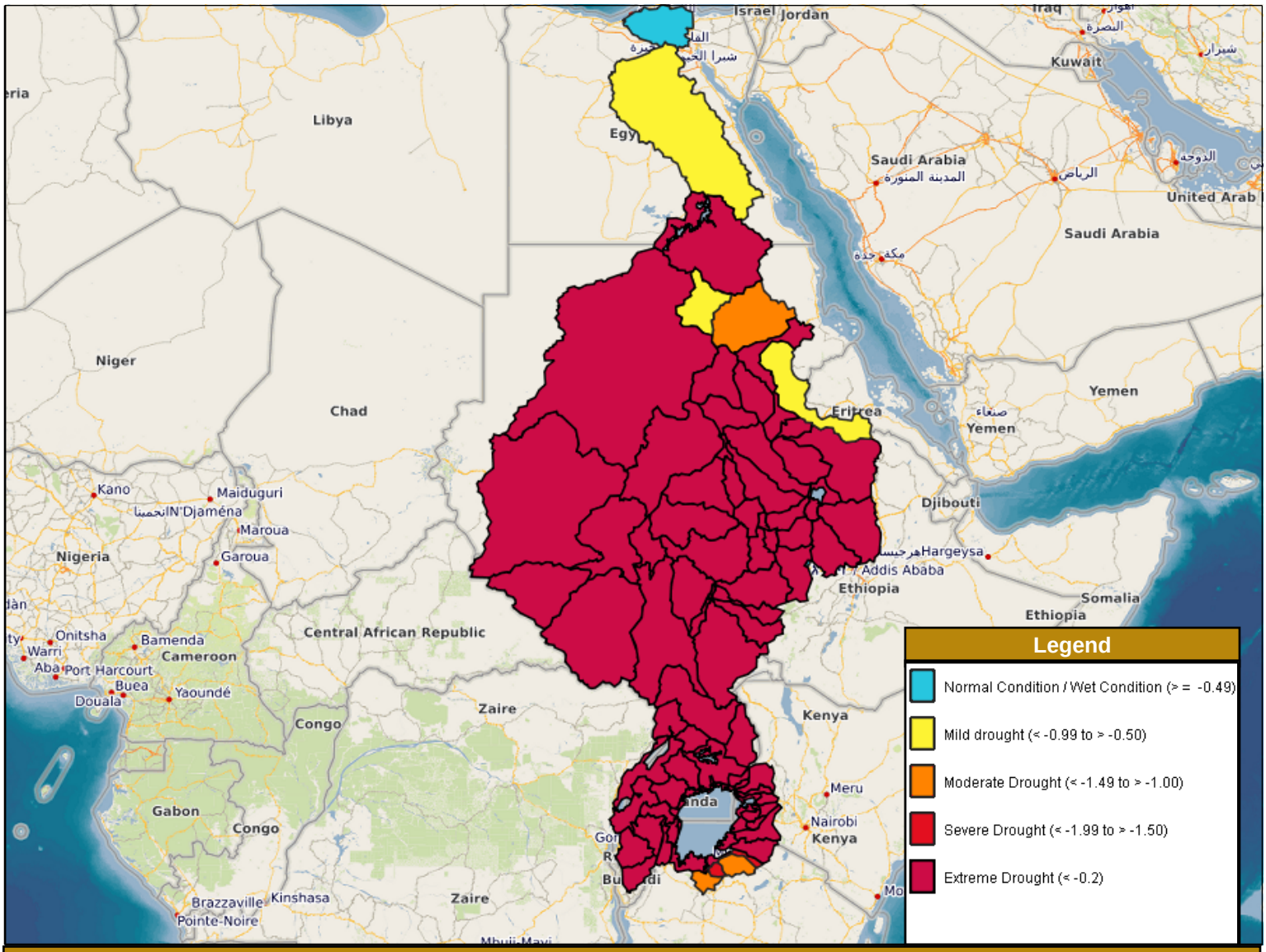

Figure 2: Spatial distribution pattern of SPI during the period from May 2025

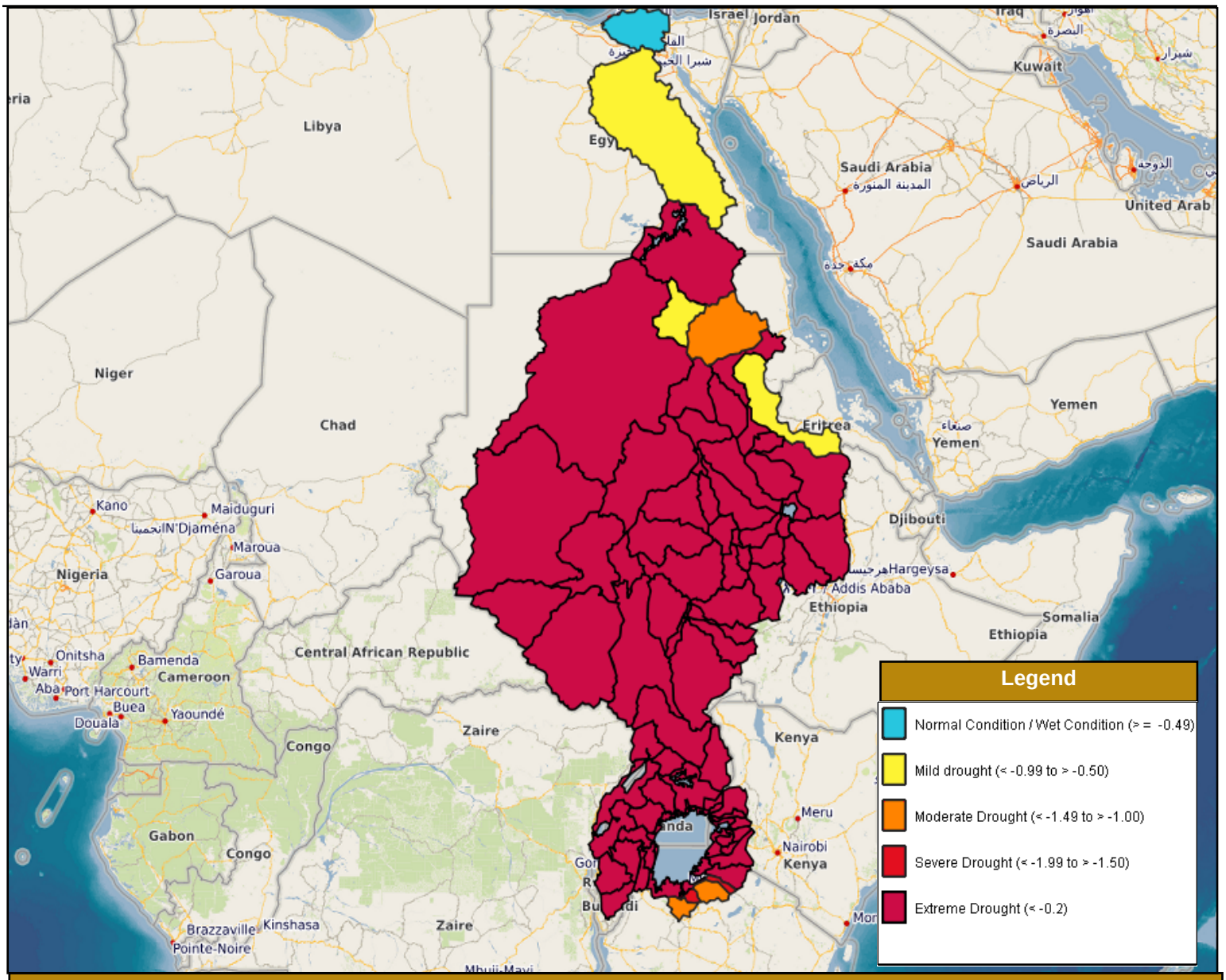

Figure 3: Spatial distribution pattern of SPI during the period from March-2025-May-2025

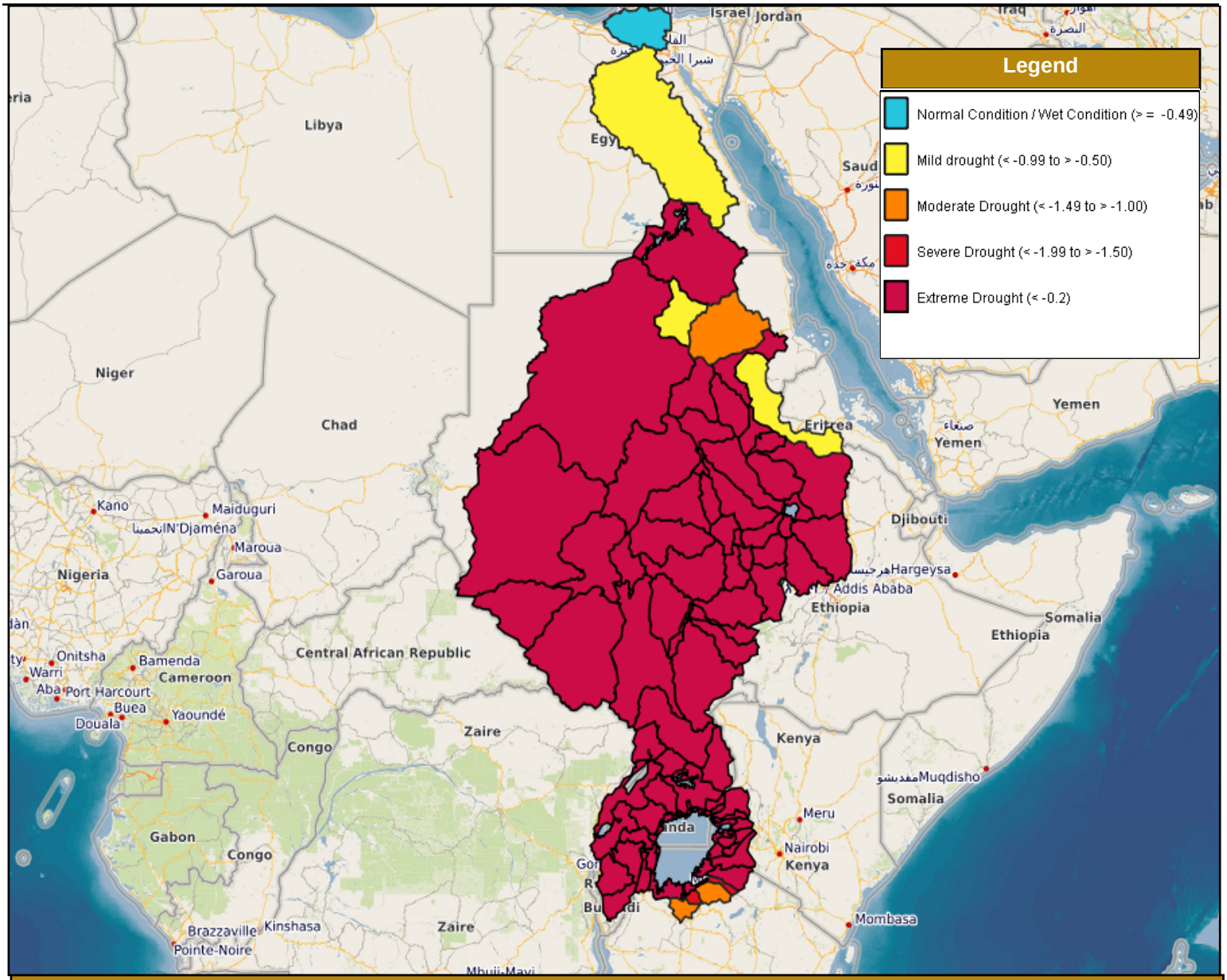

Figure 4: Spatial distribution pattern of SPI during the period from December-2024-May-2025

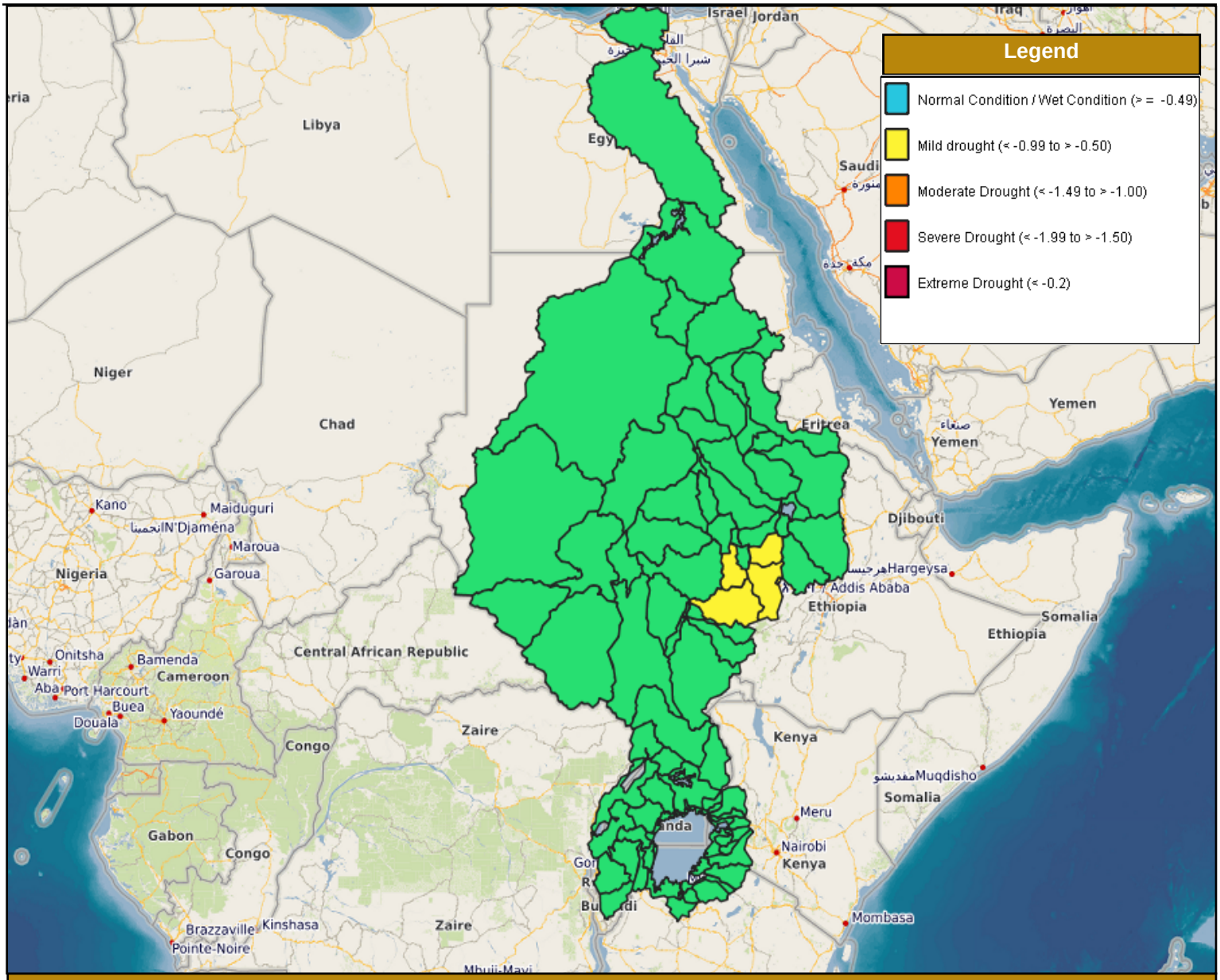

Figure 5: Spatial distribution pattern of SPEI during the period from (1 -15) June 2025

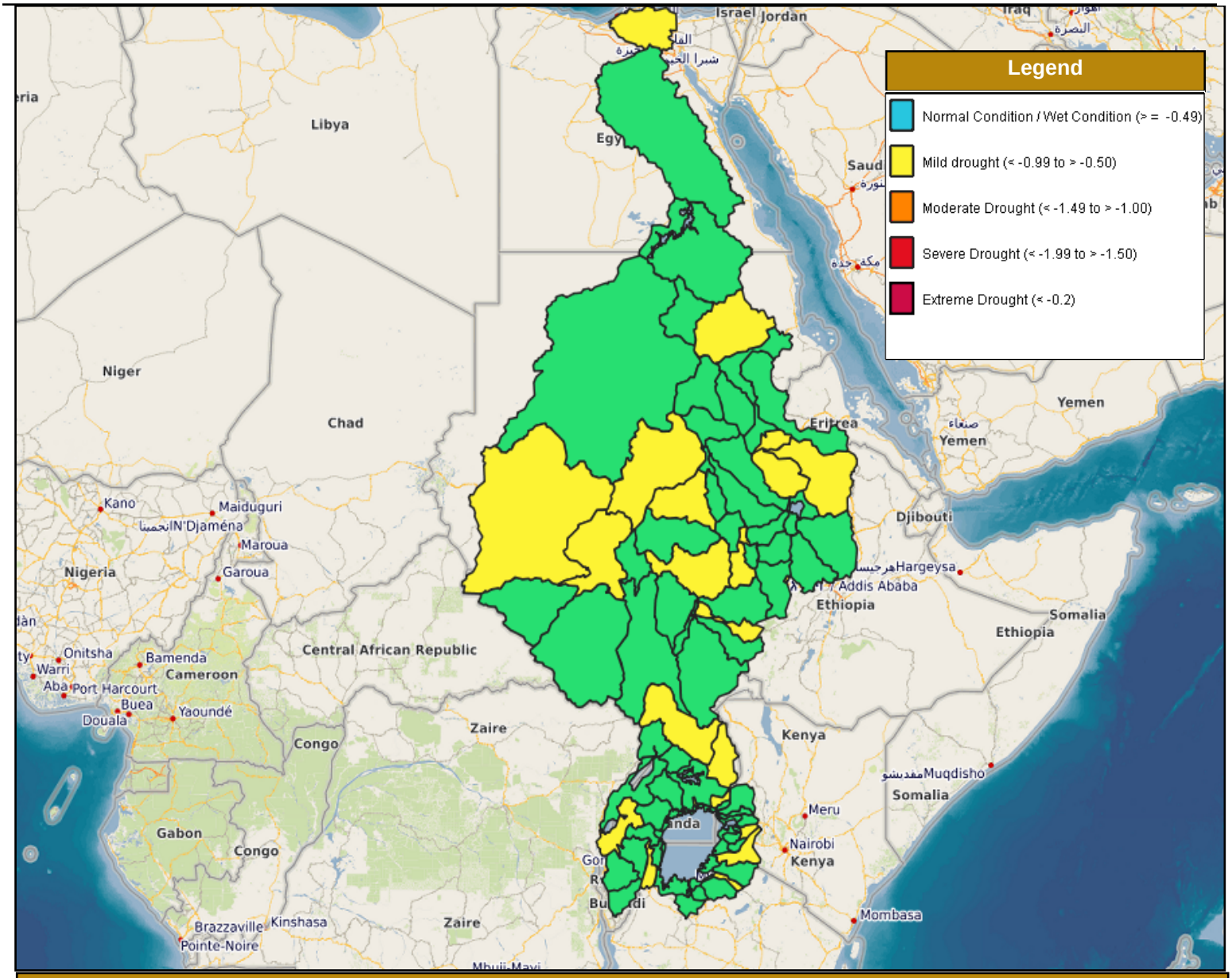

Figure 6: Spatial distribution pattern of SPEI during the period from May 2025

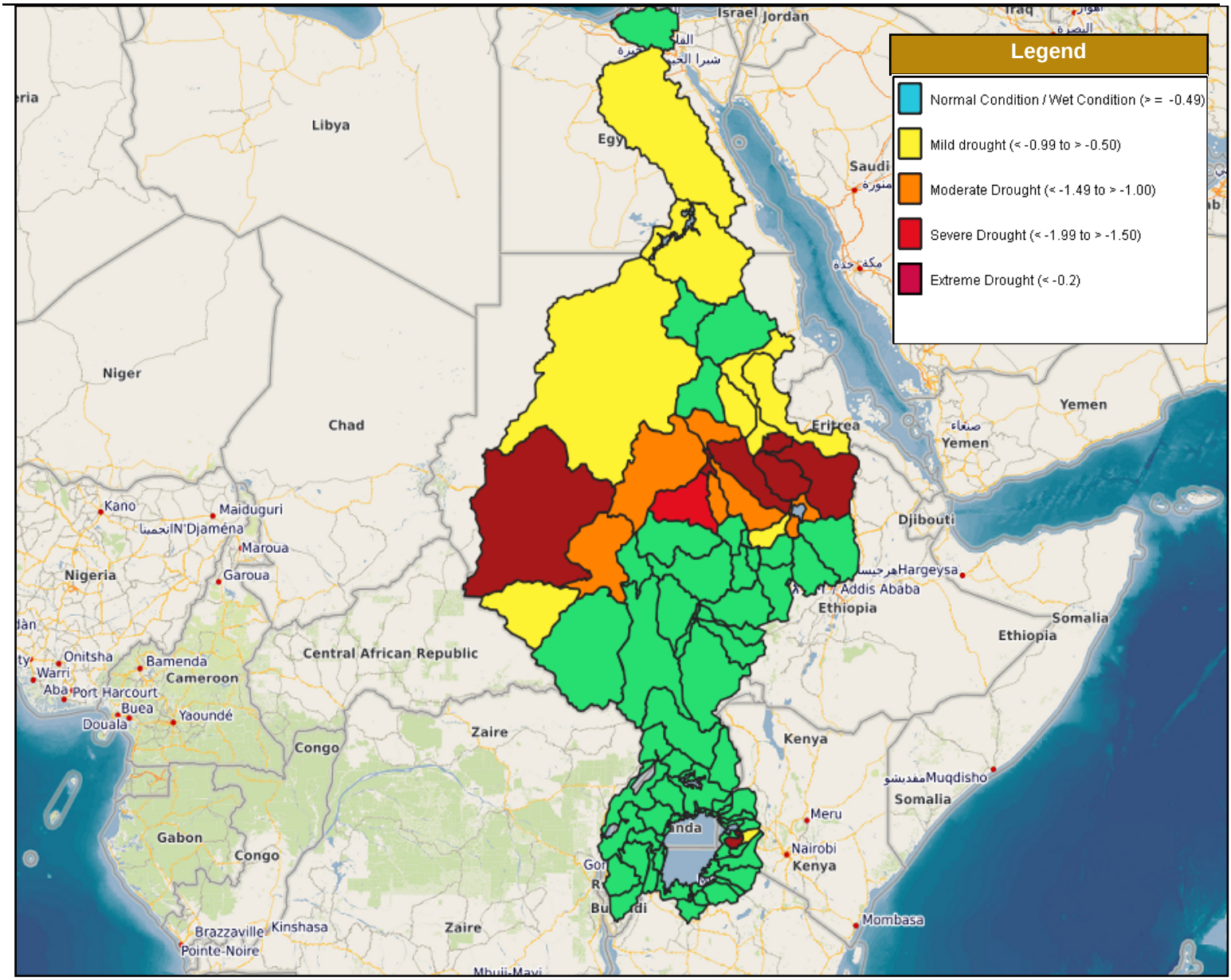

Figure 7: Spatial distribution pattern of LSTCI during the period from (1 -15) June 2025

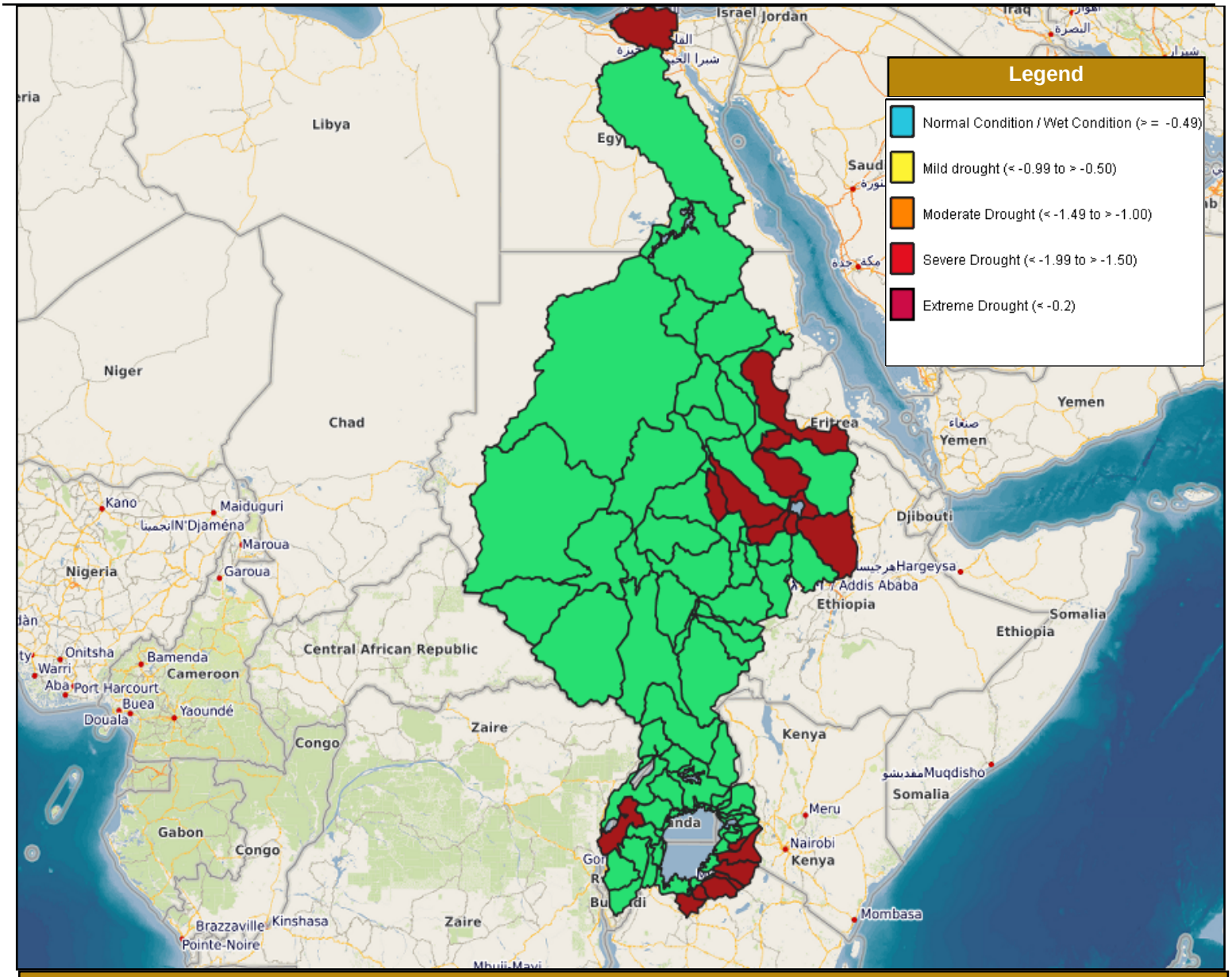

Figure 8: Spatial distribution pattern of LSTCI during the period from May 2025

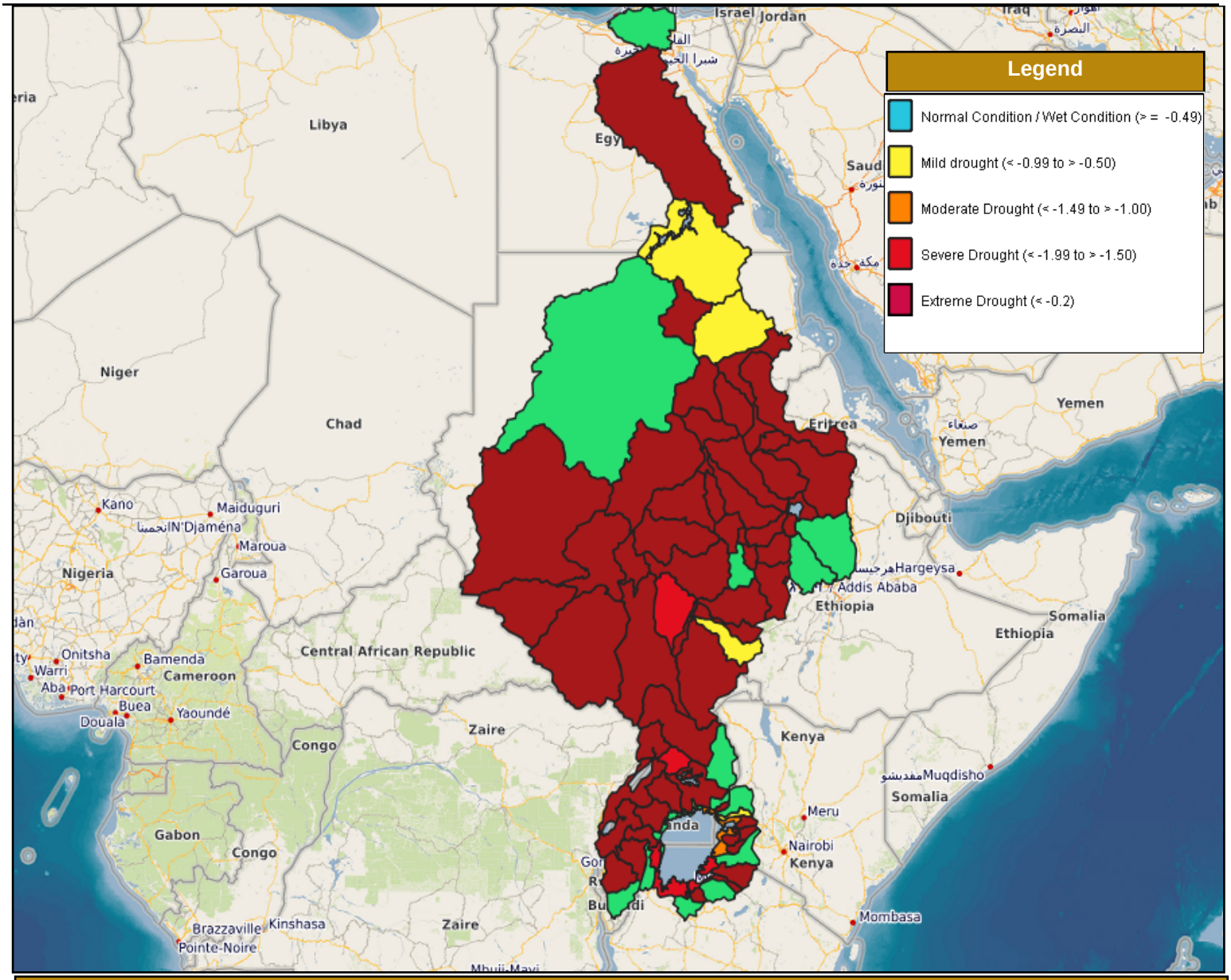

Figure 9: Spatial distribution pattern of LSTCI during the period from March-2025-May-2025

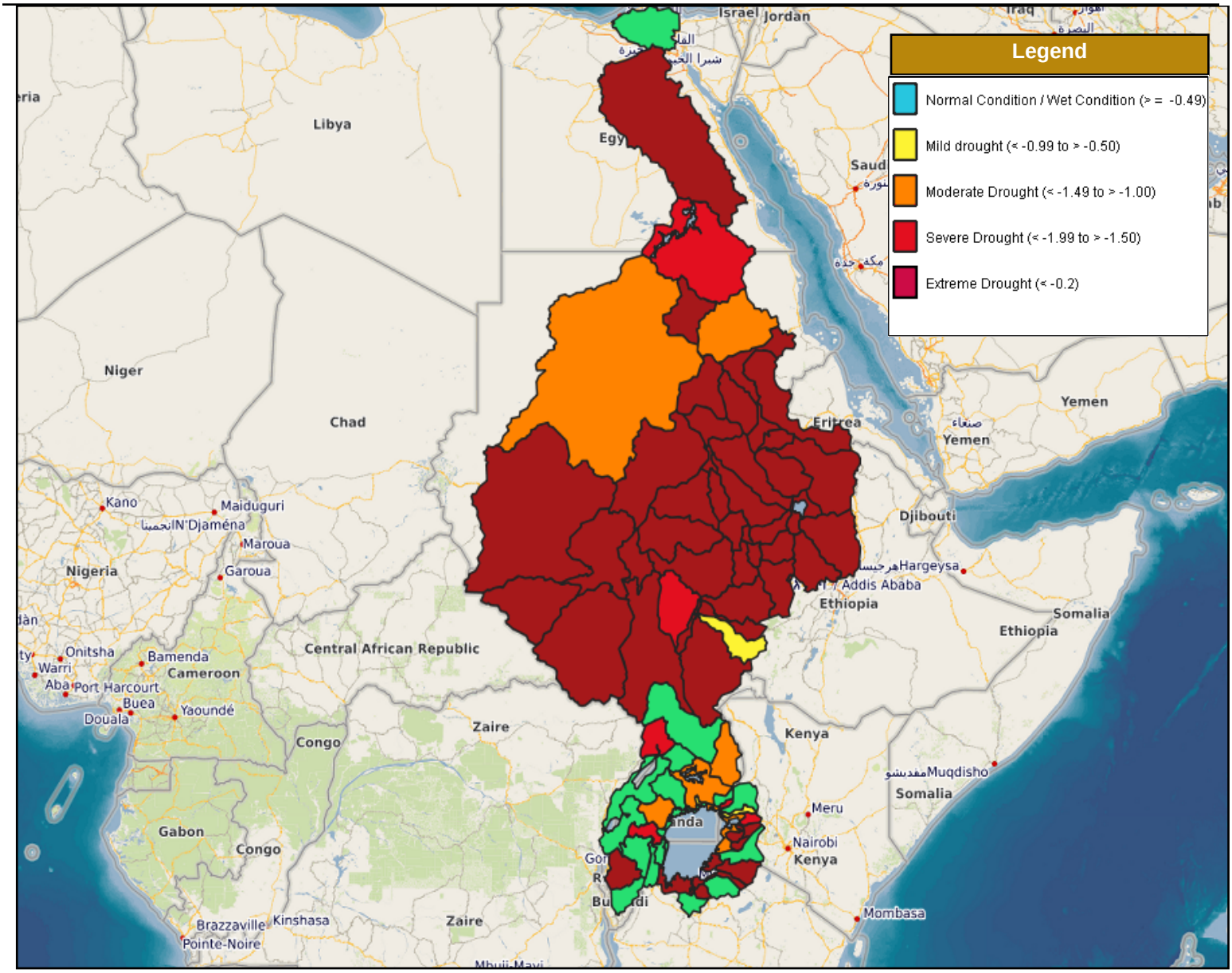

Figure 10: Spatial distribution pattern of LSTCI during the period from December-2024-May-2025

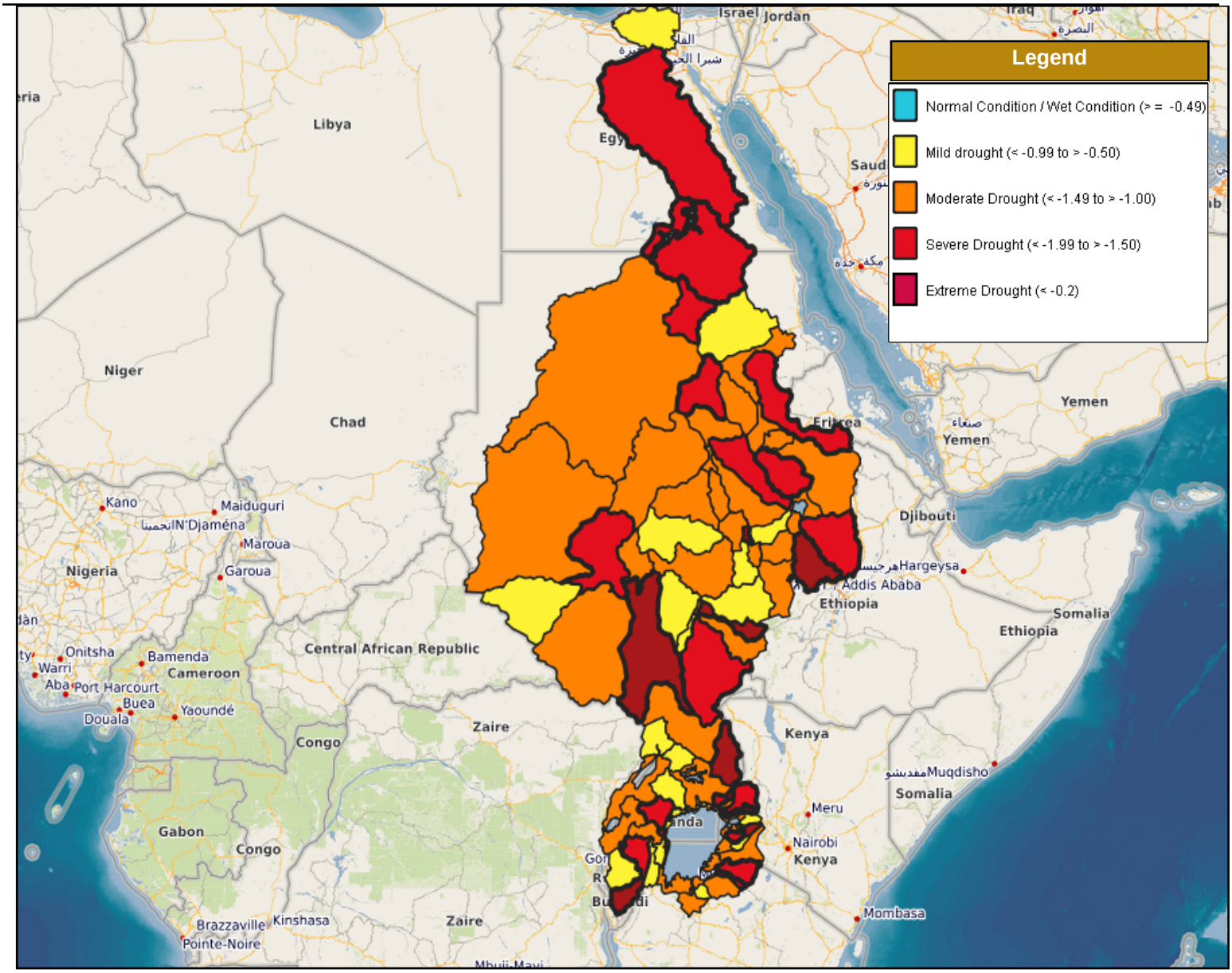

Figure 11: Spatial distribution pattern of VHI during the period from (16 - 31) May 2025

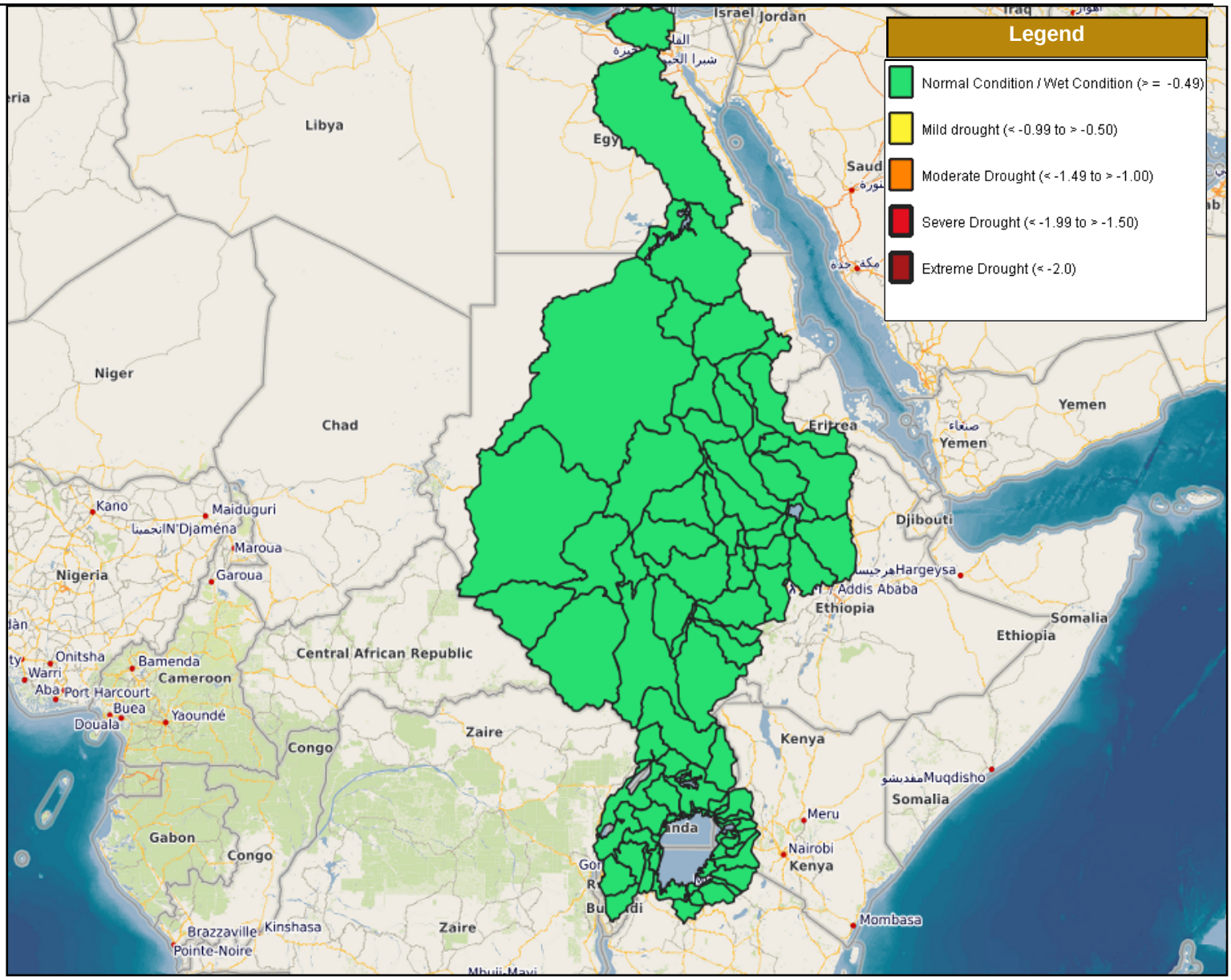

Figure 12: Spatial distribution pattern of SMAPI during the period from(1 -15) June 2025

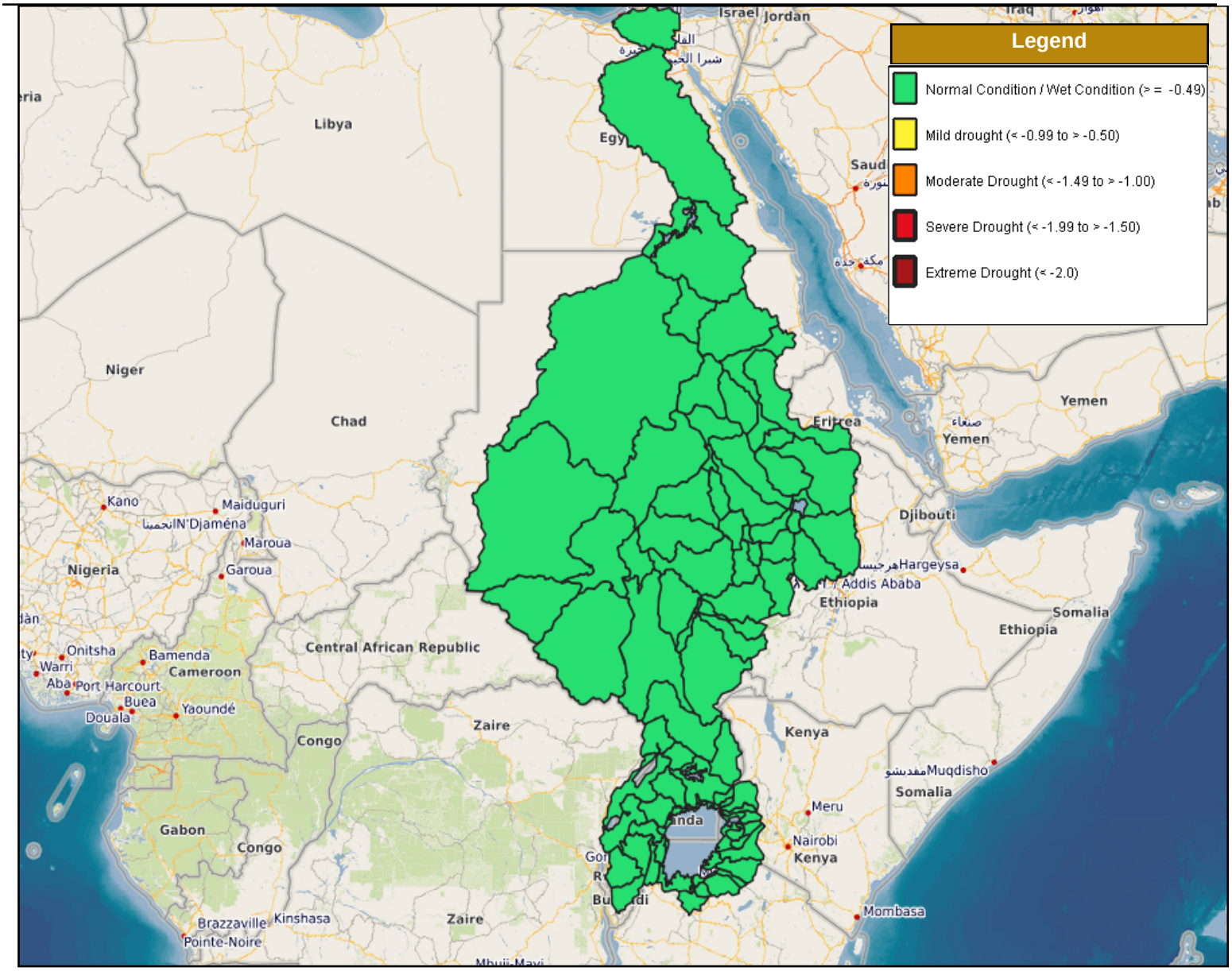

Figure 13: Spatial distribution pattern of SMAPI during the period from May 2025

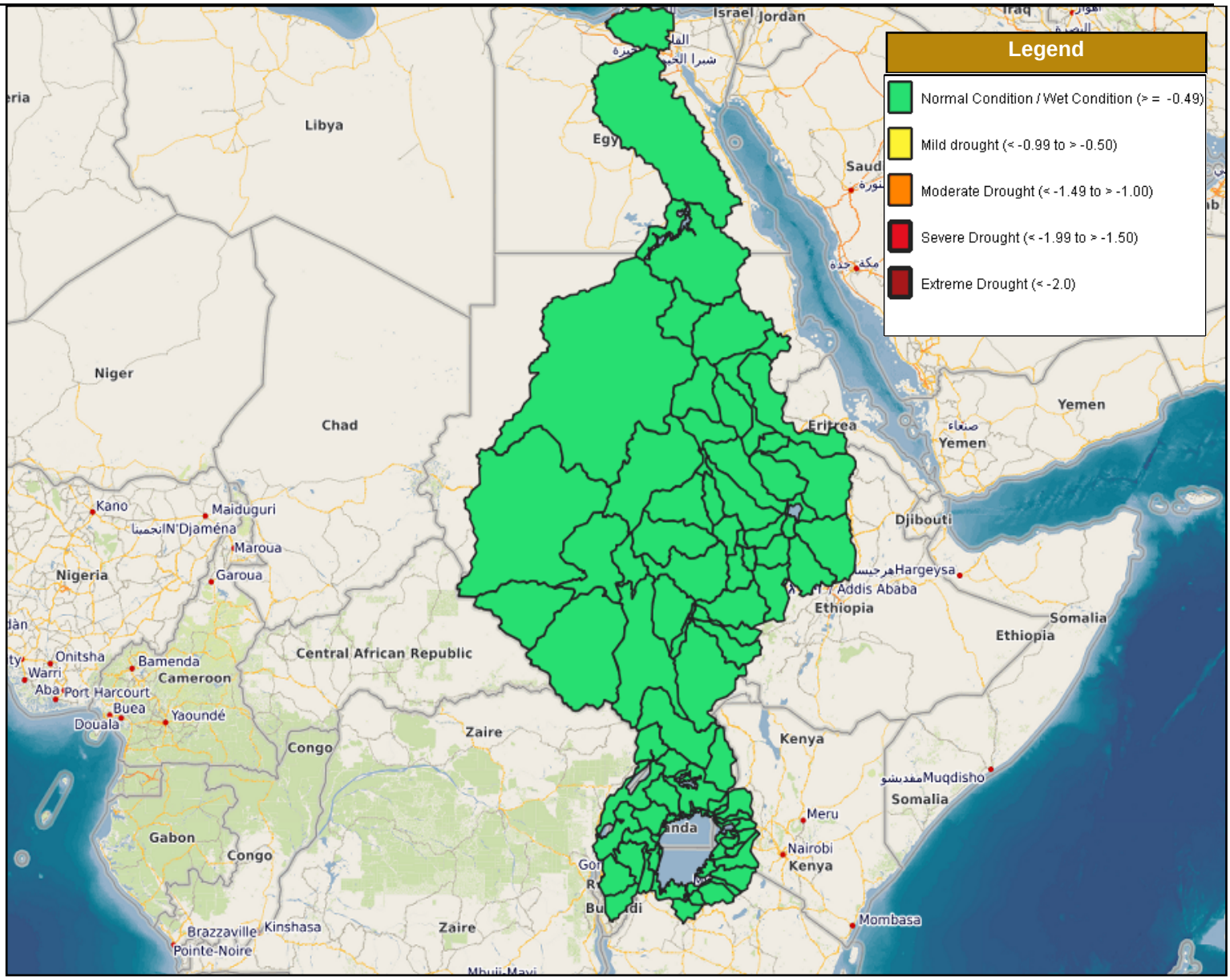

Figure 14: Spatial distribution pattern of SMAPI during the period from March-2025-May-2025

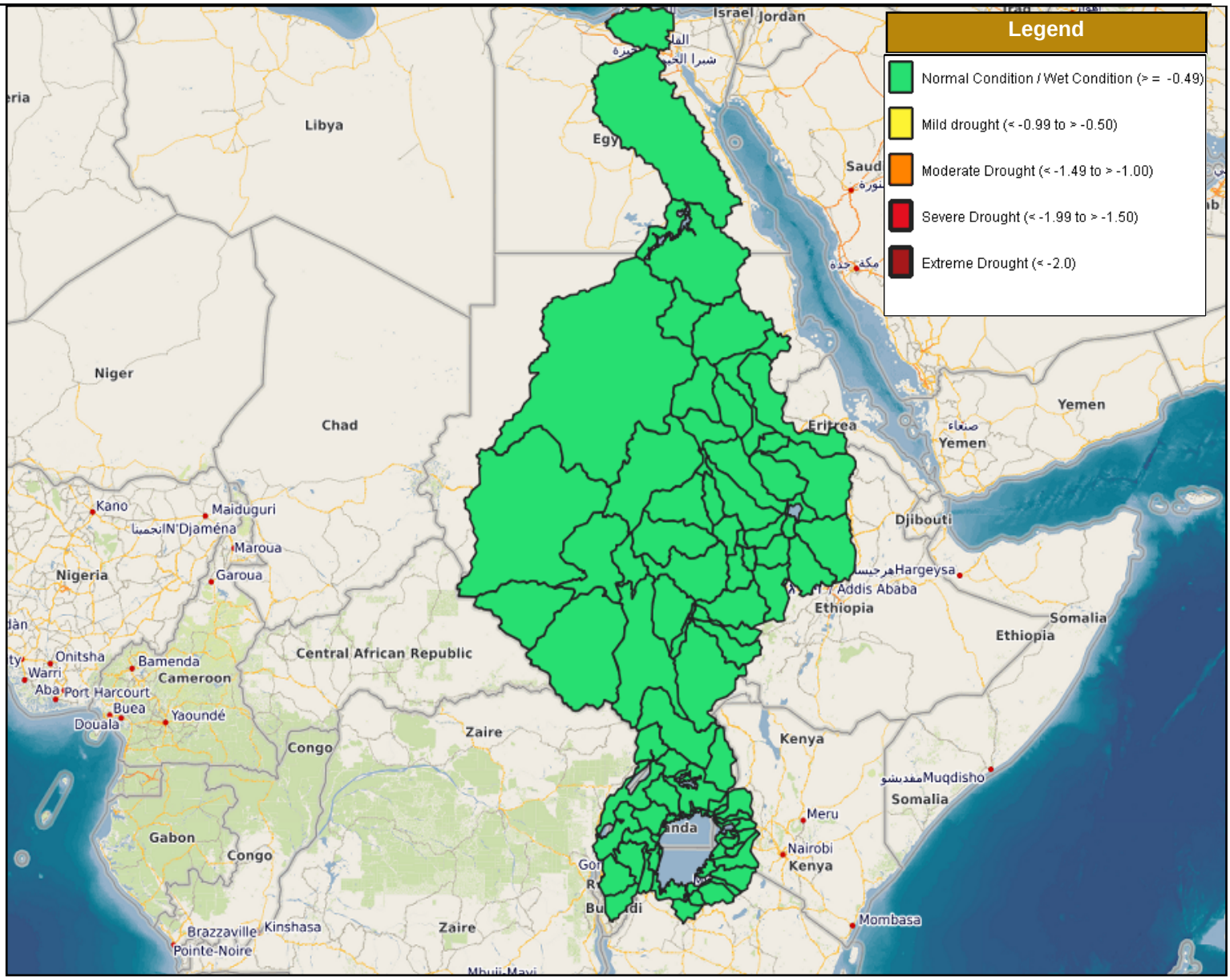

Figure 15: Spatial distribution pattern of SMAPI during the period from December-2024-May-2025

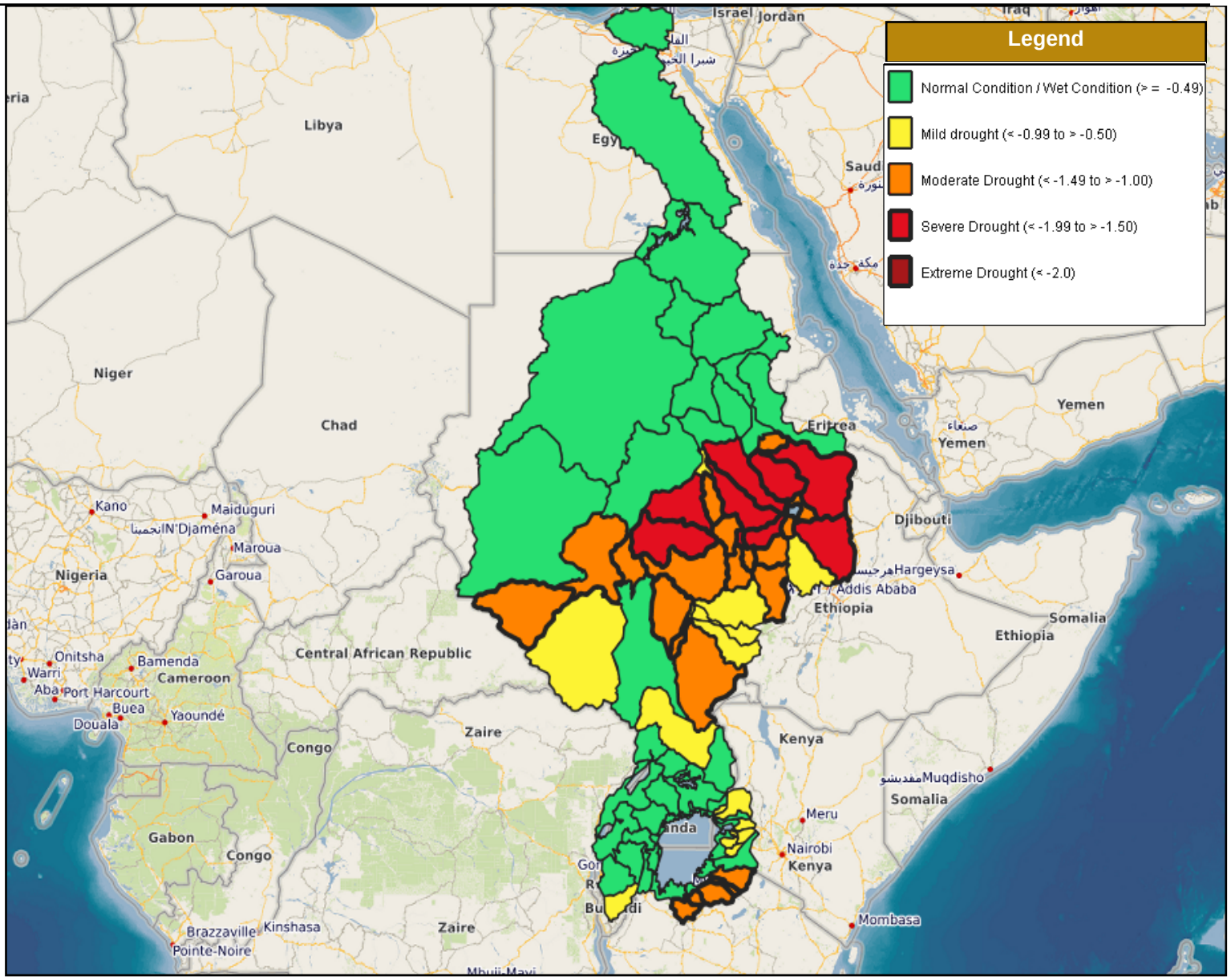

Figure 16: Spatial distribution pattern of MAI during the period from (16 - 31) May 2025

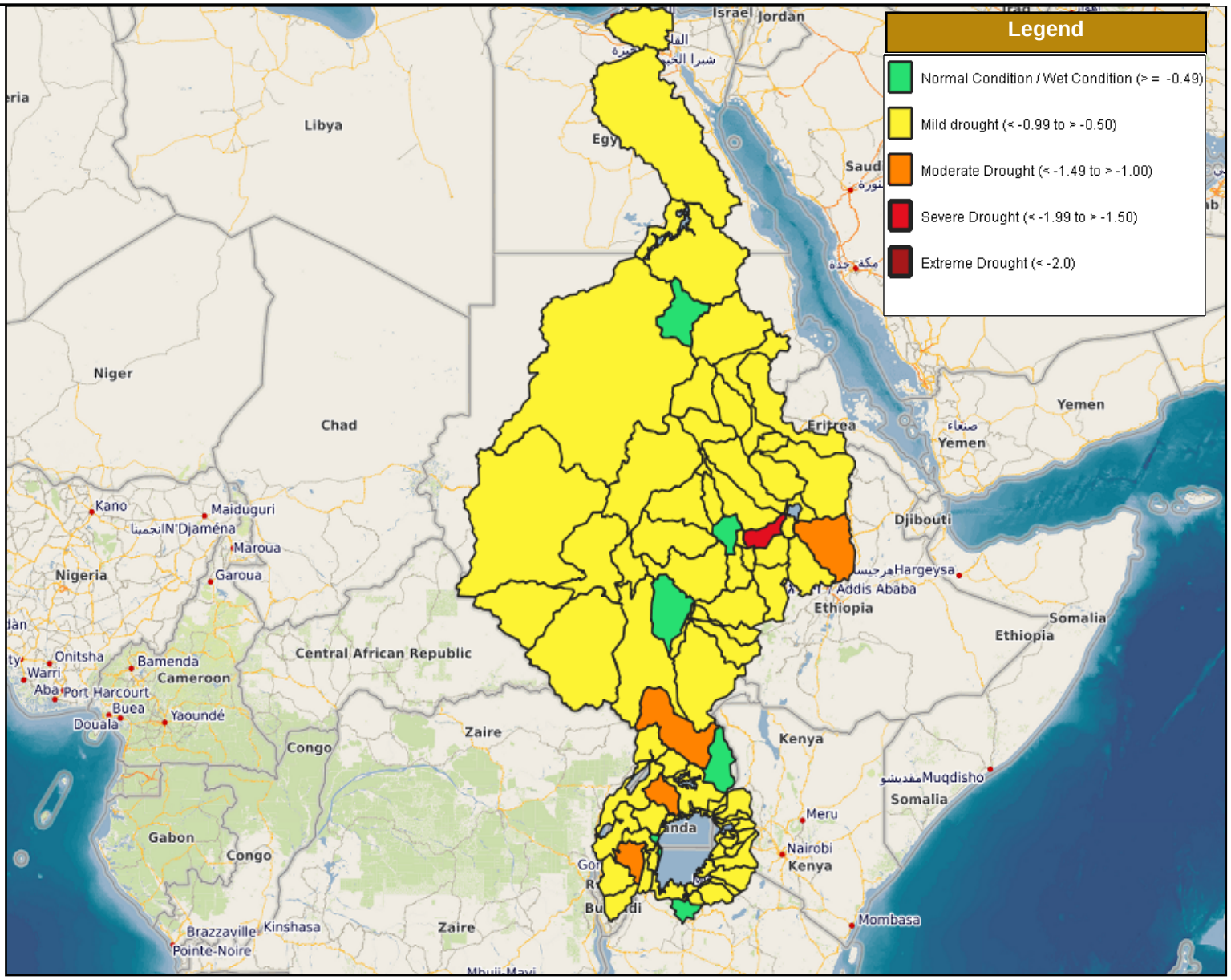

Figure 17: Spatial distribution pattern of CDI during the period from (1- 15) May 2025

Table 1. Summary of drought condition based on CDI across Nile basin during the period from 1 to 15 December 2024

Sr No.	Basin	Sub-Basin	CDI	Drought Condition
1	Blue_nile	BN_Dinder (Blue_nile)	0.31	Mild Drought
2	Blue_nile	BN_Gummera (Blue_nile)	0.37	Mild Drought
3	Bahr_el_Jebel	BJ_Bahr el Jebel upstream Shukoli (Bahr_el_Jebel)	0.22	Moderate Drought
4	Blue_nile	BN_Beshilo (Blue_nile)	0.23	Moderate Drought
5	Lake_Victoria	LV_Kagera_Kagera (Lake_Victoria)	0.25	Moderate Drought
6	Victoria_Nile	VN_Kafu (Victoria_Nile)	0.25	Moderate Drought
7	Baro_Akobo_Sobat	BAS_downstream K Nynding (Baro_Akobo_Sobat)	0.44	Normal / Wet condition
8	Blue_nile	BN_Diem_Roseries (Blue_nile)	0.60	Normal / Wet condition
9	Lake_Victoria	LV_Isanga (Lake_Victoria)	0.72	Normal / Wet condition
10	Lake_Victoria	LV_LakeVic_WetArea_West (Lake_Victoria)	0.45	Normal / Wet condition
11	Main_Nile	MN_Dagash_Merwoe (Main_Nile)	0.54	Normal / Wet condition
12	Victoria_Nile	VN_Agu (Victoria_Nile)	0.41	Normal / Wet condition
13	Blue_nile	BN_Beles (Blue_nile)	0.17	Severe Drought
14	Baro_Akobo_Sobat	BAS_Agawi (Baro_Akobo_Sobat)		
15	Baro_Akobo_Sobat	BAS_Akobo (Baro_Akobo_Sobat)		
16	Baro_Akobo_Sobat	BAS_K_Nanaam_Pibor (Baro_Akobo_Sobat)		
17	Baro_Akobo_Sobat	BAS_LowerBaro adura (Baro_Akobo_Sobat)		
18	Baro_Akobo_Sobat	BAS_LowerBaro downstream machar (Baro_Akobo_Sobat)		
19	Baro_Akobo_Sobat	BAS_Pibor_downstream (Baro_Akobo_Sobat)		
20	Bahr_el_Ghazal	BG_Bahr el Arab (Bahr_el_Ghazal)		
21	Bahr_el_Ghazal	BG_Bahr el Ghazal_North (Bahr_el_Ghazal)		
22	Bahr_el_Ghazal	BG_Gel (Bahr_el_Ghazal)		

23	Bahr_el_Ghazal	BG_Pongo (Bahr_el_Ghazal)		
24	Bahr_el_Jebel	BJ_Bahr el Jebel North (Bahr_el_Jebel)		
25	Bahr_el_Jebel	BJ_Yei_Gol (Bahr_el_Jebel)		
26	Blue_nile	BN DS Rehad (Blue_nile)		
27	Blue_nile	BN DS Rosires 2 (Blue_nile)		
28	Blue_nile	BN_Abay_at_Shegolie (Blue_nile)		
29	Blue_nile	BN_Aleltu East (Blue_nile)		
30	Blue_nile	BN_Anger (Blue_nile)		
31	Blue_nile	BN_Blue Nile at Khartoum and Soba (Blue_nile)		
32	Blue_nile	BN_Border (Blue_nile)		
33	Blue_nile	BN_Dabus near Assosa (Blue_nile)		
34	Blue_nile	BN_DS Roseries (Blue_nile)		
35	Blue_nile	BN_Mendaya (Blue_nile)		
36	Blue_nile	BN_Trib Below Beko Abo (Blue_nile)		
37	Lake_Albert	LA_AlbertNile_Laropi (Lake_Albert)		
38	Lake_Albert	LA_LakeEdward_lower (Lake_Albert)		
39	Lake_Albert	LA_LakeEdward_upper (Lake_Albert)		
40	Lake_Victoria	LV_Awach Kibuon (Lake_Victoria)		
41	Lake_Victoria	LV_Itare (Lake_Victoria)		
42	Lake_Victoria	LV_Kagera_Akanyaru (Lake_Victoria)		
43	Lake_Victoria	LV_Kagera_Mubarazi (Lake_Victoria)		
44	Lake_Victoria	LV_Kagera_Mwisa (Lake_Victoria)		
45	Lake_Victoria	LV_Katonga (Lake_Victoria)		
46	Lake_Victoria	LV_LakeVic_WetArea_East (Lake_Victoria)		
47	Lake_Victoria	LV_LakeVic_WetArea_North (Lake_Victoria)		
48	Lake_Victoria	LV_LakeVic_WetArea_South (Lake_Victoria)		
49	Lake_Victoria	LV_Lisumu (Lake_Victoria)		
50	Lake_Victoria	LV_Mamwe (Lake_Victoria)		
51	Lake_Victoria	LV_Mara_central (Lake_Victoria)		
52	Lake_Victoria	LV_Mbalageti (Lake_Victoria)		
53	Lake_Victoria	LV_Migori (Lake_Victoria)		

54	Lake_Victoria	LV_Nyando (Lake_Victoria)		
55	Lake_Victoria	LV_Rubana (Lake_Victoria)		
56	Lake_Victoria	LV_Rubare (Lake_Victoria)		
57	Lake_Victoria	LV_Ruizi (Lake_Victoria)		
58	Lake_Victoria	LV_Sare (Lake_Victoria)		
59	Lake_Victoria	LV_Simiyu (Lake_Victoria)		
60	Lake_Victoria	LV_Sio (Lake_Victoria)		
61	Lake_Victoria	LV_Yala (Lake_Victoria)		
62	Main_Nile	MN_Assuit_Cairo (Main_Nile)		
63	Main_Nile	MN_Atbara_Sherieq (Main_Nile)		
64	Main_Nile	MN_Dal_Wadi_Halfa (Main_Nile)		
65	Main_Nile	MN_Khartoum_Tamaniat (Main_Nile)		
66	Main_Nile	MN_Nile Delta (Main_Nile)		
67	Main_Nile	MN_Wadi_Halfa_Aswan (Main_Nile)		
68	Tekeze_Atbara	TA_DS Abu Gambil (Tekeze_Atbara)		
69	Tekeze_Atbara	TA_dsBurdana (Tekeze_Atbara)		
70	Tekeze_Atbara	TA_KGDam (Tekeze_Atbara)		
71	Tekeze_Atbara	TA_Qash Trib (Tekeze_Atbara)		
72	Tekeze_Atbara	TA_Rumela at Atbara (Tekeze_Atbara)		
73	Tekeze_Atbara	TA_W Arab (Tekeze_Atbara)		
74	Victoria_Nile	VN_AyagoHP (Victoria_Nile)		
75	Victoria_Nile	VN_Isimba (Victoria_Nile)		
76	Victoria_Nile	VN_LakeKyoga (Victoria_Nile)		
77	Victoria_Nile	VN_Malaba (Victoria_Nile)		
78	White_Nile	WN_Malakal Triangle (White_Nile)		
79	White_Nile	WN_Metut_Renk (White_Nile)		
80	White_Nile	WN_Mogren_Khartoum (White_Nile)		
81	White_Nile	WN_Renk_Kosti (White_Nile)		

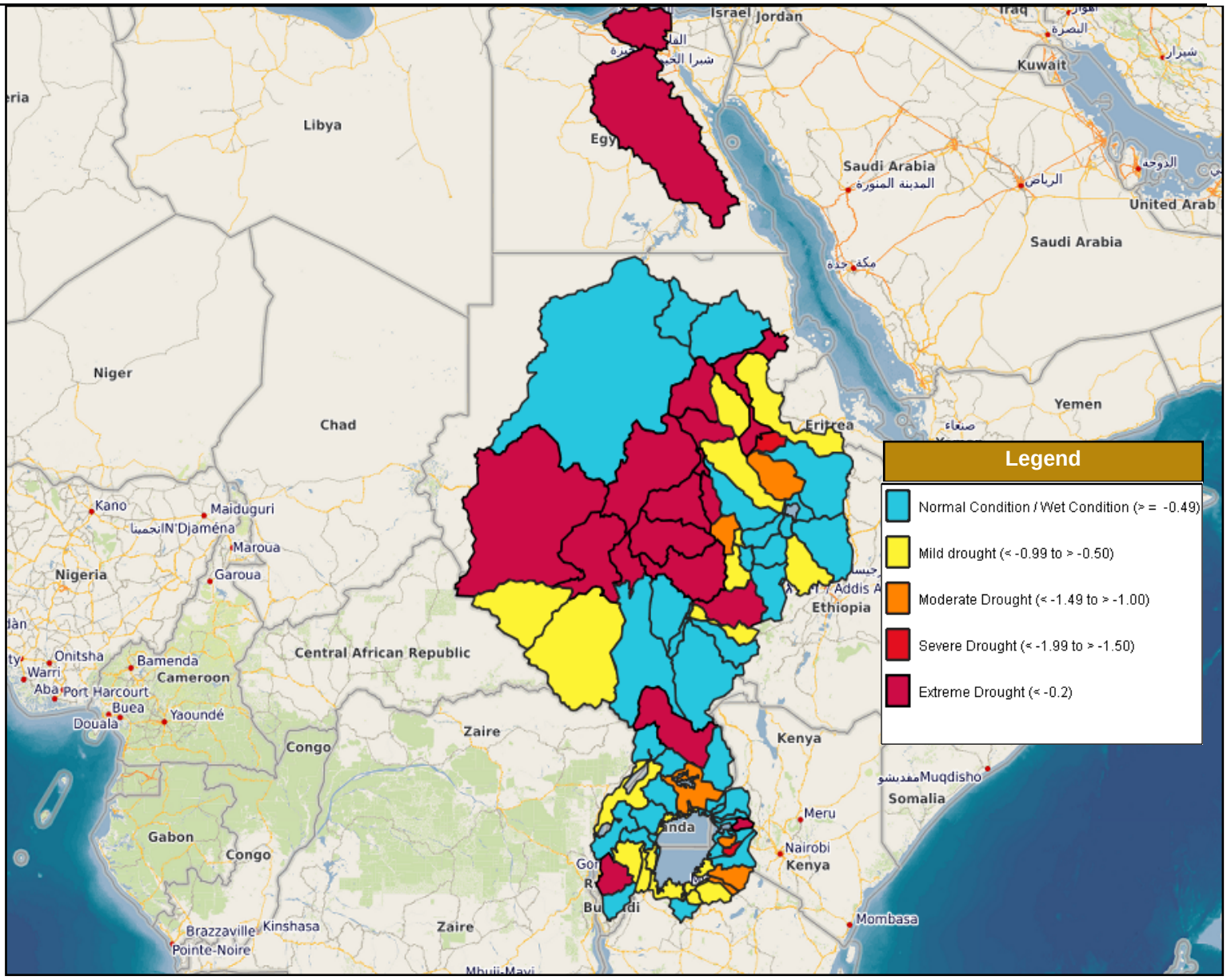

Figure 18: Spatial distribution pattern of SSI during the period from 1 to 15 December 2024

Table 3. Summary of severe and extreme hydrological drought condition based on SSI across Nile basin during the different time periods

Sr No.	Basin	Sub-Basin	SSI	Drought Condition
1	Baro_Akobo_Sobat	BAS_LowerBaro downstream machar (Baro_Akobo_Sobat)	(2.39)	Extreme Drought
2	Bahr_el_Ghazal	BG_Bahr el Arab (Bahr_el_Ghazal)	(4.25)	Extreme Drought
3	Bahr_el_Ghazal	BG_Bahr el Ghazal_North (Bahr_el_Ghazal)	(3.99)	Extreme Drought
4	Bahr_el_Jebel	BJ_Bahr el Jebel North (Bahr_el_Jebel)	(4.31)	Extreme Drought
5	Bahr_el_Jebel	BJ_Bahr el Jebel upstream Shukoli (Bahr_el_Jebel)	(3.23)	Extreme Drought
6	Blue_nile	BN DS Rosires 2 (Blue_nile)	(2.50)	Extreme Drought
7	Blue_nile	BN_Blue Nile at Khartoum and Soba (Blue_nile)	(3.68)	Extreme Drought
8	Main_Nile	MN_Assuit_Cairo (Main_Nile)	(3.81)	Extreme Drought
9	Main_Nile	MN_Khartoum_Tamaniat (Main_Nile)	(3.86)	Extreme Drought
10	Main_Nile	MN_Nile Delta (Main_Nile)	(4.21)	Extreme Drought
11	White_Nile	WN_Malakal Triangle (White_Nile)	(2.93)	Extreme Drought
12	White_Nile	WN_Metut_Renk (White_Nile)	(3.28)	Extreme Drought
13	White_Nile	WN_Mogren_Khartoum (White_Nile)	(3.83)	Extreme Drought
14	White_Nile	WN_Renk_Kosti (White_Nile)	(3.29)	Extreme Drought
15	Lake_Victoria	LV_Migori (Lake_Victoria)	(1.98)	Severe Drought
16	Tekeze_Atbara	TA_KGDam (Tekeze_Atbara)	(1.75)	Severe Drought