

SOMALIA GROUNDWATER MONITORING BULLETIN

Issued on 14th November 2024

Introduction

This bulletin is issued regularly every month and reports on the status of the groundwater resources of Somalia. It is made up of a review section where the past month is analysed in terms of both quantity and quality of groundwater resources automatically monitored on an hourly basis in 35 boreholes across the country, followed by a section on a monthly forecast and a final section on the qualitative monitoring of groundwater use monitored in about 600 boreholes across the whole country on a weekly basis by the borehole operators. The hourly borehole monitoring data is transmitted from the stations through satellite, while data from the manual weekly monitoring is transmitted through mobile phones, both data to a central server. The two sets of boreholes monitored do not overlap.

In Somalia, groundwater extraction is typically confined to subsurface aquifers that are 10s to 100s of meters deep. In the country both shallow wells (up to 40 m of depth) and boreholes (deeper than 50 m and equipped with pumps) are the norm for extracting the groundwater resource. Clearly they have different potential and recharge mechanisms. Other water harvesting practices are also in place like berkhad, balley, water catchments and sand dams. In this bulletin the focus is on boreholes only.

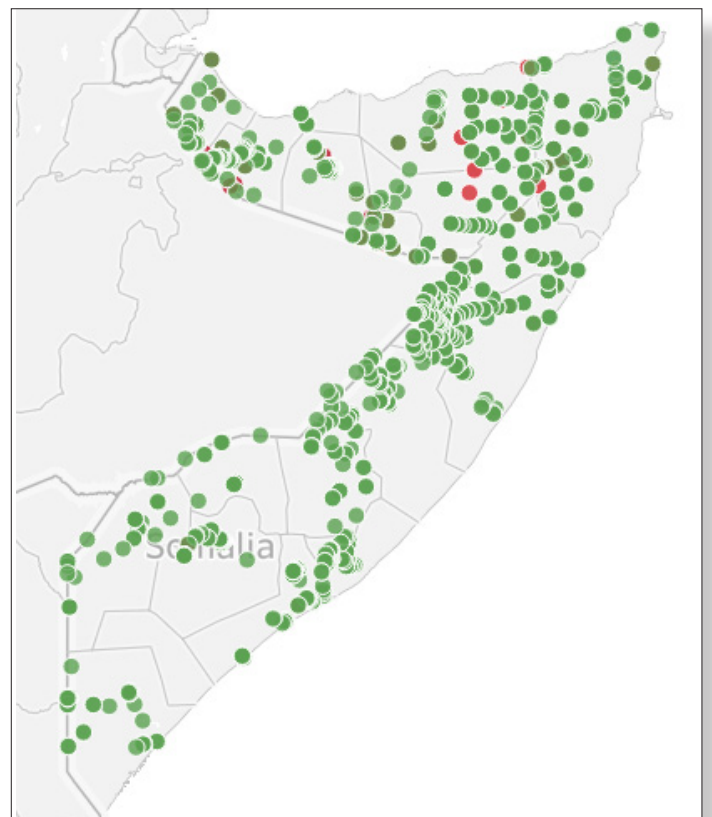
Key Highlights

- A generally stable groundwater level observed across the country over the reporting period, with only 2 regions, Sanaag and Awdal, with a slight declining trend.
- The stable groundwater levels is attributed to the good Deyr 2023 rains, and fairly good Gu 2024 rains in many parts of the country.
- Ten percent of boreholes monitored weekly were not functioning during the reporting period. The main cause of malfunctioning is related to pump issues
- Water prices in Jubaland State is the highest across the country; more than double the average national values.
- The ongoing Deyr rains across the country are expected to recharge groundwater sources, and ease pressure as the surface water sources refill.
- The rains are however expected to be short lived, with the forecast La Nina conditions through March 2025.
- Close groundwater monitoring will be crucial especially over Puntland, and central and southern regions due to expected groundwater fluctuations from the La Nina effects

This bulletin is created thanks to the collaboration between the Ministry of Energy and Water Resources of Somalia, the Food and Agriculture Organization of the United Nations Somalia County Office with the generous financial support of USAID BHA. The objective of the bulletin is to provide stakeholders with timely data and information on groundwater resources status to inform immediate interventions to sustain water supply, but also for long term policy making and management of the water resources.



Picture 1 - Ground water station in Galckayo, Puntland



Map 1 - Distribution of the boreholes being monitored weekly

Review for period between June and October 2024

The El Nino driven 2023 Deyr rains followed by good 2024 Gu rains, led to replenishment of both surface and ground water sources in Somalia. The spatial variability of the rains however meant different implications on the different aquifers across the country. In Somaliland, the good temporal and spatial distribution of the rains ensured good recharge of ground water sources in most areas. The Karan rains that fall during the normal Hagaa dry period ensured continued replenishment of the ground water sources. South and central Somalia also received average to above average rains in most of the monitored stations. However in Puntland, the below normal rainfall received during this period led to minimal recharge of ground water sources.

Between May and September 2024, FAO SWALIM has installed and started the hourly monitoring of 35 boreholes across

Somalia. The installation of the hardware is complete, and majority of the stations transmitting data online. There are however few with technical hitches either in the data recording or transmission, and these are being sorted to ensure complete network functionality by end of November 2024.

The installed groundwater level monitoring stations provide near real-time data on aquifer fluctuations, enabling efficient and effective management of the water resources. The collected data is analyzed to track changes in aquifer storage, identify areas of potential depletion, and assess the impact of pumping and recharge activities.

The groundwater fluctuation and trends per region, based on the installed monitoring stations are shown below, and are used to identify criticalities in the groundwater resources. Individual borehole trends are attached in table 1.

Regional Trends Analysis

Awdal Region

In Awdal, the overall groundwater trend displays a slight decline from late August to early November 2024. The data indicate a gradual decrease in groundwater levels, particularly noticeable in Borama, while Zeylac remains relatively stable. The steady decline in groundwater levels reflects a potential reduction in available water resources if current conditions persist, underscoring the need for monitoring and possibly adaptive water management strategies in response to the dry conditions.

Woqooyi Galbeed Region

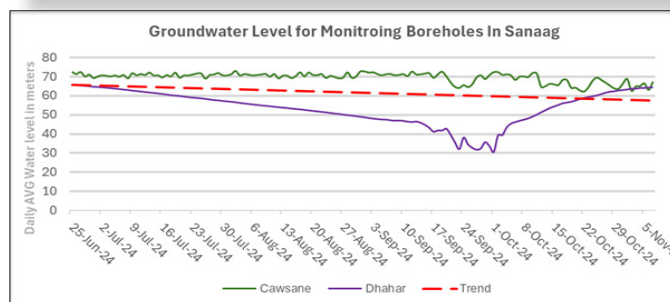
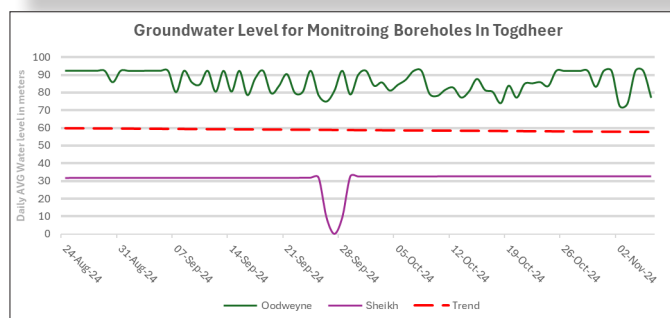
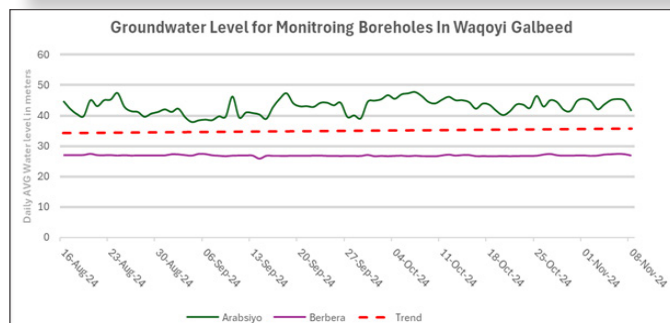
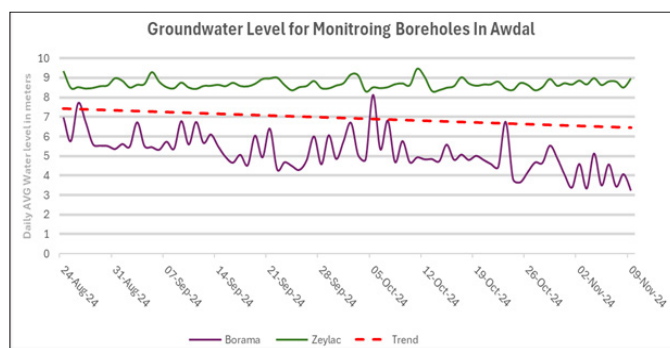
The overall groundwater trend in Woqooyi Galbeed exhibits stability from mid-August to early November 2024. Despite minor fluctuations observed in specific boreholes such as Arabsiyo. This steady trend points to a sustained groundwater level across the monitoring period, and absence of significant seasonal replenishment.

Togdheer Region

The groundwater levels in Togdheer remains stable with slight fluctuation in Oodweyne and a brief dip in Sheikh in late September. The stable red trend line suggests an overall steady regional groundwater level, indicating that recent precipitation and recharge rates are adequate to sustain Oodweyne but have limited effect on Sheikh, likely due to geological differences or varying recharge capacities across the areas.

Sanaag Region

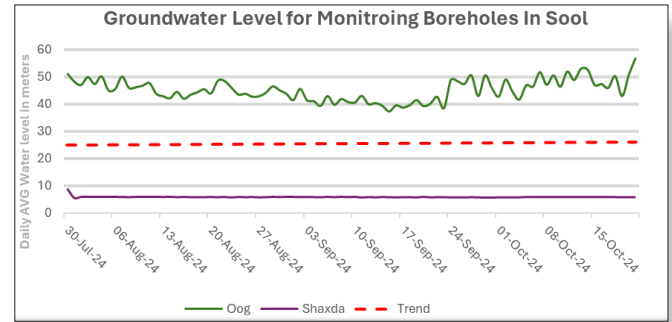
Groundwater trend in the Sanaag region shows a steady decline from late June to early November 2024. This suggests insufficient groundwater recharge during this period. In Dhahar borehole, the declining trend was up to early October, when some moderate rains (29.1mm between 6th and 7th October) were recorded in the area. After the rainfall event the borehole started to gain and has been on this upward trend up to early November, but at a reducing rate. The overall downward trend signals a potential risk of water scarcity if dry conditions persist.



**Note: The regional trends are based on the stations monitored in each region and the data is extrapolated to cover the whole region

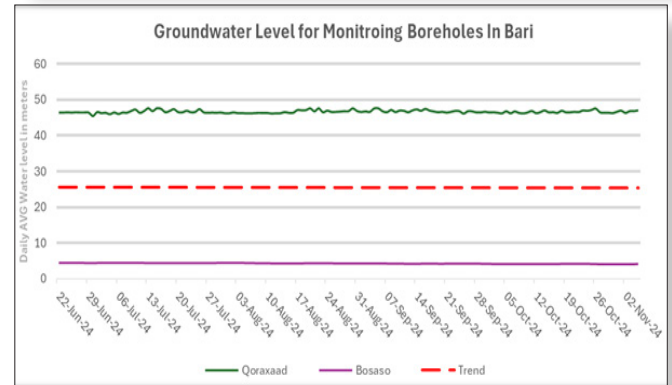
Sool Region

The graph shows groundwater levels in Sool slightly inclining, with Oog borehole (green line) fluctuating around 40–50 meters and showing a slight upward trend towards the end. The Shaxda borehole recorded minimal variations. The red trend line remains steady, suggesting a stable regional groundwater level. This pattern indicates that recent precipitation and recharge have had a stronger effect on Oog but minimal impact on Shaxda.



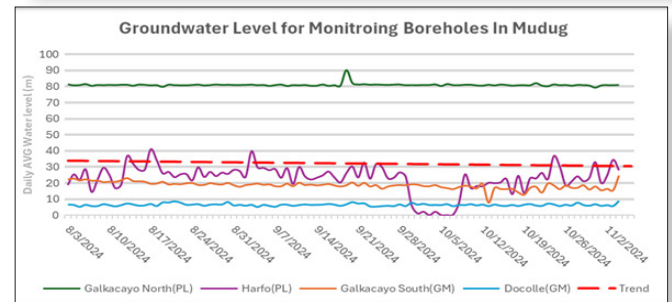
Bari Region

In Bari region, the two groundwater monitoring stations indicate a stable condition from late June to early November 2024. This consistent trend, with minimal fluctuation, suggests that the region did not experience significant rainfall or changes in groundwater recharge during this period. The stability implies that the groundwater levels are not heavily impacted by seasonal variations.



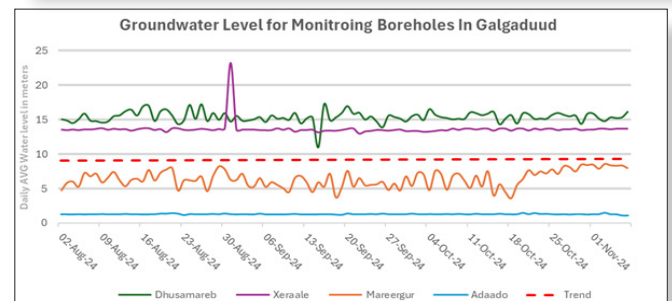
Mudug Region

The groundwater trend in Mudug remains stable from August to November 2024. Three of the four monitoring boreholes in the region recorded small daily variations in water level, while the fourth borehole (Harfo) recorded over 20 meters fluctuations in water levels, but still recovered to the original level after pumping.



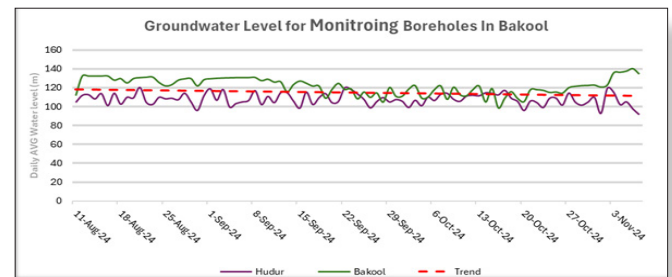
Galgaduud Region

The groundwater trend in Galgaduud remains steady from early August to November 2024, indicating stable aquifer(s), despite the dry season. There were noticeable variations in water levels in two boreholes (Mareergur and Dhusamareb), but after the pumping they were able to regain to the original level. The other two boreholes in the region remained steady with minimal variations.



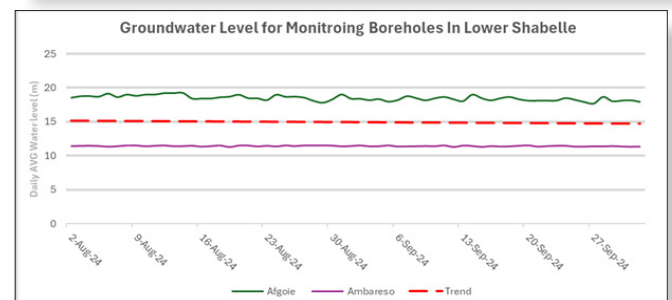
Bakool Region

The overall groundwater trend in Bakool remains relatively stable from mid-August to early November 2024, despite fluctuations in individual boreholes. A very slight overall drop is noticed during this period, which can be attributed to the extended dry period. The borehole in Bakool started to rise from the last week of October, which is associated with the start of rainy season in the area.



Lower Shabelle Region

The overall groundwater trend in Lower Shabelle remains stable from August to September 2024, indicating minimal seasonal variation and suggesting limited rainfall recharge during this period. This consistency points to a relatively unchanged groundwater situation across the region.

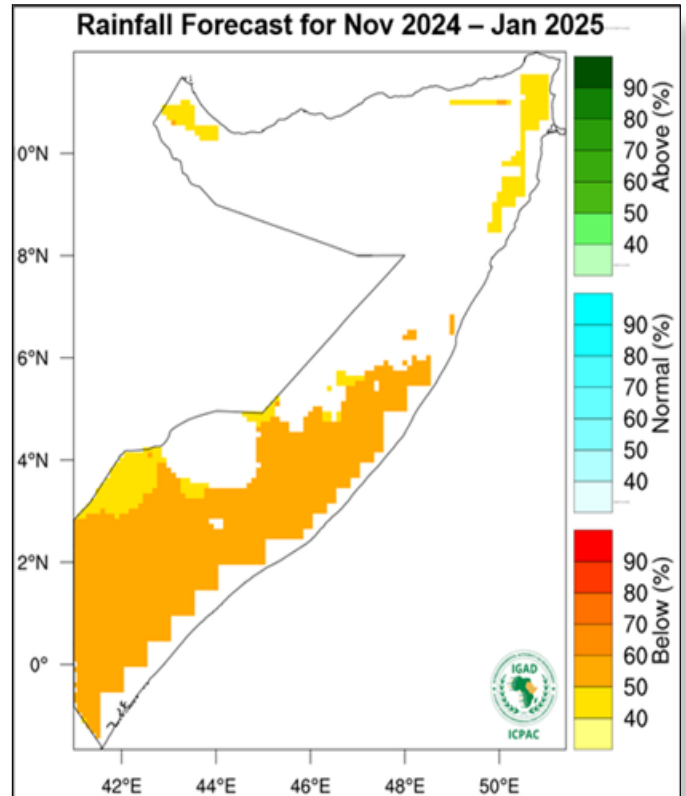
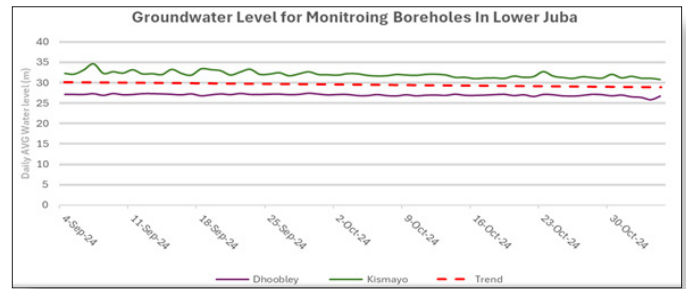


Lower Juba Region

The overall groundwater level in Lower Juba shows a stable trend, with a very minimal decline over the September to October period, which is normal within the dry period. There is limited groundwater recharge during this period from direct rainfall, as there was no rainfall recorded in the region.

Observed and Forecast Rainfall

Different climate models have predicted a transition to La Niña conditions during last quarter of 2024, with increased likelihood of below-average seasonal rainfall over the eastern Horn of Africa including Somalia. So far, moderate Deyr rains have been observed over Somaliland with light rains across Puntland and Central inland areas; Jubaland and entire eastern Coastal area is still relatively dry. The latest La Niña-driven below-normal seasonal (November 2024 to January 2025) rains (Map 2) are expected to significantly affect groundwater resources across Somalia, particularly in the southern and central regions. The forecast indicates that much of southern Somalia, including key agricultural areas, will experience 60-80% below-normal rainfall. If the forecast turns out to be true, this rainfall reduction will lead to lower groundwater recharge rates, exacerbating water scarcity, and putting further pressure on shallow wells and boreholes, which are critical for both domestic and agricultural water supply. The situation is not very dire in Somaliland, where above normal Gu and Karan rains have been observed. However, the cumulative effect could lead to increased competition for water resources, reduced availability of clean drinking water, and worsened conditions for pastoralist communities that rely on water for livestock, potentially leading to migration and conflict over scarce resources. SWALIM will continuously monitor the situation and share a monthly update as the situation unfolds.



Map 2 - Rainfall forecast for Nov 2024 - Jan 2025

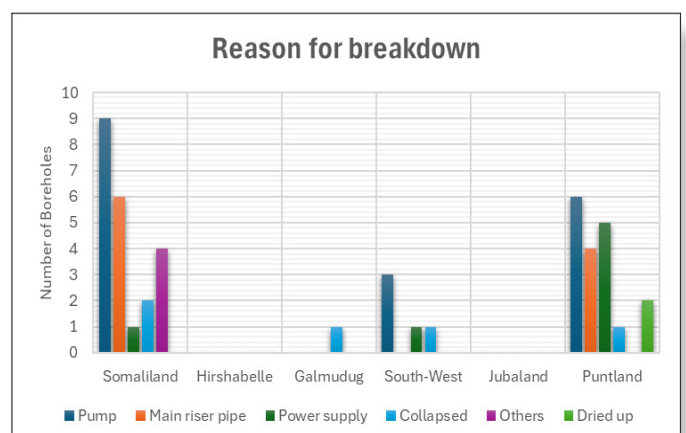
Qualitative Groundwater Monitoring

Since September 2023, FAO SWALIM through funding from USAID has partnered with the Ministry of Energy and Water Resources (MoEWR) to collect data on a weekly basis from strategic boreholes across Somalia. The data is collected by borehole operators through a mobile phone application and transmitted weekly to online servers where the data can be accessed by SWALIM and the MoEWR. The parameters collected include: borehole functionality, reason for not functioning, pumping hours, approximate yield, total number of humans served per day, total number of livestock and trucks served per day and the average price per barrel (200 litres). Analysis has been done on the different parameters monitored weekly, both at national but also at state level.

Functionality

The majority of the boreholes monitored are functional, with only 74 out of 600 registered boreholes not functioning, as per the first week of October. Of this, over 50% are not functioning due to pump related issues.

At state level, the highest number of non-functioning boreholes have been reported in Puntland, 23 out of 170 boreholes.



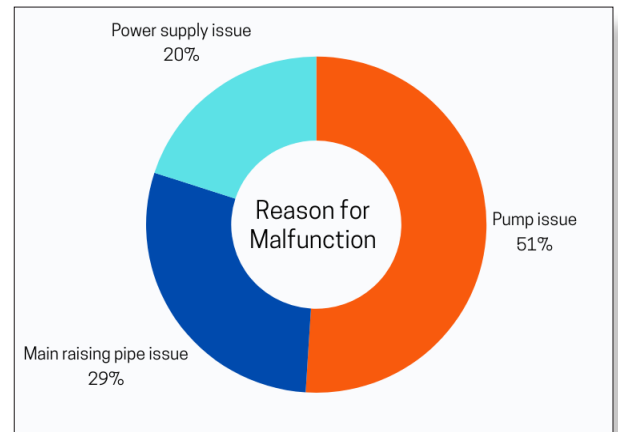
Graph 1- Functionality of the boreholes being monitored

In Somaliland 9 out of 170 boreholes monitored have been reported as non functioning, while in Southwest and Galmudug the reported non functioning boreholes are 1, out of 70 and 70 boreholes respectively. In the other states, Jubaland and Hirshabelle there are no boreholes reported as non functioning, as per the latest report. The number of boreholes monitored in these two states are respectively.

Water Price

The average price per barrel (200 litres) at national level ranges from USD 0.2 to a high of USD 0.7. The price reduced consistently from March 2023, stabilizing at around USD 0.3 for the whole period of 2024. This can be attributed to the good rains experienced in the country and availability of surface water from rain water harvesting that led to reduced reliance on underground water.

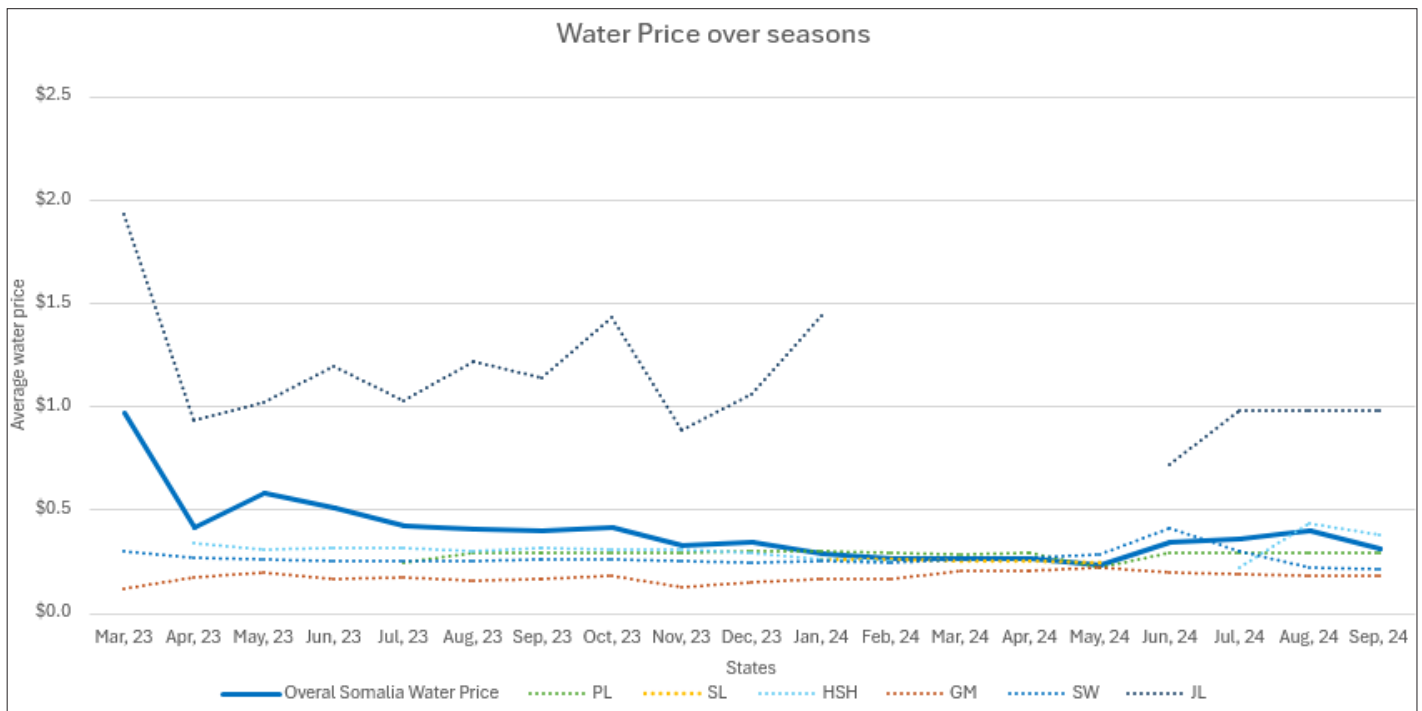
Across the states the water price is more or less the same, apart from Jubaland state where the prices are constantly higher than the other states by 2 – 3 times throughout the reporting period. This is due to higher operational costs caused by the remoteness of the locations, higher cross border demand and limited government and partners financial support. Within the same state, the water prices has been fluctuating more, compared to the others.



Graph 2 - Reason for non functionality of the boreholes



Graph 3- Water price of the boreholes being monitored at national level

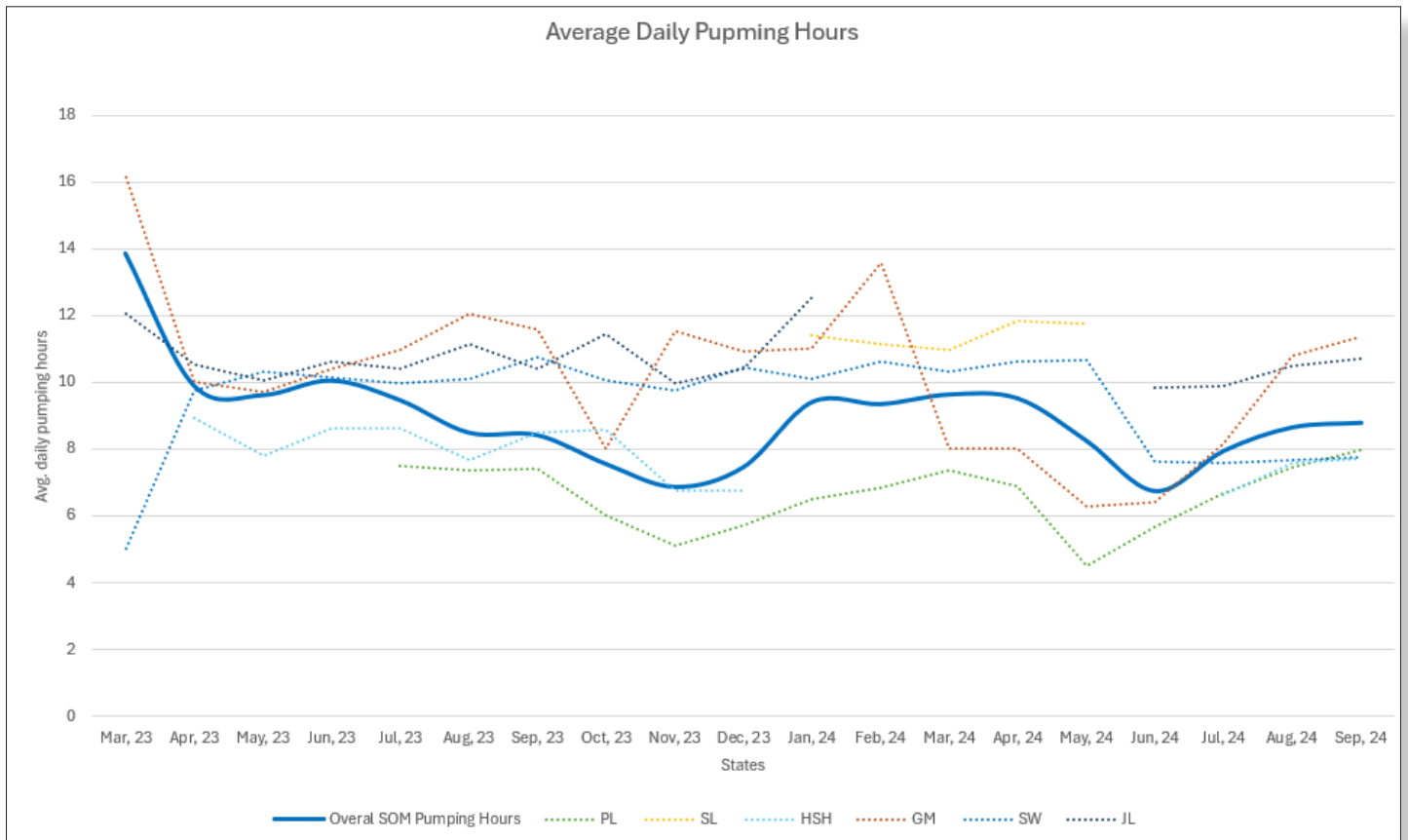


Graph 4- Water price of the boreholes being monitored at state level

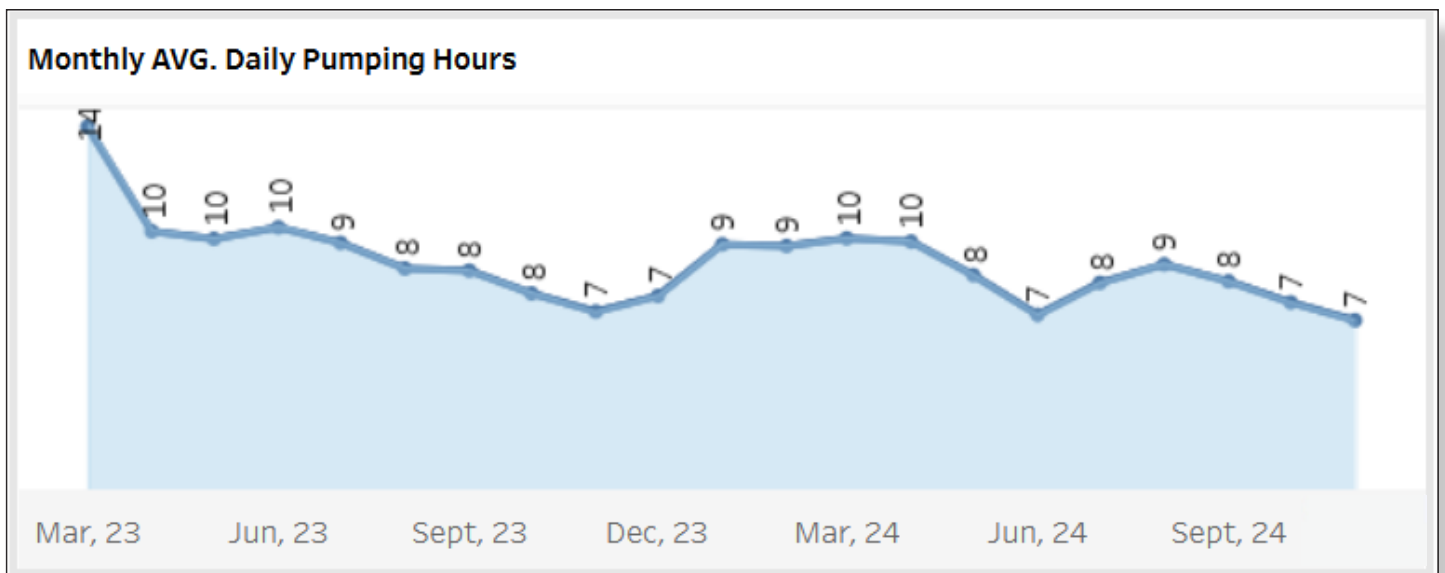
Pumping Hours

Most of the boreholes being monitored are pumped for 6 to 10 hours daily. During the rainy season the number of pumping hours generally low, and gradually increase as the Hagaa and Jilal dry periods start, when majority of the people rely more on groundwater.

The boreholes serve both Human and livestock needs. Boreholes situated in urban areas and those close to IDP camps serve more human population while those in rural settings serve more livestock. The livestock usage also increases during the dry periods when the surface water sources have been depleted.

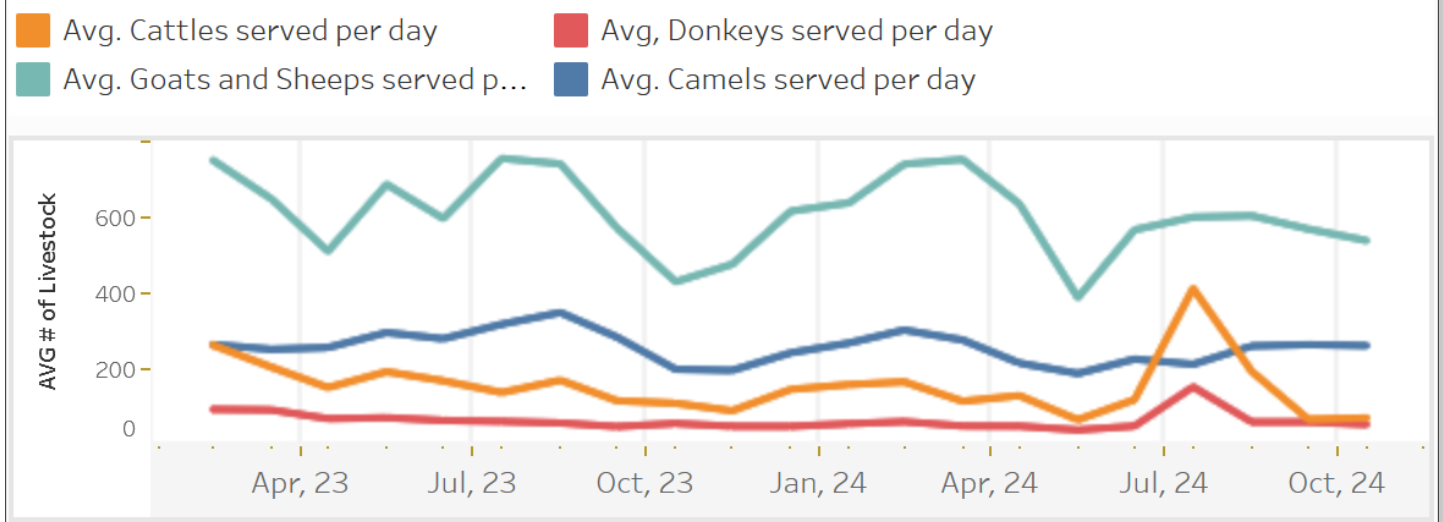


Graph 5- Average daily pumping hours



Graph 6 - Pumping hours of the boreholes being monitored at national level.

Monthly AVG Livestock Usage



Graph 7 - Livestock served by the boreholes being monitored

Conclusions

In summary the groundwater resources in Somalia over the reporting period are showing an overall stability over the past month, with the exceptions of Sanaag and Awdal regions where a slight drop in the water level has been observed. The stability can be attributed to the good rains received in Deyr 2023 and Gu 2024, replenishing the groundwater resources. The Karan rains in the northern parts of the country have also been good. The situation may however change due to the La Nina outlook for the Deyr 2024 season.

The functionality of the boreholes monitored by means of qualitative assessment is overall good with 90% of boreholes

Projections for the coming month, November

The month of November marks the peak of the Deyr rains in Somalia, and the rains which started in the northern parts of the country are expected to spread in the central and southern regions. The rains will have positive impacts in ground water in two ways: 1) recharge of groundwater as rainwater percolates into the soil, 2) the surface water sources get refilled, meeting partially the water demand, hence easing pressure on boreholes. For this period the water level in most boreholes is expected to rise, or remain stable.

However, the Deyr rains are expected to be short and below normal for many parts of the country, as a result of the LaNina, which is projected to last until March 2025 or beyond.

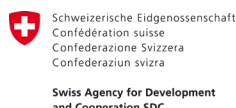
working, and only 10% of them not working due to mainly pump issues, followed by riser pipe and power supply problems respectively. In particular the highest concentration of dysfunctional boreholes is found in Puntland State.

The water prices are on average contained between 0.2 and 0.4 USD per barrel (200 litres) in 5 states with little variability within the reporting period. However, the levels are more than double in Jubaland state, for the entire reporting period. Galmudug has the cheapest water, of all the states.

The impact of this is that the boreholes will not recharge fully, and the water collected in the surface water sources will not last beyond a couple of weeks. By December the pressure on the boreholes will start building up, and the water levels start dropping. The areas to closely monitored for potential deterioration are Puntland and the entire regions in the central and southern parts of the country, as the forecast (Map 2) indicates significantly below normal Deyr rains.

FAO SWALIM will continue monitoring and updating partners on a monthly basis throughout the LaNina period. The data is hosted online on the [weekly monitoring portal](#) and the [groundwater monitoring portal](#).

SWALIM is a multi-donor project managed by FAO and currently funded by The European Union, AICS, SDC, FCDO, Government of France, USAID and SIDA



Water Level Trends at Individual Boreholes

| Station | Location | Monthly Trend | Station | Location | Monthly Trend |
|--------------|----------------|---------------|-----------------------|--------------------|---------------|
| Toqoshi BH | Zeylac | | BH 19 | Borama | |
| Botor BH3 | Gebiley | | Arabsiyo BH | Arabsiyo | |
| Kalajab BH | Berbera | | Sheikh (Dubur) BH | Sheikh | |
| Garadag BH | Garadag | | Ceel Xume BH | Odweyne | |
| Oog BH | Oog | | Qorof BH | Baran | |
| Cawsane BH | Cawsane | | Dhahar BH1 | Dhahar | |
| Wadajir IDP | Bosaso | | Qoraxaad BH | Qoraxaad | |
| Shaxda BH | Shaxda | | KM22 BH | KM 22 | |
| Harfo BH2 | Harfo | | Wadajir IDP | Galkacyo North | |
| Galkayo BH | Galkayo Sout h | | Docolle / Carfuuda BH | Docolle / Carfuuda | |
| Adaado BH | Adaado | | Mareergur BH | Mareergur | |
| Xaraale BH | Xaraale | | Dhoobshac BH | Dhusamareb | |
| Balcad BH | Balcad | | Tadamun BH2 | Afgoie | |
| Ambareso BH | Barawe | | El barde BH2 | El Barde | |
| Buulow BH | Hudur | | Garbaharey BH | Garbaharey | |
| Haadwayne BH | Kismayo | | Dhoobley BH | Dhoobley | |

Table 1 - Ground water station trend analysis

SWALIM is a multi-donor project managed by FAO and currently funded by The European Union, AICS, SDC, FCDO, Government of France, USAID and SIDA

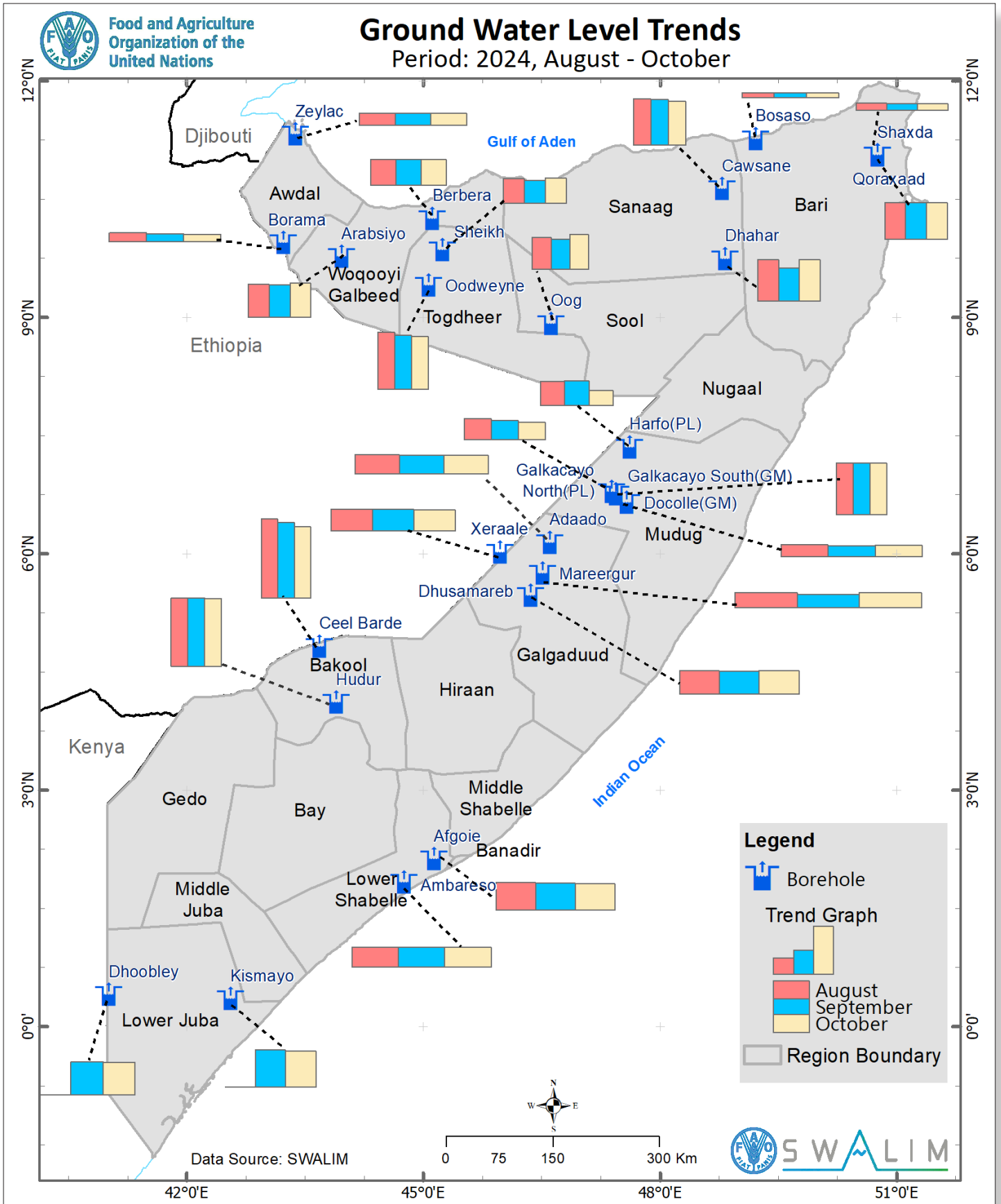




Food and Agriculture
Organization of the
United Nations

Ground Water Level Trends

Period: 2024, August - October



Map 3 - Ground water level August - October 2024 trend analysis

SWALIM is a multi-donor project managed by FAO and currently funded by The European Union, AICS, SDC, FCDO, Government of France, USAID and SIDA

