



Ethiopian Meteorology Institute (EMI)



# Monthly Hydro Meteorology Bulletin



## ***Forward***

*This Monthly Hydro Meteorological Bulletin is prepared and disseminated by the Ethiopia Meteorological institute (EMI). The ultimate objective of producing and disseminating this bulletin is to inform all level decision makers with the updated and relevant hydro meteorological information. This monthly Bulletin reviews the September 2024-month climate condition and its impacts over the river catchment across the country and highlights the October 2024 climate outlook along with the likely impact over the water dams and the rivers basins.*

*The information contained in this bulletin is believed to assist the water professionals for planning the capacity expansion of reservoirs, water supply, ecosystem restoration as well as rehabilitation of existing systems including dams, irrigation, canals, pumps, wetlands and the likes. In addition to the aforementioned benefit the bulletin also reveals the aridity levels of each basin, extremes heavy rainfall events and areas where significant amount of moistures loss through evapotranspiration. In the impact outlook section of the bulletin it provides the likelihood of the climate in the coming month and its potential impact over various aspect of the river basins including the hydraulic structures such as culverts, bridges, reservoir spillways, road embankments and dikes. It also indicates the measures need to be taken as the early actions so as to reduce the possible negative impact of the upcoming month climate condition. Meanwhile, your comments and constructive suggestions are highly appreciated to make the objectives of this bulletin a success.*



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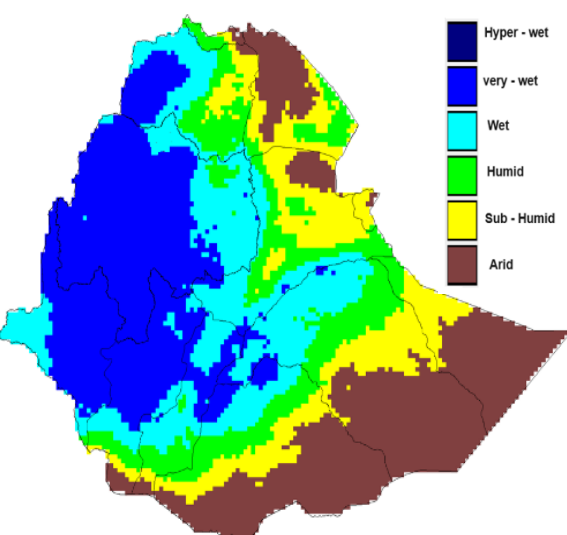


## 1. Introduction

The provision of hydro meteorological services can contribute a significant role toward water resource management and socio-economic development. both surface water and groundwater management are essentially linked to climate variability. Therefore, the provided climate information and knowledge in this monthly hydro meteorological bulletin have a critical importance for efficient, equitable and sustainable development and management of the national water resources and for coping with any climate related risks. The information illustrates the impact of previous month climate on each and every water basins and the associated climate risks observed during the month under review. In addition to the previous month impact assessment, the bulletin also provided the expected climate condition for the coming months and its impact on the water resource. The design of water-use and flood-control facilities, mainly dams and reservoirs, is frequently based on these analyses. Estimating the likelihood of precipitation, the distribution of precipitation and the rate of evaporation in location and time, the heavy rainfall and the subsequent runoff, extreme temperature and wind are among issues that hydro meteorologists are concerned with.

## 1.1 Monthly Hydro Meteorological Assessments

### 1.1.1 Monthly aridity Climatology over the Ethiopian River Basin

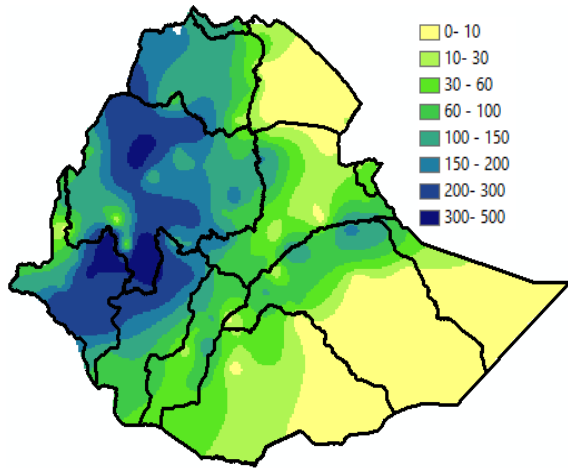


In the normal climate moisture condition at September the western, northern, central and most of southern parts of the river basin experience **humid to very wet moisture condition**. In line with this, most parts of Abay, Baro Akobo, Tekeze, Omogibe, Mereb Gashe, Afar Denakilel Awash, Rift Valley, some parts of upper Ogaden, Wabisheble and Genale Dawa receive significant amount of moisture that exceeding from the potential evapotranspiration of the areas. On the other hand, most of lower parts of southern and south eastern half parts of the river basins remain in arid moisture condition.

*Figure 1. Monthly Moisture Climatology over the river basin during September*



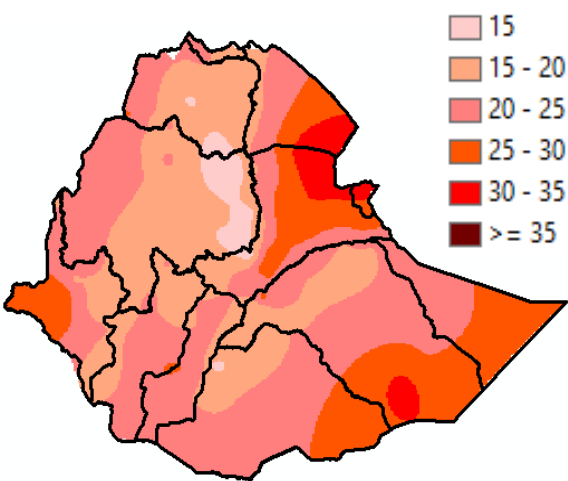




**Figure 2 September monthly mean rainfall over Ethiopian River Basin.**

## 1.1.2 August 2024 Rainfall Assessment over the River Basins

As can be seen in figure 2, better monthly rainfall distribution is observed across the western half basins of the country. According to this, most parts of Abay, Baro Akobo, Tekeze, Omo Gibe, Afar Denakile and Mereb Gashe, in the margin of upper Awash and Rift Valley, and some parts of upper and middle Genale Dawa, upper Wabisheble and Ogaden got 30 -150 mm of rainfall. In addition to this most of middle Abay, upper Baro Akobo and Omo Gibe have experienced above 150 mm.

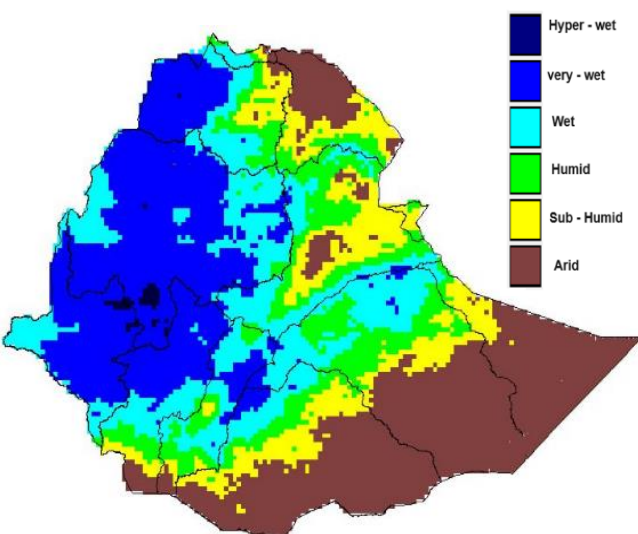


**Figure 3 September monthly mean temperature over Ethiopian River Basin**

## 1.1.3 Monthly Mean Temperature over the River Basin

As we can see in Figure 3, most of upper and middle Abay, upper Baro Akoobo, the margin and upper Omo Gibe, some pocket area of upper Rift Valley, upper Wabishebele, Awash and Genale Dawa, experienced monthly average temperatures **below 25°C**. However, the monthly average temperatures that were reported in the remaining catchments of some part of middle and lower BaroAkobo, Rift Valley, Afar Denakel, Awash, Abeay, Wabishebele, Genale Dawa and Ogaden were received above 25 °C.

## 1.1.4 Assessments of Aridity Index during the month of August

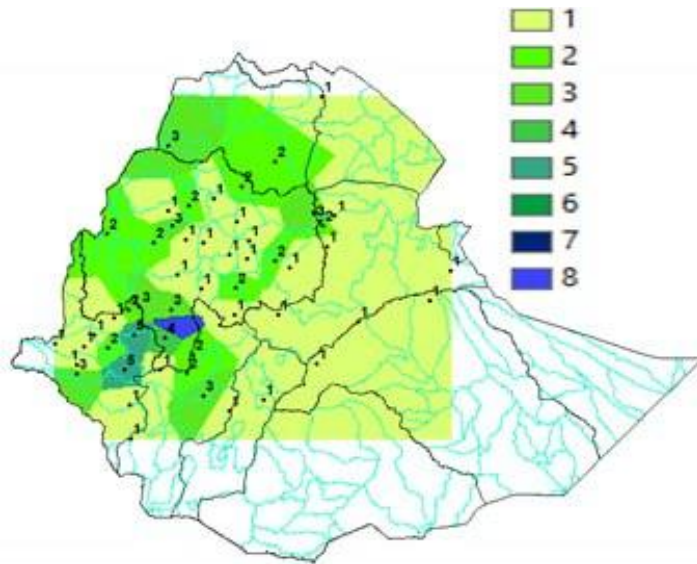


During this month, most parts of Abay, Baro Akobo, Tekeze, Mereb Gashe, Afar Denakile, Omogibe, Rift Valley, the upper Genale Dawa, Wabisheble and Ogaden have experienced wet to very wet moisture condition. Likewise, some part of Afar Denakel, Ogaden, lower part of Wabishebele and Genale Dawa received sub-humid to Arid moisture during the month of under review. Since the received moisture over most parts of Kiremt rain benefiting catchment are well exceeded from the potential evapotranspiration of the month, it favours the



available of ample moisture on the surface and ground water. On the other hand, arid moisture condition was prevailed across most part of the eastern half river catchments.

**Figure 4. September monthly Aridity Index condition over the river basins**

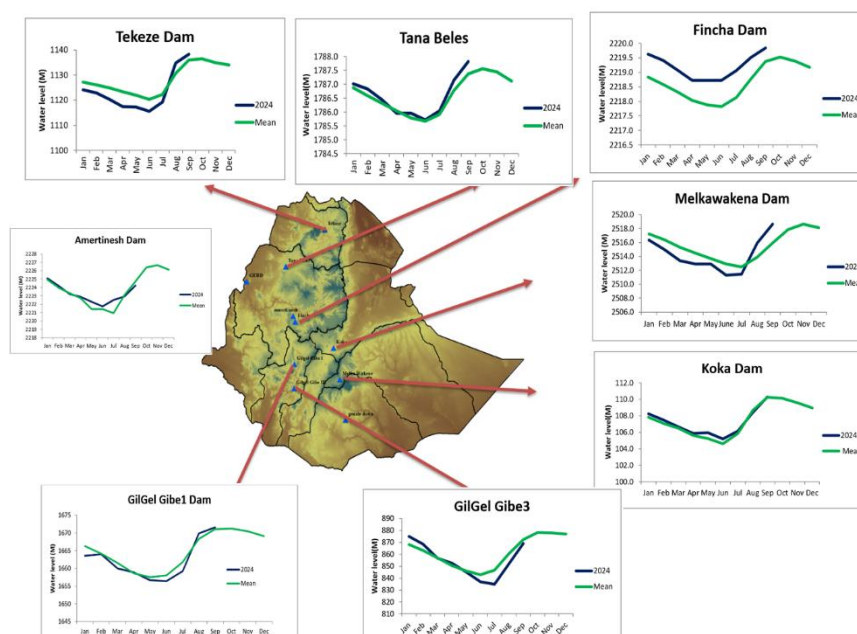


## 1.1.5 Distribution of Heavy fall (>30mm a day)

As can be seen in the above figure 5, most of Abay, Baro Akobo, Tekeze, Afar Denakile, upper parts of Omogibe, Rift Valley, the upper Genale Dawa, and Wabisheble have received from one to eight frequency of heavy fall in this month. This frequency of rainfall will be increasing water holding capacities for dams and basins.

**Figure 5 Heavy fall Frequency during the September month over Ethiopian River Basin**

As can be seen in figure 6 most of Kiremt benefiting DAMs have good water holding capacity. Specially Tana Beles, Tekeza, Koka and Melka Wakene shows start rising to above mean, Gilgel Gibe I and III have good water holding capacity, Finchaa rally have good water and it needs watch and also those the reaming dams have the same good water holding capacity and this is used for different applications that used for power generation, irrigation and different agricultural purposes.



**Figure 6 August monthly mean DAM status over Ethiopian River Basin**



## 2.1. Expected weather impact on water resource during the coming October 2024

Information indicates that in the coming month of October, the humidity will decrease in size and distribution in most of the watersheds. On the other hand, most of the Baro Akobo, Lower and Middle Abay, Omo Gibe, Rift Valley basins will experience high levels of moisture. This situation will be of great importance in terms of developing underground and surface water resources. In addition, it will increase the water level of both irrigation and power generation dams, so it will have a positive side in terms of enabling reliable energy supply in the dry months of the coming summer. However, in the lower and middle Wabe Shebele and Genale Dawa receive relatively moderate amounts of moisture.





## APPENDIX Major Ethiopian River Basin

Mereb – Gash Catchment: -Northwestern tip of Tigray.

Atbara-Tekeze Catchment: -The Tekeze River basin is situated in the northwest of Ethiopia between 11°40' and 15°12' N, and 36°30' and 39°50' E. It is bordered by the Mere Riverbasin and by Eritrea in the north, the Atbara River plains in Sudan in the west, the Abay River basin in the south and Danakil basin in the east.

Blue Nile/ Abay Catchment: - Roughly 13° N South of Gondar to 11° 30'N, and west of 39° 45' E of Wollo, northwestern parts of Shoa; Gojam except the South Western and Western narrow area, Wellega and extreme Eastern tip of Illubabor together with a narrow northeastern strip of Keffa. It is the largest catchment that covers about 16 percent of the total area of Ethiopia. The Catchment that includes the Lake Tana, Upper Abay(to Guder confluence), Middle Abay (to didessa confluence), Didessa, Dabus ,Lower Abay,Dinder and Rahad Sub-basin.

Baro –Akobo Catchment: -The south western and western narrow strip of Wellega, except the eastern tip, the whole of Illubabor and southwestern tip of Keffa. The Catchment has upper and lower sub-basins along Baro River. The Catchment It is the wettest catchment because of the highest rainfall over the area.

Omo-Ghibe Catchment: -Southwestern narrow strip of Shoa, the whole of Keffa except the southwestern tip, southwestern tip of Wellega, Western half of northern Omo and northwestern tip of Sidamo. The upper part of the catchment starts from the plateaus in north part of Ghibe and extends southward to the lower part of it (known as Omo River).

Central Lakes-Rift Valley Catchment: - The whole of North and South Omo, west and southwestern narrow strip of Sidamo, southwestern portions of Shoa and western narrow tip of Bale and western part of Arsi. The catchment is found in the Great Rift Valley system and typically known by its lakes and streams. Lakes which adjoin the Awash catchment are found in its upper part, while Lake Awassa and Bilate in its central part and end to chamo bahr in its lower part.

Genale Dawa Catchment: -The western half of Bale (South of Goba) and southeast, southwestern and northeastern parts of Sidamo. The catchment constitutes three riversystems namely Dawa, Genalle and Wabi Gestaro that meet each other before they cross the Ethio- Somalia border.

Danakil – Afar Catchment: -East of 40° E of Tigray, North of 11°N of Wollo, narrow coastal strip south of 14°30'N of Eritrea. The basin is the lowest region in the country where the kobar sink; with an elevation of about 120 meters b.s.l is found.

Awash Catchment: -North of Garamuleta mountains, south of 11° 40' Nof Wollo, south of 9° N of Shoa, Northern tip of Bale and North part of Arsi. The catchment has upper, middle and lower sub-catchments. In general, the catchment is narrow at the upper part marked by numerous volcanic mountains and wider at the lower part joining major tributaries from northwestern highlands and a number of seasonal wadies from the southeast highlands.

Gulf of Aden – Aysha Catchment): - Eastern narrow strip of Hararghe. It is a very dry Area with no stream flow representative Meteorological station. Thus, no assessment is done for this catchment in this publication.

The Shebelle River (Somali: Wabi Shabeelle, begins in the highlands of Ethiopia, and then flows southeast into Somalia towards Mogadishu. Near Mogadishu, it turns sharply southwest, where it follows the coast. Below Mogadishu, the river becomes seasonal. During most years, the river dries up near the mouth of the Jubba River, while in seasons of heavy rainfall, the river actually reaches the Jubba and thus the Somali Sea.



### Number of weather stations used for Hydro Meteorological Analysis







