Meteorological Data and Climatology Lead Excutive

Climatology and Remote Sensing Desk

Ten Daily Satellite Ranfall Estimation and Vegetation Coverage Bulletin

1st Dekad of September 2025

Date: Sep 12, 2025

Contents

Forward

As an entity responsible for monitoring local and country wide climatic features and their day-to-day evolution, the National Meteorological Agency of Ethiopia strives hard to present useable information to different socio- economic activities. The production of satellite-based rainfall estimates and vegetation greenness bulletin is part of this effort.

The launch of meteorological satellites which happens as a result of technological advancement opens a new horizon in weather and climate monitoring. Unlike manned point observations, satellites collect data on cloud, vegetation and other parameters from part of the world that are not easily reachable or accessible. Satellite observation supplements ground manned observation and when it comes to vegetation cover, it is the only source of information.

The Ethiopian Meteorological institute uses products from TAMSATA group based in UK and Copernicus for producing dekadal rainfall estimate and vegetation greenness bulletin. We have a strong belief that various socio-economic activities related to planning disaster mitigation, water resources management, construction, environmental protection, transportation, recreation, tourism and others will be benefited most by the careful and continuous use of this bulletin. Meanwhile, your comments and constructive suggestions are highly appreciated to make the objectives of this bulletin a success

Fetene Techome
Director General
Ethiopia Meteorology Institute
P.O. Box 1090
Tel: 0115-51 22 99
Fax 0115-51 70 66
E-mail: ethiomet.gov.et
Addis Ababa

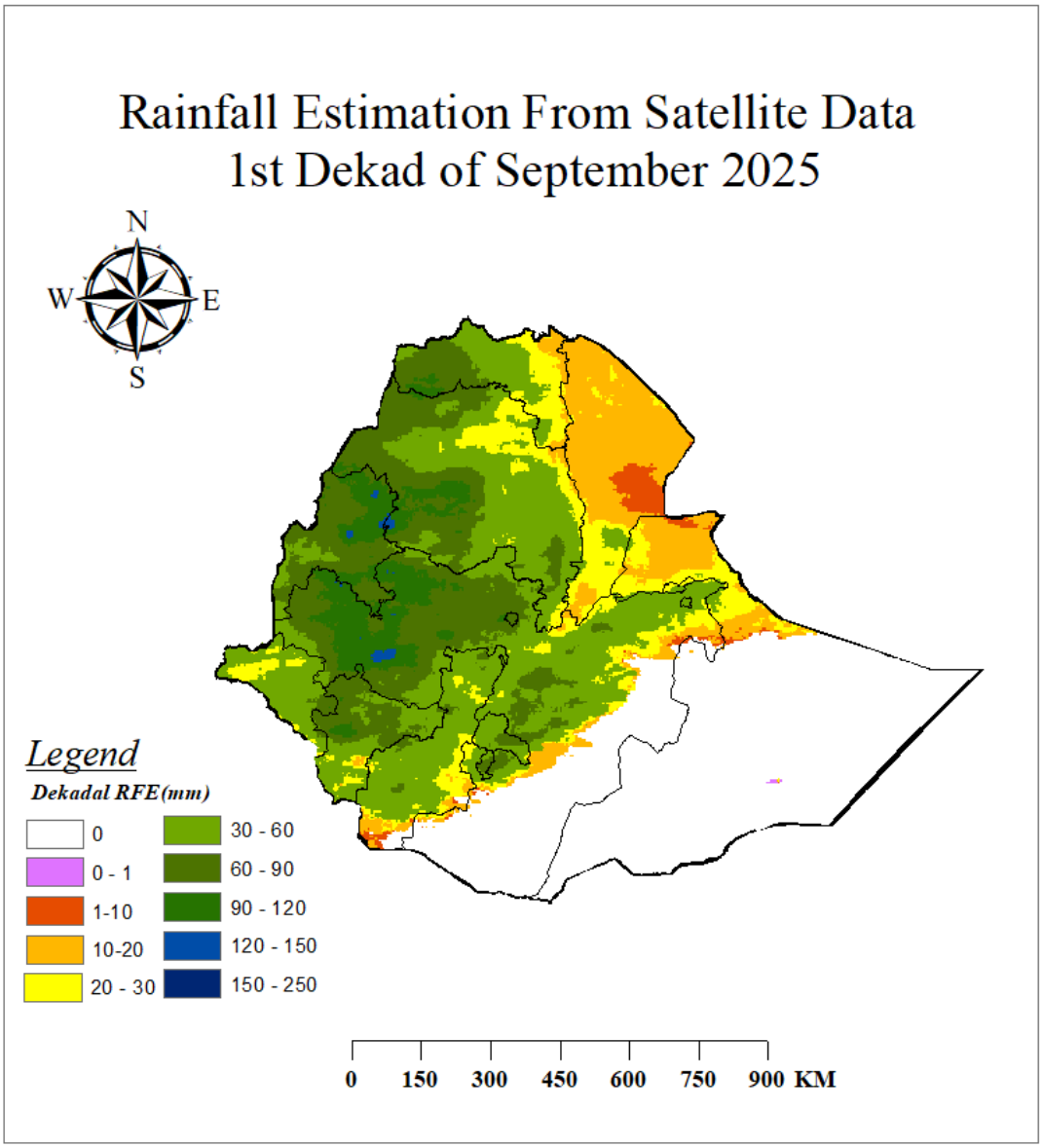
Introduction

Satellite remote sensing is often used to estimate vegetation distribution and productivity at large spatial scales. The normalized difference vegetation index (NDVI) is the most widely used surrogate for large-scale assessments of vegetation greenness and has been applied in a wide range of studies (Brandt et al. 2015, Chen et al. 1998; Santos and Negri, 1997; Zhang et al 2009). The spatial distribution of remotely sensed NDVI and consequently of terrestrial vegetation, is a function of prevalent climatic conditions such as rainfall and temperature. The relationship between NDVI and rainfall is well established at various spatial and temporal scales (Davenport et al. 1993; Grist et al. 1997; Nicholson et al. 1990; Potter and Brooks 1999; Wang et al. 2001). The results of these studies, although varying, indicate that rainfall is an important predictor of the geographical distribution of vegetation in many environments, particularly in transitional zones, such as from humid to arid and semi-arid environments (Zhao et al. 2015) as found in the Sahel of Africa.

Rainfall is a crucial resource in many socioeconomic activities, and particularly for those African countries relying predominantly on rain-fed agriculture. Many countries have been affected by rainfall variability and long-term changes in both rainfall amount and distribution over recent decades. However, the number of rain gauges throughout Africa is small and unevenly distributed, and the gauge network is deteriorating. Satellite rainfall estimates are being used widely in place of gauge observations or to supplement gauge observations. (Tufa dinku etal).

In this bulletin, the 1st Dekad of September 2025 satellite rainfall estimation and vegetation greenness was produced with the help of TAMESAT and METOSAT vegetation product. During this dekad, some part of Kiremt rain benefiting areas receive havey to light rainfall as result of strong relationship between rainfall and Normalized vegetation index (NDVI) Kiremt rain benefiting areas (North, northwest, west, and southeast part) of the country was covered by Vegetation. On the other hand, southern, eastern and southeast part of the country receive minimum to no rainfall and the low to bare greens was observed in the country.

Rainfall Estimation from Satellite Data

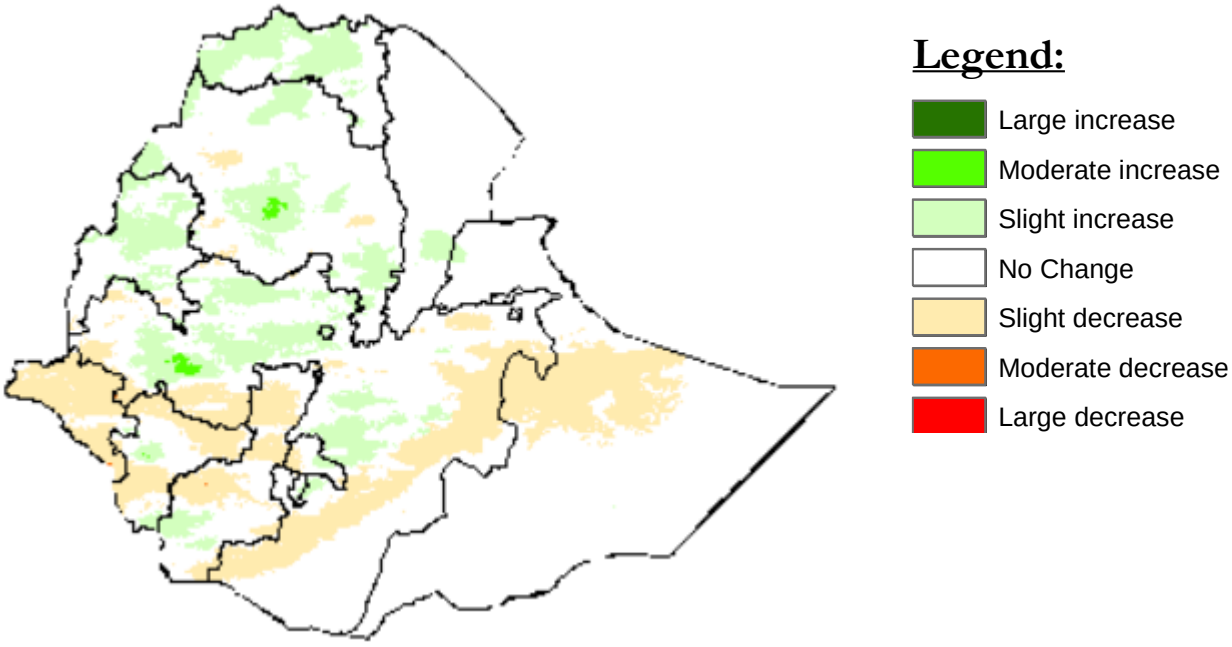


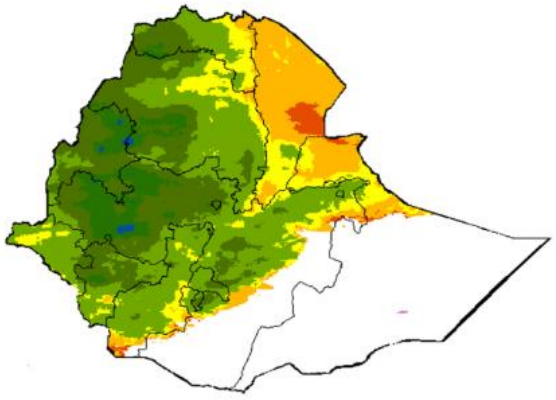
Rainfall distribution

The Kiremt season (June to September) is the main rainy period for much of Ethiopia, particularly in the northern, northwestern, and central regions. By the first decade of September, significant rainfall was recorded across several areas, including Benishangul Gumuz, western Oromia, Amhara, Tigray, Gambella, Central Ethiopia, Southwest Ethiopia, Sidama, western and southern Ethiopia, as well as Addis Ababa, with amounts ranging from 30 to 250 mm. In contrast, little to no rainfall was observed in other parts of the country.

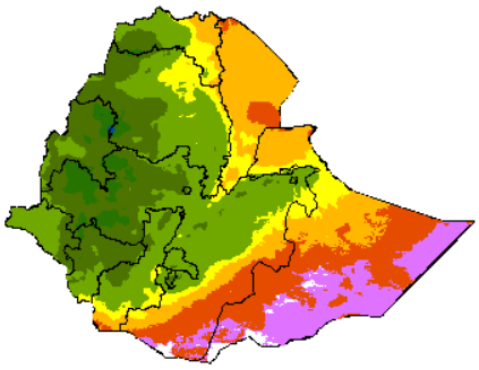
Comparison with climatological normal

In this dekad the comparison of satellite rainfall estimation and climatological average shows that there was moderate to slight increase of rainfall was observed in Tigray, Amhara, Benishangul Gumuz, Central and western Oromia, region. On the other hand, slight decrease of rainfall was observed in Gambella, southwest Ethiopia, Central Ethiopia, south and southeast Oromia and some areas of Somali regions.





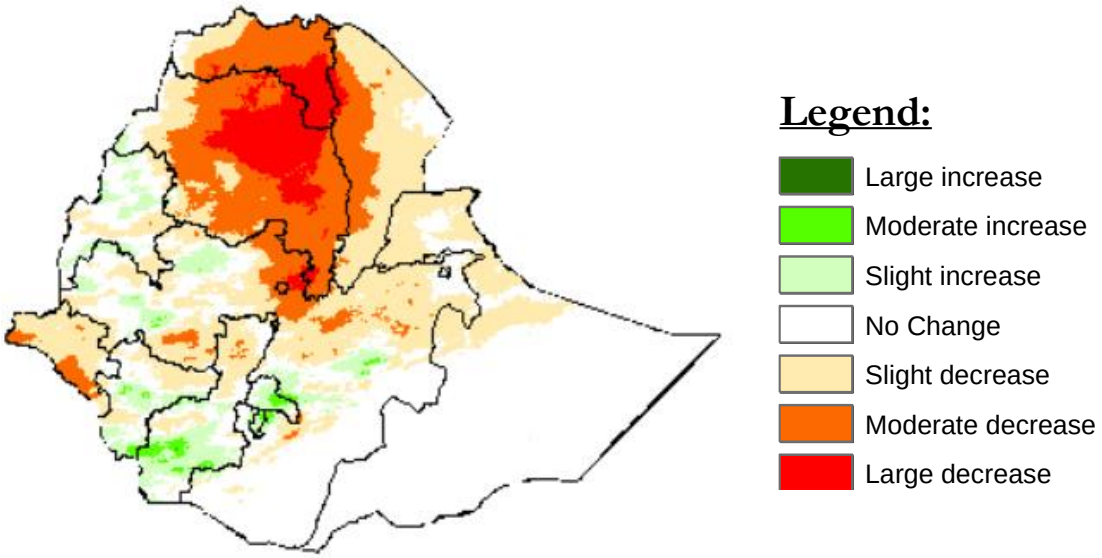
Current dekad



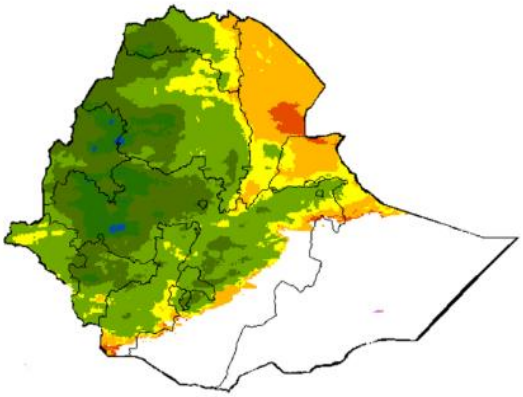
Climatological normal

Comparison with the previous Dekad

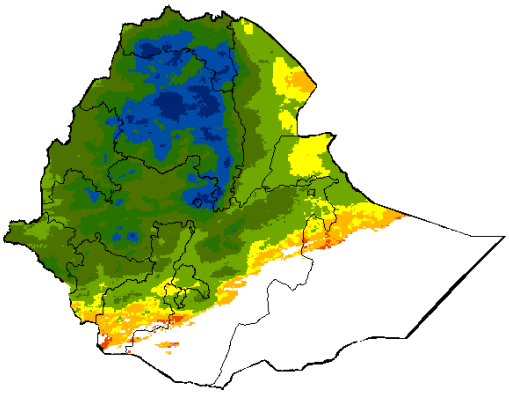
The comparison of 1st dekad of September 2025 and 3rd dekad of August 2025 show that a slight increase of rainfall was observed in some part of south Ethiopia, south and pocket areas of Oromia regions. On the other hand, moderate to slight decrease of rainfall was observed over Tigray, Amhara, Western Afar, Northern Somali, Gambella and some part of central and eastern Oromia region. No change on the rest part of the country.



Difference of two Dekad



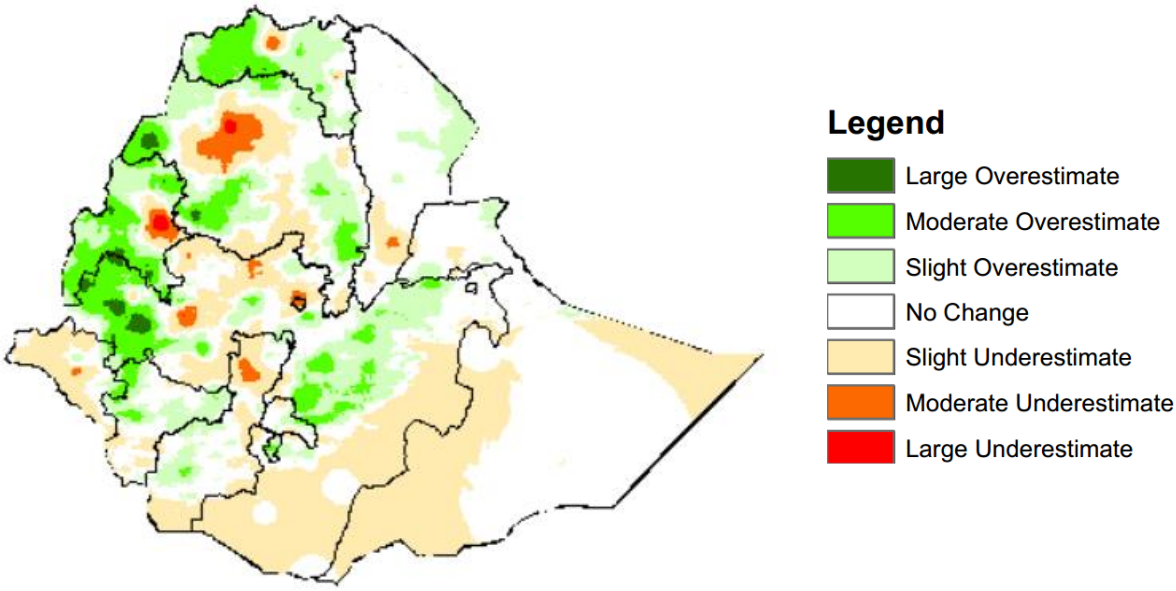
Current dekad

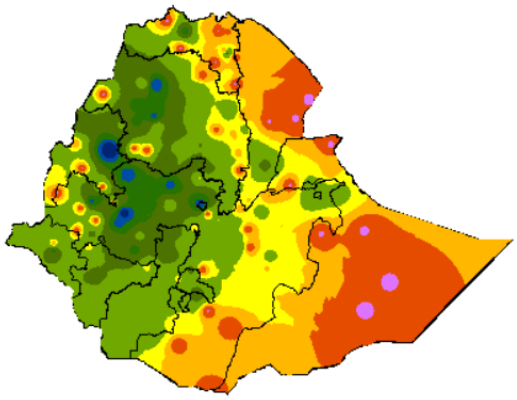


Previous dekad

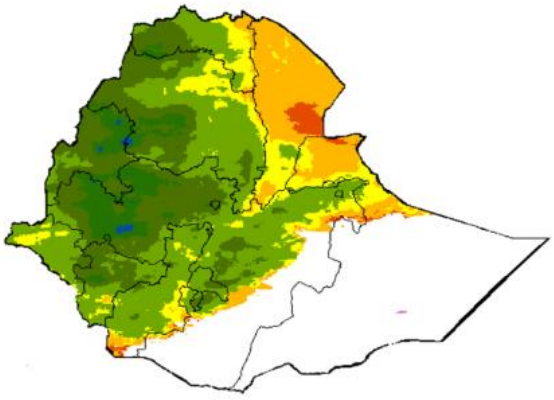
Comparison with the ground observation

The satellite rainfall estimation shows that there was an Overestimate in Tigray, some part of Amhara, Benishangul Gumuz and Oromia regions. On the other hand, a moderate to slight underestimate was observed over some part of Amhara, Gambella, Oromia, and Somali regions. There is no significant difference on the rest parts of the country, it shows the same pattern as compared with the Actual.



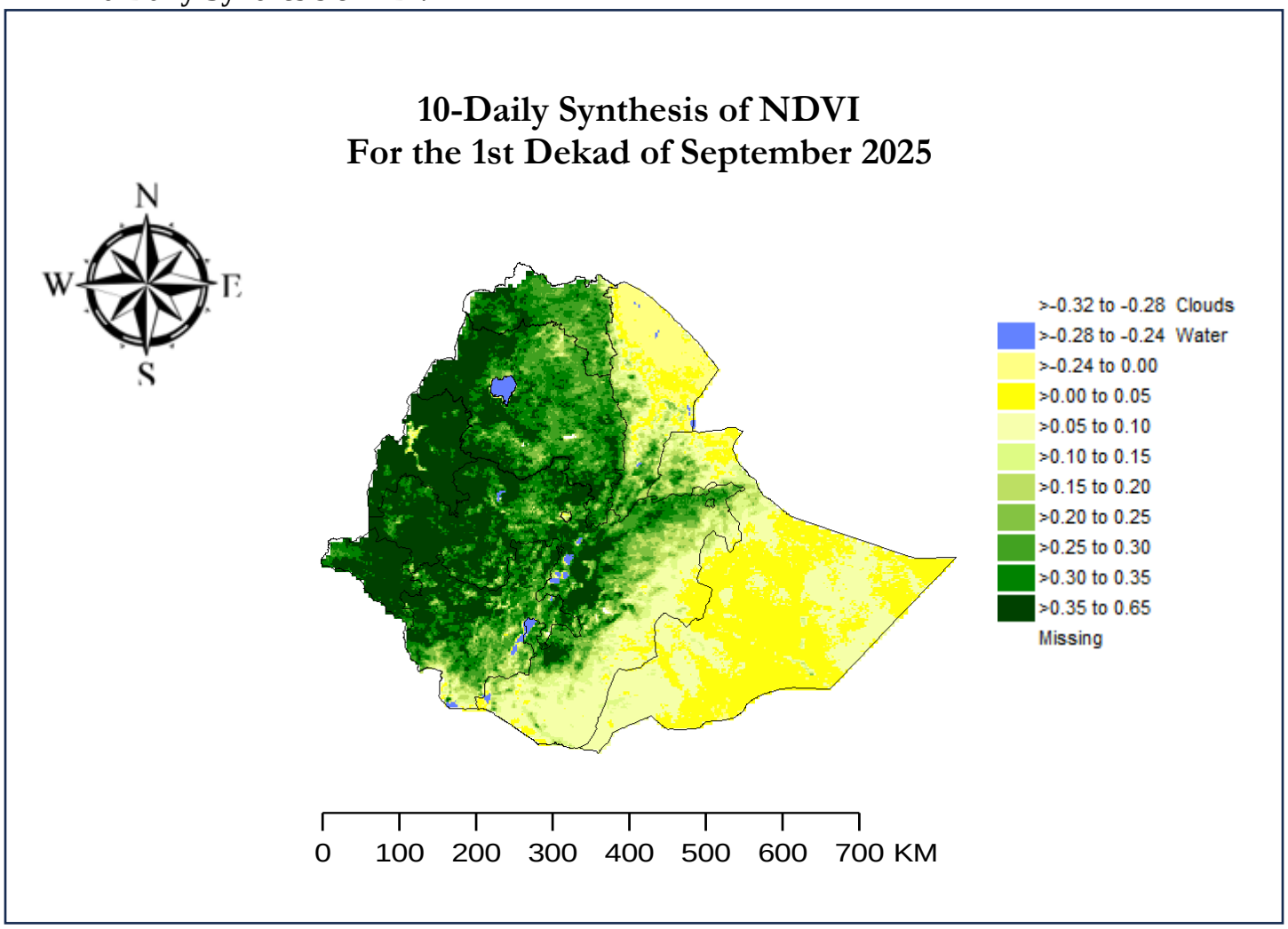


Ground Observation



Satellite rainfall estimation

10-Daily Synthesis of NDVI



Assessment of synthesis NDVI for the 1st dekad of September 2025

NDVI distribution for this dekad declared high greenness over some parts of the country. Whereas low NDVI value have been, observe over most parts of the country. Hence, Tigray, Amhara, Benishangul Gumuz, Gambella, South-west Ethiopia, Sidama, South Ethiopia regions covered by high to moderate greenness. Afar, Somali and southern Oromia regions covered by low to bare greenness. (Refer the *actual* figure above).

Comparison with the Climatological Normal

The comparison of current dekad with climatological normal show that large to small increase of greens was observed in northern Somali, some part of Afar and pocket areas of Southern Ethiopia regions. On the other hand, small decrease of greenness was observed in Amhara, Benishangul Gumuz, Gambella, most part of Oromia, and south Ethiopia regions.