# Ethiopian Meteorology Institute

## Health-Meteorology Bulletin

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# I. Foreword

This "Climate Information for the Health Sector" Bulletin has been designed to convey essential information regarding the monitoring of human comfort conditions based on the analysis of temperature and humidity data and also for the monitoring of Malaria outbreak areas based on the analysis of temperature and precipitation data. Since the monitoring of temperature and rainfall over a given area can be used to assess the likelihood of outbreak of Malaria with a lag of two months, this information can be an important for early warning tool if used judiciously.

The major objective of this bulletin is in line with the Ethiopia Meteorological Institute strategy of diversifying climate application products to the basic developmental sectors (such as the Health, the water, the agricultural sector etc…). This bulletin can be a very important source of information to Health professionals engaged in the monitoring of Public Health, to Tourism Agents and institutions who advise tourists regarding the comfort conditions of the places to be visited by the tourists and to the researcher who is interested in the field of Bio-Climatology.

We have the opinion that careful and continuous use of this bulletin can benefit to the improvement of early warning and preparedness in the Heath sector.

Meanwhile, your comments and constructive suggestions are highly appreciated to make the objective of this bulletin a success,
This same bulletin can be accessed online at: http://www.ethiomet.gov.et/bulletins/health_bulletins

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# II. Assumptions

**i. Malaria:** According to the International Research Institute for Climate and Society, (IRI), the predicted conditions of rainfall, temperature, and relative humidity are used in determining the degree of incidence for malaria.

- When rainfall is above 80 mm, the temperature is between 25°C and $32^0$C, and relative humidity is greater than 80%, the region is at high risk and is placed under high incidence.
- When the temperature is between 20°C and 25°C, relative humidity is between 70 and 80%, and rainfall is above 80 mm, then moderate incidence is advised.
- Low incidence for malaria is issued when the temperature is in the range of $18^0$C-20°C, relative humidity is 60 - 70% and rainfall is above 80 mm.
- No incidence is required when the temperature is less than 18°C, relative humidity less than 60%, and rainfall amount below 80 mm.

Based on these, climate variables have ***a one to two months*** postponed (delayed) effect on the spread of malaria.

**ii. Human heat index:** is a measure of how hot it feels when relative humidity is factored with the actual air temperature. The levels of caution for heat index are classified as follows:

- Cold stress when THI is <14, ***Asthma, Pneumonia, Common Cold and flu***
- Comfortable when THI is 14-21, ***pleasanter***
- Moderate when THI is 21-26, ***No more effects***
- Heat stress when THI is >26, ***heat stroke, heat cramps, hyperthermia, respiratory and cardiovascular diseases***

**iii. Cattle heat index:** The climatic condition for Cattle is a measure that accounts for the combined effects of environmental temperature and relative humidity on cattle. The level of heat stress for cattle classified as follows:

- Not Stressed when THI is <68, ***free from heat stress***
- Stressed threshold when THI is 68 – 71, ***impact less stress starting***
- Mild stress when THI is 72 – 79, ***stress begins and calf rate affected***
- Moderate stress when THI **is** 80 – 89, ***Milk production affected***
- Severe stress when THI is 90 – 99, ***very significant losses in milk production***
- Extremely stress when THI is >100, ***ultimate dead of cows***

# 1. Weather impact Assessment on Health for September 2nd dekad 2025

## 1.1 Malaria prone areas during September 2025 second dekad

According to the 2025 September 2nd dekad climate conditions for malaria breading and transmission, all South, South-West, Central Ethiopia, and Sidama regions, Benishangul Gumuz region, all Western zones, both Borena, Guji, and Hararge zones, East Shewa of Oromia region, Itang, Majang, and Agewak zones in Gambela, all western Amhara zones, and wag Hmara and north Wollo zones of East Amhara, all Tigray region, Dire Dawa, Harar regions, Fafan, Siti, and Erer zones in Somali regions was suitable as illustrated in Figure 1

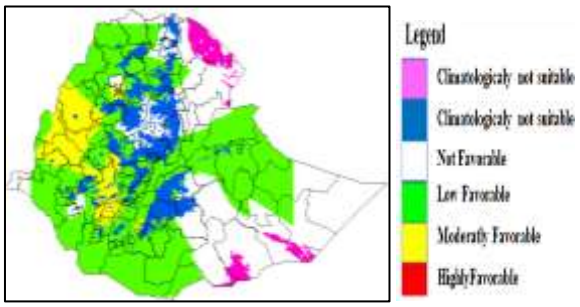


Figure 1: Malaria Prone areas

## 1.2 Climate comfort Conditions

### 1.2.1 Human Comfort Condition

As illustrated in figure 2, the climate in September 2025, the second day of the month, was completely suitable for human daily activities. However, in certain areas of the Benishangul Gumuz, Afar, and Somali regions, there were heat-stressing conditions.

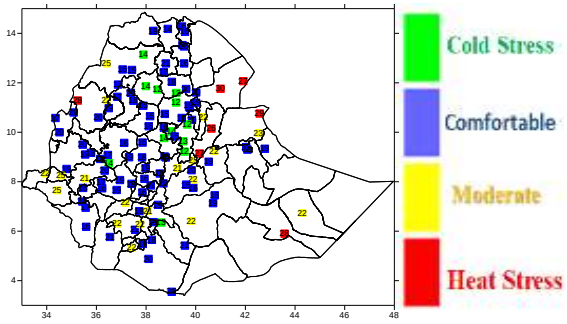


Figure 2: Human comfortable index

### 1.2.2 Cattle Comfort Condition

As seen in figure 3, non-significant (sign-of-heat-stress-begins) heat stress conditions were noted throughout the eastern Afar, northern Somalia, and Benishangul Gumuz regions during the final ten days of the September 2nd dekad.

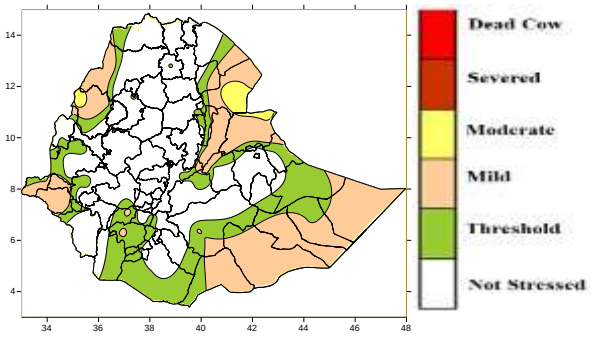


Figure 3: Cattle Comfort index

# 2. Expected Weather Impact on Health for third dekad of September

### 2.1 Expected malaria-mosquito breeding areas

The next ten days of September 2025, the third dekad, are expected to have an ideal climate for the transmission and spread of malaria: Benishangul Gumuz, Gambella, Western and North-Western Tigray, all Wellega zones, Illu Aba Bora, certain areas of East and North Showa, East and West Hararge zones in Oromia, Awi, North, West, and Central Gondar in the Amhara region, Bench Sheko, Sheka, Konta Special, Dawro, Kefa, and Mirab Omo Zone in South West Ethiopia, Gofa, Basketo, Wolaita, and a few locations of Gamo zones in South Ethiopia, Hadiya, Halaba, and Kembata zones in Central Ethiopia, and Western parts of Sidama regions, demonstrates in red in figure 4.

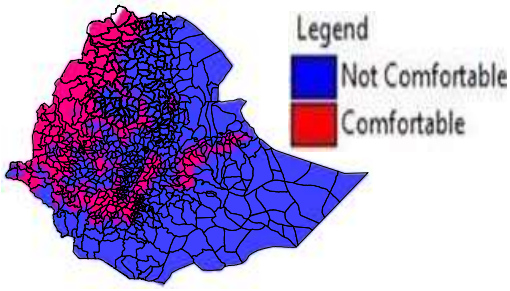


Figure 4: Expected malaria prone areas

## 2.2 Comfort condition

### 2.2.1 Human Comfort Condition

The majority of the country will experience pleasant weather during the upcoming third dekade of September 2025, with the exception of Afar, Gambella, North and South Somalia, and the southern parts of South Ethiopia, which will be partially to completely unsuitable for human daily activities (signs of heat stress are anticipated), as shown in figure 5.

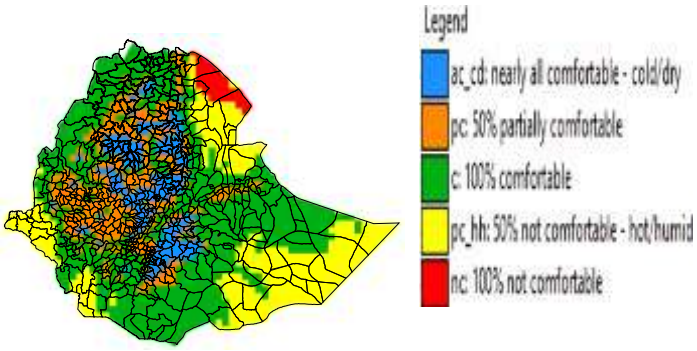


Figure 5: Expected Human comfort

### 2.2.2 Cattle Comfort condition

The majority of lowland areas of Afar, Somalia, Gambella, South Ethiopia, Benishangul Gumuz, and the Western Amhara region will experience mild to moderate heat stress levels in September 2025, which is similar to the comfort conditions for humans. However, as Figure 6 illustrates, non-stress conditions will exist in the country's western, southern, central, and northernmost midland and highland regions.

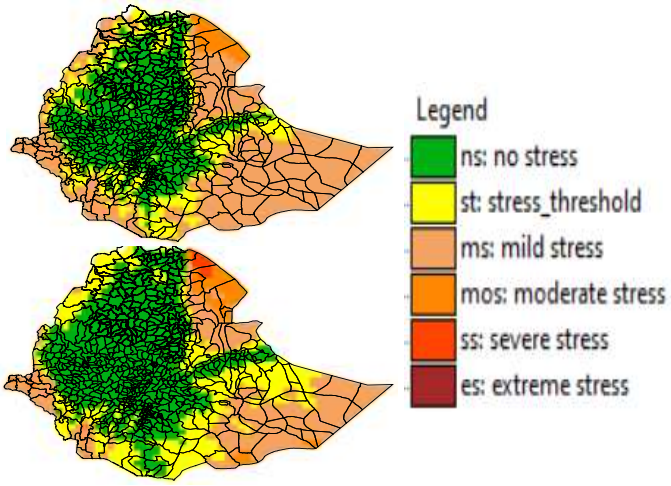


Figure 6: Expected Dairy (***Top***) and Non-Dairy (***Bottom***) Cattle comfort index

## 3. Summary

According to results of the climate-health analysis conducted on September 2nd and 3rd, 2025, malaria is spreading throughout the country's Western, South-Western, Southern, Central Eastern, Northern, and North-Western regions (areas that benefit from Kirimt rainfall). Furthermore, the low-lying border areas of the country's northeast, south, west, and northwest experience negligible heat stress, whereas the mid-to-high-land regions continue to be suitable for the activity and productivity of people and cattle.

## 4. Advisory

Use and implement the following recommendations in places that are favourable for the development of malaria and other vector-borne related diseases;

- Attention to any incidence, especially for malaria disease in such favourable areas
- Controlling measures and activity are advised
- Reducing the environmentally aggravating condition
- Awareness creation campaign to the community and sharing of the climate-health update
- Avoid any exposure of the community to mosquitoes by ensuring clean environment and using mosquito’s nets.