

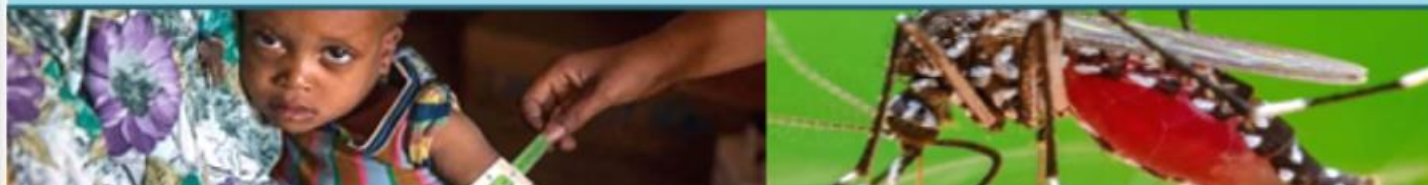
# Ethiopian Meteorological Institute

## Health-Meteorology Bulletin

**MONTHLY BULLETINE: September 2024: Volume 9 No 27**

**Date of Issue 30/09/2024**

**Valid Until 30/11/2024**



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## 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 Health 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](http://www.ethiomet.gov.et/bulletins/health_bulletins)

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## I. 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°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°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*

## Part One

### 1. Weather impact Assessment on Health for the last month of September 2024

#### 1.1 Malaria Prone areas during September 2024

According to the collected and analysed climate data for September 2024, there was a **low to moderate favourable** climate conditions for the breeding and transmission of malaria over most western parts of the country. Regions such as Eastern Gambela, south and South-west Ethiopia, central Ethiopia, western and eastern Oromia, western Amhara, central Somali, Harar and Dire dawa, and Benishangul Gumuz regions of the country was very conducive for malaria transmission as illustrated in Figure 1

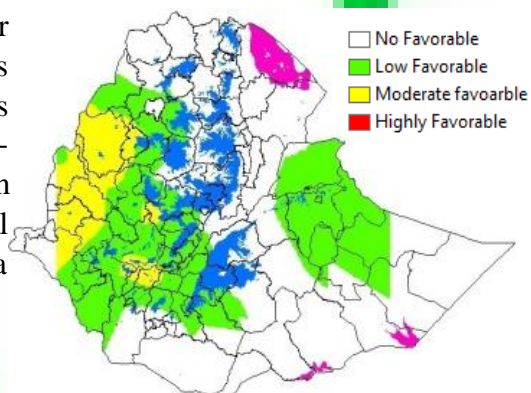


Figure 1: Malaria Prone areas

#### 1.2. THI Conditions during September 2024

##### 1.2.1 THI for Human

As a result of the Temperature-Humidity Index (THI) analysis of September 2024 over a few places of Gambela, southern Somali, Benishangul and Afar regions was experienced heat stress condition; whereas the rest of most parts of the country were experienced comfortable and moderately comfortable weather conditions looking at figure 2

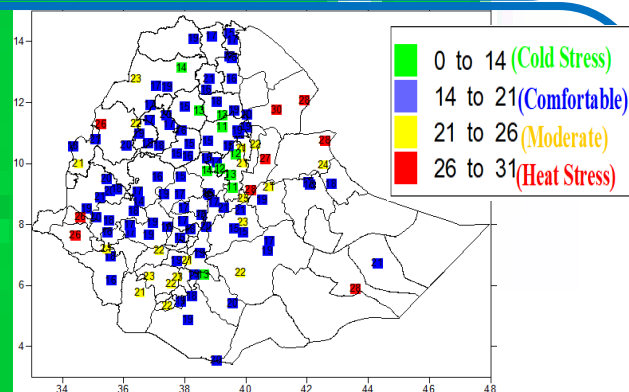


Figure 2: Human comfortable index

##### 1.2.2. THI for Cattle

Moderately heat stress was experienced in Afar regions. While non-significant heat stress condition was observed in southern Somali, the rest of Afar, border of western Amhara and Benishangul Gumuz and most of Gambela regions. Whereas the rest parts of the country were dominated by non-stress climate conditions as shown in figure 3.

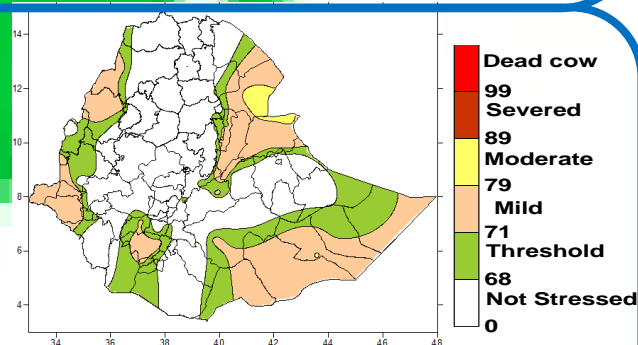


Figure 3: Cattle Comfort index



## Part Two

### 1. Expected Weather Impacts on health for first dekad of October 2024

#### 2.1. Expected Mosquito breeding suitable areas

During the upcoming first (1-10) dekad of October 2024; encouraging climate condition for mosquito breeding and development will be expected over most of Western, Southern and Central Eastern parts of the country.

**Regions** such as; south and south-west Ethiopia, Central Ethiopia, Benishangul Gumuz, most parts of western, central and eastern Oromia, most parts of western Amhara, and western Tigray regions will be in a suitable weather condition in the coming ten days as illustrated in red in figure 4.

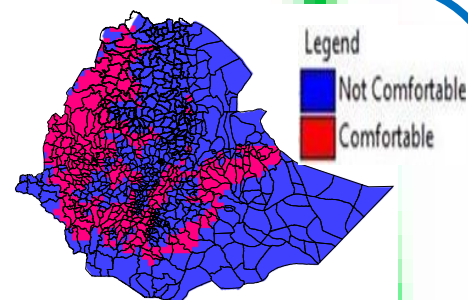


Figure 4: Expected malaria

#### 2.2.2 THI for Human

For the coming ten days of October 1<sup>st</sup> decade 2024, severe heat stress will be experienced in the northern Afar region. A partial (50%) uncomfortable weather situation will be expected over southern and northern Somalia, southern Afar, and south Ethiopia.

Conversely, most of the rest of the country will enjoy fully comfortable (100%) weather conditions, as shown in Figure 5.

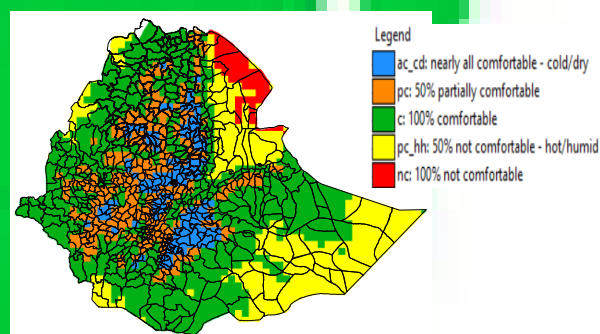


Figure 5: Expected Human comfort index

### 2.2 Temperature Humidity Index (THI)

#### 2.2.1 THI for Cattle

Moderately to severe heat stress will be expected for the coming ten days in Afar for dairy and non-dairy cattle respectively. For the rest parts of the country there will be non-significant heat stress condition as shown in Figure 6.

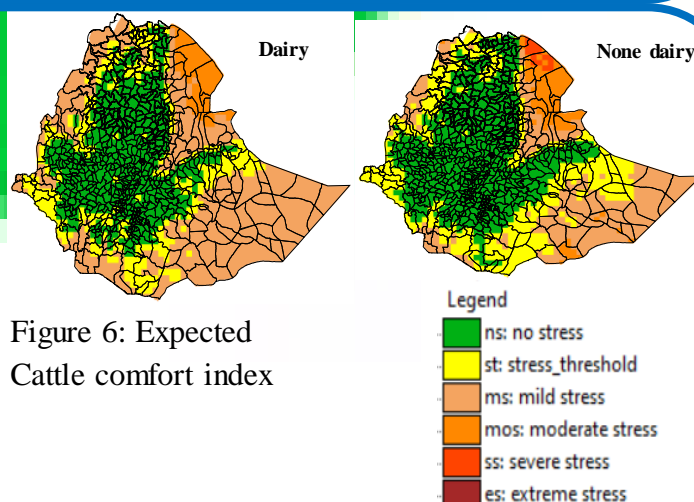


Figure 6: Expected Cattle comfort index






### 3. Summary

Based on the climate-health analysis for September 2024, it has been observed that, there were low to moderate suitable climate conditions to the breeding and transmission of vector-borne diseases in western half of the country. Additionally, over the next 10 days, the western and north-western half, pocket areas of southern and central eastern parts of the country will continue to experience expanded suitable conditions for the breeding and development mosquitoes.

In terms of climate comfortability conditions, most parts of the country have experienced pleasant conditions for both humans and livestock. However, certain regions like Afar, Somali, and Gambela might be affected by heat stress in some hotspot lowland areas. Looking ahead to the next 10 days of October first dekad, the low-lying border areas of the country, especially Afar region will experience moderately to severe heat stress, which will affect both humans 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 Mosquitoes nets.