

Ethiopian Meteorology Institute

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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 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

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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°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*

1. Weather impact Assessment on Health for September



1.1 Malaria prone areas during September 2025

Most parts of the southwestern, western, northern, and central parts of the Kiremt rainfall benefiting areas of the country were under suitable conditions for the breeding and transmission of malaria. As for the climate conditions, Oromia (all western Oromia zones), Borena and Guji zones, most of the Eastern Harergie and Eastern Shewa zones, all zones of South, Southwest, and Central Ethiopia and the Sidama region, the eastern parts of the Gambela region, the Benishangul-Gumuz region, Awi, North and West Gojam, Wag Hamra, all Gondar zones, some pocket lowland parts of the South Wello zones in the Amhara region, the western parts of Tigray, the Dire Dawa city administration, and the Siti and Fafan zones in the Somali regions were suitable malaria transmission areas over the country, as illustrated in Figure 1.

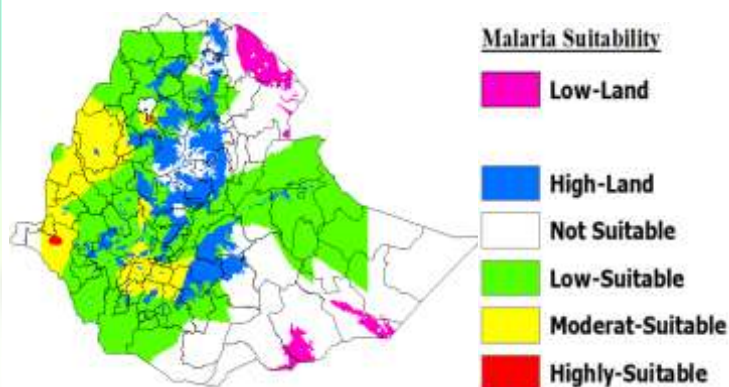


Figure 1: Malaria Prone areas

1.2 Climate comfort Conditions

1.2.1 Comfortability for Human

The majority of the country experienced fairly nice weather for human daily activities in September 2025, with the exception of a few lowland areas of the Afar, Gambela, Benishangul Gumuz and Northern and Southern Somali regions, which were experiencing heat stress, as the figure illustrates 2.

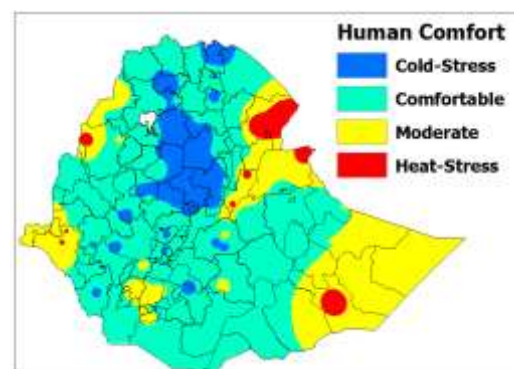


Figure 2: Human comfort index

1.2.2 Comfortability for Cattle

As with human comfort, there were no significant heat stress climate conditions that affected the production of the cattle; nevertheless, as figure 3 illustrates, moderate to mild heat stress was experienced in the Afar, Somali, Gambela, Benishangul Gumuz, and Western Amhara regions of the country.

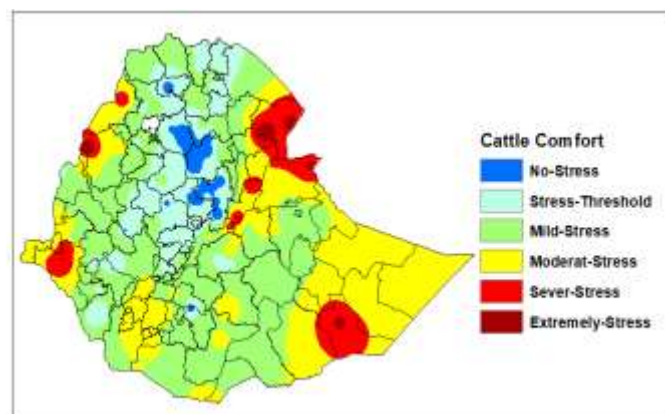


Figure 3: Cattle Comfort index

2. Expected Weather Impact on Health for first dekad of October 2025



2.1 Expected Mosquito breeding areas

All of western Oromia's zones, with the exception of the highlands, as well as West Arsi, Bale, East Bale, Guji, and West Guji, as well as the majority of Southwest Ethiopia, South Ethiopia, Benishangul Gumuz, Northern and Western Amhara, western Sidama, and the western and northern Tigray zones of the country, are actually suitable for malaria breeding and transmission during the upcoming first ten days of October 2025, as shown in figure 4 in red.

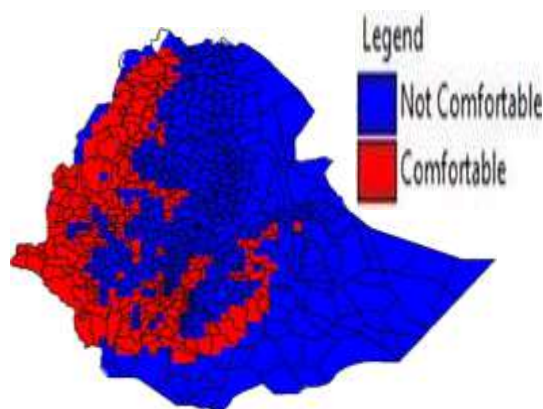


Figure 4: Expected malaria prone areas

2.2 Temperature Humidity Index

2.2.1 Human Comfort Condition

The majority of the country will experience pleasant weather for the first ten days of October, with the exception of the regions of Afar, Benishangul Gumuz, Southern and Northern Somalia, southern South Ethiopia, and Gambela, which will be partially (50%) to completely (100%) uncomfortable for those who live there (a sign of heat stress is anticipated), as shown in figure 5.

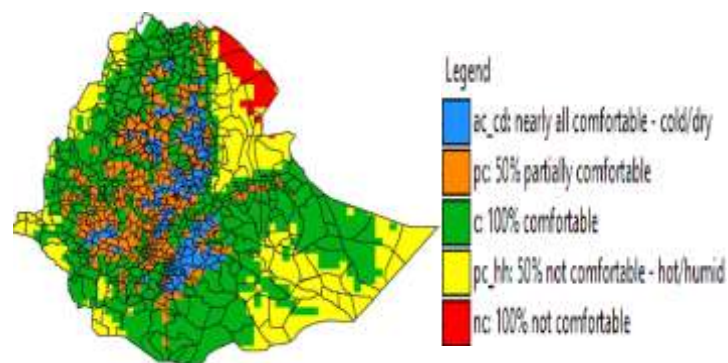


Figure 5: Expected Human comfort

2.2.2 Cattle Comfort Condition

Equivalent to the comfort of humans, cattle will face moderate heat stress conditions over the next ten days of October in the regions of Afar, Gambela, and Southern South Ethiopia, while the majority of the country's low-land border regions will experience mild heat stress conditions, as illustrated in Figure 6.

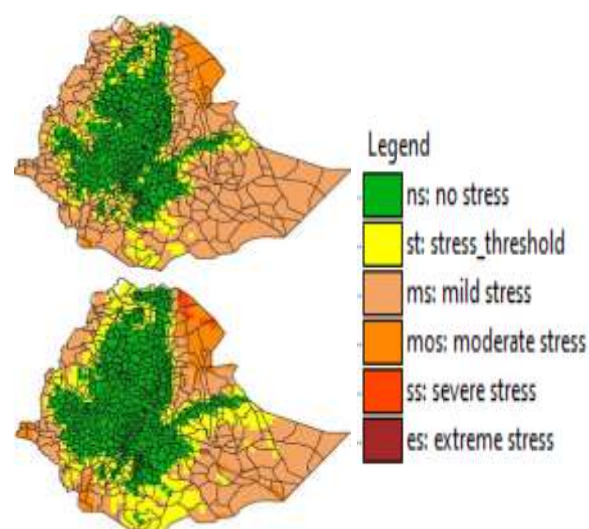


Figure 6: Expected Dairy (*Top*) and Non-Dairy (*Bottom*) Cattle comfort



3. Summary

According to the September 2025 climate-health analysis, the Western and Northern halves of the country (i.e., south-west, west, north, and north-west) have favourable climate conditions for malaria vector transmission and expansion. As a result, malaria exposure will increase, particularly in Kiremt rainfall-benefiting areas of the country's west and north. However, heat stress conditions exist in the low-lying border areas of Eastern, Northeaster, Western and Southern Ethiopia, particularly in the Afar, Gambela, Somali, and South Ethiopia regions, affecting human and cattle activity and productivity.



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.

