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Integrated Sector Oriented Meteorological Service

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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 32^0C, 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 18^0C-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 April 2025

1.1 Malaria prone areas

During the month of April 2025, Southern, South-Eastern and South-Western half of the countries were suitable for malaria transmission. In Oromia region Jimma, Illu Aba Bora, Buno Bedelle, Kellem welega, west Wellega, East Bale, Bale, All Guji zone and Borena zones, All zones of Southe-west, South, central Ethiopia and Sidama region, in Gambela Agnewak and Majang zones and in Somali Daawa, Liben, Afder, Shebele, Nogob, Erer and Jarar zones were some of the suitable zones to the malaria breading and transmission as illustrated in Figure 1

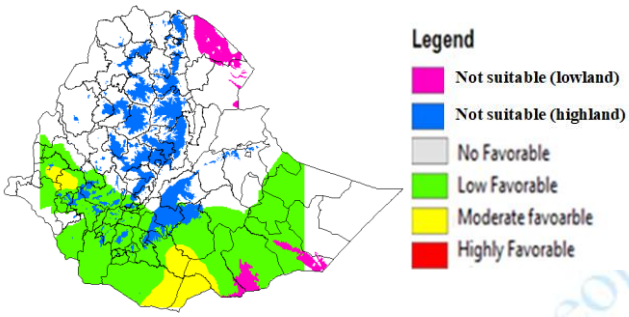

Figure 1: Malaria Prone areas

1.2 Climate comfort Conditions

1.2.1 Comfortability for Human

In the day-to-day human activity during the month of April 2025, most low land parts of Gambela, Afar, Western Amhara, Benishangul Gumuz and also southern parts of Somali region was in heat stress condition, while the rest most parts of the country was moderately heat stress to pleasant condition as shown in figure 2.

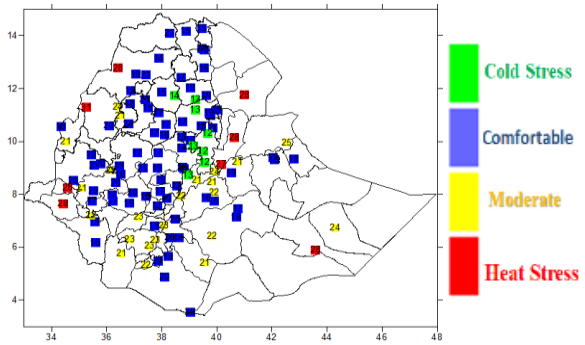

Figure 2: Human comfortable index

1.2.2 Comfortability for Cattle

In the other way, in the month of April 2025, there was a mild to moderately heat stress condition over Gambela, Afar, Benishangul Gumuz, western Amhara, lowlands of South Ethiopia region and souther and northern parts of Somali regions. While other mid and high lands of the country was comfort conditions as shown in figure 3.

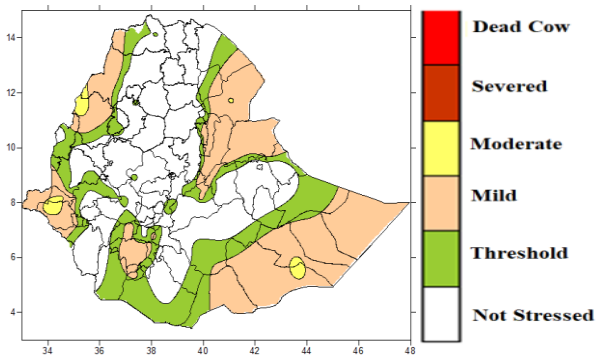

Figure 3: Cattle Comfort index

2. Expected Weather Impact on Health for first dekad of May_2025

2.1Expected Malaria breeding areas

In the coming Ten days (1st dekade) of May 2025, most parts of Belg rainfall benefiting area will more conducive to the breading and transmission of malaria; such as Jimma, Illu Aba Bora, west Wellega, Kellem Wellega, Borena, Guji, Bale, and west Harerge in oromo regions, All zones of South-west Ethiopia, Sidama, most parts of South and Central Ethiopia zones, Liben, in Somali, and Agnewak and Majanig zones of Gambela regions will in suitable climate conditions for the next ten days for the breading and transmission of malaria as illustrated as red in figure 4.

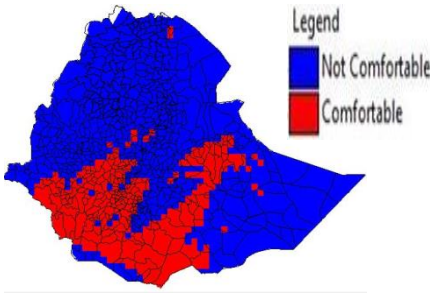

Figure 4: Expected malaria prone areas

2.2 Comfort condition

2.2.1 Comfortability for Human

In the coming May 1st dekad, there will be a 100% heat stress weather condition over Afar and Gambela regions. Also a partially (50%) heat stress weather condition will prevailed in lowlands of South Ethiopia, Benishangul Gumuz, western Amhara, western Tigray and southern-Somali for humans day to day activities (heat stress expected), while other highland parts of the country will in a good condition as looking in figure 5.

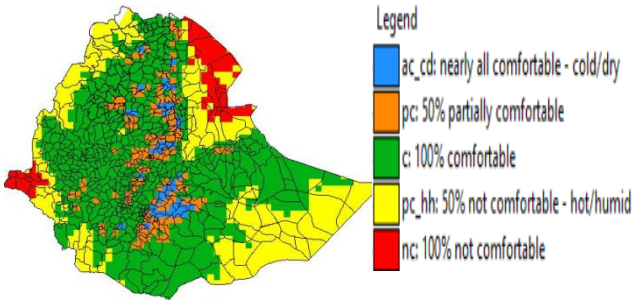

Figure 5: Expected Human comfort index

2.2.2 Comfortability for Cattle

In addition to the human comfort, in the coming ten days of May 1st dekad, most lowland-border parts of the country will under in the start of heat stress condition for cattle's productivity. However, strengthen moderately heat stress condition will happened in Afar, Gambela, southern-Somaliand the rest most **highland parts** of the country's will have non-stress conditions, as shown in Figure 6.

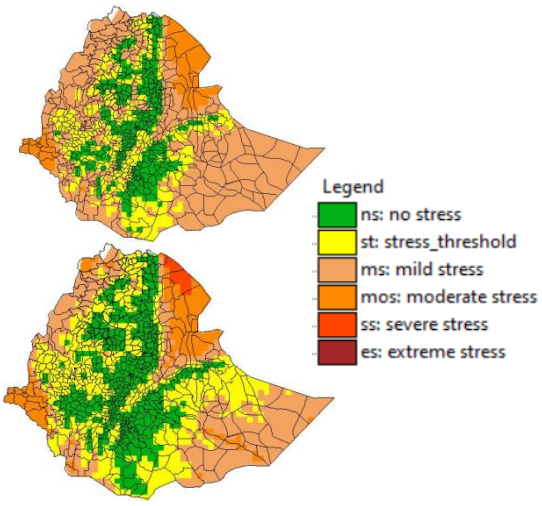

Figure 6: Expected Dairy (***Top***) and Non-Dairy (***Bottom***) Cattle comfort

3. Summary

As of the climate-health analysis result, the transmission and expansion of malaria will expand in the coming time step, especially in the southern, south-western, and south-eastern parts of the country. Moreover, the heat-stress conditions will increase in strength and area distribution, especially over the low-laying border parts of the Eastern, Southern, Western, North-western, and North-eastern parts of the country for humans and cattle's 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.
- Use more fluids in heat prone-areas
- Lime the outdoor activities and re-arrange the working times