

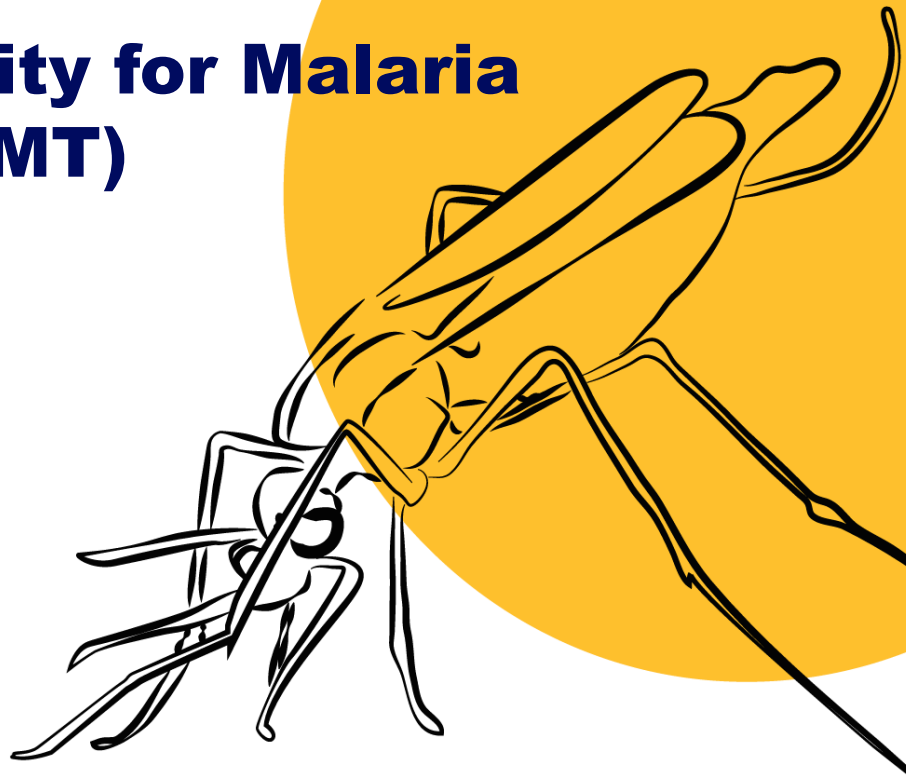


# EN/ACTS

ENHANCED NATIONAL CLIMATE SERVICES

## Climatic Suitability for Malaria Transmission (CSMT)

**Training Module**  
**Ethiopia**  
**July 15, 2016**  
**Version 1.0**



International Research Institute  
for Climate and Society  
EARTH INSTITUTE | COLUMBIA UNIVERSITY

**NMA** ብሔራዊ ሚትዎርሎጂ ኤጀንሲ  
NATIONAL METEOROLOGY AGENCY

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## CLIMATIC SUITABILITY FOR MALARIA TRANSMISSION (CSMT) TRAINING - ETHIOPIA

### 1.1 Overview

*Why was it developed?*

The Climatic Suitability for Malaria Transmission (CSMT) tool was developed to help malaria control practitioners better plan activities at district or regional scales through a better understanding of the seasonality of malaria risk as indicated by climatic factors.

*What can the CSMT tool be used for?*

- Estimating the probable length of the main malaria season(s)
- Planning for the timing of control activities, including dissemination of malaria commodities to individual districts
- Identifying epidemic prone districts
- Identifying districts where increasing temperature or precipitation trends may increase malaria transmission

*What can the CSMT tool NOT be used for?*

- Predicting epidemics in the coming season/year
- Investigating malaria risk caused by factors other than precipitation

and/or temperature

### 1.2 Definition

The CSMT tool is an interactive map that displays the number of months during the year when climatological (i.e. long-term average) conditions are considered to be suitable for malaria transmission. Suitability is based on empirically-derived thresholds of precipitation, temperature and relative humidity.

### 1.3 Interpretation

The CSMT map shows the number of months suitable for malaria transmission, based on climatological averages. Suitability is defined as the coincidence of monthly precipitation accumulation greater than 80 mm, monthly mean temperature between 18°C and 32°C, and monthly relative humidity greater than 60%. These thresholds are based on a consensus of the literature. In practice, the optimal and limiting conditions for transmission are dependent on the particular species of the parasite and the mosquito vectors.

## 1.4 Access

Figure 1.1 displays a clickable map used in the CSMT interface that can be accessed through the Ethiopia Climate and Health Maproom (<http://www.ethiometmaprooms.gov.et:8082/maproom/Health/CSMT/index.html>)

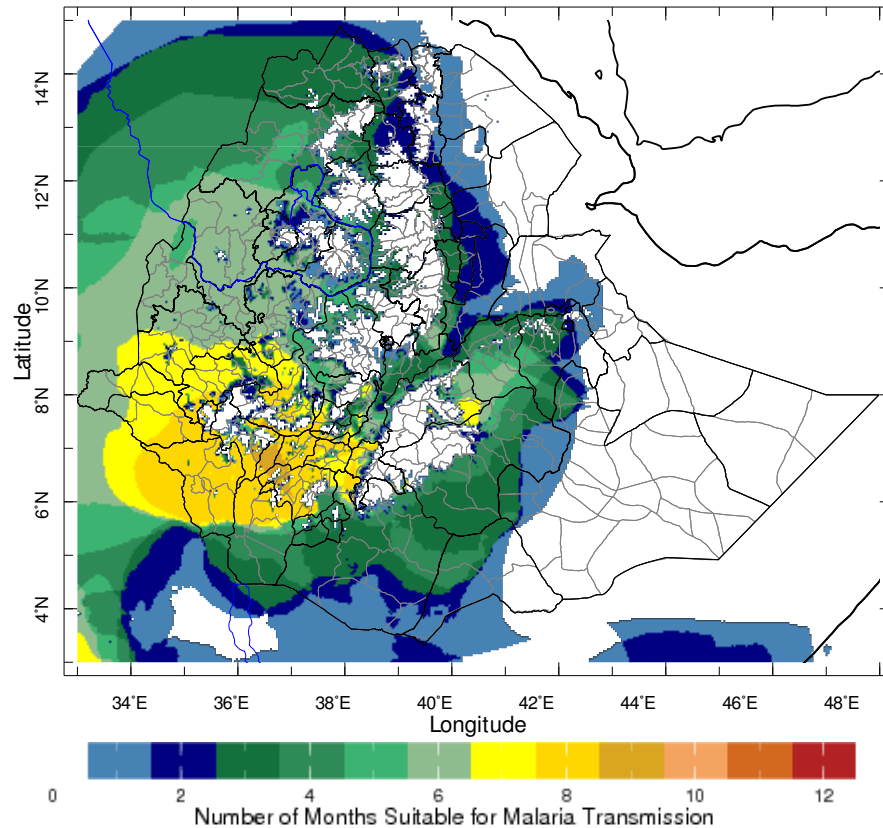


Fig. 1.1: Seasonal Climatic Suitability for Malaria Transmission in Ethiopia

This Ethiopia CSMT illustrates the number of months during the year that are suitable for malaria transmission based on climatological conditions derived from precipitation (NMA ENACTS climatology 1983-2010), temperature (NMA ENACTS climatology 1981-2010) and relative humidity (National Centers for Environmental Prediction/National Center for Atmospheric Research).

## 1.5 Analyses

In Figure 1.2, the time series graphs display the percent occurrence of climate conditions that were suitable for malaria transmission during 1983-2010 for the Southern Nations, Nationalities and Peoples, region in Ethiopia.

By clicking on any location of interest, it is possible to generate and visualize the map of percent occurrence of climate conditions suitable for malaria transmission and the individual graphs of corresponding precipitation, temperature and relative humidity percentage occurrences.

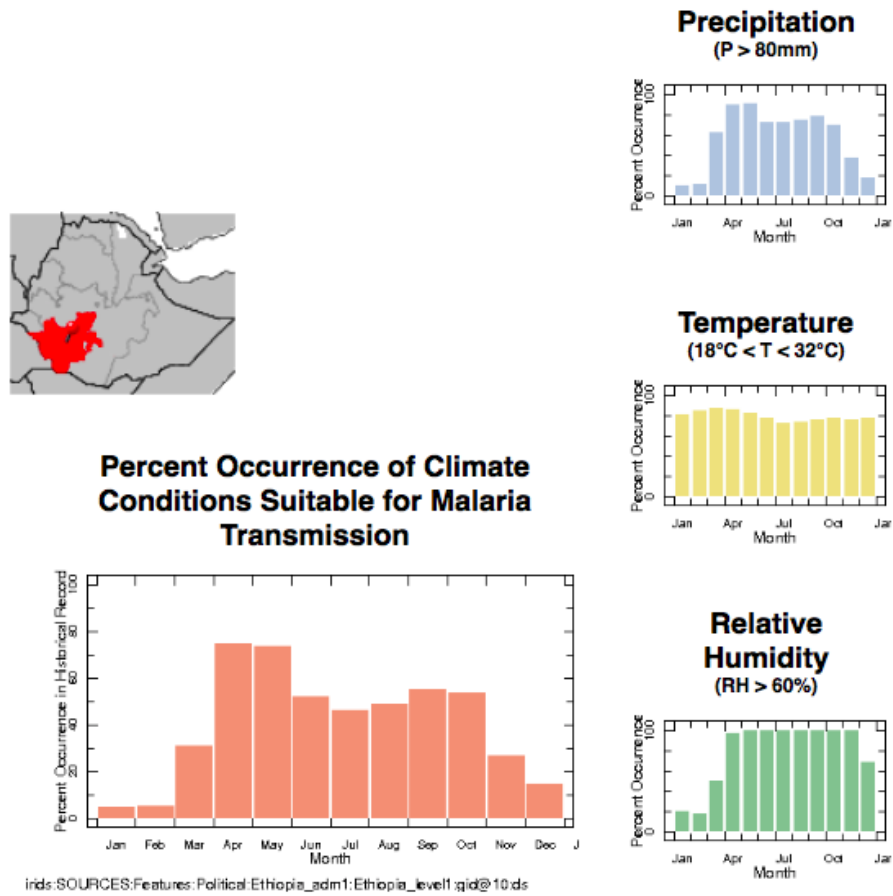


Fig. 1.2: Percent occurrence of climate conditions suitable for malaria transmission for the Southern Nations, Nationalities and Peoples, region in Ethiopia

## 1.6 Case Study - Tanzania

The President Malaria Initiative (PMI) wants to start a campaign of mosquito control in an area in South East Tanzania. When would be the best time to apply insecticide and control the mosquitoes?

The answer can be obtained by selecting a southeastern district within the toolbar or the clicking on a location in southeastern Tanzania, as seen in Figure 1.3.

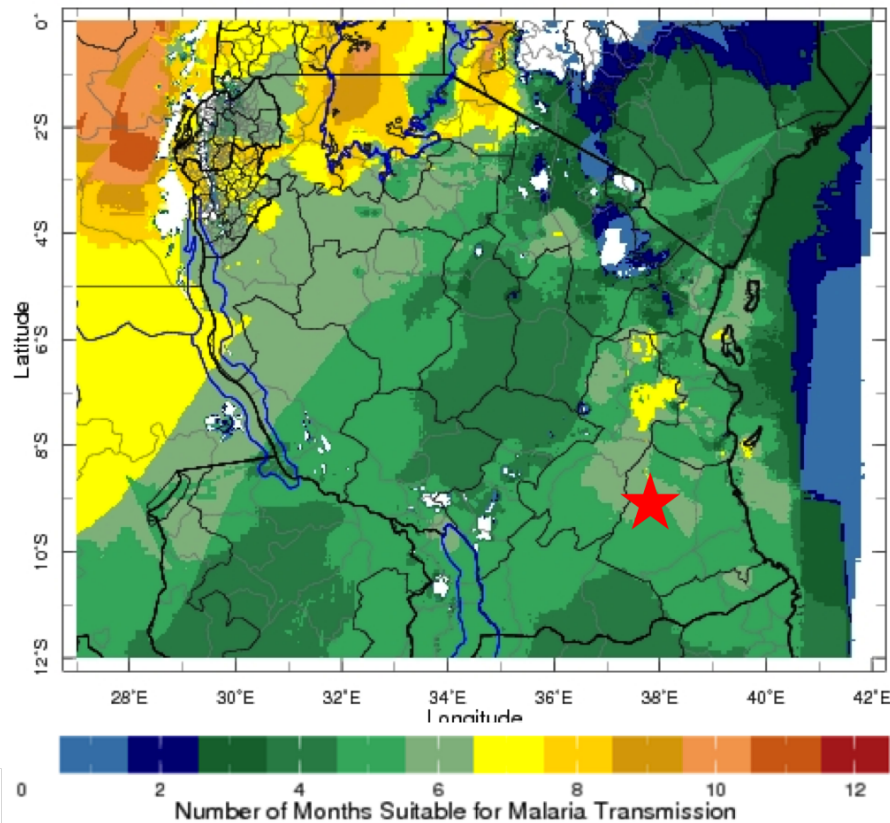


Fig. 1.3: Seasonal Climatic Suitability for Malaria Transmission in an area in South East Tanzania

The resulting graphs in Figure 1.4 show that the malaria transmission usually starts in November and lasts until May. Therefore, the most appropriate time to run the control campaign would be just before the beginning of the malaria transmission – September or October.

## 1.7 Exercise - Ethiopia

*Please perform the following exercises:*

E1. Using the CSMT tool and its toolbar, generate maps and graphs for the southeast district of Ifanadiana, Fianarantsoa, Ethiopia.

*Please answer the following question:*

Q1. Based on your map, also seen in Figure 1.5, when would be the best time to control mosquitoes in the Ela (Konta), Dawro, SNNPR district in Ethiopia, where CSMT is 5 months?



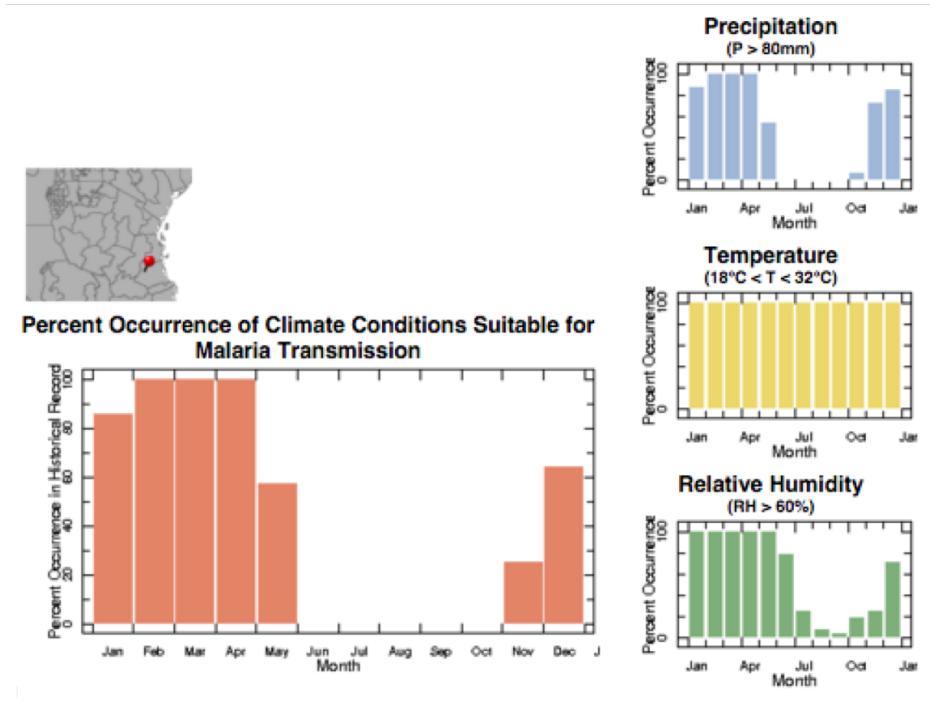


Fig. 1.4: Percent occurrence of climate conditions suitable for malaria transmission for a district in an area in South East Tanzania

### 1.7.1 Exercise - Answers

A1: As per figure 1.6, November, December, January and February would be the best months to control mosquitoes because the malaria transmission is at the lowest.

## 1.8 Quiz

Please answer the following questions:

1. The CSMT tool can be used to identify the timing of interventions (T/F)
2. The CSMT tool can be used to predict malaria epidemics (T/F)
3. The CSMT tool can be used to evaluate the impact of interventions (T/F)

### 1.8.1 Quiz - Answers

A1: True, the CSMT tool can be used to identify the timing of interventions.

A2: False, the CSMT tool CANNOT be used to predict malaria epidemics.

A3: False, the CSMT tool CANNOT be used to evaluate the impact of interventions.

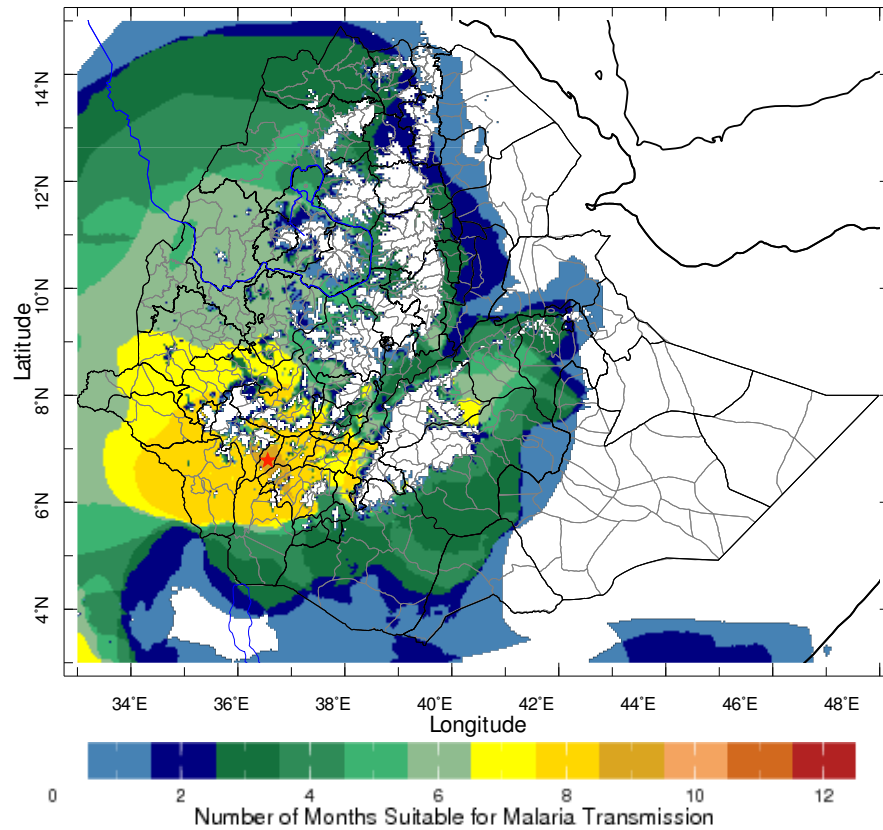


Fig. 1.5: Seasonal Climatic Suitability for Malaria Transmission in Ela (Konta), Dawro, SNNPR district in Ethiopia

### Percent Occurrence of Climate Conditions Suitable for Malaria Transmission

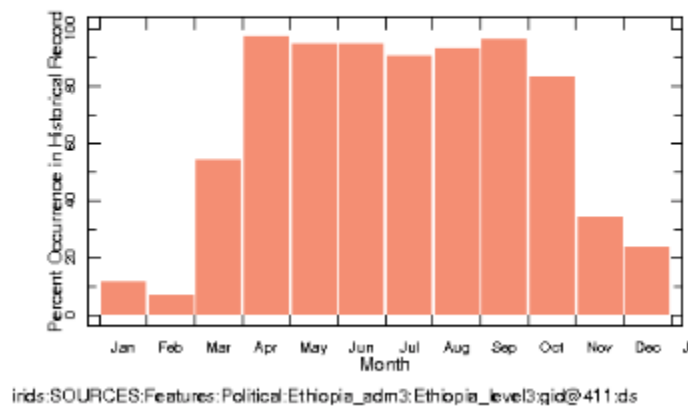


Fig. 1.6: Total percent occurrence of climate conditions suitable for malaria transmission for the southeast district of Ela (Konta), Dawro, SNNPR district in Ethiopia

## 1.9 Summary

The CSMT is a tool for use in malaria surveillance intervention. It enables the user to access the information about when and where malaria transmission is suitable based on a combination of precipitation, temperature and relative humidity.

## 1.10 Reference(s)

- Grover-Kopec, E. K., Blumenthal, M. B., Ceccato, P., Dinku, T., Omumbo, J., Connor, S. J. (2006). Web-based climate information resources for malaria control in Africa. *Malaria Journal*, 5:38