



# IMPROVING MALARIA EVALUATION AND PLANNING WITH ENHANCED CLIMATE SERVICES IN EAST AFRICA

Authors: B. Platzer (*Mobilizing Action Toward Climate Change and Health*); T. Dinku (*International Research Institute for Climate and Society*); S. Ferazzi (*Roll Back Malaria Partnership*); Thomas Teuscher (*Roll Back Malaria Partnership*); Aduugna Woyessa (*Ethiopian Public Health Institute*); Melesse Lemm (*Ethiopian National Meteorological Agency*); Renata Mandike (*Tanzanian Ministry of Health and Social Welfare - National Malaria Control Programm*); Hellen Msemo (*Tanzanian Meteorological Agency*); Christine Hershey, Sergio Rene Salgado (*USAID/President's Malaria Initiative*); Madeleine Thomson (*International Research Institute for Climate and Society*).



## CONTEXT

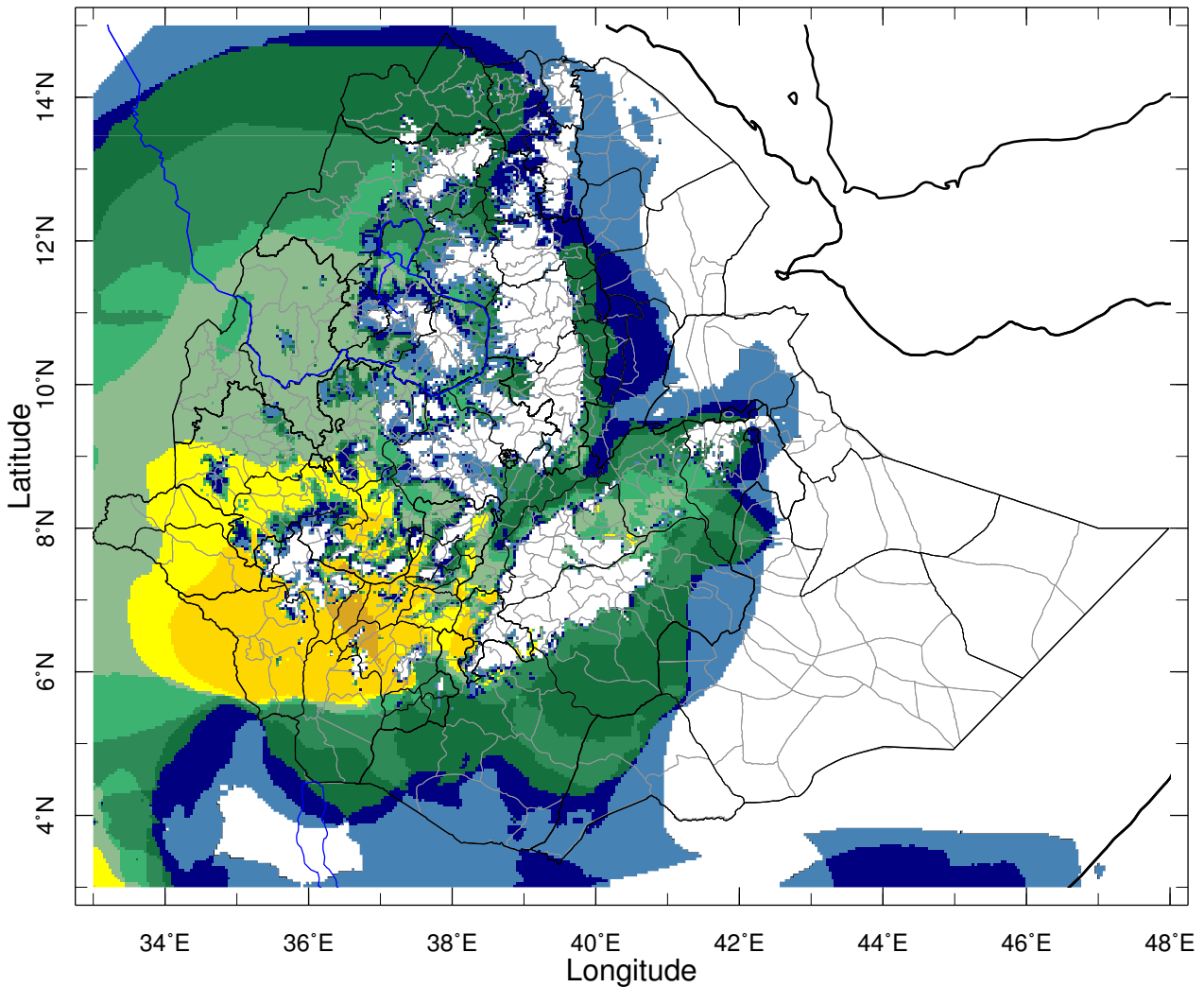
National malaria control programmes and national meteorological agencies in East Africa are pioneering new decision-support tools and partnerships to address the historical impact of climate on malaria transmission and to better prepare for the future (29). This case study highlights, in particular, country efforts underway in Ethiopia and Tanzania with technical support from the International Research Institute for Climate and Society (IRI), the Columbia Global Centers/Africa (CGC/Africa), the Roll Back Malaria Partnership and the US President's Malaria Initiative (PMI). Lessons learned from incorporating climate data into malaria impact assessments (27), and other aspects of malaria planning (28), can benefit the broader development of climate services that deliver relevant and robust information to often underserved health stakeholders.

## NEW APPROACHES

The Ethiopian National Meteorology Agency and the Tanzanian Meteorological Agency (TMA) have launched groundbreaking initiatives on Enhancing National Climate Services (ENACTS) to dramatically improve the availability, access and use of climate data and information relevant to decision-maker needs through partnered consultation across government ministries and sectors. National malaria control programmes, in particular, have provided a pathway to demonstrate the value of this newly available information to communities in need of quality assured, high-resolution data and tools for mapping populations at risk of malaria, investigating the seasonality and timing of interventions, monitoring year-to-year trends, targeting resources and advocacy for early preparedness (30).

This nationally rigorous climate information, which leverages all ground-based observations available at the country level with proxy satellite and other data, is especially valuable to historical impact assessments of malaria control. Understanding how the past climate has impacted malaria transmission and control is critical to current national evaluations, future financing and the ability to respond to malaria risks in a changing climate. The ENACTS products have already supported several Roll Back Malaria-led impact assessments, including in Ethiopia, Tanzania and Rwanda (with other country evaluations in development).

**Figure 6.9** Number of months suitable for malaria transmission, computed based on the suitability of climatological condition. Suitability is defined as the coincidence of precipitation accumulation greater than 80 mm, mean temperature between 18°C and 32°C, and relative humidity greater than 60%.



As is well documented, the East African climate is a key driver of spatial and temporal variability in malaria transmission in the region. Populations with high malaria prevalence are historically found in the humid lowlands (such as those surrounding Lake Victoria), while populations prone to climate-related epidemics are found in marginal transmission zones such as semi-arid regions (including northeastern Kenya, for example) and the East African highlands. Thus control efforts, especially those being evaluated over the past decade, must be understood in this context of underlying variability with interventions more likely to succeed in areas with lower climate suitability for malaria.

## CASE STUDY 6D



Historically well-understood malaria stratification may be changing, however, due to recent climate trends (see Figure 6.9). Thus high-quality climate services are more crucial and in demand than ever (32). East Africa has made headlines with a series of severe drought events, experienced since 1999 particularly during the long rainy season, which typically runs from March to May. The most recent of these events triggered a humanitarian crisis in the Horn of Africa. These recent droughts, while exacerbating threats to food security and livelihoods, may have in fact contributed to malaria declines in the region, indirectly increasing the impact of government and donor investments in malaria control and elimination. However, the favourable environment for malaria control in East Africa may not last. A study on the causes of the recent drying suggests that the alternating dry and wet periods in this region are associated primarily with natural climate variability operating on a decadal time-scale (28). Long-term climate change projections may have further implications for the climatic suitability of malaria transmission.

Short-lived phenomena, such as El Niño (which tends to increase rainfall during the short rainy season of East Africa and bring warmer temperatures across the tropics) can also disrupt the steady progress made by national malaria control programmes in this region, at a time when interventions are facing more constrained resources than experienced in the past decade. The ENACTS products were used, in particular, by national malaria control programmes and their partners in Ethiopia and Tanzania to monitor and prepare for the forecasted 2014 El Niño and its associated risk of increased malaria transmission.

Figure 6.10 Implications of climate suitability for malaria transmission and impact assessments.

CHANGES IN CLIMATE SUITABILITY FOR MALARIA TRANSMISSION FOLLOWING INTERVENTION (RELATIVE TO BASELINE)	CHANGES IN OBSERVED MALARIA FOLLOWING INTERVENTION (RELATIVE TO BASELINE)	
	decrease ↓	no change or increase ↑
Increase ↑	may underestimate impact of intervention	may obscure impact of intervention
No change (average)	no effect	
Decrease ↓	may overestimate impact of intervention	may obscure extent of failure of intervention

## ACKNOWLEDGEMENTS

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While climate is not the only driver of changes in malaria risk (effectiveness of malaria interventions, poverty reduction, education, urbanization, etc. are also significant factors), countries and the global malaria community should be aware of the potential risk linked to climate variability and change and take measures accordingly. Lower transmission risk during a favourable (dry) climate should also be taken advantage of, in particular to reduce the impact of a return to a wetter environment and to drive down this devastating disease overall. Variations in malaria outcomes that result from a changing climate should be factored in as part of malaria control and elimination strategies and should not be interpreted as programme failure. This can be supported through dedicated trainings and stakeholder consultations responding to national needs. Through ENACTS partnerships, on-site training and extended technical visits have been held at the national meteorological agencies in Ethiopia and Tanzania, for instance, along with tailored workshops for communities of practice (ranging from health professionals and decisions-makers to local public health researchers). National exchange has also been supported through regional stakeholder meetings to ensure country lessons are shared. Ministry of health and national meteorological agency staff have also been supported for technical trainings and collaborations hosted at the International Research Institute for Climate and Society at Columbia University in New York.

## BENEFITS AND LESSONS

The added value of the decision-support tools and partnerships pioneered in East Africa has been demonstrated by a growing demand for the ENACTS products. Uptake of these tools has been evaluated through workshop assessments and follow-up, as well as project surveys and monitoring of access to web-based platforms and requests made to national authorities for ENACTS products and training. Ongoing systematic evaluation, including national surveys on the wider use of climate information by health practitioners, is a priority for collaborators to ensure continued relevance of products to country needs.

Advances in nationally available historical climate data and information, available through the online climate and health 'map rooms' of Ethiopia and Tanzania, should be further leveraged locally and internationally to better understand, monitor and manage climate-related risks to malaria control and elimination. In addition, understanding the spatial extent of the current drought in Eastern Africa, its severity, its likely cause and if and when it may end, are important for decision-makers and other stakeholders, including development partners, to better target current malaria interventions and improve allocation of shrinking resources, while preparing for new challenges ahead.