ENHANCING NATIONAL CLIMATE SERVICES

Maximizing the Impact of Malaria Investment in a Varying Climate

Malaria is a complex disease, with climate acting as one of a number of possible confounders in the evaluation of malaria interventions. While drought years may help drive malaria cases down, warm and wet years may increase risk of disease and make control and elimination more difficult to achieve. Factoring in climate is a key part of measuring the success of national and international investments in malaria control and elimination and managing risks moving forward.

The Enhancing National Climate Services (ENACTS) initiative delivers robust climate data, targeted information products and training for practitioners, enabling them to apply climate information to malaria impact assessment with confidence.

Why Quality Climate Data Is Needed

Incorporating climate into malaria impact assessment or other aspects of malaria planning and program implementation can improve targeting of scarce resources and response to changes in malaria risk. Using climate information, however, requires quality assured data at the appropriate spatial and temporal scales. Until recently, data, technical issues and policy constraints have limited the availability of program-relevant climate information for local and national analyses.

Many developing countries have gaps in climate observational records, undermining the reliability of climate analysis, short-term forecasts and long-term projections.

Tanzania's National Meteorological Agency is pioneering efforts to dramatically improve the availability, access and use of climate data and information through the development of the Enhanced National Climate Services (ENACTS) initiative, supported by the International Research Institute for Climate and Society, Columbia University, New York, and partners.

ENACTS strengthens policy analysis for multiple sectors, by providing relevant data with national coverage with much greater accuracy at smaller spatial and temporal scales. In addition to improving malaria risk maps and helping target scarce resources, this data can assist malaria impact assessment. If climate is not taken into account, malaria impact assessments may overestimate or underestimate the success of interventions and put populations and critical future funding at risk.

Overcoming the Data Challenge

By integrating ground-based observations with proxy satellite and other data, ENACTS products and services overcome issues of data scarcity and poor quality, introducing quality-assessed and spatially complete data services into national meteorological agencies to serve stakeholder needs. One of the strengths of ENACTS is that it harnesses all local observational data, incorporating high definition information that globally produced or modelled products rarely access. The resulting spatially and temporally continuous data sets allow for the characterization of climate risks at a local scale.

ENACTS enables analysis of climate data at multiple scales to enhance malaria control and elimination decisions.

It uses detailed historical climate data to:

+ Understand natural variability in temperature and rainfall over national, regional and district scales and assess the impacts on malaria outcomes.

If climate is not taken into account, malaria impact assessments may overestimate or underestimate the success of interventions.

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

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

WHO Collaborating Center on Early Warning Systems for Malaria and other Climate Sensitive Diseases

ENACTS

A Climate Sensitive Disease

Climate is important for the geography and seasonality of malaria as well as for year to year changes in risk (e.g. epidemics). Temperature drives the development rates of both the mosquito vector and malaria parasite, while rainfall and humidity provide essential environmental characteristics for mosquito development and survivorship, respectively.

"Understanding how the climate has aided or challenged interventions is a critical component to rigorous impact assessments of malaria investments in control and elimination."

**Abdisalan Noor
MERG, Roll Back Malaria Partnership**

+ Understand climate sensitivity to map populations and systems at risk of climate variability and change.

+ Improve the timing and scale of malaria interventions.

It provides the ability to monitor current climate and to develop forecasts to:

+ Trigger early warning systems to alert for potential changes in malaria risk including epidemics.

+ Strengthen activities to support climate-smart sustainable development, including multi-sectoral approaches to malaria control and elimination.

Adding Value to Current Malaria Programs

Availability of data is enhanced by blending data from the national obser-vation network with satellite, climate reanalysis and elevation map data.

Access is improved by making informa-tion available online. An online mapping service, populated and customized using the powerful IRI Data Library platform, is installed at national meteorology services

with user-friendly tools for the analysis, visualization, sharing and downloading of climate information across systems.

Use of climate information is enhanced by practitioners and decision-makers identifying their information needs to guide development of products and training. This user-led approach ensures ENACTS builds capacity and empowers malaria programs and their partners to apply climate information with confidence.
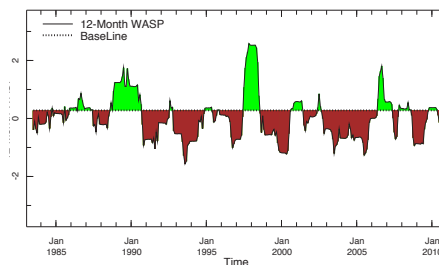
ENACTS data can be converted 'on the fly' to user-oriented products such as the WASP index which provides a simple visual means of relating averaged rainfall for an area (e.g. here Singida Province, Tanzania) to a reference period of interest such as a pre (1995-1999) and and post (2000-2012) intervention period. Note that former period includes the 1997/1998 El Nino rainfall while the intervention period includes a series of major droughts (2000, 2003, 2005).
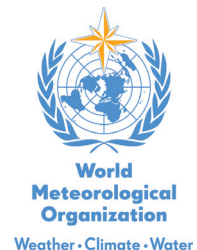
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