Impacts of El Niño on health: what have we learned since 1997/8

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Collaborating Centre on early warning systems for malaria and other climate sensitive diseases
Malaria

• Critical outcome area for the MDGs
• Highly climate sensitive
• Potential for expansion (re-emergence) in Europe and North America) associated with warming
Detrended malaria incidence anomalies in Botswana associated with ENSO (blue - La Nina and red = El Nino – both = purple)
Epidemic malaria in Kericho associated with the 1997/8 El Niño

GOING UP
Malaria incidence and temperatures have risen near Kericho in Kenya over the past 30 years; health experts are keen to know whether they are linked.

Catastrophic death-rates in North Eastern Kenya (Wajir) following 1997/8 El Niño

Catastrophic deaths, approximately 5% of the population, during the 1997–1998 epidemic and 10,545 deaths in the Wajir province as a whole.

Average daily crude mortality was 9.4/10,000 and daily under-5 mortality was 28.4/10,000.
Changing policy, funding and socio-economic environment since 1997/8
Public health and weather services—climate information for the health sector

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Introduction

Climate is a key variable in managing the overall burden of disease, particularly in developing countries where the ability to control climate-sensitive diseases constrains the prospects of achieving the United Nations Millennium Development Goals. To mitigate their adverse effects, the health sector needs to understand and quantify the specific impacts of climate variability and change on both the overall disease burden and on opportunities and interventions in the public health sector.

It applies equally to future adaptation strategies of the health sector in the face of climate change. For example, accurate assessment of the impact of a bed net programme for malaria control depends on knowing the climate trend during the assessment period. In the absence of any intervention, increasingly wet years may well increase the mosquito population, resulting in a higher incidence of malaria, while conversely, periods of drought may well decrease the mosquito population and reduce the incidence of malaria.

It is also possible that the trend could reverse in certain locations. Dry years favouring transmission when normally rainy dreams leave intermittent pools of water during drought periods which then become suitable for mosquito breeding. Thus, it is important to understand the environmental context to develop an accurate picture of the efficacy of any intervention strategy.

The health sector can also use climate information effectively in epidemic early warning systems. Seasonal forecasts of temperature and rainfall, which are used to indicate the likely occurrence of malaria outbreaks, can be integrated into a programme of vector control. Weekly min temperature and rainfall estimates can be used to initiate selective interventions and to support the early detection of disease outbreaks.

Climate change is high on the agenda of public health services worldwide. The recent World Health Assembly of the World Health Organization (WHO) (May 2010) reinforced the need for countries to develop health measures and integrate them into their adaptation strategy to climate change to strengthen the capacity of health systems for monitoring and mitigating the public health impacts of climate change through adequate preventive measures, preparedness, timely response and effective management of natural disasters. To enhance the health sector’s ability to effectively engage with all of the relevant sectors, agencies and key partners at national and global levels to identify current and projected health risks from climate change. One approach is to build and strengthen the use of climate information to inform national and global health policies and strategies, help prioritize and plan investments, and monitor and evaluate health outcomes and impacts of climate change.

The health sector is not usually engaged in climate and environmental monitoring, acquiring and using this type of information successfully depends on developing partnerships between health practitioners and the gatherers and providers of climate and environmental information. In most countries, the collection and provision of climate data and other information are the responsibility of the National Meteorological Service. National climate service providers need to be developed to meet user needs.
ENACTS* IN AFRICA

INTRODUCING ENHANCING NATIONAL CLIMATE SERVICES INITIATIVE

Targeted climate Information for impactful decision-making

*Enhancing National Climate Services
The Goal of ENACTS (Enhancing National Climate Services) is to transform local, national and regional climate-sensitive development decisions through the widespread uptake of timely, relevant, locally enhanced, quality assured climate information at relevant spatial and temporal scales.
New products combine locally calibrated satellite rainfall and temperature estimates and all available quality controlled ground-based meteorological station gauge data.

30 years – every 10 days every 4-5km
ENACTS Advantage

ARC RFE  ENACTS Monitoring  ENACTS Climate Analysis
Enhanced National Climate Services (ENACTS) Tanzania

Monthly Climate Analysis

This Maproom provides information on the mean climate at any given point or at national and sub-national levels.

This tool allows the user to construct maps of monthly mean climate variables: rainfall, maximum temperature and minimum temperature. The default map shows average precipitation for January over the whole country. Clicking on the map would generate graphs showing monthly climatologies as well as over 30-year time series of monthly anomalies for the selected season.

Probability of Monthly Averages (in a Season) Rainfall Tercile Conditioned on ENSO

The map shows the historical probability (given in percentiles) of seasonal average monthly rainfall falling within the upper (top), middle (normal), or bottom (low) one third (tercile) of the 1983-2009 normal period, conditioned on ENSO's state (El Niño Southern Oscillation) during that time period.

Here, the ENSO state for each season is determined by the seasonal average of the Niño-3.4 SST index. If the seasonal average Niño-3.4 SST index is in the top (bottom) 25% of the historical distribution for the season, the ENSO state is defined as an El Niño (La Niña). If the Niño-3.4 SST index falls between the 25th and 75th percentiles of the historical distribution, use the center icon on the page to select the season, rainfall tercile category of interest, and ENSO state.

Clicking on the map will then display, for the selected point, yearly seasonal rainfall averages for several seasons. The color of the point on the map indicates which tercile of rainfall the point falls in. This allows a user to quickly identify which seasons fall into each ENSO phase and into which rainfall tercile category.

Note: This is not a forecast. It is based on historical observations of rainfall and SST index values. It would be a good exercise for the user to review different ENACTS products on an operational basis.
ENACTS data in Tanzania
Comparison of CMAP and ENACTS rainfall
Weighted Anomaly Standardized Precipitation (WASP) Index

CPC Merged Analysis of Precipitation (CMAP)  ENACTS
At Ethiopian MoH Request

What is the impact of El Nino on Malaria?

Historical probability of seasonal monthly averages conditioned on El Niño in Ethiopia a) Low rainfall for Jul-Sep and (b) high rainfall Oct-Dec (c) high minimum temperatures Oct-Dec
Observations for Amhara, Ethiopia

Adjusted Rainfall Reconstruction [mm]

La Niña  Neutral  El Niño

ENSO Phase
Characteristics of climate

- The characteristics of climate make it potentially ideal as an additional layer of information for the health sector for application in vulnerability assessments, impact assessments, surveillance and forecasting:

- its climatology, seasonality, diurnal rhythm and potential predictability at multiple time scales (weather, seasonal, decadal and climate change).
Strengthening National Climate Data and Information for Malaria Decision-Making in Africa

4-5 August 2014, Dar es Salaam, Tanzania