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

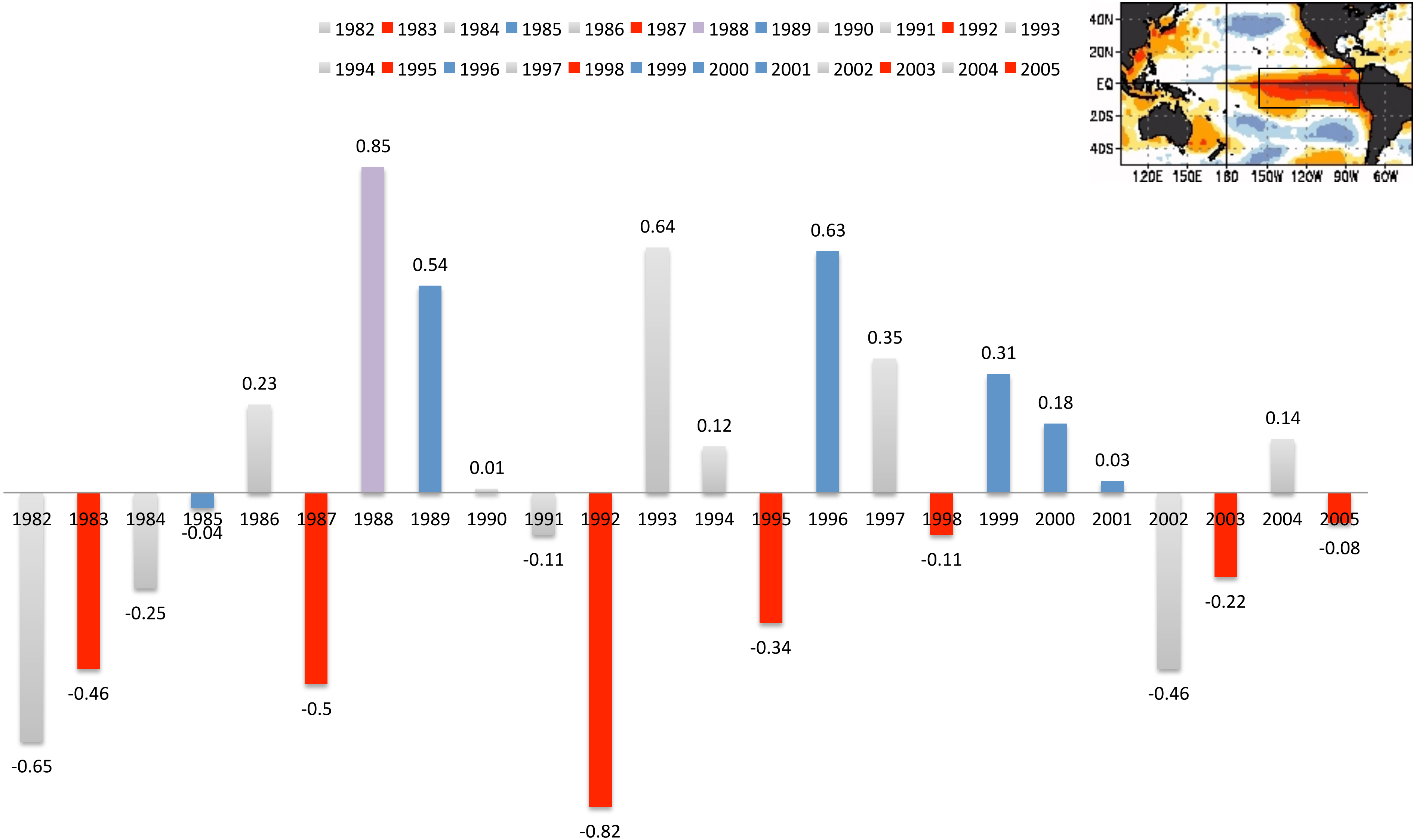
Madeleine C. Thomson

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

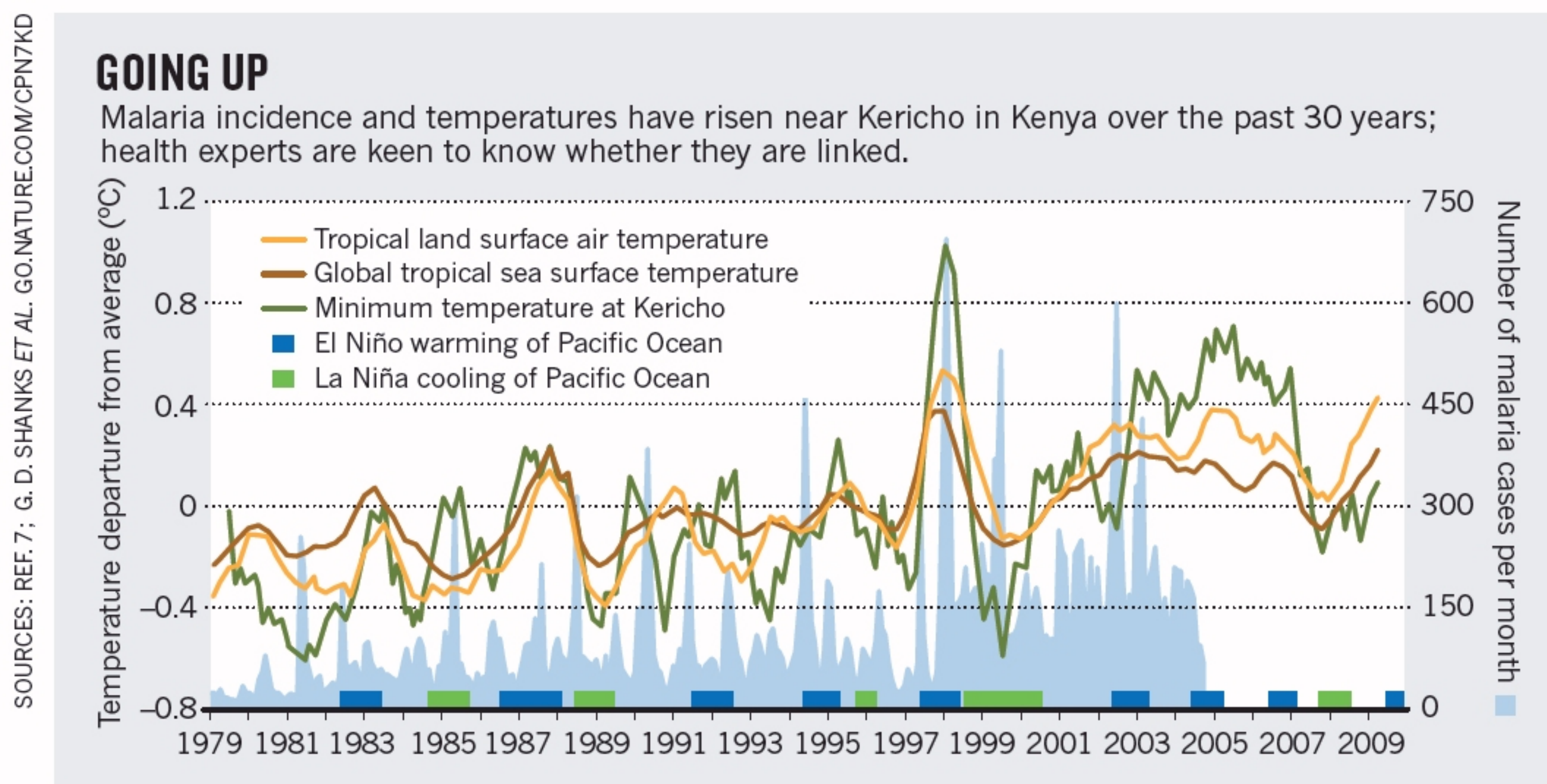
Malaria

- 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)

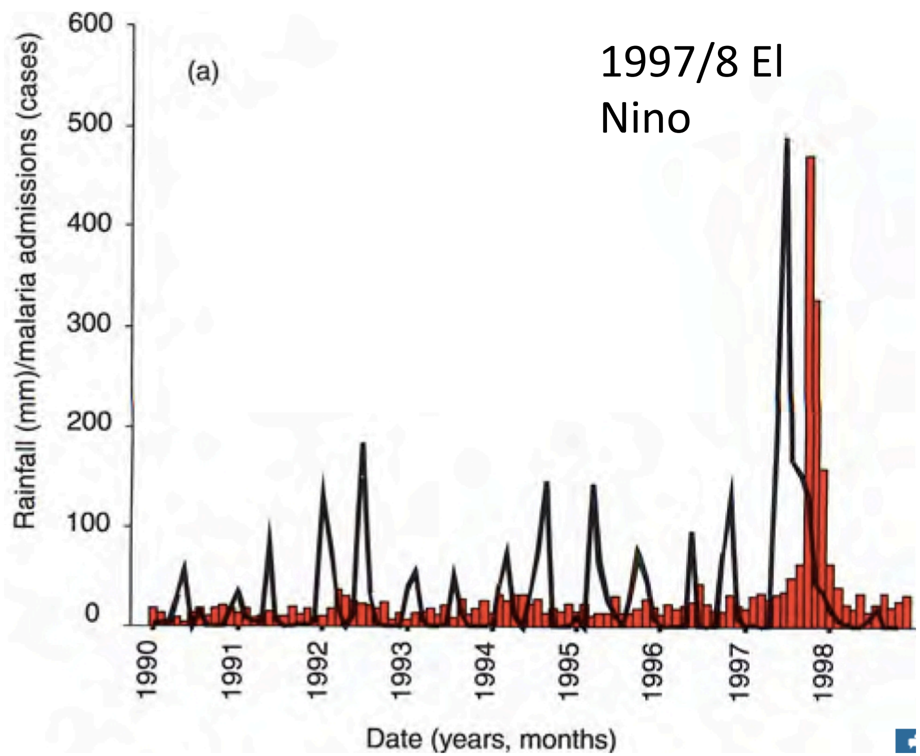


Epidemic malaria in Kericho associated with the 1997/8 El Niño



Thomson, M.C. Connor, S.J., Zebiak, S.E. Jancloes, M., and Mihretie, A (2011) Africa needs climate data to fight disease. Nature, 471 440-442 (24th March 2011)

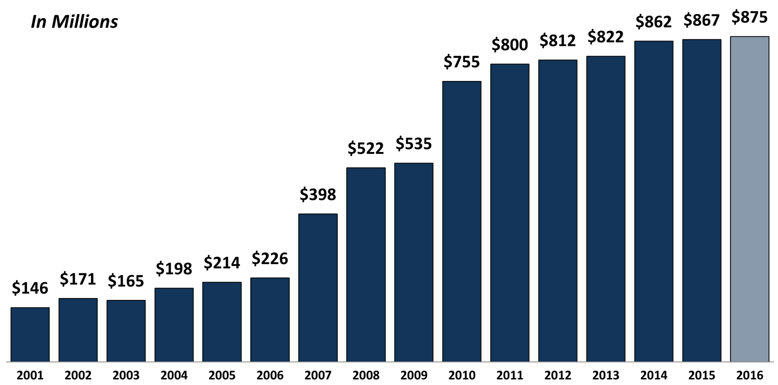
Catastrophic death-rates in North Eastern Kenya (Wajir) following 1997/8 El Niño



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

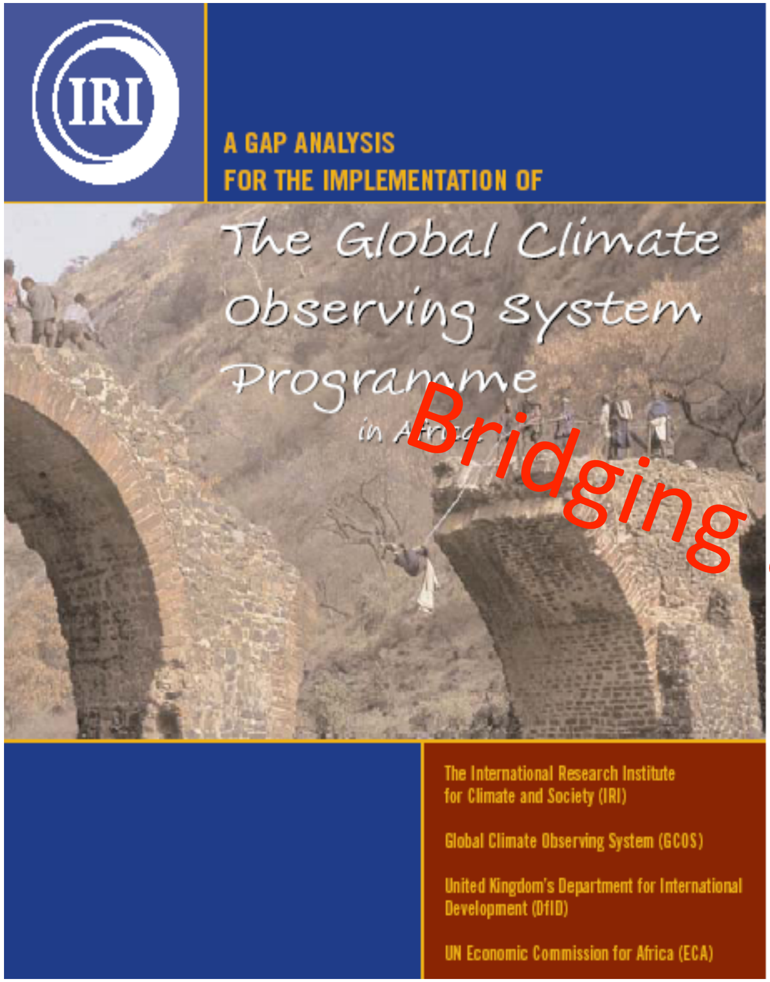
Average daily crude mortality was 9.4/10,000 and daily under-5 mortality was 28.4/10,000.

Changing policy, funding and socio-economic environment since 1997/8



The Addis Ababa light railway under construction in 2014. 'The country is pushing a narrative of breakneck development – the government says annual economic growth averaged 10% over the past decade.' Photograph: Carl De Souza/AFP/Getty Images

Bridging the Gaps



Public health and weather services—climate information for the health sector

by T.A. Ghebreyesus[1], Z. Tadese[1], D. Jima[1], E. Bekele[2], A. Mihretie[3], Y.Y. Yihdego[4], T. Dinku[5], S.J. Connor[5] and D.P. Rogers[6]

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 effects of climate variability and change both on the overall disease burden and on opportunities and effectiveness in the public health response.

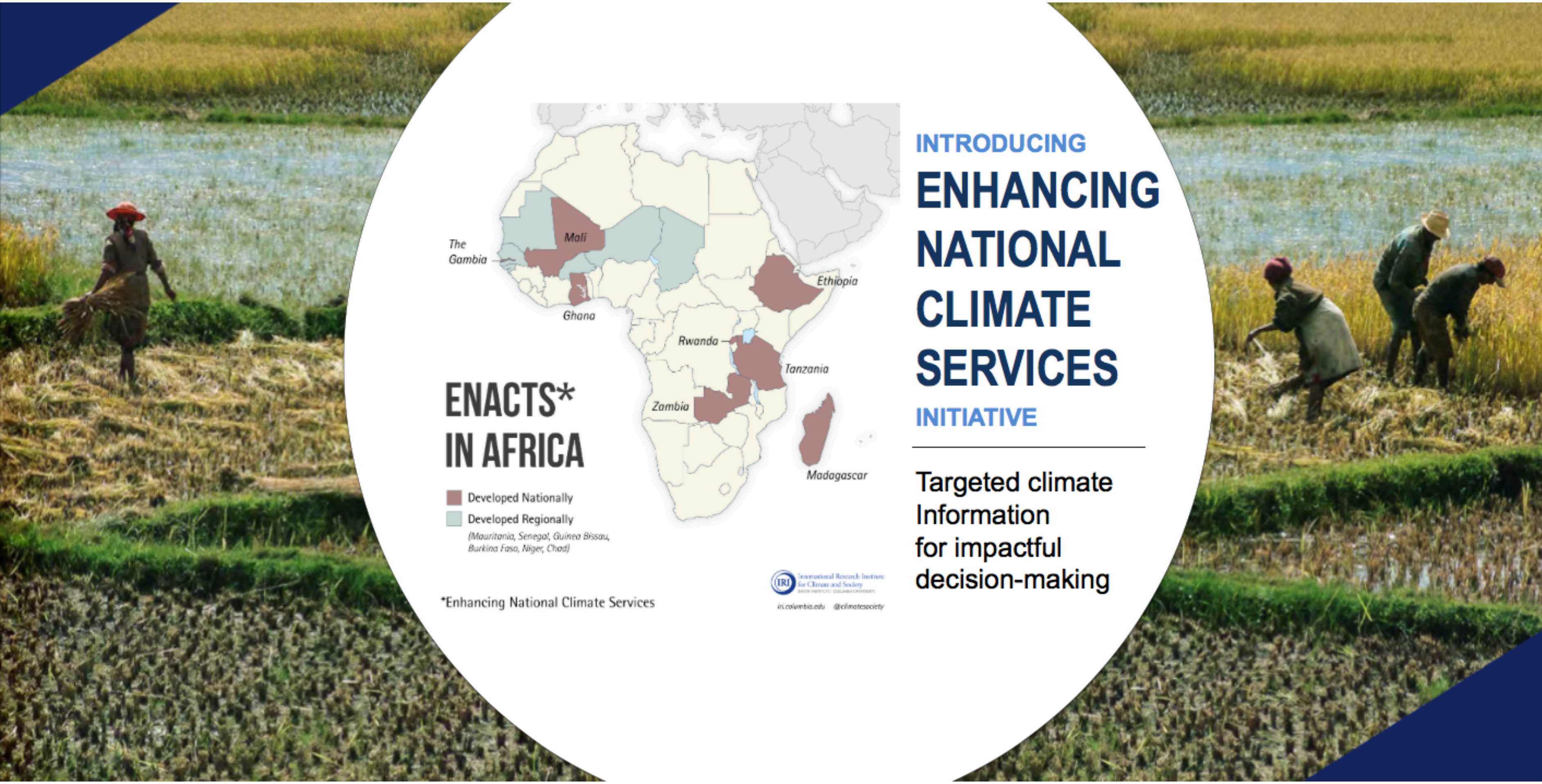
This applies equally to future adaptation strategies and to understanding fully the impact of the climate on the existing disease burden and current interventions. For example, an accurate assessment of the impact of a bed net programme for malaria control depends on knowing the climate trend during 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 spells favouring transmission when normally running streams leave intermittent pockets 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 useful indicators of the likely occurrence of malaria outbreaks, can be used to implement a programme of heightened epidemic surveillance, while real-time 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 2008) reinforced the need for countries to develop health measures and integrate them into plans for adaptation to climate change: to strengthen the capacity of health systems for monitoring and minimizing the public health impacts of climate change through adequate preventive measures, preparedness, timely response and effective management of natural disasters; and for the health sector to effectively engage with all of the relevant sectors, agencies and key partners at national and global levels to reduce current and projected health risks from climate change. One approach is to build on existing decision-support and other tools, such as surveillance and monitoring, to include the capacity to assess vulnerability to, and the health impacts of, climate change, and to develop new responses, as appropriate.

Since 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 information are the responsibility of the National Meteorological Services. National climate service providers need to be developed to meet user

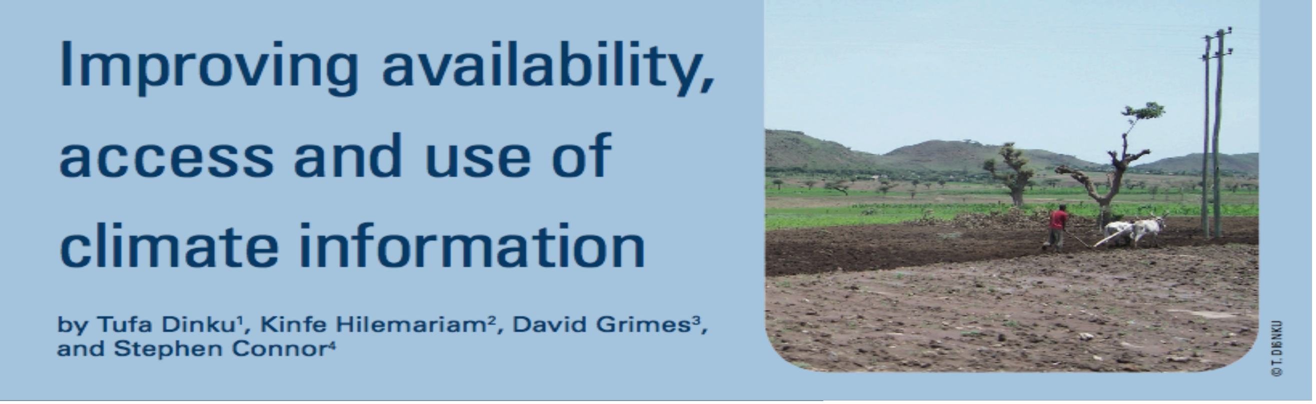
1 Ministry of Health, Addis Ababa, Ethiopia
2 National Meteorological Agency, Addis Ababa, Ethiopia
3 Anti Malaria Association, Addis Ababa, Ethiopia
4 Centre for National Health Development in Ethiopia, Addis Ababa, Ethiopia
5 International Research Institute for Climate & Society (IRI), The Earth Institute at Columbia University, Palisades, New York, USA
6 Health and Climate Foundation, Washington DC, USA


INTRODUCING
ENHANCING NATIONAL CLIMATE SERVICES
INITIATIVE
Targeted climate Information for impactful decision-making
ENACTS* IN AFRICA
Developed Nationally
Developed Regionally
(Mauritania, Senegal, Guinea Bissau, Burkina Faso, Niger, Chad)
*Enhancing National Climate Services
The Gambia
Mali
Ghana
Ethiopia
Rwanda
Tanzania
Zambia
Madagascar

Improving availability, access and use of climate information

by Tufa Dinku[1], Kinfe Hilemariam[2], David Grimes[3], and Stephen Connor[4]

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.


Improving availability, access and use of climate information

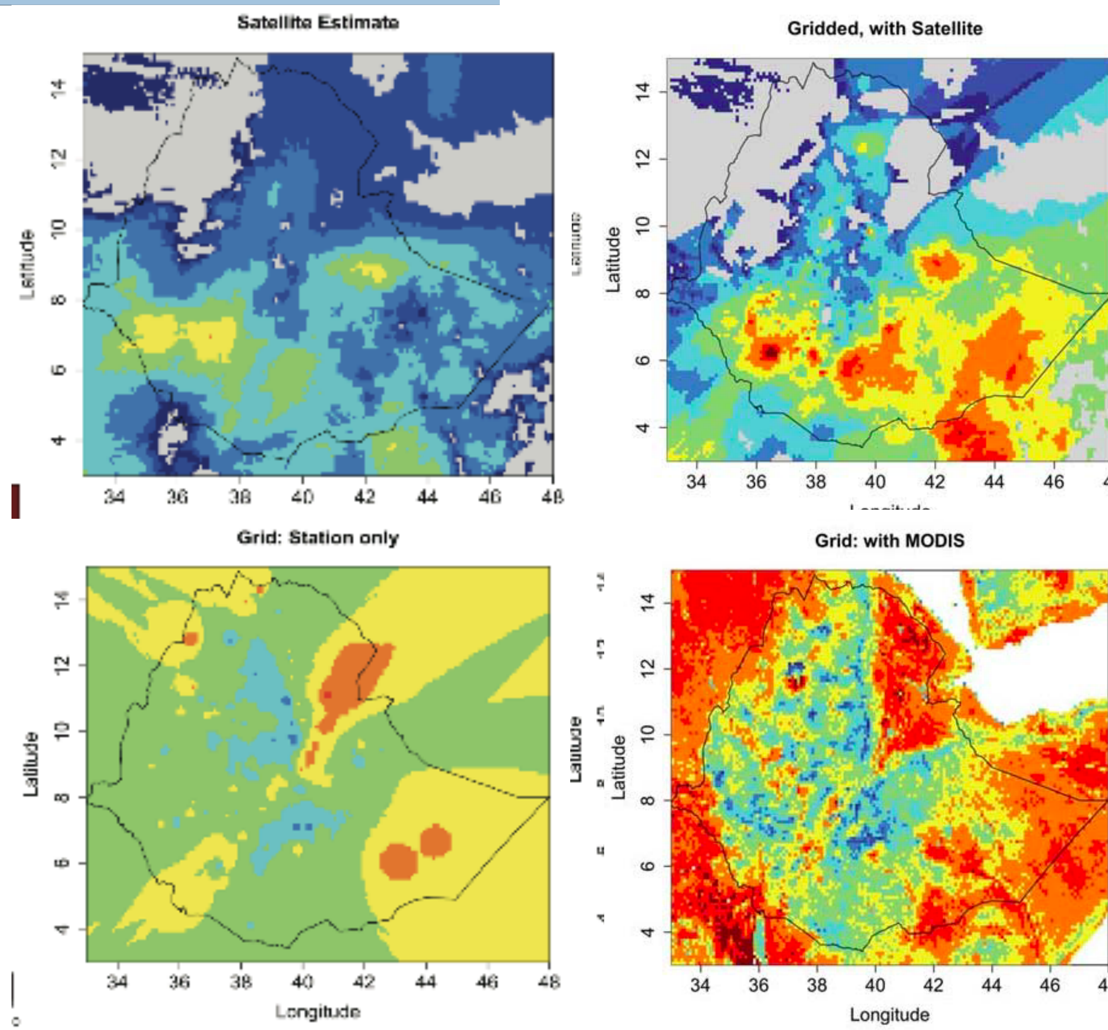
by Tufa Dinku[1], Kinfe Hilemariam[2], David Grimes[3], and Stephen Connor[4]

©T.DINKU

Enhanced National Climate Services (ENACTS) Ethiopia

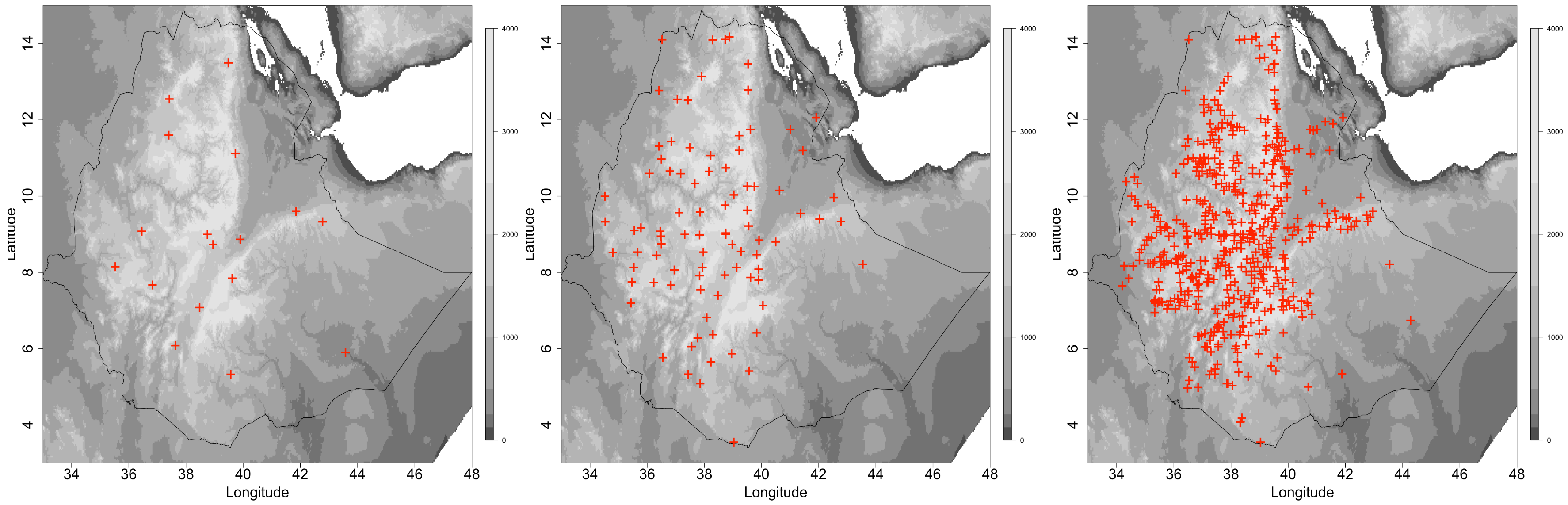
New products combine locally calibrated satellite rainfall and temperature estimates and all available quality controlled ground-based meteorological station gauge data.

30 years – every 10 days every 4-5km

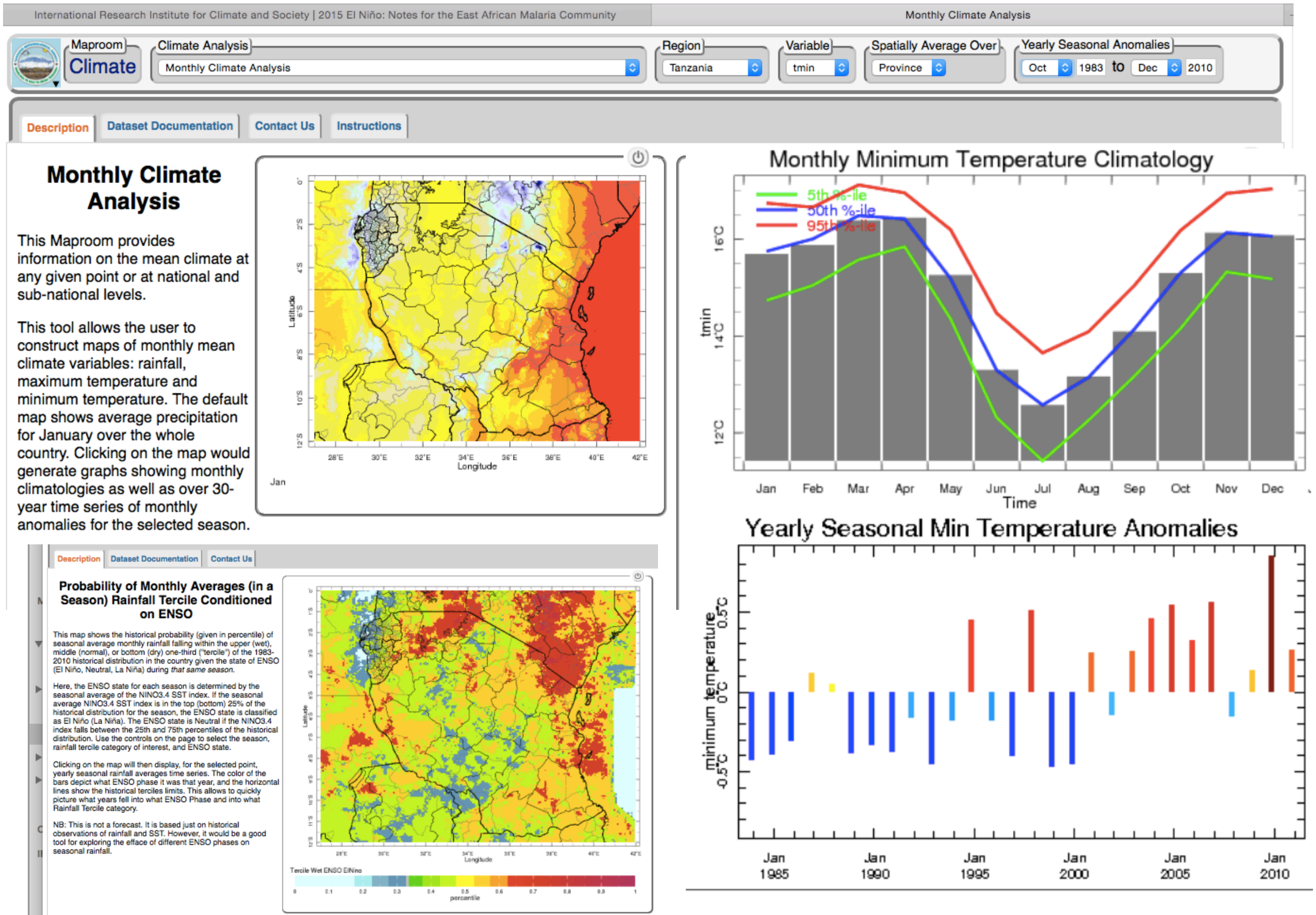


ENACTS Advantage

ARC RFE | ENACTS Monitoring | ENACTS Climate Analysis



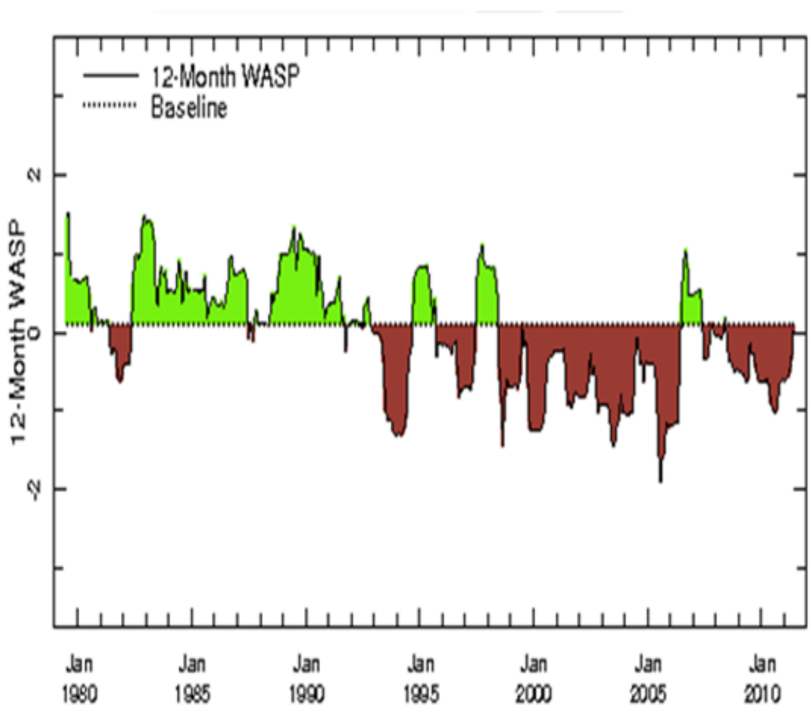
Enhanced National Climate Services (ENACTS) Tanzania

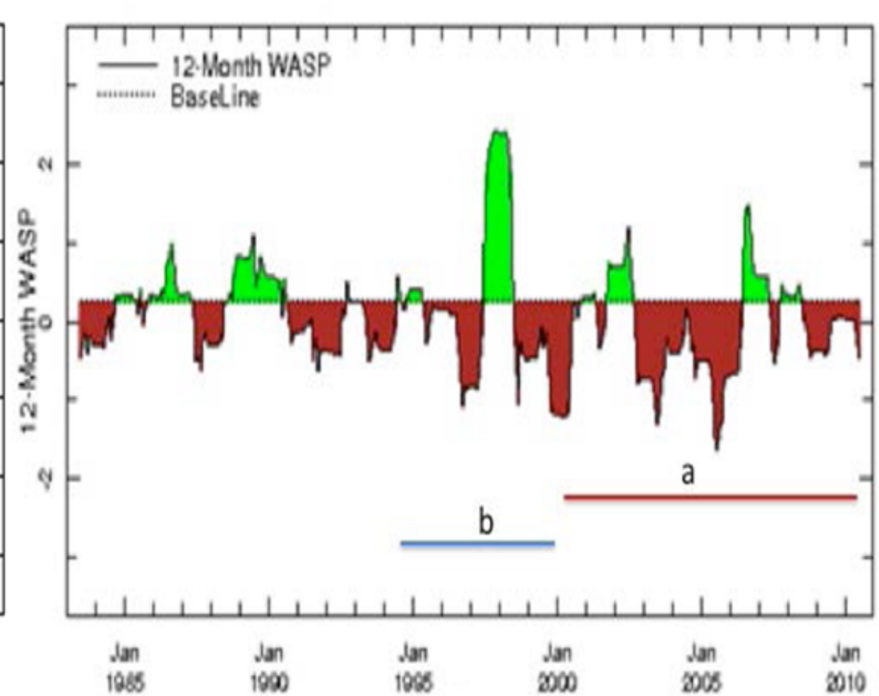


ENACTS data in Tanzania Comparison of CMAP and ENACTS rainfall

Weighted Anomaly Standardized Precipitation (WASP) Index

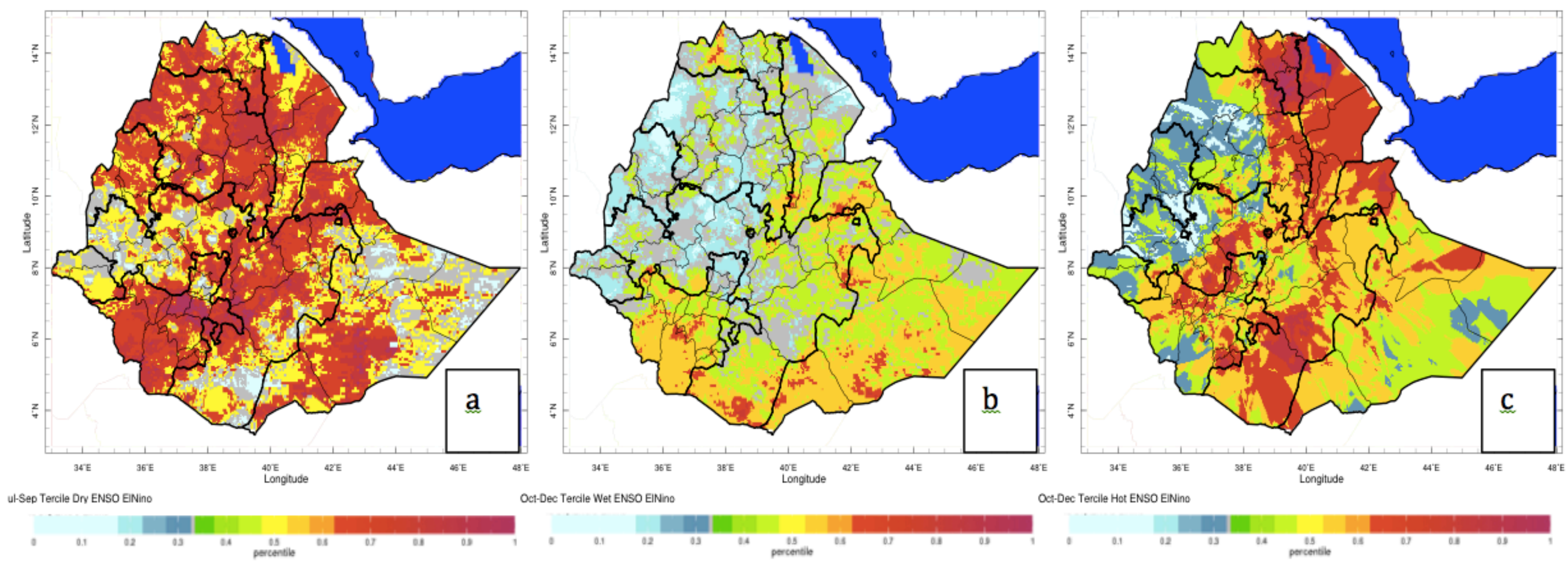
CPC Merged Analysis of Precipitation (CMAP) ENACTS

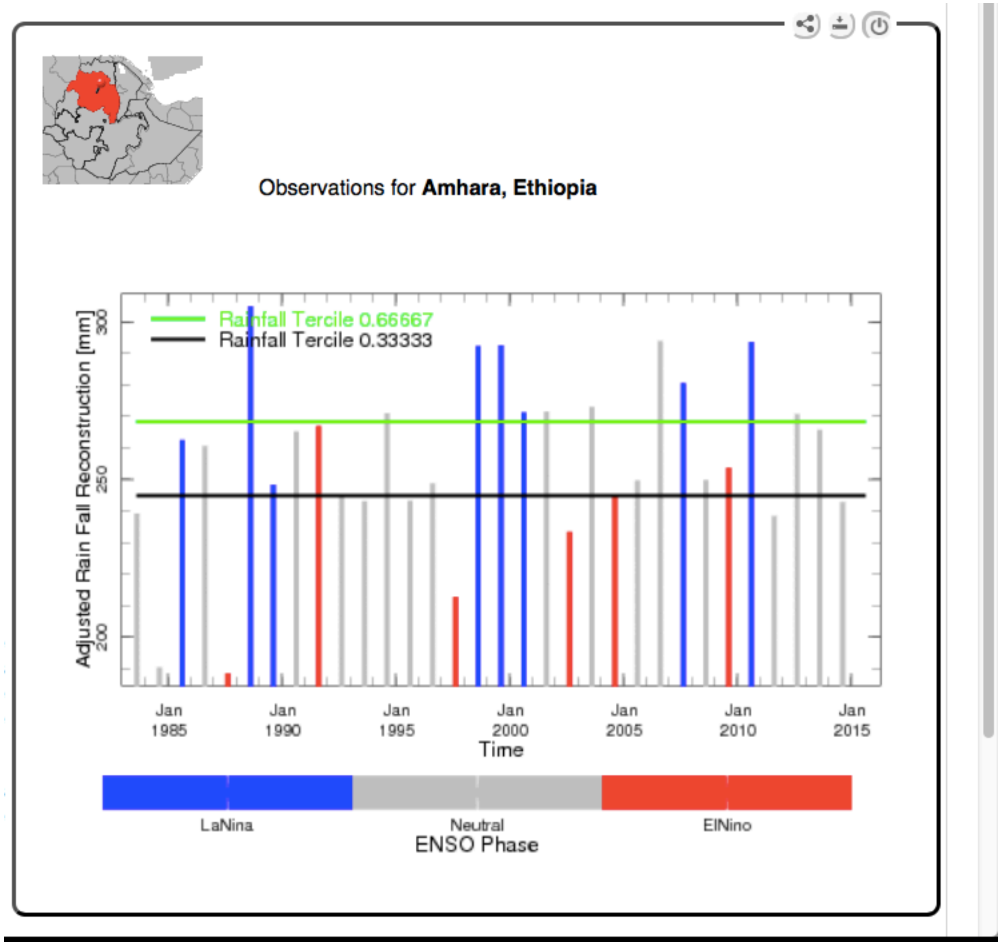




At Ethiopian MoH Request
What is the impact of El Nino on Malaria?

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





Observations for **Amhara, Ethiopia**
Rainfall Tercile 0.66667
Rainfall Tercile 0.33333
Adjusted Rain Fall Reconstruction [mm]
300
250
200
Jan 1985
Jan 1990
Jan 1995
Jan 2000
Jan 2005
Jan 2010
Jan 2015
Time
LaNina
Neutral
ElNino
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

RBM Mechanisms

Constituencies

Board

Committees and task forces:

Executive Committee

Finance and Performance Committee

Resource Mobilization Sub-Committee

External Evaluation Task Force

GMAP2 Task Force

Working Groups:

Advocacy

Communication

Harmonization

Vector Control

Procurement and Supply Management

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NOAA
U.S. DEPARTMENT OF COMMERCE

CDC

USAID
FROM THE AMERICAN PEOPLE

President's Malaria Initiative

ROLL BACK MALARIA PARTNERSHIP

UKaid
from the British people

SERVIR

TANZANIA METEOROLOGICAL AGENCY

World Meteorological Organization
Weather • Climate • Water