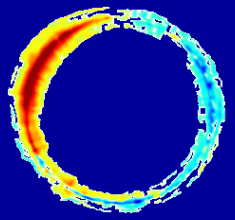
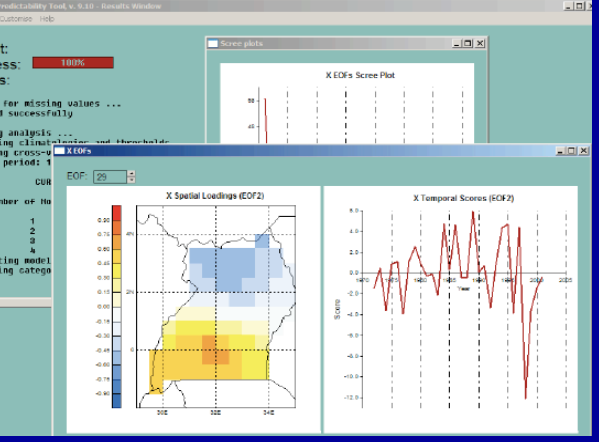


Climate Information for Public Health Action

GAIA
12th April 2011
APL- John Hopkins, Baltimore

Madeleine Thomson & Gilma Mantilla,
International Research Institute for Climate & Society

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



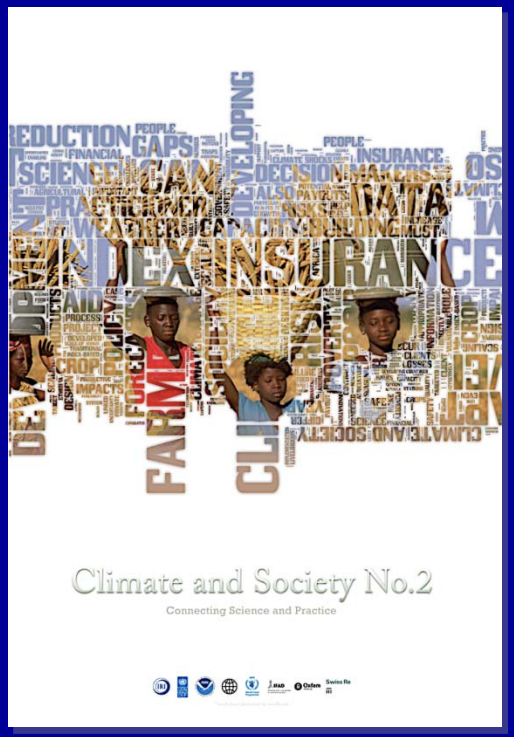
Innovate

Demonstrate

Educate

IRI's mission

To enhance society's capability to understand, anticipate and manage the impacts of climate in order to **improve human welfare**, especially in developing countries.

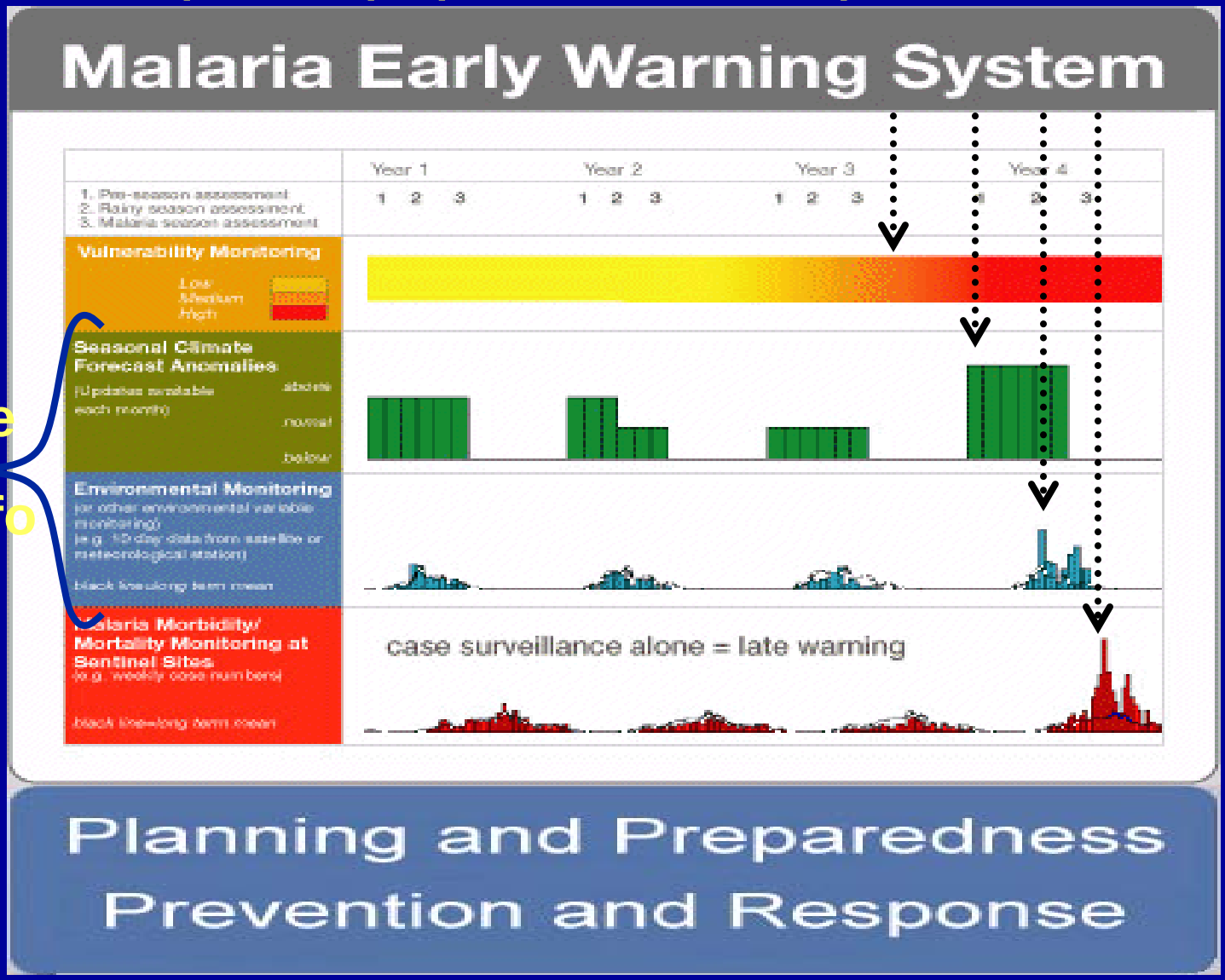


Advocate

Climate and Health ~10 years ago

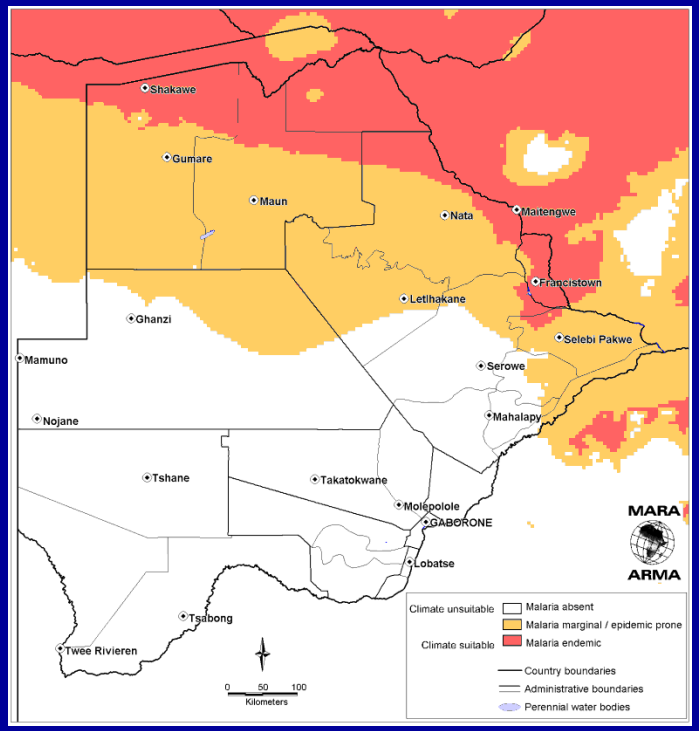
Demand for integrated early warning systems …

Integrated MEWS gathering cumulative evidence for early and focused epidemic preparedness and response

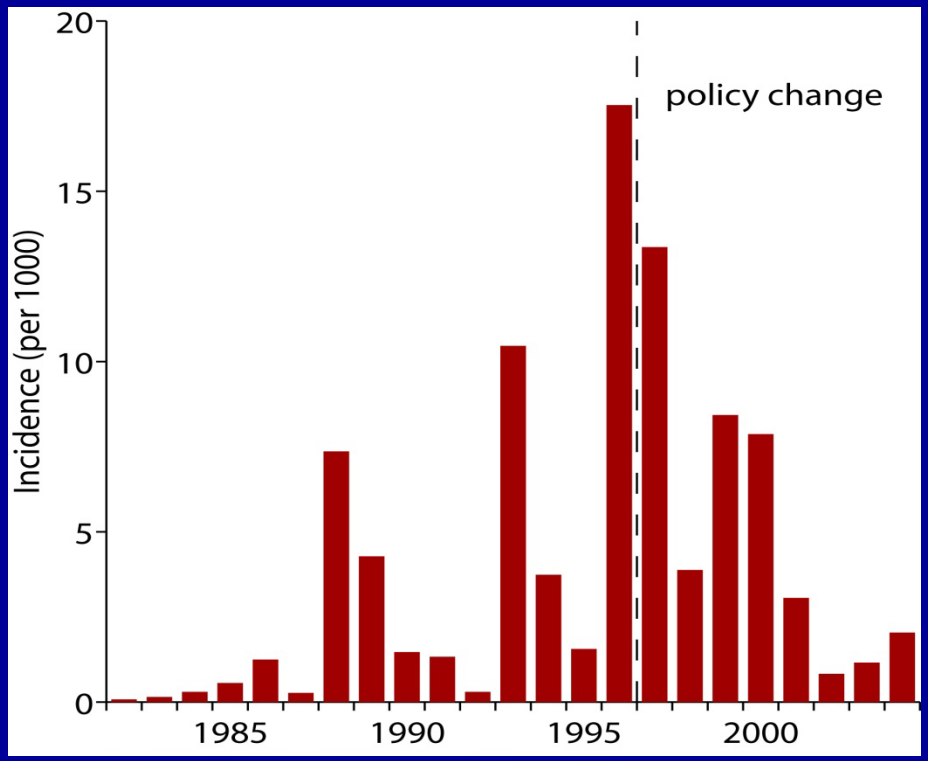


Climate

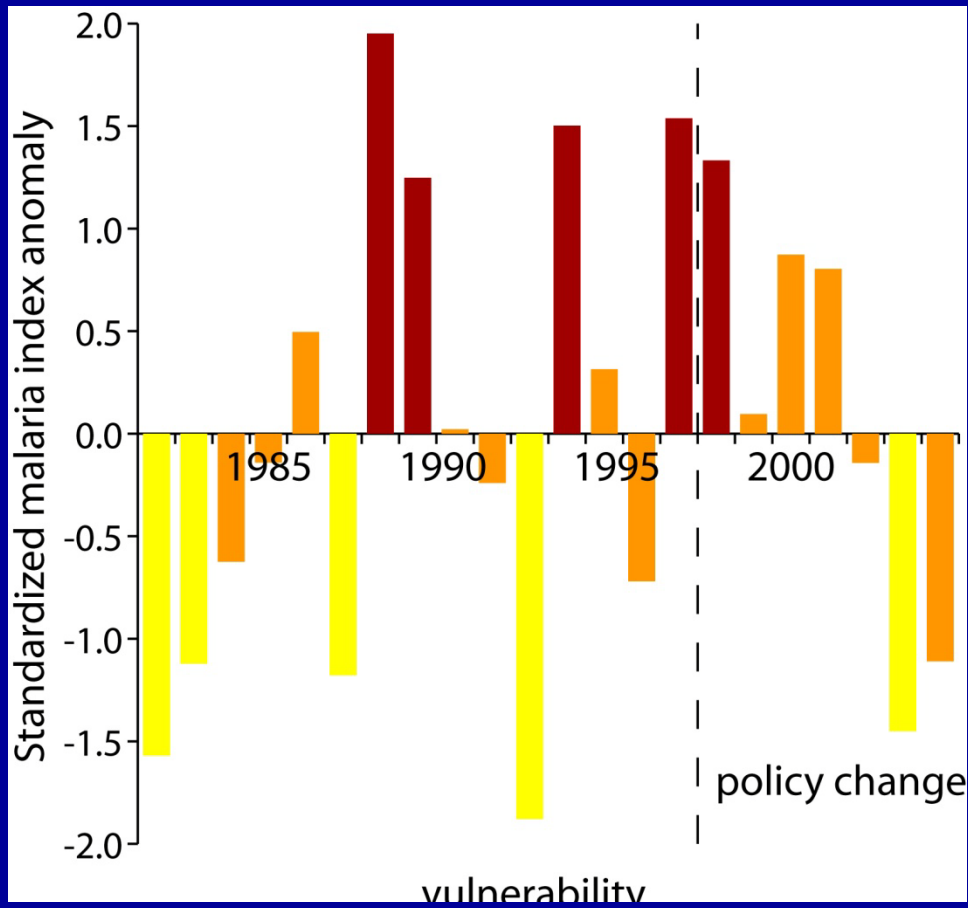
Env-Info



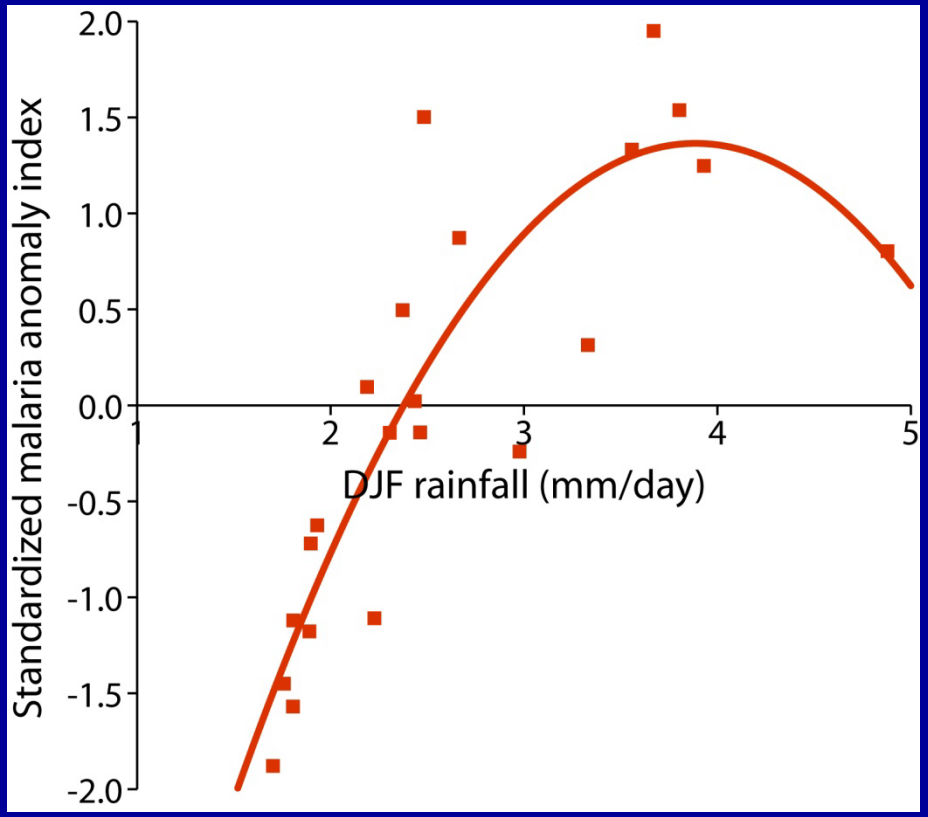
The long term increasing trend 1982–1996 ends when revisions to national control policy and practice occurred in 1997 (new drugs, new insecticide, revitalized programme.



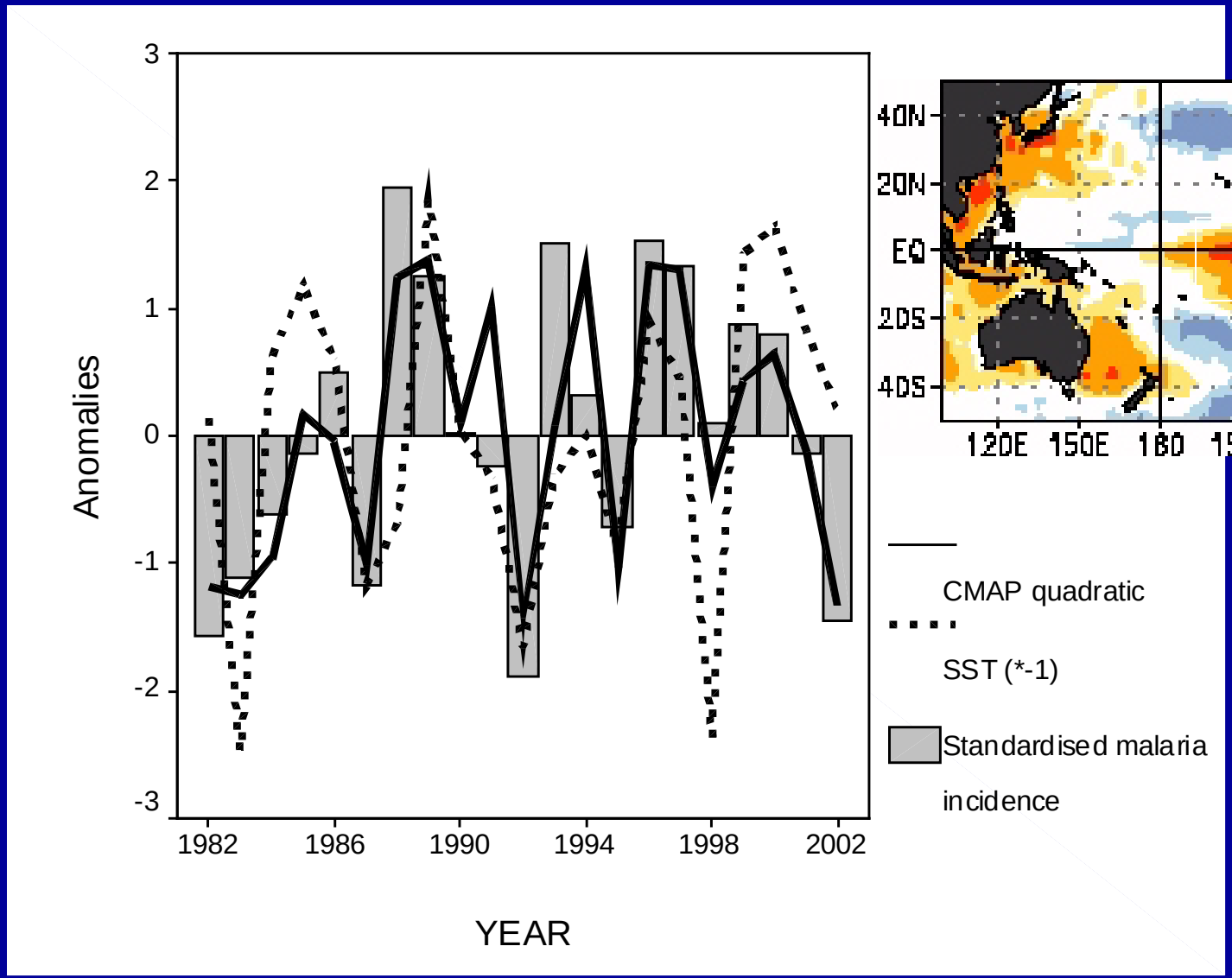
High and low years are defined by the upper and lower quartiles (after detrending and log transformation.

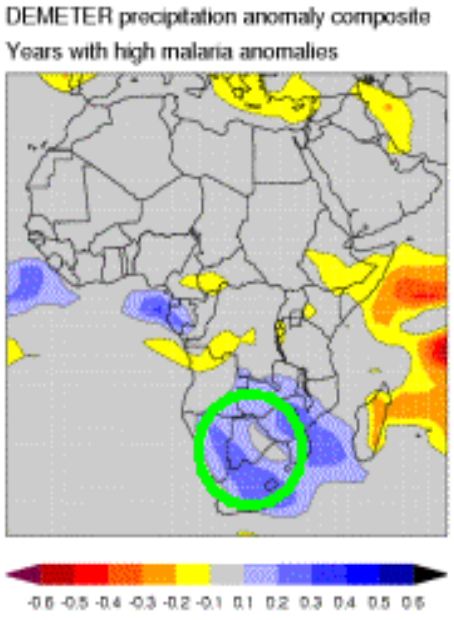


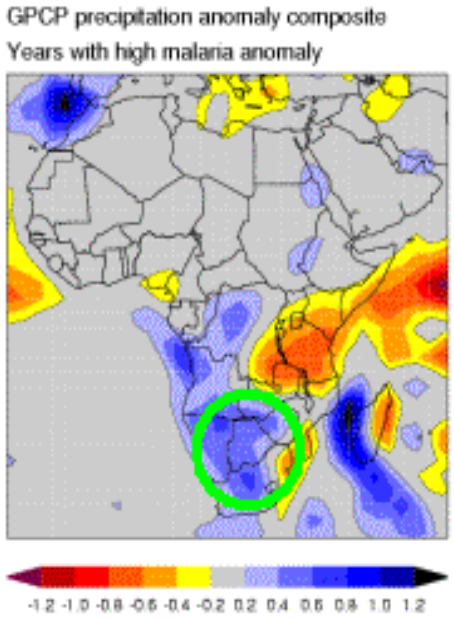
Malaria incidence in Botswana is strongly related to rainfall variability during the peak rainfall season December – February.

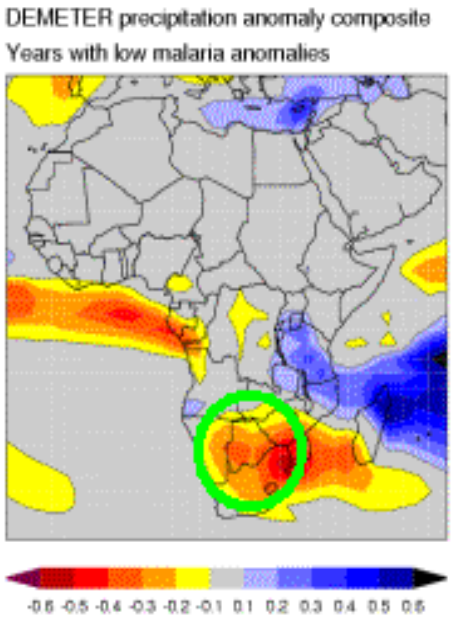


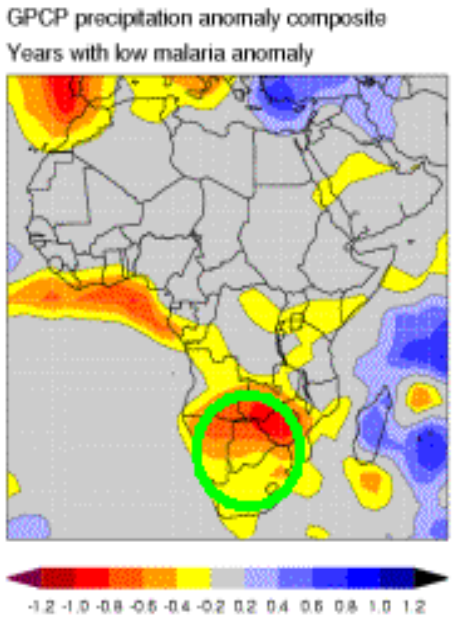
Malaria varies from year to year according to the climate and the temperature of the sea in the Nino 3.4 region



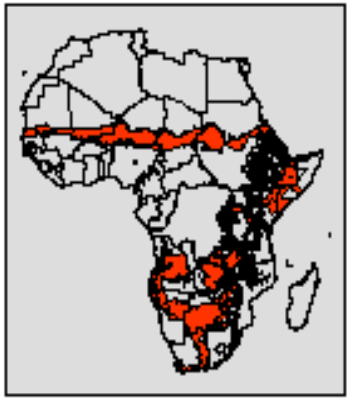






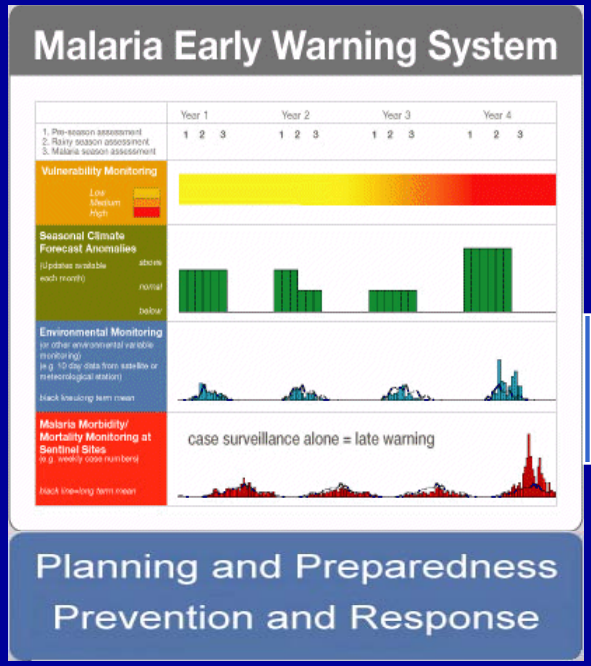


Comparison between forecast and observed climate



For high and low malaria anomaly years

RBM: Southern African Regional MEWS activities



Evidence for practical application within a decision making framework (DaSilva, et al. MJ 2004).

Evidence for using environmental monitoring (Thomson, et al. AJTMH 2005)

Evidence for using seasonal forecasting (Thomson, et al. Nature 2006).

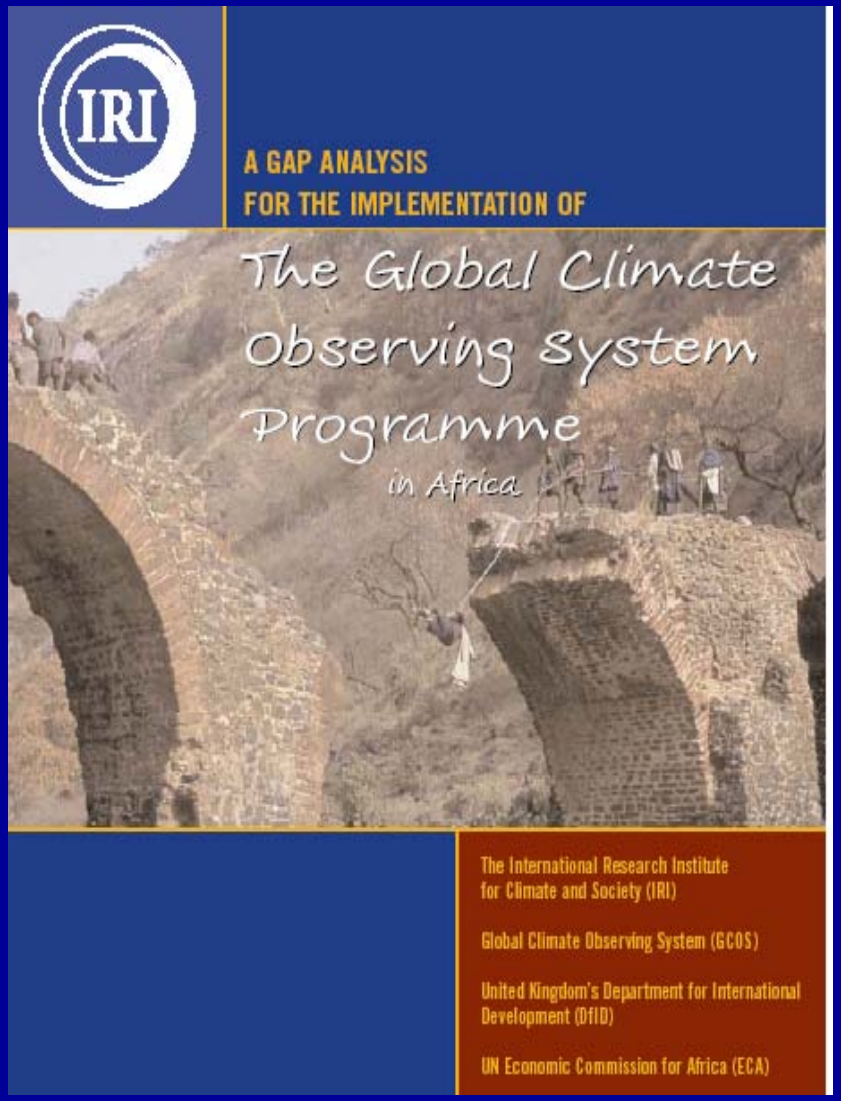
Evidence of timing/effectiveness (Worrall, et al. *TMIH* 2007; Worrall, et al. 2008)

Why is Climate Information so rarely used in support of development interventions?

'Gap Analysis' identified Gaps in:

- policy
- practice
- services
- data

Market atrophy - negligible demand coupled with inadequate supply of climate services



Malaria and Climate in Africa

Where malaria is not controlled - Climate impacts on:

- The spatial distribution of malaria prevalence
- The seasonality of malaria incidence
- Year to year variation in malaria incidence
- Trends in malaria incidence
- The measurement of anti-malaria interventions

- Relevance to Control Policy

Building a Climate Service Platform

HEALTH AND CLIMATE NEEDS

Connor S.J., Omumbo J.A., Green C., DaSilva J., Mantilla G., Ndione J-A., Delacollette C., Hales S., Rogers D., Thomson M.C.

WCC-3 (WS-1): Climate and Human Health
1st September , 2009

requirements for improving evidence use in policy and practice (Davies and Nutley, 2001)

Agreement as to the nature of evidence.

A strategic approach to the creation of evidence, together with the development of a cumulative knowledge base.

Effective dissemination of knowledge; together with development of effective means of access to knowledge.

Initiatives to increase the uptake of evidence in both policy and practice

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[5]

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

Malaria trends in the East African highlands

A - Has malaria increased in the East African Highlands?

B - Has Temperature increased in the East African highlands?

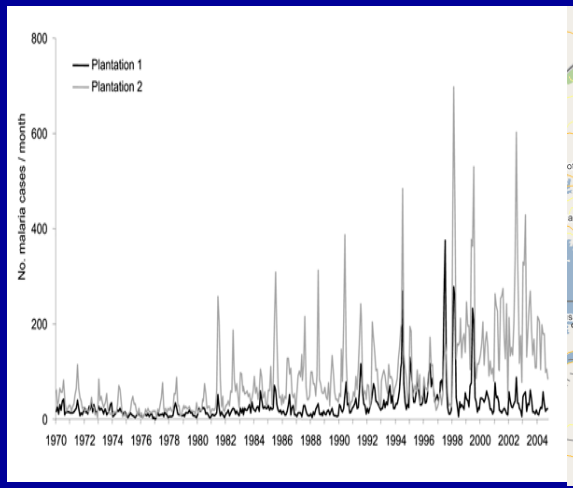
C - If A and B are both positive is there evidence that increases in A are related to increases in B?

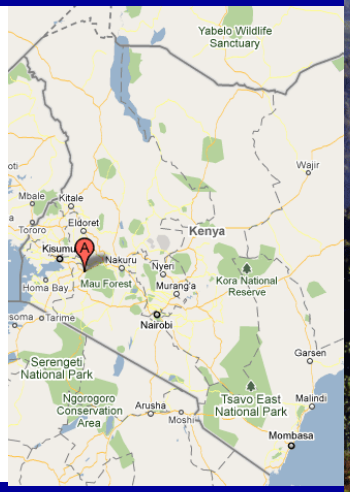
D - If B is positive is this related to global warming?

Until last month - 10 years of debate only question A has been successfully answered

A. Has malaria increased in the East African Highlands

- √





Is increase due to climate change? drug resistance or other factors ?

B Has Temperature increased in the East African highlands?

Reiter, P., Global warming and malaria: knowing the horse before hitching the cart. *Malaria Journal* 2008, 7(Suppl 1):S3

"Whatever the cause, the history of multiple epidemics in the earlier part of the century, including many at higher altitudes, makes it unnecessary to infer climate change as a contributory factor. **Moreover, a set of well-maintained meteorological records shows no significant change in temperature over recent decades** [52].

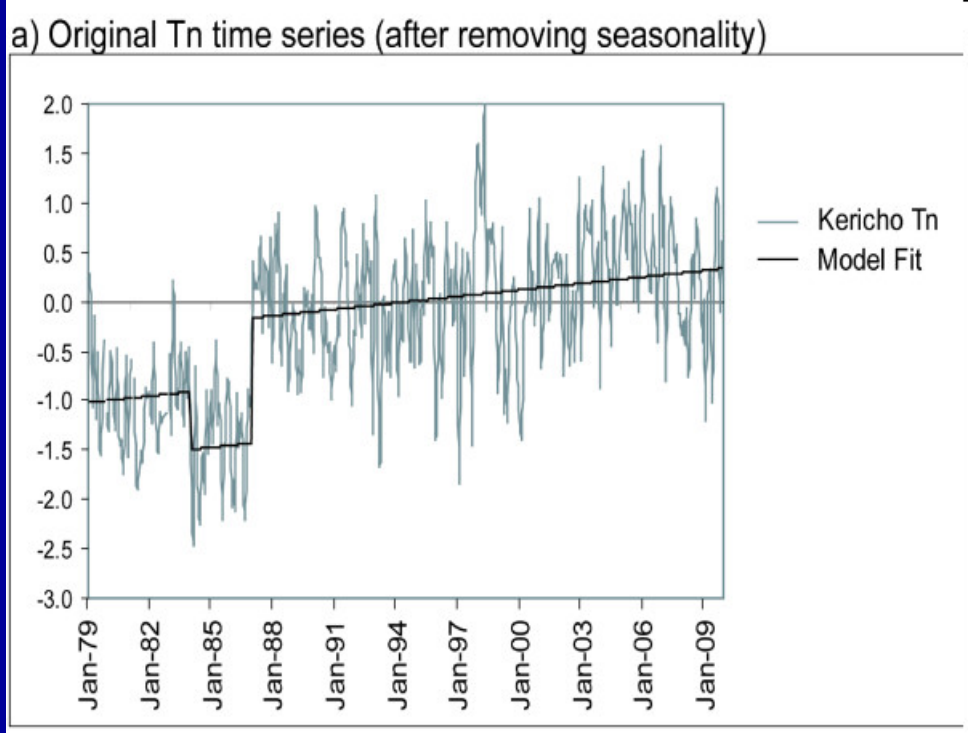
52 Hay, S. I., J. Cox, D. J. Rogers, S. E. Randolph, D. I. Stern, G. D. Shanks, M. F. Myers and R. W. Snow (2002). "Climate change and the resurgence of malaria in the East African highlands." NATURE **415**(6874): 905-909.

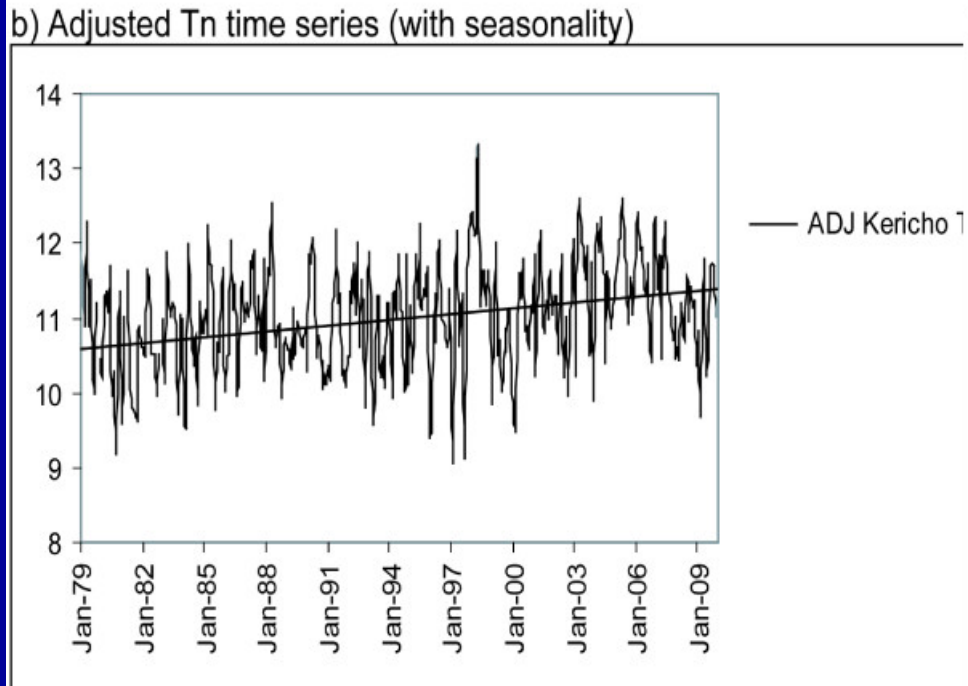
Previous studies have relied heavily on limited time series of station data, have used data that are inadequately quality controlled or have ignored local ground observations completely in favour of spatially interpolated datasets – not suited for local analysis

Need for gold standard meteorological data

Raised temperatures over the Kericho tea estates: revisiting the climate in the East African highlands malaria debate Omumbo et al.,

Malaria Journal 2011, 10:12





Minimum Temperature at Kericho significantly associated with land surface and sea surface temperatures for the tropics

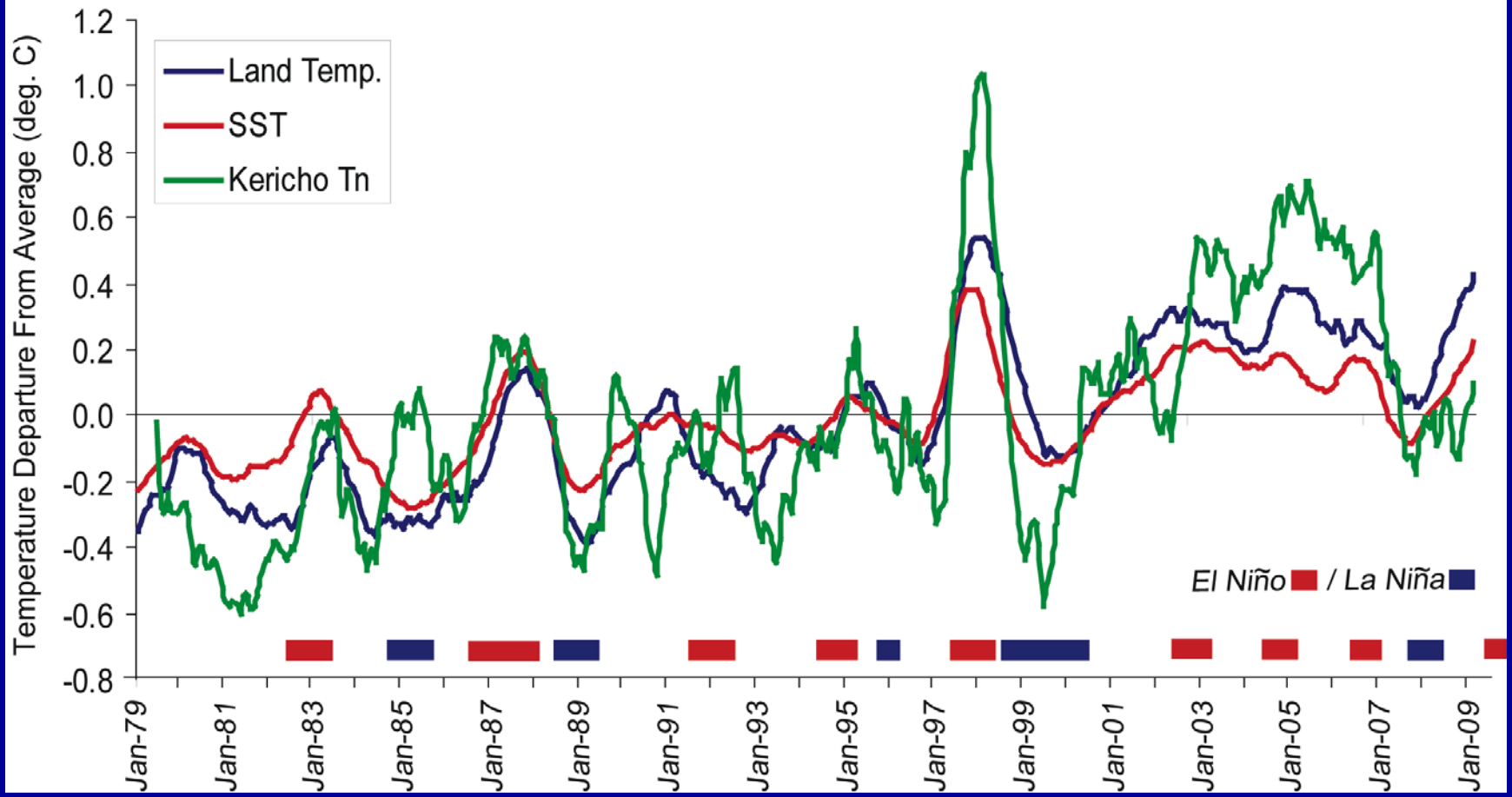


Figure 1. Reproduced from Figure 3 Omumbo, J.A., et al., (2011) *Raised temperatures over the Kericho Tea Estates: Revisiting the facts in the East African highlands malaria debate.* Malaria Journal, .http://www.malariajournal.com/content/10/1/12

Establish Multi-Agency Climate-Health Working Group

Objectives of the Working Group

To create awareness on the impact of weather and climate on health

To develop effective and functional means for the health sectors and beneficiary communities to routinely use appropriate climate information for estimating populations at risk of climate sensitive diseases (where and when – including early warning systems)

To stimulate the partners in the climate/environment community to identify needs, create relevant products and supply appropriate services.

Members and Establishment of the Working Group

1. Federal Ministry of Health (FMoH)
2. National Meteorology Agency (NMA
3. Anti Malaria Association (AMA)
4. United Nations Environment Program (UNEP)
5. United Nations Children fund (UNICEF)
6. World Health Organization (WHO)
7. Ethiopian Public Health Association (EPHA)
8. Center for National Health Development in Ethiopia (CNHDE)
9. Ethiopian Health and Nutrition Research Institute (EHNRI)
10. School Of Public Health
11. Christian Relief and Development Association (CRDA)

-Ethiopia-
-Kenya-
-Madagascar-

Activities

Review the status climate and health information especially on malaria, meningitis and acute watery diarrhea

Review the status of early warning system in the country especially usage of climate information for early epidemic detection and control.

Fostering Research on climate sensitive diseases.

Develop information sharing system

Capacity Building

Accomplishment

"Climate Matters in Health" workshop February 2008

Working Group Meetings

"Science and technical Meeting" Sep 3-5, 2008

MERIT workshop, Dec 1-3

Training

IRI

Train community of practice…

-New York-

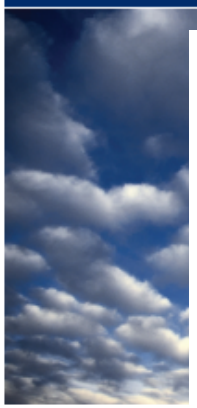
-Ethiopia-

-Kenya-

-Madagascar-

CLIMATE INFORMATION FOR PUBLIC HEALTH

SUMMER INSTITUTE 2008

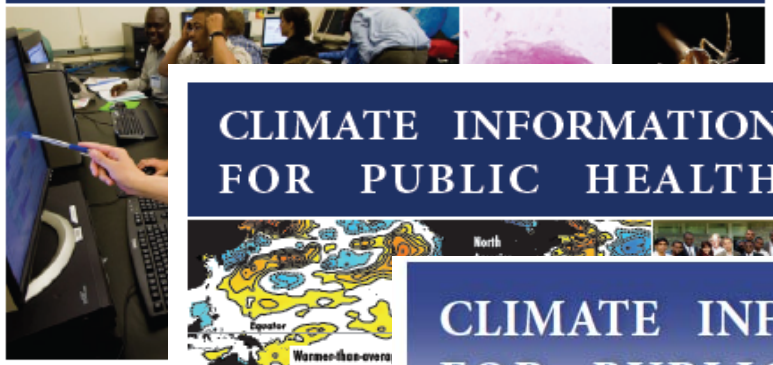


Now that the world's atte
is increasingly focused on cli
change adaptation, it is essen
for the health community to
understand the role that clim
plays in driving disease burde
and affecting human health.

The International Research I
for Climate and Society (IRI)
partnership with the Center f
International Earth Science I
mation Network (CIESIN) ar
Mailman School of Public He
is pleased to announce the Su
Institute 2008 course on Clim
Information and Public Healt
The training course offers pul
health decision makers and t

CLIMATE INFORMATION FOR PUBLIC HEALTH

SUMMER INSTITUTE 2009



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announce the Summer Inst
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The training course offers
partners the opportunity to
knowledge into decision m
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The IRI is the premier glob
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diseases and has active inte
diseases. The institute also

The International Res
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CLIMATE INFORMATION FOR PUBLIC HEALTH 2010

SUMMER INSTITUTE

NOW THAT THE W
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The International Research Institu
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knowledge into decision making
seminars, focused discussions and

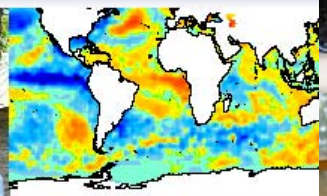
The IRI is the premier global re
focused on the use of climate infor
It is a collaborating Centre with W
and has active international partn
cal meningitis, Rift Valley Fever
an interest in dengue, influenza,
niasis).

The International Res
for Climate and Socie

CLIMATE INFORMATION FOR PUBLIC HEALTH 2011

SUMMER INSTITUTE

Clockwise from left: Participants, facilitators from SI2010. F. Fiorella/IRI. Microscopic image of Neisseria meningitidis, a bacteria best known for its role in meningitis. An IRI Data library image of a la Niña SST anomaly



WITH THE WORLD'S ATTENTION

focused on mechanisms for adaptation to climate variability and change, it is essential, not only for public health communities, but also for planners in central government, to understand the role climate plays in driving disease burden and impacting economic growth. Public health often emerges as the final common pathway for all impacts of climate variability and change on both individuals and society.

As a contribution to this process, The International Research Institute for Climate and Society, in partnership with the Center for International Earth Science Information Network (CIESIN) and the Mailman School of Public Health initiated this two-week course in 2008. Building on the response of our 2008 – 2009 -2010 alumni, and partners, we are pleased

COURSE DATES

May 16 – 27, 2011

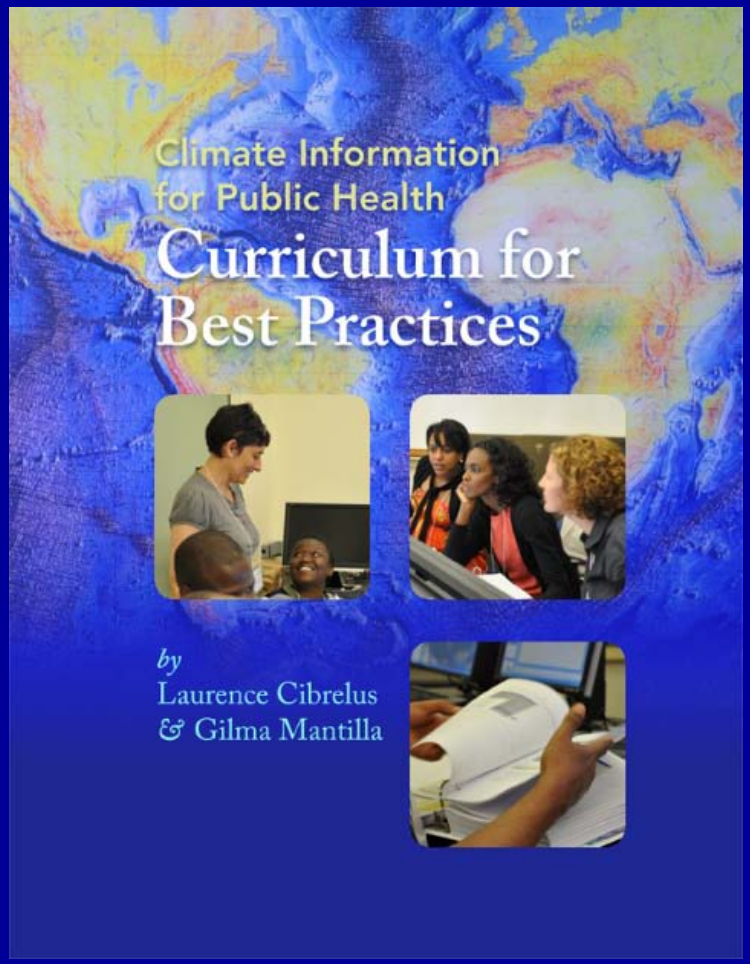
VENUE

The Earth Institute, Columbia University Lamont Campus located at:
61 Route 9W, Monell Building, Palisades, New York.

DEADLINES

Application deadline is:
February 11, 2011

With an innovative curricula



Climate Information for Public Health: A Curriculum for Best Practices “ Putting Principles to work”

…tested in different settings

Information Climatique pour la Santé Publique (ICSP)

École d'Été
Des nouvelles du terrain
Février 2010
Volume 2 Numéro 2

Signature de l'accord entre Kamal El Kheshen, vice président de la BAD (droite) et Adama Alhassane Diallo, directeur général de l'ACMAD (gauche), Copenhague, 14 Décembre2009.

Éditorial

Ces derniers mois se sont accompagnés d'une série prometteuse de développements de partenariats qui auront d'importantes répercussions à long terme sur la manière dont les communautés du climat et de la santé collaborent à travers le monde. Nous nous réjouissons de ces partenariats et du rôle que les membres du réseau CIPHA/ICSP ont joué dans leur mise en place.

Lancement de l'initiative ClimDev-Afrique. Il s'agit d'un projet commun de l'Union Africaine (UA), de la Commission Economique des Nations Unies pour l'Afrique (CEA) et de la Banque Africaine de Développement (BAD). Ce projet très attendu fut finalisé au cours de la conférence sur le changement climatique de Copenhague, en décembre 2009, lors de la signature d'un protocole d'accord entre la BAD et le Centre Africain pour les Applications de la Météorologie au Développement (ACMAD). D'un montant initial de 30 millions de dollars américains, cette dotation permettra de renforcer l'opérationnalité des institutions africaines pour le climat et de développer un nouveau partenariat avec le Forum Humanitaire Mondial (FHM). Cette nouvelle avancée s'est accompagnée de résultats positifs immédiats, utiles pour le secteur de la santé – comme par exemple le plan d'action de Banjul.

Dans ce numéro

Ce bulletin fournit des informations sur les dernières avancées réalisées au sein du réseau CIPHA/ICSP/ICSP, notamment sur les activités des anciens élèves ou des facilitateurs, les conférences à venir, les nouvelles de la communauté climat-santé ainsi que sur des opportunités de collaboration éventuelle.

Les Directeurs des Services Météorologiques d'Afrique de l'Ouest se concentrent sur le climat et la santé. Au cours de la réunion des Directeurs de Services Météorologiques qui s'est tenue récemment à Banjul, en Gambie, le Service Météorologique Espagnol (AEMET) a apporté sa contribution aux Services Météorologiques Africains dans le cadre de l'initiative ClimDev-Afrique et de l'opportunité de développer un partenariat avec la communauté de santé publique.

Le Plan d'action de Banjul, qui a découlé de cette réunion, permettra la création de **Groupes de Travail sur le Climat et la Santé** (GTCS) au sein de l'Afrique de l'Ouest. L'Ecole d'Eté sur l'Information Climatique pour la Santé Publique (Summer Institute on Climat Information for Public Health) permettra de former les services météorologiques à collaborer avec les services de santé publique. La collaboration se focalisera initialement sur l'amélioration du contrôle de la méningite et du paludisme dans la région.

AEMET fait partie de l'initiative **MERIT** (Technologies d'Information sur le Risque Environnemental de la Méningite) - un projet axé sur le contrôle de la méningite à méningoco-

The International Research Institute for Climate and Society

IRI is a WHO/PAHO Collaborating Center for Climate Sensitive Diseases

IRI Technical Report 10-01:
Report on Training of Health Professionals on Climate and Health

IRI

International Research Institute for Climate and Society
Earth Institute at Columbia University

Written by: Hiwot Teka (MSc), Adugna Woyessa (MSc) Daddi Jima (M
Gilma Mantilla (MD, MSc)

Edited by: Abenet Girma (MSc)

CLIMATE INFORMATION FOR PUBLIC HEALTH
SUMMER INSTITUTE 2009

Summary of the Climate Information for Public Health Training Course

Palisades, New York
June 1-12, 2009

The International Research Institute for Climate and Society
Columbia University Mailman School of Public Health

Training via the IRI Data Library

- Data repository
- Data analysis tool
- Data visualization tool
- Data download resource

http://iridl.ldeo.columbia.edu

IRI/LDEO Climate Data Library

The IRI/LDEO Climate Data Library contains over 300 datasets from a variety of earth science disciplines and climate-related topics. It is a powerful tool that offers the following capabilities at no cost to the user:

- access any number of datasets;
- create analyses of data ranging from simple averaging to more advanced EOF analyses;
- monitor present climate conditions with maps and analyses in the Maproom;
- create visual representations of data, including animations;
- download data in a variety of commonly-used formats, including GIS-compatible formats.

Are you new to the world of climate data? Check out our Introduction to Climate Data page.

What's New

Mar 08 - Shapes for climate zones in Sri Lanka have been added as a new Features data set

Mar 08 - A new "International Federation" Map Room has been added to the IRI Map Rooms and is accessible from the Map Room front page. It contains a forecast precipitation map tool developed in collaboration with the International Federation of Red Cross and Red Crescent Societies that features analyses to provide context for global precipitation forecasts.

Mar 08 - A new "linked pdf" image option has been added to the Figure Viewer pages of the Data Library. Clicking on the "linked pdf" button will produce a clickable PDF version of the image you are viewing that links back to the Figure Viewer page for the image in the Data Library. The following link provides an example: February 2008 SSTA

Feb 08 - A k-means cluster analysis named k-means136 has been added to the Data Library as a new function

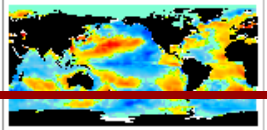
Finding Data

Datasets by Category
Datasets by Source
Dataset Search
Browse/Search Datasets
Browse/Search Maproom

Help Resources

Introductory Tutorial
Statistical Analysis Tutorial
Ingrid Function Documentation
Questions and Answers

Monitoring Global Climate



Map Room
A collection of maps and analyses used to monitor climate conditions. Click on any of the maps to modify the figures or access the source data.

Climate Information Digest
A monthly publication covering global climate events, their impacts and the seasonal forecast.

ENSO Web
Information about El Niño-Southern Oscillation.

Climate Highlights

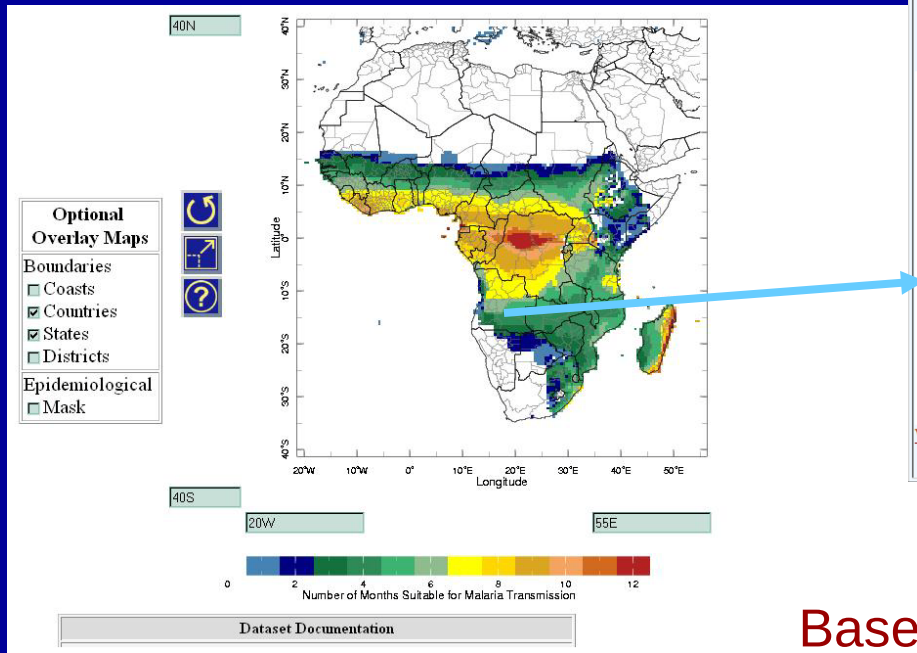
Malaria Map Room

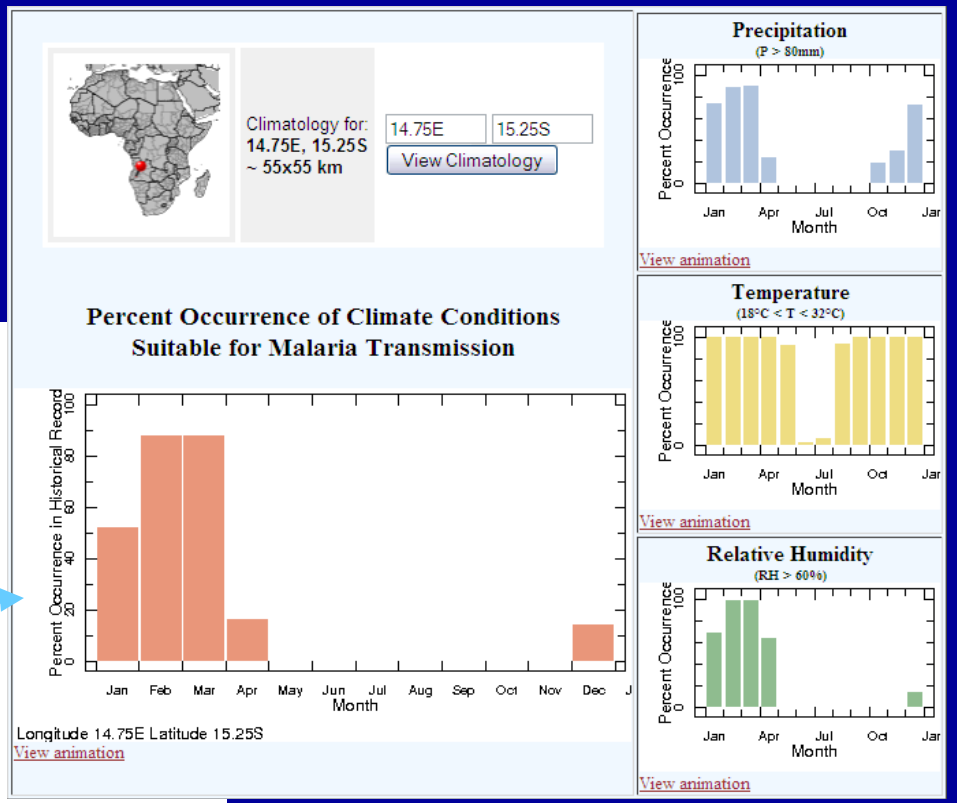
Due to poor epidemiological data in sub-Saharan Africa – climate/env. data has been used to help model and map the distribution of disease

Another example on IRI website:

Climate suitability for malaria transmission

= 18-32ºC + 80mm + RH>60%

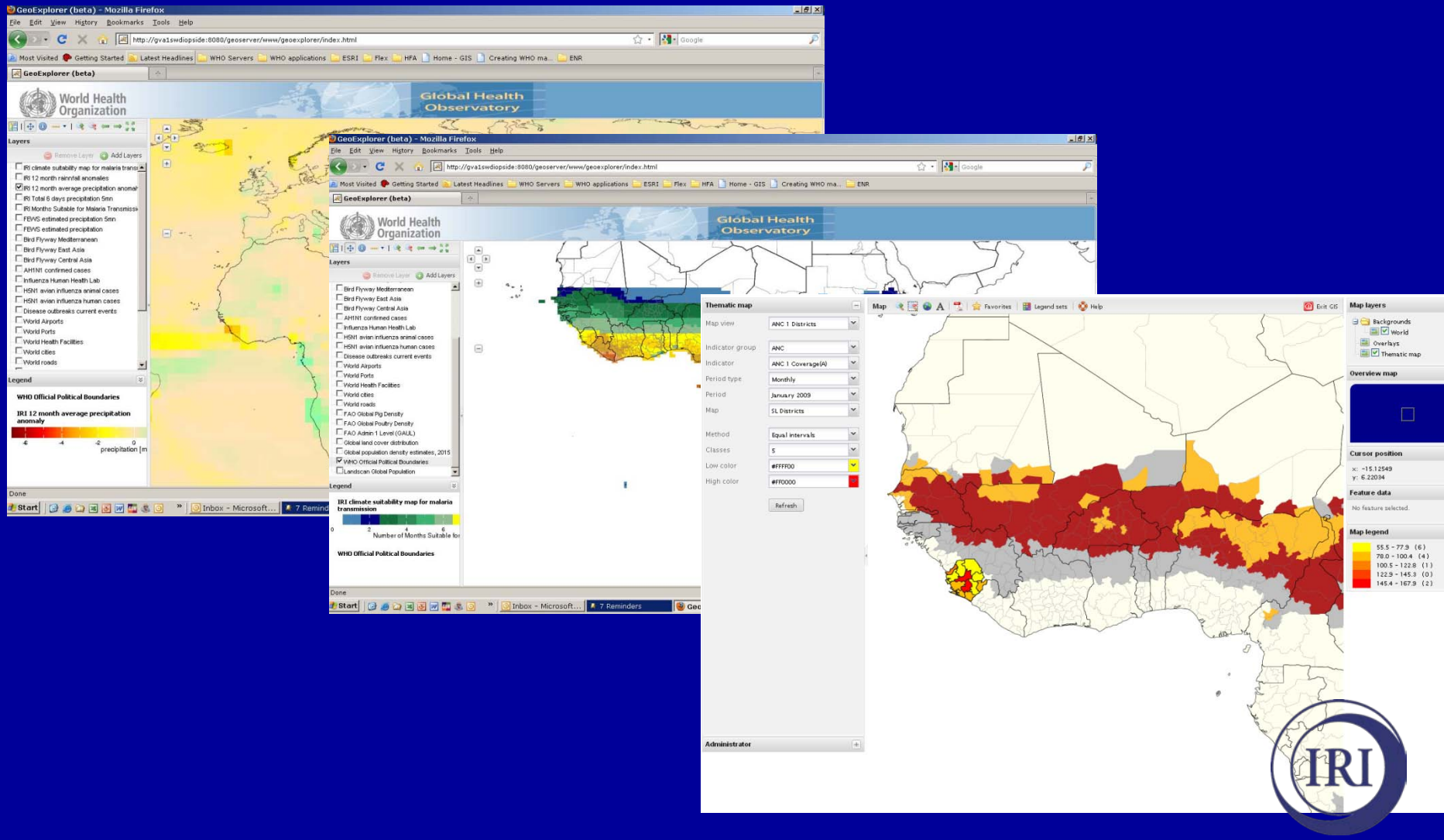




Grover-kopec et al., 2006

Based on long-term averages - information relevant to seasonal control calendars….

Data Library Integrates With the Global Health Observatory and OpenHealthmapper of WHO



You are logged in as Stephen Connor (Logout) English (en)

Climate Information for Public Health Action Network

PAHO/WHO Collaborating Centre on Early Warning Systems for Climate Sensitive Diseases

Home | Training Tools | Library

Library

Searchable database of research on climate-sensitive diseases

By Region:

OR

By Disease:

Advanced Search

Available Courses

- 2010 Summer Institute on Climate Information for Public Health

About the Climate Information for Public Health Action Network

Photo: T. Wolde-Georgis

THE CIPHAN has been developed to provide public health professionals with knowledge, methodologies, tools, and data to better manage climate sensitive diseases* toward improving health outcomes. It acts as a web portal to guide the learner towards other sources of information, as well as a source of learning resources, such as educational modules and exercises. This site's library also contains a directory of published material to give the reader opportunity for further investigation.

This portal is subdivided into three sections: the Climate Sensitive Disease Library, Courses and Training Tools. The portal is currently still under construction and various sections are regularly updated.

Training

New in Training -Coming Soon

CIPHAN

CLIMATE AND HEALTH IN AFRICA

10 Years On

WORKSHOP

4-7 April 2011

Going forward…

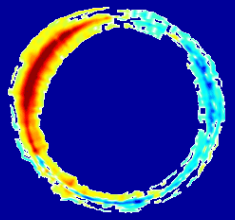
"The following must be put in place within the next decade:

- new partnerships between the public-health community and national meteorological agencies, space agencies and researchers;
- a governance structure that ensures data sharing between public and private agencies;
- a funding model that builds open-access climate databases
- climate scientists focused on the delivery of quality products, tailored to user needs
- health professionals trained to demand and use climate information;

And

- evidence of the value of all this, relative to alternative investments in health."

Africa Needs Climate Data to Fight Disease Thomson et al., 2011 Nature.



Thank you

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Theme 1: Policy

Support effective implementation of the Joint Statement on Climate Change and Health in Africa adopted by African Ministers of Health and Environment in Luanda, 2010, as an overarching platform for addressing climate and health issues to:

- **Bridge the gap between policies and practices** through legislation and guidelines, appropriate planning, including relevant vulnerability assessments, programmatic support and multi-sectoral and participatory processes that are gender sensitive.
- Support countries to establish **integrated health surveillance and climate observation and processing systems.**
- **Strengthen health systems** using climate information tailored to decision needs at all relevant levels and time scales.
- Make evidence-based, sound climate-informed decisions to implement a set of **preventive actions** to reduce population vulnerability and lssen the additional burden imposed by **climate-sensitive diseases and health issues** according to their respective epidemiological circumstances.
- **Anticipate, prepare for and respond** to the health consequences of **extreme weather events**, particularly by strengthening the functioning of health systems and other relevant sectors.
- **Multilateral partners** to consider the significant co-benefits of environment integrity, population health and consequent economic development that can result from mitigation and adaptation policies in the climate and health sectors and to support African countries in gaining **access to resources under the various climate-related funds**.

Theme 2: Practice

- Integrate climate health risk management into **cross-sector planning and practice for adaptation** to climate variability and change by developing climate services and products that address disease prevention at end-user level.
- **Create a human resource center/virtual hub** where expertise is shared in order to develop the capacity of African health and climate communities, institutions, practitioners and negotiators to understand/integrate climate change challenges into policy, socio-economics, planning and programming by identifying institutions and organizations in Africa that can deliver **training courses and conduct research on "Climate, Health and Prevention**".
- **Strengthen community-based organizations** by liaising, in a gender-sensitive fashion, with their leaders to develop locally owned **sustainable strategies for adaptation to climate change and/or variability** in their communities taking account of local knowledge rooted in social history and disseminated by appropriate channels, including the mass media.
- **Define the different levels and needs (including learning outcomes) of health practitioners and stakeholders** across different geographic scales, specifically researchers and teachers, graduate and undergraduate students, practitioners in the public health system, community opinion leaders, traditional healers, impacted communities and other special interest groups and **develop appropriate curricula** for **adaptation to climate change and/or variability** in the health sector.
- **Promote a gender-sensitive approach to interventions** on climate and health in cross-sectoral disaster risk reduction and preventive health strategies.

Theme 3: Services and Data

- **Develop tailored services** in partnerships with weather/climate and health organizations. These should recognize that health forecasts, which are different from weather forecasts, should be well designed and understood by all. They should act as early warnings to users of differing types, that assist in the prediction of future health outcomes.
- **Improve existing data**, for example through: the digitization of historical health and climatic data; the increased use of metadata analyses and validation tools; the inclusion of aggregated health data at appropriate spatial and temporal scales; and the enhanced awareness of, and use of, observational and processed data, appropriate satellite, and climate model data sources.
- **Access and use data in a systematic manner** in order to identify vulnerable groups and areas. This needs to involve: employing data strategically within and across sectors; considering trend and seasonality issues; using data to evaluate the success of interventions; and, importantly, understanding how communities cope.
- **Incorporating other data into these health forecast services**, for example population, rural *vs*. urban residence, migration, nutritional status, environmental and poverty data.
- **Collaboration +: new, multi-disciplinary initiatives** that involve communities beyond health and climate/ weather; build upon existing initiatives and progress; aim to meet emerging challenges; and communicate with end-users in appropriate ways.
- **Commitment at all levels** that brings climate and health communities together, clarify responsibilities, builds capacity in the climate and health sectors to achieve these services, facilitates joint initiatives and ensures resources such as data are shared in a suitable way.

Theme 4: Research and Education

- **Understand the relationships between climate and climate-sensitive diseases and health issues** under different environmental conditions through interdisciplinary, multi-sectoral and multi-centre research.
- **Ensure that climate change mitigation and adaptation strategies are informed by multidisciplinary research**.
- **Develop capacity within Africa** for the generation, interpretation and use of climate, health and other interdisciplinary data enabling informed, evidence-based decision making.
- **Standardize and quality control** data collection and storage, ensuring data are available on relevant temporal and spatial scales.
- **Enhance knowledge transfer and communication** of information across disciplines and communities through existing networks, encouraging the introduction of climate and health into the curriculum at all levels of education.
- **Strengthen existing partnerships and collaborations** while developing new groups and building links across disciplines