

# WMO Task Force on Social and Economic Applications of Public Weather Services

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## Climate Information for Health: managing climate sensitive disease

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# Health and Development .....



Good health is one of the primary aspirations of human social development

Health indicators feature prominently in human development indicators

Used as a means of measuring progress towards sustainable development

Health goals and targets prominent in the MDGs.....



"Six out of eight Millennium Development Goals can only be reached with effective malaria control in place."

MDGs by 2015 - health related targets:

- indirect < Hunger, >Education, >Water and Sanitation
- direct < Maternal Mortality
- direct < Childhood mortality
- direct < Malaria and other infectious diseases

.....with <Poverty as an overarching goal

# Climate and Health .....

*Using Climate to Predict Infectious Disease Epidemics. WHO 2005*

Diseases include:	Inter-annual variability:	Sensitivity to climate#:	Climate variables:
Influenza	* * * * *	* *	(<T)
Meningitis	* * * *	* * *	>T, <H (>R)
Leishmaniasis	* *	* * *	(>T, >R)
R.V. Fever	* * *	* * *	>R (<T)
Cholera	* * * * *	* * * * *	(>T)
Malaria	* * * * *	* * * * *	(>R, T, H)
Dengue	* * * *	* * *	(>R, T, H)

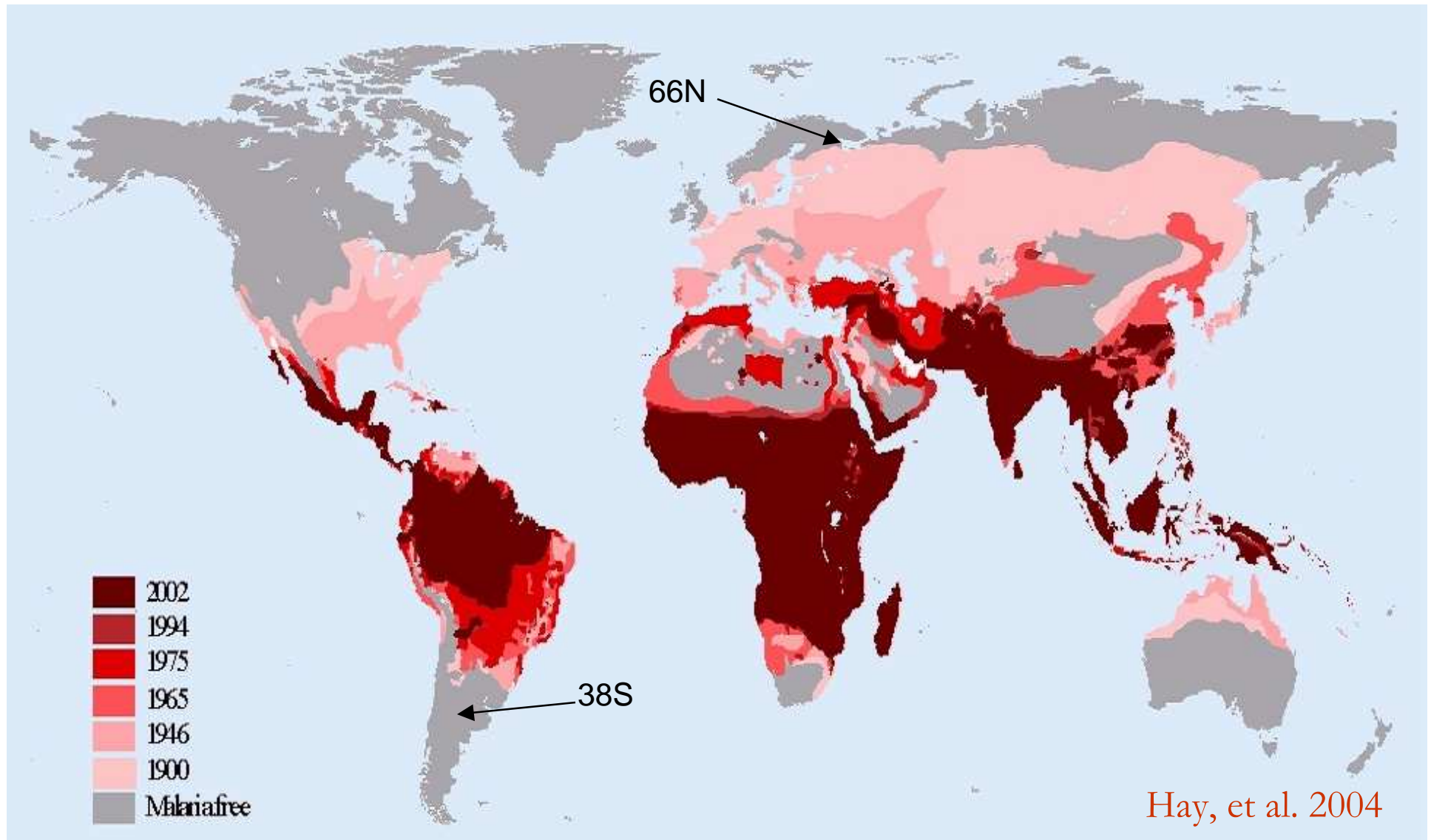


.. bacterial, viral and protozoan ..

..other candidates, e.g some respiratory and pulmonary diseases, allergies, cancers, etc. not yet included....

... must remember socio economic factors very important...

# Distribution of malaria (a Tropical Disease ?)



Where malaria is not adequately controlled, the normal seasonality of the climate largely determines the seasonality and endemicity of malaria

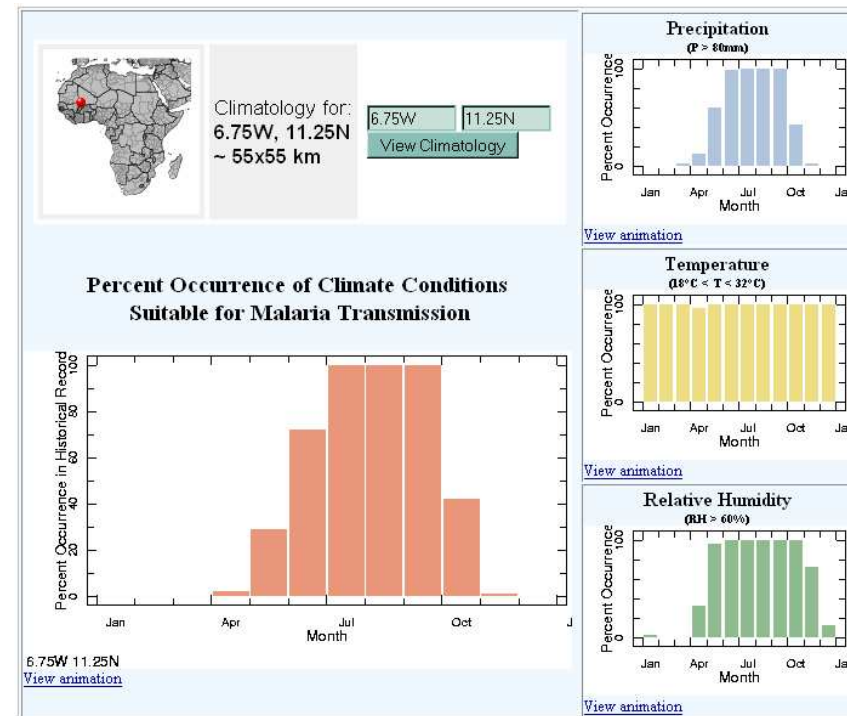
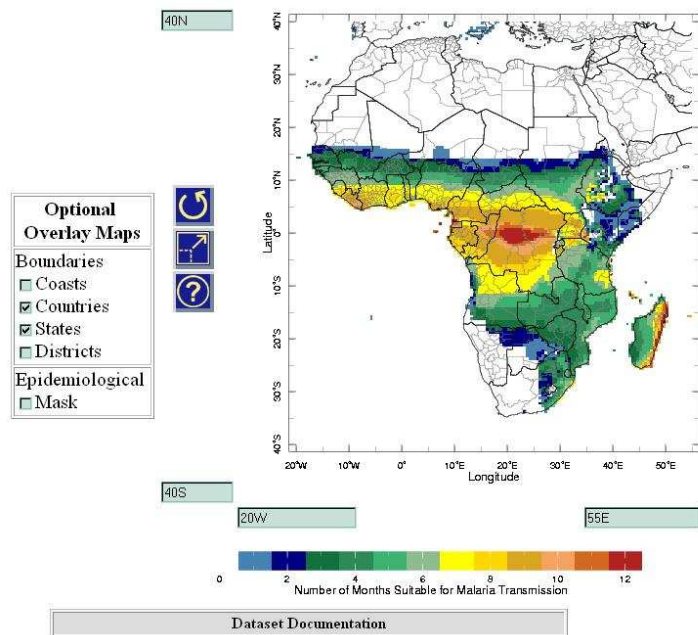


# Climate and endemic (stable) malaria....

Unfortunately epidemiological data is very poor in sub-Saharan Africa.

In the absence of epidemiological data - climate data has been used to help model and map the distribution of climate sensitive disease.

Climate suitability for endemic malaria  
= 18-32°C + 80mm + RH>60%

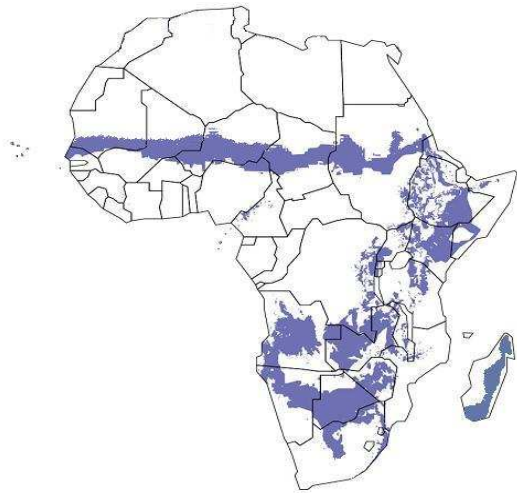


Temporal information useful for developing seasonal disease calendars for control planning purposes

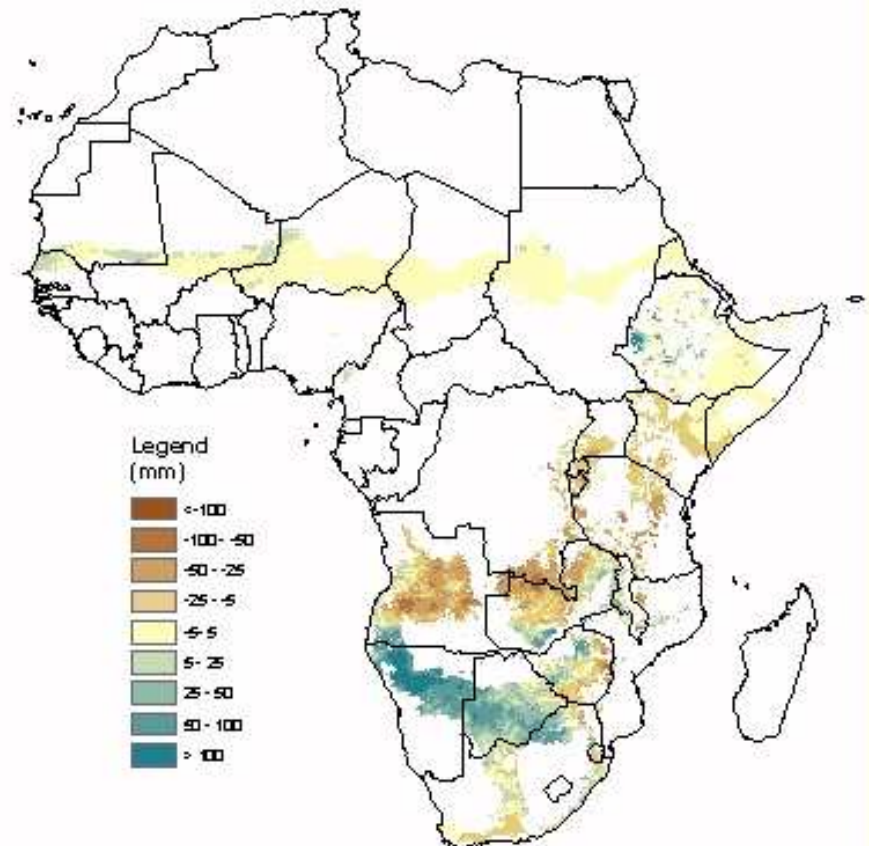
# Climate and epidemic (unstable) malaria.....

For epidemics we are less interested in the 'normal' – more interested in the 'abnormal' ....

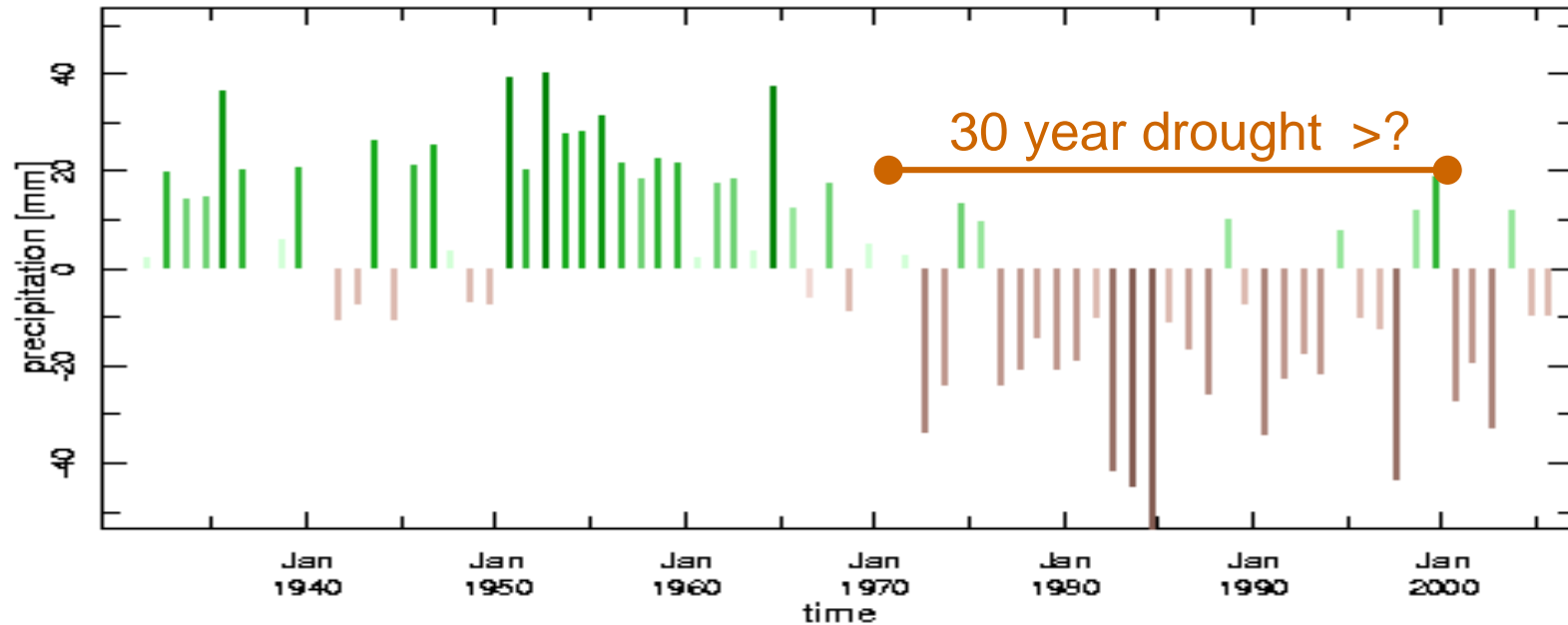
## Areas at risk of epidemic malaria



Rainfall Anomalies  
in  
Zones with Malaria Epidemic Potential  
January 21 - 31, 2006



## the impact of climate trends....



West Africa provides one of the most dramatic examples worldwide of climate variability that has been directly and quantitatively measured [Hulme, 2001].

### Changes in malaria

<endemicity (Faye et al 1995)  
>epidemicity (Mouchet et al 1996)

### Changes in meningitis

>epidemic frequency  
>southward extension of 'Meningitis Belt' (Molesworth et al 2003)

**!! Very important consideration when establishing baselines !!**



# Demands for evidence-based health policy

Before using climate information in routine decision making health policy advisors need:

Evidence of the impact of climate variability on their specific outcome of interest, and

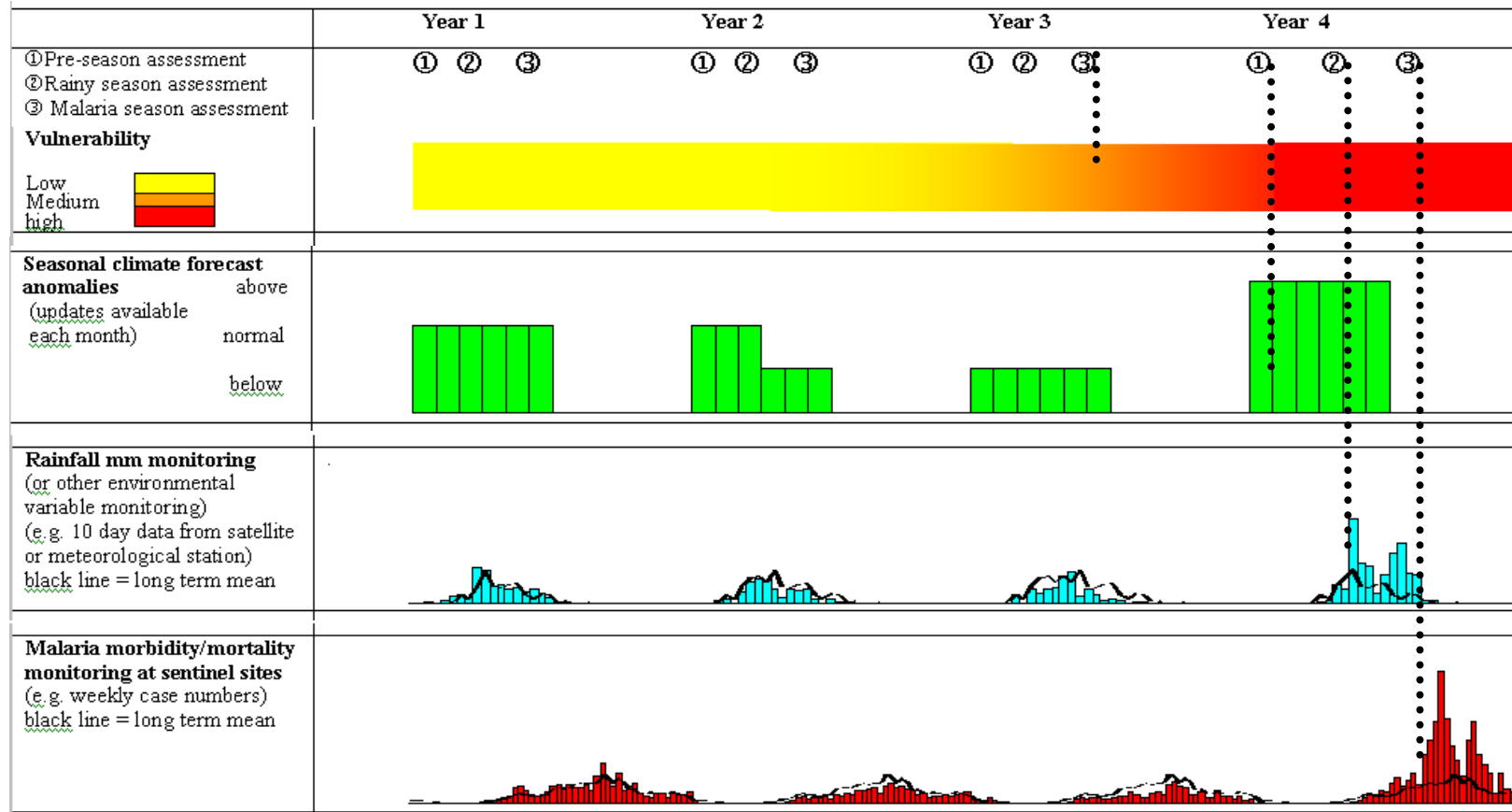
Evidence that the information can be practically useful within their decision frameworks, and

Evidence that using climate information is a cost-effective means to improving health outcomes.



# Demand for integrated early warning systems..

Integrated MEWS gathering cumulative evidence for early and focused epidemic preparedness and response (WHO 2004)....



Flag 1 – Flag 2 – Flag 3

>>> Planning & Response

# Vulnerability monitoring



## Example in practice: Botswana ...

Routine assessment of drug efficacy in three sentinel sites, susceptibility of the vector to insecticides, and coverage of IRS achieved each season

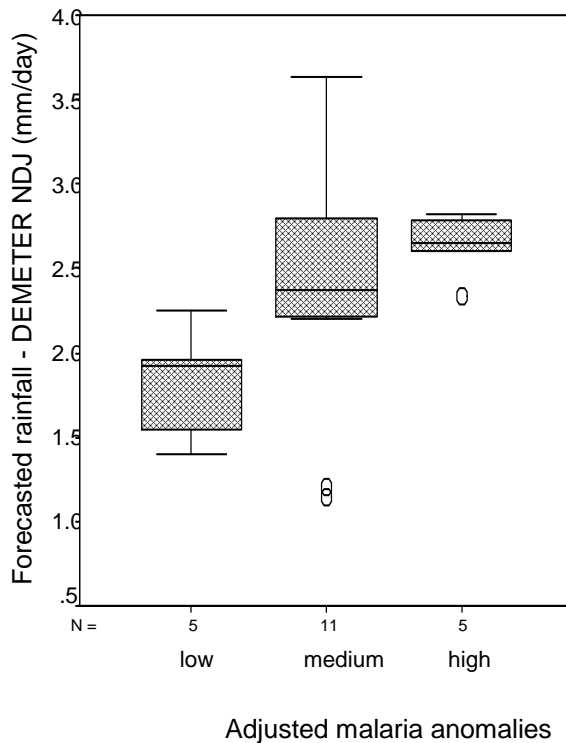
Requests regular assessments of drought and food security status from the SADC Drought Monitoring Centre and disseminates the information to the epidemic prone DHTs

Recognised need for extra vigilance in malaria control programme monitoring, and surveillance among its most vulnerable groups, including those co-infected with HIV, TB, etc.

# Seasonal Climate Forecasting



**Example in Botswana** ..... SCF offers good opportunities for planning and preparedness. NMCP strengthen vector control measures and prepare emergency containers with mobile treatment centres

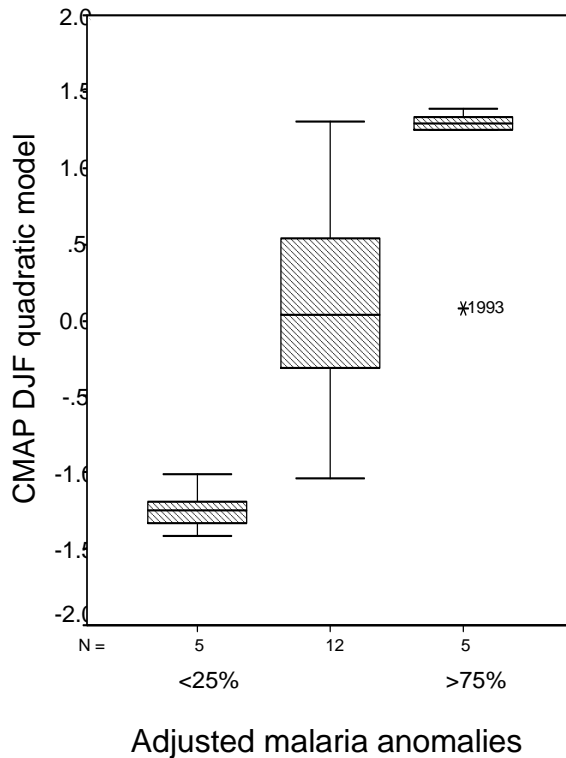
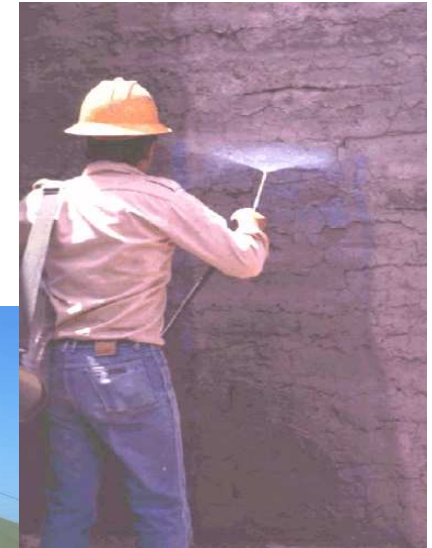


Evidence of impact of climate variability on specific outcome of interest (Thomson, et al. *Nature*. 2006)

# Environmental monitoring



Example in Botswana ...ENV monitoring enables opportunities to focus and mobilise more localised response, i.e. vector control and siting of emergency treatment centres....

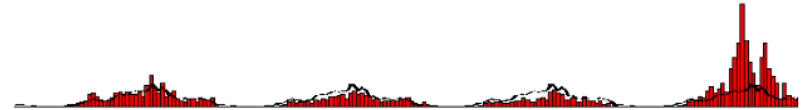


Evidence of impact of climate variability on specific outcome of interest (Thomson, et al. *AJTMH*. 2005)

Evidence of timing/effectiveness (Worrall, et al. in press)



# Case surveillance



Example in Botswana .. Of a number of indicators (WHO 2004) the NMCP uses case thresholds defined for three levels of alert ...

## OKAVANGO SUB-DISTRICT

**ACTION 1:** When district notification reaches/exceeds 600 unconfirmed cases/week

### DEPLOY EXTRA MANPOWER AS PER NATIONAL PLAN

- ◆ Request 4 nurses from ULGS by telephone/fax
- ◆ Collect the 4 nurses from districts directed by ULGS
- ◆ Erect tents where needed
- ◆ Catchment areas to deploy volunteers in hard-to-reach areas
- ◆ Print bi-weekly newsletter to inform community about epidemic

Threshold 1- 600 unconfirmed cases/week >>> Action Plan 1.

**ACTION 2:** When district notification reaches/exceeds 800 unconfirmed cases/week

### DEPLOY MOBILE TEAMS PER DISTRICT PLAN

- a) Each team to be up of a Nurse or FEW, a vehicle and a driver
- b) Deploy teams as follows:

TEAM AND DEPLOYMENT AREA	VEHICLE	Reg No
Team A: Qangwa area	Council	
Team B: Habu/ Tubu / Nxaunxau area	Council	
Team C: Chukumuchu / Tsodilo / Nxaunxau area	Council	
Team D: Shakawe clinic (vehicle and driver only)	DHT vehicle	
Team E: Gani / Xaudum area	Gani HP vehicle	
Team F: Mogotho / Tobera / Kaputura / Ngarange area	Mogotho HP vehicle	
Team G: Seronga to Gudigwa area	Gudigwa HP vehicle	
Team H: Seronga to Jao Flats	Boat	

Threshold 2- 800 unconfirmed cases/week >>> Action Plan 2.

- c) Deploy MO at Shakawe and 2 more nurses as per National Manpower contingency plan

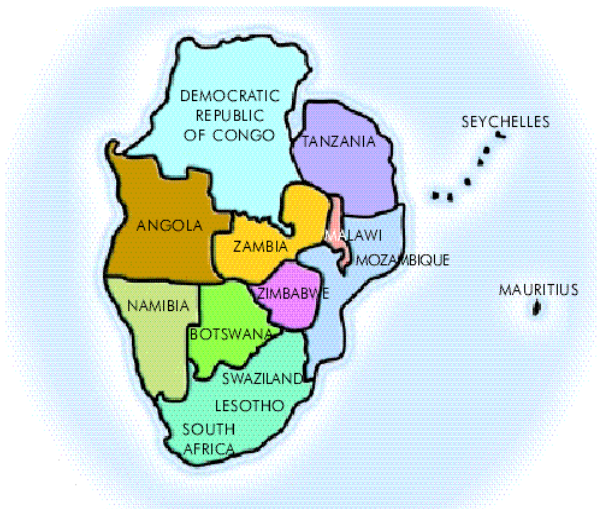
**ACTION 3:** When district notification reaches/exceeds 3000 unconfirmed cases/week

### DECLARE DISTRICT DISASTER

- a) Call for more outside help (manpower, vehicles, tents, etc)
- b) Convert some mobile stops to static treatment centres
- c) Station nurses at the static treatment centres
- d) Station GDA to assist nurse eg cooking for patients on observation
- e) Erect tents with beds and mattresses (6 – 10 beds/tents) at selected centres
- f) Station vehicles at selected centres
- g) Deploy MO or FNP at Seronga
- h) Station officer from MOH to co-ordinate epidemic control with DHSCC

Threshold 3- 3000 unconfirmed cases/week >>> Action Plan 3.

# Southern African Regional Pre-Season Epidemic Malaria Outlook Forum, Harare, 2004 and 2005



## Malaria Surveillance, Forecasting, Preparedness and Response in Southern Africa

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

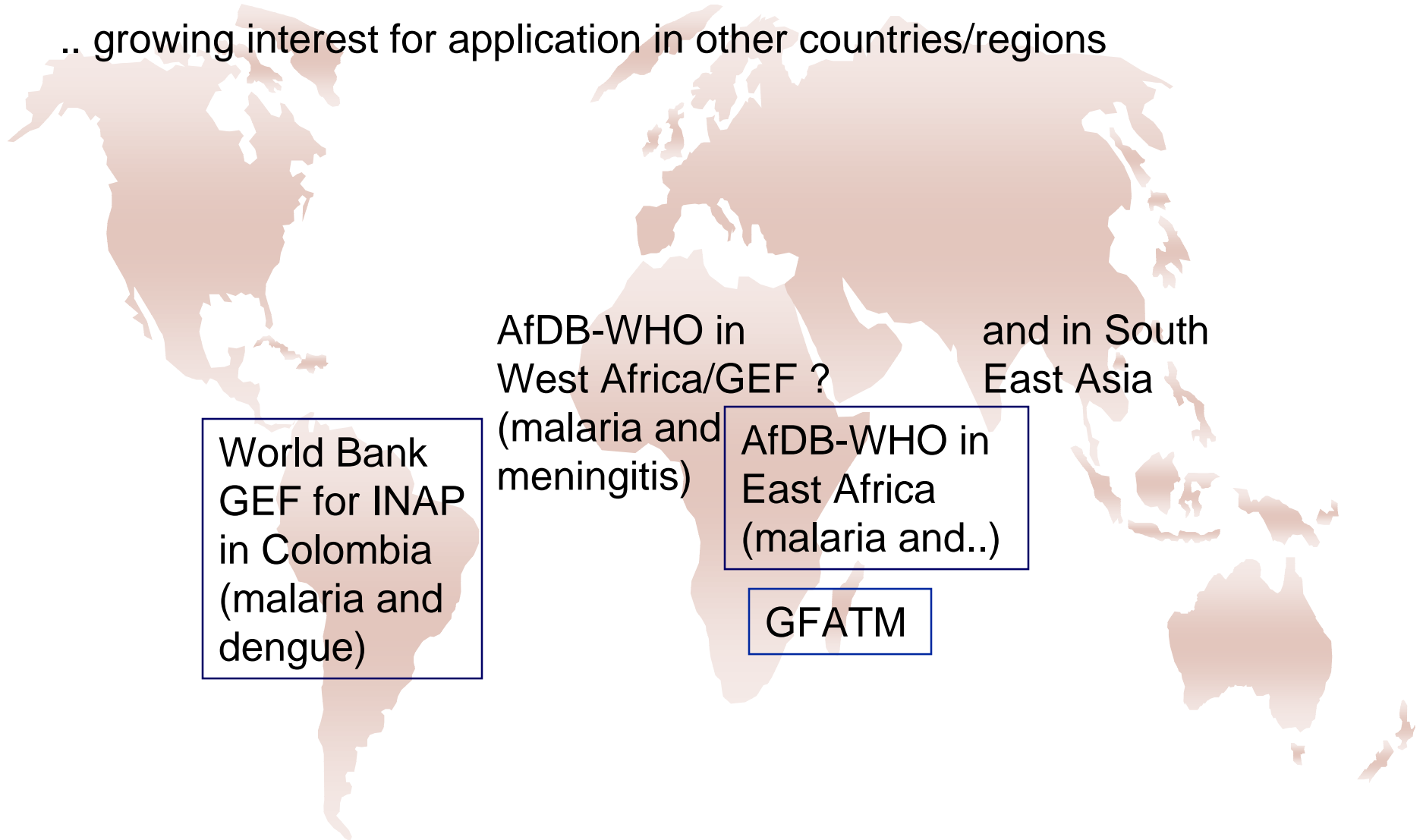
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## And for application of the approach elsewhere ?

.. growing interest for application in other countries/regions



World Bank  
GEF for INAP  
in Colombia  
(malaria and  
dengue)

AfDB-WHO in  
West Africa/GEF ?  
(malaria and  
meningitis)

AfDB-WHO in  
East Africa  
(malaria and..)

GFATM

and in South  
East Asia

# Data issues....

Climatology - is the time period relevant to current distributions in the disease of interest?

If we use more recent climatology what are the implications of declining data available in recent decades?

More data available at national level – need better access and utilization.....

Otherwise we run the danger of giving national health services sub-optimal disease modeling and mapping products

Many data issues – over satellite rain estimates and ground-based observations (severe limitations of temperature estimates) ....

...again need better incorporation of national data....

Otherwise sector users end up with sub-optimal monitoring products.

# Institutional issues...

Institutional (?? Global/Regional/National/District ??)

- ~ accountability
- ~ capacity
- ~ sustainability

Training – trans-disciplinary requirement – few if any boundary institutions in SSA dealing adequately with climate-health knowledge generation and transfer

Need very significant medium term investment in strengthening African research, education and training establishments to supply appropriate human resource needs



# Gaps and bridge building opportunities....

◆ To be discussed .....

*“If development economists have failed miserably to consider climate as an important resource in development planning, one can ask, however, why have the climatologists ensured that such neglect is allowed to continue? One is hard pressed to name more than a handful of climatologists who are active even in the fringe areas of development”. Biswas 1984.*

# Managing climate sensitive disease risk in context of climate change adaptation ....

Many of the MDG goals and targets (health, hunger, water, environment) are sensitive to climate variability. We need a process to use climate information today for better management of the associated risks.

- Establish firm evidence base for linkage
- Anticipate impacts (who, where and when)
- Monitor key variables and indicators
- Adapt planning preparedness and response measures according to changes in risk
- Build responsive capacity.....

For health in Africa there are the resources of the Global Fund for AIDS, TB and Malaria, and the AfDB

There are the wider resources of the Global Environmental Facility (GEF) World Bank, UNDP and UNEP

Post G8 Climate-Change and Africa commitments.....GCOS....etc.



The IPCC has identified building public health infrastructure as  
“the most important, cost effective and urgently needed”  
adaptation strategy for climate change (WHO-UNEP-WMO 2003)

Climate information/risk management for climate sensitive disease  
should be a vital component in this effort

This type of no regrets action in health, and other development  
sectors, is realizable and essential, both to help achieve the MDGs  
and to help vulnerable communities better manage and adapt to  
their varying climate.



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