

Towards A Multi-hazard Early Warning And Response System In West Africa:

A Multi-hazard Approach To Forecasting Adverse Health Impacts In Africa

Abdoulkarim Traore

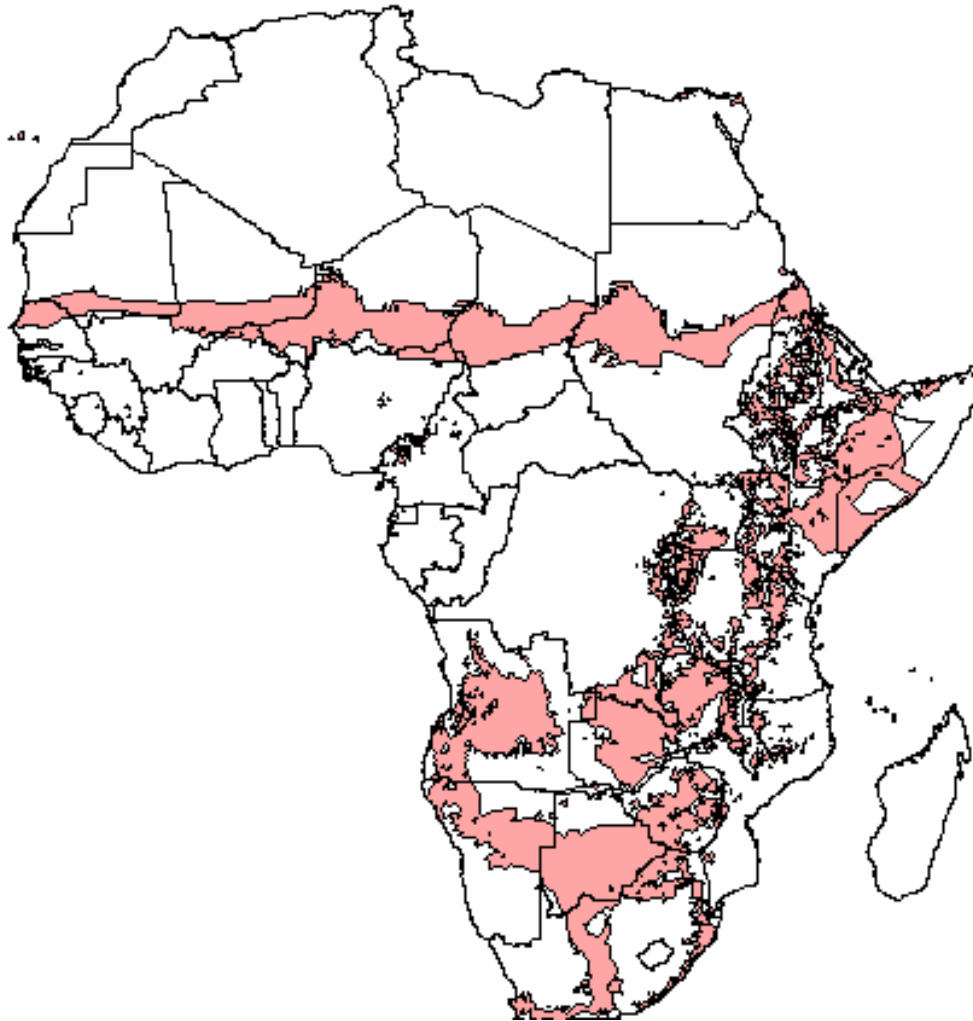
Direction De La Météorologie Nationale, Niger

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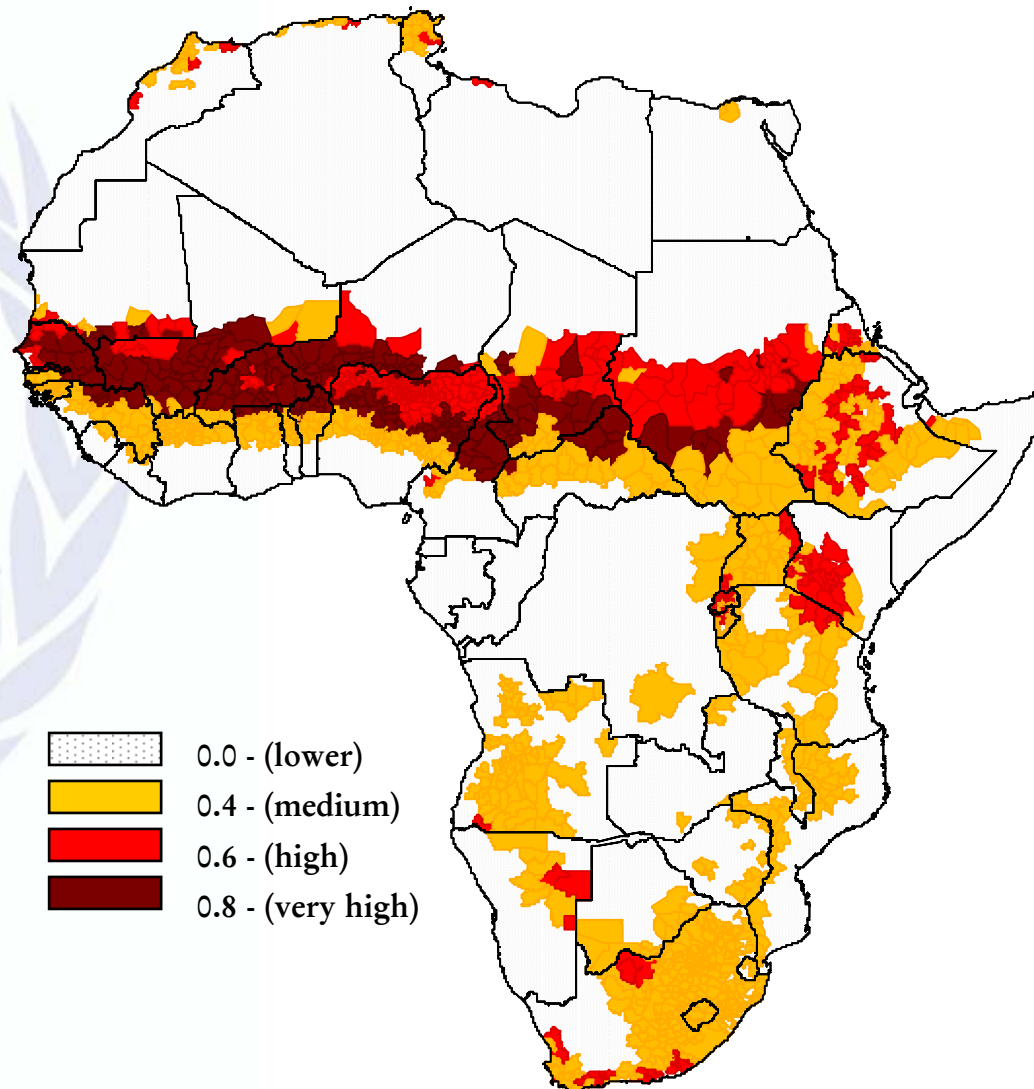
David Rogers

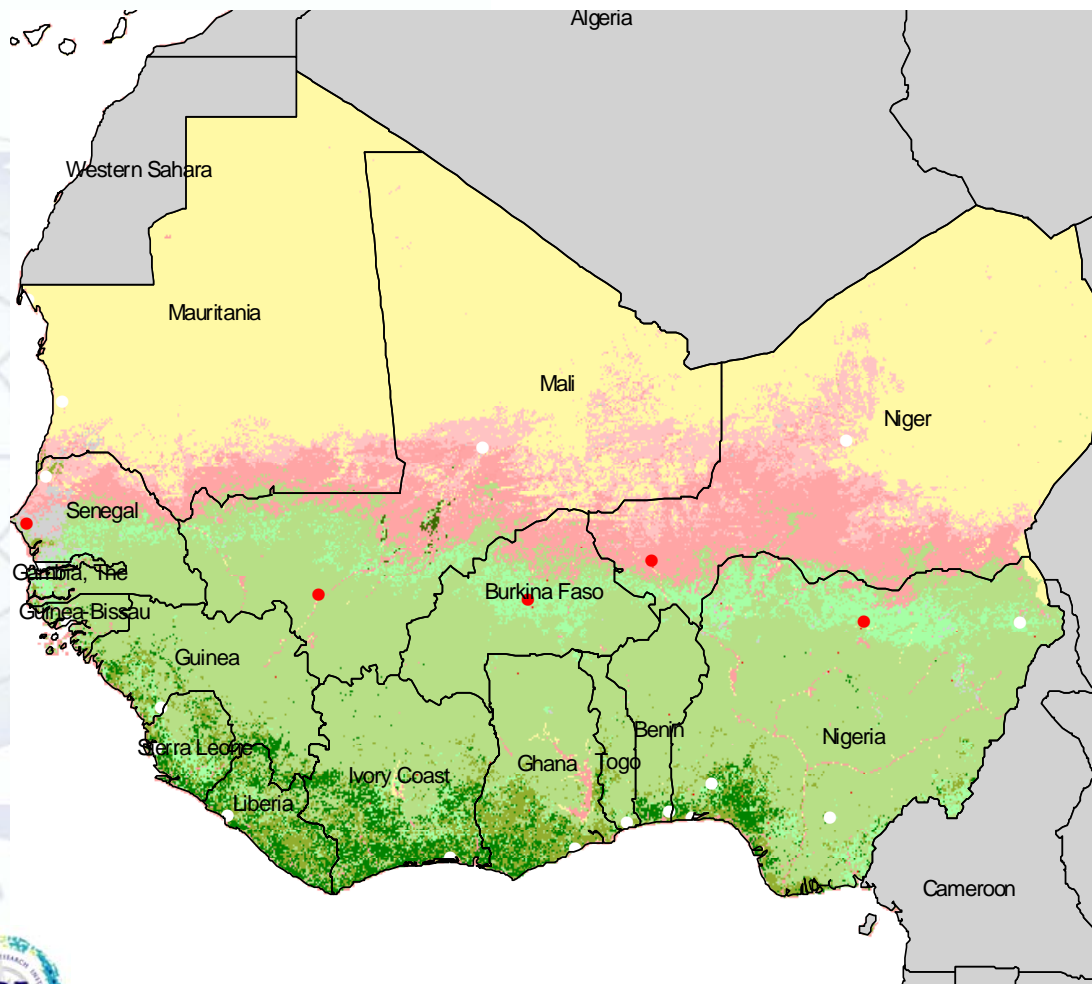
World Meteorological Organization

The Epidemic Malaria Zone In Africa



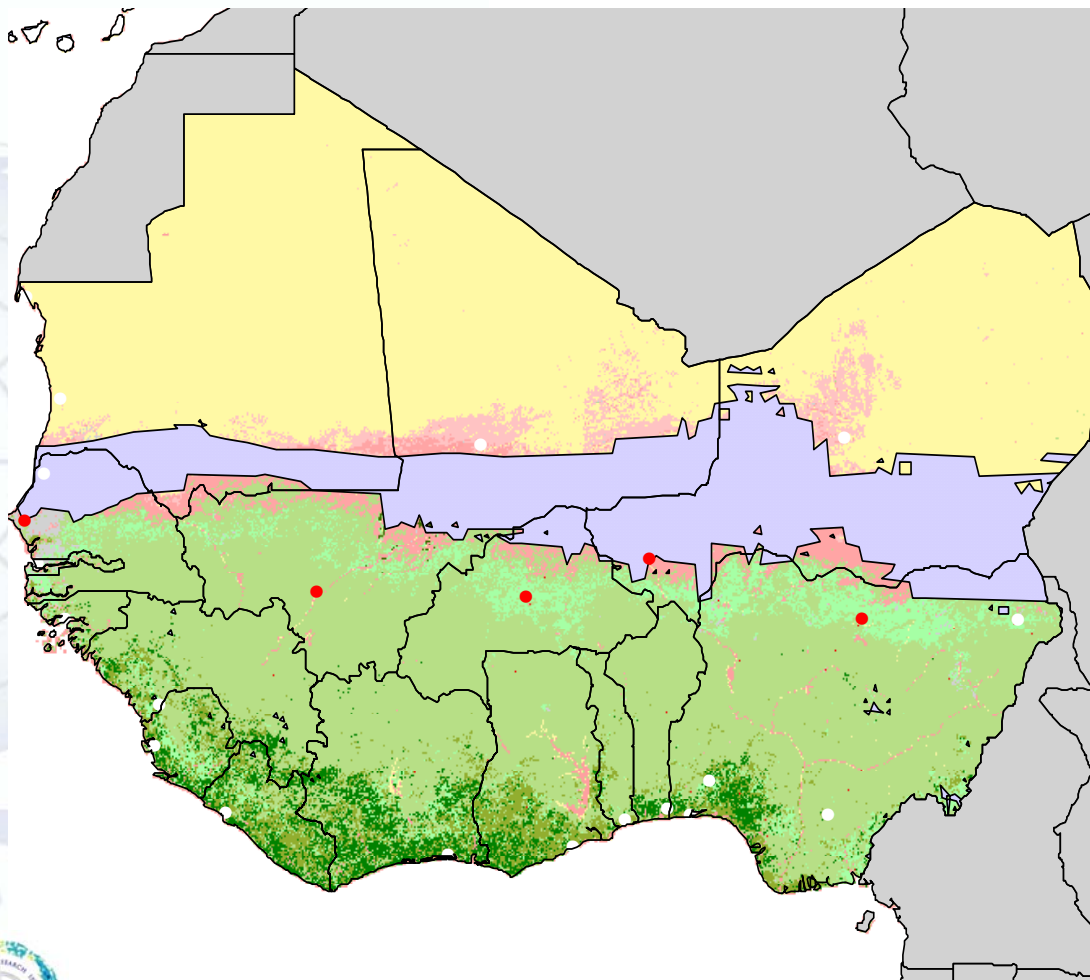
The Epidemic Meningitis Zone In Africa





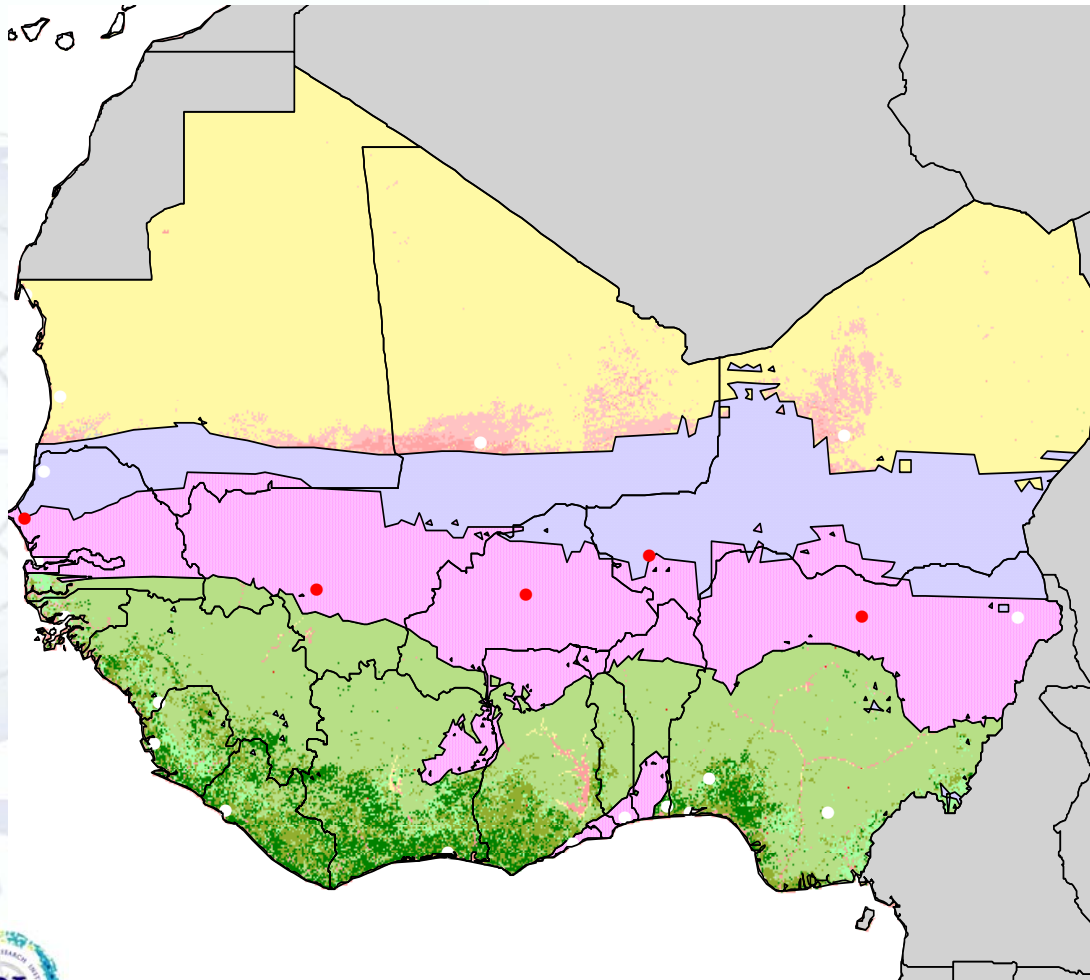
- Landcovers**
- urban
 - drylands
 - irrigated croplands
 - cropland/grassland mosaic
 - cropland/woodland mosaic
 - grassland
 - shrubland
 - savanna
 - broadleaf deciduous forest
 - evergreen broadleaf forest
 - waterbodies
 - forested wetland
 - Barren sparsely vegetated
 - No Data





Limites climatiques de la zone d'épidémies de paludisme





Épidémies de paludisme

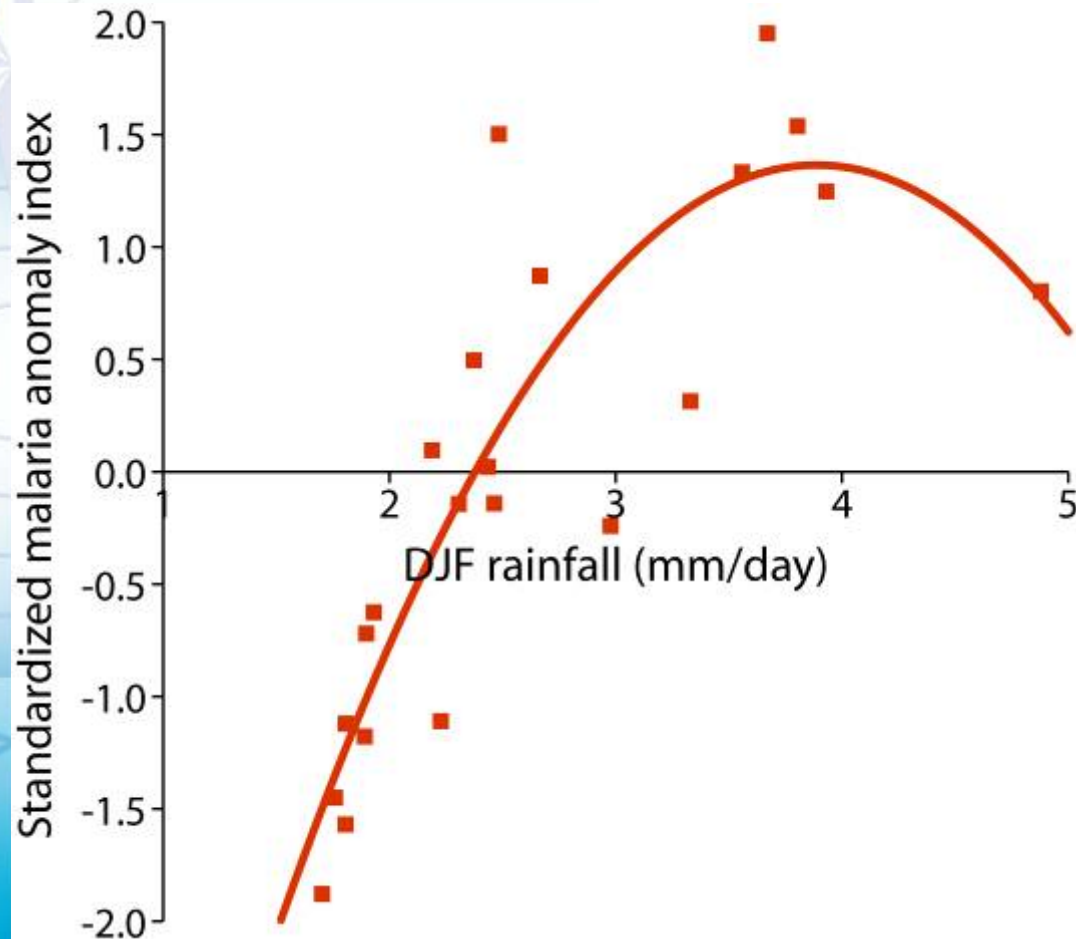
Épidémies de méningites

Limites climatiques

CERMES
Niger



Malaria Incidence (example from Botswana)

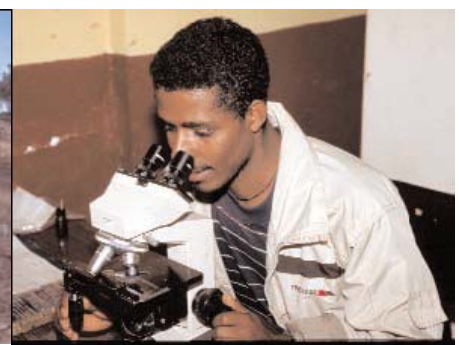


Malaria incidence in Botswana is strongly related to rainfall variability during the peak rainfall season December – February. The relationship is non-linear.



An Effective Warning System Is Expected To:

- Reduce the risk of epidemic diseases for the tens of millions of people in the Sahel currently threatened by epidemic malaria and meningitis;
- Improve routine rural and urban health care for weather- and climate sensitive diseases;
- Increase capacity in the operational/research weather, climate and health communities to serve national development agendas through reduction in risk associated with weather- and climate-related health hazards.



Multi-hazard Early Warning And Response System

- This project aims to contribute to the development a multi-hazard early warning and response system (MEWARS) to enable national health services cope with both the impacts of 'normal' seasonal variability in disease/health hazard occurrence, and scaled up interventions in the event of a disaster whenever one threatens

- The primary focus is on both normal and under

- This project is based on four elements of ISDR.

1. Prior knowledge of the risks faced by communities
2. Technical monitoring and warning service for these risks
3. Dissemination of understandable warnings to those at risk
4. Knowledge and preparedness to act

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& 3).

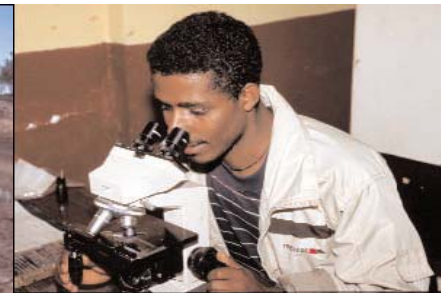
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Multi-hazard Early Warning

- Early warning systems for weather and climate sensitive epidemic diseases require similar information, tools, capacity to those which can serve for early warning of pest outbreaks (e.g. Locusts), food insecurity, flood hazards and droughts
- Therefore it makes political, financial, technical and operational sense to develop one multi-hazard early warning “system” to serve a number of sectoral response purposes
- Developing the capacity to respond to warnings of adverse events at the institutional as well as the community level is critical to the creation of an effective early warning system. It is therefore essential to develop the integrated early warning systems embedded in the institutions that deal with response with a direct connection to the community affected

Results Required

- **Partnership:**
 - An effective collaboration established between the operational health, weather and climate communities to create and sustain early warning systems for adverse weather and climate related health events (disease, nutrition, hazards) at the national and regional level
- **Partnership strengthening:**
 - Operational capacity in the health community to use weather and climate information alongside the development of operational capacity in the meteorological community to deliver appropriate weather and climate information in a timely manner and in a useful format (including observed and forecasting information at appropriate spatial and temporal scales)



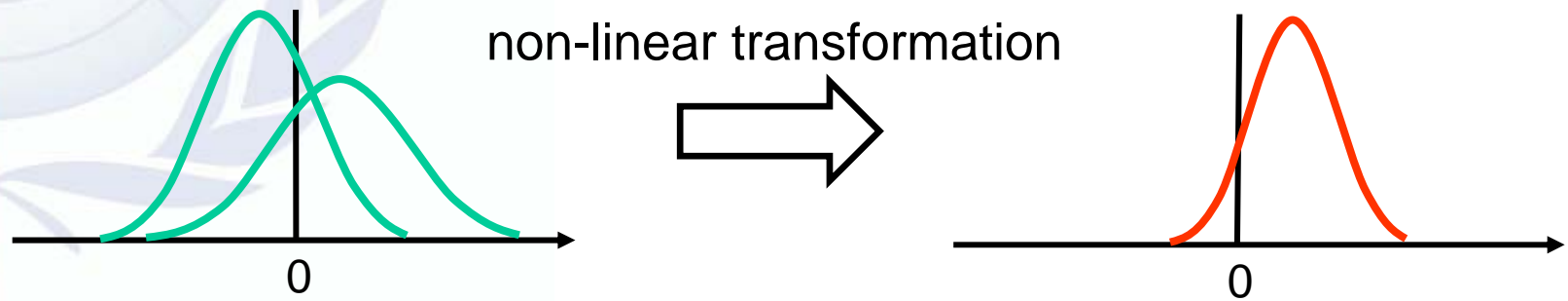
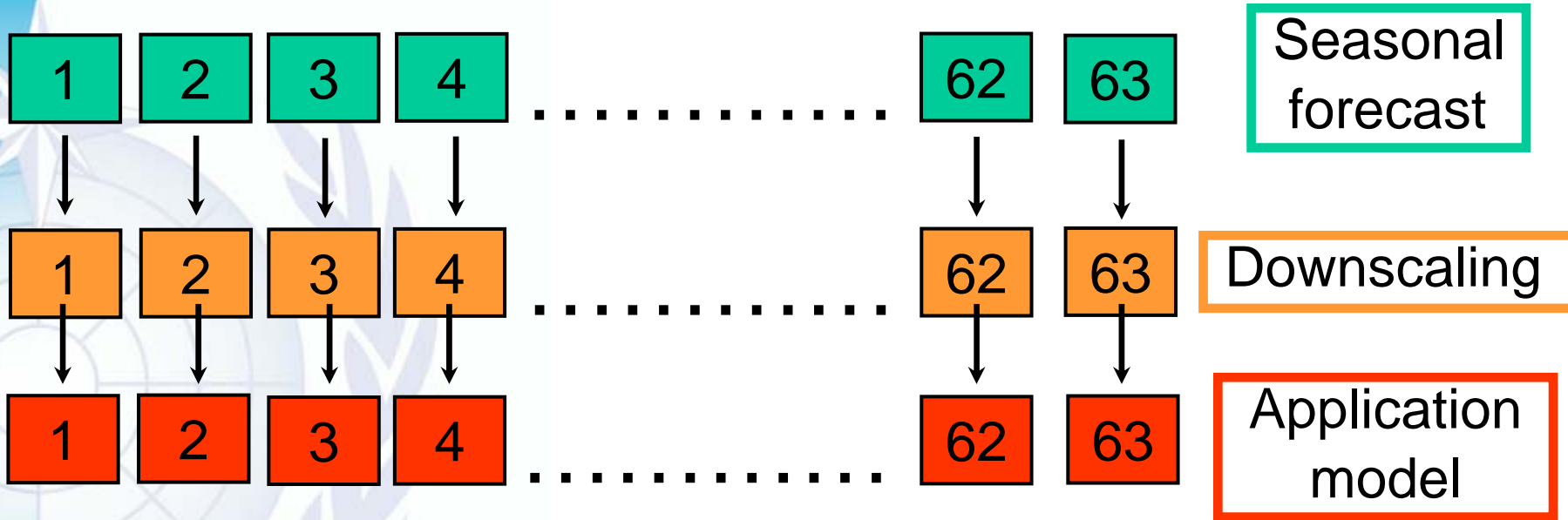
Results Required

- **Communication:**
 - To develop and test a strategy in priority locations for the dissemination of weather and climate based early warning to local decision makers
- **Sustainability:**
 - Suitable materials developed to sustain efficient and effective communications between the weather, climate and health communities, e.g. climate risk toolbox
 - Integration of methods into future capacity strengthening and training activities in the health, weather and climate communities
 - Demonstration of regional and national institutional structures necessary to sustain an operational early warning system for decision-makers and the public

Results Required

- **Targeted research to improve knowledge management of risk reduction by**
 - Improving the capacity of the health sector to predict climate related health hazards through carefully designed impact studies
 - Improving the capacity of the weather/climate/environmental monitoring community to make operational existing and newly available climate/weather products now and to tailor these products to particular end-user needs in disease/epidemic, agriculture/food security, flood/drought and locust situations
 - Establishing the appropriate temporal and spatial scales at which weather and climate information can provide valuable new information to decision makers for specific health related problems – (week, month, season, decade for village, district, region)

DEMETER multi-model ensembles forecasting system



Probability of Precip & Temp

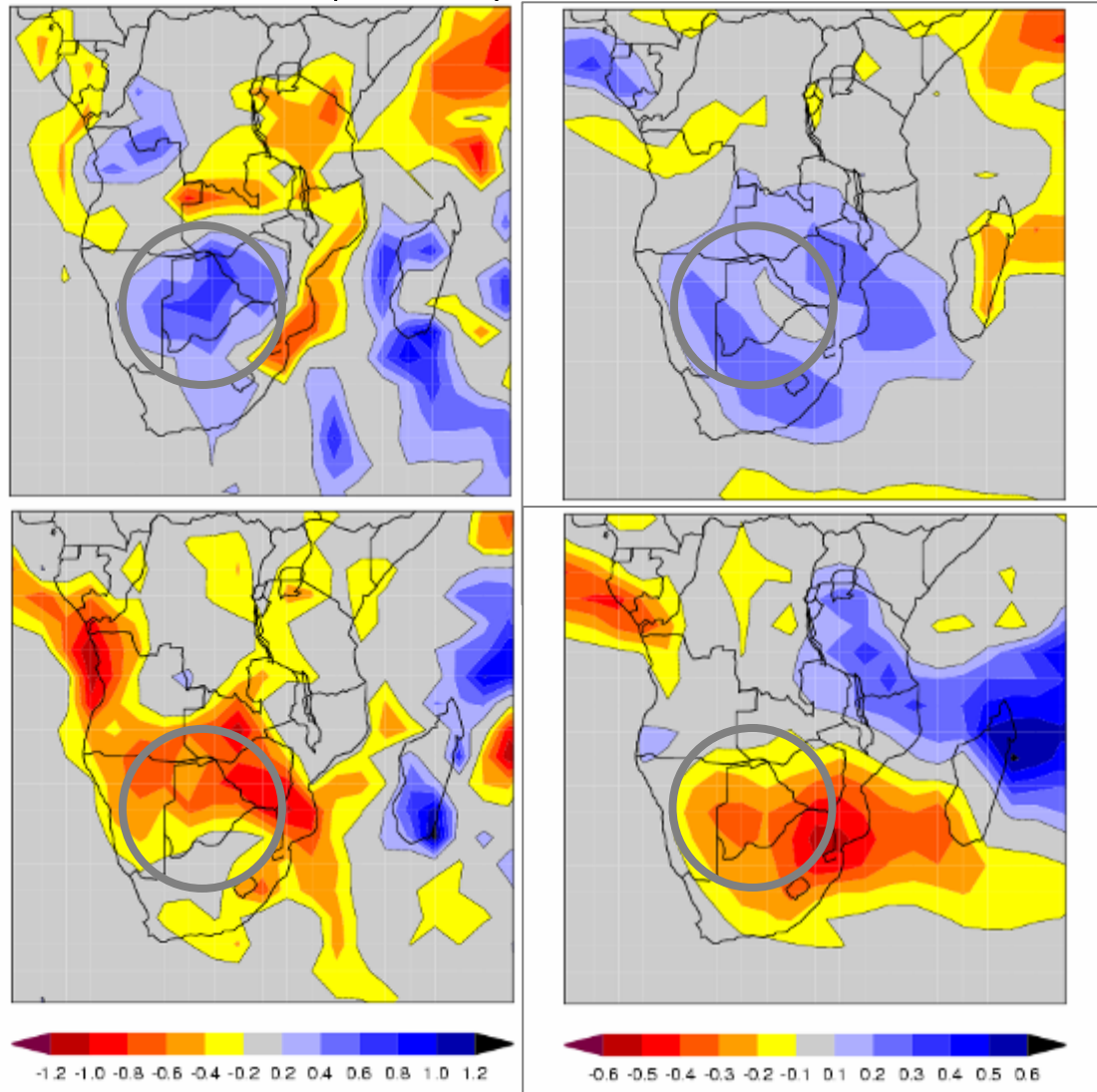
Probability of Malaria Incidence

Bulletin of the American Meteorology Society 85, (6) 853–872.

EWC III Bonn

DJF Precipitation Composites

Observation (CMAP) DEMETER Forecasts



High Malaria
years

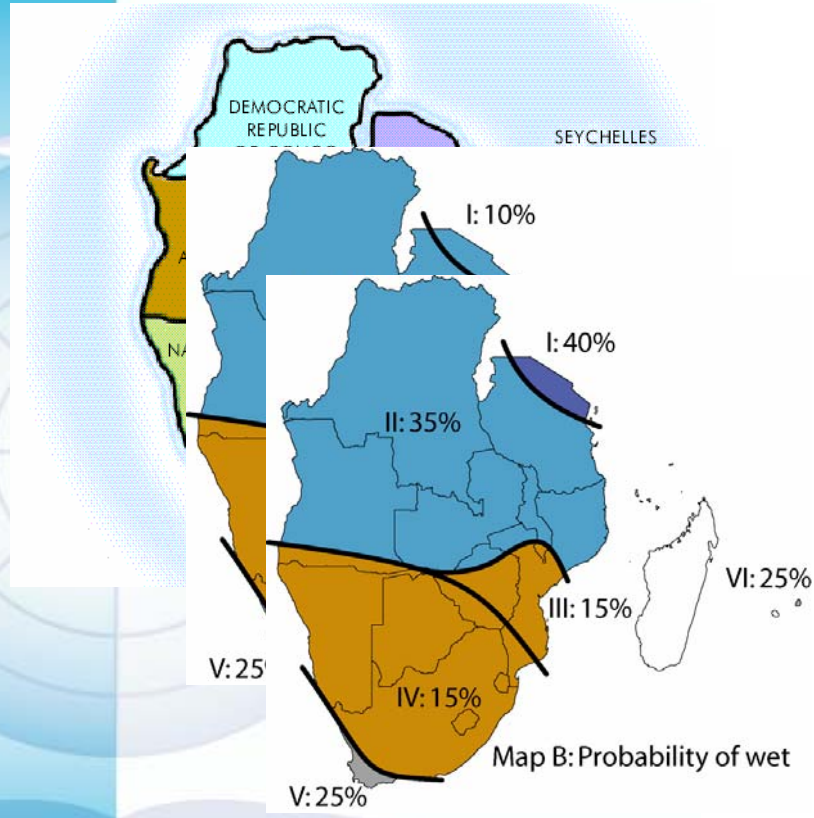
88, 89, 93, 96, 97,

Low Malaria
years

82, 83, 87, 92, 02,

1) Thomson, M. C., F. J. Doblas-Reyes, S. J. Mason, R. Hagedorn, S. J. Connor, T. Phindela, A. P. Morse, and T. N. Palmer, 2006: *Nature*, **439**, 576-579.

These results discussed at 1st SA Regional Epidemic Malaria Outlook Forum, Harare, 2004



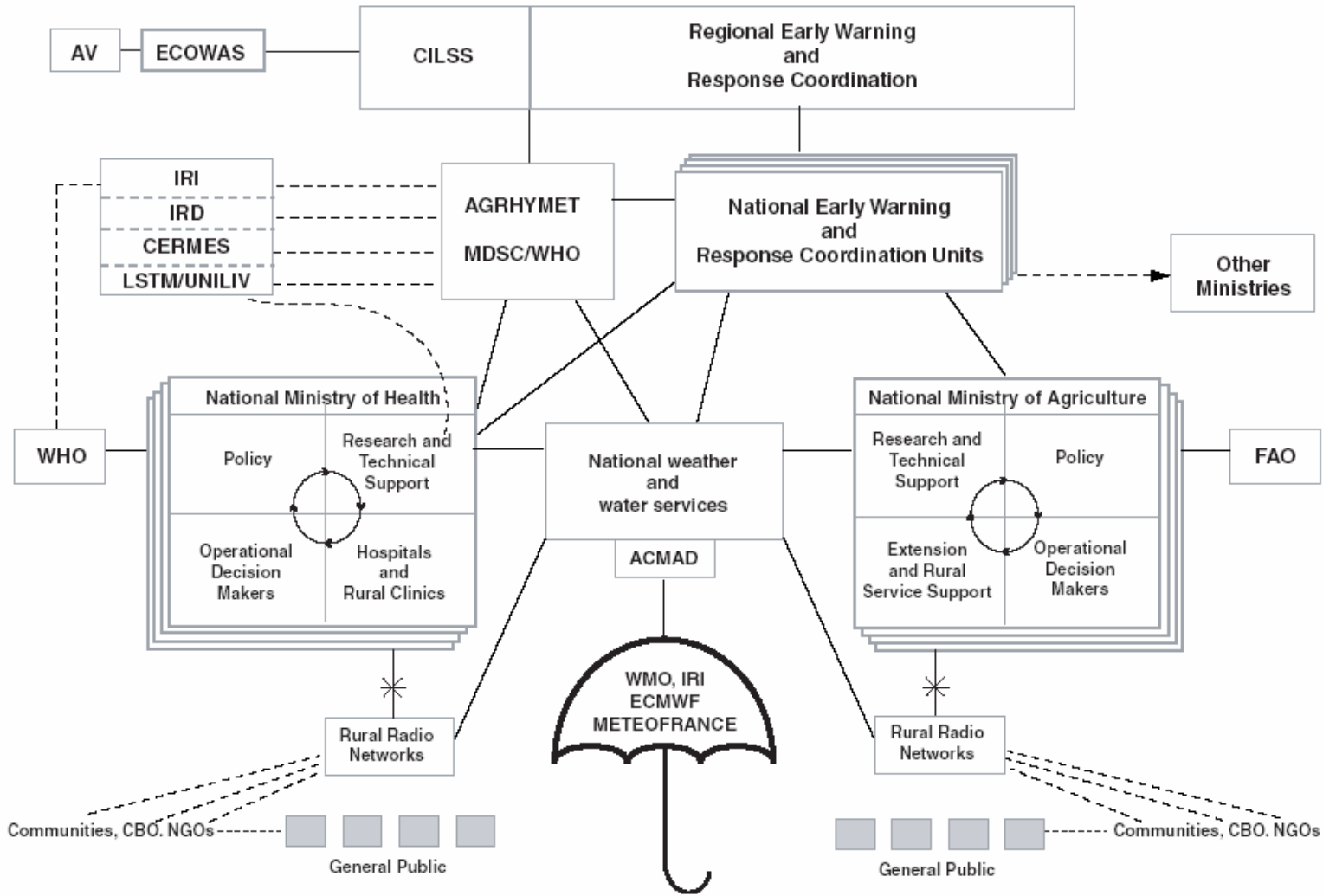
Improving epidemic malaria planning, preparedness and response in Southern Africa. (DaSilva, et al. 2004)

Malaria Surveillance, Forecasting, Preparedness and Response in Southern Africa

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Partnership Plan Multi-hazard Early Warning & Response System (MEWARS)



Partnership

- World Health Organization
- International Federation of the Red Cross and Red Crescent Societies
- World Meteorological Organization
- WHO Multi Disease Surveillance Centre (MDSC), Burkina Faso
- Centre de Recherche Médicale et Sanitaire (CERMES), Niger
- Direction de la Météorologie Nationale du Niger (NMD), Niger
- African Centre of Meteorological Applications for Development (ACMAD), Niger
- AGRHYMET Regional Centre, Niger
- International Research Institute for Climate and Society (IRI), USA
- European Centre for Medium-Range Weather Forecasts (ECMWF), UK
- Institut de Recherche Pour le Développement (IRD), France
- Liverpool School of Tropical Medicine (LSTM), UK
- Météo France, France
- National Oceanic and Atmospheric Administration (NOAA), USA
- University of Liverpool (UofL), UK

Hippocrates, Father of Medicine , 460 - 377 B.C.

«Who ever would study medicine aright should learn the following subjects. First he must consider the effects of the seasons of the year and the differences between them. Secondly, he must study the warm and the cold winds both those are in common to every country and those peculiar to a particular locality. Lastly the effect of water on the health must not be forgotten.»

Hippocrate, Père de la Médecine, 460 - 377 av. J.C.-

«Qui voudra étudier la médecine correctement devra apprendre les sujets suivants: avant tout il devra prendre en considération l'effet des saisons de l'année et les différences entre elles. En second lieu, il devra étudier les vents chauds et froids, qu'ils soient communs à tous les pays ou particuliers à un lieu. Enfin, l'effet de l'eau sur la santé ne devra pas être oublié.»