

Climate Change and Health: Experience in use of Space Technology over the Greater Horn of Africa

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**IGAD Climate Prediction and Applications Centre
(ICPAC)**

**UN-SPIDER Regional Workshop "Building Upon Regional Space-based
Solutions for Disaster Management and Emergency Response for
Africa"**

6-9 July 2010, Addis Ababa, Ethiopia

Outline

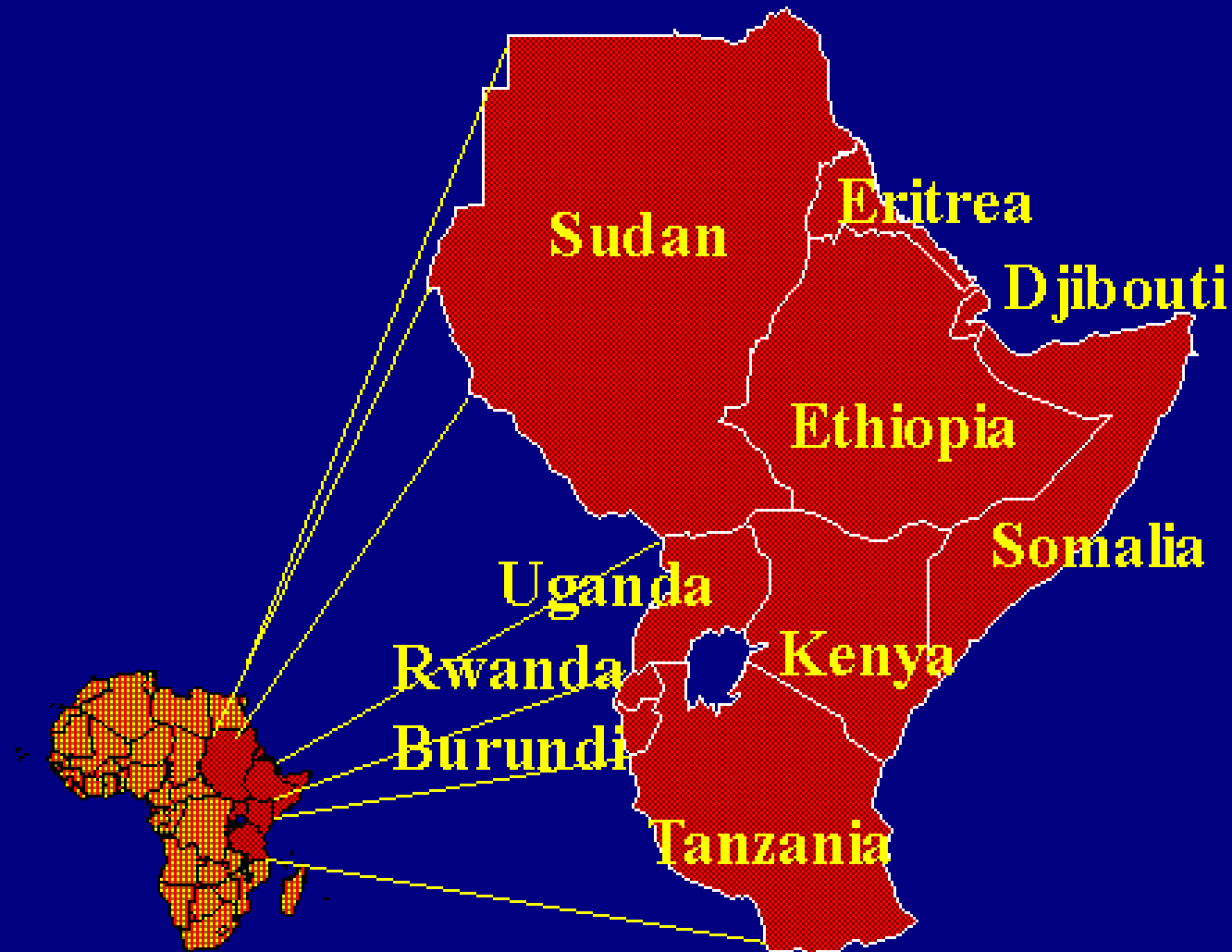
- **Brief on ICPAC**
- **Climate/weather monitoring and forecasting**
- **What the IPCC says about climate change**
- **Climate change implications on health**
- **Summary**
- **Conclusion**

Intergovernmental Authority on Development (IGAD)



IGAD Member Countries

Countries of the Greater Horn



ICPAC Member Countries



IGAD CLIMATE PREDICTION AND APPLICATIONS CENTRE (ICPAC)

**a specialized Institution of the Intergovernmental Authority on
development (IGAD) charged with the Responsibility of
Coordinating all Regional Climate Risk Reduction related issues in
the Greater Horn of Africa**

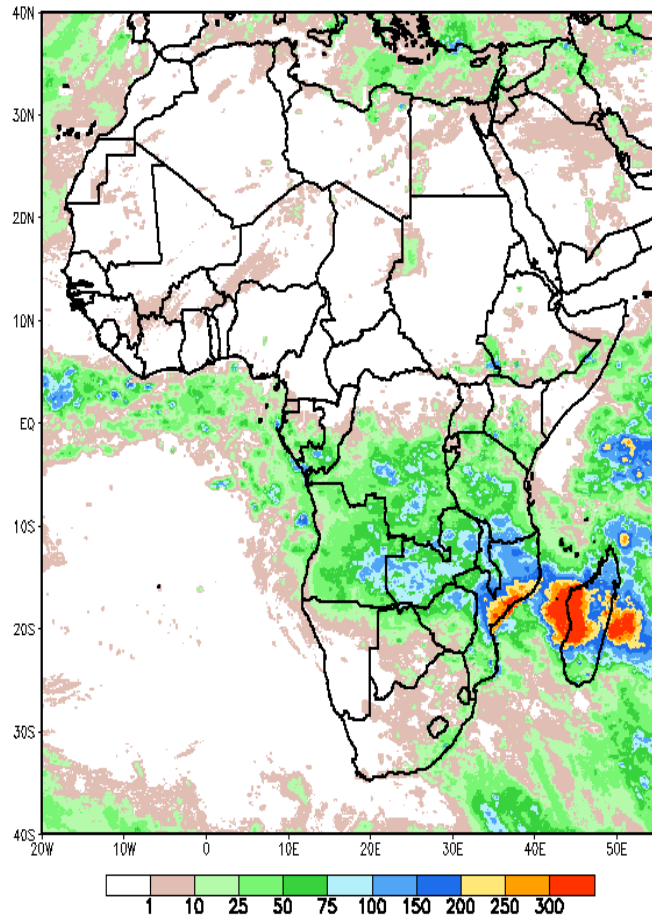
BANNER

SATELLITE BASE MONITORING

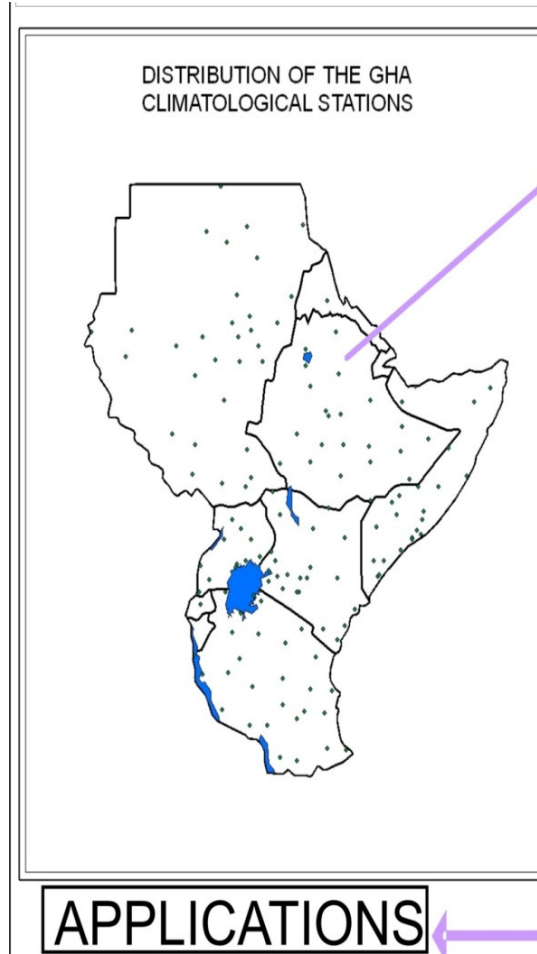
- How can satellite imagery help farmers, growers, ranchers/herders, emergency relief workers, policy makers, e.t.c.?
- ICPAC uses products from METEOSAT/PUMA real time imageries courtesy of AMESD PROJECT receiving station
- Provide Early Warning
 - Detect problems before they escalate
 - Rapidly provide broad perspectives on areas affected
 - provide impacts /information on 10-day, monthly, and seasonal timescale to end users

CLIMATE DATA

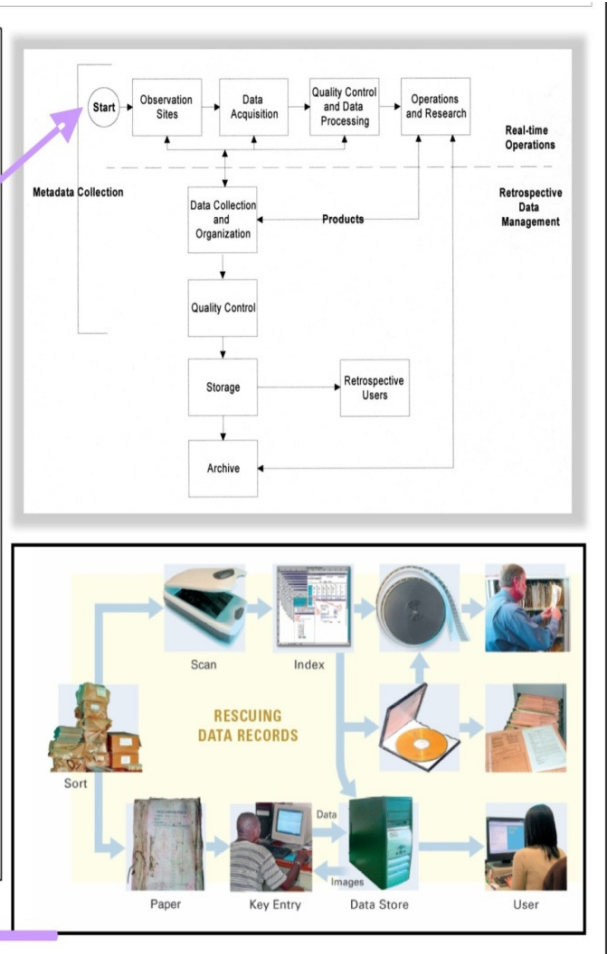
RAINFALL ESTIMATES



OBSERVED RAINFALL

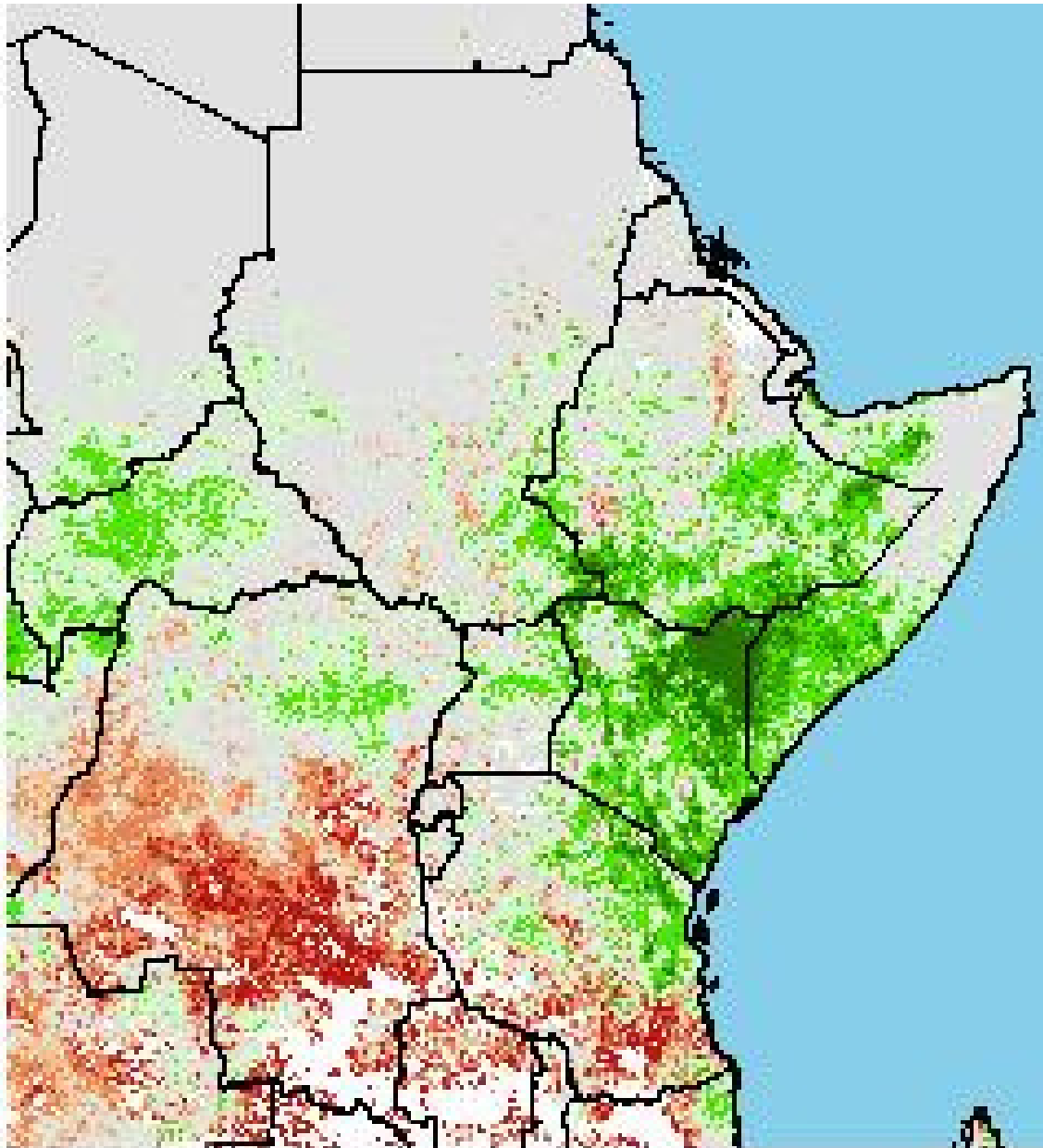


DATA PROCESSING

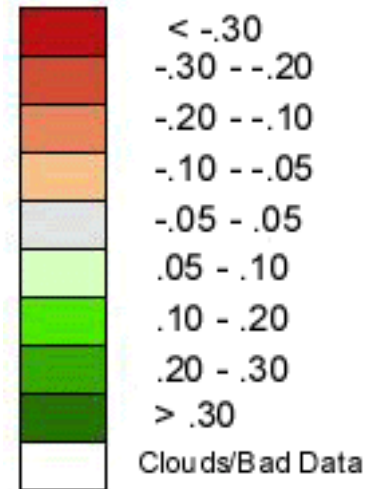


NDVI

VEGETATION MONITORING



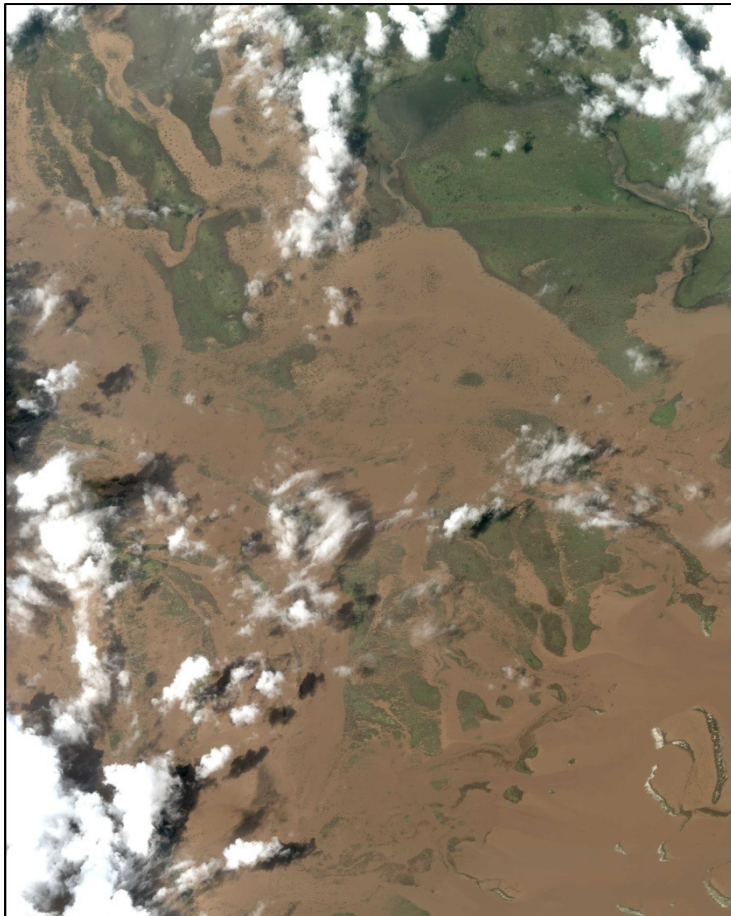
Key



MONITORING OF FLOODS

- Warning, tracking, damage assessment

Extensive flooding



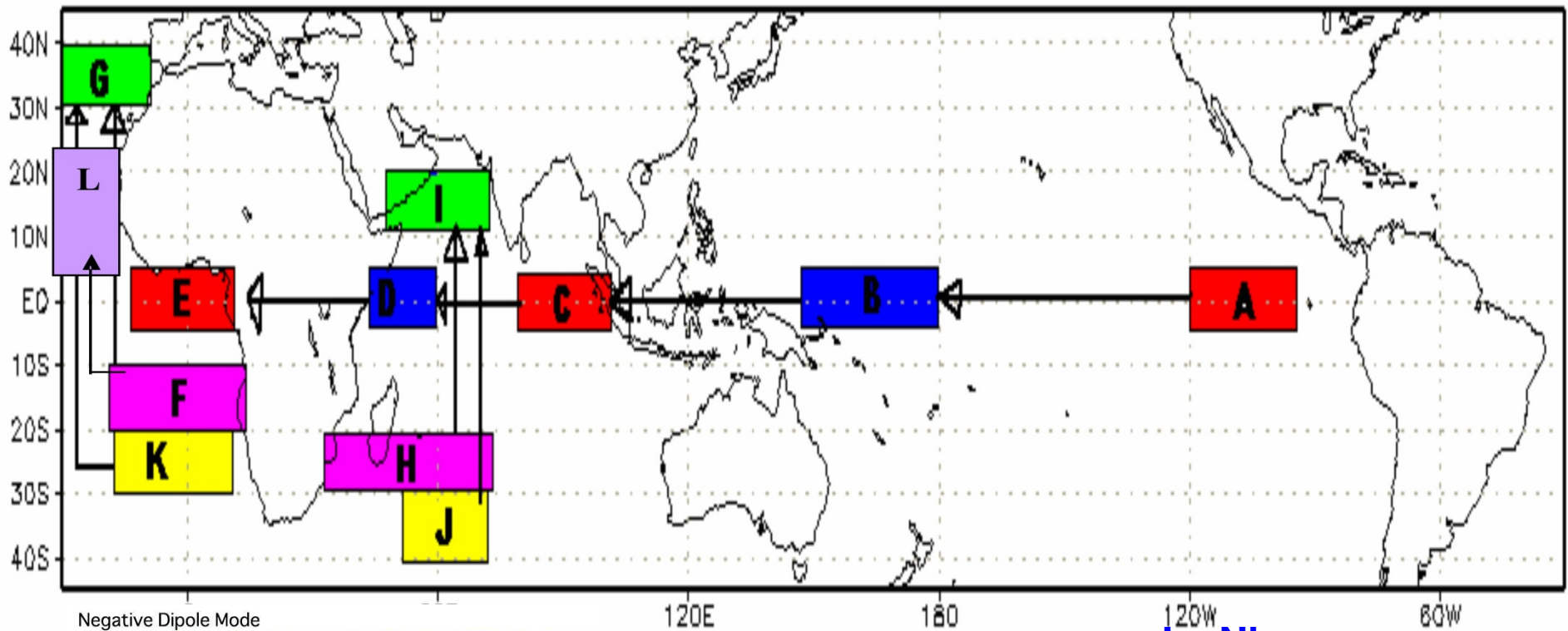
Flooded Agricultural Fields



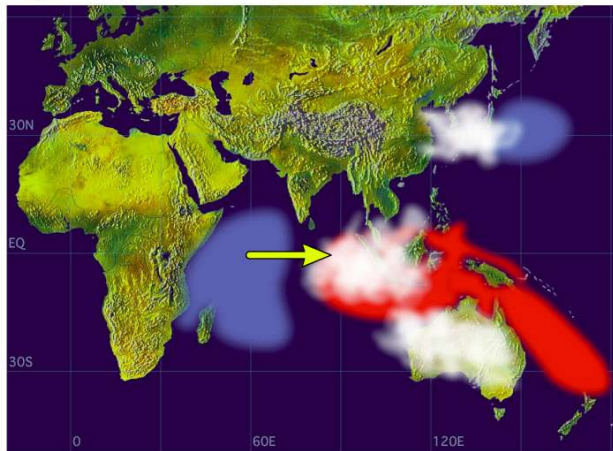
AGRICULTURAL MONITORING

- Precision Agriculture
 - Determine crop health/stress
 - Delineate field boundaries
 - Quantify crop damage
 - Delineate management zones
 - Improve yields at field level
- Agricultural Infrastructure

TOOLS FOR MONITORING WEATHER CLIMATE VARIABILITIES

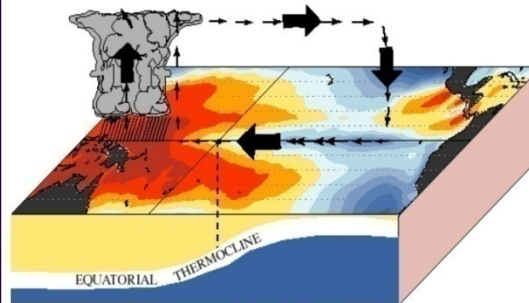


Negative Dipole Mode



Typical La Niña Conditions

December - February La Niña Conditions

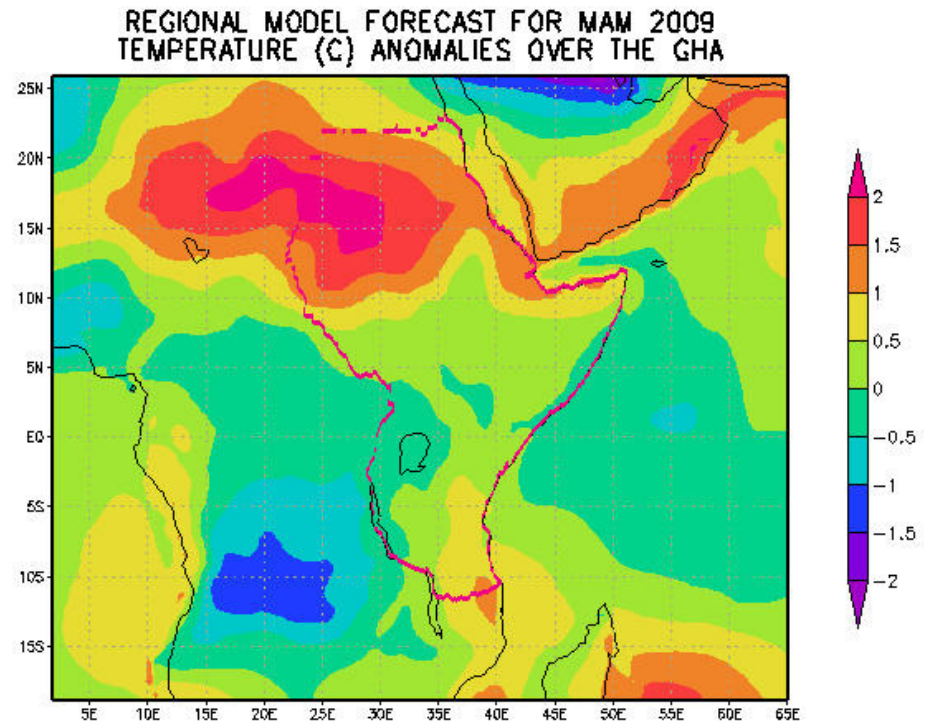
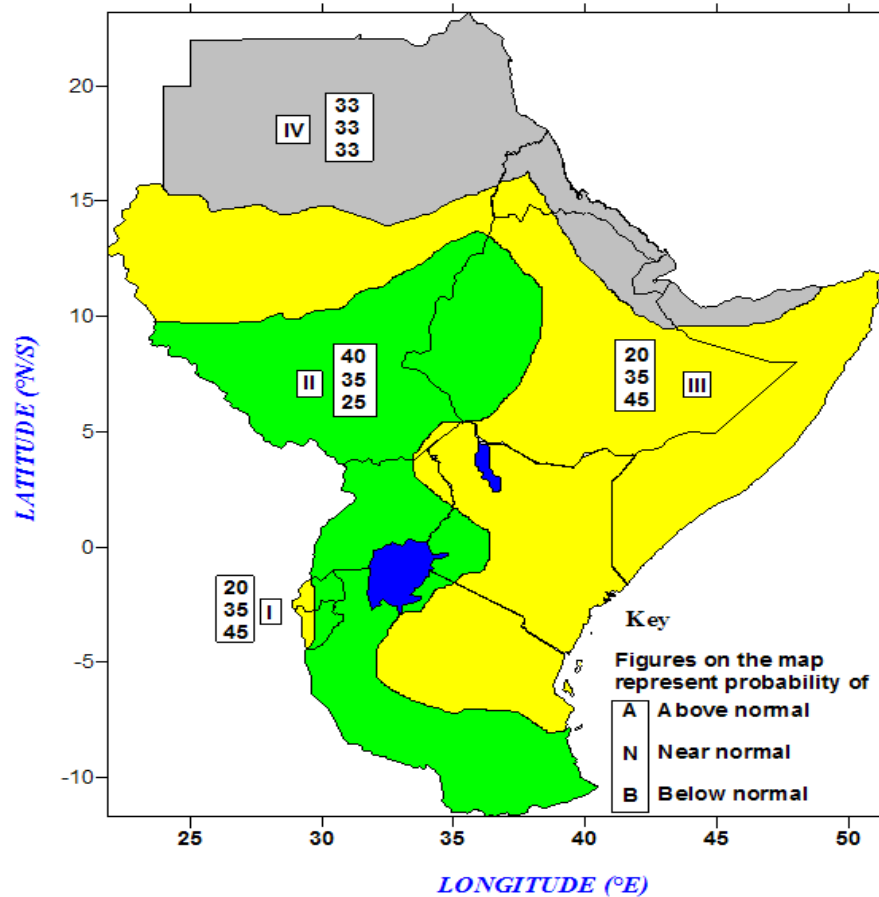


La Niña
Conditions
 associated with
 dry spell in
 most parts of
 the GHA
 region



Sharing Climate/weather information among specific sector

GHACOF: Malaria Forecast



Malaria Forecast Cont...

- **Zone I:** Normal to below normal malaria transmission over western Burundi and western Rwanda. The possibility of a malaria outbreak is not over-ruled, in the event of a rise in minimum temperatures.
- **Zone II:** Normal to above normal transmission of malaria expected over southern, western and parts of northern Tanzania, eastern Burundi, eastern Rwanda, much of Uganda, western Kenya, southern Sudan and western Ethiopia
- ***There is a likelihood of localized (pockets) epidemics if the current high temperatures are sustained. Stakeholders in the region are therefore advised to take precaution.***

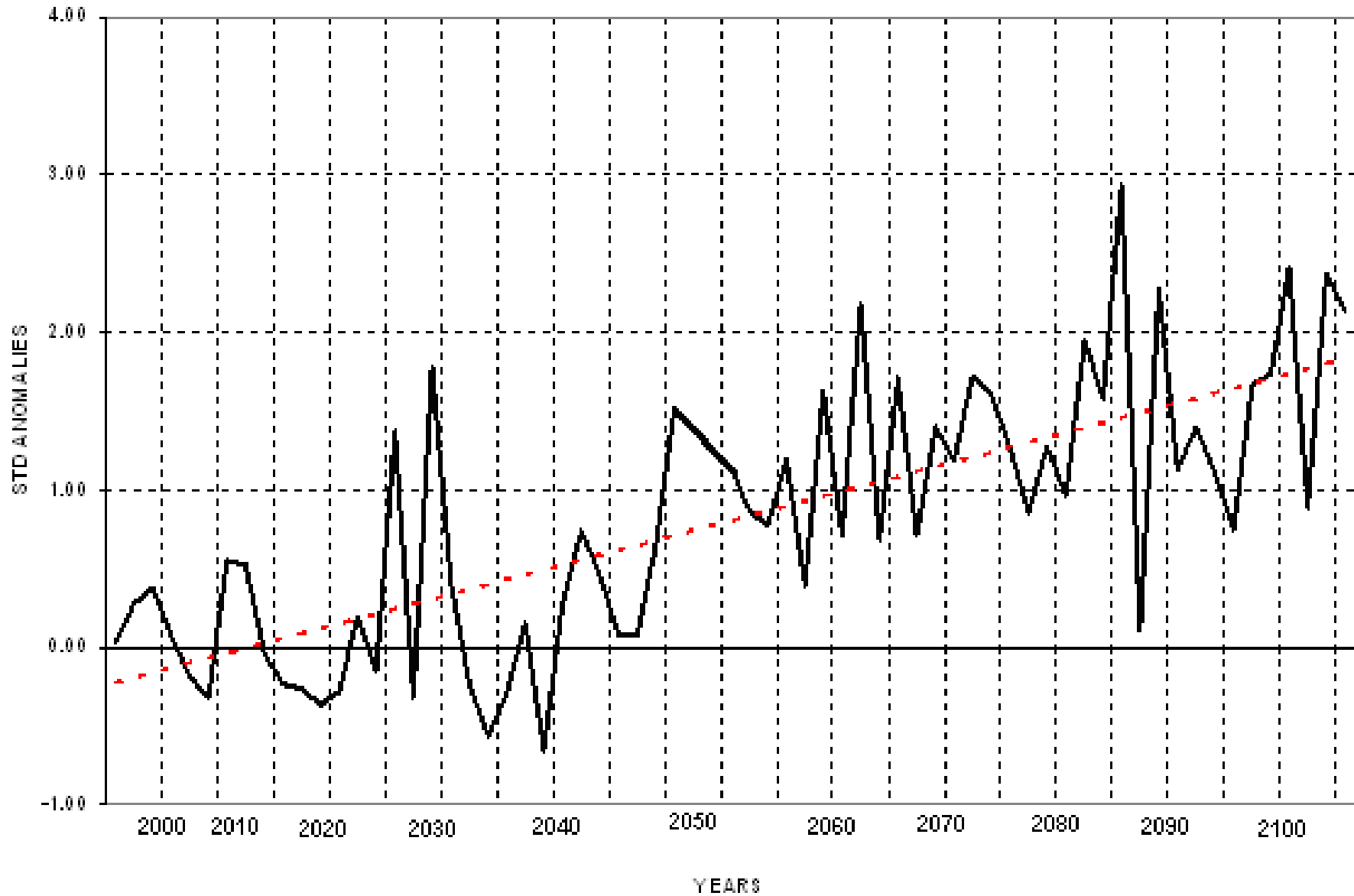
WHAT THE IPCC SAYS ABOUT CLIMATE CHANGE

- “Global climate change will have a wide range of impacts, and overall negative health impacts will outweigh positive impacts (IPCC 2007).
- Changes in frequencies of heat and colds will be accompanied by an increase in morbidity and mortality;
- Other impacts will come from changes in the frequency of floods and droughts;

GLOBAL WARMING AND CLIMATE CHANGE

- Global warming and overall climate change is now a scientific reality to be reckoned with in all countries of the world, and more particularly in Sub-Saharan Africa which has been shown to be the most vulnerable
- In its Fourth Scientific Assessment brought out in 2007, the Intergovernmental Panel on Climate Change, the IPCC said global warming is ***“unequivocal, as is evidenced by numerous observations around the world”***.

Projected Temperature Rise



Impacts of extreme climate/weather events



Kenya Floods: Effects



- Entire villages were submerged. Estimated people affected: **778,874**
- Considerable quantities of crops and farmland were destroyed.
- Water pumps were washed away & irrigation infrastructure severely damaged.
- Thousands of latrines either collapsed or overflowed, contaminating water sources and increased the risk of outbreaks of water-borne disease.



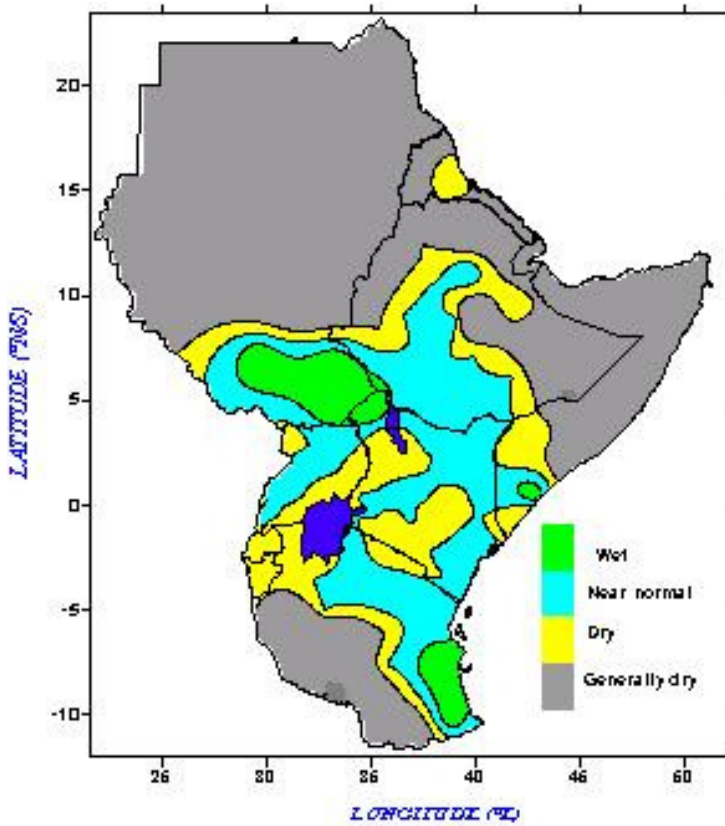
Health impacts and vulnerability

FLOOD RISK

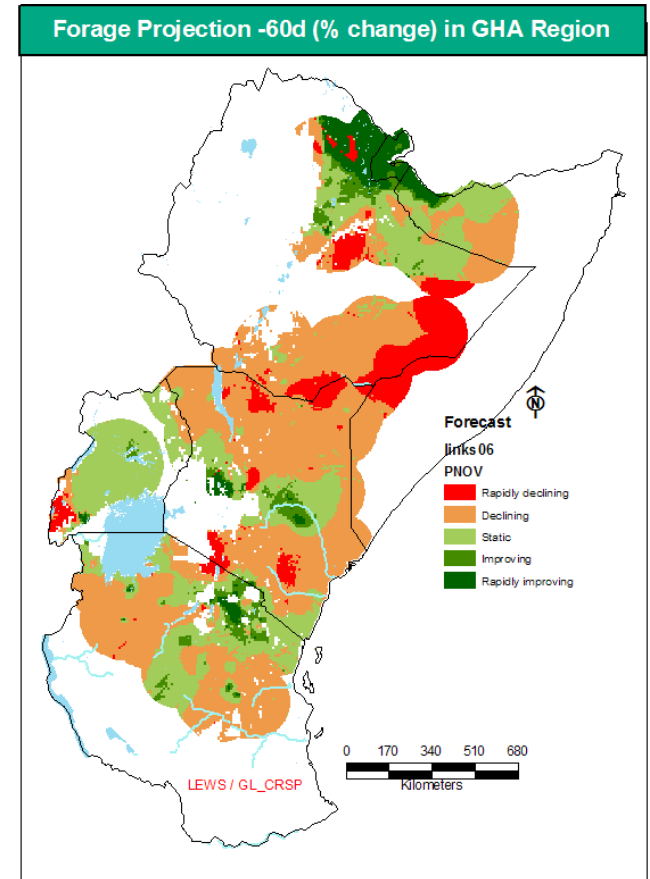


Rift Valley Fever





Drought Severity Index for Dekad 13



CONFLICT



Does climate have a role to play ?

- Climate may impact on health through a number of mechanisms
- directly through cold or heat stress – aggravating conditions such as heart disease and respiratory conditions – and extreme events leading to disasters
- and indirectly, for example through:
 - food security - nutritional status and immunosuppression
 - water source quality and water-borne disease
 - infectious disease

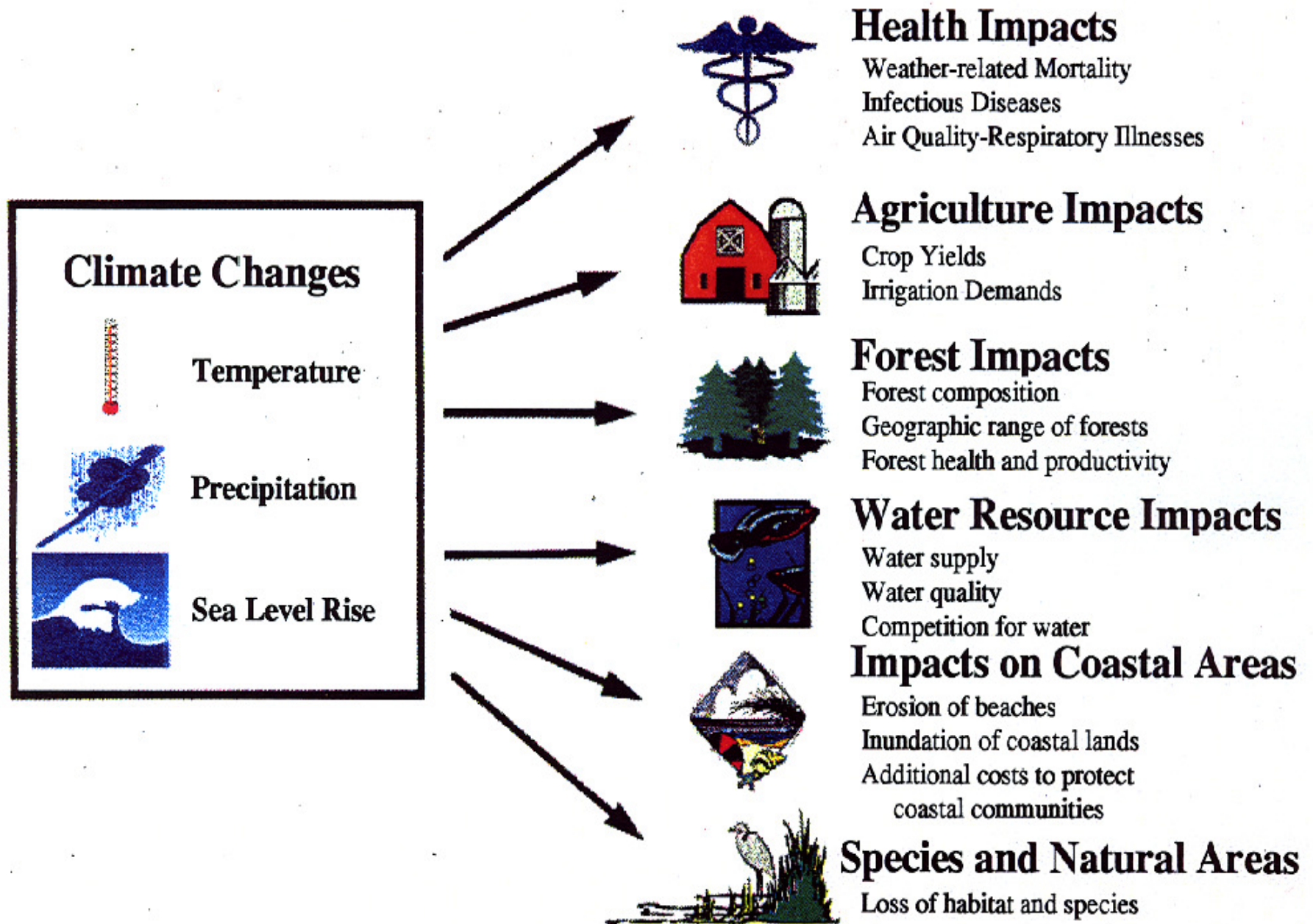
CLIMATE CHANGE IMPLICATIONS ON HEALTH

- The GHA region is expected to be at risk primarily from increased incidences of **vector-borne diseases** and reduced nutritional status.
- A warmer environment could open up new areas for **malaria**; altered temperature and rainfall patterns also could increase the incidence of **yellow fever, dengue fever, onchocerciasis, and trypanosomiasis**.
- Increased **morbidity** and **mortality** in sub-regions where vector-borne diseases increase following climatic changes would have far-reaching economic consequences.
- In view of the poor economic status of most household in the region, outside assistance and efforts often is required to tackle the potential health effects.

Projections of Future Changes in Climate

- For the **next two decades**, a warming of about **0.2°C per decade** is projected for a range of possible emission scenarios.
- **Even if the concentrations** of all greenhouse gases and aerosols had been **kept constant** at year 2000 levels, a further warming of about **0.1°C per decade** would be expected.
- Temperature and precipitation extremes will be **more frequent**;
- Precipitation **decreases/increases** likely in most marginal areas of the sub-tropical land regions

SUMMARY: OVERALL IMPLICATIONS OF CLIMATE CHANGE



CONCLUSION

- ❑ Space technology is critical bridging gap in weather/climate monitoring
- ❑ Climate change and variability is real – **Extreme climate events are more frequent and devastating**
- ❑ Increasingly, there are evidence showing that climate, human and animal health are integrally linked in the GHA region through many different associations –(**malaria epidemics, RVF, Yellow fever, respiratory disorders & other emerging and re-emerging diseases**)
- ❑ Many vector borne diseases are sensitive to changes in meteorological parameters such as- **rainfall, temperature, and humidity**
- ❑ There are other climate change impacts that have a negative direct bearing on human health – **Droughts, floods, food deficiency** ,
- ❑ Climate change will continue to influence the distribution and occurrence of communicable diseases and other health conditions–**complicating their prevention and control and negate current achievements.**

A scenic mountain landscape with a rainbow in the valley and a road winding through the foreground. The text "THANK YOU" is centered in the upper half of the image.

THANK YOU

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