SATELLITE TECHNOLOGY CONTRIBUTION TO WATER AND FOOD SECURITY

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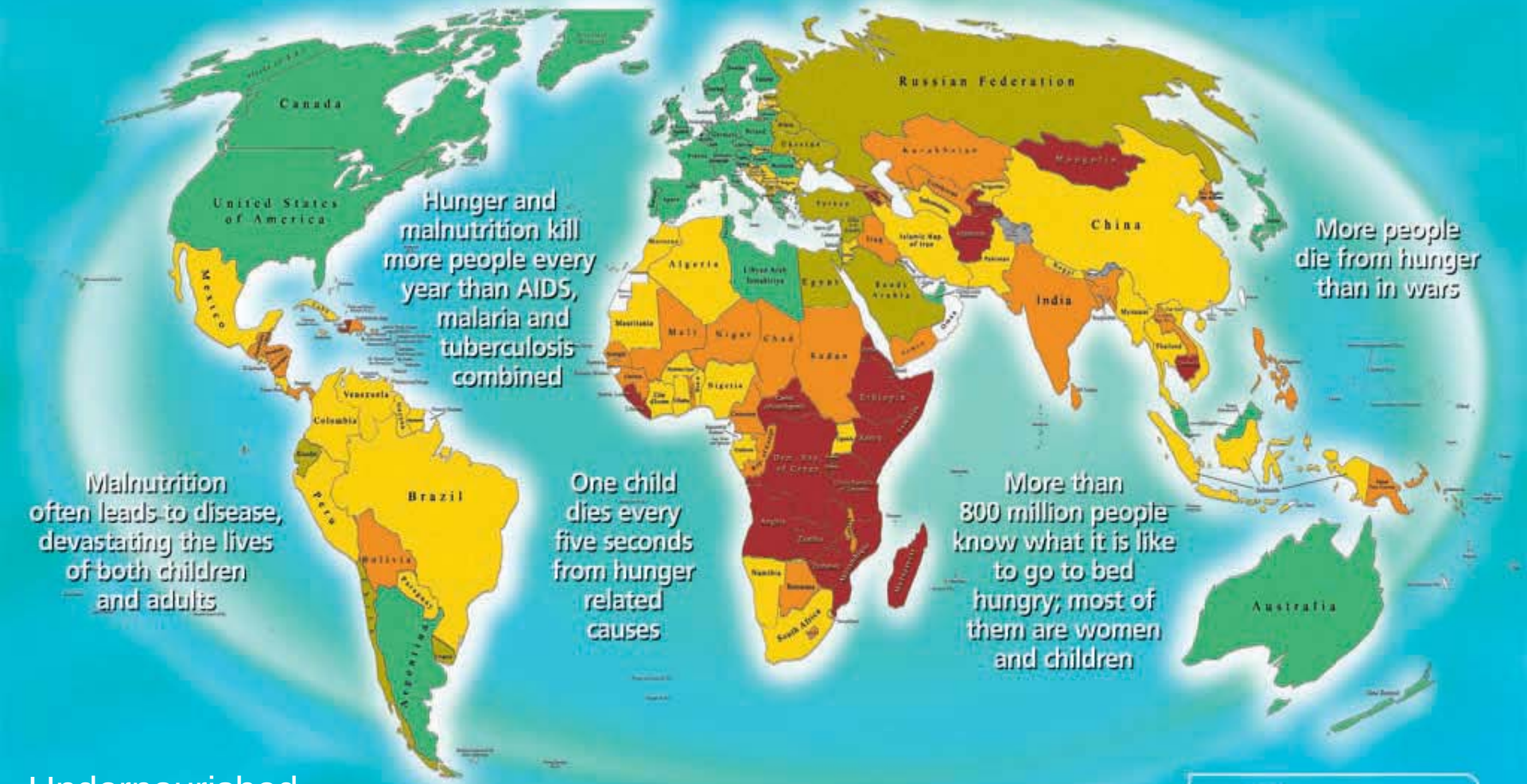
Global Environmental Change and Food Security

Food security is the ability of all people to attain sufficient food for an active and healthy life.

- Despite having the technical capacity to solve the problem, there continues to be many food insecure people in the world
- Trends that contribute
  - Population growth
  - Energy Costs
  - Geopolitical disparities
  - Distribution of natural resources, particularly water
  - Climate: changing water cycle, increasing temperatures
- Global monitoring of food resources needs global observations – satellites

WORLD HUNGER



Undernourished

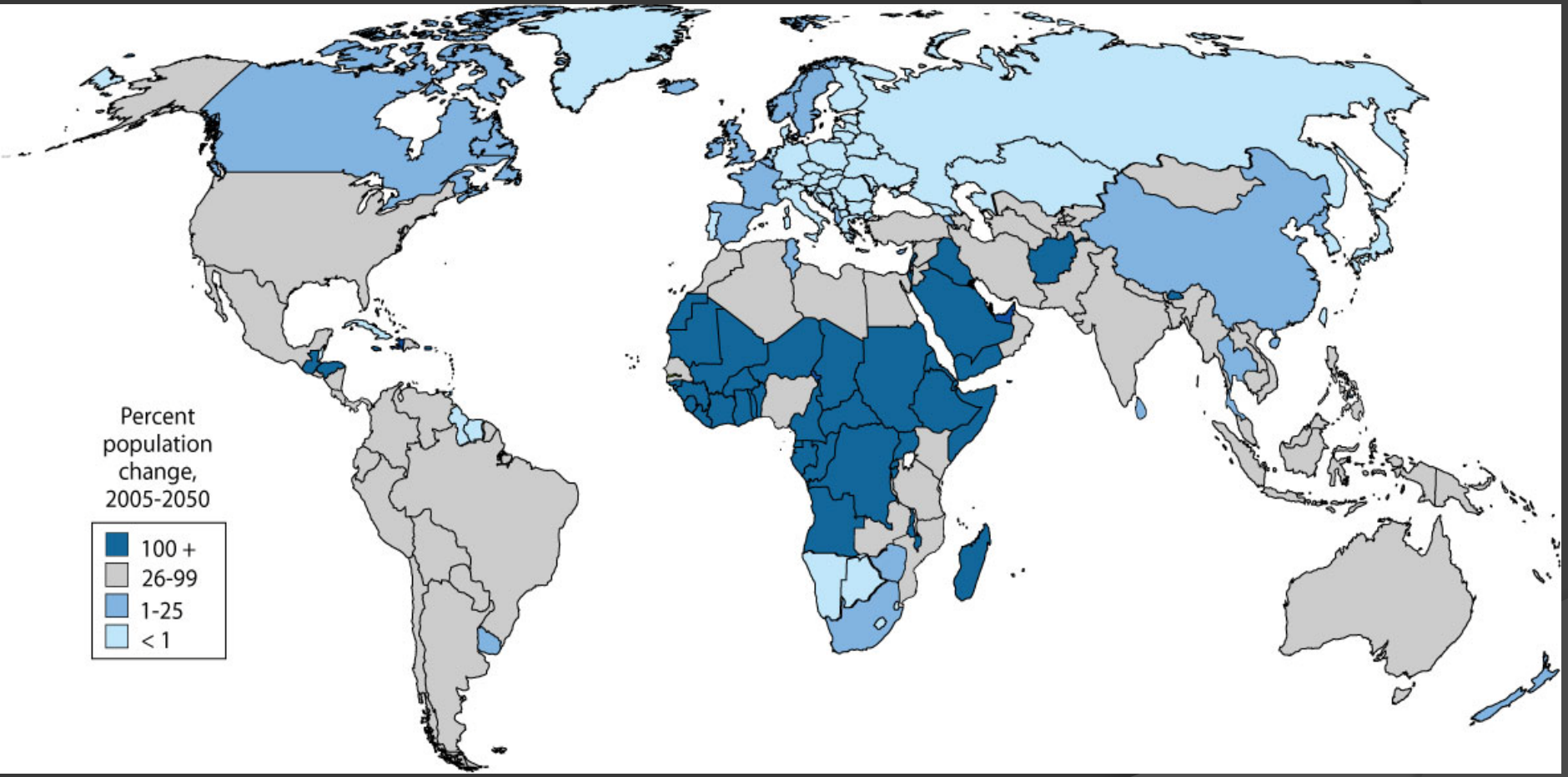
>35% 20-34% 5-19% 2.5-4% <2.5%

Category	1	2	3	4	5		
Undernourished	≥35%	20-34%	5-19%	2.5-4%	<2.5%	no data	incomplete data
Description	Very high	Moderately high	Moderately low	Very low	Extremely low		

WFP World Food Programme
Feeding The World's Hungry

www.wfp.org

Projected Population Change, **2005-2050**

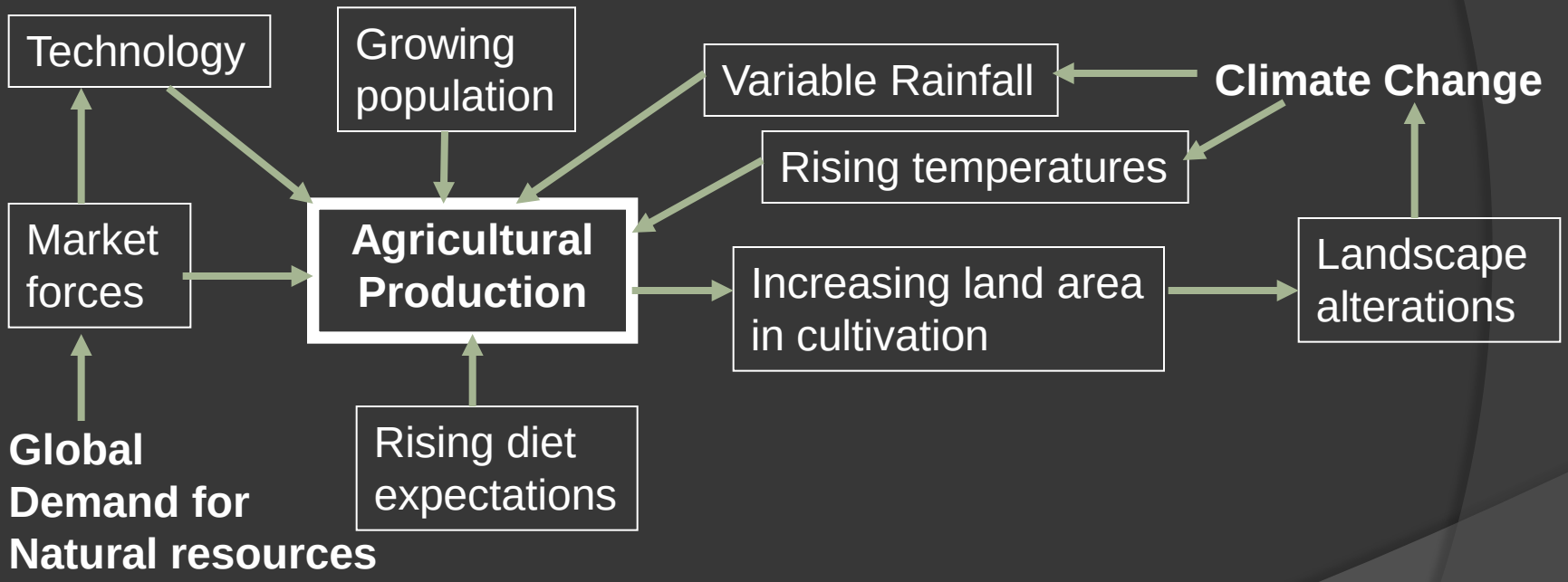


Source: Population Reference Bureau, *2005 World Population Data Sheet*.

Food security – more than just agricultural production

- Food utilization
  - Ability to derive nutrition from the food you eat
  - Analysis at individual scale
- Food availability
  - How much food is produced in a region
  - Analysis at household, community scale
- Food access
  - Cost of food and affordability to the poorest
  - Analysis at community and region scale

Food Demand, Markets and Ecosystems: Climate Change in Africa



As populations and incomes rise, the global demand for food will also grow – probably roughly doubling by 2050 and shifting towards more water-demanding diets.

IAASTD 2008

Africa is No Longer Self-Sufficient in Food

Cereal yields on the continent are roughly one metric ton of grain per hectare of cultivated land, a figure little changed from 50 years ago and roughly one third of the yields achieved on other continents.

Lack of technology (irrigation, Improved seeds, fertilizer) means that African agriculture is far more weather-dependent than US Agriculture – and its people more vulnerable to food insecurity due to increasing food prices.

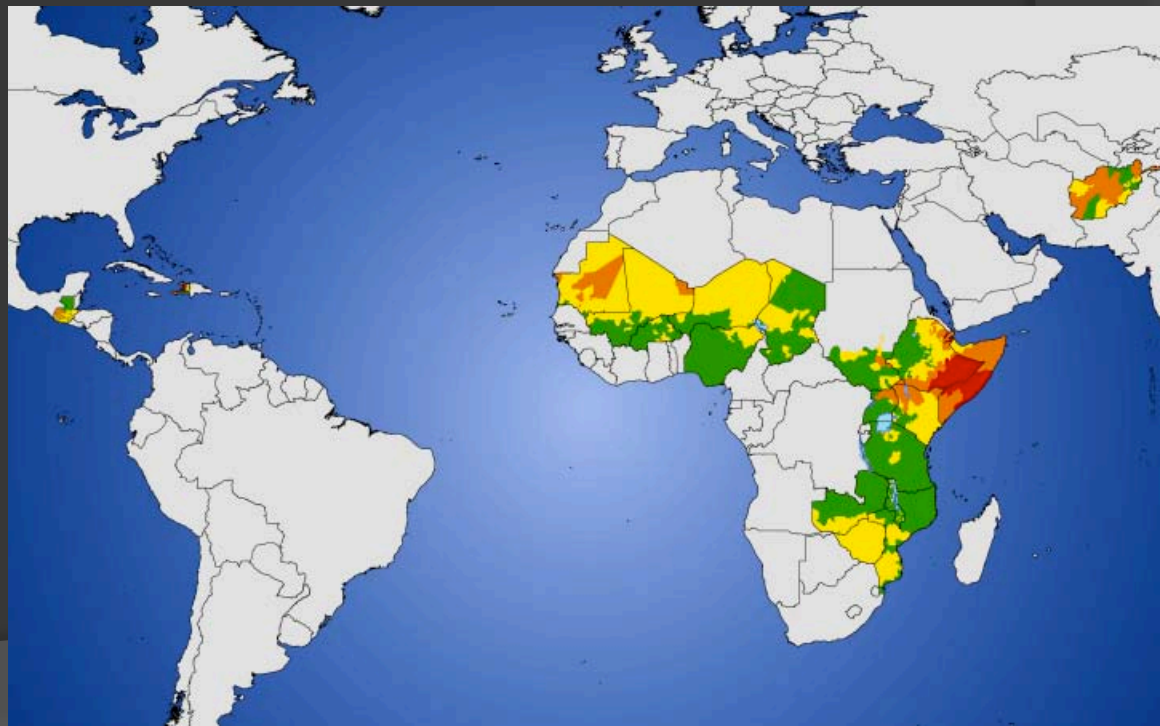
The Famine Early Warning Systems Network

FEWS NET is a USAID-funded activity that works to strengthen the abilities of countries and regional organizations to manage risk of food insecurity through the provision of timely and analytical early warning and vulnerability information.

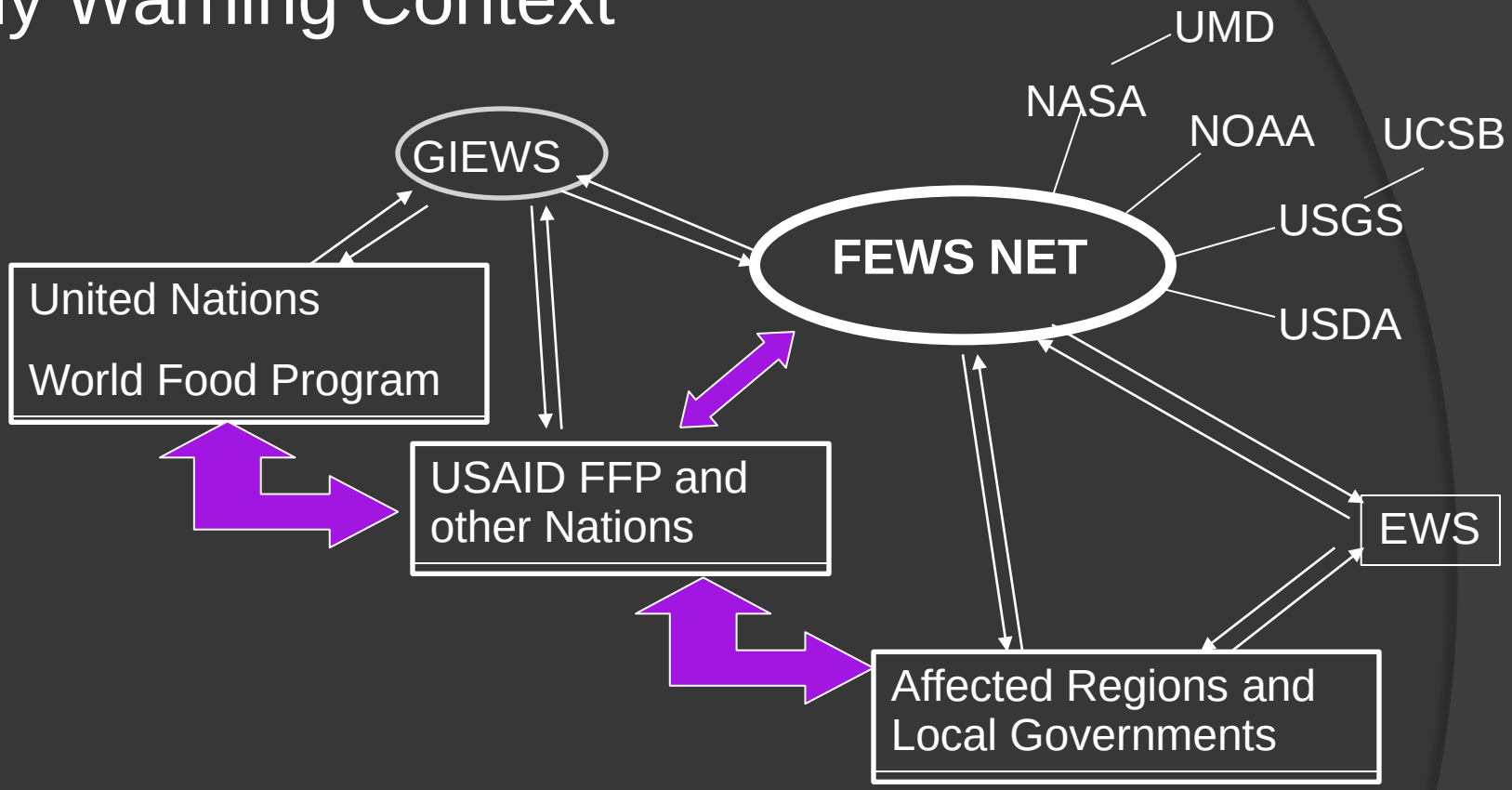
Oct-Dec 2008

- Generally Food Secure
- Moderately Food Insecure
- Highly Food Insecure
- Extremely Food Insecure
- Famine
- No Data

Geographic Extent of
FEWS NET's 23 countries



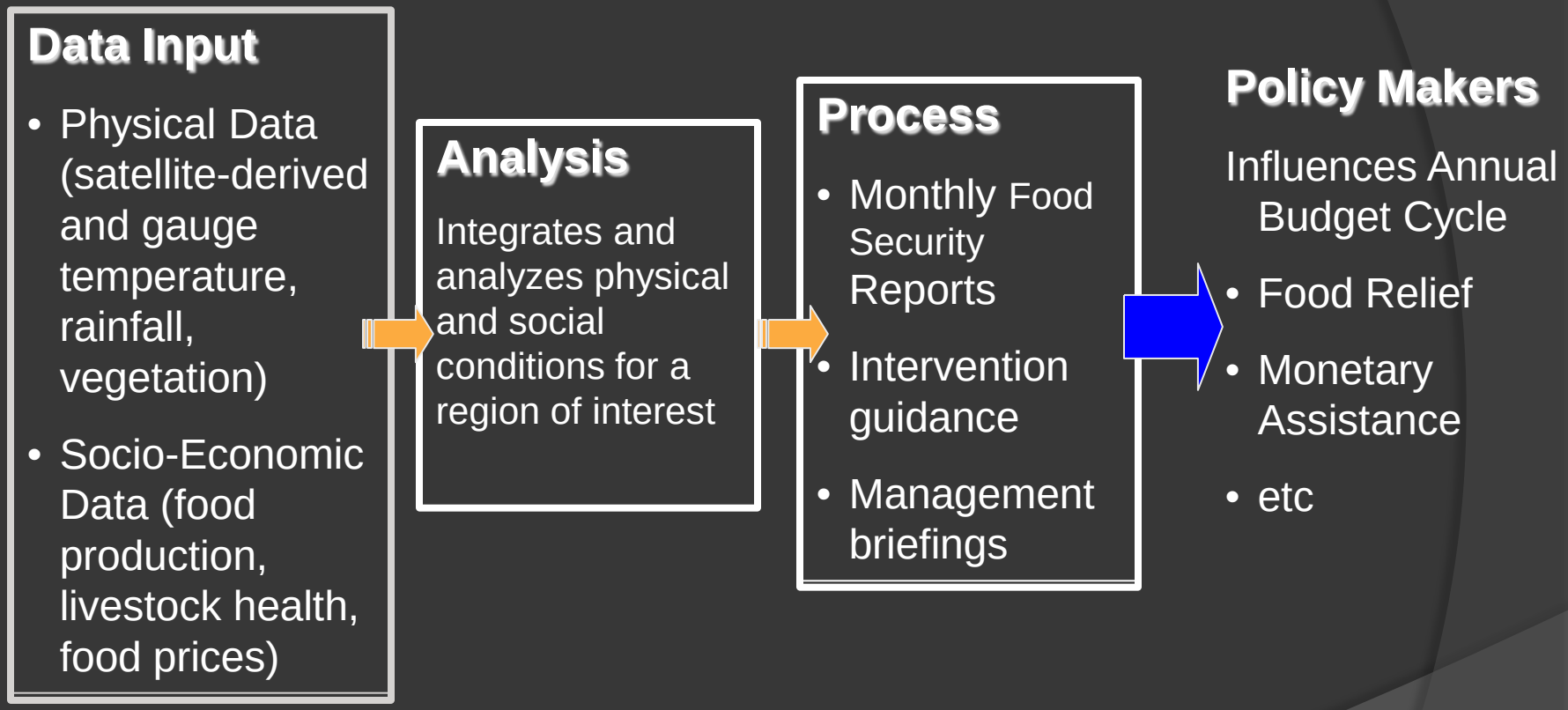
Early Warning Context



'Early Warning' (EW) programs provide Information so Governments can respond to Food Security problems before lives or livelihoods are lost.

Legend:
GIEWS: Global information and early warning system
EWS: Local Early Warning Systems
FEWS NET: Famine Early Warning System Network

FEWS NET process



FEWS NET operates in a complex, consensus based decision making environment.

Diversified and targeted information products

And an integrated early warning information system….

FEWS NET

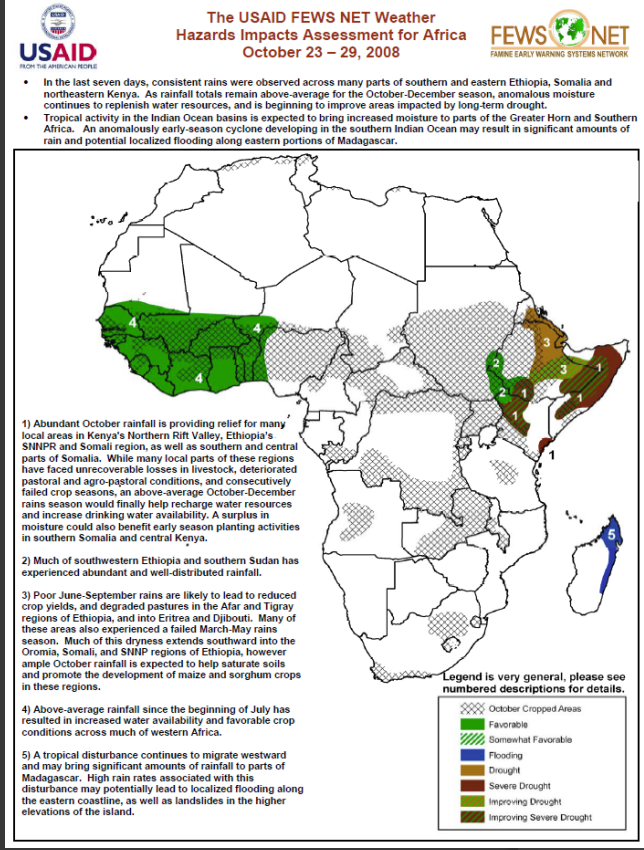
Country Reports

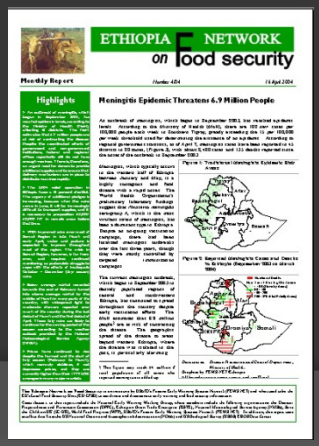
Regional Reports

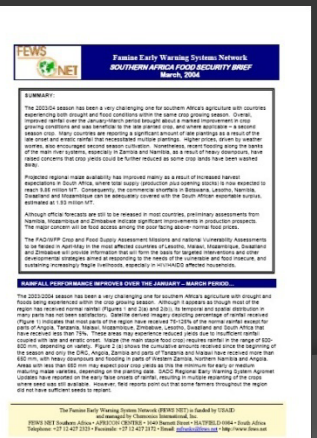
Executive Overview

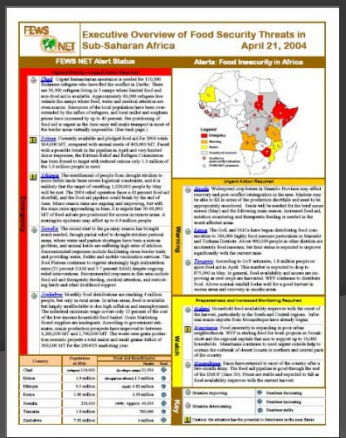
Alert Statements

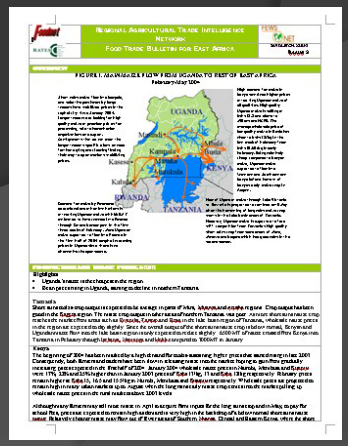
Market/Trade Information









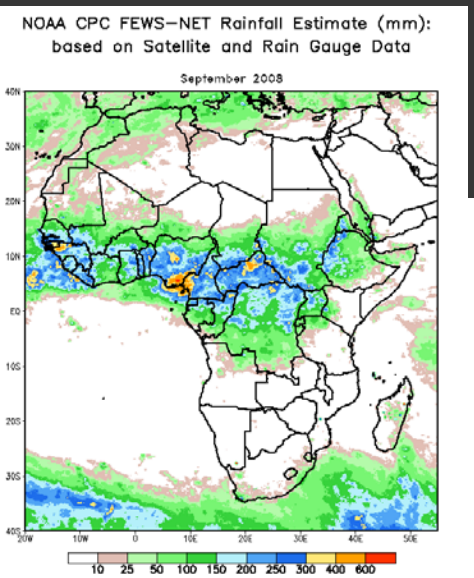


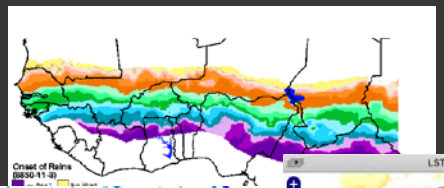
Remote sensing provides an Objective Analysis of Hazards for Earlier Early Warning

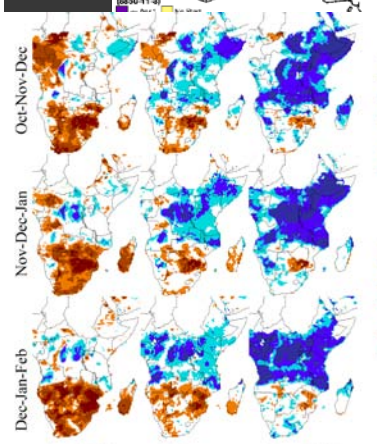
- Problem specification: identification of potential changes in:
  - Agricultural production (veg., rain, yields)
  - Value of Assets (livestock through rangeland, market information)
- Remote sensing provides information on both cropped area and yield estimates
- It is the least controversial information on production

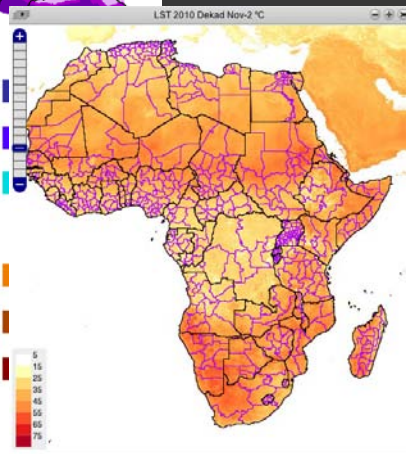
Satellite Products

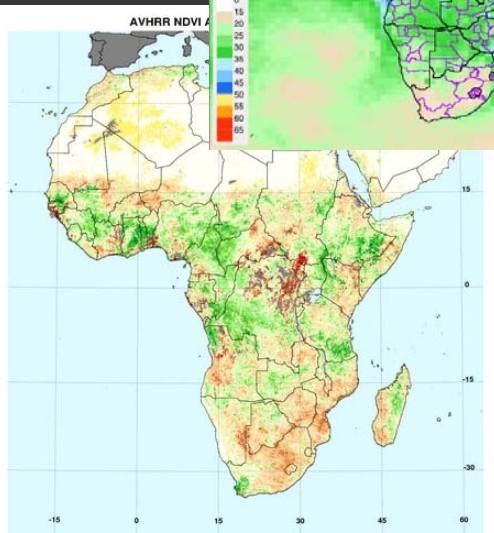
- NDVI from AVHRR, SPOT, MODIS
- Rainfall from TRMM, SSM/I
- Temperature from MODIS
- Crop models using rainfall inputs
- Predictive products from GFS, WRF

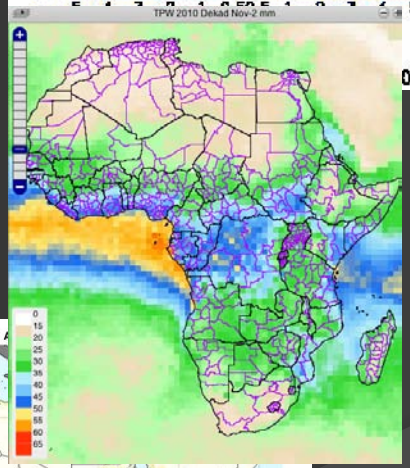


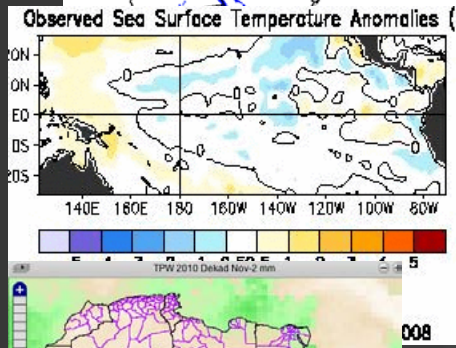


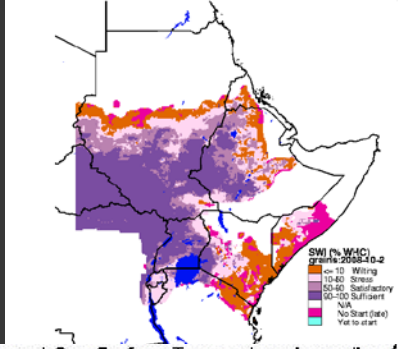




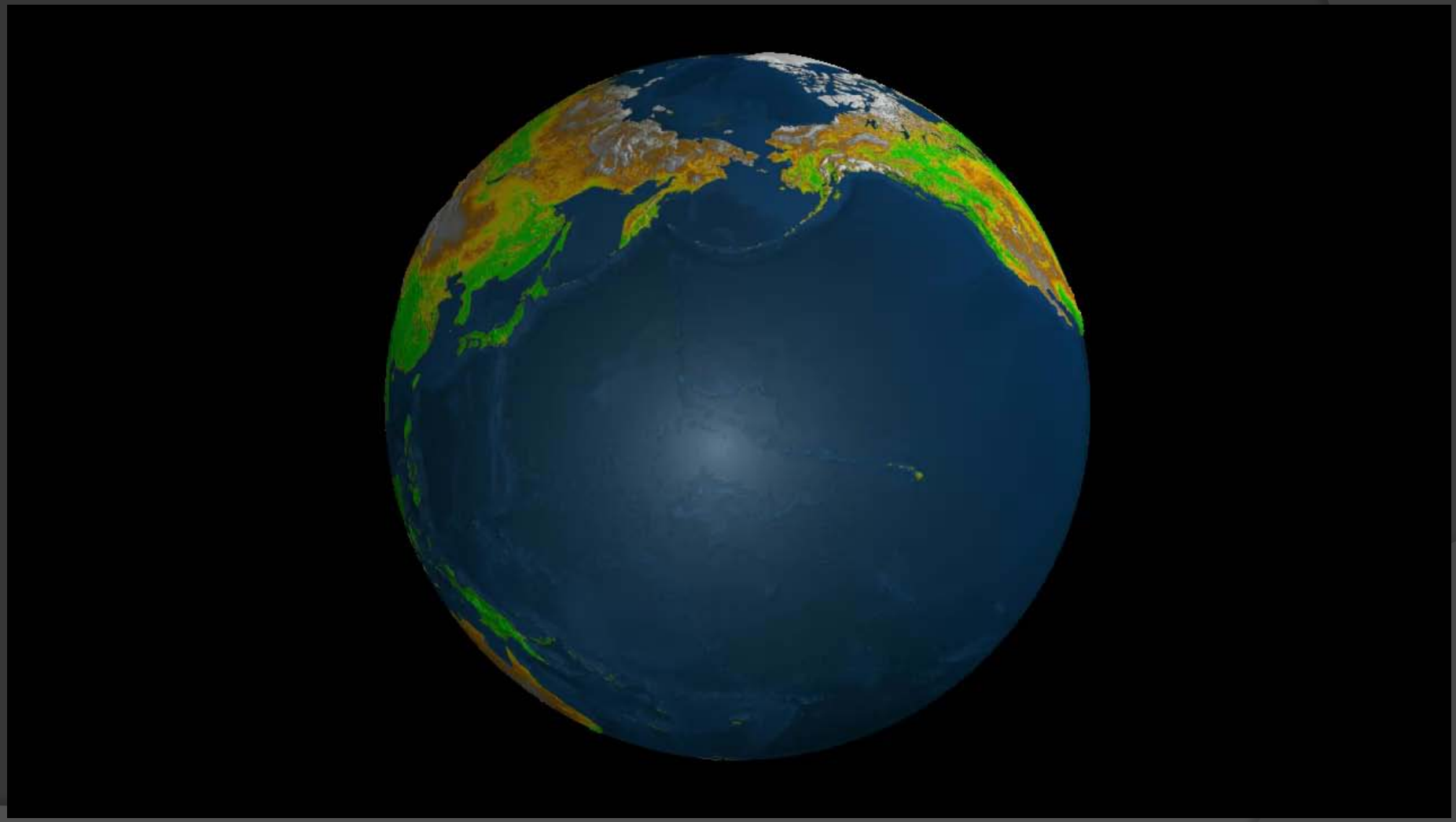




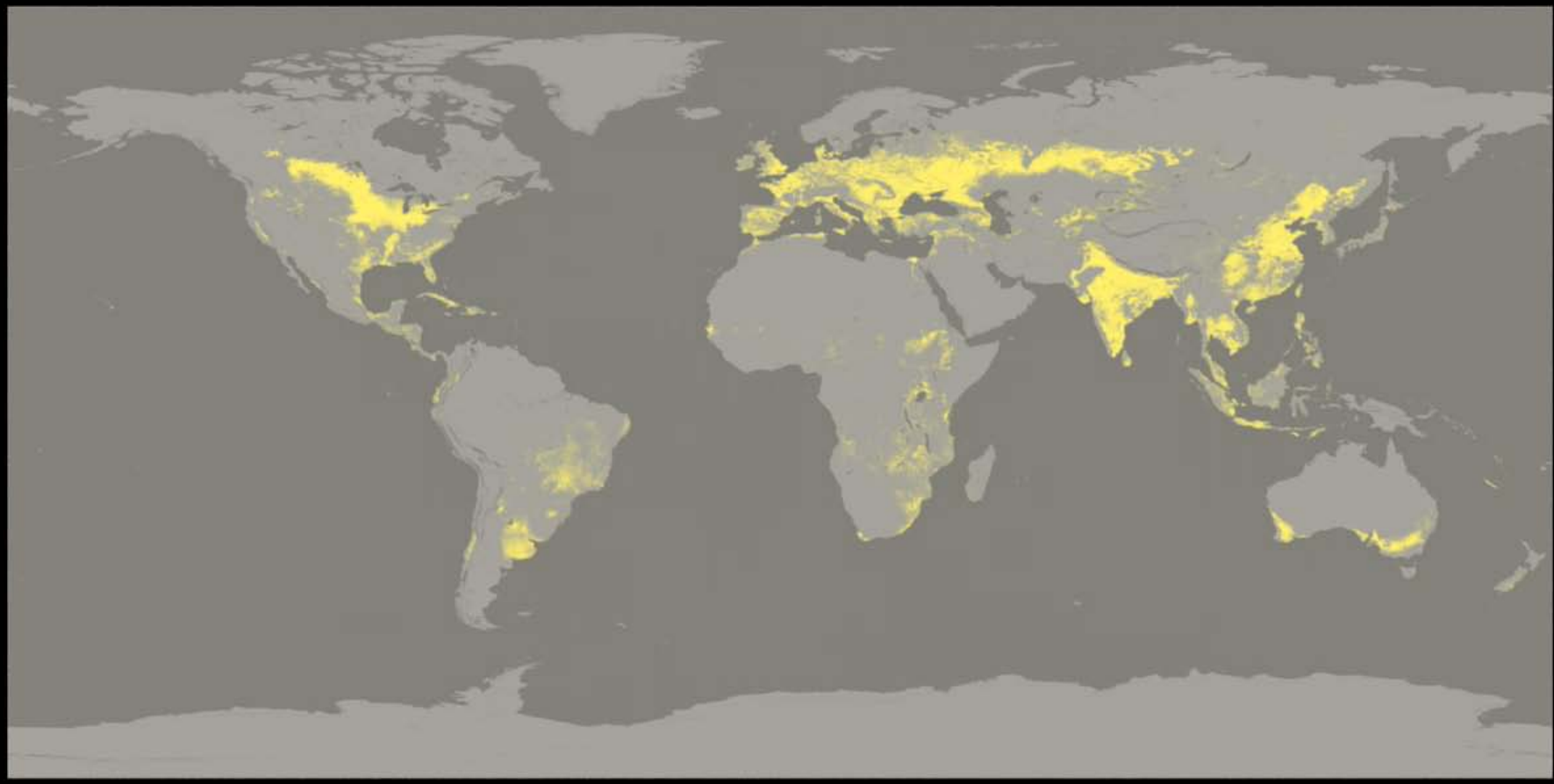




Satellite Data for Drought Management



NDVI for Wheat in Australia



Conclusions

- Food production is critical to the basic food security of millions in Africa
- Remote sensing provides early warning of trouble (impending decline in production)
- Integrated observations and models will provide improved data tools for decision makers – enables the incorporation of non-biological factors into the model for more precise and specific information
- Improved coordination for decision support