Workshop Next-Generation Food Shock Modeling

Services in Food Security and Agriculture

From Space to Village

USAID FROM THE AMERICAN PEOPLE

NASA

SERVIR

CILSS

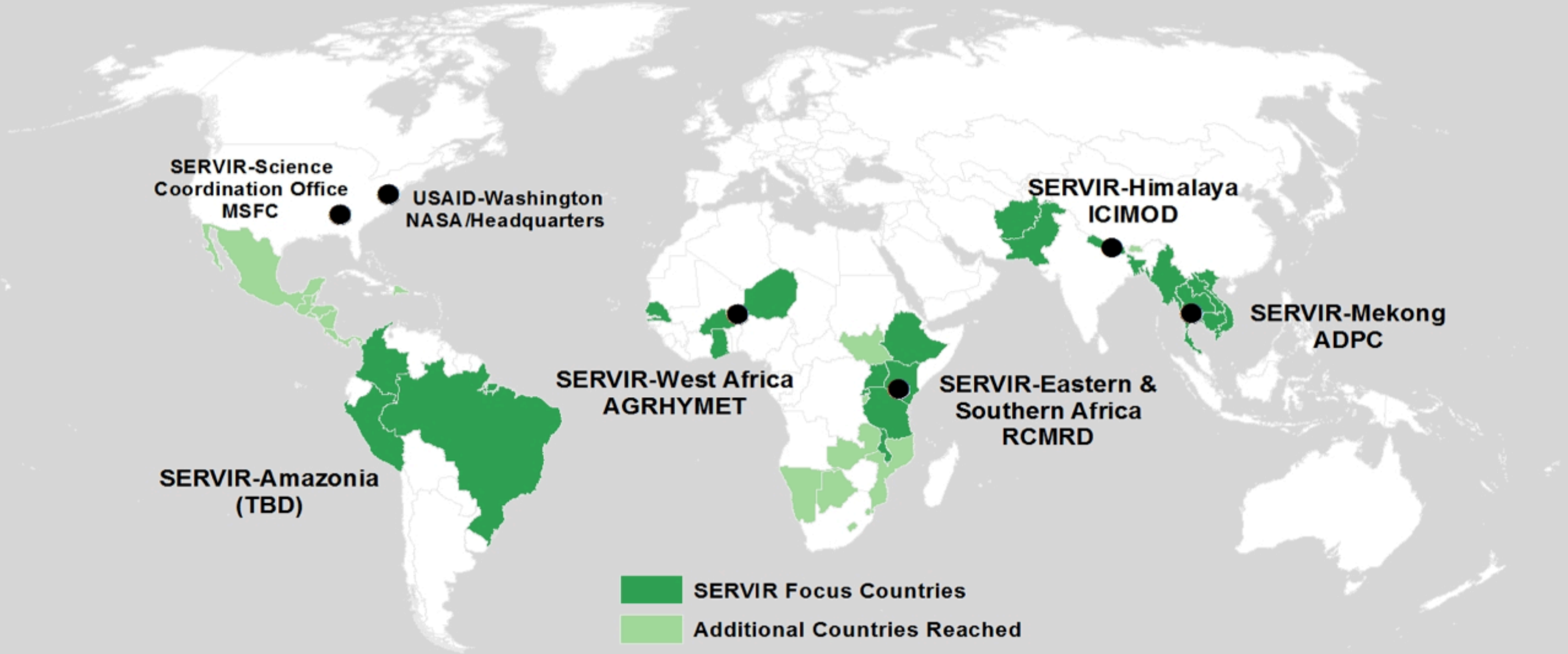
RCMRD

ICIMOD

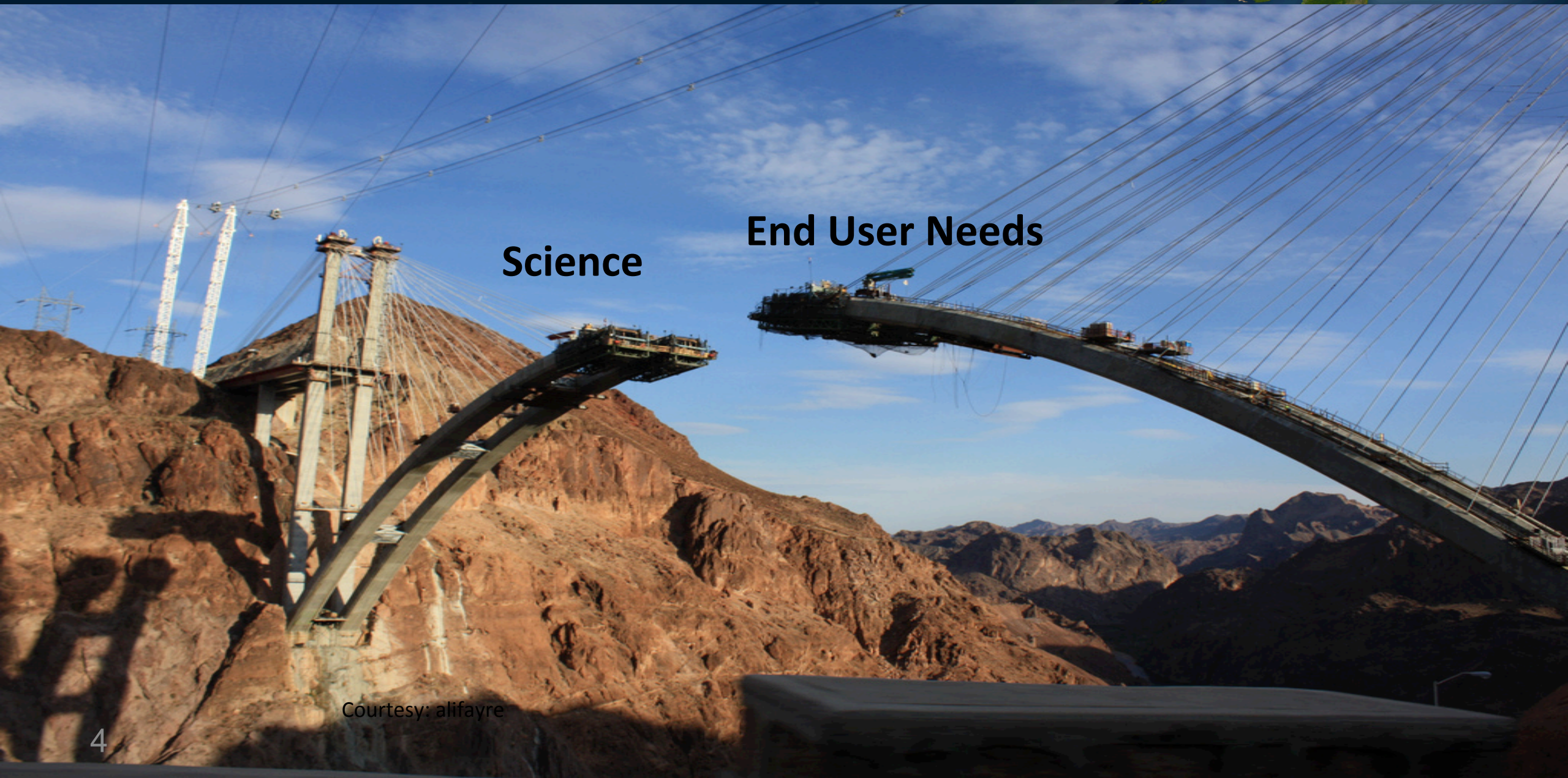
adpc

SERVIR connects space to village by helping developing countries use satellite data to address critical challenges in food security, water resources, weather and climate, land use, and natural disasters. A partnership of NASA, USAID, and leading technical organizations, SERVIR develops innovative solutions to improve livelihoods and foster self-reliance in Asia, Africa, and the Americas.

The Current SERVIR Hub Network



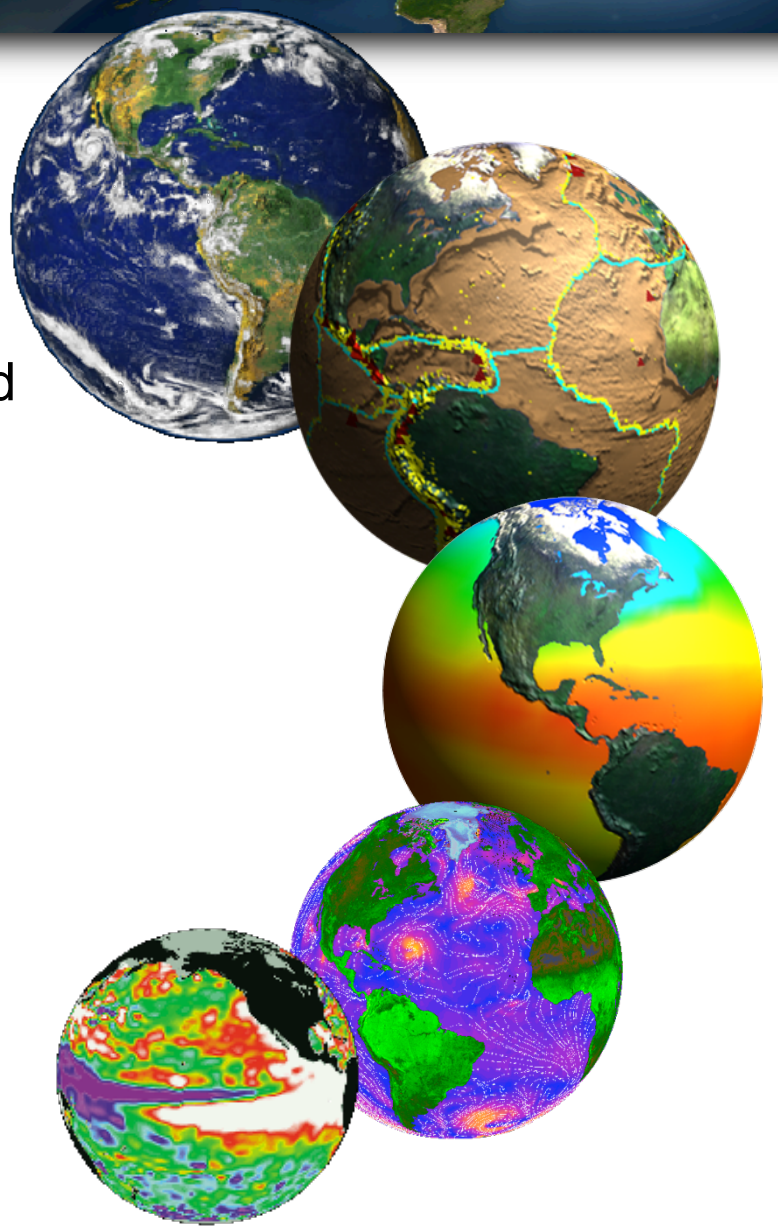
Linking Science to End User Needs



Courtesy: alifayre

What We Do

- **Identify needs** in SERVIR regions
- **Link science products** from research institutions to **meet those needs** through improved access to data, models, online maps, and visualizations
- **Strengthens** the technical **capacity** of regional institutions, stakeholders, and youth
- Creates **user-tailored** decision support tools and services
- Raises awareness of the **value** of user-tailored earth observed information




Formulation
Implementation
Primary Ops
Extended Ops
MAIA
TROPICS (12)
EVM-2
Copernicus (ESA) Sentinel Constellation
Earth Science Instruments on ISS:
RapidScat
CATS
LIS
SAGE III (on ISS)
TSIS-1
OCO-3
ECOSTRESS
GEDI
CLARREO-PF
TSIS-2
Landsat 9
PACE
NI-SAR
SWOT
TEMPO
JPSS-2 (NOAA)
RBI, OMPS-Limb
GRACE-FO (2)
ICESat-2
CYGNSS (8)
ISS
SORCE, TCTE (NOAA)
NISTAR, EPIC (NOAA'S DSCOVR)
QuikSCAT
EO-1
Landsat 7 (USGS)
SMAP
Terra
Suomi NPP (NOAA)
Aqua
Landsat 8 (USGS)
CloudSat
CALIPSO
GPM
Aura
GRACE (2)
OSTM/Jason 2 (NOAA)
OCO-2

How we do it - Service Planning

- **Consultation and Needs Assessment**
- Stakeholder Mapping
- Service Design
  - Service Concept
  - Product Definition
  - Data Management Definition
  - Capacity Building and Training
- Monitoring, Evaluation and Learning
  - Theory of Change

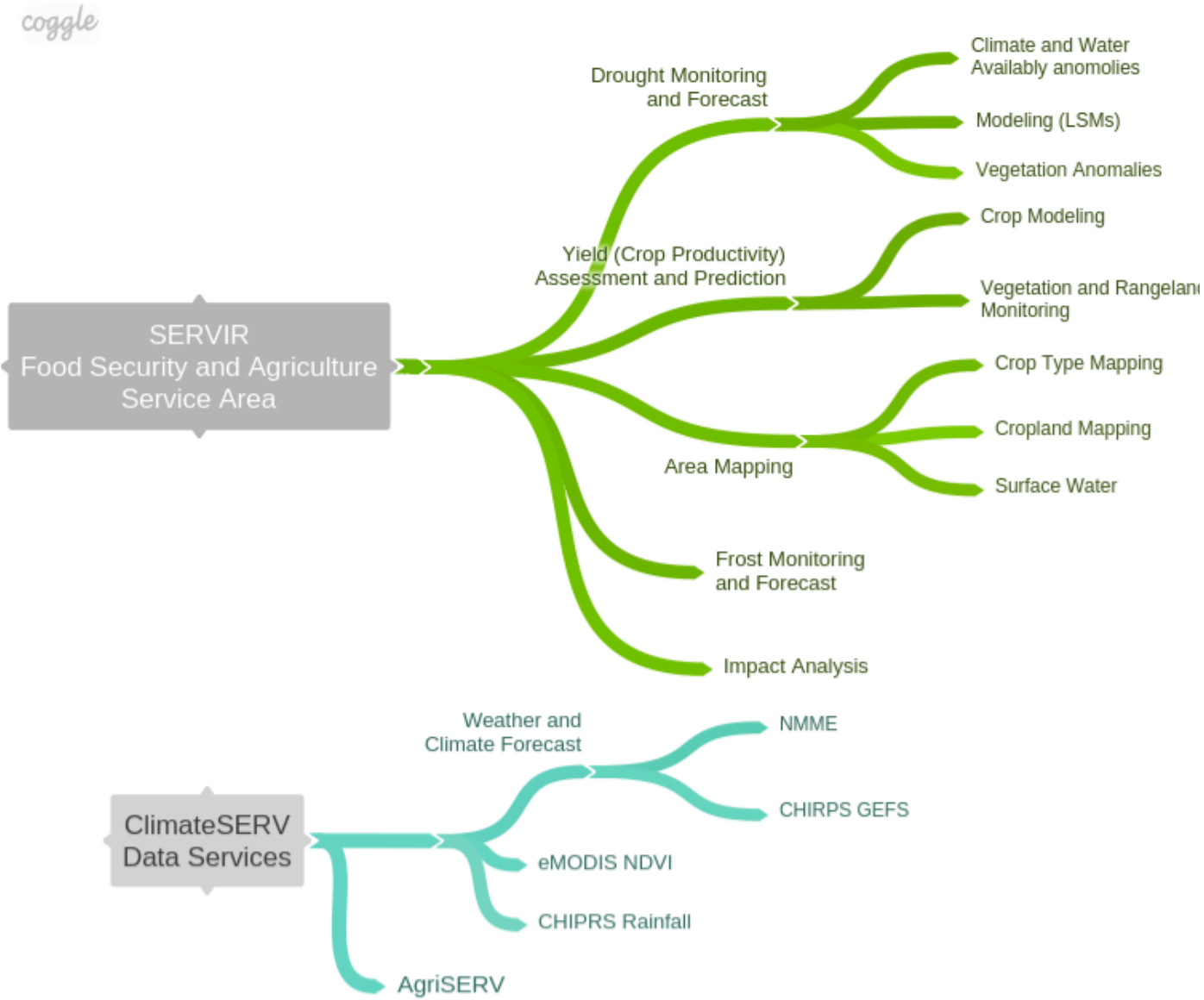
https://www.servirglobal.net/about-Servir

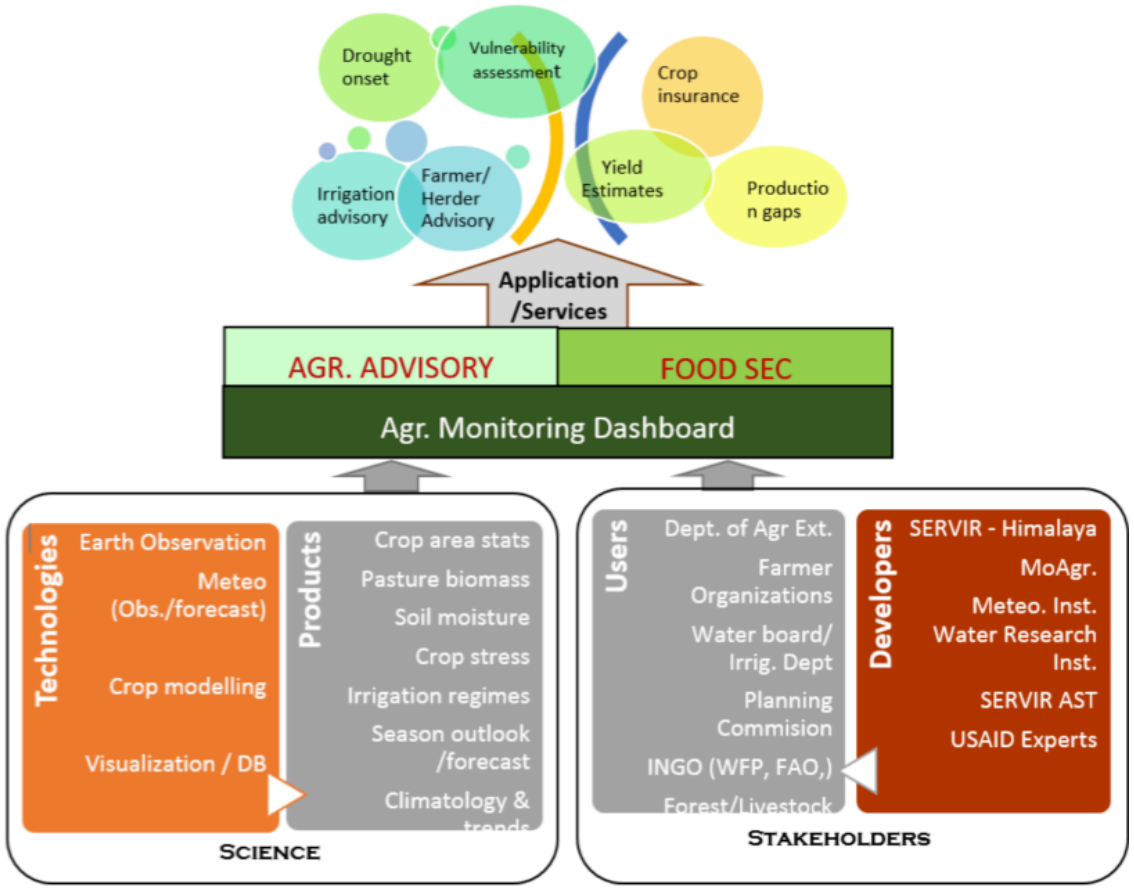
SERVIR Thematic Service Areas

1. **Agriculture and Food Security**
2. Water and Water-Related Disasters
3. Land Cover and Land Use Change, and Ecosystems
4. Weather and Climate

The aim is to develop individual services that build the capacity of the regional hub organizations and their users in national governments to use Earth observations for improved environmental decision making.

Food Security and Agriculture



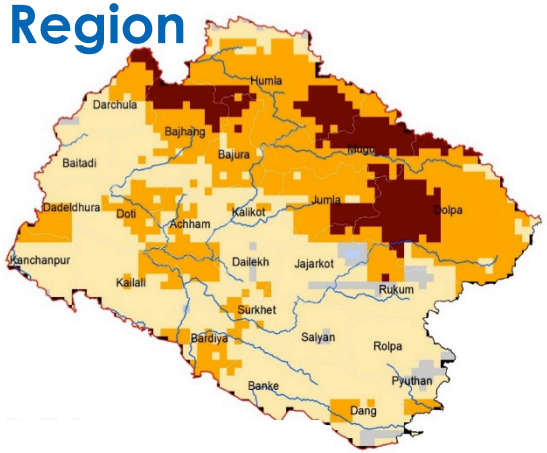


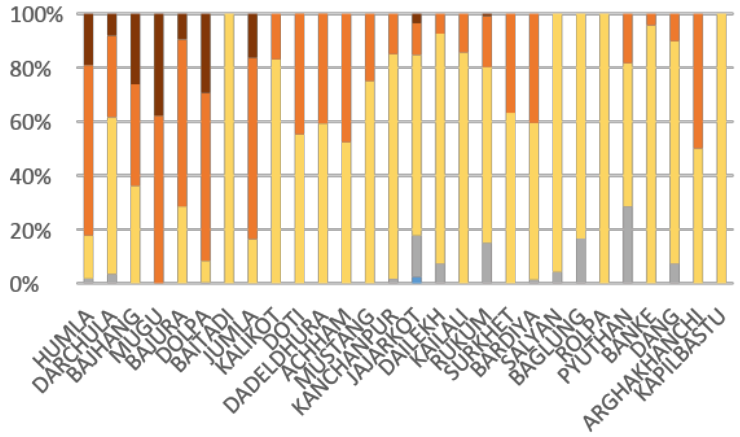
Framework for Agriculture and Food Security Services in HKH region

Aiding the vulnerable during Crop Crises: Collaboration with WFP-Nepal

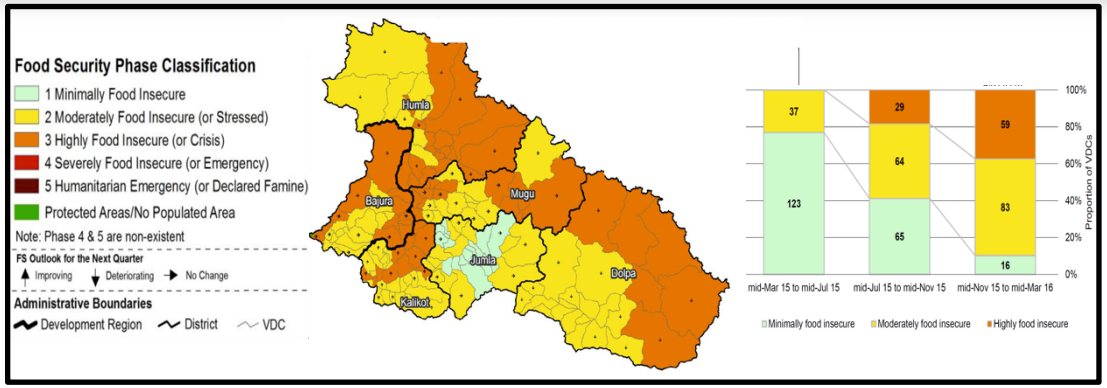
SERVIR

Winter Drought 2015–16 in Western Mountain Region

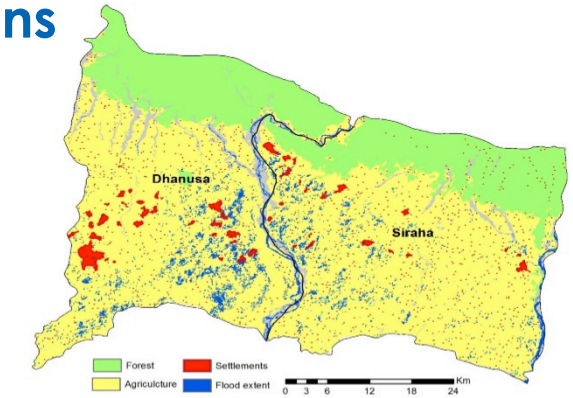




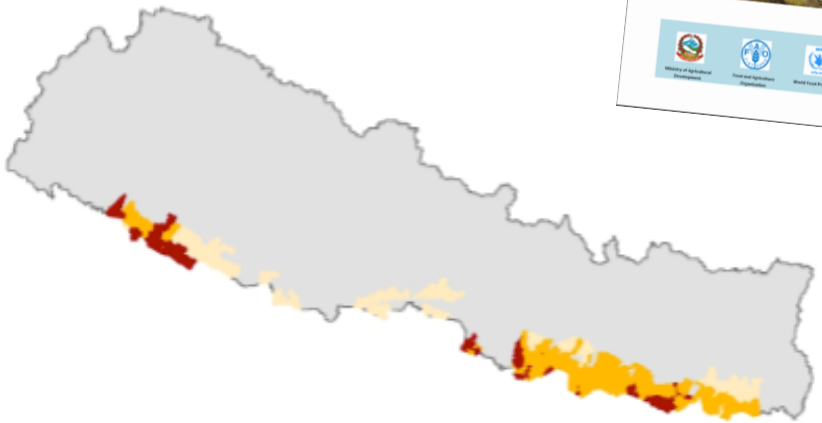
Normal Dry Moderate drought Severe drought Extreme drought



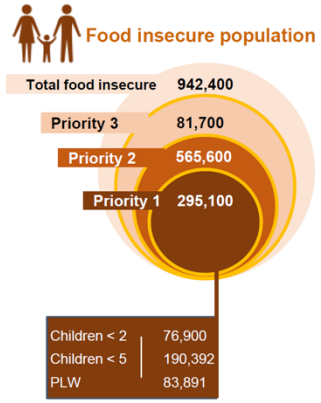
Summer Floods 2017 in the Southern Terai Plains



Flood extent and vulnerable settlements



Priority areas identification



The collaborative work by WFP and ICIMOD in Nepal mixes the comparative strengthens of WFP's on-the-ground food security monitoring with ICIMOD's remote sensing and GIS capacities. This paid off by guiding decisions for humanitarian response to the 2016 drought and 2017 floods there.

Kurt Burja, Policy Officer, World Food Programme

Crop Monitors for Early Warning

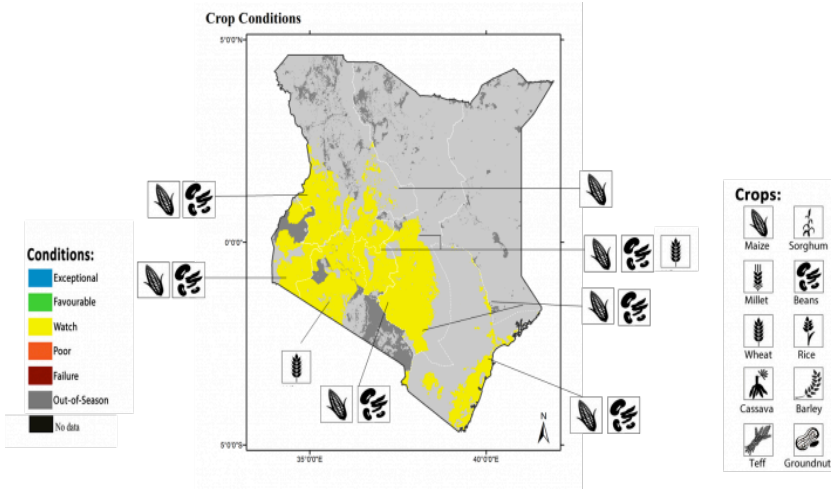
Problem: Consultations with regional and national stakeholders identified the need for frequent monitoring crop conditions to inform decision making

Service Objective: Development National and regional crop monitors that online interface for combination of EO indicators of productivity such as NDVI with other information (FEWSNET FS assessments and national reports) to report **crop conditions and their drivers (pests, drought, conflict)** at **disaggregated levels** ; and generate maps that can inform high level decision making

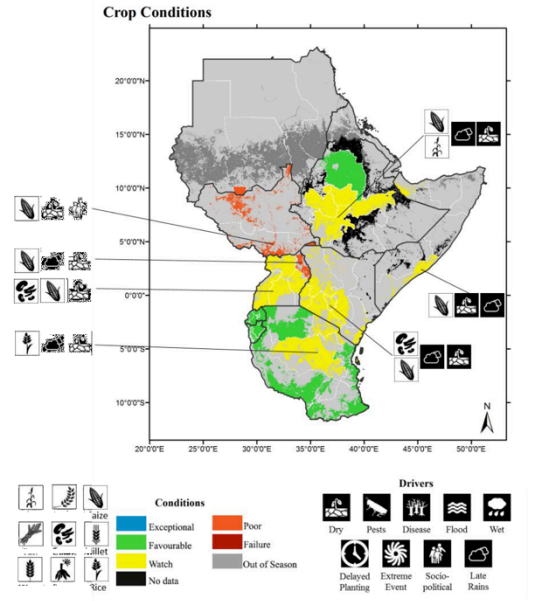
Outcomes:

- Implementation of the national crop monitor with SDA and **UMD** (County level reporting)
- Implementation of the Regional crop monitor and linkage to GHACOF climate outlook information(Country focal points trained)

Kenya National Crop Monitor -April 2019



ICPAC Regional Crop Monitor -April 2019

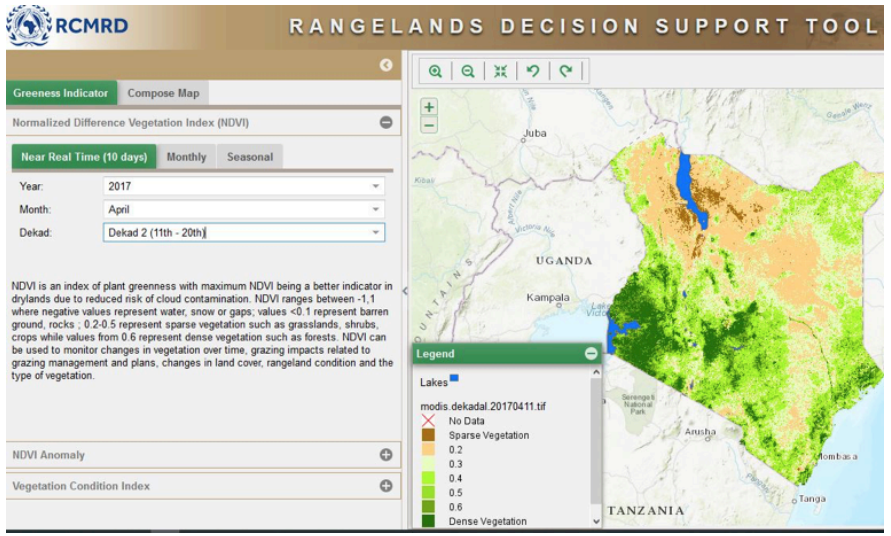


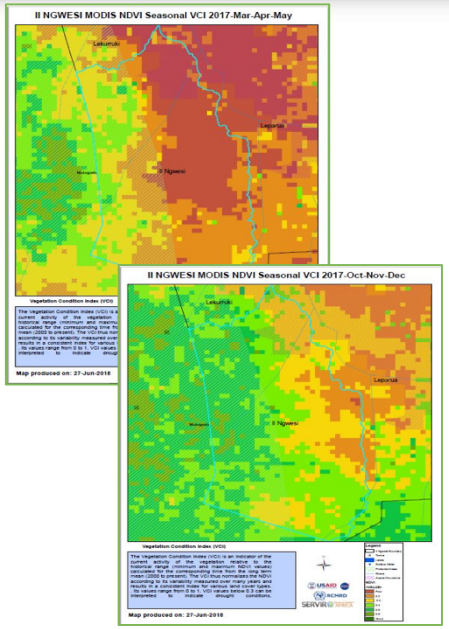
Teaming up! The Applied Science Teams from UMD and UCSB/ CHG held a joint training in Tanzania with a group from the Ministry of Agriculture. As a result The team published the Tanzania National Food Security Bulletin for February 2019, and were able to integrate climate and hydrological information for the first time.

Kenya Rangelands and Productivity Assessment and Monitoring

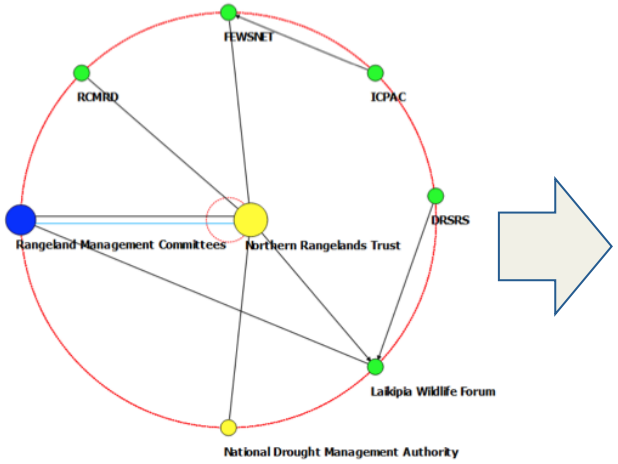
Rangelands comprise 80% of Kenya's land mass which are classified as arid and semi-arid, and contain 70% of the country's livestock population while also generating 90% of tourism revenue .

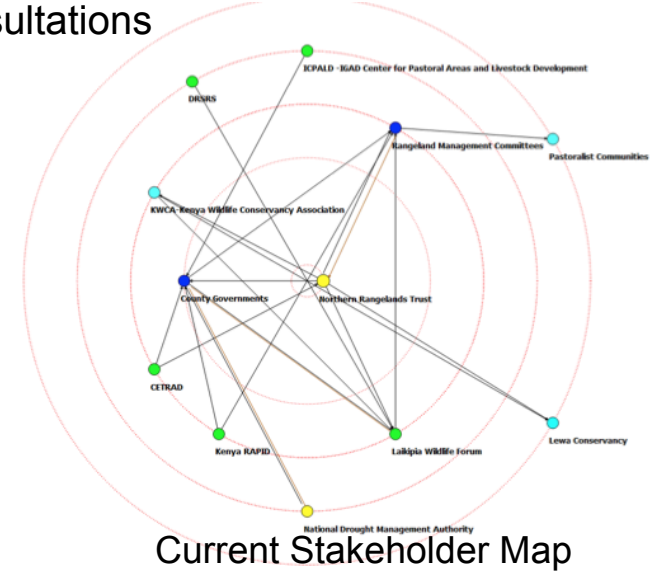
The rangelands are under continuous threat due to climate variability, coupled with a rapidly growing livestock and human populations. Extreme events are also increasing in intensity and frequency, resulting in notable declines in productivity in the rangelands due to shorter recovery time.





Growth in Stakeholders Network following CNA and Stakeholder Consultations





Initial Stakeholder Map

Current Stakeholder Map

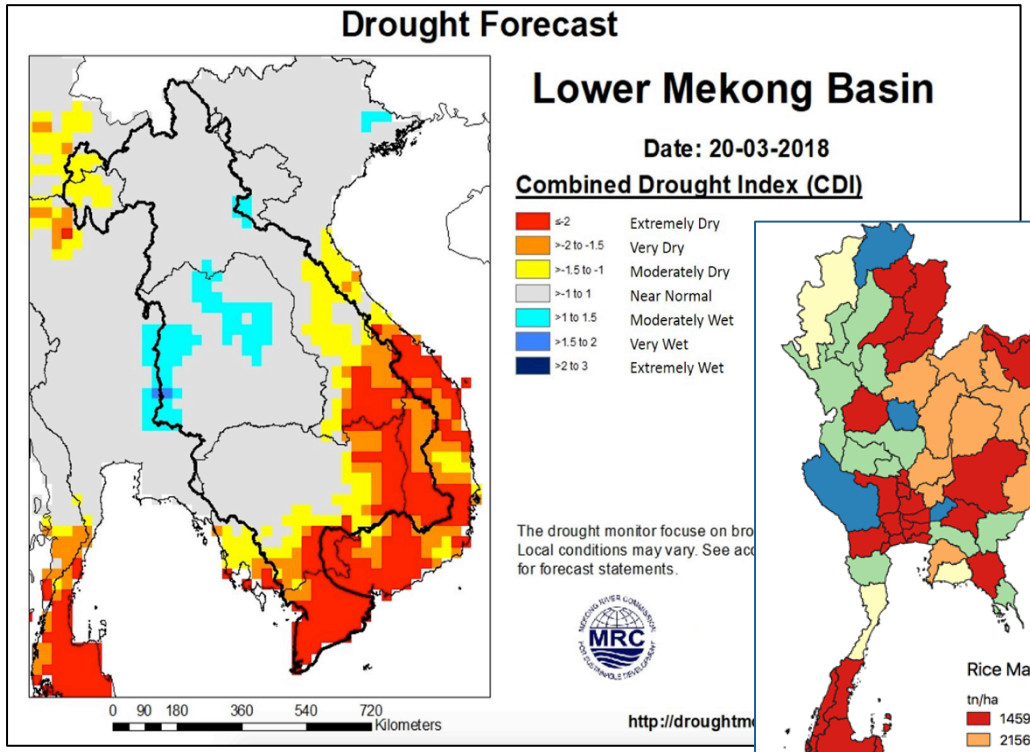
"Our current grazing plans, due to frequent droughts had resulted in in poor vegetation conditions especially in Leparua area. Using the maps, we have been able to confirm the areas which are degraded and developed a new plan which we will present to management for review"

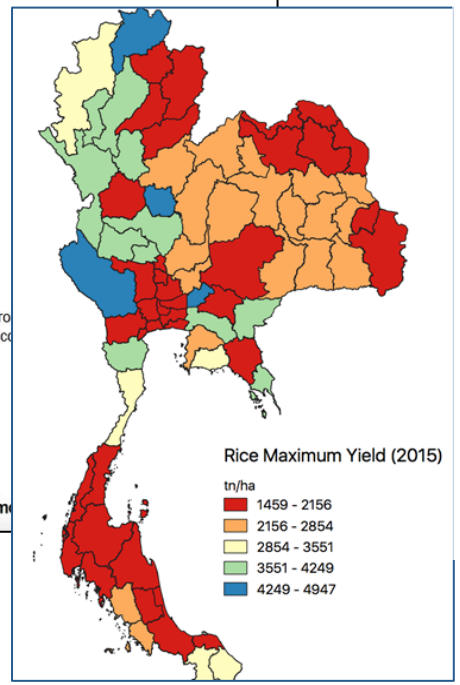
Sammy Tema- NRT Grazing Coordinator for Il-Ngwesi Conservancy

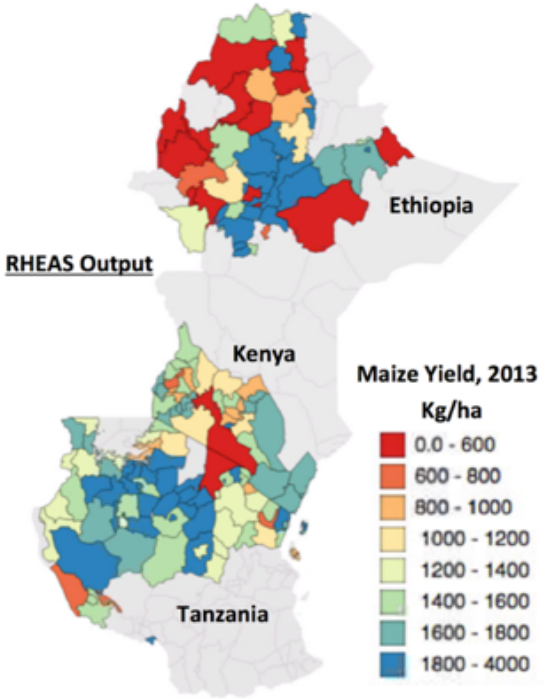
Slide adapted from Lilian Wangui with permission

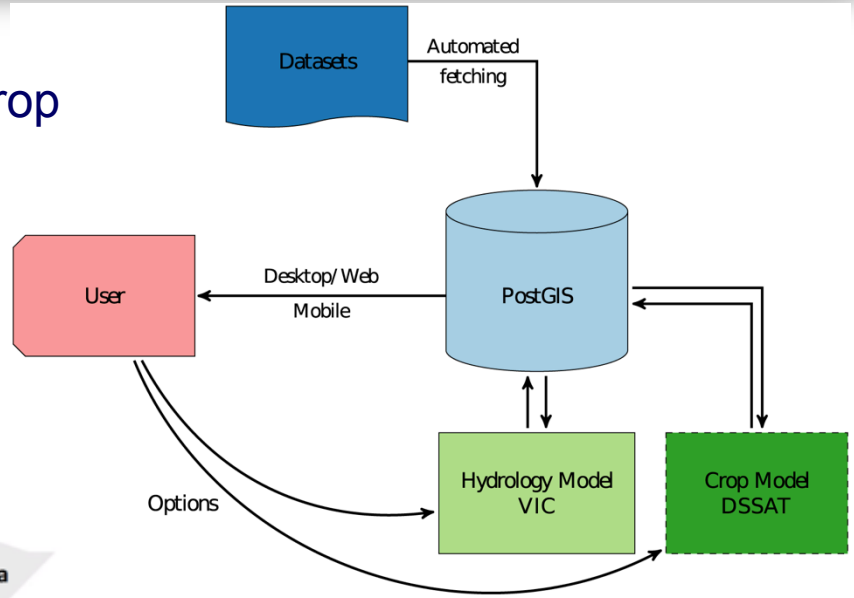
The Regional Hydrologic Extremes Assessment System (RHEAS) Model

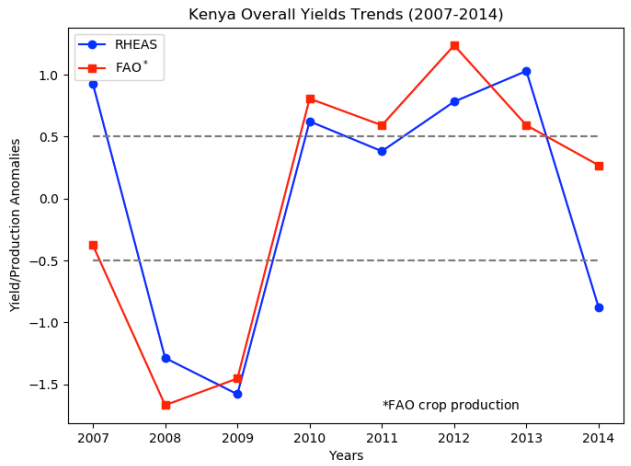
In the context of decision-making, the RHEAS model helps to addresses the much needed drought preparedness, monitoring and forecasting as well as crop yield information for selected crops while assessing economic, social and environmental impacts in East Africa and the Lower Mekong countries.











Challenges we face

- Establishing/revising national level baseline crop area and yield statistics to operationalize/institutionalize remote sensing approaches/products

- Model data requirements
  - Field measurements for cal/val (met, yield, soil moisture, etc.), soil properties
  - Regional crop growth estimates based on field reports are often expensive, prone to large errors, and cannot provide real-time, spatially explicit estimates or forecasting of crop condition

- Delineation/revision of agro-ecological zones considering changed agriculture practices, climate conditions and supported by newly emerged high resolution agro-climatic data products

- Biomass estimation for rangeland monitoring

- Request of very high temporal and spatial scale information products by decision makers


SERVIR
Connecting space to village
www.servirglobal.net