

SERVIR

Applying Earth Observation data to
support decision making

Africa Flores, April 2016

NASA/SERVIR Science Coordination Office

africa.flores@nasa.gov

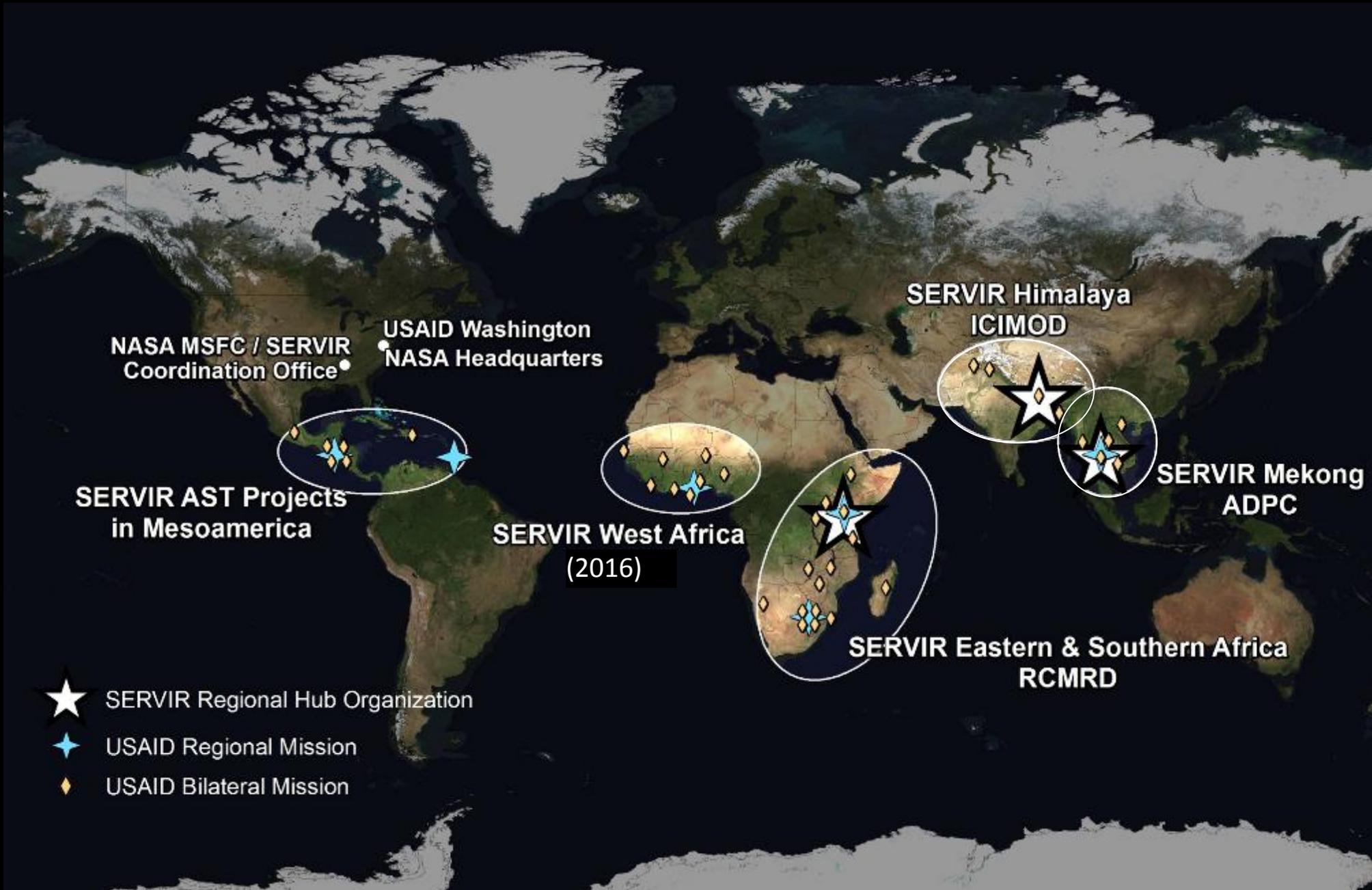


From space, we can view our planet in new ways.

SERVIR empowers people to use that view for gaining knowledge and insights about their environments and adaptation to a changing climate.

We work with regional decision-makers to foster use of Earth observation satellite data, GIS, and predictive models for addressing water and land use, natural disasters, agricultural problems, biodiversity, and more.

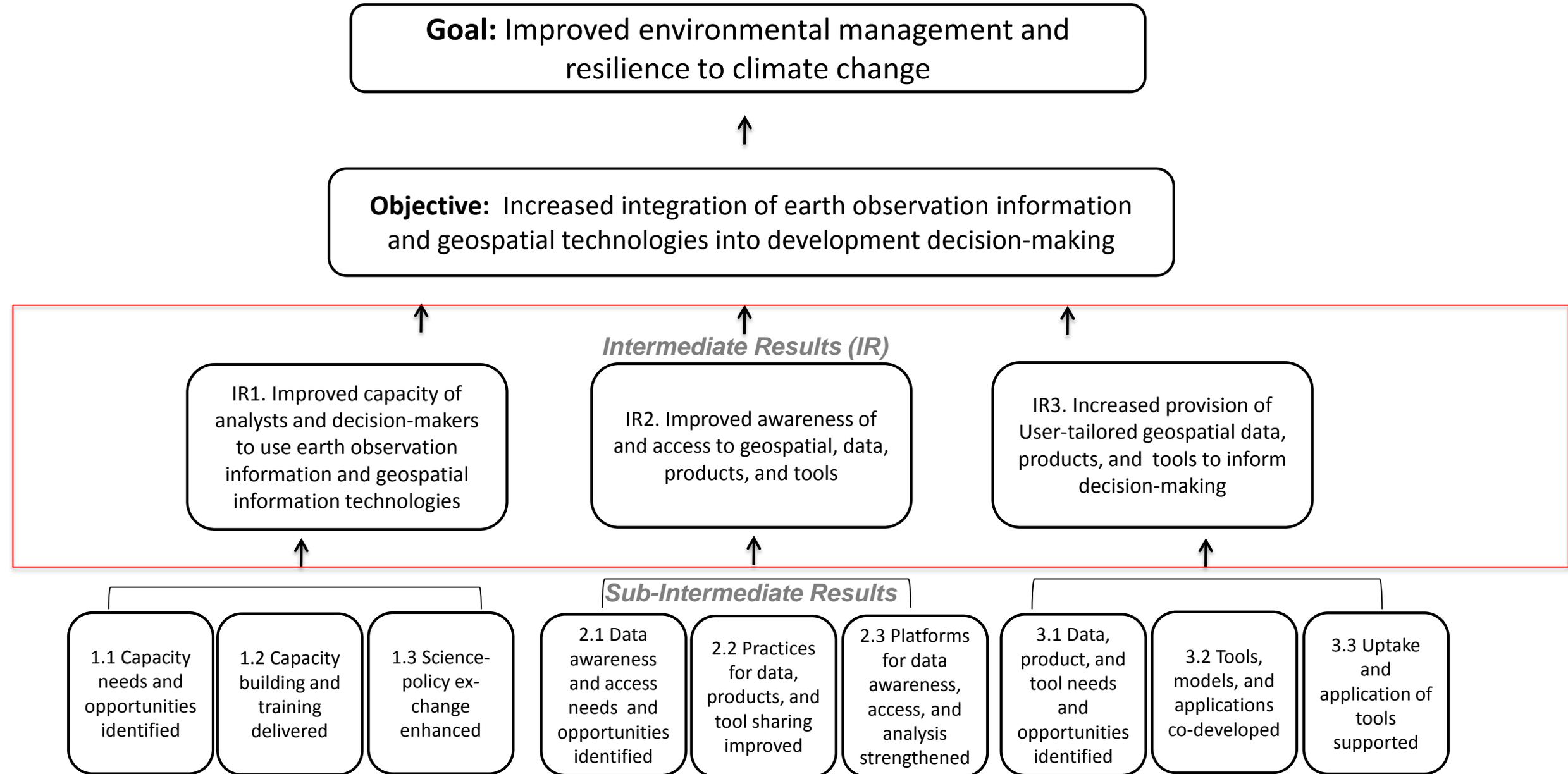
These tools can improve the lives, livelihoods, safety, and future of people in communities around the world.



- SERVIR is a link between research institutions and end user decision making.
- SERVIR efforts are led by the needs of the region. Some examples include hydrologic modeling, crop yield estimation, land cover change detection, and hydro-meteorological hazard monitoring
- Presence of SERVIR Hubs, such as ICIMOD, RCMRD, and ADPC, with regional governmental support, makes the linkage sustainable.



Results framework





Mexico
Guatemala
El Salvador
Nicaragua
Costa Rica
Panama

Belize
Honduras

Dominican Republic

South Sudan
Uganda
Rwanda
Burundi
Zambia
Botswana
Namibia

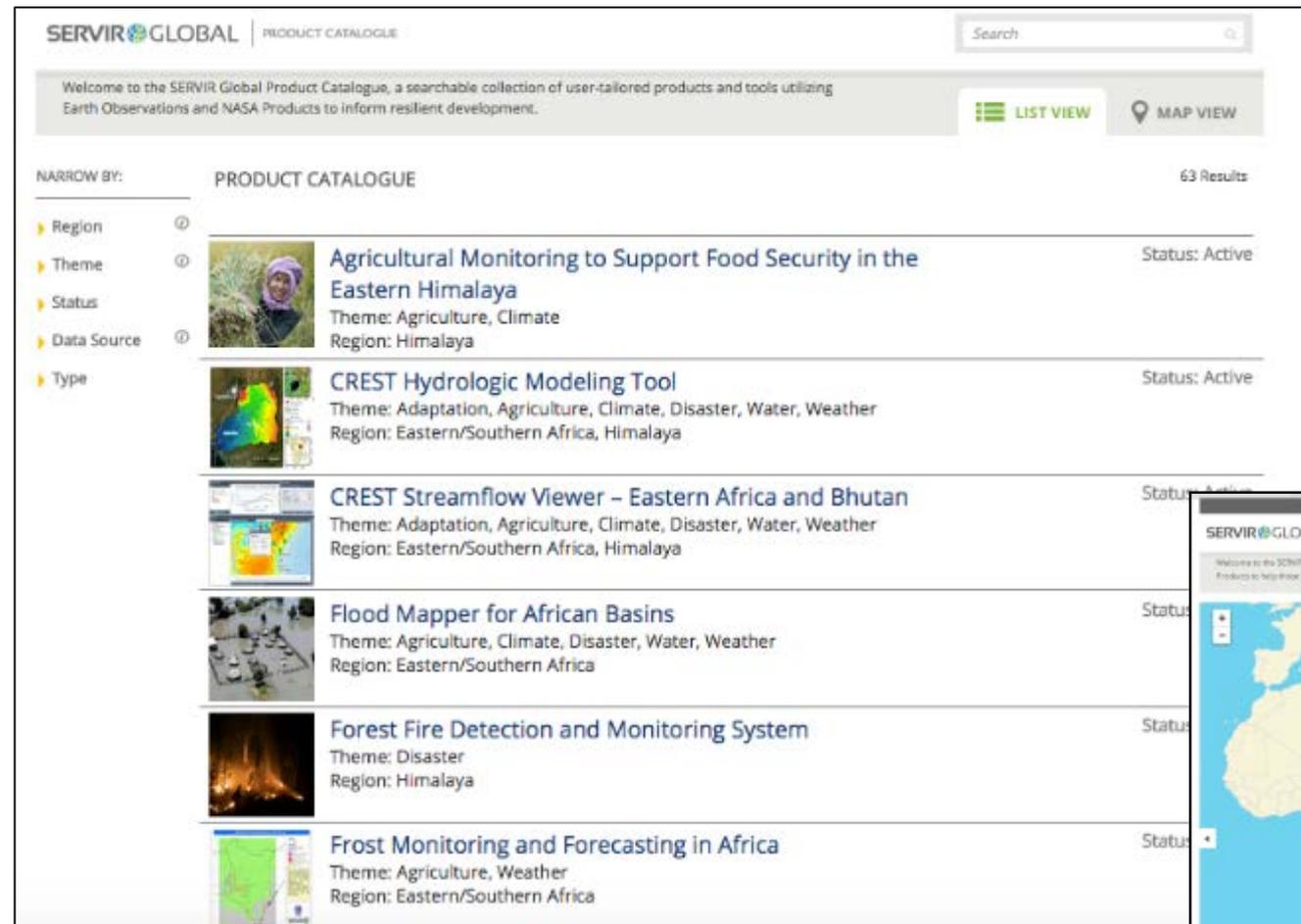
Pakistan
India

Nepal
Bhutan
Bangladesh

Ethiopia
Kenya
Tanzania
Malawi
Mozambique
Seychelles
Mauritius
Madagascar
Swaziland
Lesotho
South Africa

Cambodia
Laos
Myanmar
Thailand
Vietnam

Comprehensive online catalogue of products



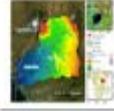
SERVIR GLOBAL | PRODUCT CATALOGUE

Welcome to the SERVIR Global Product Catalogue, a searchable collection of user-tailored products and tools utilizing Earth Observations and NASA Products to inform resilient development.

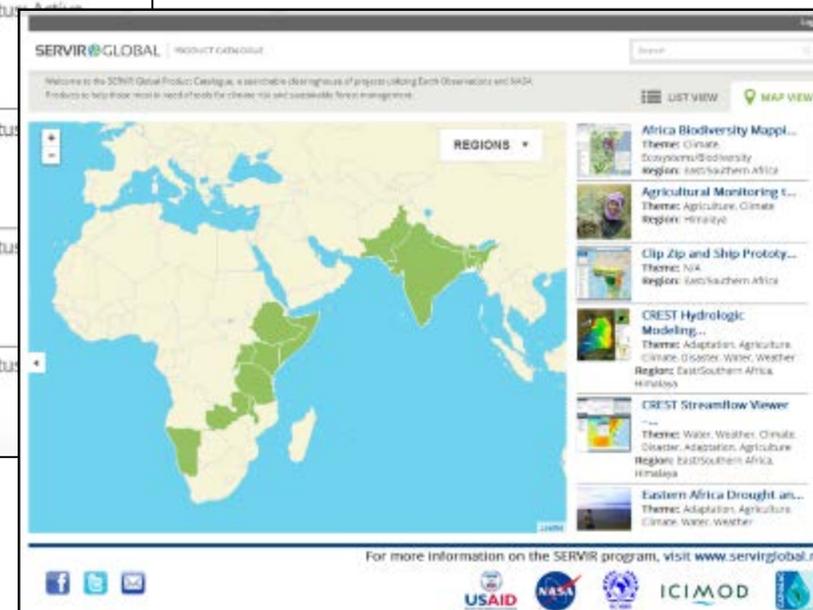
63 Results

NARROW BY:

- Region
- Theme
- Status
- Data Source
- Type

Thumbnail	Product Title	Theme	Region	Status
	Agricultural Monitoring to Support Food Security in the Eastern Himalaya	Agriculture, Climate	Himalaya	Active
	CREST Hydrologic Modeling Tool	Adaptation, Agriculture, Climate, Disaster, Water, Weather	Eastern/Southern Africa, Himalaya	Active
	CREST Streamflow Viewer – Eastern Africa and Bhutan	Adaptation, Agriculture, Climate, Disaster, Water, Weather	Eastern/Southern Africa, Himalaya	Active
	Flood Mapper for African Basins	Agriculture, Climate, Disaster, Water, Weather	Eastern/Southern Africa	Active
	Forest Fire Detection and Monitoring System	Disaster	Himalaya	Active
	Frost Monitoring and Forecasting in Africa	Agriculture, Weather	Eastern/Southern Africa	Active

- Water, water related disasters, weather, climate, LCLUC, ecosystems, food security and agriculture



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LIST VIEW | MAP VIEW

REGIONS

Thumbnail	Product Title	Theme	Region
	Africa Biodiversity Mapping	Climate	East/Southern Africa
	Agricultural Monitoring to Support Food Security in the Eastern Himalaya	Agriculture, Climate	Himalaya
	Clip Zips and Ship Protocols	N/A	East/Southern Africa
	CREST Hydrologic Modeling Tool	Adaptation, Agriculture, Climate, Disaster, Water, Weather	East/Southern Africa, Himalaya
	CREST Streamflow Viewer	Water, Weather, Climate, Disaster, Adaptation, Agriculture	East/Southern Africa, Himalaya
	Eastern Africa Drought Analysis	Adaptation, Agriculture, Climate, Water, Weather	

For more information on the SERVIR program, visit www.servirglobal.net

USAID NASA ICI/MOD

SERVIRcatalog.net / SERVIRcatalogue.net

SERVIR in Numbers



Regions



Countries



Tools



Institutions with
increased capacity



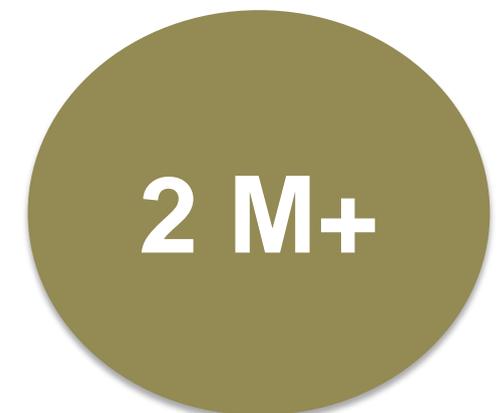
Small grants/scale
applications



University fellows



People trained



Online map requests

<http://servirglobal.net>

SERVIR E&S Africa Land Cover Viewer



RCMRD LAND COVER VIEWER

Map | **Layers** | **Downloads**

Base Maps

Overlays

- tanzania_landcover_2010_scheme_ii
- tanzania_landcover_2010_scheme_i
- tanzania_landcover_2000_scheme_ii
- tanzania_landcover_2000_scheme_i

Select

Country:

Classification Scheme:

Year:

Statistics

Land Cover Statistics for Tanzania 2010 scheme_ii

Land Cover Category	Area (Hectares)
Dense Forest	~1,000,000
Moderate Forest	~4,000,000
Sparse Forest	~18,000,000
Planted Forest	~1,000,000
Mangrove Forest	~1,000,000
Woodland	~1,000,000
Closed Grassland	~1,000,000
Open Grassland	~10,000,000
Closed Bushland	~12,000,000
Open Bushland	~18,000,000
Perennial Cropland	~1,000,000
Annual Cropland	~18,000,000
Wetland	~1,000,000
Water Body	~15,000,000
Settlement	~1,000,000
Bare Soil	~1,000,000
Rock Outcrop	~1,000,000

Legend

- Dense Forest
- Moderate Forest
- Sparse Forest
- Planted Forest
- Mangrove Forest
- Woodland
- Closed Grassland
- Open Grassland
- Closed Bushland
- Open Bushland
- Perennial Cropland

Land Cover Statistics for Tanzania 2010 scheme_ii

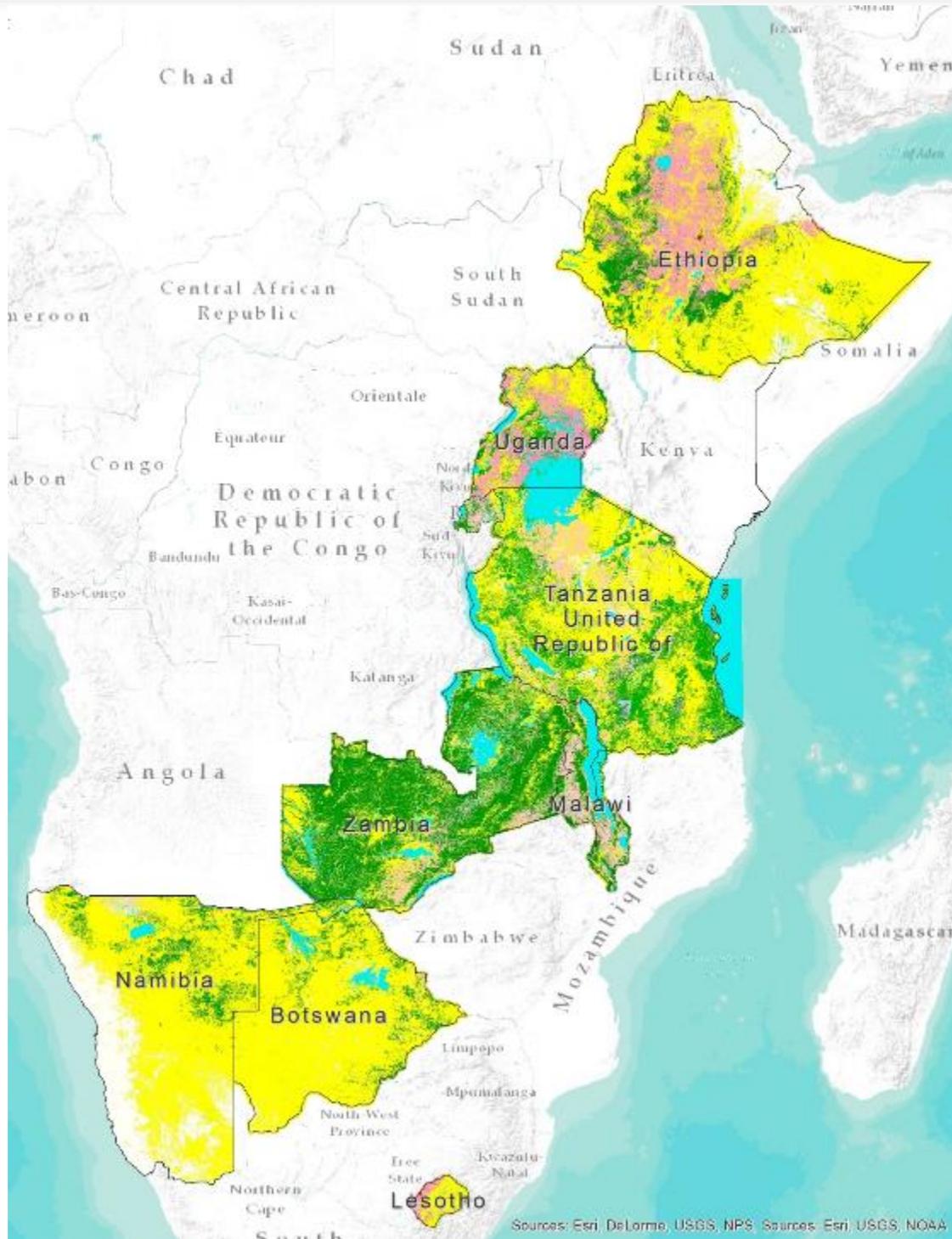
Land Cover Category	Percentage
Dense Forest	19.6%
Moderate Forest	21.1%
Sparse Forest	16.5%
Closed Bushland	~10.0%
Open Bushland	~10.0%
Perennial Cropland	~10.0%
Annual Cropland	~10.0%
Wetland	~10.0%
Water Body	~10.0%
Settlement	~10.0%
Bare Soil	~10.0%
Rock Outcrop	~10.0%

Scale = 1 : 7M

Logos: USAID, SERVIR Eastern & Southern AFRICA, NASA

<http://apps.rcmrd.org/landcoverviewer/>

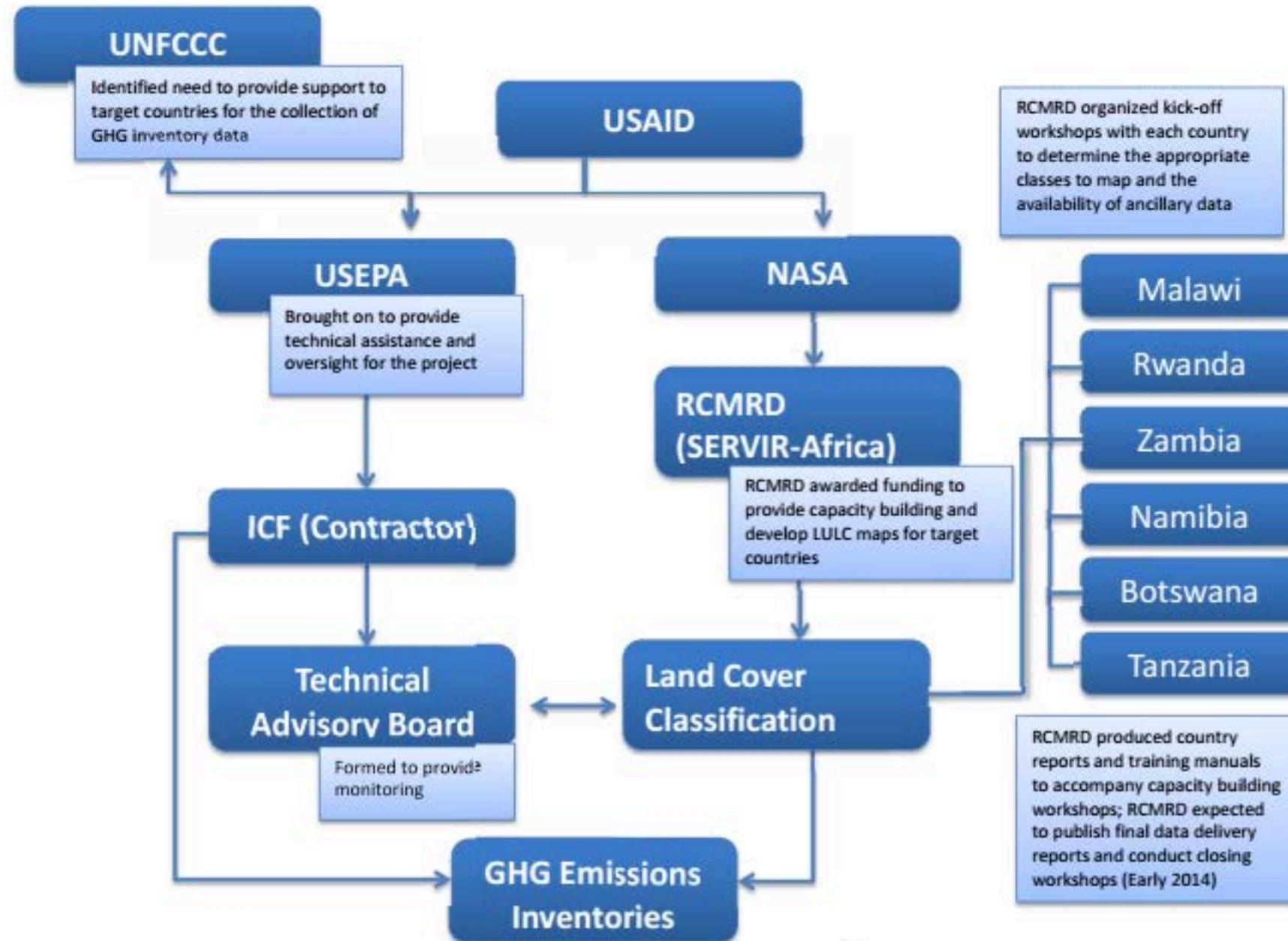
SERVIR E&S Africa/RCMRD

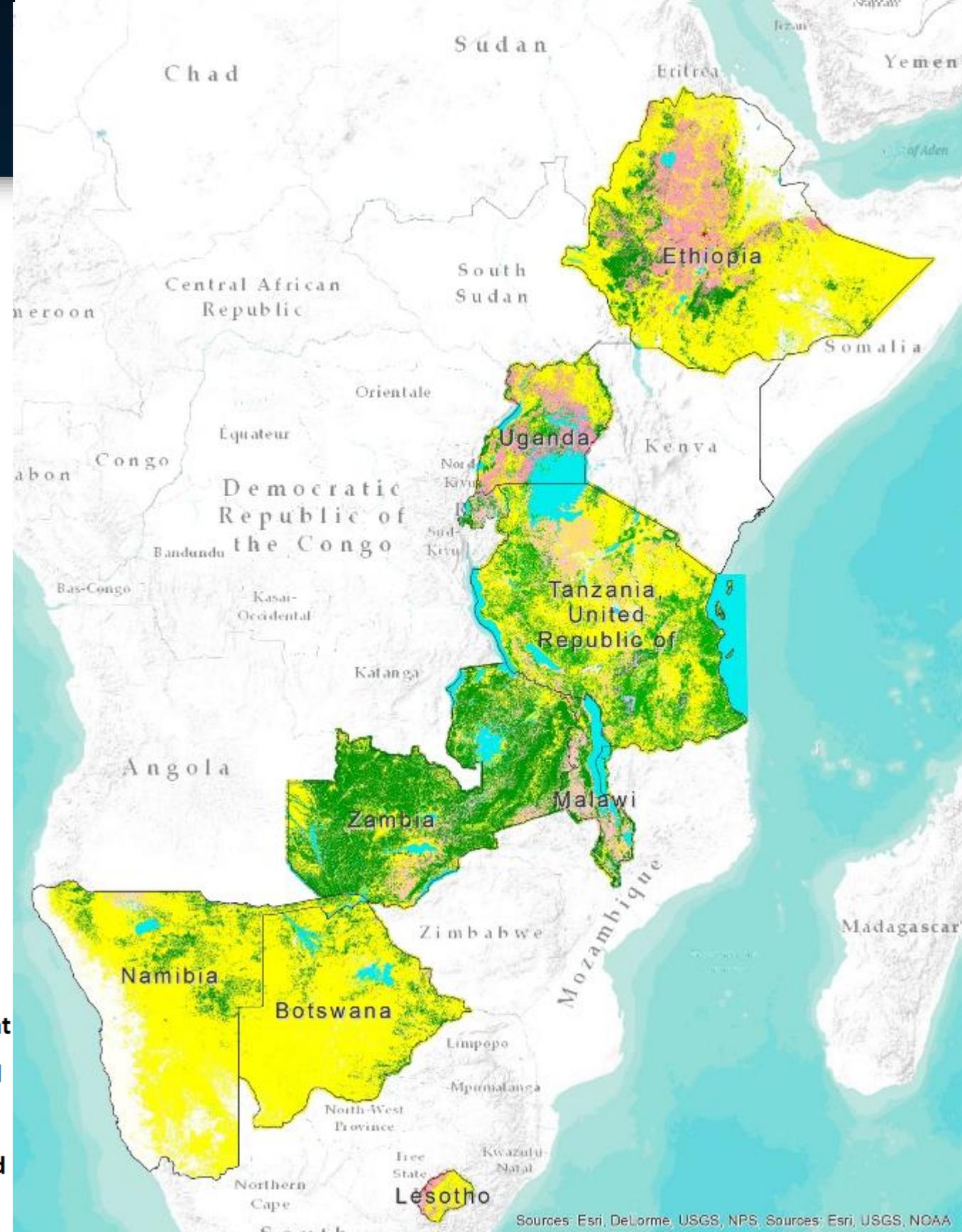


Land cover mapping for green house gas inventories development:

- Generation of land cover maps initially for six countries, extended to nine
- Close consultation with country counterparts
- Accuracy assessments
- 2 classification schemes: country base, and IPCC (6)
- UNFCCC-US, EPA, NASA/SERVIR, RCMRD
- Technical advisory board: formed to provide monitoring
- Landsat derived
- Field work done in collaboration with national counterparts
- Strong training component

Land cover mapping for GHG inventories development



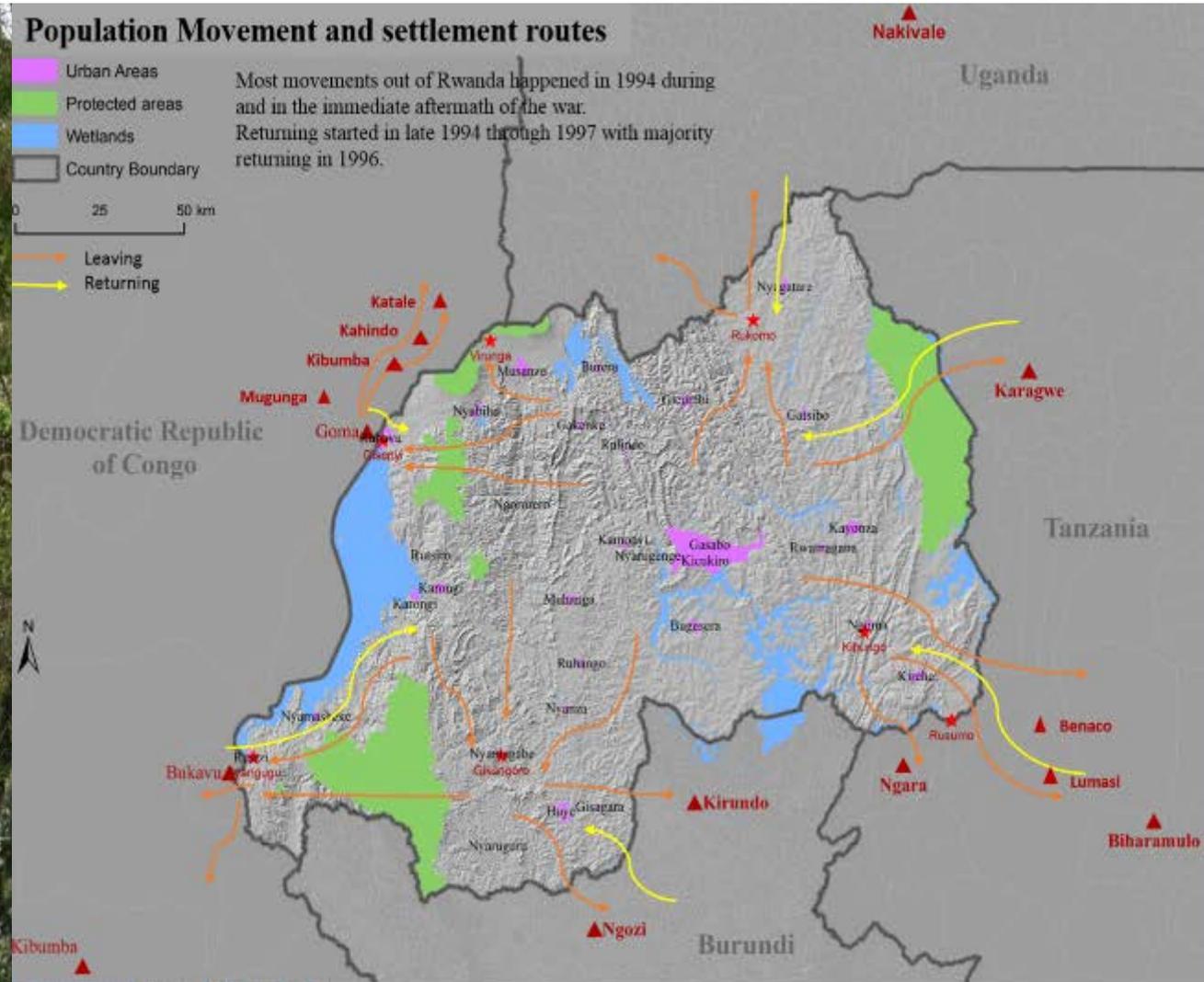


- Land Cover**
- Wetland
 - Settlement
 - Otherland
 - Grassland
 - Forestland
 - Cropland

Sources: Esri, DeLorme, USGS, NPS, Sources: Esri, USGS, NOAA

<http://apps.rcmrd.org/landcoverviewer>

What is this LC data telling us?



GHG Inventory Development in Rwa...  

Effects of civil war and the ensuing population dynamics on land cover in Rwanda



Rwandan refugees walking near Benaco Junction past Rusumo into Tanzania. Photo by Martha Rial Dec. 1996

In the years following the war, the displaced refugees started returning to Rwanda in overwhelming numbers.

From the major camps in Bukavu and Goma in Zaire, Ngara, and Karagwe in northwestern Tanzania, Ngozi and Kirundo in Burundi, and Nakivale in Uganda, people flooded back into Rwanda, creating housing shortages in the country.

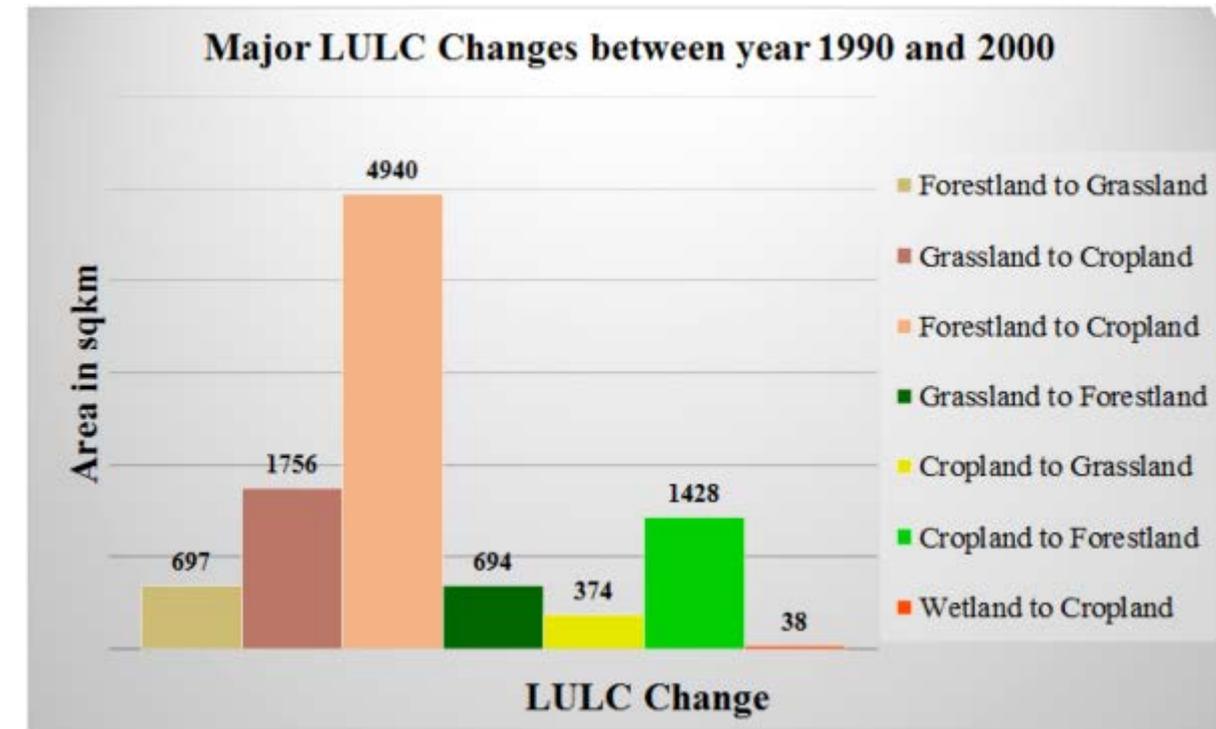
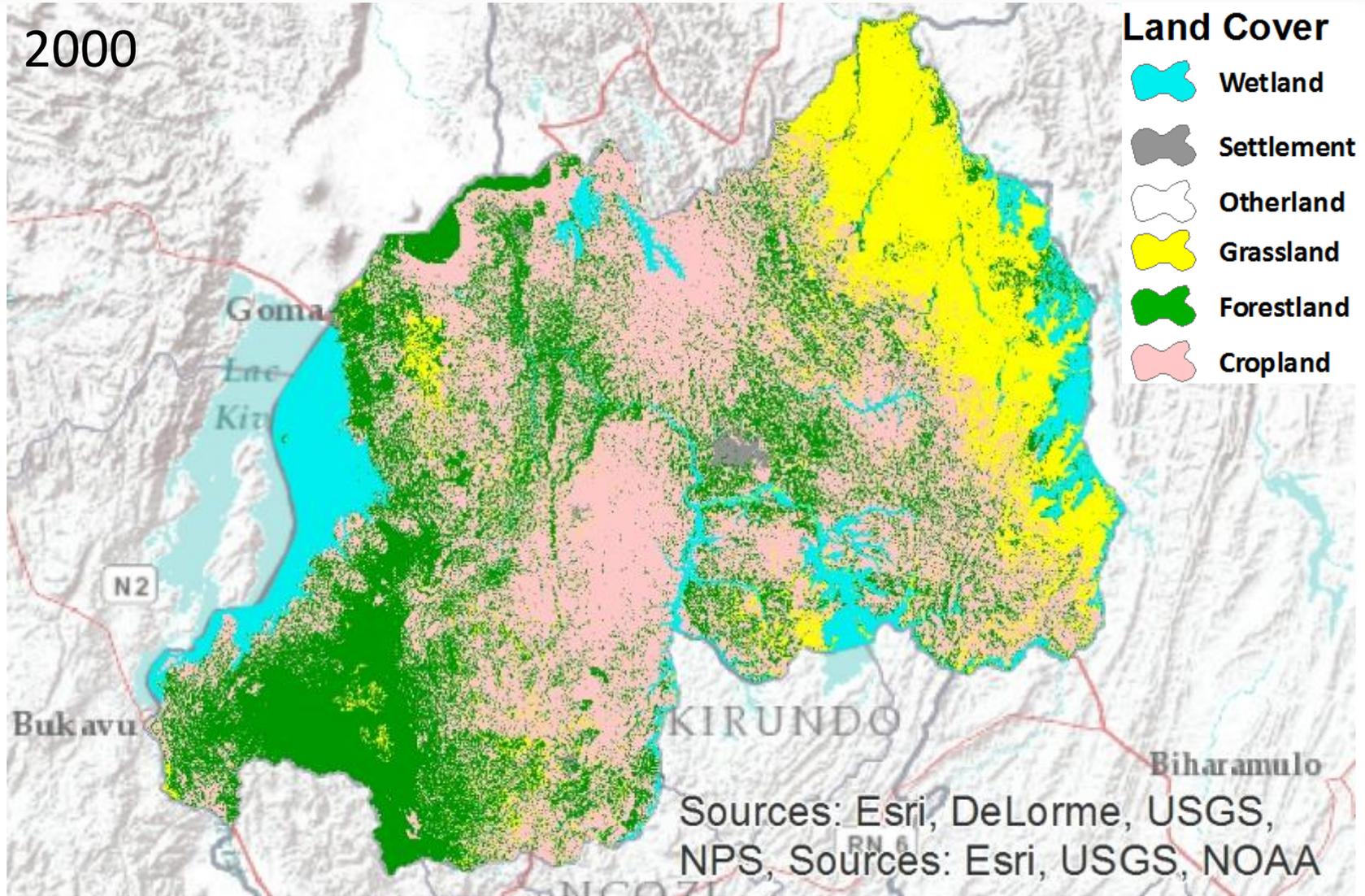
This led to high concentrations of people in Rusizi, Gisenyi, Gikongoro, Virunga, Kibungo, and Rukommo.

With no economic means to start a living, people resorted to exploitation of natural resources.

as open access data as part of the completed land cover mapping project for Rwanda, provides an overview of trends in land cover change in relation to civil unrest and resulting population dynamics in the country.



Rwanda case

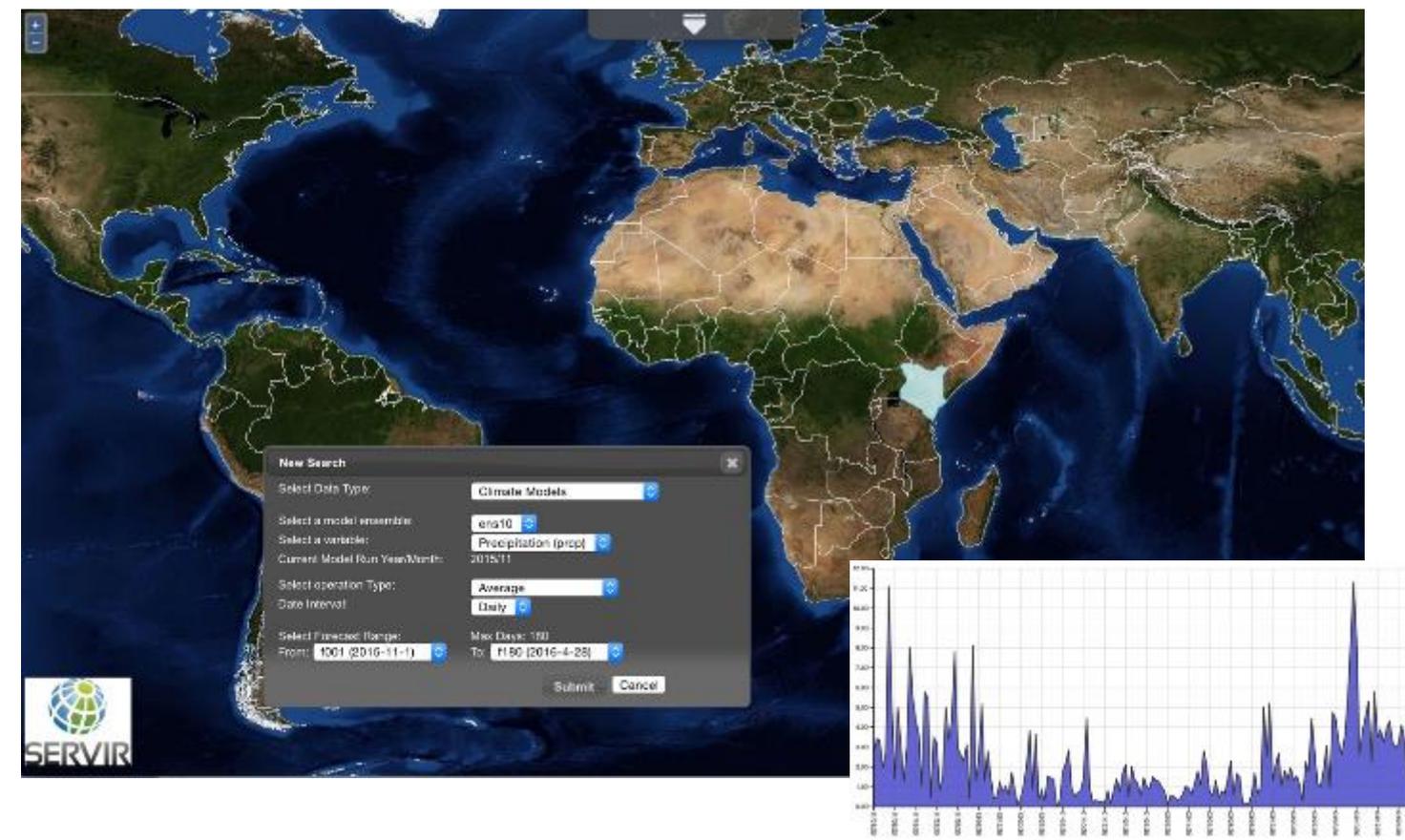


Malaso, 2016. <http://arcg.is/1QUQE1y>

Lessons learned on LC project



- Capacity building is key: enable stakeholders to replicate analyses (e.g. generation of land cover datasets, **calculation of GHG emissions**) to be able to submit forest reference levels and forest reference emission levels to REDD+
- Transition of science: Readable methods that have proven successful. Need to be aware of the state of the art methods that are ready to be used.
- Flexibility: open to change and modification, re-evaluate objectives and assess if there are still achievable and relevant.
- Strong needs assessment component. Understand requirements, key end users capacities and needs. What type of decisions are going to be made with this information?
- Stronger coordination with multiple NASA programs and US Government agencies.



Many users do not need global data for each day, instead need only information for their geographic area of interest and for their time period of interest.

SERVIR has built the ClimateSERV data processing system to analyze and deliver global or regional data for the time period and area of interest.

- Built on the following free and open datasets:
 - CHIRPS global rainfall data (FEWS NET)
 - 0.05° spatial resolution (~5 km)
 - Consistent, daily rainfall records since 1981
 - NMME Seasonal climate forecasts (NASA/SERVIR)
 - 0.5° spatial resolution (~50 km).
 - Daily rainfall and temperature for 180 days in advance, updated monthly
 - eMODIS vegetation index (NDVI, for West Africa, USGS)
 - 250 m spatial resolution. Pentadal, available since 2001

ISERV Viewer

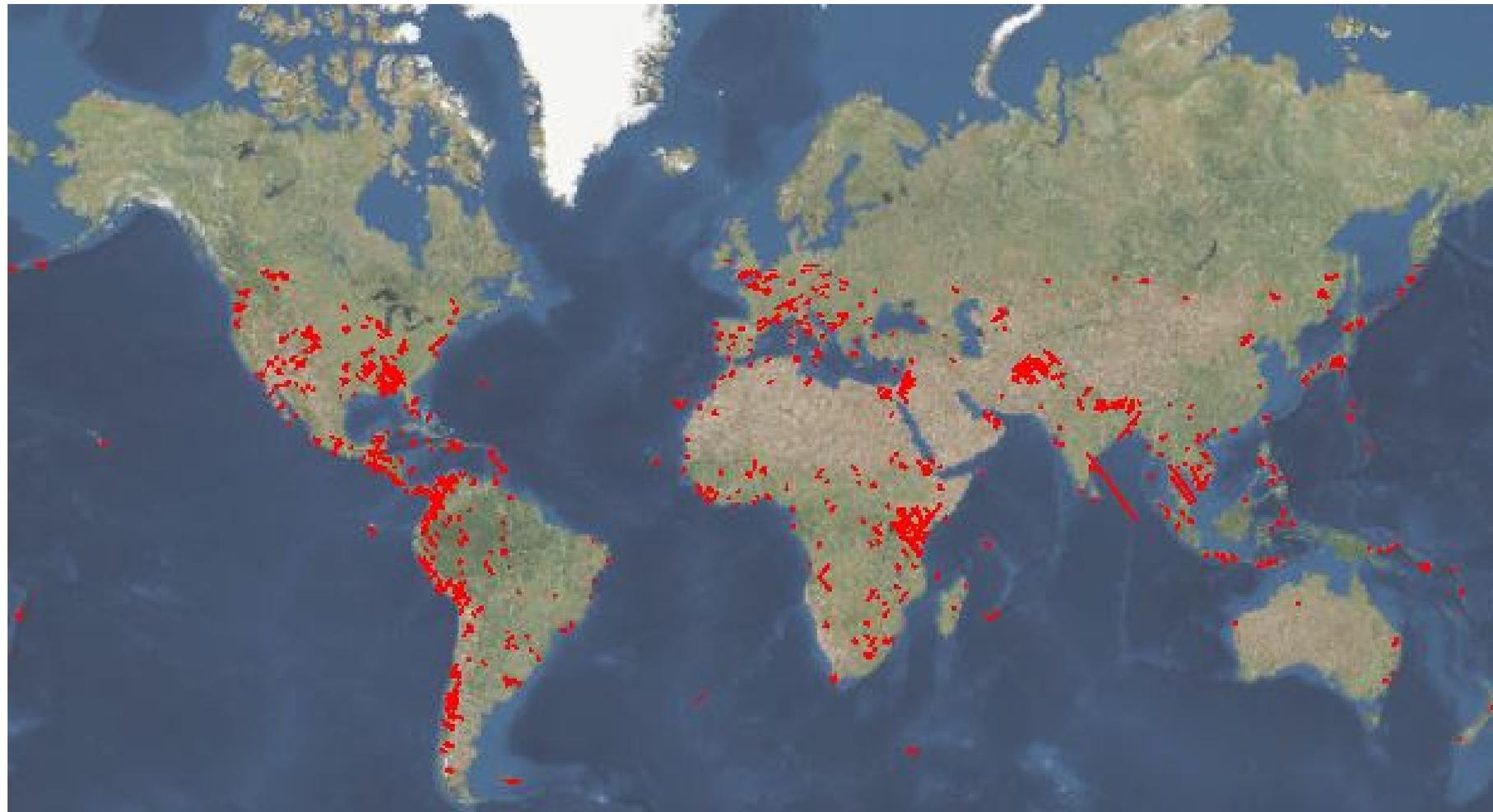


<http://www.servirglobal.net/mapresources/iserv/>

ISERV data



<http://earthexplorer.usgs.gov>



Search Criteria **Data Sets** Additional Criteria Results

2. Select Your Data Set(s)

Check the boxes for the data set(s) you want to search. When done selecting data set(s), click the *Additional Criteria* or *Results* buttons below. Click the plus sign next to the category name to show a list of data sets.

Use Data Set Prefilter [\(What's This?\)](#)

Data Set Search:

- Aerial Imagery
- AVHRR
- CEOS Legacy
- Commercial Satellites
- Declassified Data
- Digital Elevation
- Digital Line Graphs
- Digital Maps
- EO-1
- Global Fiducials
- Global Land Survey
- HCMM
- ISERV
 - ISERV
- Land Cover
- Landsat Archive
- Landsat Legacy
- Landsat MRLC
- NASA LPDAAC Collections
- Radar
- Vegetation Monitoring



SERVIR



Connecting space to village

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Thank you

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