National Aeronautics And Space Administration

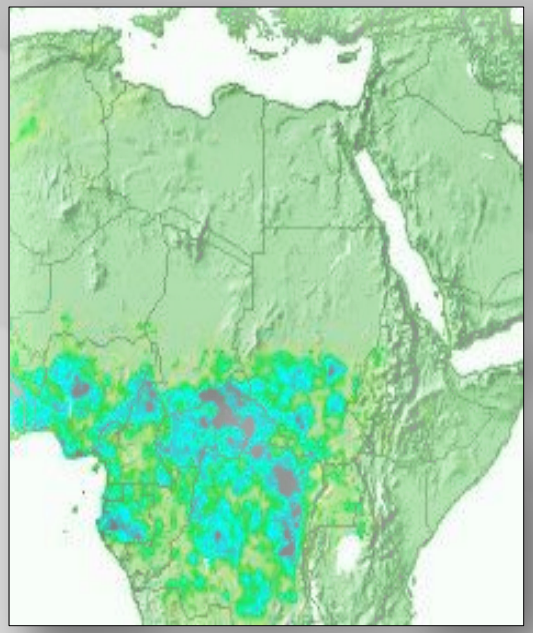
SERVIR
Brief Perspective & Future Directions

Public Health Program Review
San Antonio, Sept 29, 2010

Ashutosh Limaye
NASA/Marshall Space Flight Center

SERVIR

Enabling the use of earth observations and models for timely decision making to benefit society



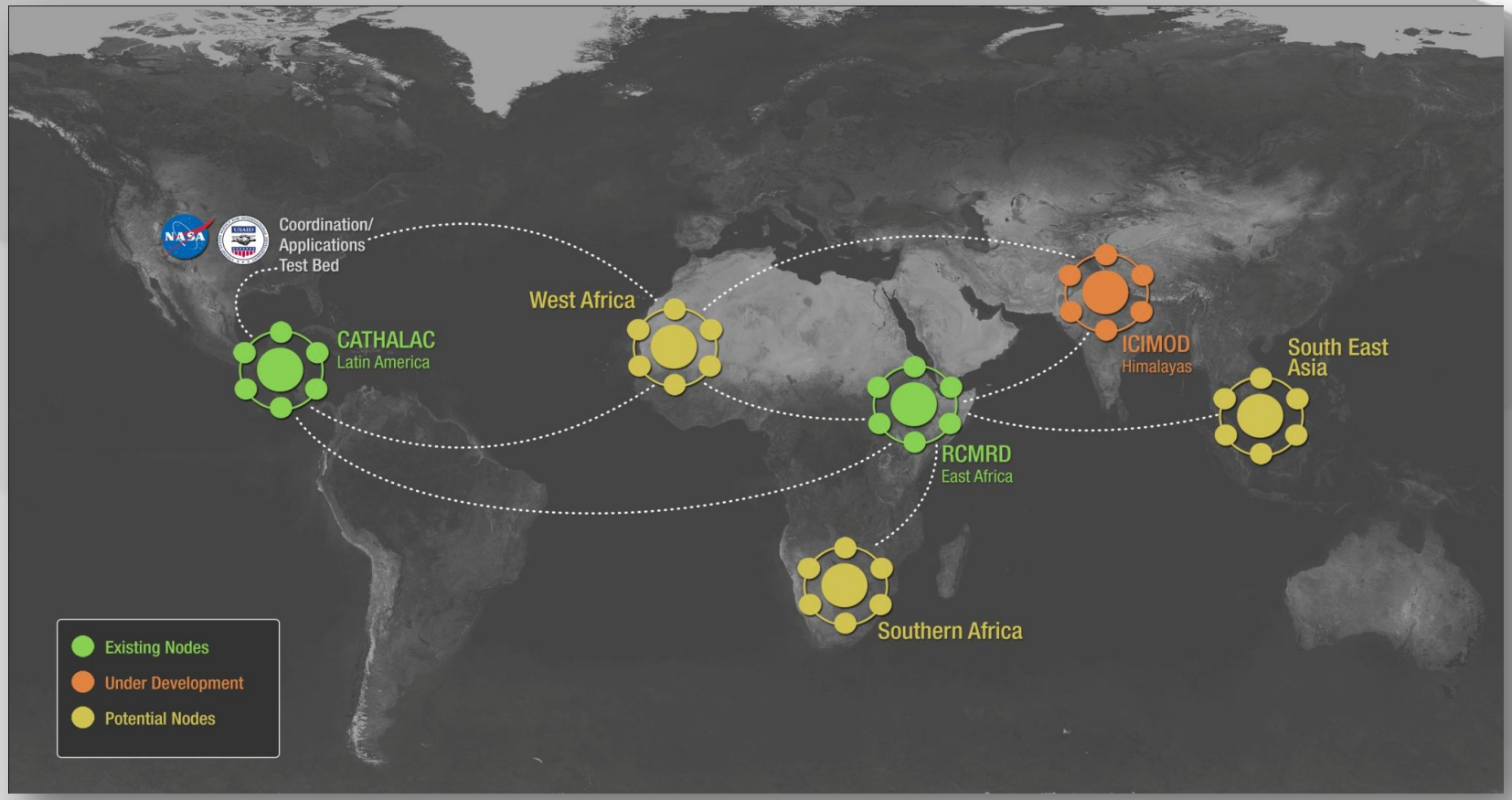
Flood Forecasting in Africa

Training and Capacity Building

Mapping Fires in Guatemala Mexico

- Data and Models
- Online Maps
- Visualizations
- Decision Support
- Training
- Partnerships

SERVIR Network



SERVIR @ CATHALAC

City of Knowledge, Panama

Dedicated on February 3, 2005

SERVIR-Africa @ RCMRD

Nairobi, Kenya

Dedicated on
November 21, 2008

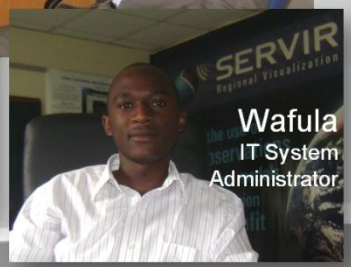
Daniel
Database Mgt
Specialist

Erick
Project Lead
at
RCMRD

Tesfaye
Senior Scientist

Lawrence
RCMRD
Database
Manager

Catherine
Remote
Sensing
Analyst



Wafula
IT System
Administrator

John
Web services
Specialist

SERVIR-Himalaya @ ICIMOD

Kathmandu, Nepal

Coming…
October 2010

SERVIR Applications

Applications are the mechanisms by which remotely sensed and in-situ observations are translated into useful information for societal benefit

- **Applied Science Program**

  agriculture, air quality, climate, natural disasters, ecological forecasting, public health, water resources, and weather

- **GEO**

  agriculture, biodiversity, climate, disaster, ecosystems, and human health

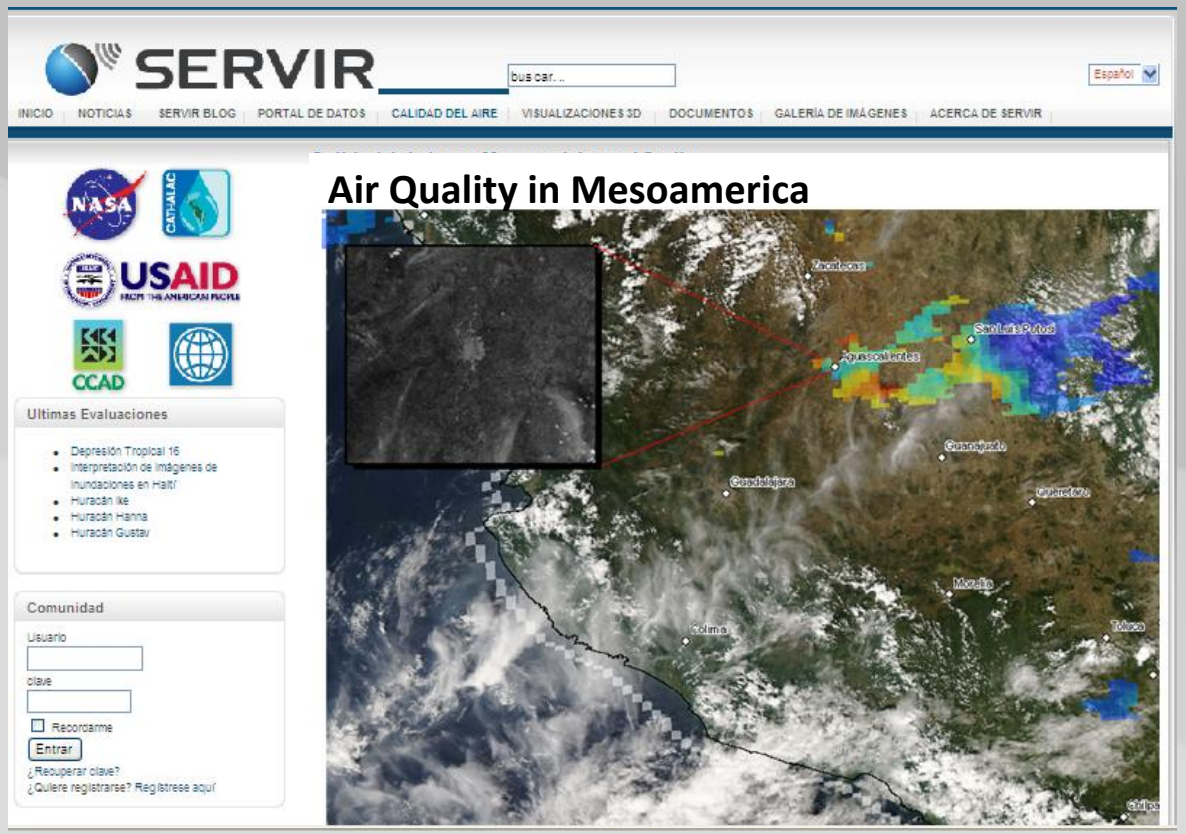
- **USAID**

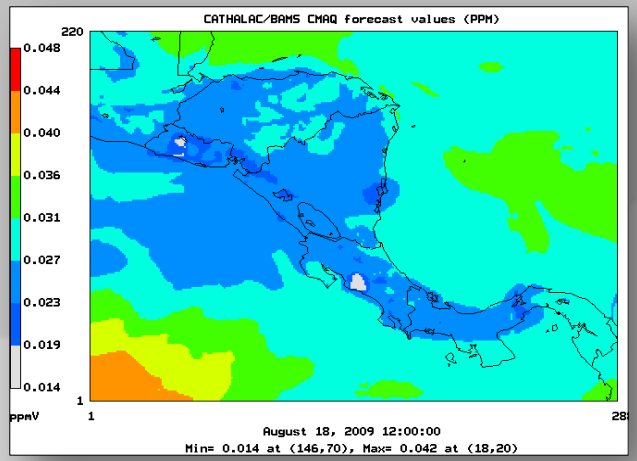
  Climate change adaptation, carbon tracking and GEO focus areas

- **Regional Needs Assessment**

SERVIR Air Quality Modeling

Mesoscale atmospheric model WRF coupled to EPA's CMAQ Air Quality model generates operational model runs and model forecasts

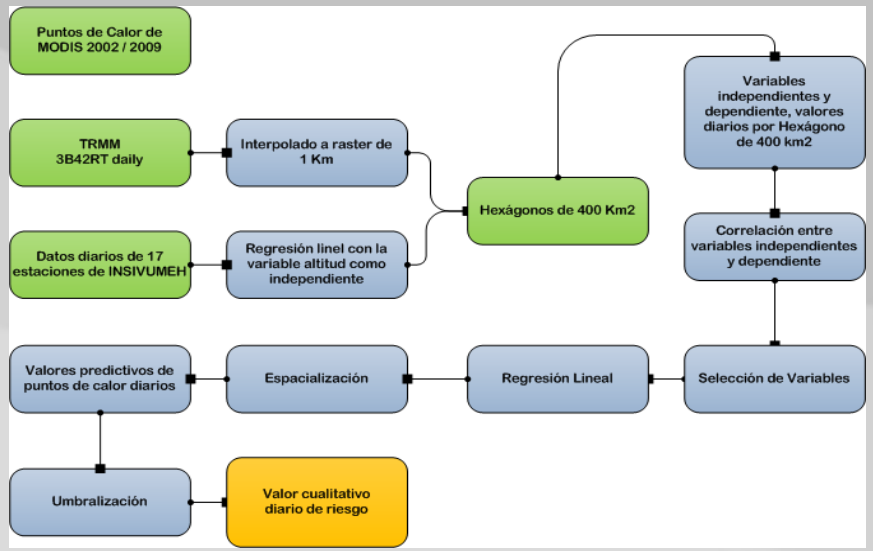


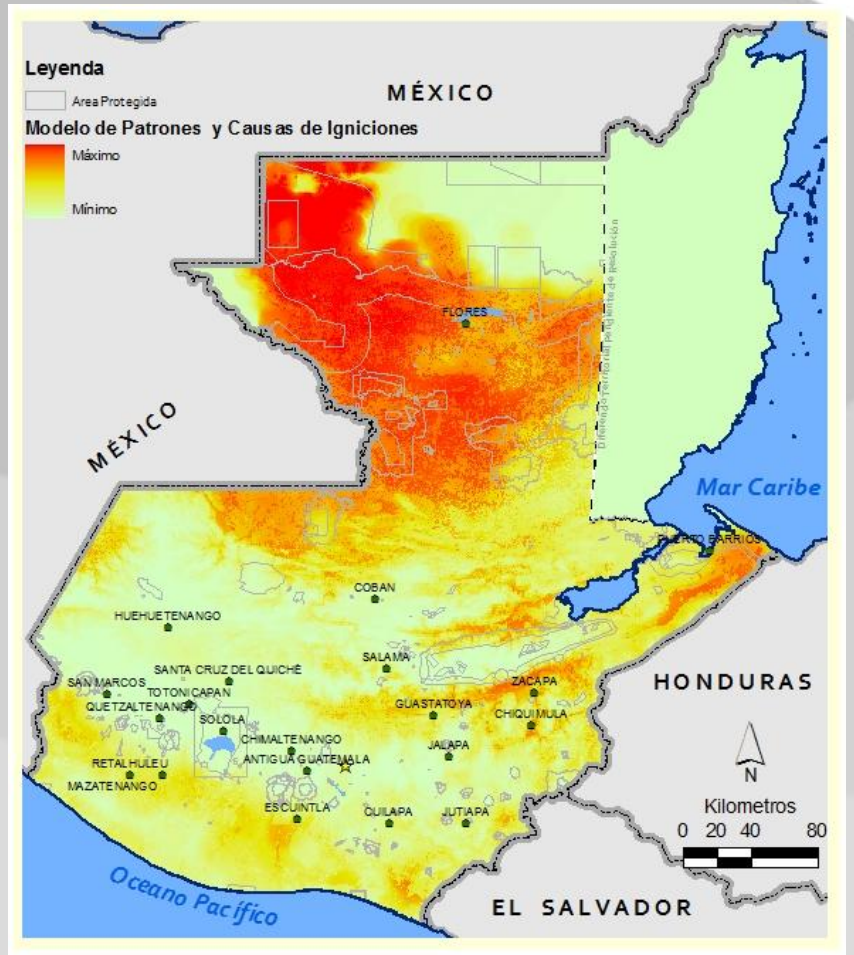


Forecasting Air Quality in Central America

SERVIR Fire Forecasting

Fire forecasting uses MODIS Rapid Response System, a collaborative effort between GSFC and University of Maryland





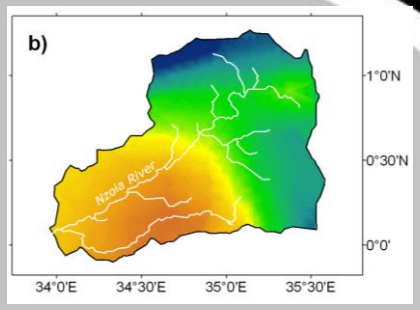
SERVIR Hydrologic Modeling

Spatially distributed hydrologic model CREST is developed by University of Oklahoma

Based on Variable Infiltration Capacity (VIC)

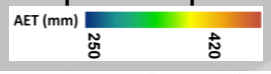
Spatial resolution ~1km

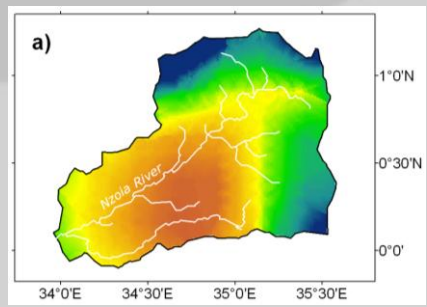
Uses near real-time 3B42 TRMM rainfall estimates to produce soil moisture, evapotranspiration and streamflow

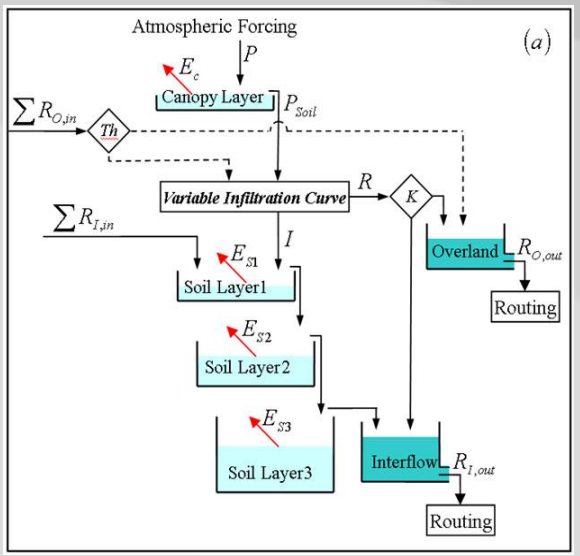


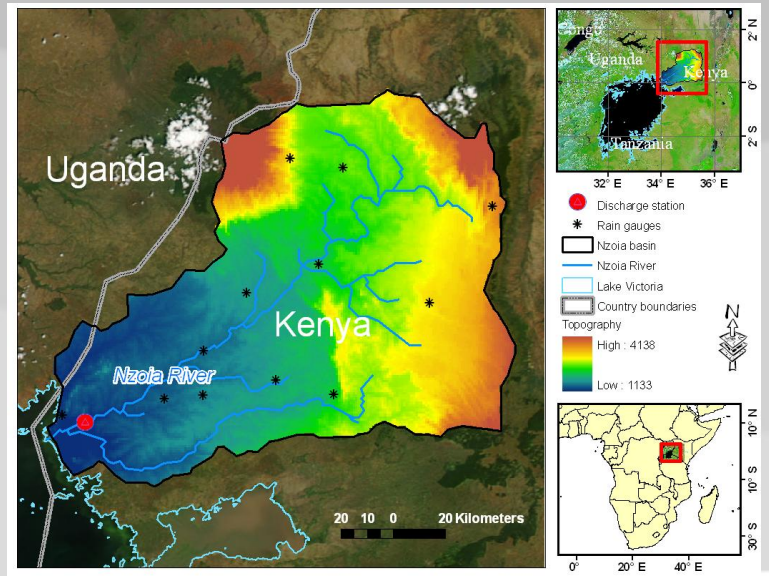
Nzoia River in the Lake Victoria Basin

Modeled Evapotranspiration



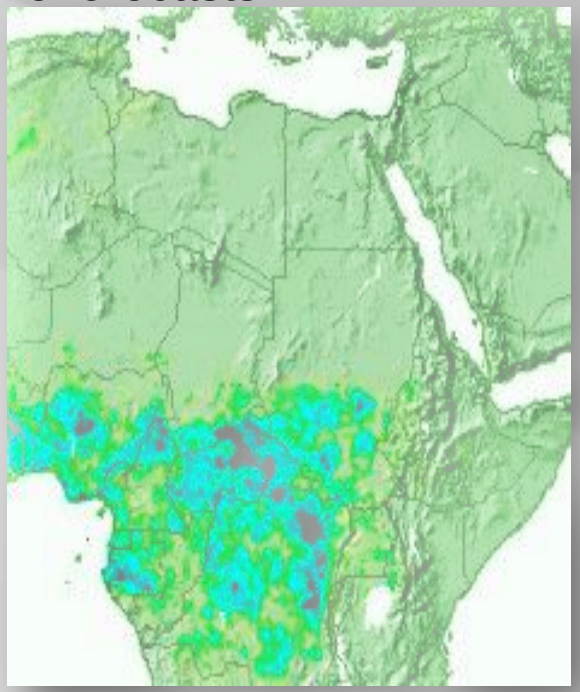






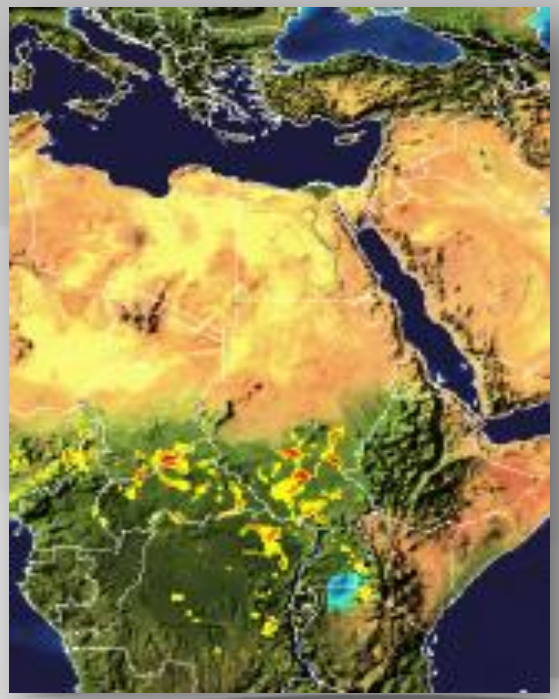
Mapping Flood Potential in Africa

- Using a regional version of the hydrologic model with near-real time precipitation from the 3B42 TRMM rainfall to derive flood potential over a much larger area
- Provides an estimate of expected depth of flood inundation at a 0.25 degree resolution
- Precipitation forecast data can be used with the model to provide longer lead time forecasts



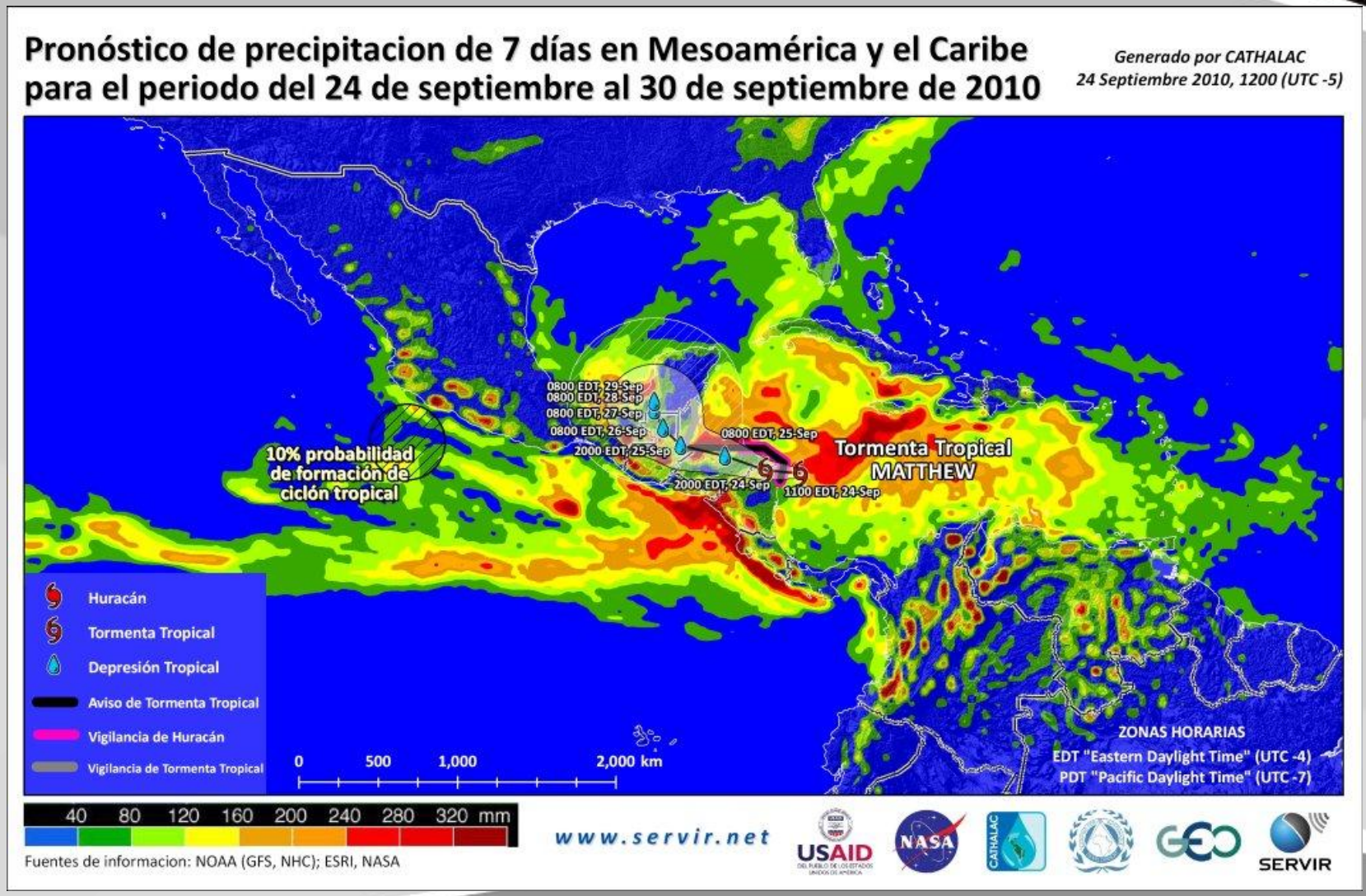
TRMM 3B42 Precipitation

Model

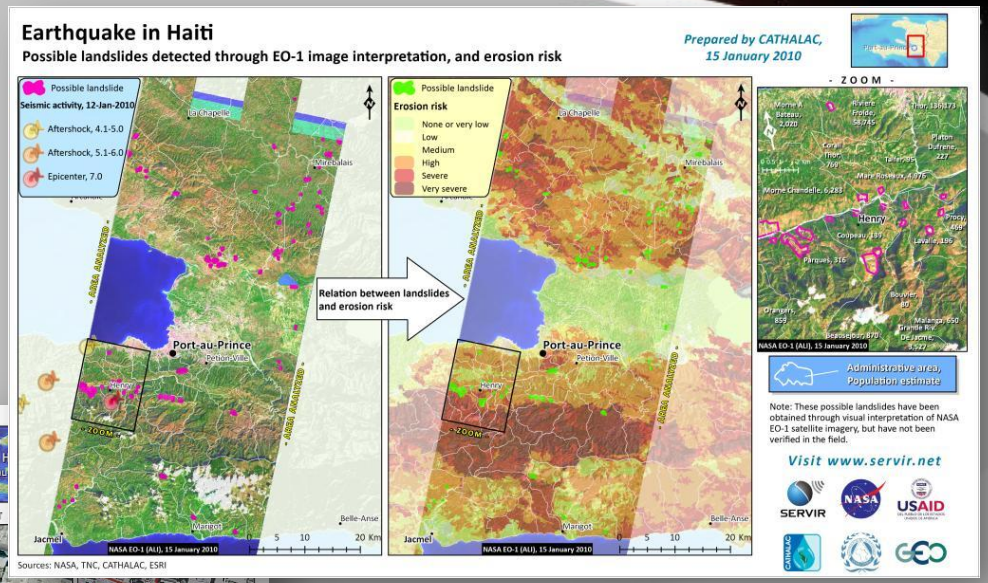


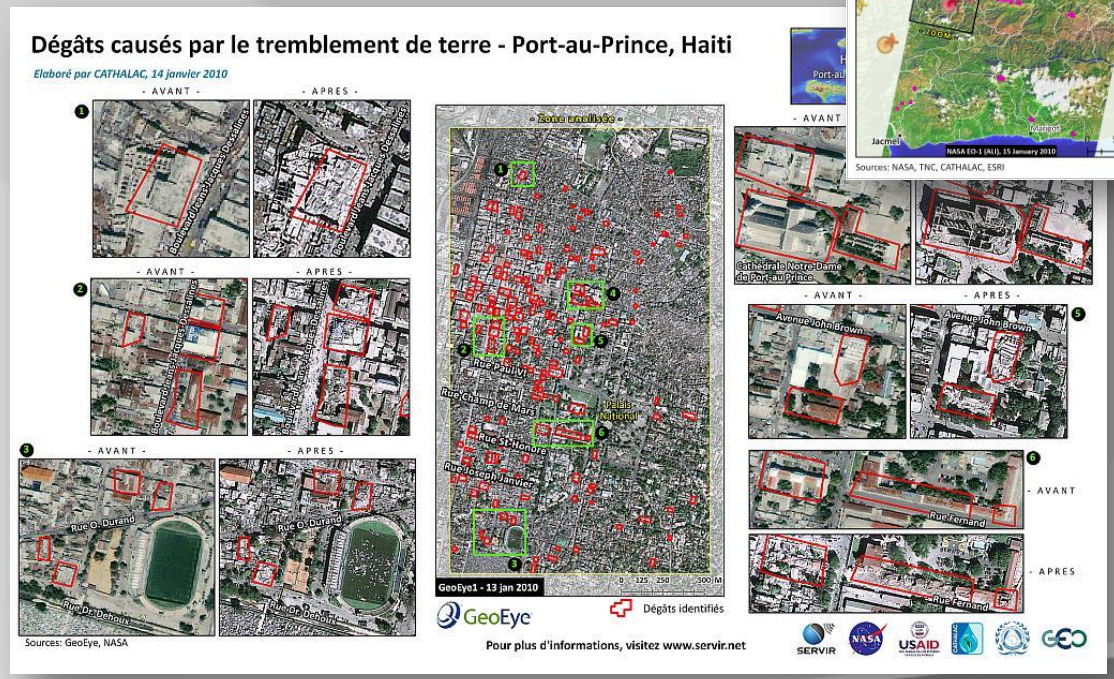
Flood Potential

Extreme Events
Rainfall Forecasts for Mesoamerica



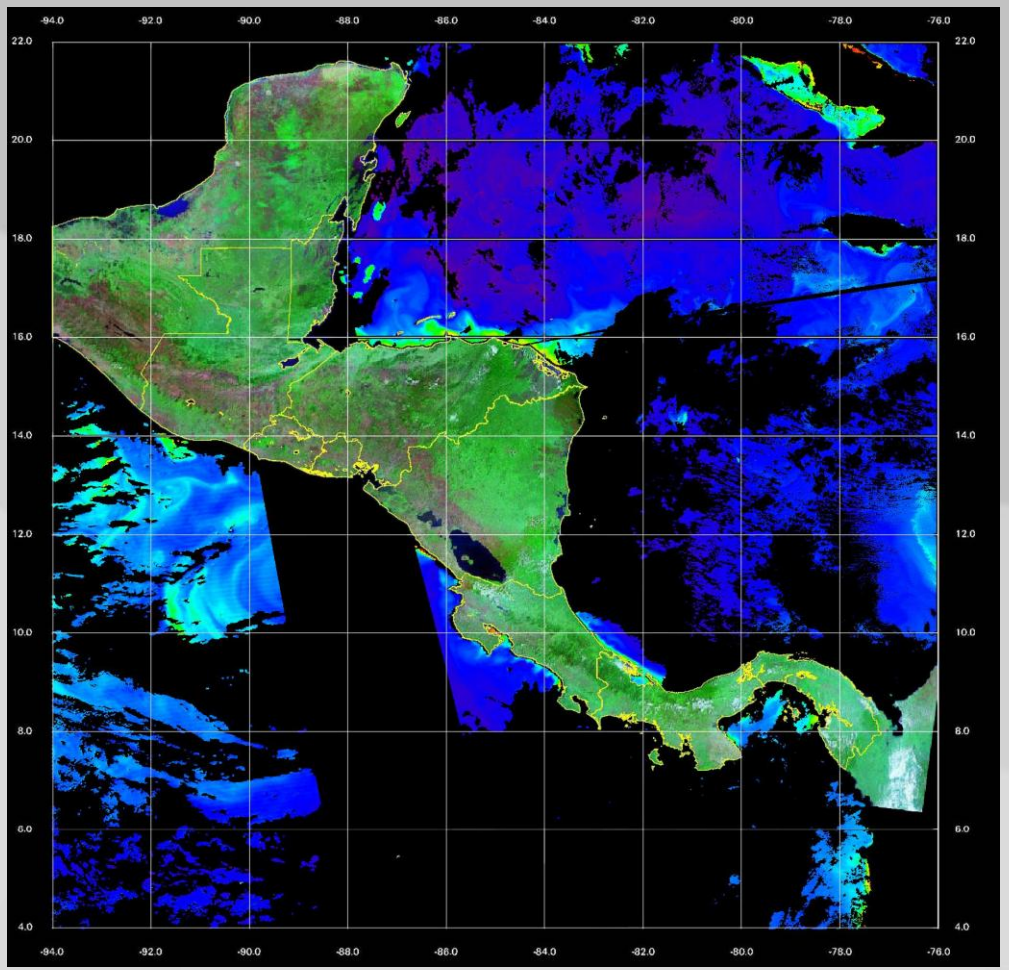
Earthquake in Haiti

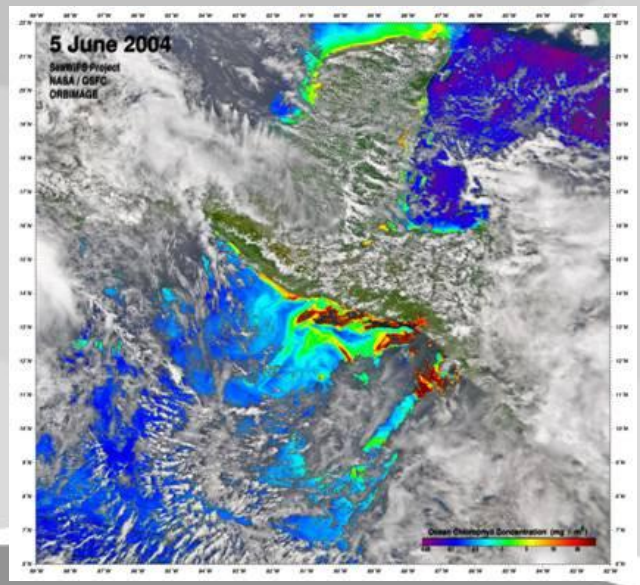




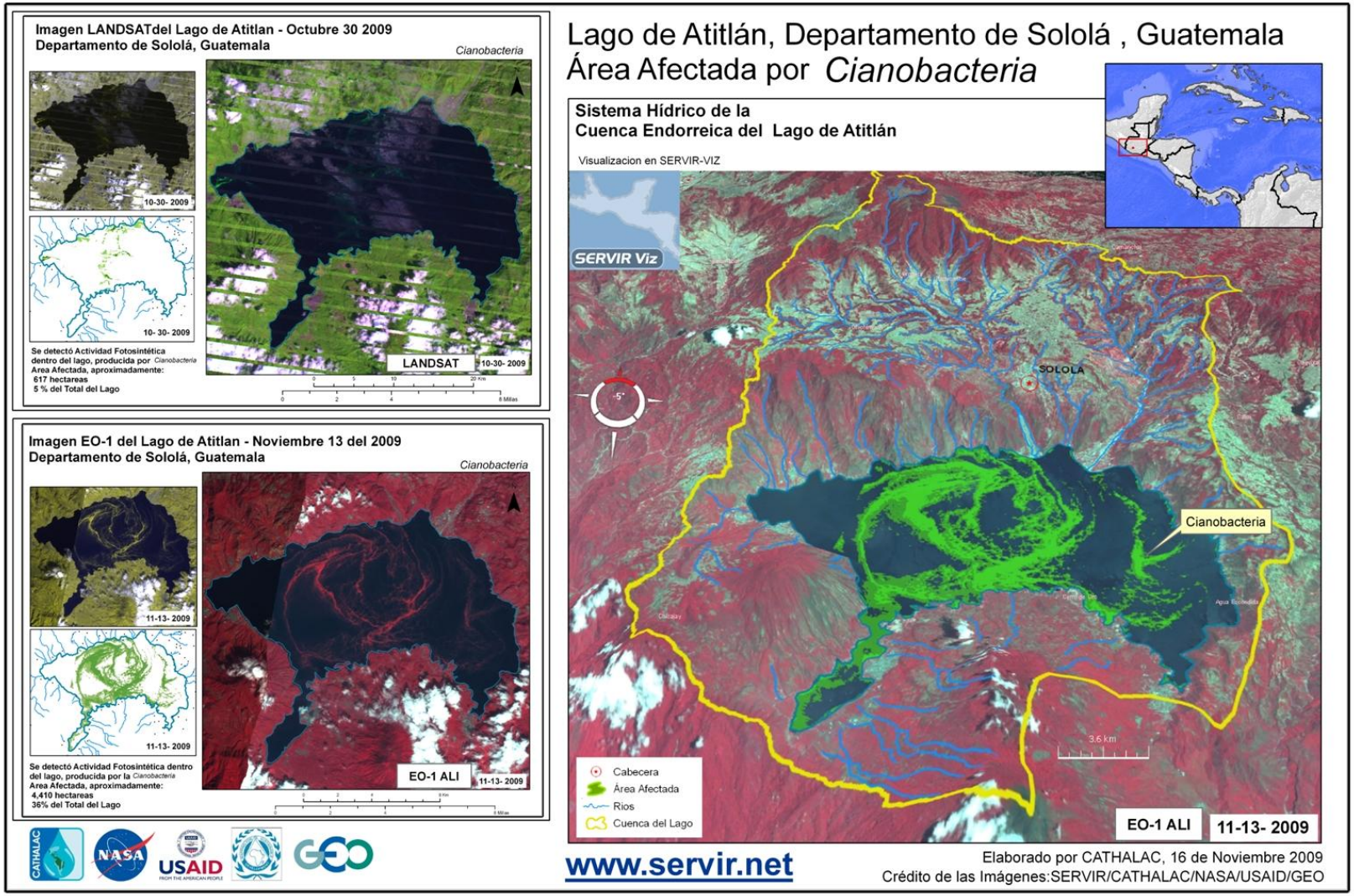
Harmful Algal Blooms

Real time monitoring of Harmful Algal Blooms (HAB) using remotely sensed data products

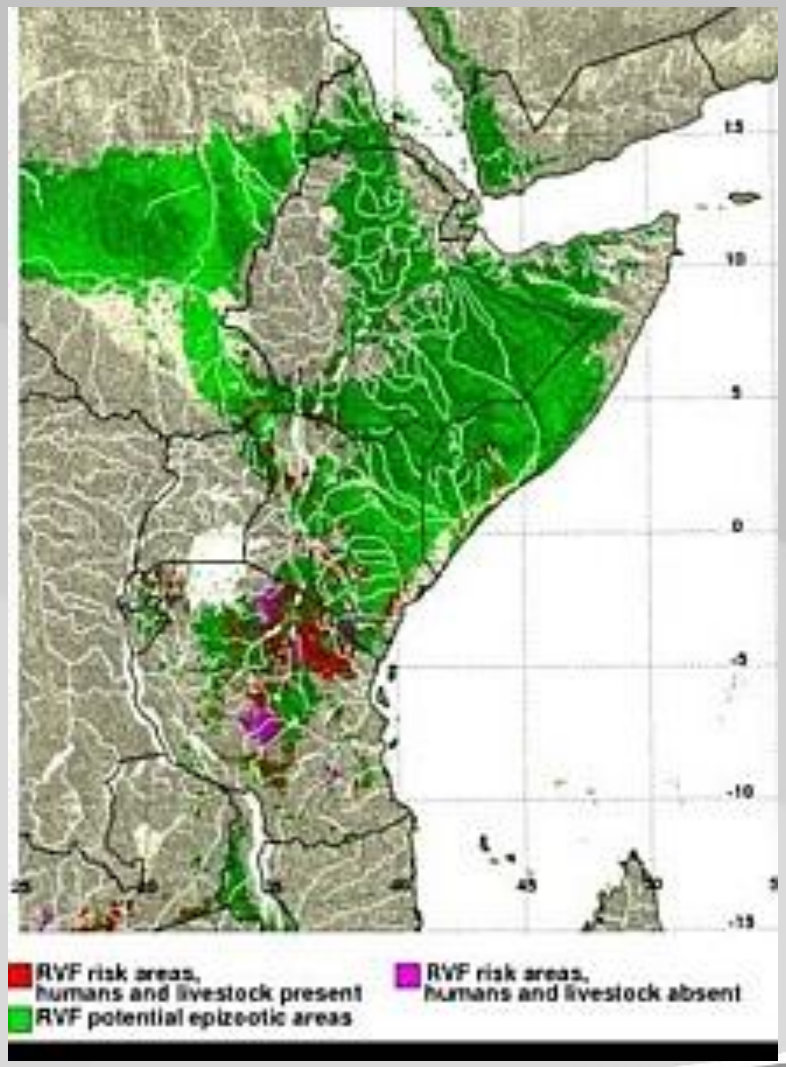




Lake Water Quality
Cyanobacteria Growth



Rift Valley Fever in Africa



Rift Valley Fever Risk Mapping using AVHRR data and flooding potential maps

MyCOE-SERVIR Initiative

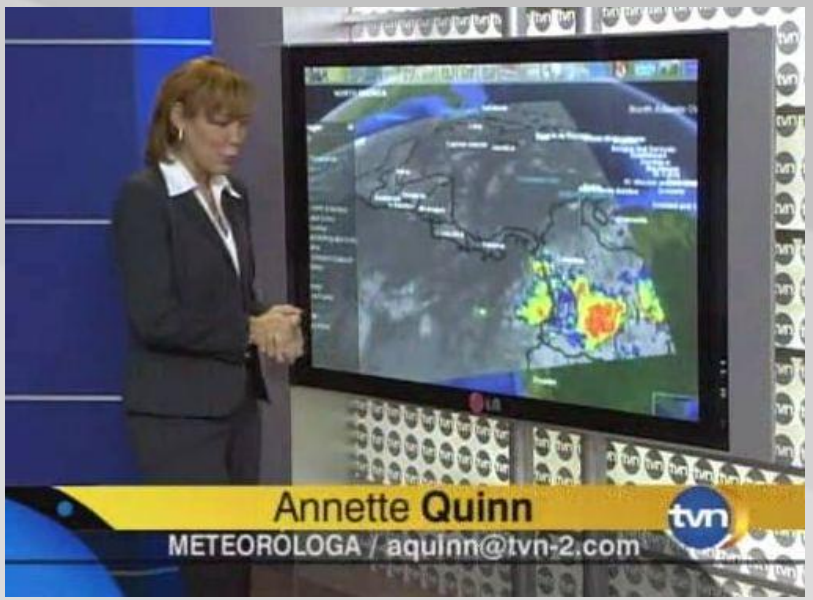
- Building capacity to protect biodiversity using GIS, RS, and geospatial analytical techniques.
- Strengthening collaboration amongst universities, government environmental authorities, and NGOs.
- Students & mentors competitively selected; both receive modest stipends to conduct 6-month long projects and travel support .

my community, our earth

USAID NASA ESRI EIS

SERVIR Users

Decision makers, media, educators, students, private industry, community groups.



SERVIR Challenges

Each SERVIR node has unique challenges

- Natural disasters are more prominent in Mesoamerica
- Droughts and water shortages are critical in Africa
- Mountain challenges are unique to Himalayas

However, there are some key similarities across nodes

- Climate change
- Urbanization and land cover change
- Impacts on public health, water resources, agriculture

Historical Analysis

- Typically, we rely on past observations to “benchmark” the analysis of remotely sensed data and products
- However, recorded observations are hard to come by in developing countries
- Hindcasting of key products provide a historic perspective, which can be inferred on such data sparse regions.
- For example, NASA GSFC’s Global Land Data Assimilation System (GLDAS), based on Land Information System (LIS) employs historic re-analysis datasets and are available for over 30-years.

Near Real-time Analysis

- These long term historic datasets give much needed perspective for the analysis of real time products.

- Anticipate expansion of SERVIR application portfolio in public health, agriculture and water resources

- Analysis grounded in historic perspective, and using near-real time observations and data products enables improved decision making

Climate Change and Impacts

- Analysis based on long term reanalysis datasets can also give us a perspective for the analysis of climate change scenarios.

- Changes in probabilities of atmospheric variables can be implemented in an ensemble sense as perturbations on the reanalysis datasets.

- Climate change adaptation is a very important topic for USAID. Providing policy relevant information to nodes and their partners will be critical.

In a Nutshell……

- SERVIR is eager to collaborate with other Applied Science projects, the synergy is critical for the program

- Agriculture, Water Resources and Public Health continue to be key issues for SERVIR

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