SERVIR
Connecting Space to Village

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SERVIR Global
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.

- Prevent seafood poisoning by mapping harmful microalgae
- Help herders & farmers by detecting ephemeral water bodies
- Support food security by monitoring agricultural drought
- Protect lives by monitoring & forecasting intense thunderstorms
- Conserve forests by mapping land cover & land use change
NASA Constellation of Satellites
The SERVIR Hub Network

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The Service Planning Approach

Consultations and Needs Assessments

Stakeholder Mapping

Service Design and Implementation

Consultation and Needs Assessments

= Impact!
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Regional and national organizations led by the AGRHYMET Regional Centre

- Centre for Remote Sensing and Geographic Information Services (CERSGIS)
- Centre de Suivi Ecologique (CSE)
- African Regional Institute for Geospatial Information and Technology (AFRIGIST)
- African Centre of Meteorological Applications for Development (ACMAD)
- International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)

WITH SUPPORT FROM

- National Aeronautics and Space Administration (NASA)
- Applied Sciences Team (AST)
- SERVIR Support Team – supporting exchanges and learning between hubs

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The SERVIR Program

- A science and data driven technology program designed to improve decision making through the application of geospatial science and remote sensing

- Central aspect of this effort will focus on demand-driven product and service development

- Interactive process with a clear understanding of the problem and decision context

- Building upon existing capacity and products that are potentially available
Stakeholder-focused services

- Enhancing ephemeral water body management in the Ferlo ecological region of Senegal
- Use of satellite imagery and remote sensing data for improved forecasting and response to potential locust outbreaks in the Sahel
- Charcoal Production Site Monitoring in the West Gonja Districts of Ghana
- Monitoring illegal mining activities in Ghana using remote sensing technology
- Forest Degradation Monitoring in the high forest zone of Ghana
Ferlo Ephemeral Water Body Monitoring

https://tethys.servirglobal.net/apps/waterwatch/

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Charcoal Production Site Monitoring

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Illegal mining monitoring application

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Declining Forest Index values exhibit large disturbance anomalies near a forest reserve boundary.
Opportunities

• Improved access to data

• Advanced training in remote sensing and capacity building

• Institutional coordination and networking

• Improved evidence-based decision making

• Training in geospatial product and service development

• Technical backstopping
Key Stakeholders

- Public Institutions
- Private Sector Organization
- Non-Governmental Organizations
- Development Partners
- Research Institutions
- Professional Bodies
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REGIONAL CENTRE FOR MAPPING OF RESOURCES FOR DEVELOPMENT

Our Vision
To be a premier Centre of Excellence in provision of Geo-Information services

Our Mission
To promote sustainable development through generation, application & dissemination of Geo-Information and allied ICT services and products in the Member States & beyond

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The Complexity of Modern Day Decision Making

“I am a firm believer in the people. If given the truth, they can be depended upon to meet any national crisis. The great point is to bring them the real facts.” Abraham Lincoln

**Population & Demand for Services**

- Population ~ 400 M
- About 5% of globe
- Distribution: 25% is urban
- Median age: 18.1 years
- Projection 2050: 870M (9.2% of global)
Services

01 Agriculture & Food Security

02 Land Use Land Cover Change

03 Water & related Disasters

04 Weather & Climate

**Food security**
- Agricultural monitoring
- Drought management
- Crop productivity
- Rangeland decision support
- Aquaculture decision support

**Weather and climate**
- Weather monitoring and forecasting
- Climate modeling and scenario planning
- Air quality monitoring
- Adaptation planning

**Water resources and disasters**
- Water resources monitoring and forecasting
- Flood management
- Hazard monitoring and forecasting
- Fire monitoring
- Water quality monitoring

**Land cover/land use and ecosystems**
- Land cover/land use change mapping
- Ecosystem management
- REDD+ decision support
- Land use decision support
- Low emission development planning

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Agriculture & Food Security

Agricultural Cropmask – Kenya

Monitoring Crop Conditions & Early Warning
Agricultural Crop Mask Mapping for Kenya

**Goal:**
- Develop cropland maps depicting cropland extent, major and other crops and system used (rain-fed/irrigated) and change maps.

**Impact:**
- Used to compute National level Agric. statistics for SDA (Area under Agric, Area under specific crops).
- Input to FEWSNET crop modelling (GEOWRSI), feeds into crop monitors and as an Input to the sampling frame.
- Further engagements for support of national assessments by SDA, KNBS.

**Change Between 2000 and 2015**
- **Total change:** 5394 km² of land converted to cropland
Monitoring Crop Conditions & Early warning


http://pekko.geog.umd.edu/usda/apps/

Regional Crop Conditions
Land Use Land Cover Change & Ecosystems

- Monitoring Vegetation Change Conditions
- Invasive Species Mapping
Invasive Species Mapping

Problem

- Lack of spatially explicit information for decision making & management of invasive species.

Milestones

- Invasive Spp.. App designed & developed
- Data of invasive Spp.. Collected using the App and shared with partners.

Planned

- Disseminate and train the stakeholders on the use of Invasive Spp. App
- Continue Supporting Invasive Spp.. Data collection Efforts

1. Forage land infested with *Acacia reficiens*, degrading & narrowing space for conservation.
3. Database hosting collected data
4. Invasive Species extents modelled from the occurrence data
Problem

- Estimation of area covered by invasive species in the Northern Kenya Rangelands in recent decades. Information can improve plans for forage space available for both livestock and wildlife, & minimize conflicts.

Milestones

- Extents of Invasive Spp..mapped within the 4 conservancies.
- Validation data collected for model fitting.

Planned

- Disseminate the methodology and the preliminary results of modelling/Mapping of Invasive Spp.
Problem

Monitoring changes in key forest ecosystems in Kenya.

Milestones

- Provided 16 epochs change maps for climate vulnerability assessment.
- Provided technical advice to the advisory team (4 technical meetings attended).
- Trained USFS and KFS on automation and production of change maps.

16 epochs change maps for major water towers
Water & Water Related Disasters

- Monitoring Small Water Pans
- Flood Monitoring (extent & depth)
Mapping Surface Water Bodies

**Problem**

- Lack of information on size & distribution of small water bodies.
- The activity will borrow from the methodology developed by NASA-JPL team for mapping surface water bodies using Landsat images.
- The product will feed into the rangeland monitoring tool being developed under SERVIR E&SA and inform other activities like water balance modelling under FEWSNET.

**Milestones**

- Training by NASA-JPL to RCMRD and stakeholders team was done- 16 participants were trained.

**Planned**

- SERVIR ESA team working on exploring suitable methodologies to allow mass/operational production of the maps.

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Before processing

Output after processing
Problem

- Lack of timely information on the likelihood of flooding and flood extent maps for decision making – useful for water managers.
- SERVIR ESA is implementing a flood monitoring system using EO data and hydrologic model (CREST).
- The model output has been linked with an online tool which can translate water levels into a flood inundation extent.

Milestones

- The tools have been used for flood risk assessment under the Kenya Water Security and Climate Resilience project.
- SERVIR E&SA trained 20 stakeholders drawn from Lower Mekong and HKH region on the use of the flood tool for disaster management.
- Through the AST project, the tool is being enhanced to include other capabilities including disaster communication mobile app development.
Weather & Climate

- Climate Change Vulnerability Impact Assessments
- Hazard Atlas Mapping
Community Climate Change Adaptation Assessment (C3A2)

Using C3A2 results to plan and implement community adaptation projects

Objectives:

1. Identify climate change “hot-spots” at community-level, their risks and adaptation strategies (C3A2).

2. With communities, develop adaptation options and projects

3. Support small scale pilot climate change adaptation projects at community level (17 communities)

Source: VI mapping supported by PREPARED Project through CIESIN, SERVIR, FEWSNET and EAC Partner States... connecting space to village ...
Vulnerability and conflicts in Northern Rangelands in Kenya

**Problem & Goal**

- 10,000 pastoralists & 135,000 cattle moved into Laikipia
- Human – wildlife and pastoralist – farmer conflicts increasing
- USAID supporting holistic grazing management in vulnerable areas
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Partnerships
Partnerships

- Kenya Meteorological Department
- NDMA
- Kenya Water Towers
- Northern Rangelands Trust (NRT)
SERVIR-E&SA support to PREG:

- Capacity building for decision makers - GIS for natural resources management


- Rangeland assessment and monitoring
Goal: leveraging weather data through robust and cost-effective stations for enhanced water and agricultural productivity that leads to economic growth in Sub-Saharan Africa.

Beneficiaries:
- Universities
- schools

https://school2school.net/
Goal: Equip students with skills in environmental science, climate change and its drivers. Contribute to STEM & SDG’s.

Video: https://www.youtube.com/watch?v=8v5WTv8J79M&t=1s
2nd RCMRD INTERNATIONAL CONFERENCE (RIC2018)


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Thank you

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