

Land Cover Mapping for Development Planning in the Eastern and Southern Africa

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RCMRD.





SERVIR: A powerful partnership

NASA has:

- Incredible satellite data
- A mandate to work domestically

USAID has:

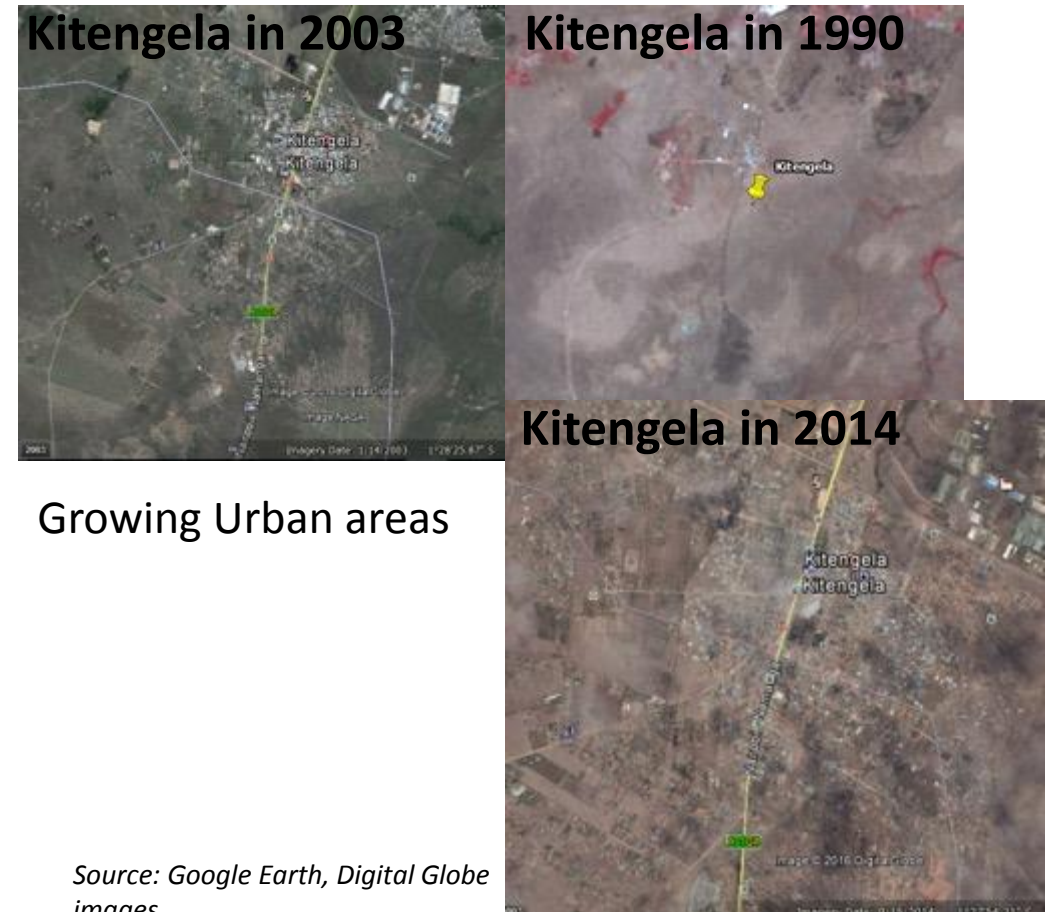
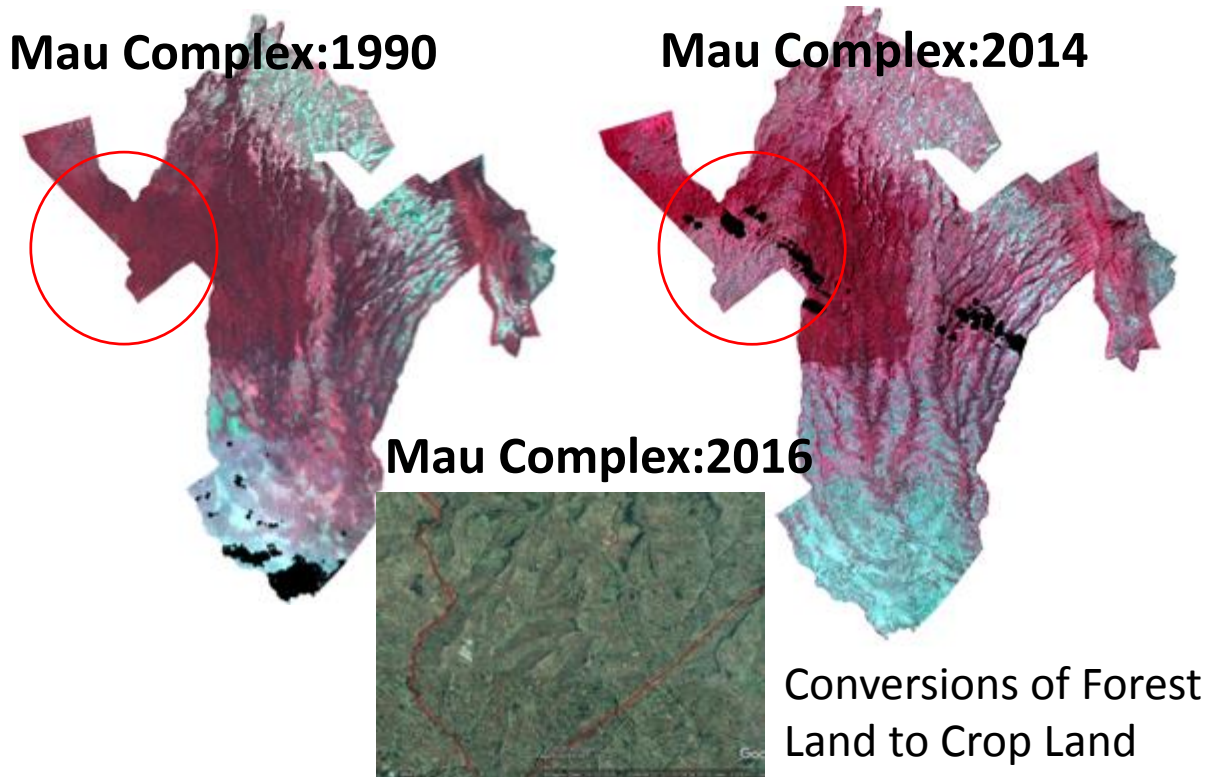
- A presence in 100 countries
- Connections to people who need information



NASA + USAID = the potential for significant impact in development decision-making

Problem Statement

- **Land cover conversions:** Growing pressures on land due to increasing population has created a need to closely monitor land resources.
- World population: (in 40 years) 1959-**3 billion**, 1999-**6 billion**. Estimated to be **9 billion** by 2038.



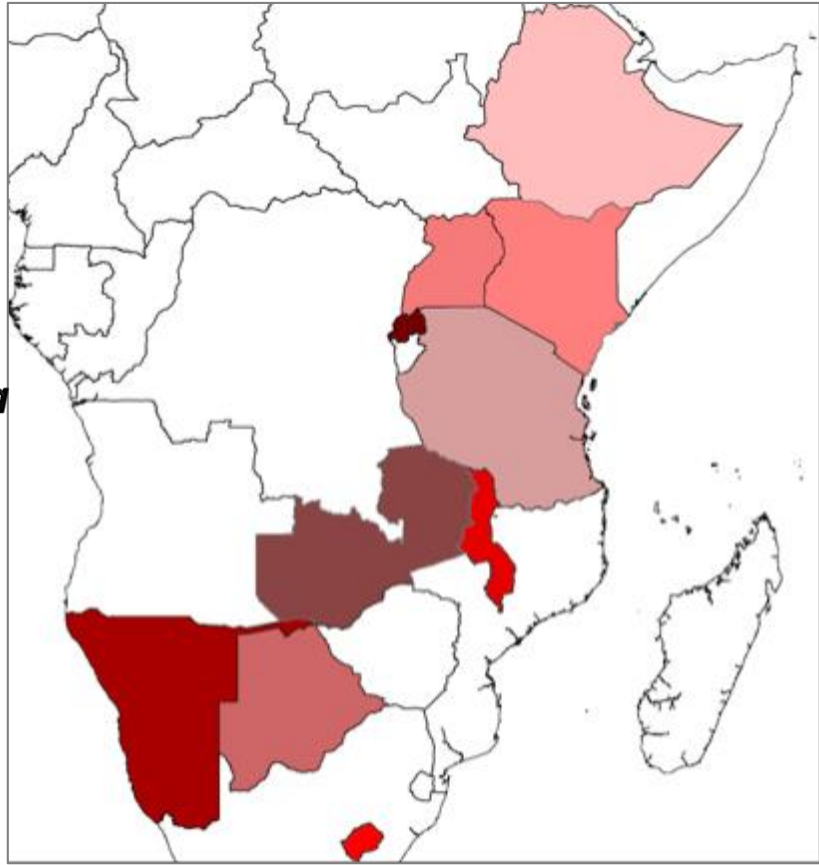
Source: Google Earth, Digital Globe images.

Connecting space to village...

Participating Countries and Methodology

Countries participating in the project

1. **Malawi**
2. **Rwanda**
3. **Tanzania**
4. **Zambia**
5. **Namibia**
6. **Botswana**
7. **Ethiopia**
8. **Uganda**
9. **Lesotho**
10. **Kenya**



Methodology

- Data: Landsat 30m resolution
- Methodology: Maximum likelihood classification.
- Classification Scheme: Scheme I- IPPCC categories: Forest, Grassland, Wetland, Cropland, Settlement and Otherland; and Scheme II-Nationally defined.
- Quality control.
- Validation of Data

Partnerships

- Strategic Partnerships have to be built by first getting a clear understanding of the ongoing initiatives
 - Key Ministries and International agencies
 - Science and Data: NASA
 - Synergies-Funding, Methods, Human Resource, Reviewing



USAID
FROM THE AMERICAN PEOPLE



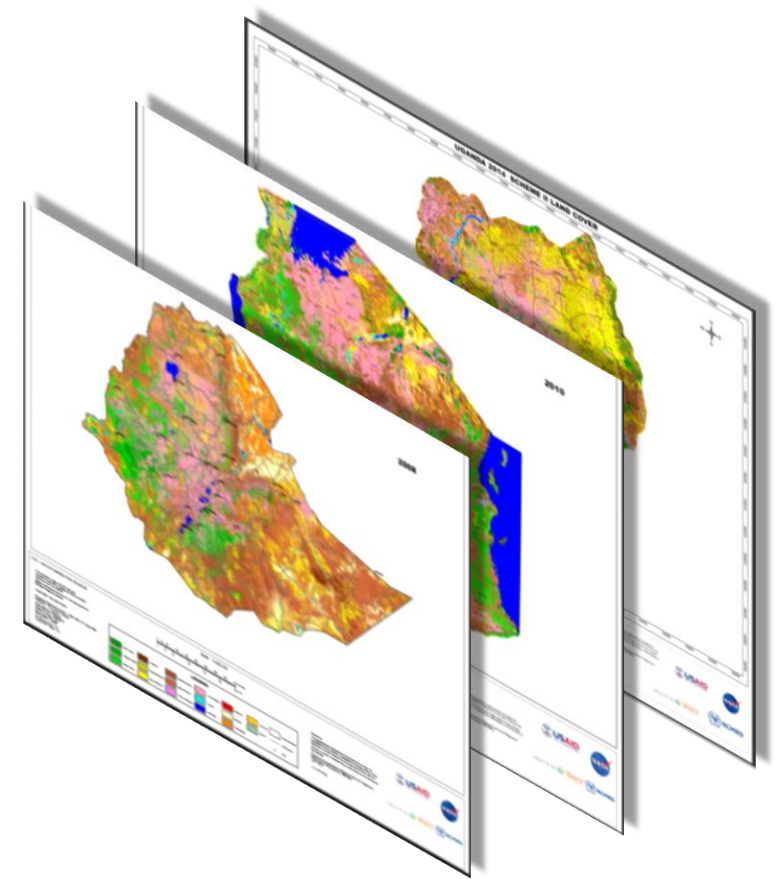
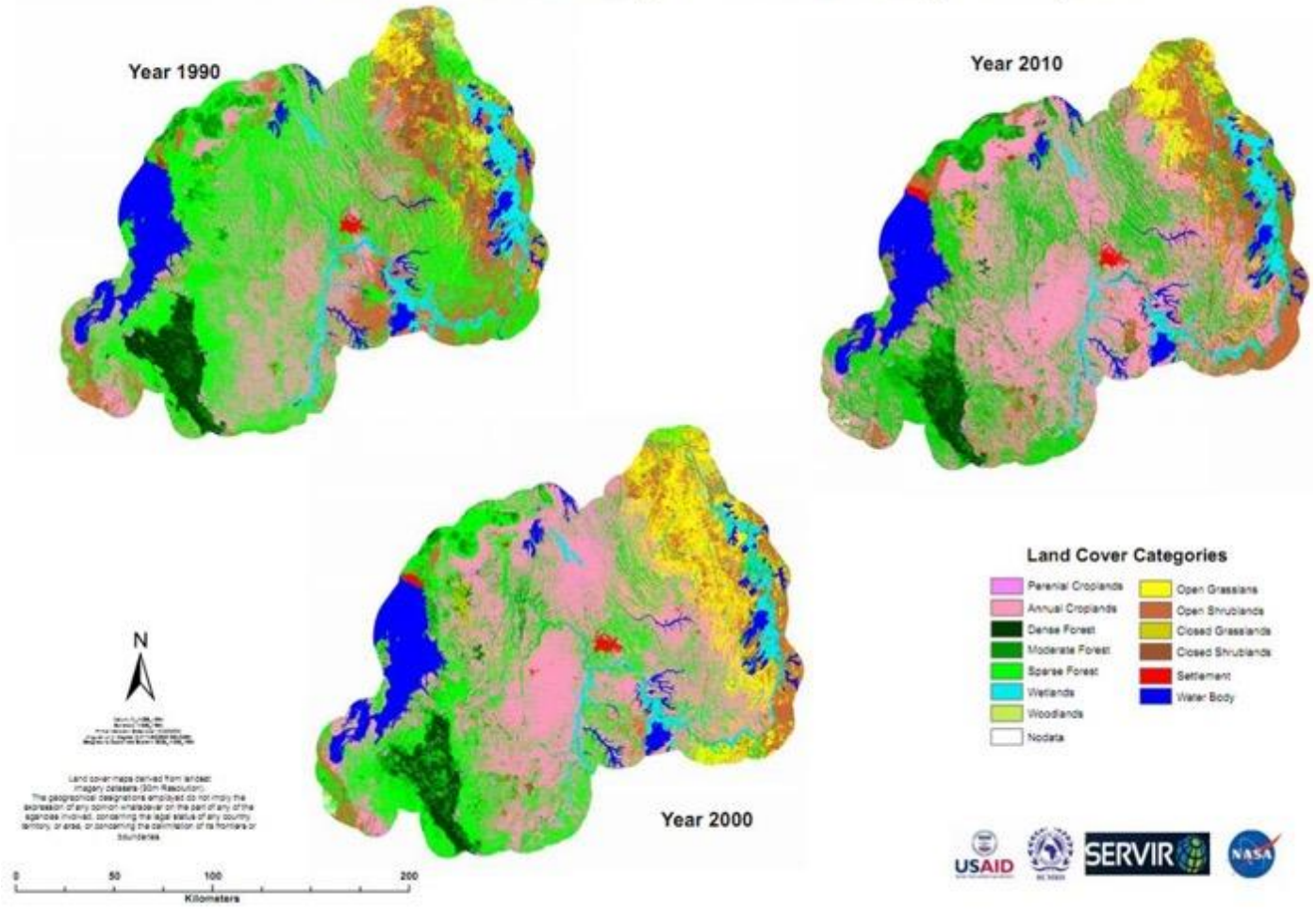
User Engagements

Users need to be engaged at every stage in the project implementation.

- **Needs assessment.**
Needs assessment has to be done to determine challenge.
- **Defining the Classification Schema.**
Stakeholders meeting was held to determine the scheme to be used.
- **Collection of In-Situ data**
Local people understand the environment, the system and the language.

Sample Maps

Rwanda Land Cover Maps for GHG Inventory Development



Dissemination

The screenshot displays the RCMRD Land Cover Viewer interface. The main map shows Ethiopia with a multi-colored land cover overlay. A legend window is open, listing categories such as Dense Forest, Moderate Forest, Sparse Forest, Woodland, Closed Grassland, Open Grassland, Closed Shrubland, Open Shrubland, and Perennial Cropland. The statistics panel on the right features a horizontal bar chart titled 'Land Cover Statistics for Ethiopia 2008 scheme_ii'. The x-axis represents Area in Hectares, ranging from 0 to 37,500,000. The y-axis lists land cover types. The 'Open Shrubland' category shows the highest area, followed by 'Annual Crop...'. Other categories include Wetland, Water Body, Settlement, Bare Soil, Rock Outcrop, and Salt Pan.

Land Cover Type	Area (Hectares)
Dense Forest	~1,000,000
Moderate Forest	~1,000,000
Sparse Forest	~1,000,000
Woodland	~1,000,000
Closed Grassland	~1,000,000
Open Grassland	~1,000,000
Closed Shrubland	~1,000,000
Open Shrubland	~35,000,000
Perennial Cropland	~1,000,000
Annual Crop...	~20,000,000
Wetland	~1,000,000
Water Body	~1,000,000
Settlement	~1,000,000
Bare Soil	~1,000,000
Rock Outcrop	~1,000,000
Lava Flow	~1,000,000
Salt Pan	~1,000,000

Development Planning uses

Greenhouse gases Inventories

- Input data for GHG reporting on Agriculture, Forestry and Land Use (AFOLU).
- Tools such as: ALU (Agriculture Land Use Tool, FLINT (Full Integration Tool), Exact by FAO, InVEST and many other tools.

Forest Reference Levels

FREL/FRLs are benchmarks for assessing each country's performance in implementing REDD+ activities.

1. Reducing emissions from deforestation;
2. Reducing emissions from forest degradation;
3. Conservation of forest carbon stocks;
4. Sustainable management of forests;
5. Enhancement of forest carbon stocks.



Development Planning uses Sustainable Development Goals

	Population distribution	Cities and infrastructure mapping	Elevation and topography	Land cover and use mapping	Oceanographic observations	Hydrological and water quality observations	Atmospheric and air quality monitoring	Biodiversity and ecosystem observations	Agricultural monitoring	Hazards, disasters and environmental impact monitoring
1 No poverty										
2 Zero hunger										
3 Good health and well-being										
4 Quality education										
5 Gender equality										
6 Clean water and sanitation										
7 Affordable and clean energy										
8 Decent work and economic growth										
9 Industry, innovation and infrastructure										
10 Reduced inequalities										
11 Sustainable cities and communities										
12 Responsible consumption and production										
13 Climate action										
14 Life below water										
15 Life on land										
16 Peace, justice and strong institutions										
17 Partnerships for the goals										

Direct measures of some indicators and indirect measures for others can be derived using Land cover maps



6.6.1 Change in the extent of water-related ecosystems over time



15.3.1: Proportion of land that is degraded over total land area.

15.4.2: Mountain Green Cover Index

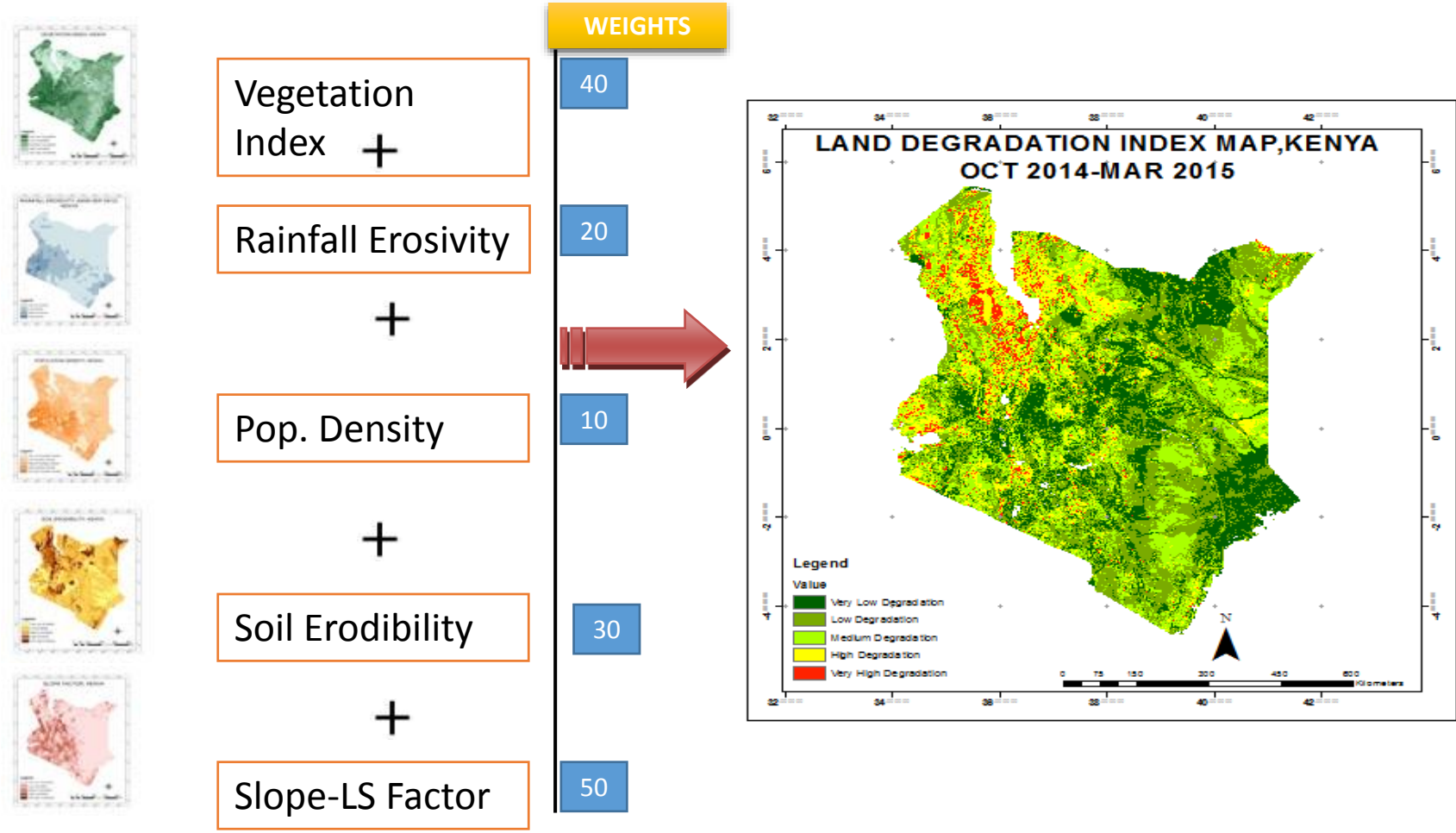
Development Planning uses

Natural Capital Accounting

- In 43 low income countries, World Bank findings shows that Natural Capital makes up 36% of total wealth;
- Countries need data on the value of the services provided by Ecosystems Land Cover Accounts:
 - Monitoring of deforestation/afforestation.
 - Carbon storage and sequestration for different types of land cover.
 - Green indicators to monitor the EDPRS (Economic Development and Poverty Reduction Strategies), as well as indicators for the SDGs.

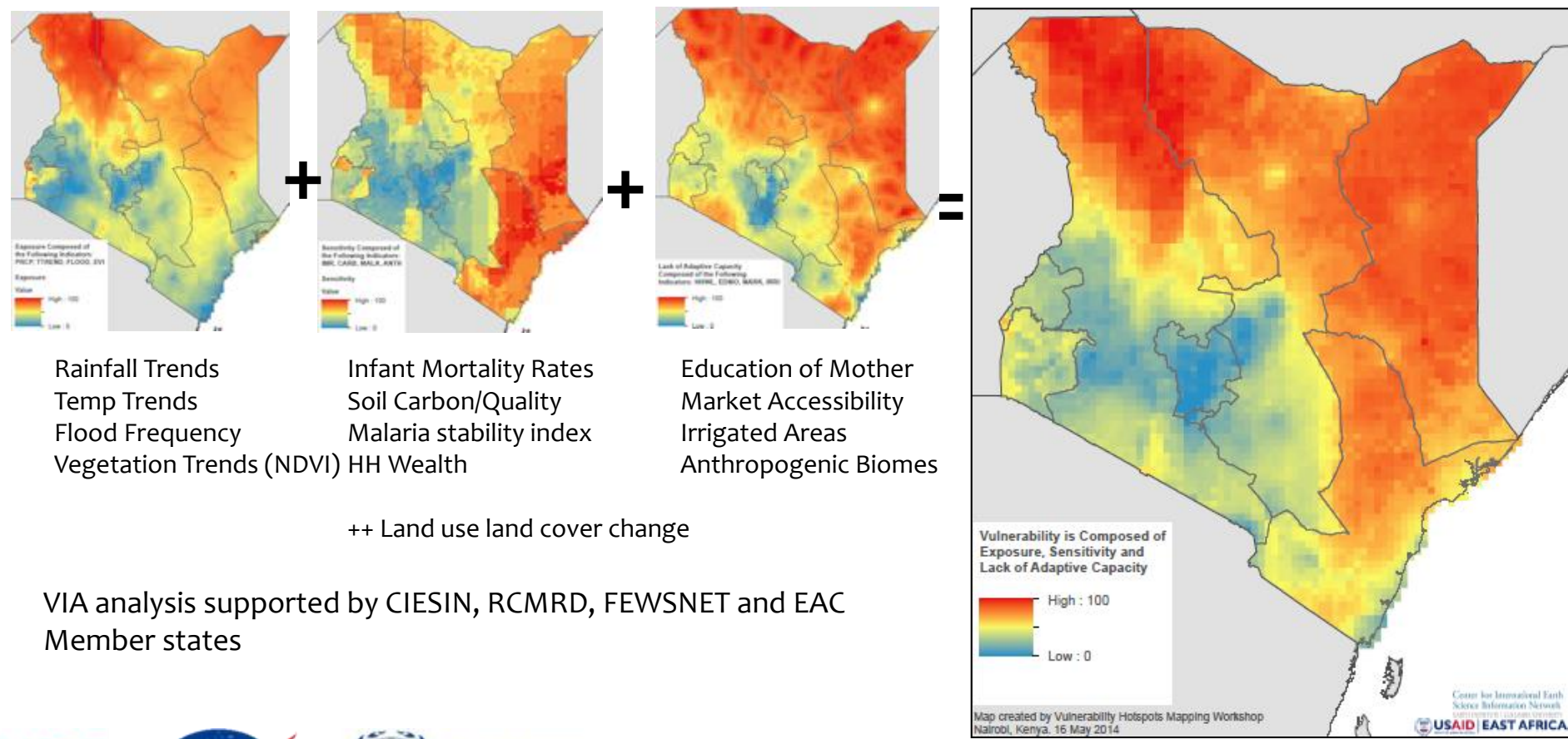
Development Planning uses

Land Degradation Studies



Development Planning uses Vulnerability Assessment Studies

CIESIN/GIS VIA Training Workshop with Proxies



Rainfall Trends
Temp Trends
Flood Frequency
Vegetation Trends (NDVI)

Infant Mortality Rates
Soil Carbon/Quality
Malaria stability index
HH Wealth

Education of Mother
Market Accessibility
Irrigated Areas
Anthropogenic Biomes

++ Land use land cover change

VIA analysis supported by CIESIN, RCMRD, FEWSNET and EAC Member states

Thank You



RCMRD Regional Centre for Mapping of Resources
for Development

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