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

Phoebe Oduor,

RCMRD.

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NASA

RCMRD

SERVIR Eastern & Southern AFRICA

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

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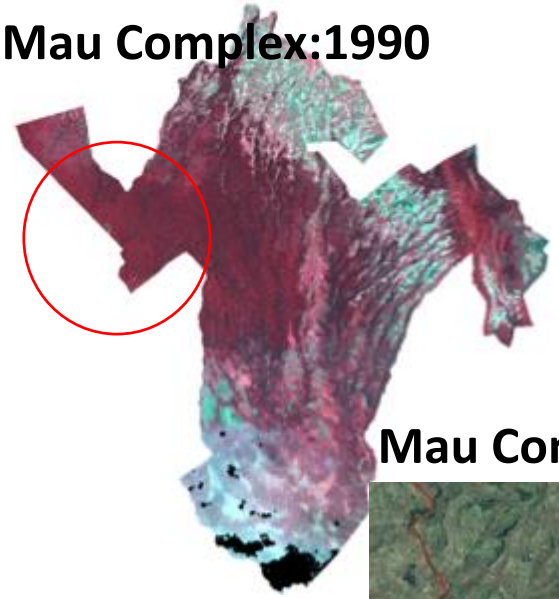
Connecting space to village...

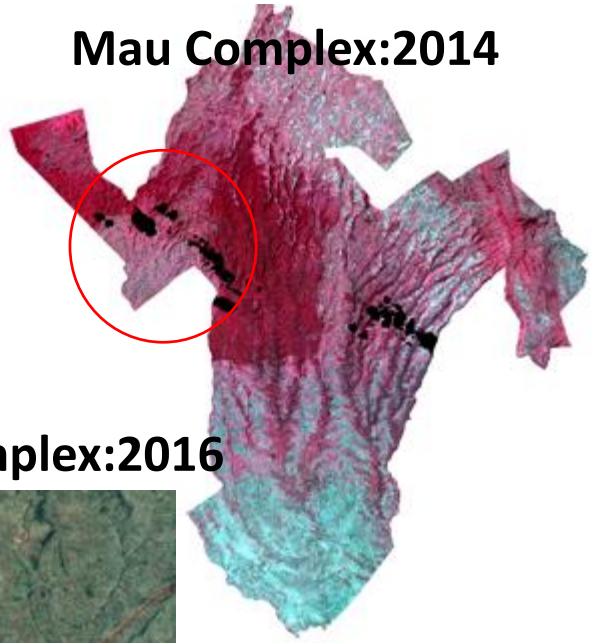
Problem Statement

- **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.

Mau Complex:1990



Mau Complex:2014



Mau Complex:2016

Conversions of Forest Land to Crop Land

Kitengela in 2003

Kitengela in 1990

Growing Urban areas

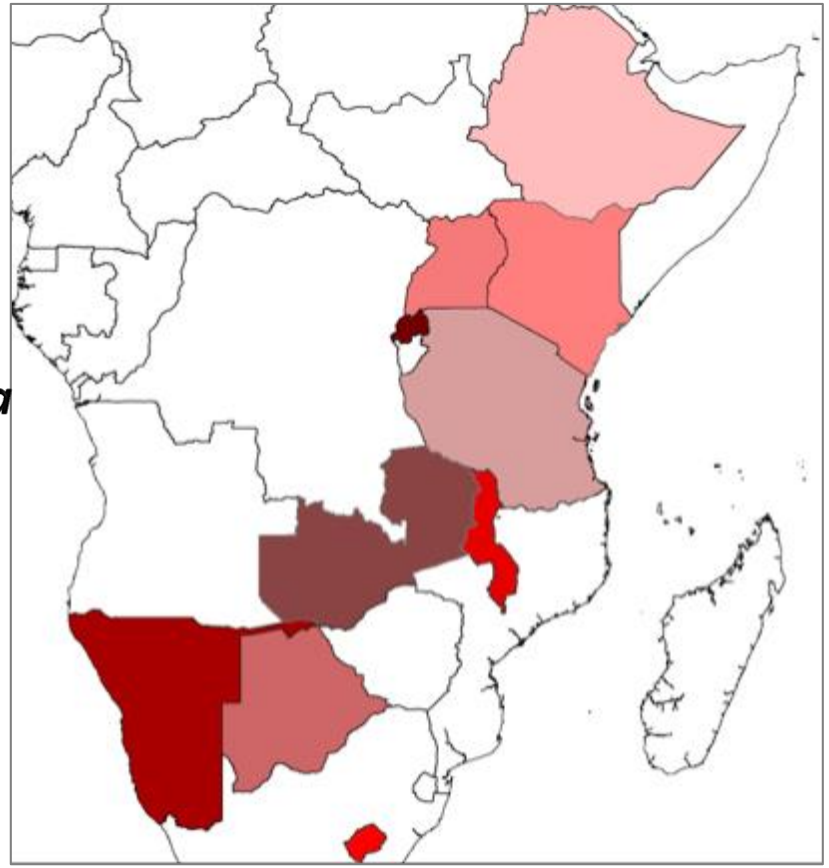
Kitengela in 2014

Source: Google Earth, Digital Globe images.

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

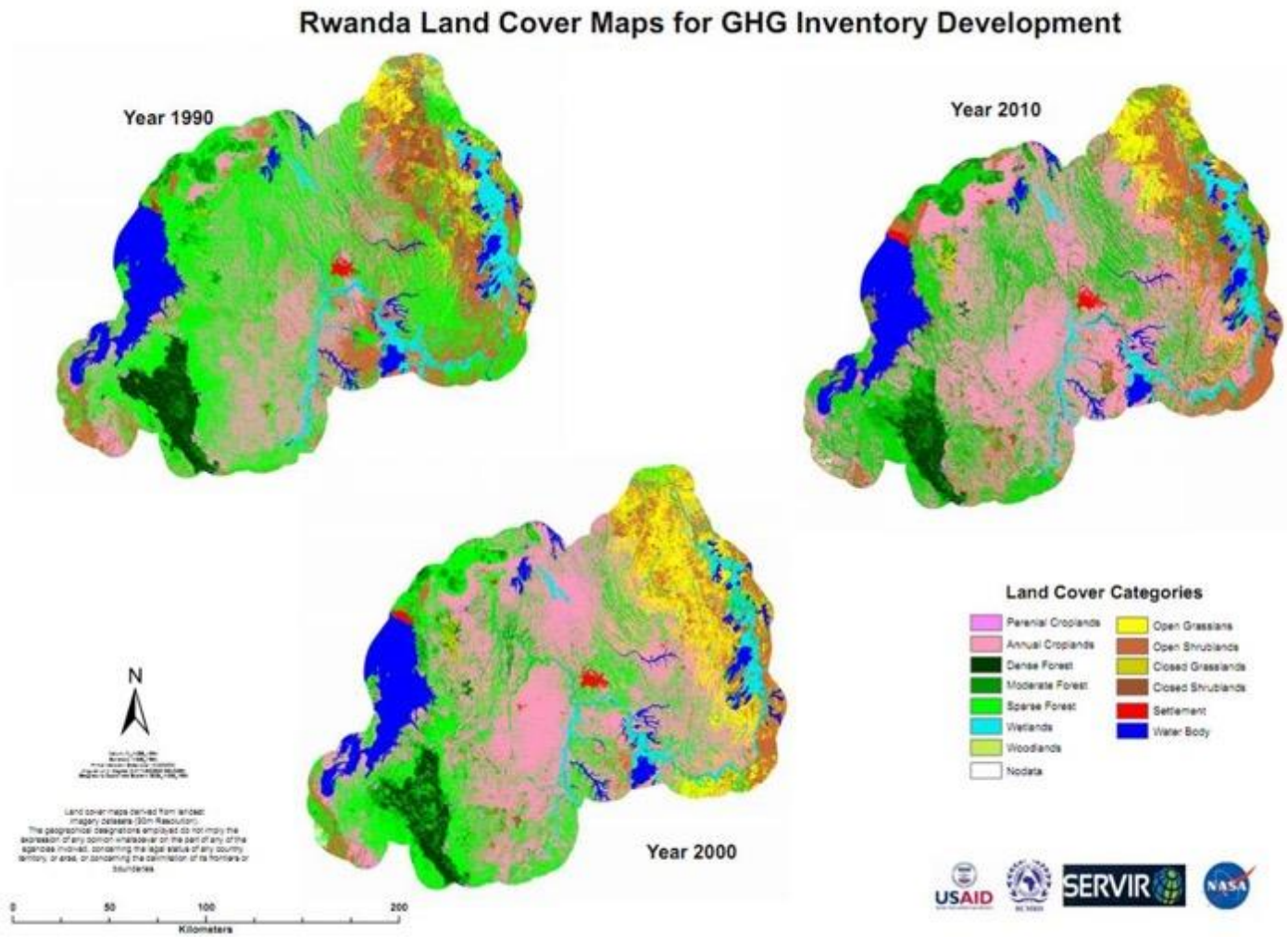
- Strategic Partnerships have to be built by first getting a clear understanding of the ongoing initiatives
  - Key Ministries and International agencies
  - Science and Data: NASA
  - Synergies-Funding, Methods, Human Resource, Reviewing

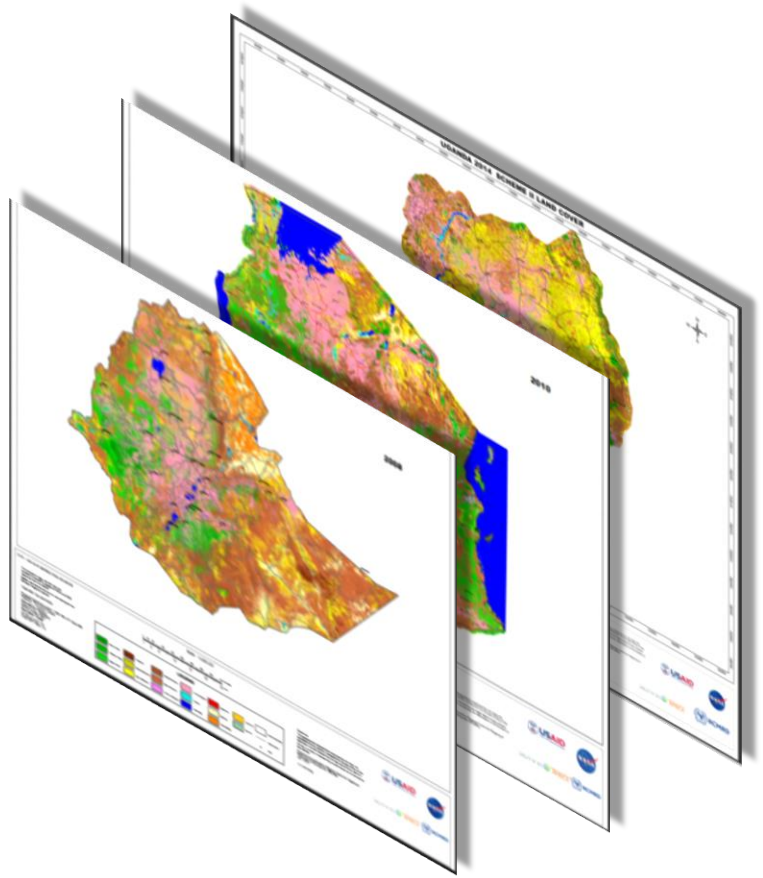
User Engagements

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





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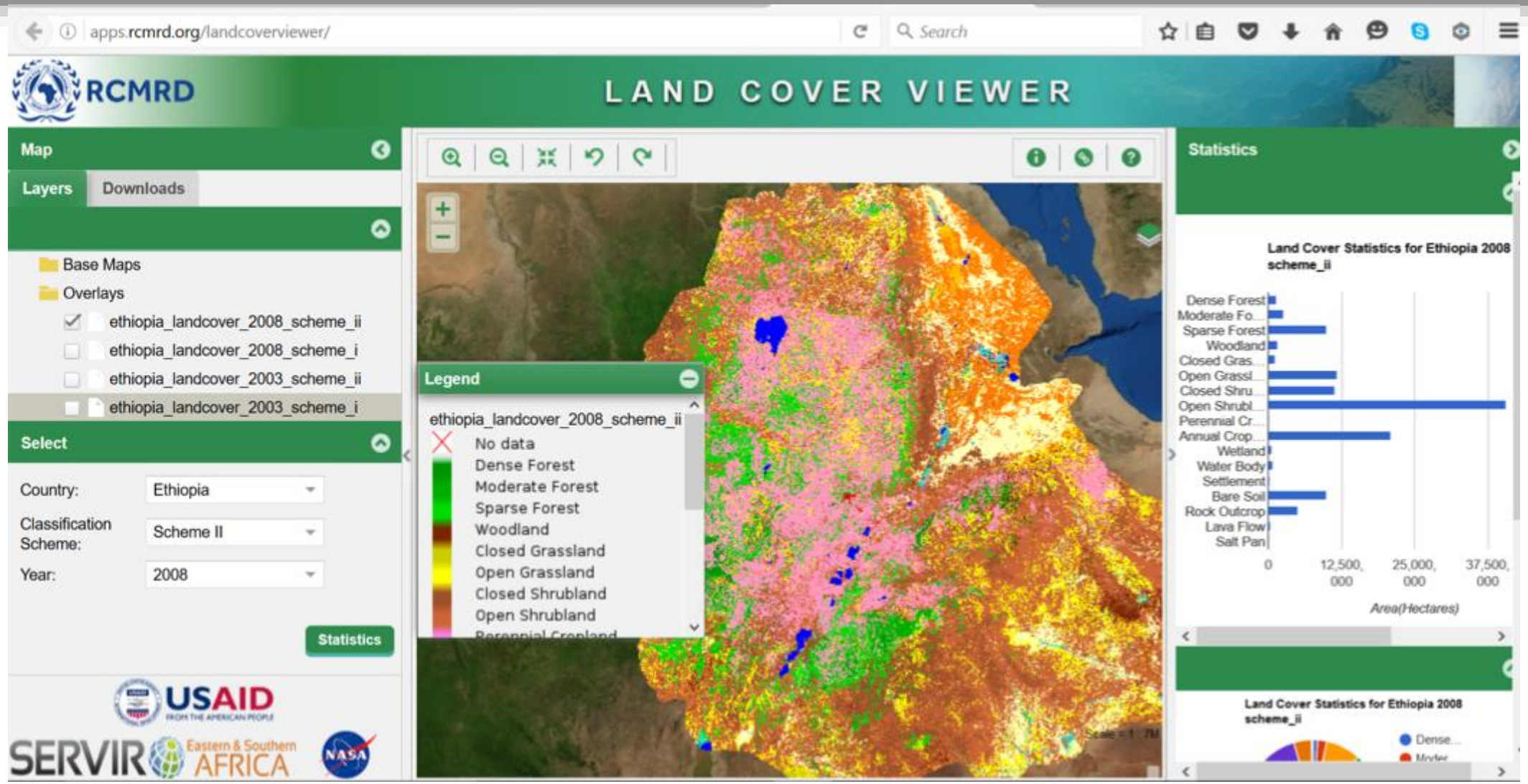
Dissemination



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.

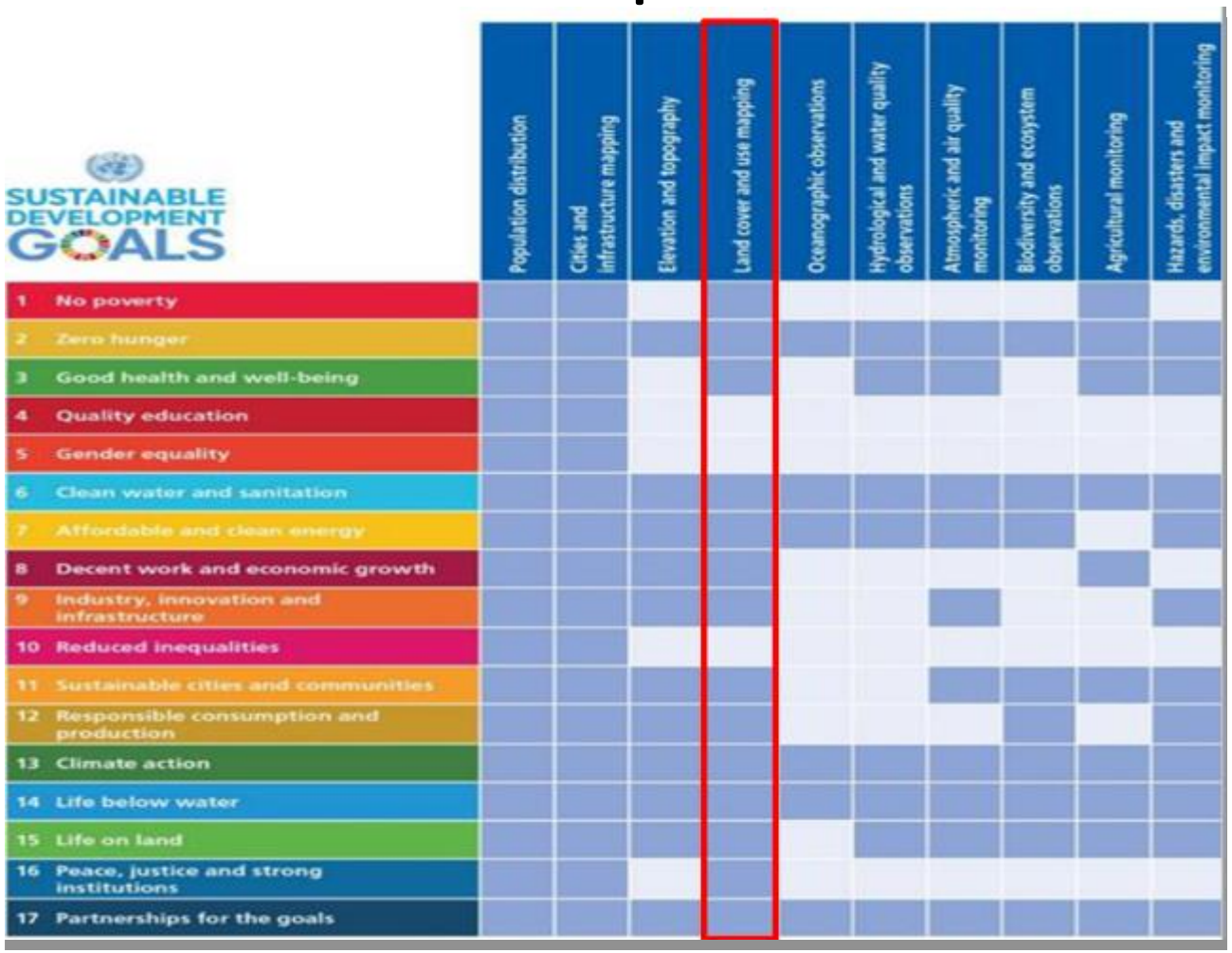
Forest Reference Levels

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



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

Vegetation Index +

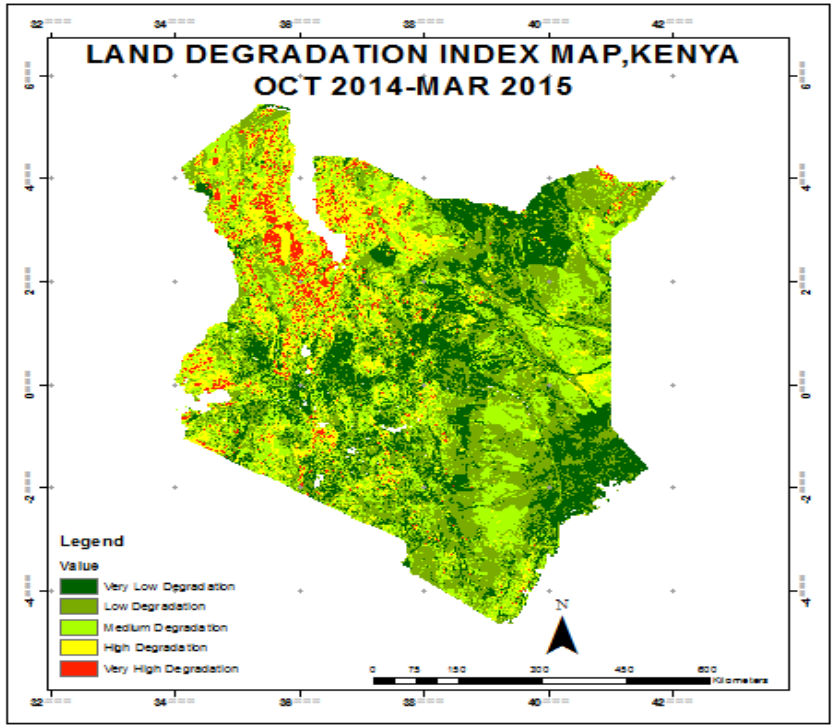
Rainfall Erosivity +

Pop. Density +

Soil Erodibility +

Slope-LS Factor

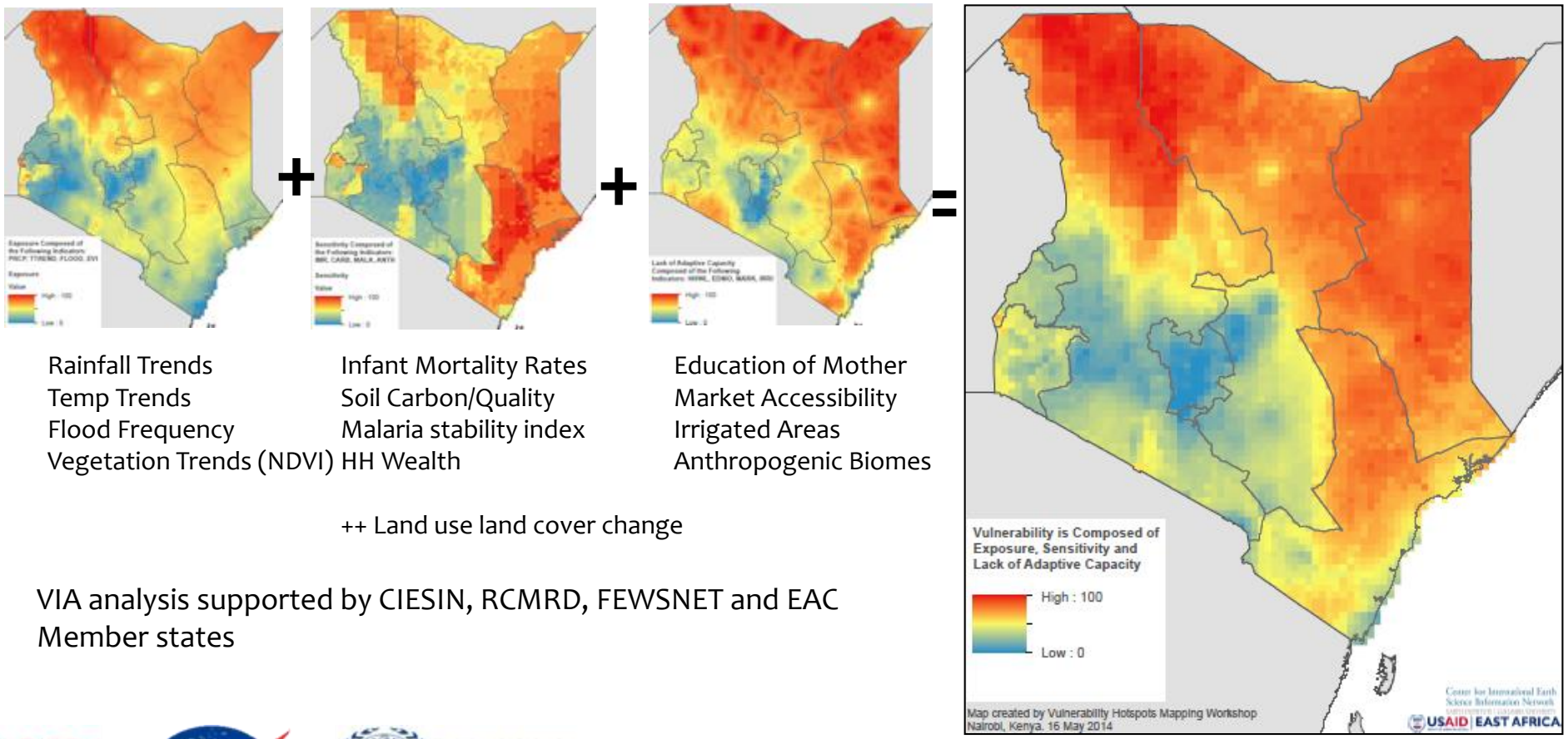
WEIGHTS
40
20
10
30
50



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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