Land Cover Change Mapping: System for Land based Emissions Estimation in Kenya (SLEEK)

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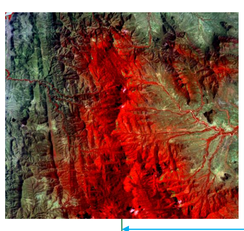
Why this project?

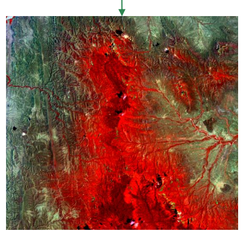
The SLEEK Land Cover Change Mapping (LCC) Program aims to create a sustainable and technically rigorous process for providing land cover and change information required for national land based greenhouse gas (GHG) estimation under the SLEEK program. The focus of this is on providing nationwide, time series consistent, land cover maps for Kenya. The maps will allow for analysis of land cover and cover change through time. In addition to supporting SLEEK, the maps and statistics produced by the program will serve as official Government documents for informing Government processes across the land sector – such as land use planning, tracking deforestation, and landscape restoration.

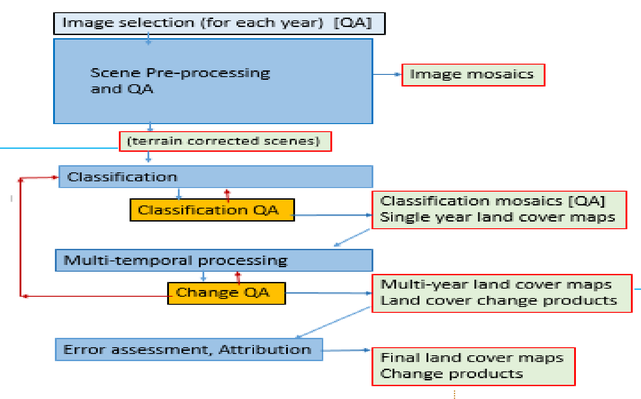
Objectives

- Develop (16) Land cover maps that can be used in a Conditional Probability Network to monitor Land Cover change over time.
- Develop data that that can be used for multiple purposes by multiple stakeholders.
- Validation of data
- Change and Attribution
- Capacity Building for the Government Staff involved
- Authentication of data by the National Mapping Agency

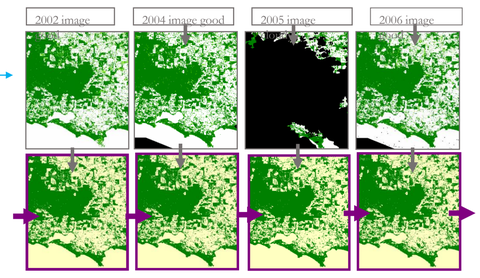
Approach/Project Activities







CPN output forest classifications 2002-2006 using temporal rules



Full Land Integration Tool (FLINT)

- Forest cover and growth rates
- Soil data and measurements of carbon emissions resulting from various land-use regimes
- Climate and Meteorological Data
- carbon emissions associated with various crop and plant types

National Emissions

Earth Observations and Other Inputs

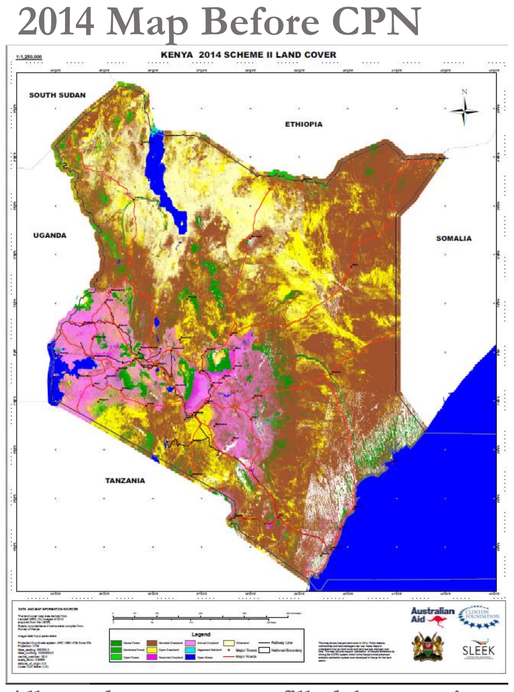
Data	Source
Landsat- Calibrated Level 2 Surface reflectance data obtained from NASA Surface Reflectance data are generated from the Landsat Ecosystem Disturbance Adaptive Processing System (LEDAPS)	NASA
DEM- 30m SRTM	NASA, processed by RCMRD
High Resolution Images	Google Earth
Agro Ecological Zones	Ministry of Agriculture
Other Ancillary data	KFS, SOK, Ministry of Agriculture

Specialized Apps used:

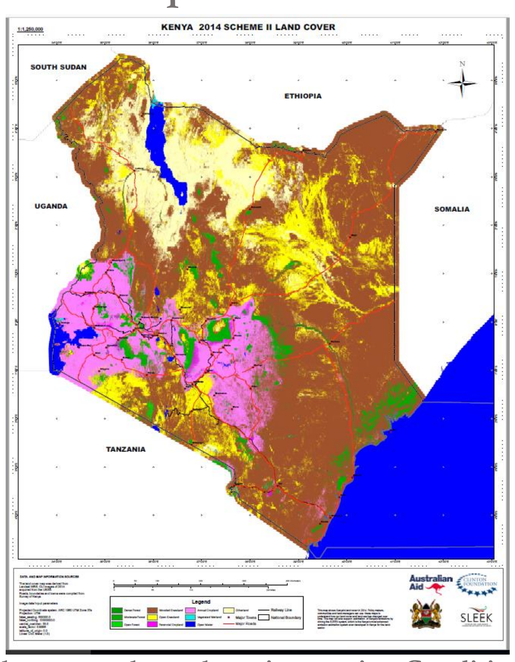
- Terrain Illumination Correction- ***Ter_Correct.Exe*** *and* ***Time Series*** both provided by CSIRO

Results

2014 Map Before CPN

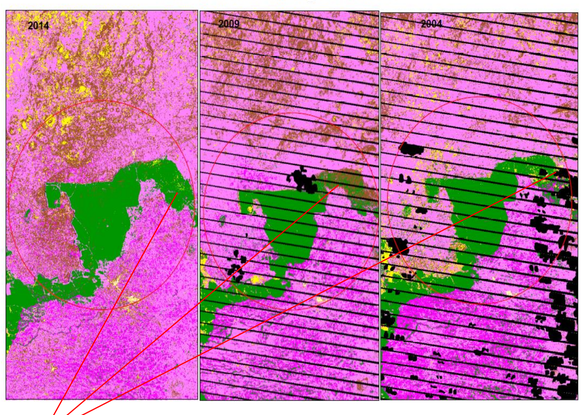


2014 Map After CPN



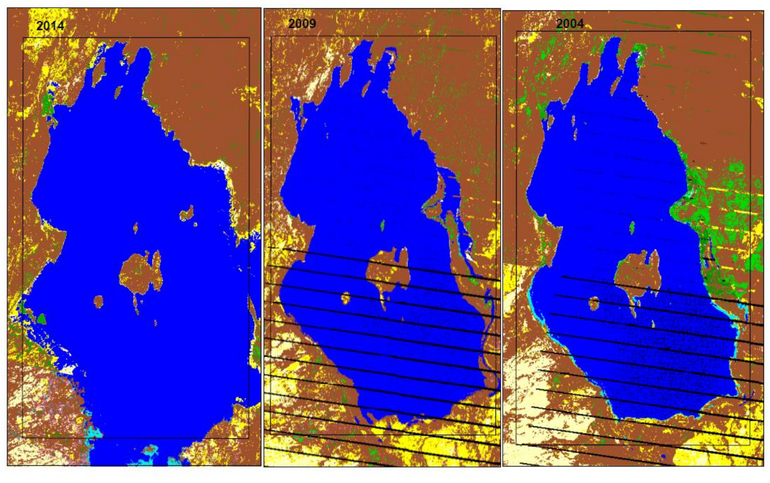
All no data gaps are filled by running the maps through a time series Conditional Probability Network Model

Forest Cover Changes in Meru

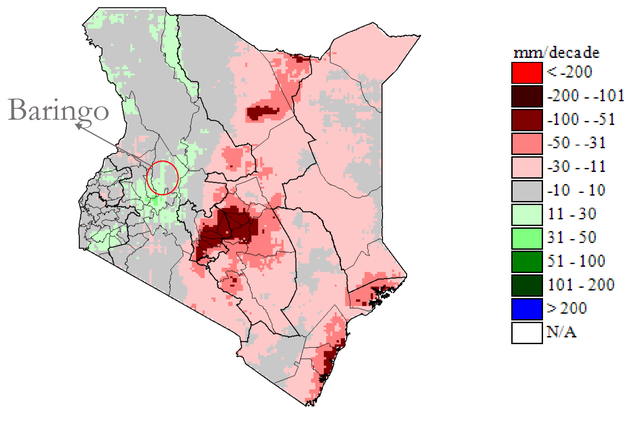


Forest Cover Changes can be quantified for purposes of REDD and MRV (Monitoring, Reporting and Verification).

Analysis of Lake area Changes in Lake Baringo



Precipitation Trends in MAM season



Lake Baringo surface area changes in the 3 epochs: 2014, 2009, 2004 (left to right). The changes noted in 2014 are consistent with ground studies indicating increase in surface water area in the Rift Valley lakes between 2014 and 2015. A precipitation trend analysis (map on the right) between 1981-2014 showed an increasing trend over Baringo county.

Outcomes/Anticipated Impacts

- Land Cover Maps developed and adopted as National data.
- Data used to inform Forest Policy.
- Capacity built for 3 Government Institutions.
- Institutionalization into Government work plans for continuous update.
- Data has been adopted for use in REDD+ Program for the country.
- "Private" Sector Government Partnership reinforced.
- Government Partnerships reinforced –Australia/Kenya.

Project Partners

- Australian Government
- Clinton Foundation/ Clinton Climate Initiative
- Commonwealth Scientific Research and Industrial Organization (CSIRO)
- Global Forest Observations Initiative (GFOI)
- National Aeronautics and Space Administration (NASA)
- RCMRD
- Departments of Resource Surveys and Remote Sensing(DRSRS)
- Kenya Forest Service (KFS)
- Survey of Kenya (SOK)
- Kenya Forest Research Institute (KEFRI)
- Jomo Kenyatta University of Agriculture and Technology (JKUAT)
- Dedan Kimathi University of Technology (DeKUT
- Karatina University
- Africa Wildlife Foundation

Project End Users

- Government Agencies including the ones listed as partners
- Internal Agencies
- NGOs
- Researchers
- Universities