Developing a Crop Mask for Agricultural Assessments in Kenya

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Why this Project?

Kenya relies on agricultural production for supporting local consumption and other processing value chains. The role of agriculture in supporting Kenya's economy is critical, with its contribution to the Gross Domestic product (GDP) estimated at over 277,000 Million in 2016. With changing climate in a rain-fed dependent agricultural production system, cropping zones are shifting and proper decision making will require updated data for proper delineation of cropping areas and extent; especially in agriculture and food security assessments.

Where up-to-date data is not available it is important that it is generated and passed over to relevant stakeholders to inform their decision making processes. It is important that government agencies, non-governmental agencies and other agricultural stakeholders access updated tools and information to assist in their assessments.

To support agricultural decision making, SERVIR E&SA will develop an updated agricultural crop mask. Due to intercropping especially in small holder farming, the mask will cover all crops to provide an overall map of cropped areas.

Approach/Project Activities

- Engagement of stakeholders
- Identification and acquisition of relevant datasets
- Preliminary satellite imagery analysis
- Field validation
- Final satellite image analysis
- Preparation of agricultural crop mask
- Preparation of agricultural crop land change map
- Product dissemination

Results

- An updated 2015 agricultural crop mask
- Two epochs of agricultural crop masks
- Agricultural crop land change maps

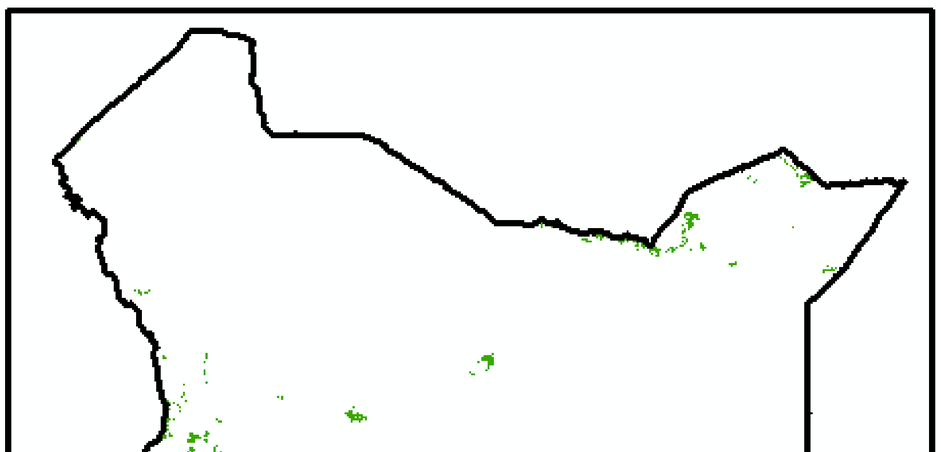

Fig. 1: Preliminary agricultural crop mask for Kenya (2015)

Fig. 2: Bananas and finger millet field in Bungoma, Kenya (Field data collection, 2016)

Fig. 3: Maize and banana plantations in Kakamega, Kenya (Field data collection, 2016)

Fig. 4: Cassava field in Kakamega, Kenya (Field data collection, 2016)

Fig. 5: Sorghum field in Busia, Kenya (Field data collection, 2016)

Objective

- Develop an updated agricultural crop mask of Kenya.
- Develop change maps cropped area in Kenya based on two epochs.

Earth Observations and Other Inputs

- Landsat 8 from Operational Land Imager sensor of 30 meter spatial resolution with 11 spectral bands.
- Landsat 7 from Enhanced Thematic Mapper sensor of 30 meter spatial resolution with 8 spectral bands.
- GeoEye-1 of 0.5 meter spatial resolution with 4 spectral bands .
- WorldView 2 of 0.5 meter spatial resolution with 8 spectral bands .

Fig. 6: Sugarcane plantation along River Nzoia in Mumias, Kenya. Landsat 8 Satellite Image (Image credit: NASA)

Fig. 7: Cultivated fields along Daua River in Mandera, Kenya. GeoEye1 Satellite Image (Image credit: Digital Globe)

Outcomes/Anticipated Impacts

- Improved access of information on cropped areas via the web portal.
- Improved data and information on the updated cropped areas via the web portal.
- Enhanced technical skills of the trained personnel on crop mask development.
- Improved understanding of the effect of climate change on the changing crop zones

Project Partners

- United States Agency for International Development (USAID).
- National Aeronautics and Space Administration (NASA).
- Famine Early Warning Systems Network (FEWSNET).

Project End Users

- Famine Early Warning Systems Network (FEWSNET).
- Ministry of Agriculture, Kenya.
- Ministry of Devolution and Planning, Kenya.