

Remote sensing to monitor and study ecosystem dynamics and degradation in the Maasai Mara

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Remote sensing (RS) is the measurement of properties of the Earth's surface using data acquired from airborne or space-borne vehicles. RS-data provide a repetitive, full coverage, and consistent view of the earth that can be used for many purposes such as monitoring short-term and long-term changes, and assessing the impact of human activities.

Some of the important applications of RS-technology are:

- Mapping (topography, land cover)
- Natural resources (wetlands, soils, forests, vegetation types)
- Human impacts (urban growth, roads, industry, waste)
- Agriculture (crop types, crop conditions, soil erosion, irrigation regimes)
- Hydrology (water streams, soil erosion, flooding risk assessments)
- Meteorology (atmosphere dynamics, precipitation, temperatures, wind speed)

Many RS programs scan the earth systematically with revisiting as frequent as every 14 days. These data are stored in large internet archives, and besides providing the raw image data, several programs provides refined and interpreted data such as measurements of vegetation indices, primary production, land cover maps, terrain elevation etc.

RS-programs from NASA and lately also ESA (European Space Agency) offer these kinds of RS data for free. Some of these archived data date back to 1980s thus providing a direct option to assess land changes over the past 30 years. The data span a range of pixel sizes of 1-km to 30-meter.

A number of private companies provide satellite based RS data with sub-meter resolution. These data are extremely valuable for making baseline maps with high accuracy and details but as they are commercial they are also expensive to buy.

In recent years airborne laser scanning technology (LiDAR) has developed greatly. With this technology it is possible to scan an area from an airplane and assess the shape of the terrain surface in sub-meter resolution as well as assessing the 3D-structure of vegetation canopies etc. This powerful technology makes it possible to map and model the surface hydrological properties of the terrain and thereby analyze the hydrologic connectivity. This is utterly important for modelling the ecological impact of human activities, hazardous wastes, climate change etc.

The presentation will outline some of the obviously interesting possibilities of remote sensing for the Maasai Mara project. It will demonstrate where we can launch activities at no or relatively low cost and where we will need to apply for funding. Moreover it will emphasize the importance of planning educational activities for the people involved (researchers, students, stake holders etc.) so as to learn to apply GIS and RS technologies.