Implications of Crowdsourcing and Cloud Computing for Improved Ecosystems Mapping in Sub-Saharan Africa

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Ecosystems Mapping in Africa

Cape Floristic Region
This is one of the world's five Mediterranean climate zone hotspots and contains its largest non-tropical concentration of higher vascular plant species. It is the only hotspot encompassing an entire floral kingdom.

Guinean Forests of West Africa
The Guinean Forests of West Africa are home to more than a quarter of Africa's mammals, including more than 20 species of primates. These and other species are threatened by logging, mining, hunting, and even increasing numbers of people.

Succulent Karoo
The Succulent Karoo of South Africa and Namibia hosts the world's richest succulent flora and exceptional plant endemism—60 per cent of its plants are found nowhere else—as well as a number of unique reptile species. It is one of only two of the world's completely arid hotspots. Grazing, agriculture, and mining threaten this fragile region.

Eastern Afrotropical
This hotspot is formed by scattered mountains with very similar plant communities. The Albertine Rift has more endemic mammals, birds, and amphibians than any other African region. The Eastern Afrotropical also contains some of the world's most extraordinary lakes, which harbour about 67 endemic fish species. Agricultural expansion of crops such as bananas, beans, and tea, as well as the growing demand for bushmeat, are threatening the region's biodiversity.
EC-09-01b: Ecosystem Classification and Mapping

- Develop a standardized, robust, and practical global ecosystems classification and map for the planet’s terrestrial, freshwater, and marine ecosystems.
- Based on machine learning CART algorithm
GEOSS Ecosystems Mapping in Sub-Saharan Africa
Ecosystems of Sub-Saharan Africa (GEOSS)
Crowdsourcing

- Taps into the collective intelligence of the vast public resources at one’s disposal to achieve a goal or solve a problem and to develop a product.
  - Example of geospatial application of the Crowd: Ushahidi

- This is a voluntary participation that may or may not offer rewards after contributions are made. It also offers the ability for many different people to collect and upload different types of information to a single database.

- Crowdsourcing can be used for data collaboration and convenient distribution and assessment of data (e.g. ecosystems) among various users.
Africa Chapter (International Association for Landscape Ecology)

Promote the adoption and application of Landscape Ecology perspectives in a sustainable management of natural resources in African countries

Linkages between ecosystem structure and landscape process in the African context
Harnessing the Power of the Crowd

- IALE-Africa Session on Potential Adoption and Use of GEO Standardized Ecosystem Mapping Products by IALE Community
  - October 29th 2009 Africa-GIS Conference in Uganda

- Part of GEO Task ID-04
  - Building a User-Driven GEOSS

- Crowdsource the knowledge of African scientists and resource managers
  - Evaluate the accuracy and usability of the GEOSS Africa Ecosystems Map
Preliminary Survey Status

Area of use or application
Forestry, Water, Wetlands, Biodiversity, Agriculture, Socio-economic

Level of Satisfaction
- How do you rate the data structures for your own use/application?
- How do you rate the scale of the data for your own use/application?
- How satisfied are you regarding the following items?
  - Overall quality of dataset
  - Value of dataset
  - Dataset usage experience
- Compared to other ecosystems data that you have used, would you say that the GEOSS ecosystems dataset is?
- Will you use the dataset again and or will you continue to use the dataset?
- How likely are you to recommend the dataset to others?

Challenges and recommendations
Join the Crowd

We need help to identify and reach more users of ecosystems maps in African Countries
Cloud computing is a service that uses the internet to distribute data and extract information with significant speeds.

Cloud computing offers an alternative to loading data and software onto a personal computer and creates a more productive work environment.
What services are offered in the Cloud?
Cloud Computing - ROI and TCO

- **TCO (Total Cost of Ownership) Analysis** is designed to uncover all the lifetime costs of acquiring, operating, and changing something.

- **ROI (Return On Investment)**
  - A performance measure used to evaluate the efficiency of an investment or to compare the efficiency of a number of different investments.

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ROI = \frac{(Gain\ from\ Investment - Cost\ of\ Investment)}{Cost\ of\ Investment}
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Some Online Geospatial Data Portals for African Countries:

- GEOSS Africa Ecosystems Mapping
- SERVIR
- WorldMap
- Eye on Earth
It’s critical to streamline the emerging web mapping platforms to provide a meaningful and simplified data distribution and access for researchers and resource managers.

- Geospatial Access Point
  - must be led by African Institutions

- Cloud computing infrastructure can bridge the gap between regional centers of geospatial technology and the African user community.