Geospatial Science & Technology for Sustainable Development in Africa: Partnerships and Applications
Harvard University
John F. Kennedy School of Government
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Panel 1: Government Initiatives & Partnerships—
Maxine Levin, US Department of Agriculture
Natural Resources Conservation Service
USDA International Activities in Sustainable Agriculture--AFRICA

- Primarily Domestic Programs and agencies
- Work through USAID and USDA Foreign Agricultural Service (FAS)
  - NRCS World Soil Resources Program
  - CSREES International Program/Guide to USDA Programs
  - USFS International Program—Forest Health monitoring
  - Land Grant University and Agency Scientific Exchanges
NRCS World Soil Resources

Natural Resources / Agriculture Links

- **Africa Data Dissemination Service** (ADDS)
  A source for digital environmental information on Africa.
- **International Soil Reference and Information Centre** (ISRIC)
  ISRIC is a foundation for documentation, research and training about the soils of the world with emphasis on developing countries.
- **Consortium for International Earth Science Information Network** (CIESIN)
  CIESIN - global and regional network development and science data management.
- **The GLOBE Program**
  GLOBE is a worldwide hands-on primary and secondary school-based education and science program.
- **GlobalSoilMap.net**
  Initiative to create a new digital soil map of the world.
Inherent Land Quality Assessment

http://soils.usda.gov/use/worldsoils/mapindex/
GlobalSoilMap.net

- Sub-Saharan Africa – Tropical Agriculture Program of the Earth Institute at Columbia University (EI), World Agroforestry Centre (ICRAF), Tropical Soil Biology and Fertility Institute (TSBF-CIAT), and CIESIN/Earth Institute of Columbia University
CSREES Global Initiative

Guide to USDA's International Programs

• A Guide to USDA's International Programs is a clearinghouse of information on international programs and activities within the USDA of potential interest to staff at land grant institutions.

• http://www.csrees.usda.gov/nea/international/pdfs/vis_guide.pdf
USFS International—Africa

- The African Leadership Seminar on People and Conservation is an intensive one week program held in southern Africa, University of KwaZulu-Natal’s Centre for Environment, Agriculture and Development Fall 2009

- 2008 Forest Health Monitoring in the Ngangao Forest, Taita Hills, Kenya: - A Five Year Assessment of Change (Rogers, Paul C.; et al)


- 2006, 2005 Malawi and Tanzania Invasives- Chilima, Dr. C.Z

- 2003 Monitoring for Sustainable Forests and Biodiversity in the Eastern Arc Mountains of Kenya and Tanzania (Dull, Charles; and James D. "Denny" Ward)
Foreign Agricultural Service (FAS)

FAS offers a wide range of technical assistance, education and outreach programs for emerging markets and developing countries that are designed to support the development of science-based regulatory policies and promote food security.

- Trade and Scientific Exchanges
- Cochran Fellowship Program
- Norman E. Borlaug International Agricultural Science and Technology Fellows Program - Global Cocoa Initiative for Africa
- Embassy Science Fellows
- Agricultural Science and Technology cooperation with Universities
1) Developing GIS based marketing and traceability support models and tools to small and medium coffee producers, export and import companies.

2) In order to provide the coffee sector with discrete “branding” parameters to increase consumer recognition thus increasing the value of Rwandan coffees.

At the FAO Agribusiness conference in June, the Coffee project won the Best Prize for Rwanda.
The importance of traceability

- Data available
  - Flagrance
  - Aroma
  - Taste
  - Flavor
  - Mouth feel
  - Finish
- Service area
- Climate: temperature, Humidity, Rainfall, Evaporation
- Soil characteristics: soil PH, C/N, Mg,
Cupping Profiles and Sources of Origin
Forest change mapping
Forest

Gishwati Natural Reserve

Mukura Forest

1988

2007

lost

1988

2007

lost
Geo-Data Portal
Data Sharing between Data Stewards

- Terrain Data
  - LIDAR
  - Digital Elevation Models
- Annual and seasonal Temperature
- Precipitation
- Digital Orthophotography
- ASTER LANDSAT Infrared Spectroscopy
- Land Use Infrastructure Roads
- Hydrographic Data
- Geology
- Vegetative Cover Seed Zones
- Digital Soils Data Attributed
Results

• All 60 social groups were detected within bamboo zone

golden monkey group distribution

- Frontiers
- Contour lines

group size
- 1 - 10
- 11 - 20
- 21 - 30
- 31 - 40
- 41 - 48

VNP

Kilometers
All monkeys were recorded from the bamboo zone.
Climate Change Adaptation Strategy
State and Transition Model for Ecological Site Descriptions

Vegetative Reference State 1

Vegetative Reference State 2

Vegetative Reference State 3

Bare ground

Adaptation 1

Adaptation 2

Land degradation/soil erosion

Threshold-Climatic or Land Degradation
BioInformatics Open Platform

Integrated Analysis data

Transactional Data

GIS Integration

Web Services

Intranet Shared data

Published Reference Data
Proposed Data Flow Infrastructure for Open Platform BioInformatics

Individual Researcher Transactional Data

- Tabular data
- Staging Server
- Digital Data

Public Web Services Application and programming interfaces

- Models and applications

Public Web Reference Library

Staging server to public sites

Official Data Storage for Intranet and data sharing

Socioeconomic and Community based information

- Land Based data
  - Soils
  - Terrain
  - Metrological
  - Hydrological
  - Land Cover/Infrastructure

Published Biological Reference data

Inventory and Monitoring Analysis

- Ecological site Descriptions

Reference/Public Access Data
Summary - Areas for Partnership and Collaboration

- Life Cycle Analysis—GIS Applications
- Capacity Building
- Natural Resource Data Models
- Database maintenance
- Data sharing policy
Thank you!

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