Geospatial Science and Technology for Sustainable Development in Africa:

Partnerships and Applications

By:

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Outline of Presentation

- Africa in Context
- Geo-information and sustainable development
- Geo-information applications in Sustainable Development
- Recent Advances in Geospatial Sciences and Technology and Emerging Business Opportunities and Partnerships
- Mainstreaming GI in Community Management and Development
- Challenges of Geoinformation Applications and Partnerships in Africa and the Way Forward

1. Africa in Context

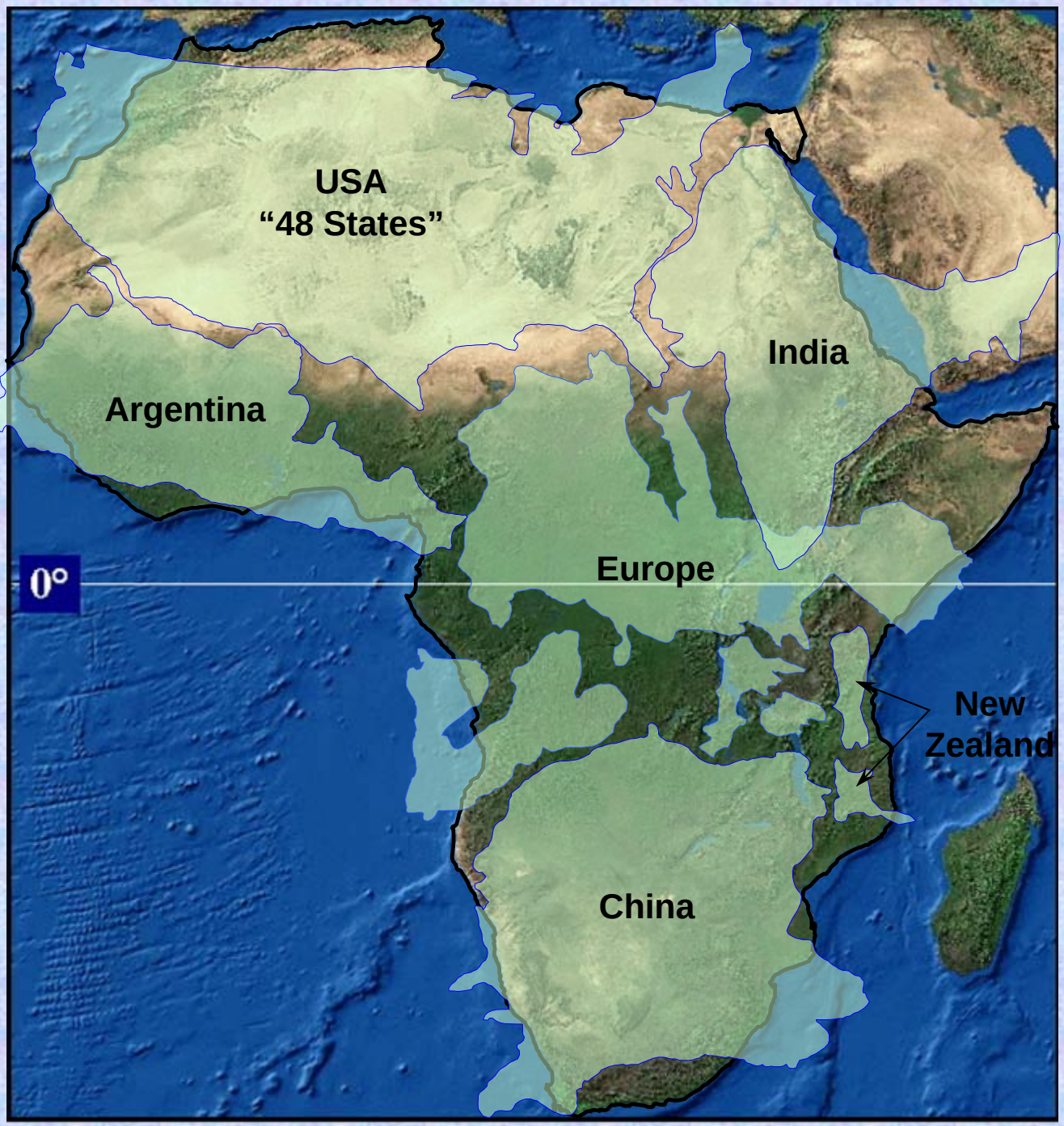
Size

Africa covers 20% of Earth land surface

China	9,596,960 km^2
USA	9,363,071
India	3,287,590
Europe	4,936,973
Argentina	2,766,890
New Zealand	268,680
TOTAL :	30,220,164 km^2

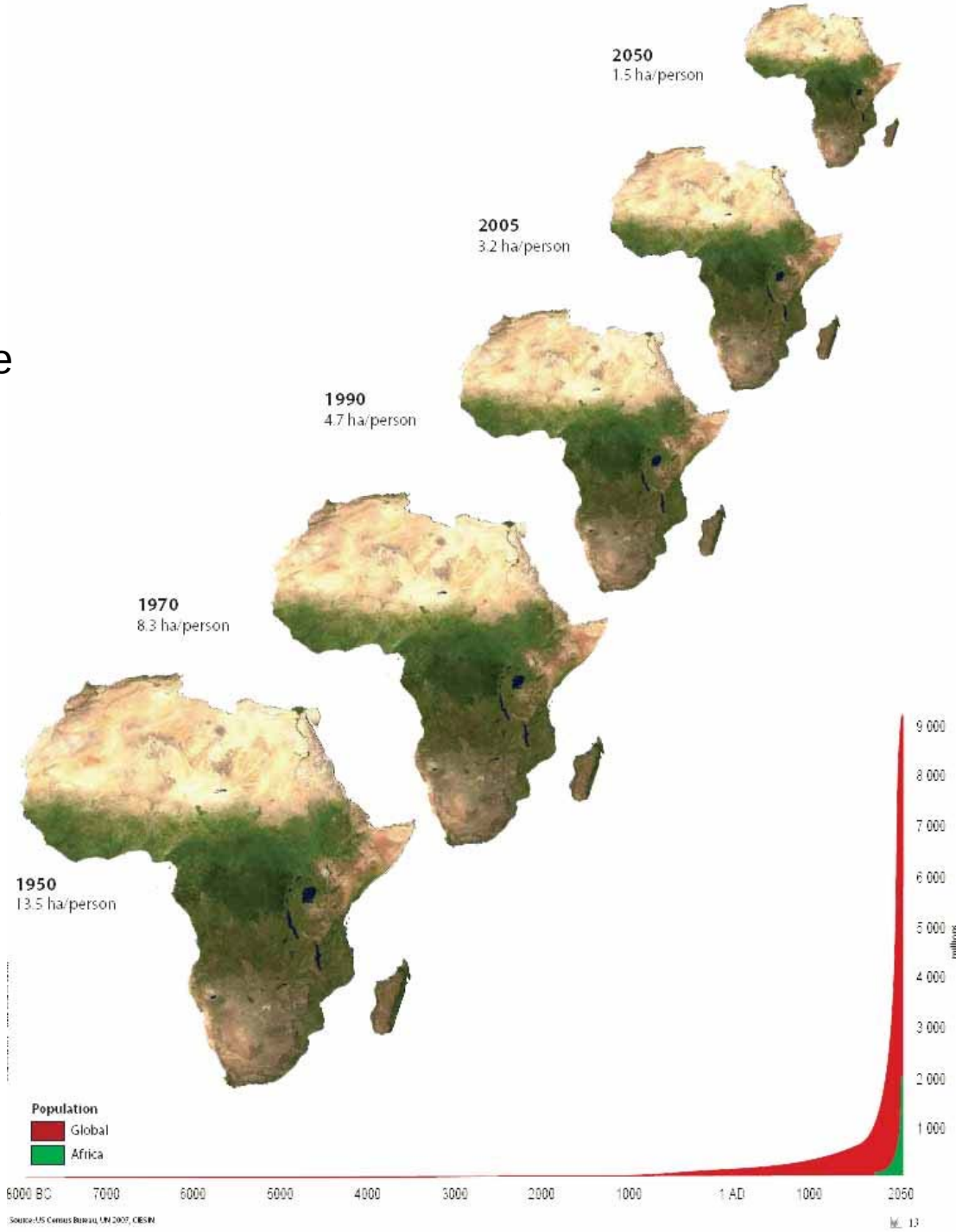
Area of Africa: 30,318,830 km^2

Source: World Factbook, 2004



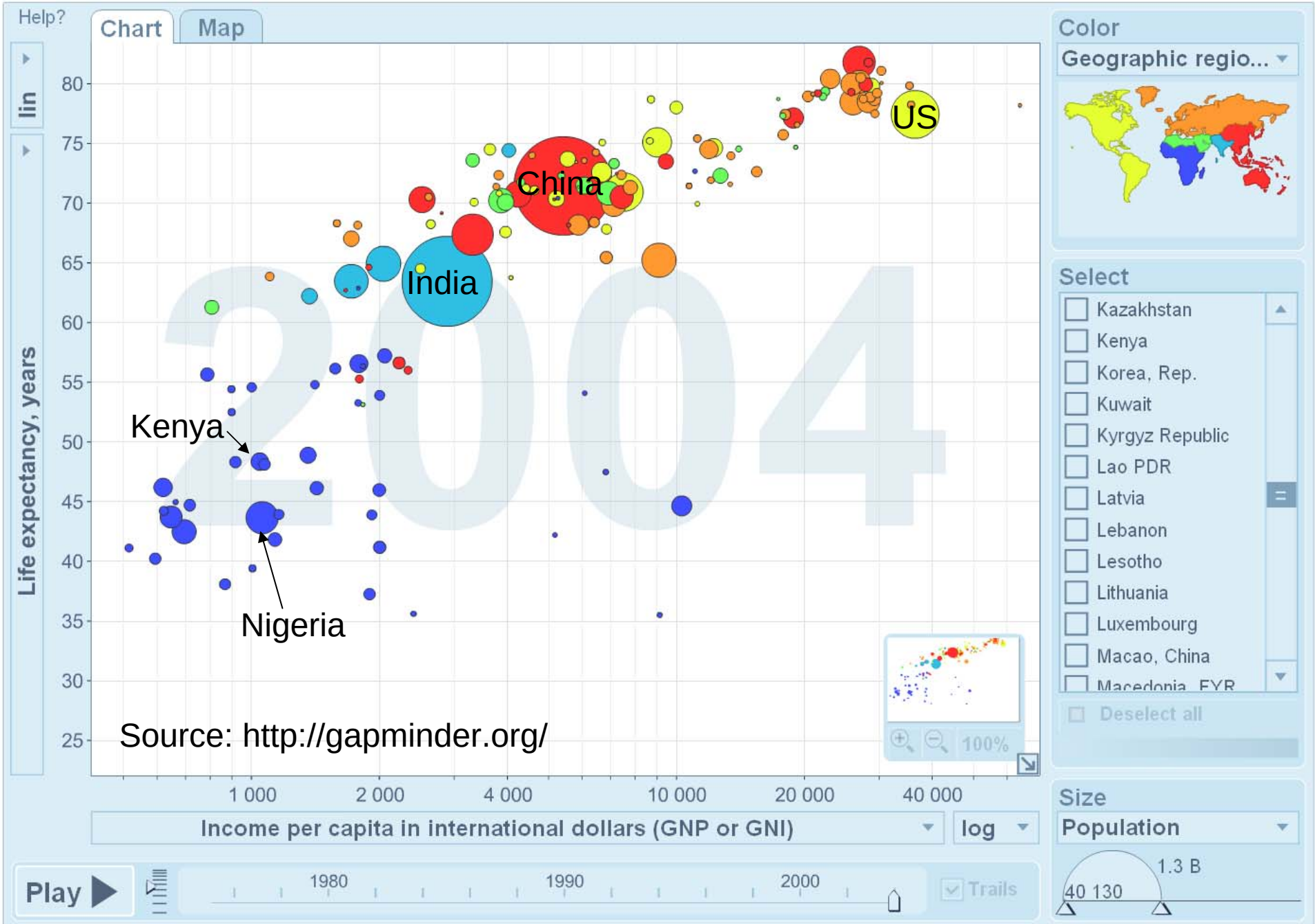
Population:

- ❖ Currently over 965 million people
- ❖ Per capita land has fallen from 13.5Ha in 1950 to 3.2Ha in 2005
- ❖ Population expected to reach 1.9 billion in 2050
- ❖ Per capita land expected to fall to 1.5 Ha
- ❖ Average life expectancy: 45.8 years (September 2004)

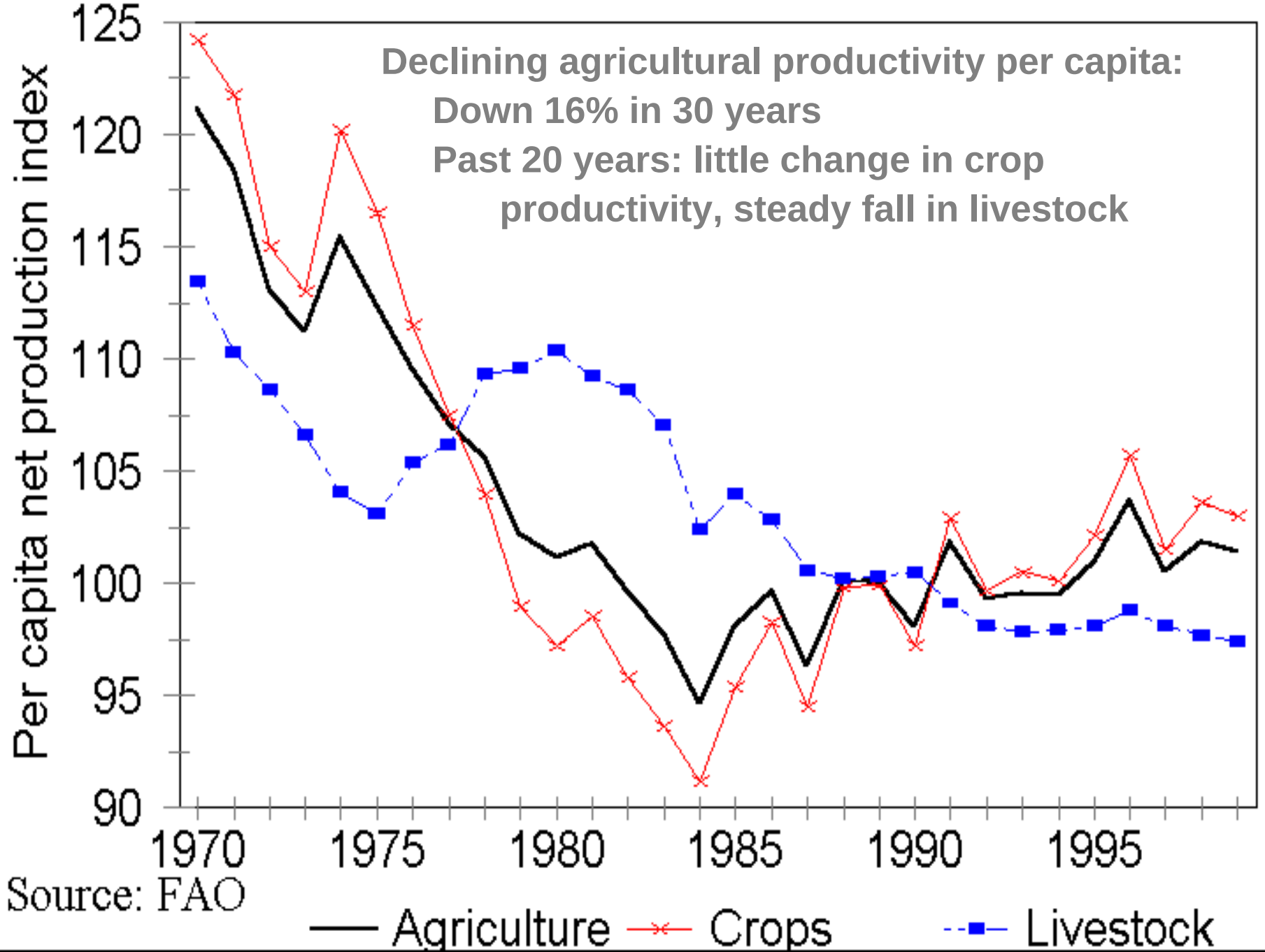


Source: Africa Atlas of Our Changing Environment

Africa in the global map of **Income per capita** and **Life Expectancy**

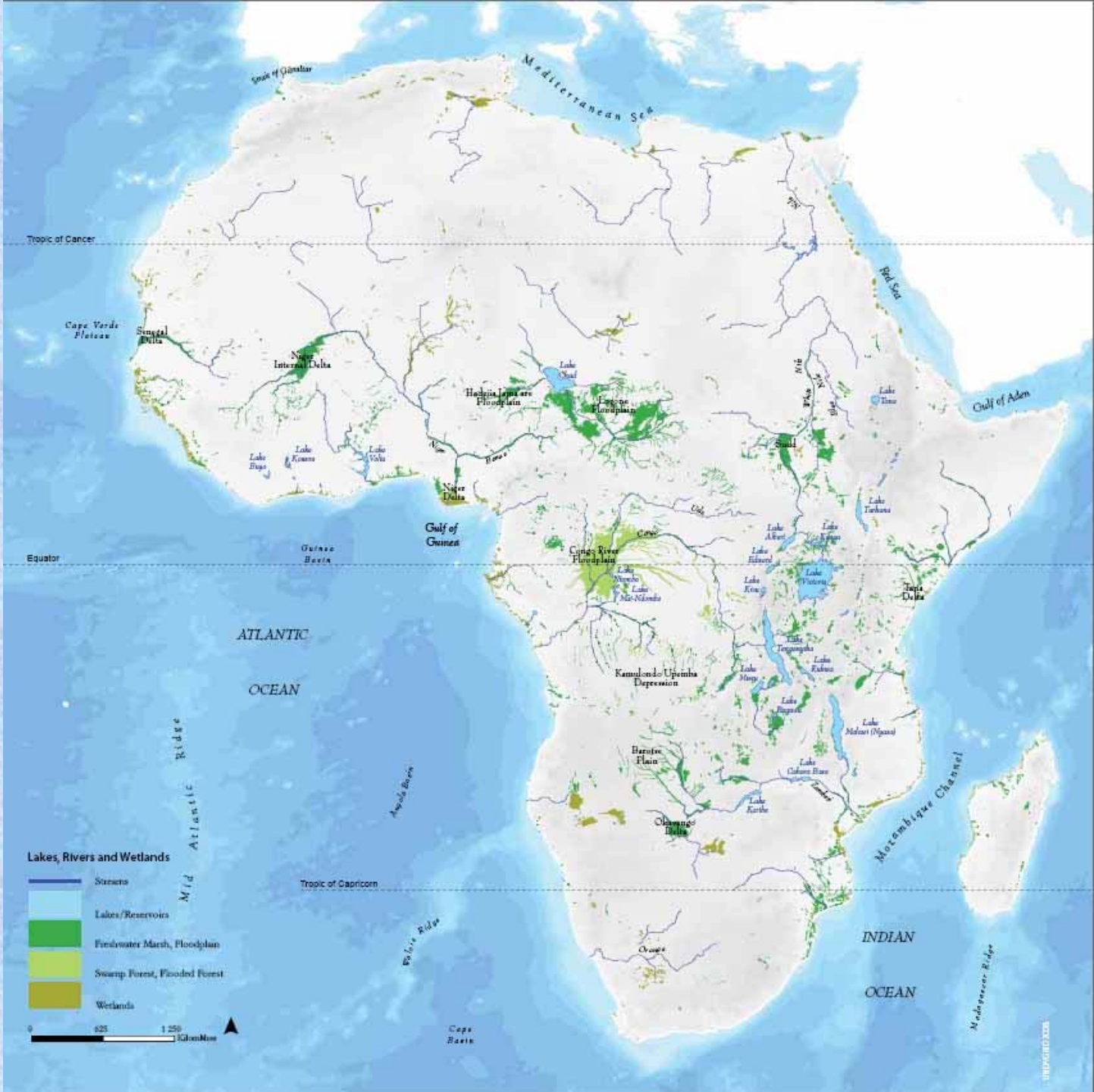


Agricultural Resources Situation in Africa



Water:

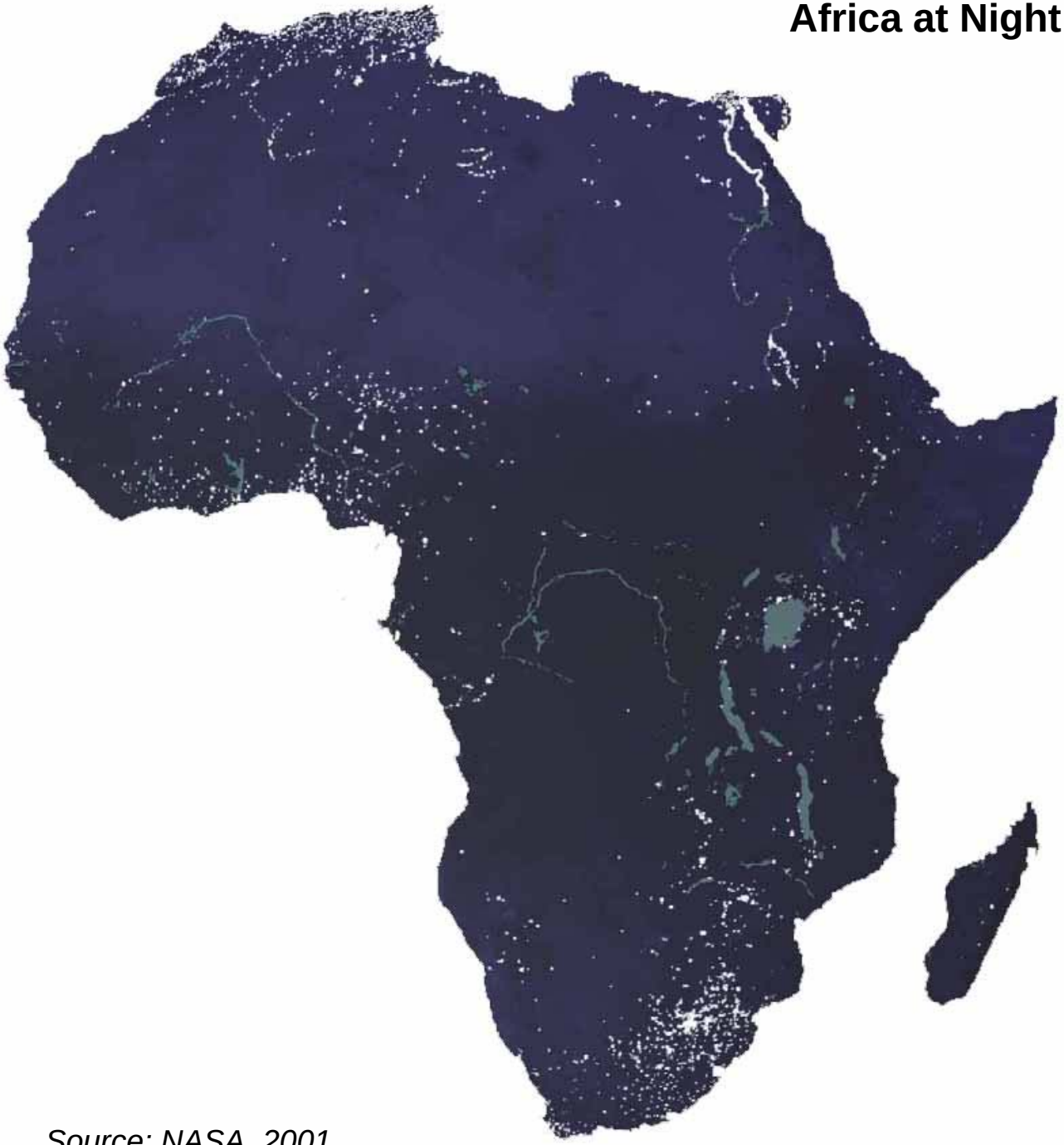
Africa is the second driest continent after Australia



Energy:

Remains a major challenge

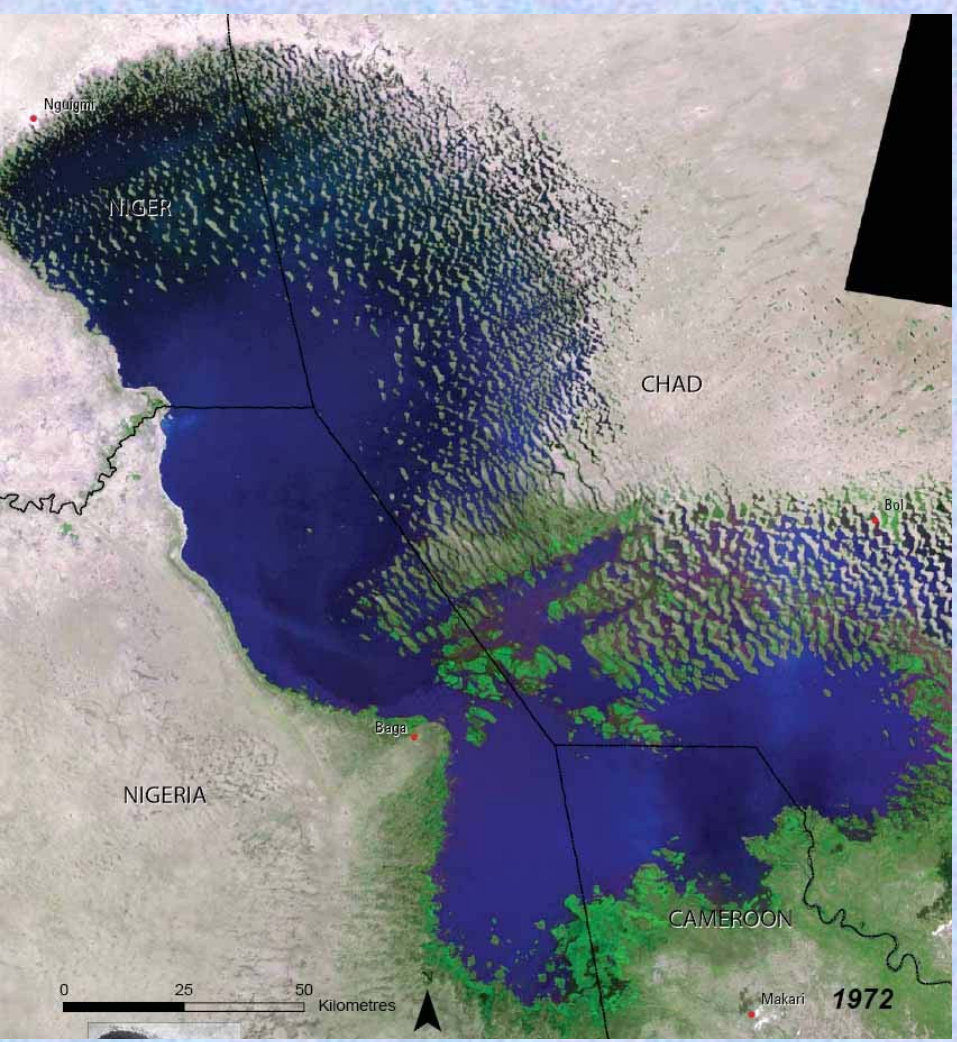
Africa at Night

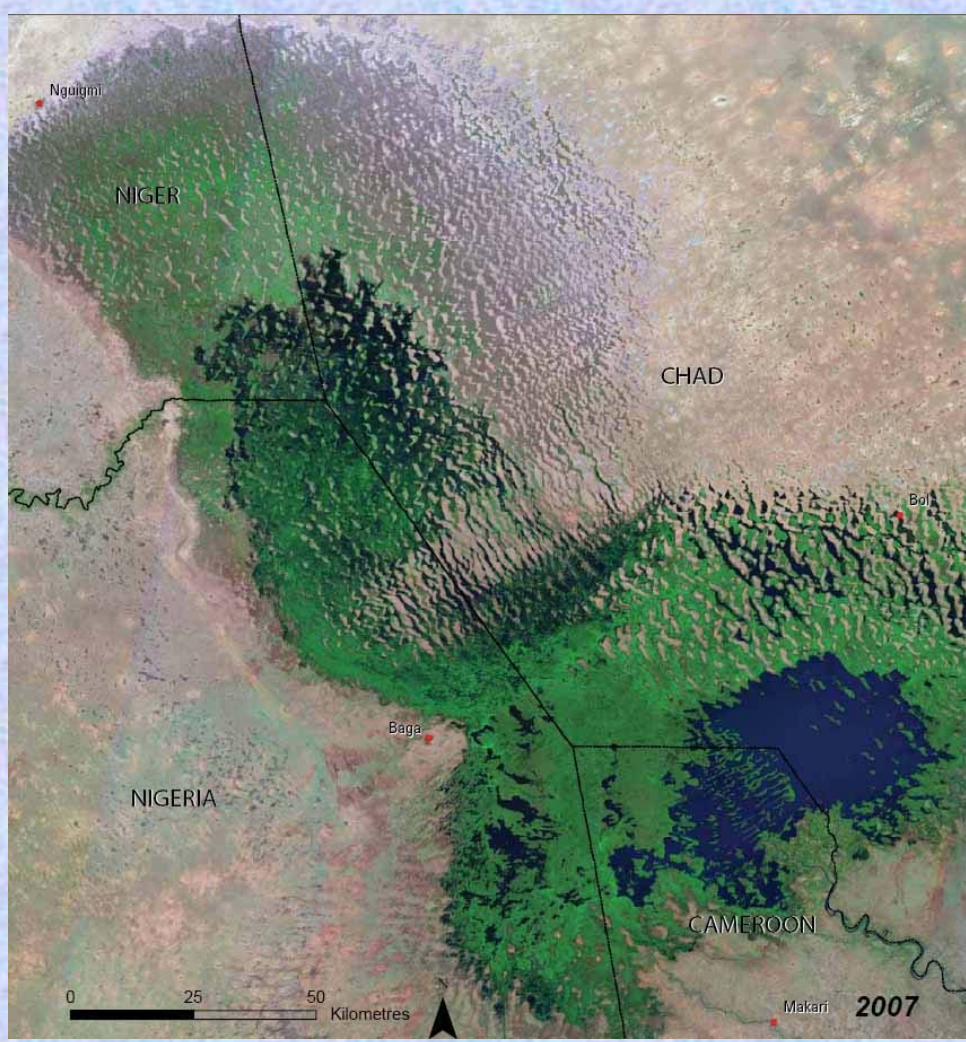


Source: NASA, 2001

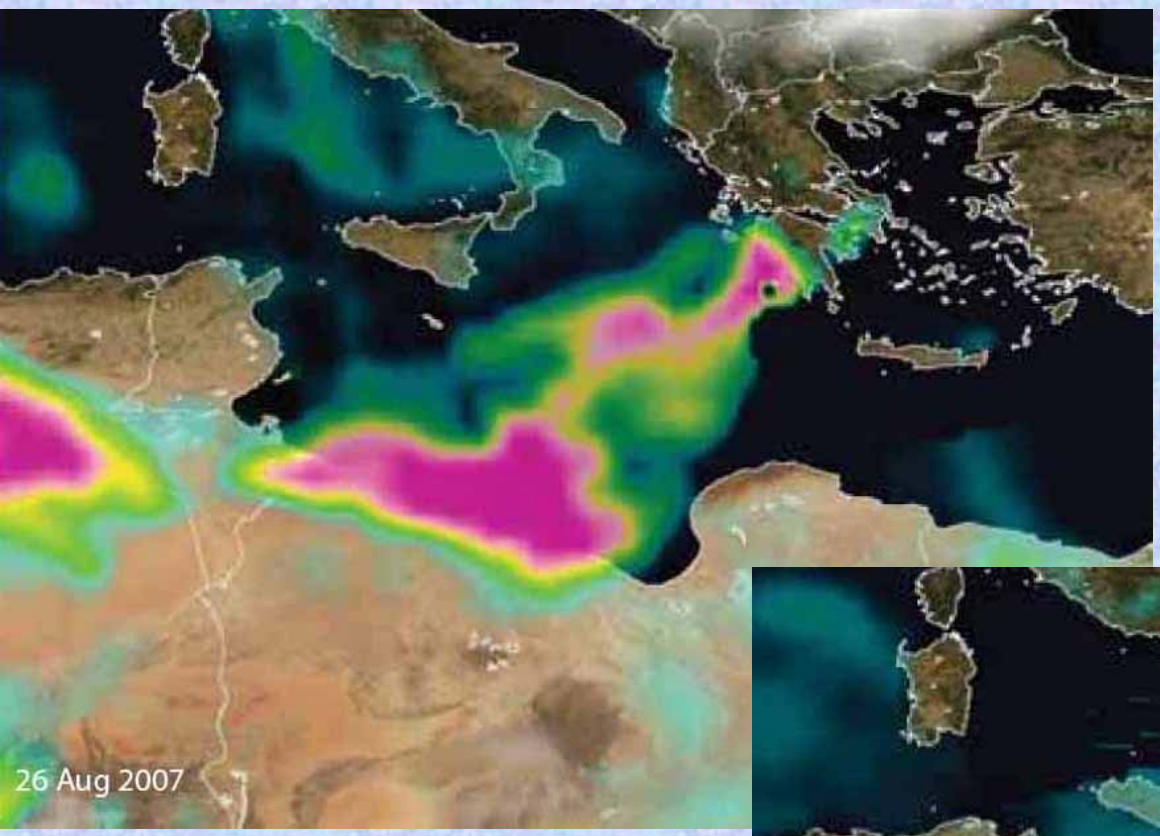
Environment:

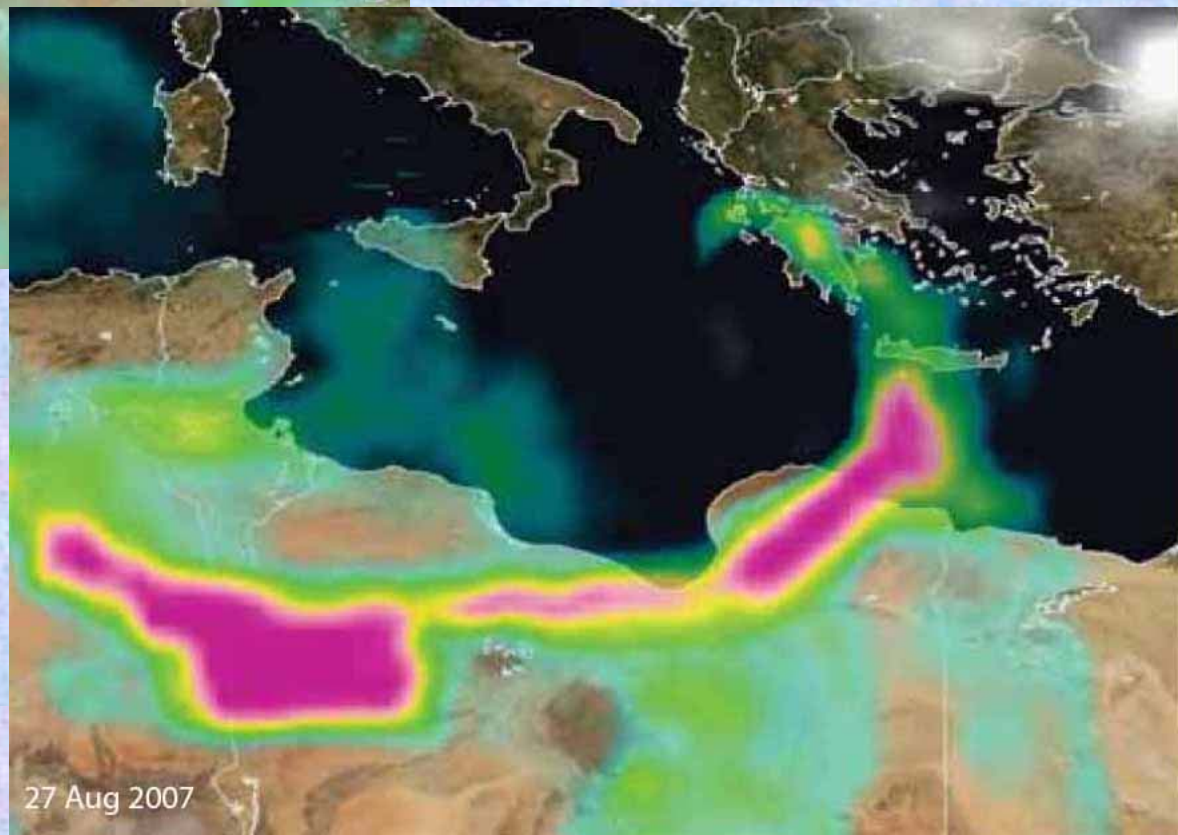
Numerous environmental challenges





Lake Chad





Smoke spreading from Greece
Into Africa (2007)

2. GI and Its Importance in Sustainable Development

- Sound and rational economic planning and decision making requires comprehensive and integrated data and information
- About 80% (ISO Bulletin 2001) of the data and information used in planning and decision making relates to geographic space, typically involving locations or positional data
- Geo-spatial data or Geo-Information is usually presented in the form of maps to facilitate easy understanding

Importance of GI in Africa

Sustainable Development of Africa

Requires

- Data
- Information
- Knowledge
- Understanding of
  - Environment
  - Nat. Resources
  - socio-economic opportunities

GI – Geo-Information

3. Geo-Information Applications in Sustainable development

- Geo-information is mainly used in:
  - Resources Assessment and Management
    - In exploration and exploitation of Resources
    - In mapping and quantification of reserves (Minerals and Oil)
    - In management, marketing and distribution of products
  - In Environmental studies such as:
    - Water and air quality monitoring and study
    - Forest depletion
    - Eco-system conservation
    - Land degradation
    - Environmental Impact studies
  - Early warning and disaster management
    - In drought and famine early warning
    - In flood forecasting, landslide early warning, etc
    - In epidemic diseases early warning

a) Resource Assessment and Mapping

i) Geoinformation in support of alleviating Poverty and Civil Conflicts: *The Case of Karamoja Region, Uganda*

Funded by the Government of Uganda

Acacia senegal stand at Kapedo

Gum arabic from *A. senegal* at Kotido

c) Importance of Gum arabic, aloe and other allied dryland resources

Gum arabic

- is used primarily in the food industry as a stabilizer such in the soft drinks industry (Coca Cola, etc)

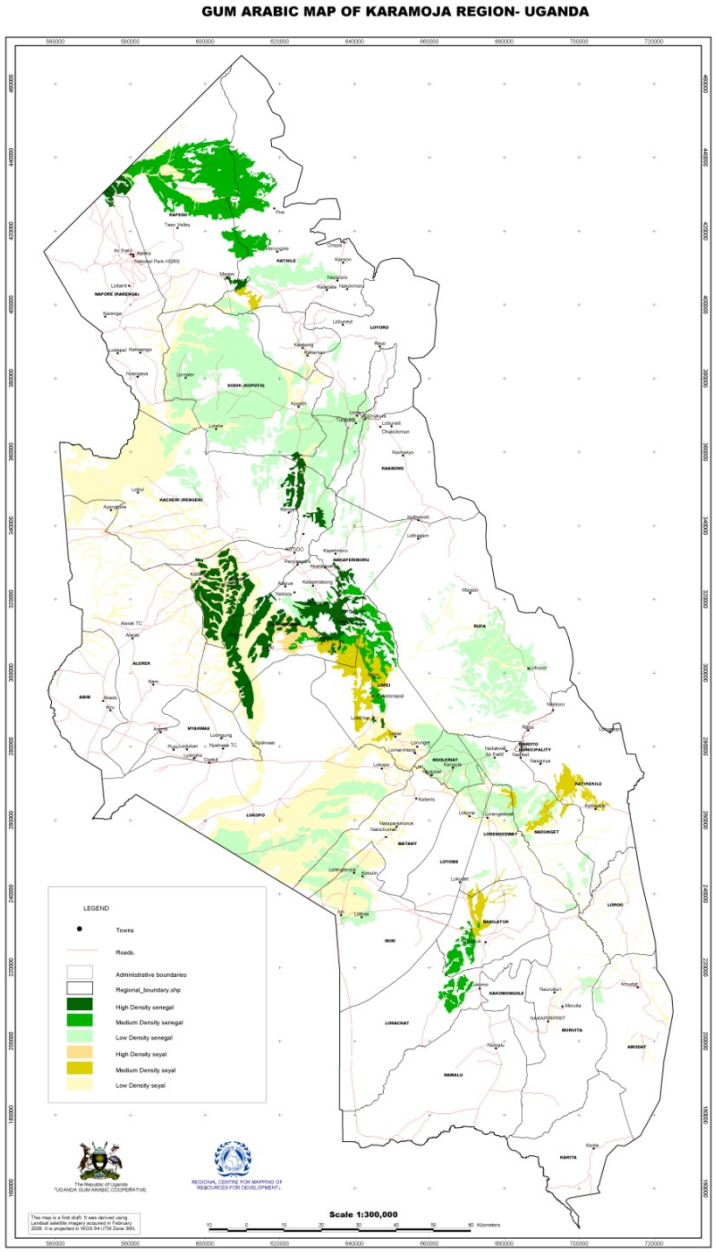
Aloe

- Health products help rebuild human skin, hair and digestive health

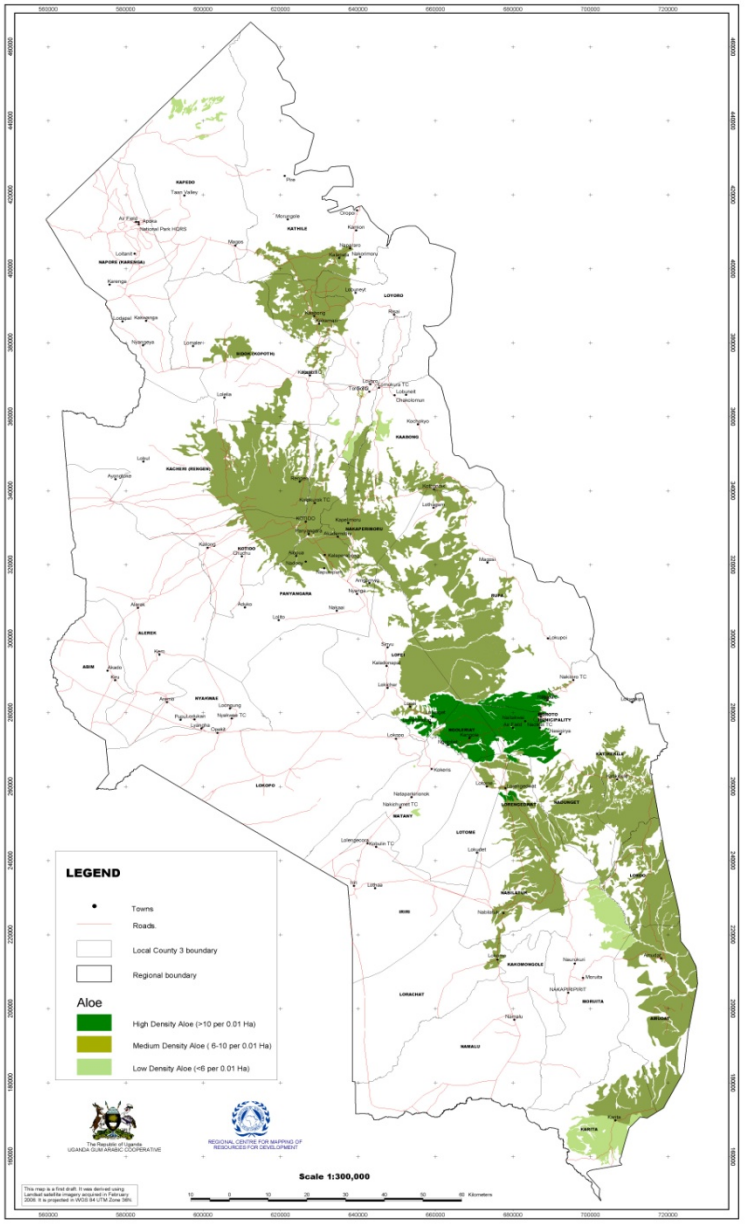
Other dryland resources

- Saddlewood – cosmetic industry
- Shea tree – shea nut butter
- Amarula – Amarula wine

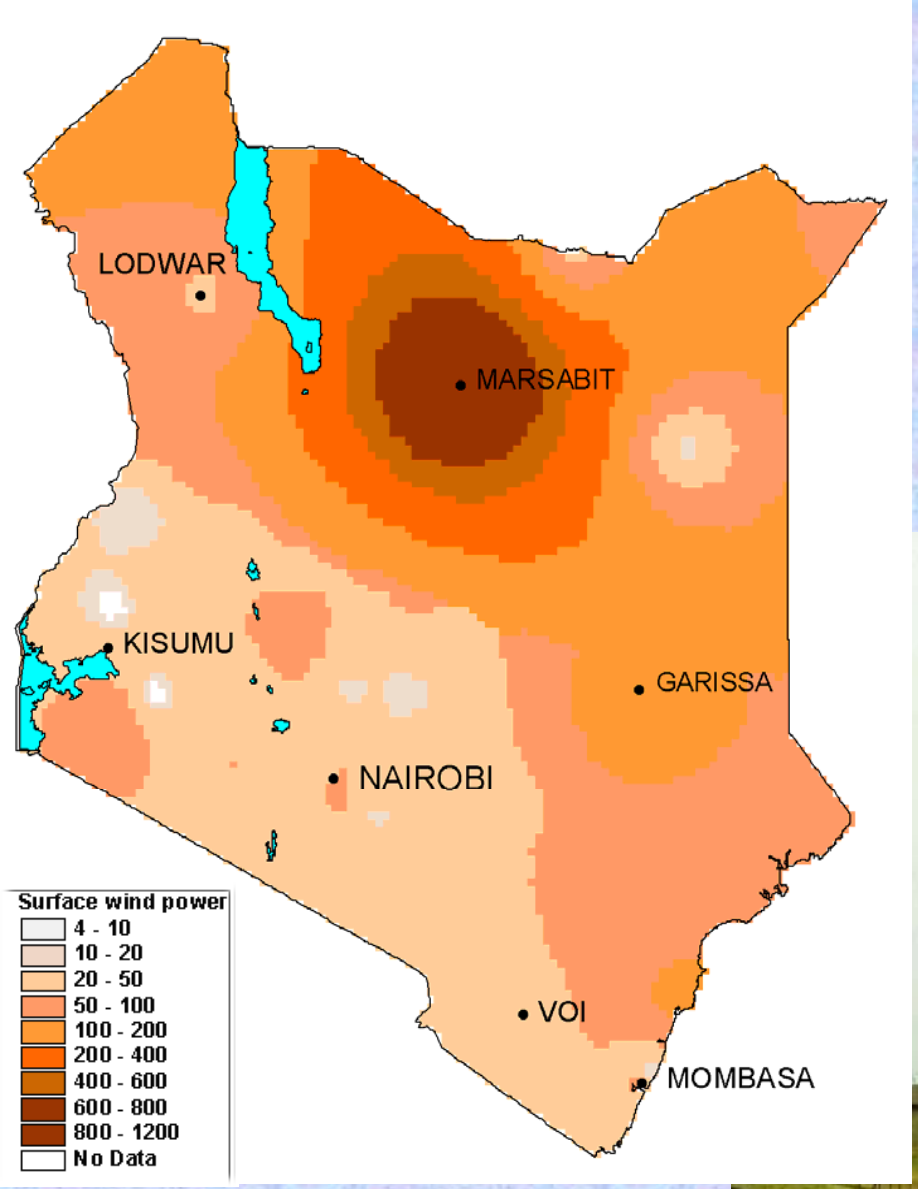
Maps showing distribution and density of Gum arabic and Aloe Resources in Karamoja



Gum Arabic



Aloe



ii) Geoinformation in support of rural Energy provision: *the case of Mapping Wind resource in Kenya*

Funded by the Government of Kenya

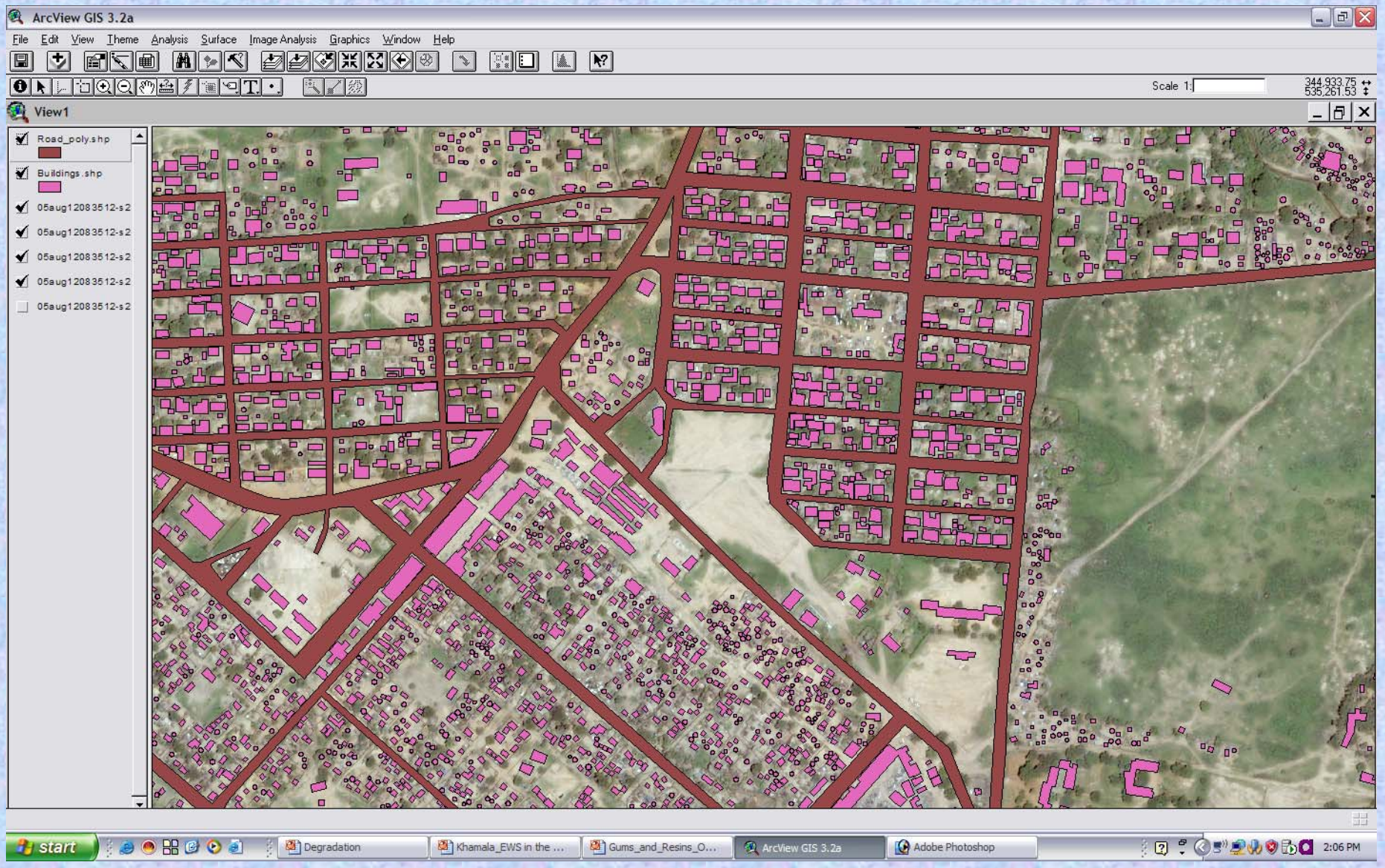
iii) Geoinformation in support of Urban Planning and Management:

The case of Planning 10 State Capitals of South Sudan

Funded by USAID through Creative Associates Inc.

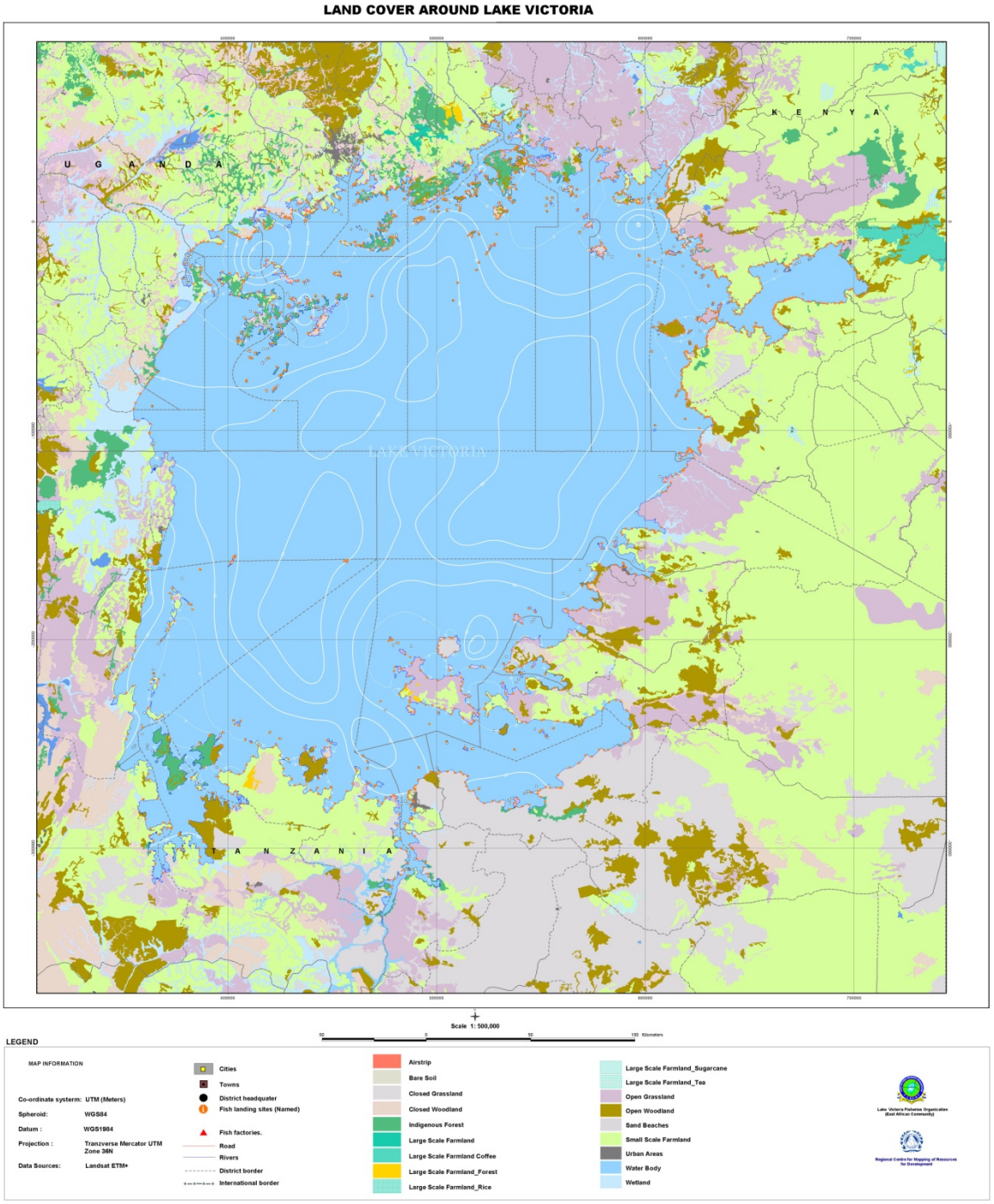
QuickBird image of Juba City, South Sudan, September 2005

Mapped buildings, roads, rivers, land use



iv) Geoinformation in Water and Sanitation Planning: the case of mapping 17 towns around Lake Victoria

Funded by UN-Habitat



v) Geoinformation in Fisheries Management Planning:

the case of mapping Fish Landing Sites around Lake Victoria

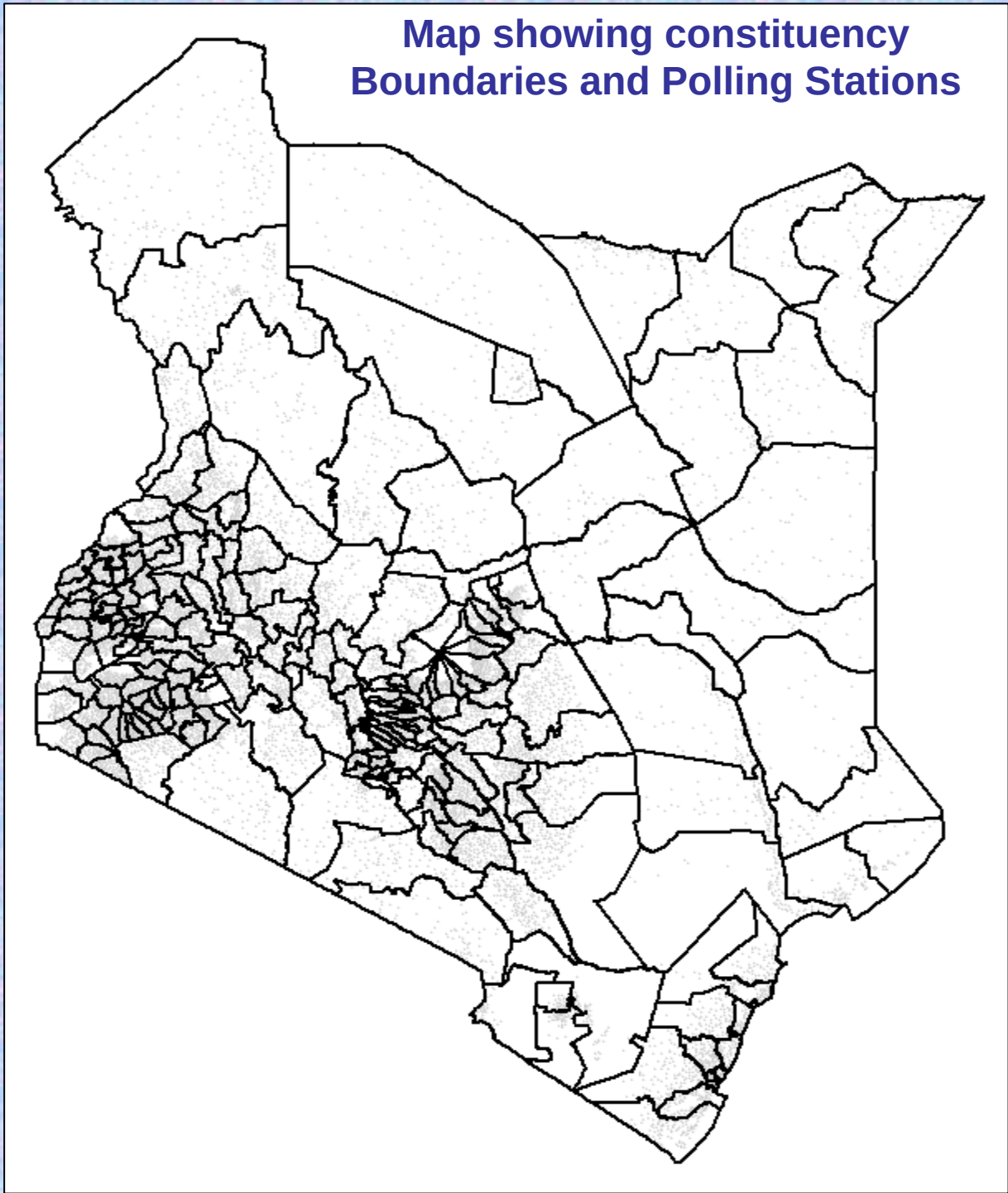
Funded by European Development Fund through Lake Victoria Fisheries Organisation (LVFO)

vi) National Elections Planning and Management: the case of the 2007 elections in Kenya

Funded by the Government Of Kenya

Features mapped:

- Political boundaries
- Polling stations
- Road network
- Attribute data for all mapped features
- etc



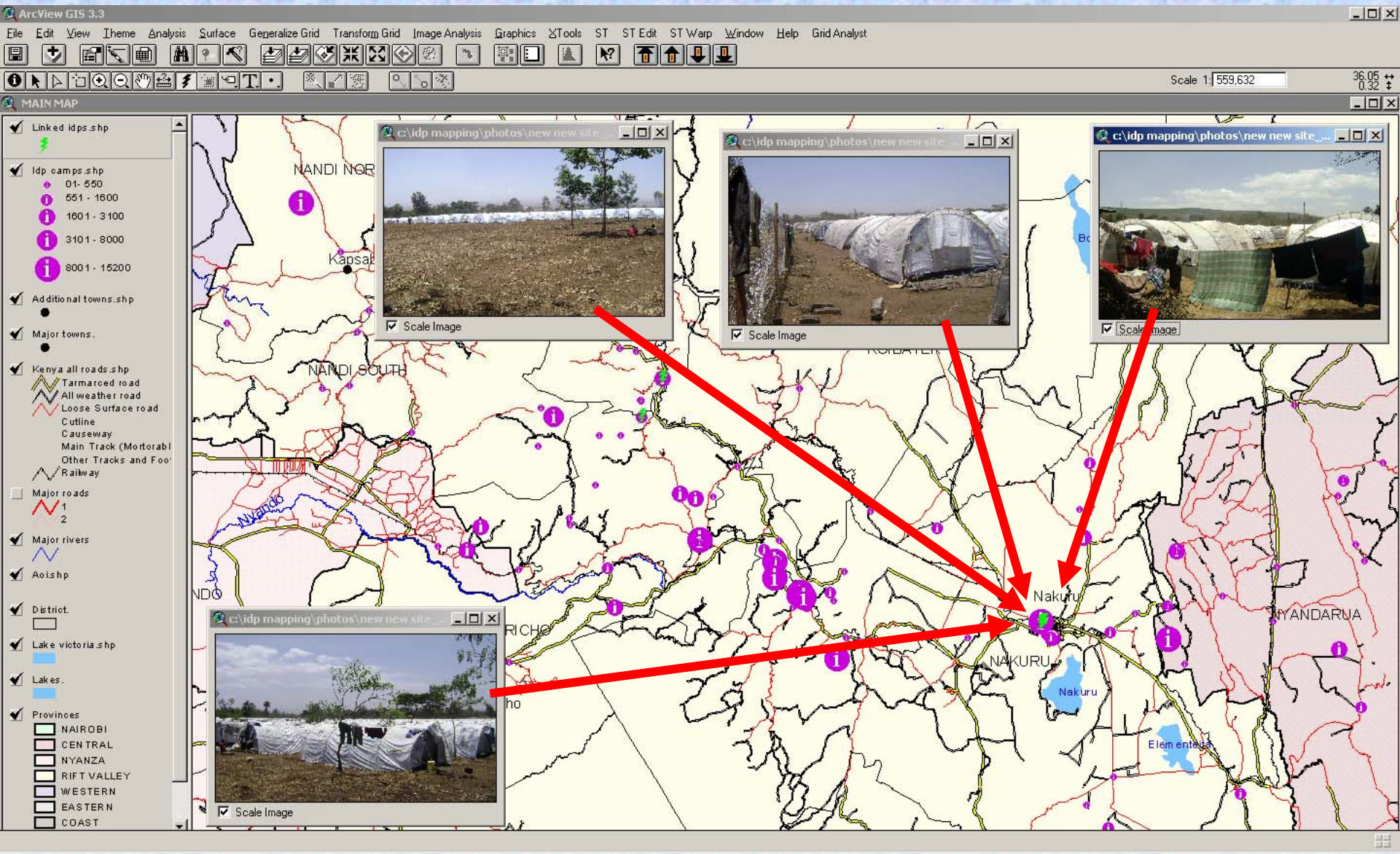
Attribute data for all polling polling stations in Kenya

Stn_name	Location	Division	District	Elec_area_	Elec_area1	Local_auth	Const_no	
Aremit Cattle Crush Ctr	Ng'oron	Kolowa	Baringo	Tirioko	0001	County Of Baringo	128	Bar
Oronto Kreze Village	Ng'oron	Kolowa	Baringo	Tirioko	0001	County Of Baringo	128	Bar
Rotii Village	Tirioko	Kolowa	Baringo	Tirioko	0001	County Of Baringo	128	Bar
Sukut Water Point	Tirioko	Kolowa	Baringo	Tirioko	0001	County Of Baringo	128	Bar
Adomeyon Nur Sch	Ng'oron	Kolowa	Baringo	Tirioko	0001	County Of Baringo	128	Bar
Ngeleyo Village Ctr	Ng'oron	Kolowa	Baringo	Tirioko	0001	County Of Baringo	128	Bar
Ptikii Pri Sch	Ng'oron	Kolowa	Baringo	Tirioko	0001	County Of Baringo	128	Bar
Kapenguria Nur Sch	Ng'oron	Kolowa	Baringo	Tirioko	0001	County Of Baringo	128	Bar
Ng'oron Pri Sch	Ng'oron	Kolowa	Baringo	Tirioko	0001	County Of Baringo	128	Bar
Ndiriman Village	Tirioko	Kolowa	Baringo	Tirioko	0001	County Of Baringo	128	Bar
Kimnyan Nur Sch	Tirioko	Kolowa	Baringo	Tirioko	0001	County Of Baringo	128	Bar
Embositit Village	Tirioko	Kolowa	Baringo	Tirioko	0001	County Of Baringo	128	Bar
Kapunyany Village	Akoret	Nginyang	Baringo	Akoret	0003	County Of Baringo	128	Bar
Akoret Centre	Akoret	Nginyang	Baringo	Akoret	0003	County Of Baringo	128	Bar
Emboses Mobile	Akoret	Nginyang	Baringo	Akoret	0003	County Of Baringo	128	Bar
Kongor Village(mobile)	Akoret	Nginyang	Baringo	Akoret	0003	County Of Baringo	128	Bar
Lain Village(mobile)	Akoret	Nginyang	Baringo	Akoret	0003	County Of Baringo	128	Bar
Kaisakat Nur Sch	Kolowa	Kolowa	Baringo	Kolowa	0008	County Of Baringo	128	Bar
Kolowa Pri Sch	Kolowa	Kolowa	Baringo	Kolowa	0008	County Of Baringo	128	Bar
Kakapul Pre-sch	Kolowa	Kolowa	Baringo	Kolowa	0008	County Of Baringo	128	Bar
Meuto Nur Sch	Kolowa	Kolowa	Baringo	Kolowa	0008	County Of Baringo	128	Bar
Chepturu Pri Sch	Kolowa	Kolowa	Baringo	Kolowa	0008	County Of Baringo	128	Bar
Kaipapich Nur Sch	Kolowa	Kolowa	Baringo	Kolowa	0008	County Of Baringo	128	Bar
Kapunyany Pre-sch	Kolowa	Kolowa	Baringo	Kolowa	0008	County Of Baringo	128	Bar
Kapow Village	Akoret	Nginyang	Baringo	Akoret	0003	County Of Baringo	128	Bar
Kopotarit Village	Ribkwo	Nginyang	Baringo	Ribkwo/kositei	0002	County Of Baringo	128	Bar
Tilingwo Ctr(mobile)	Kolowa	Kolowa	Baringo	Kolowa	0008	County Of Baringo	128	Bar

vii) Geoinformation in Humanitarian Interventions: the case of the 2007 Post Election Violence in Kenya

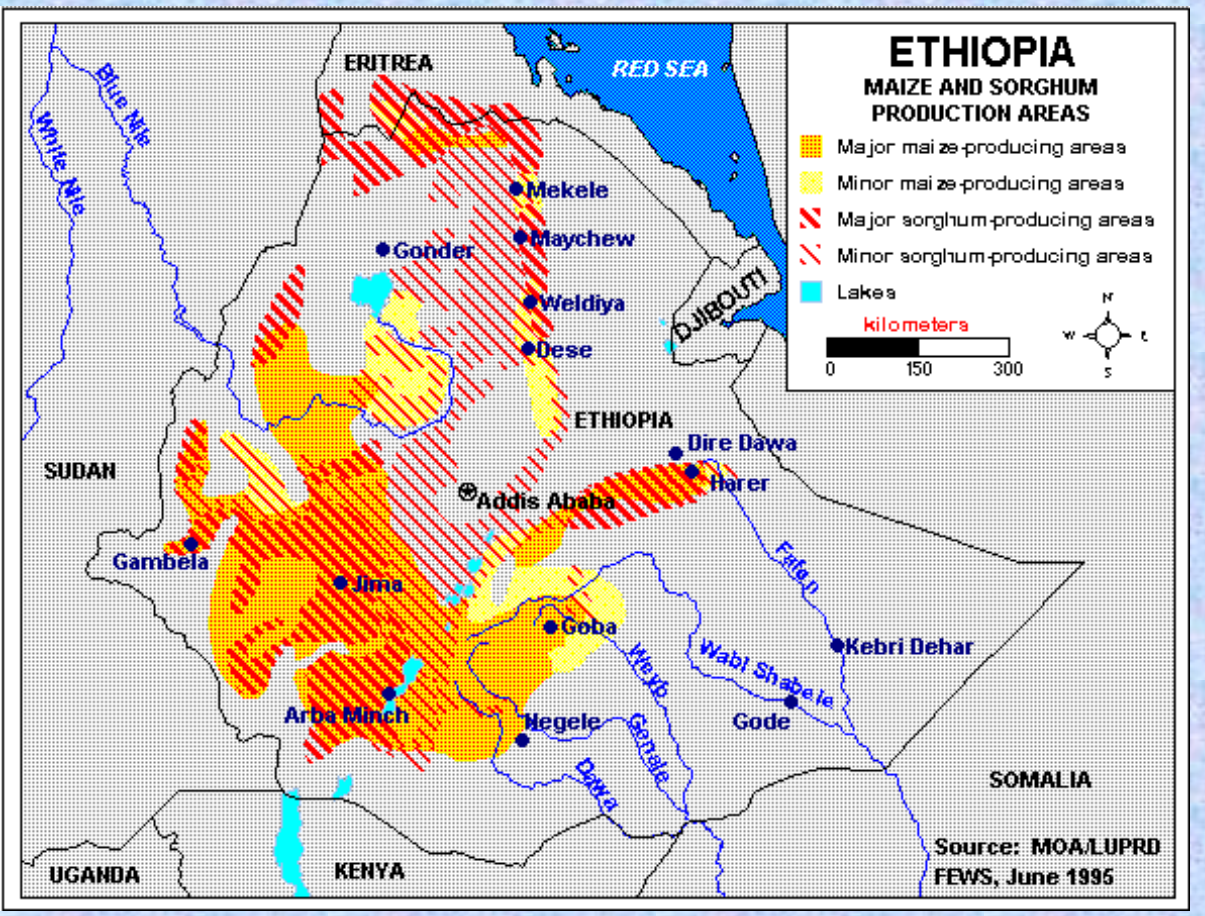
Funded by UNHCR

Map showing post election IDP camps in Kenya

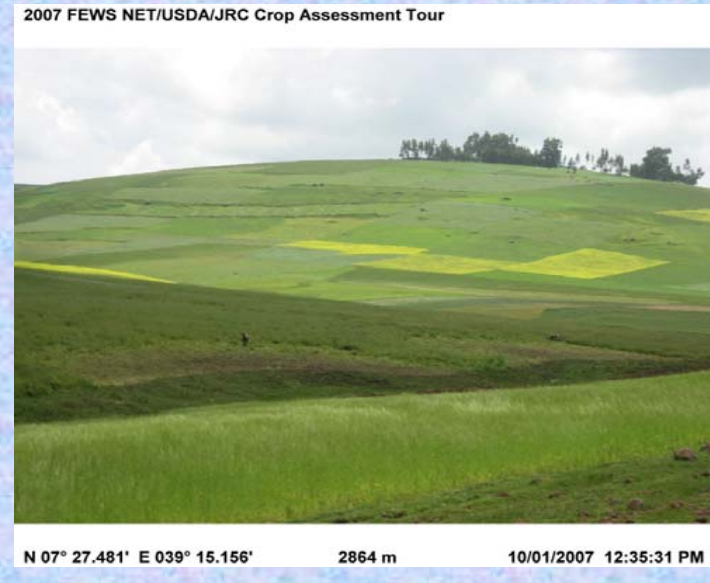


viii) Estimating National Agricultural Statistics: *The Case of Ethiopia*

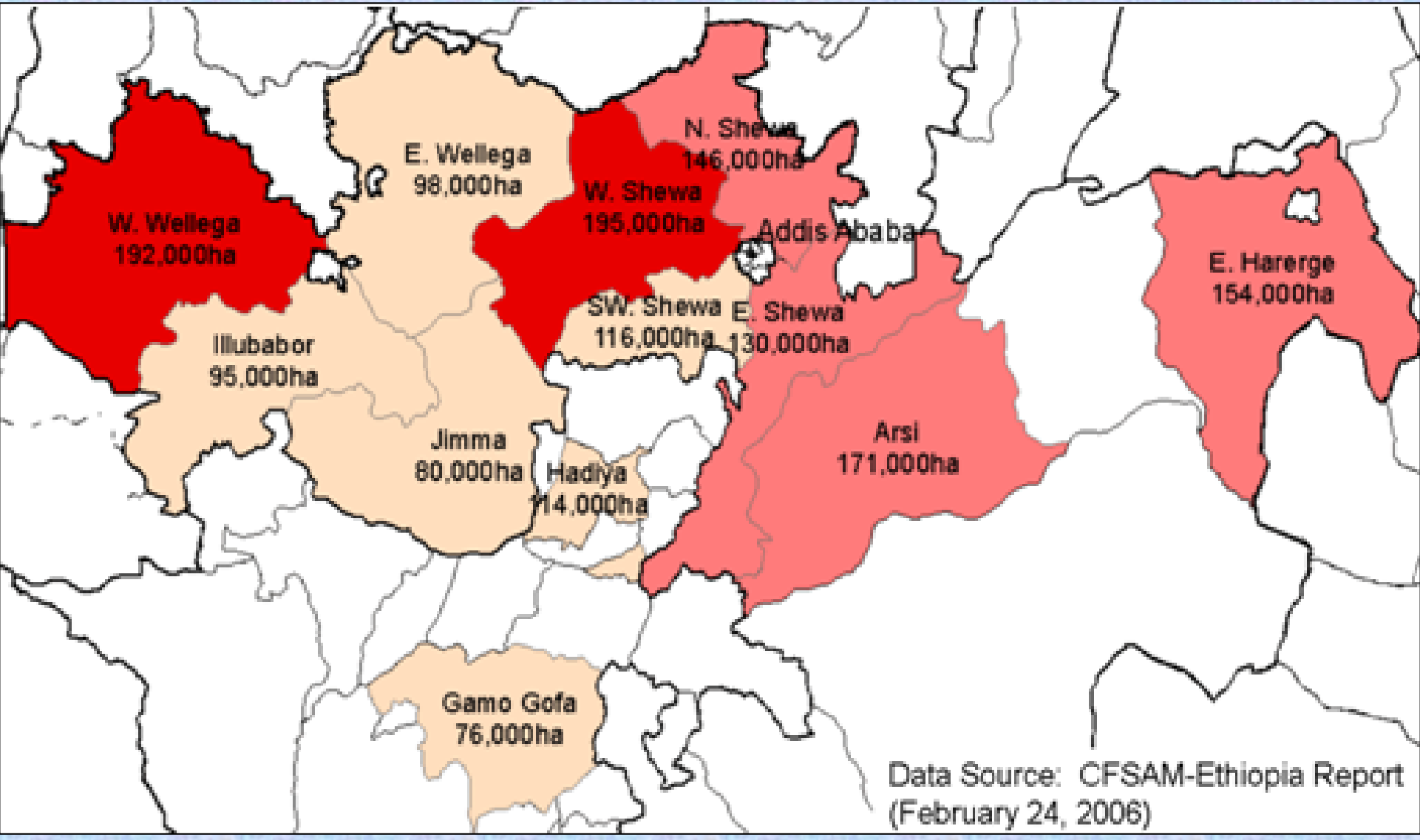
Implemented in collaboration with USGS/Fewsnet



Maize and Sorghum Production Areas in Ethiopia

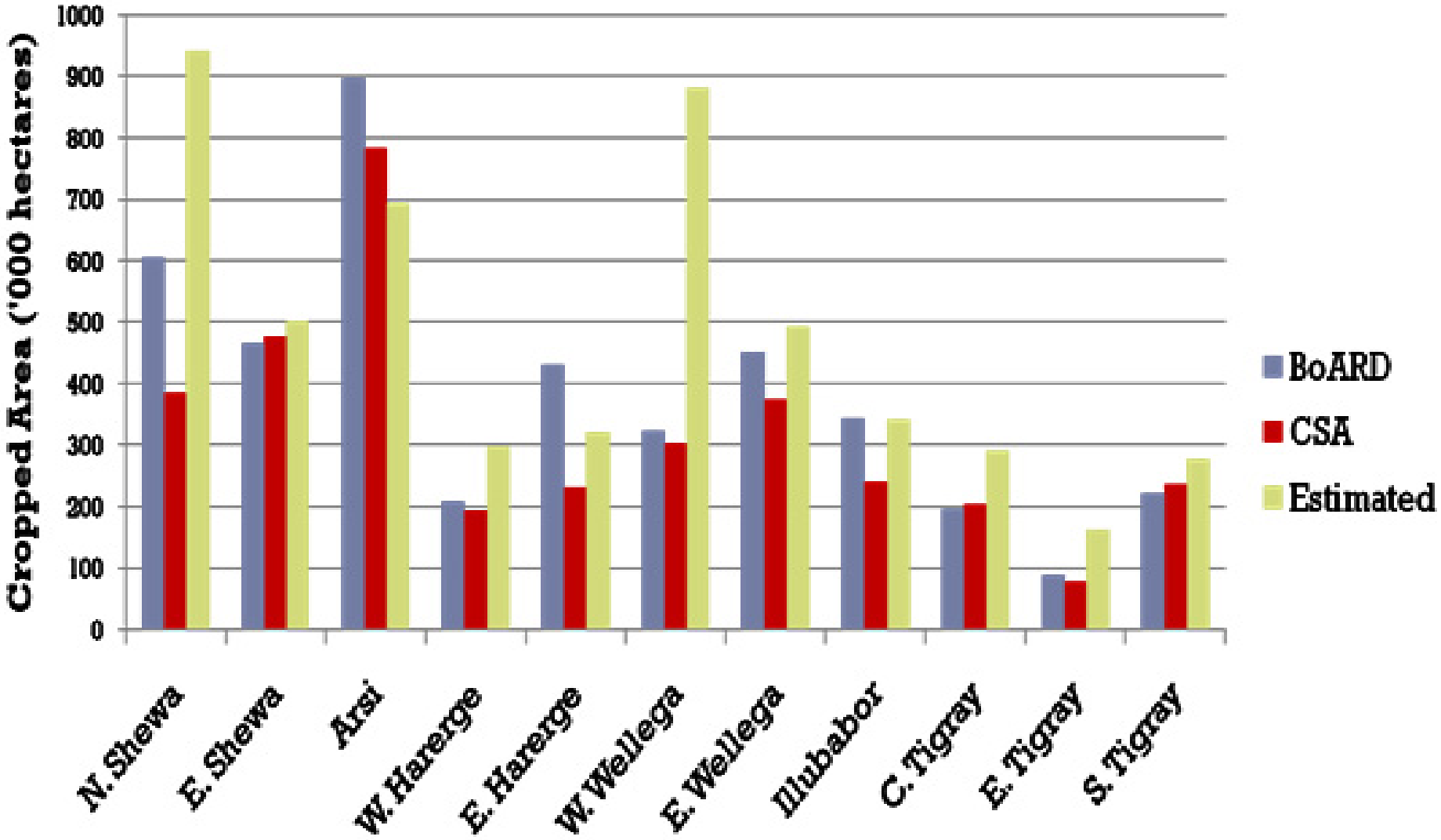


Districts in Ethiopia with major agricultural statistics discrepancies



Assigning LU/LC classes to dots as interpreted on the image (cont..)

RESULTS: Comparison of Remote Sensing derived statistics with those generated by BoARD and CSA



BoARD – Ministry of Agriculture, Ethiopia
CSA – Central Statistics Agency, Ethiopia

b) Applications in Environmental Studies

i) Forest Cover Change Mapping, Mau Forest, Kenya

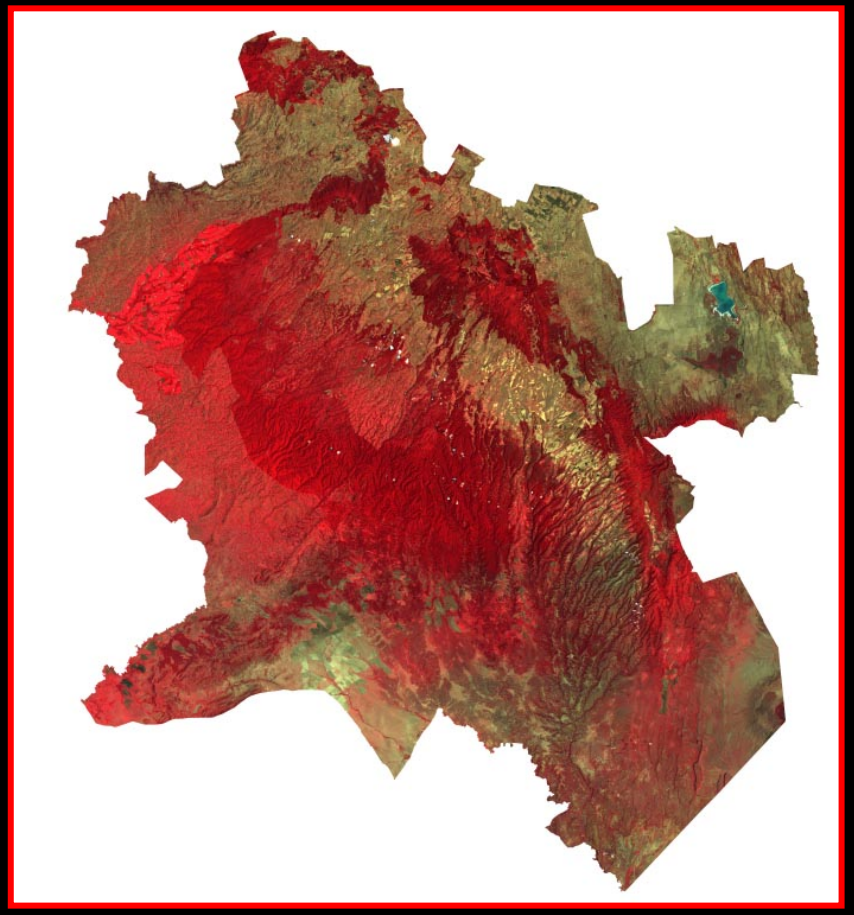
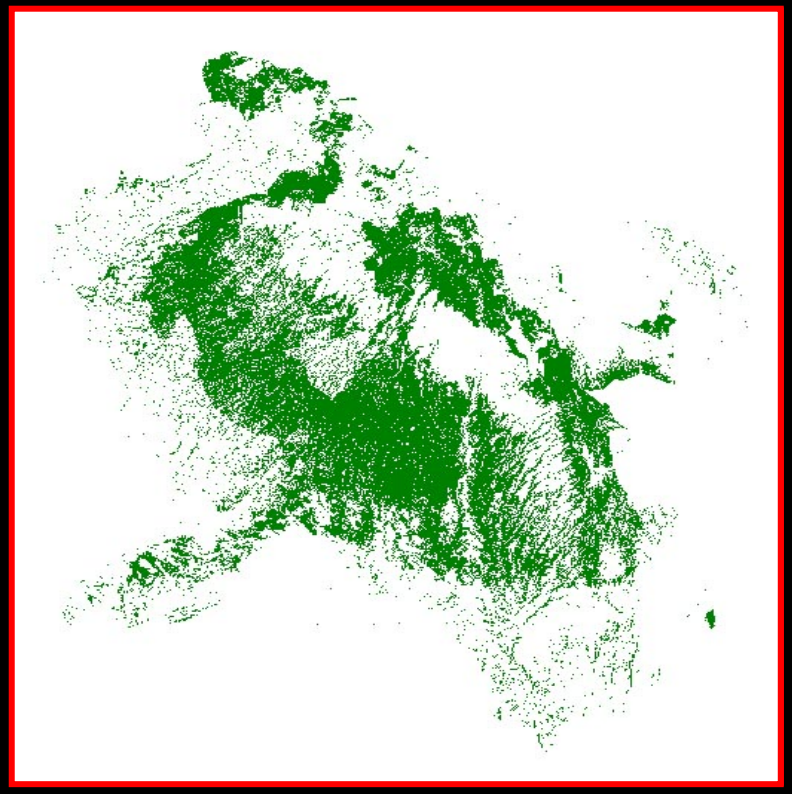


Image of Study area: 1986

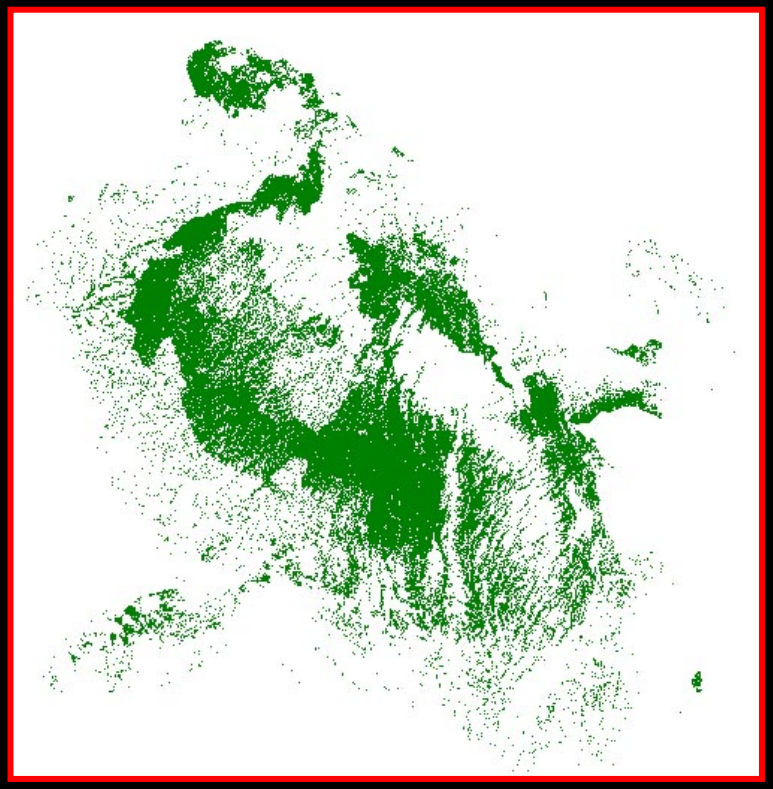
Image of Study area: 2000

The case of Mau Forest (Cont..)



Extent of Mau Forest in 1986

Area = 435,071.8 Ha (4,350.718 Km^2)



Extent of Mau Forest in 2000

Area = 352,603.5 Ha (3,516.035 Km^2)

Total area of deforested land = 82,468.3 Ha (824.683 Km^2)

Average rate of deforestation = 5,890.6 Ha per year (58.906 Km^2)

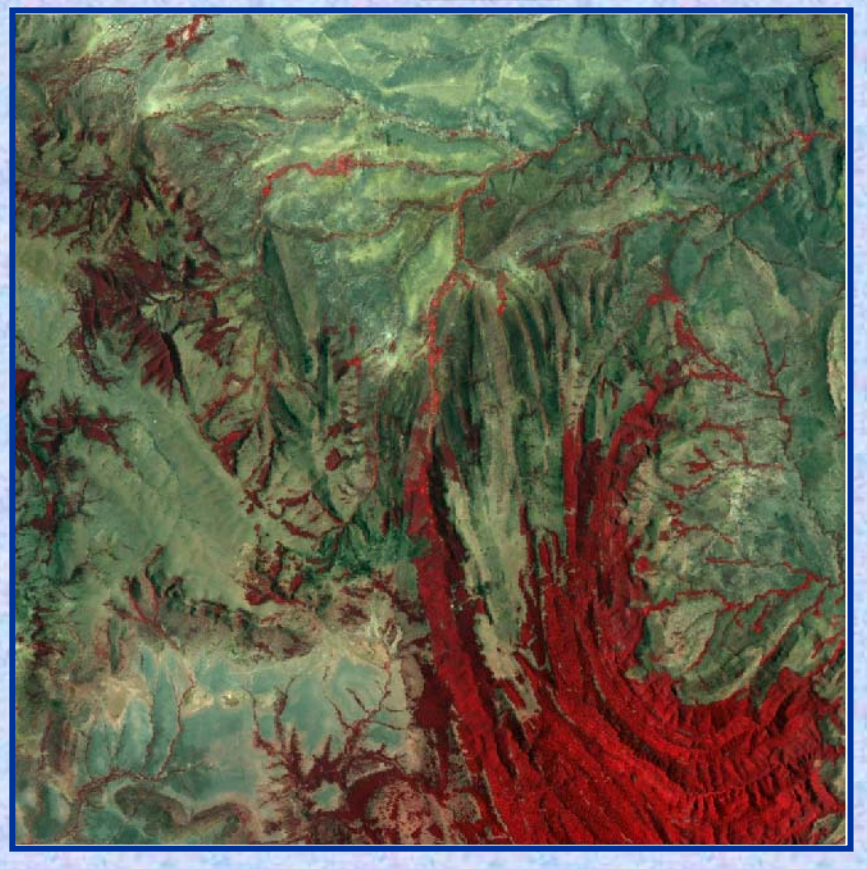
ii) Geoinformation in Community Resource Conservation:

the case of Loita Forest Mapping, Kenya

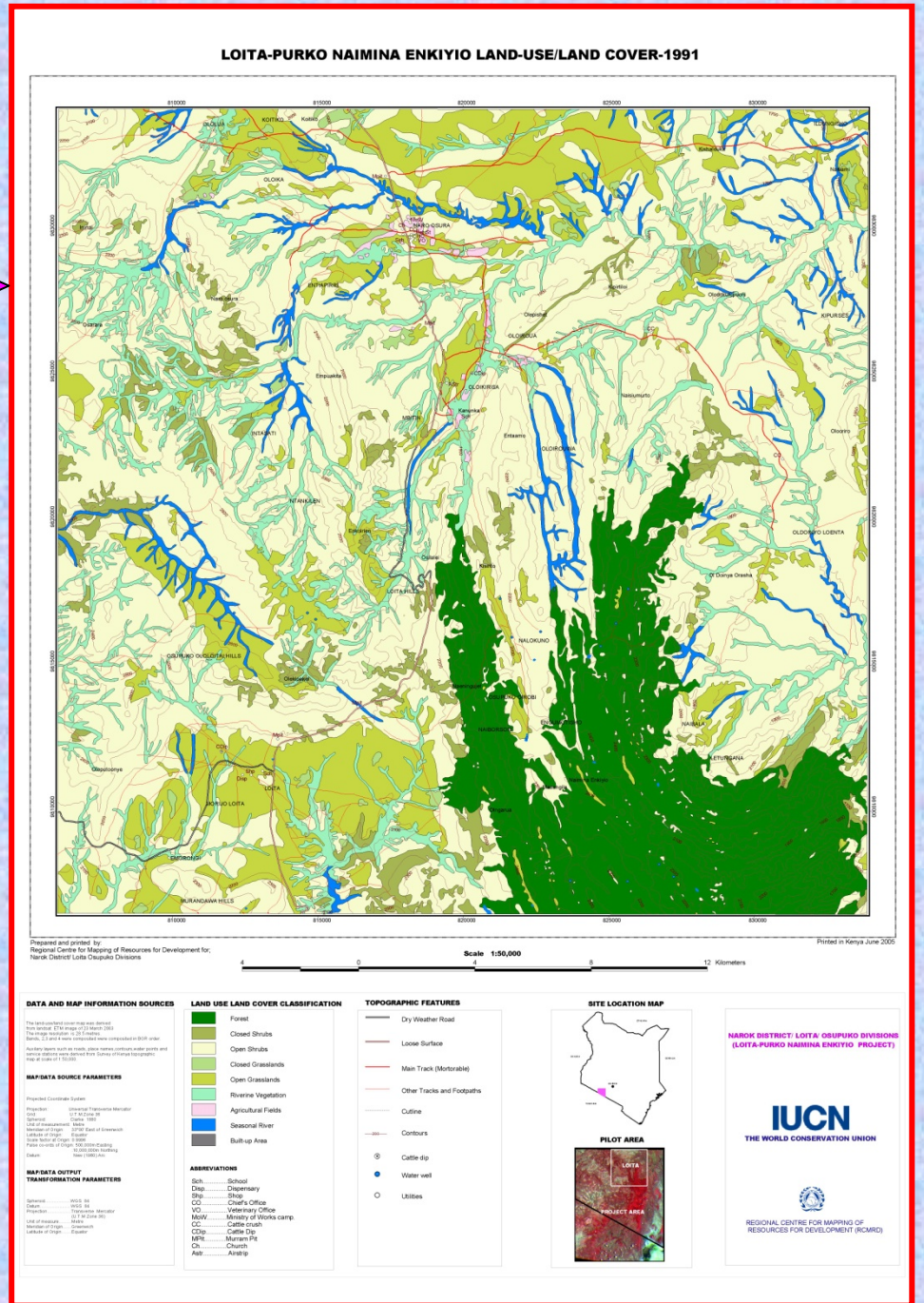
Implemented in collaboration with IUCN

Participatory GIS Mapping: Forest Mapping: Loita Forest, Kenya

Landsat



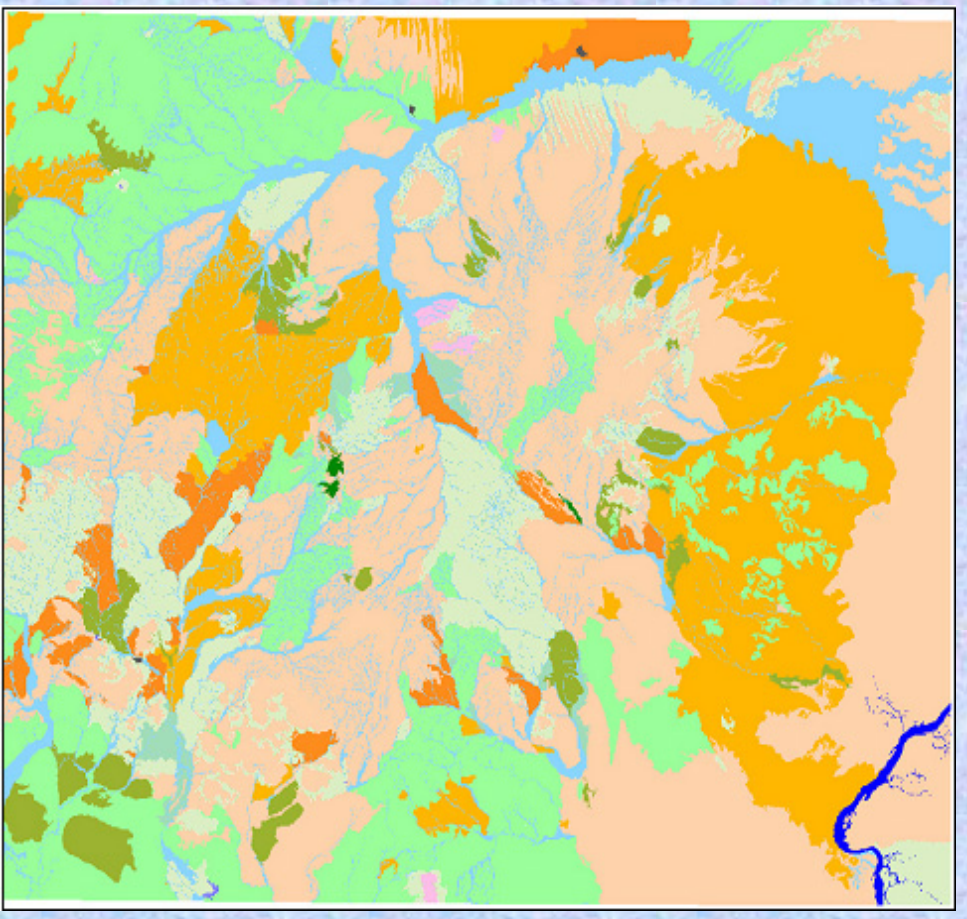
Final Map



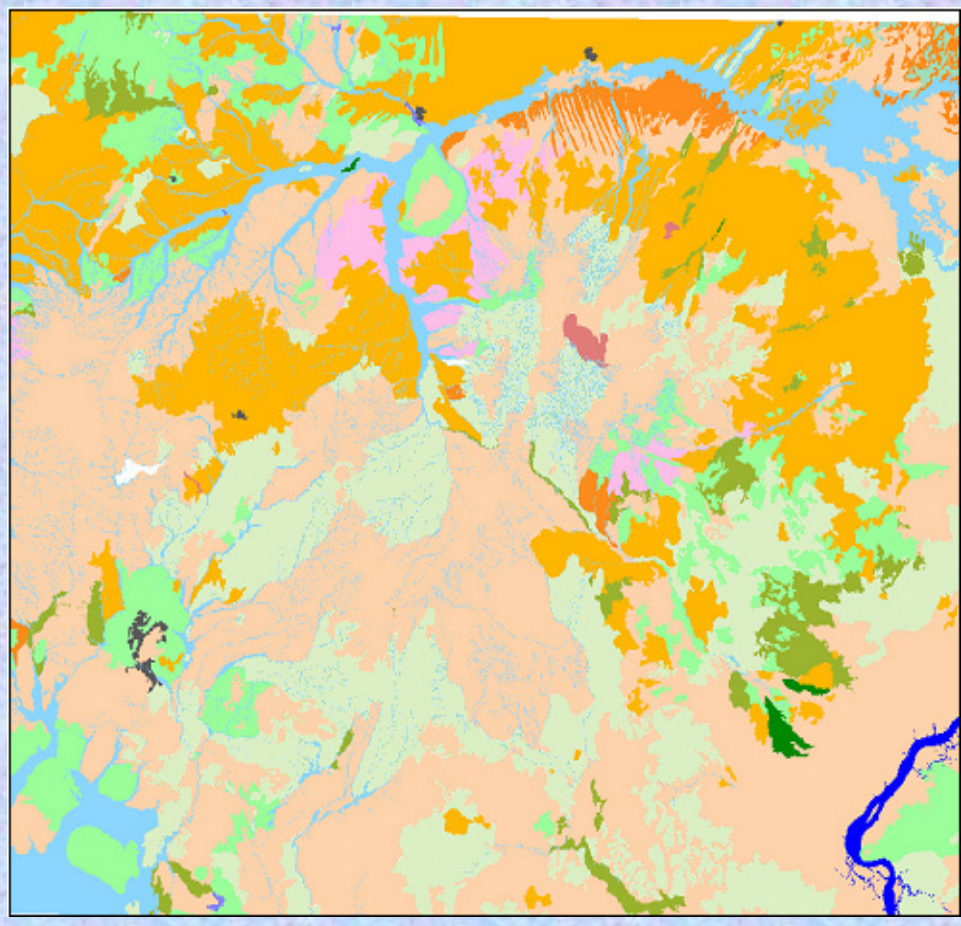
iii) Range Management Strategy: the case of South Kordofan, Sudan

Funded by IFAD through Yam CDC, Sudan

Land cover Maps of South Kordofan Region, Sudan

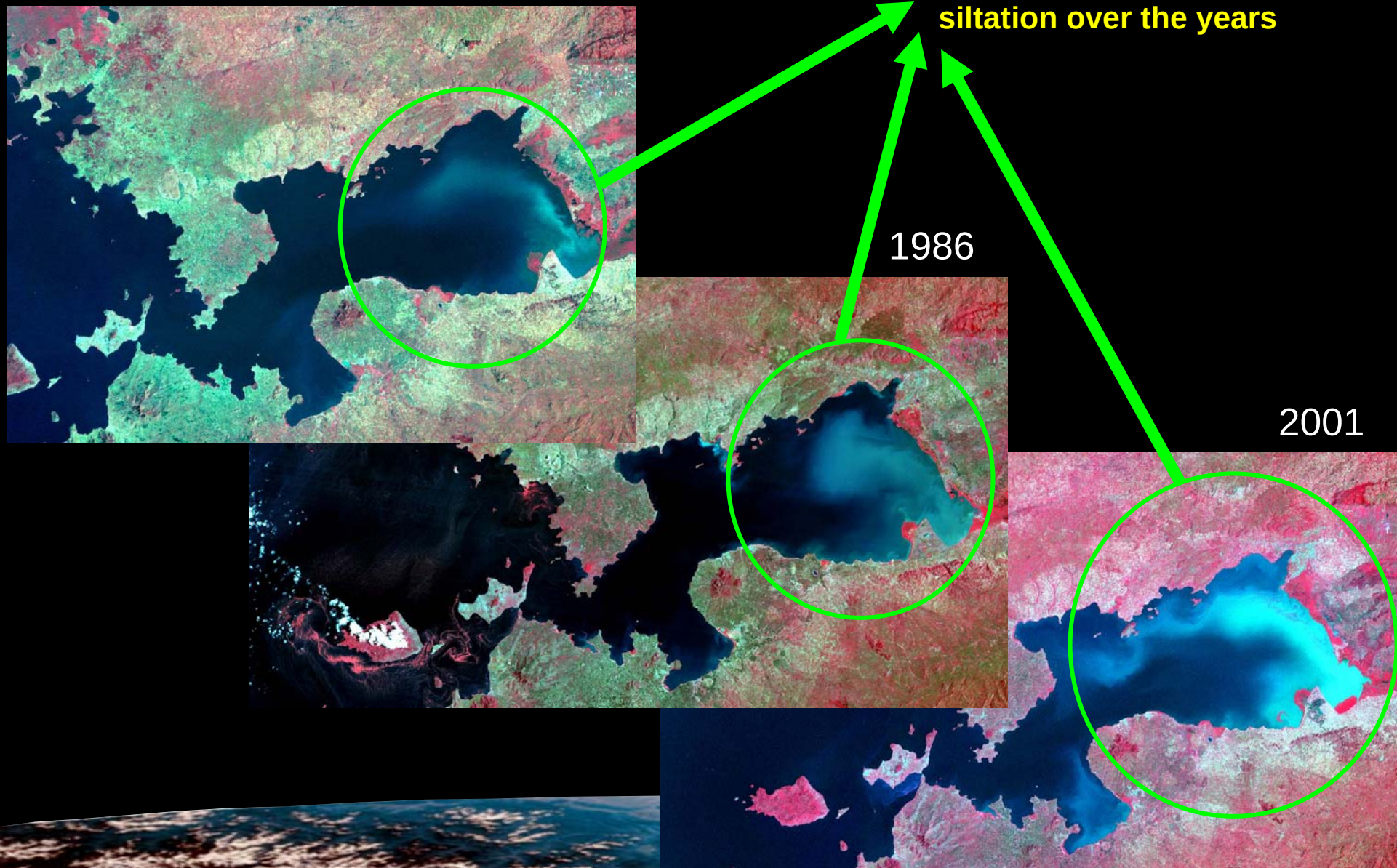


November 1984



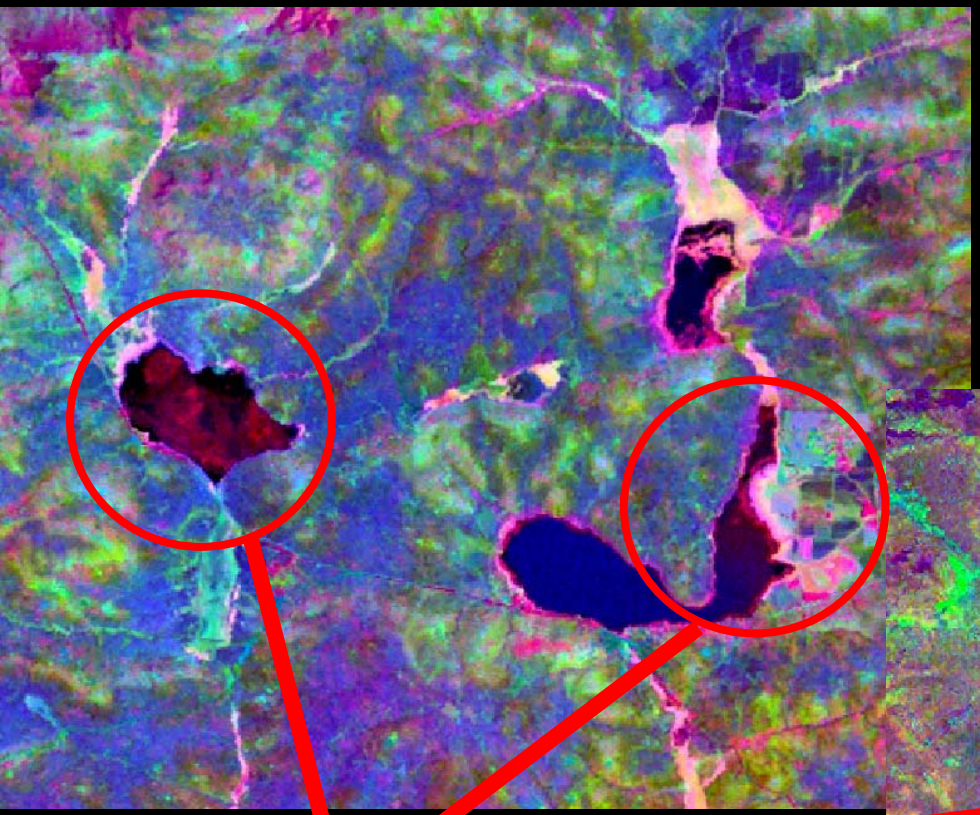
November 2000

iv) Monitoring Lake: The Case of Siltation in Lake Victoria

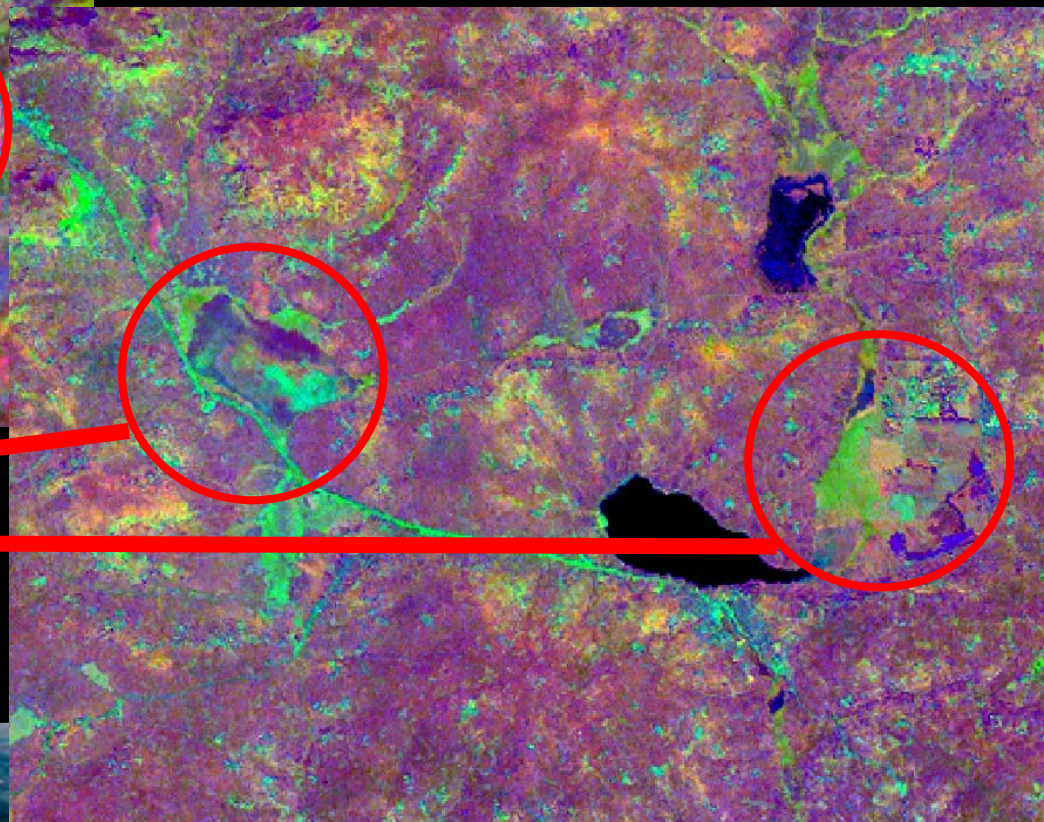


v) Monitoring Lakes: The case of disappearing Lakes in Ethiopia

1985



2002



Lakes disappeared

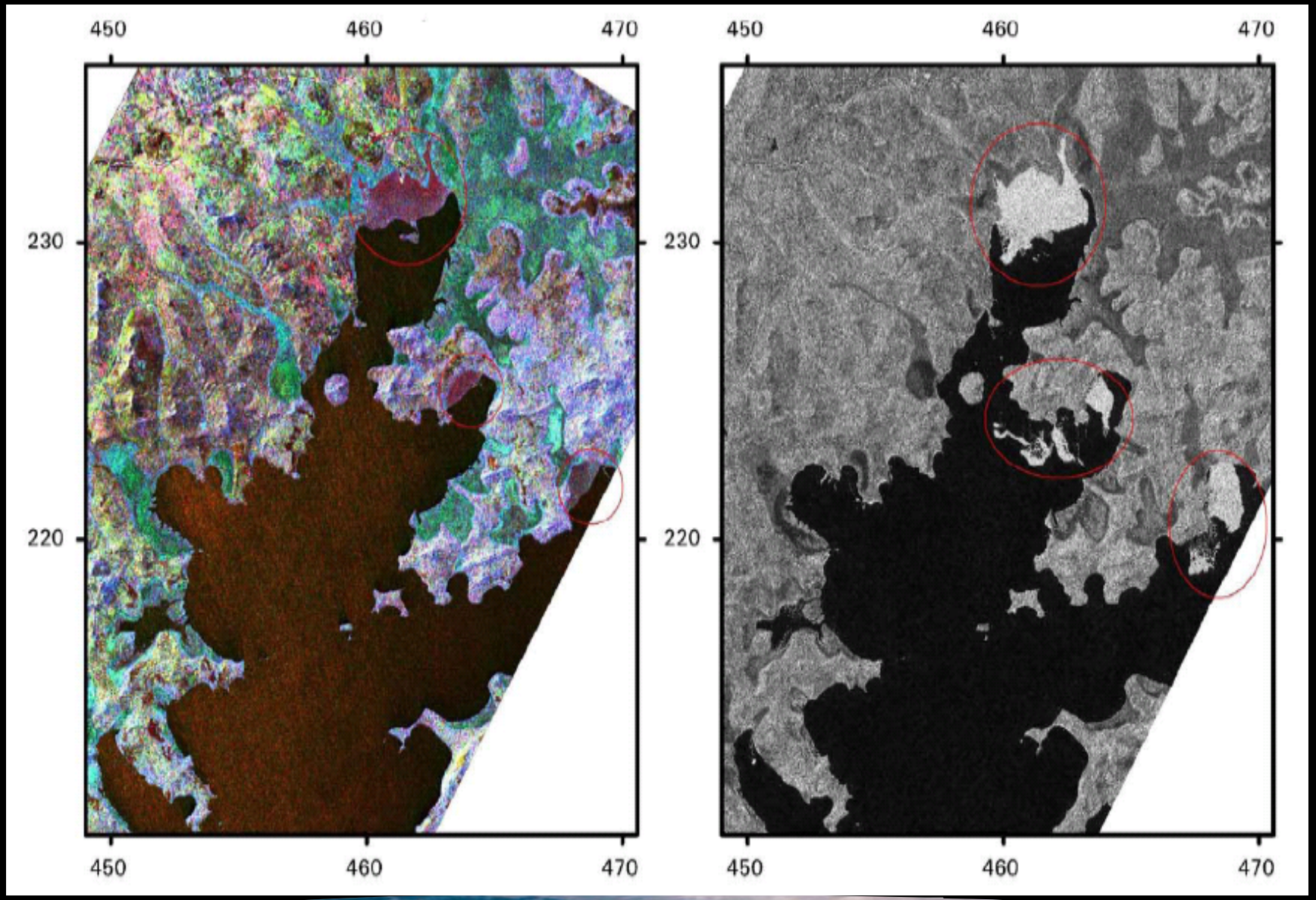
within 17 years

vi) Monitoring Lakes:
the case of Water Hyacinth Mapping in Lake Victoria

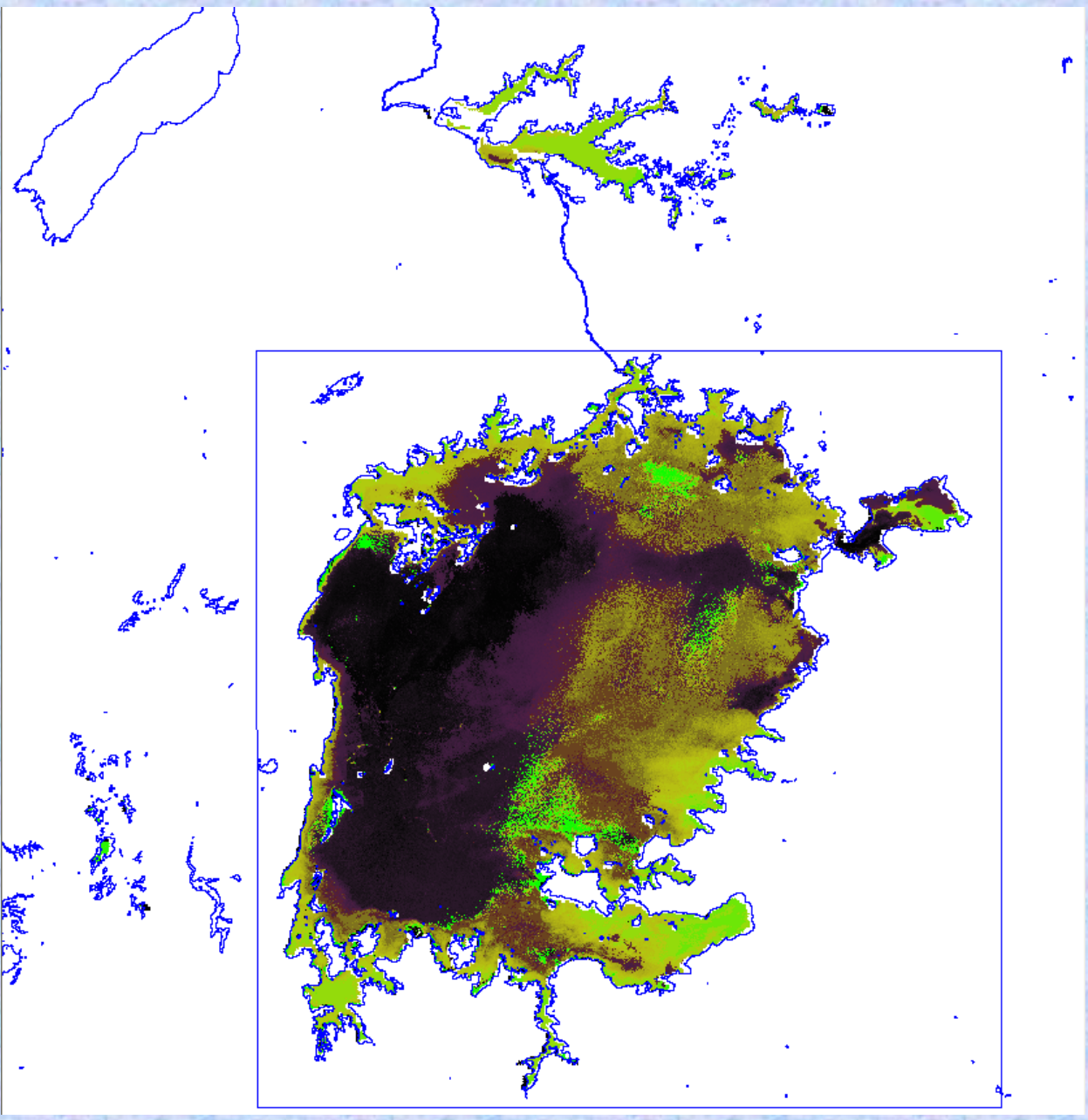
Plate 1a. Flowering water hyacinth

Plate 1b. Picture of a water hyacinth mat near Kisumu (Kenya) in October 1997 that demonstrates the vast and homogenous nature of these mats.

Mapping distribution and spread of water hyacinth in Lake Victoria using Radar satellite imagery



vii) Water Quality Monitoring: the case of Lake Victoria

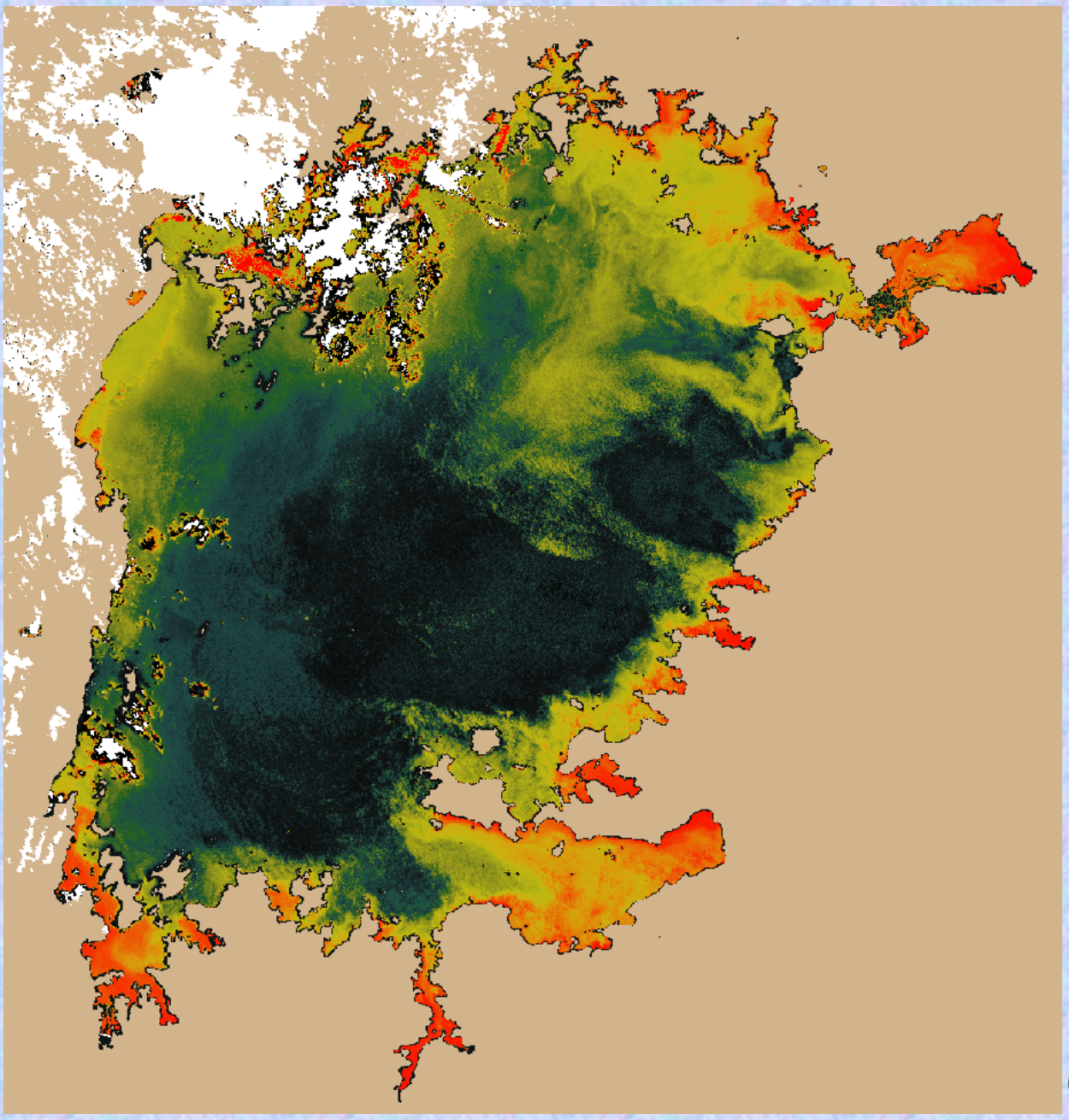


Total chlorophyll

0 20

mg/m^3

Derived from MERIS, 06-Feb-2006

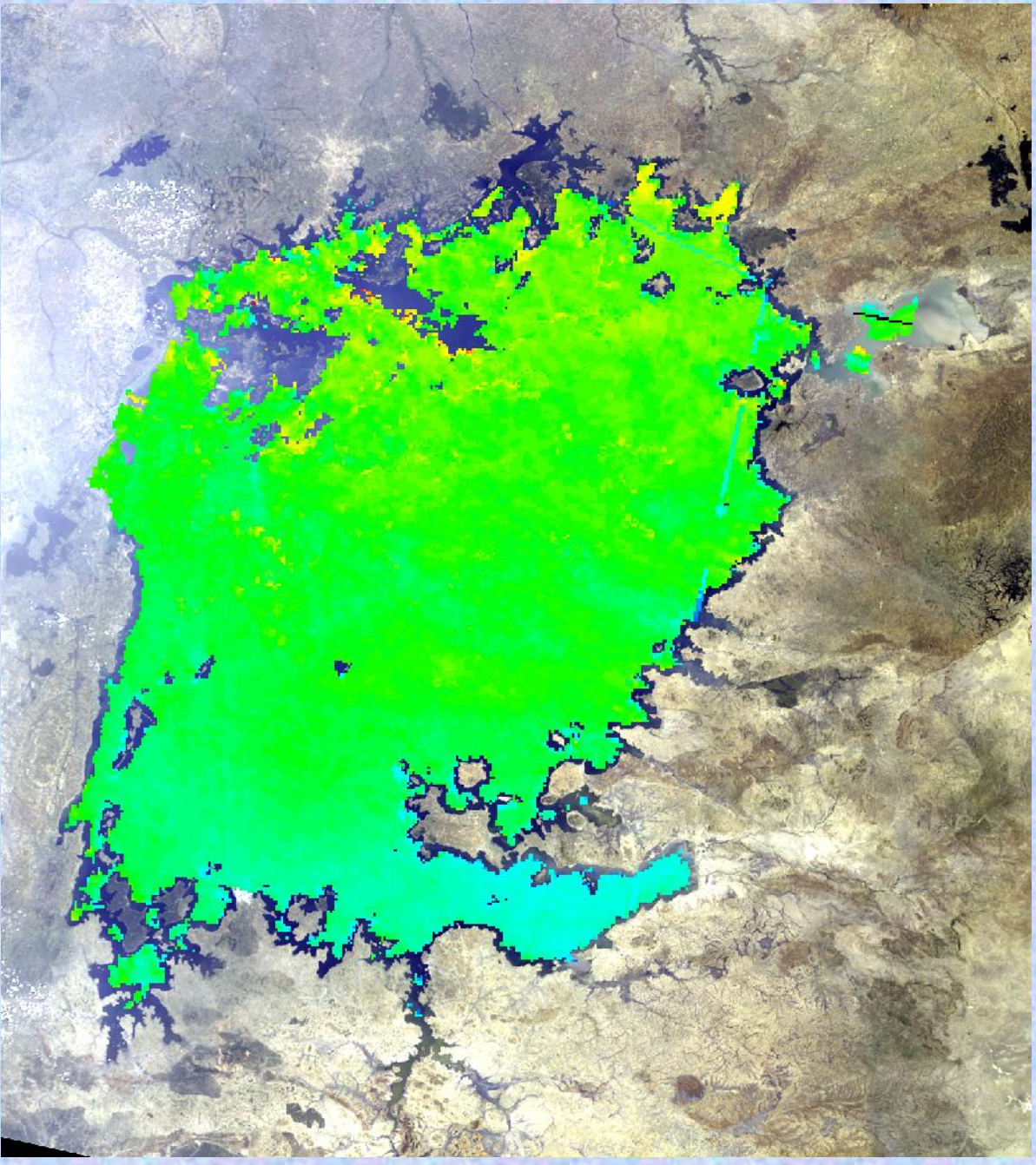


Processed MERIS scene of 04-SEP-2006

Total suspended matter

0 65

Total suspended matter ($gr*cm^{-3}$)



Lake surface temperature

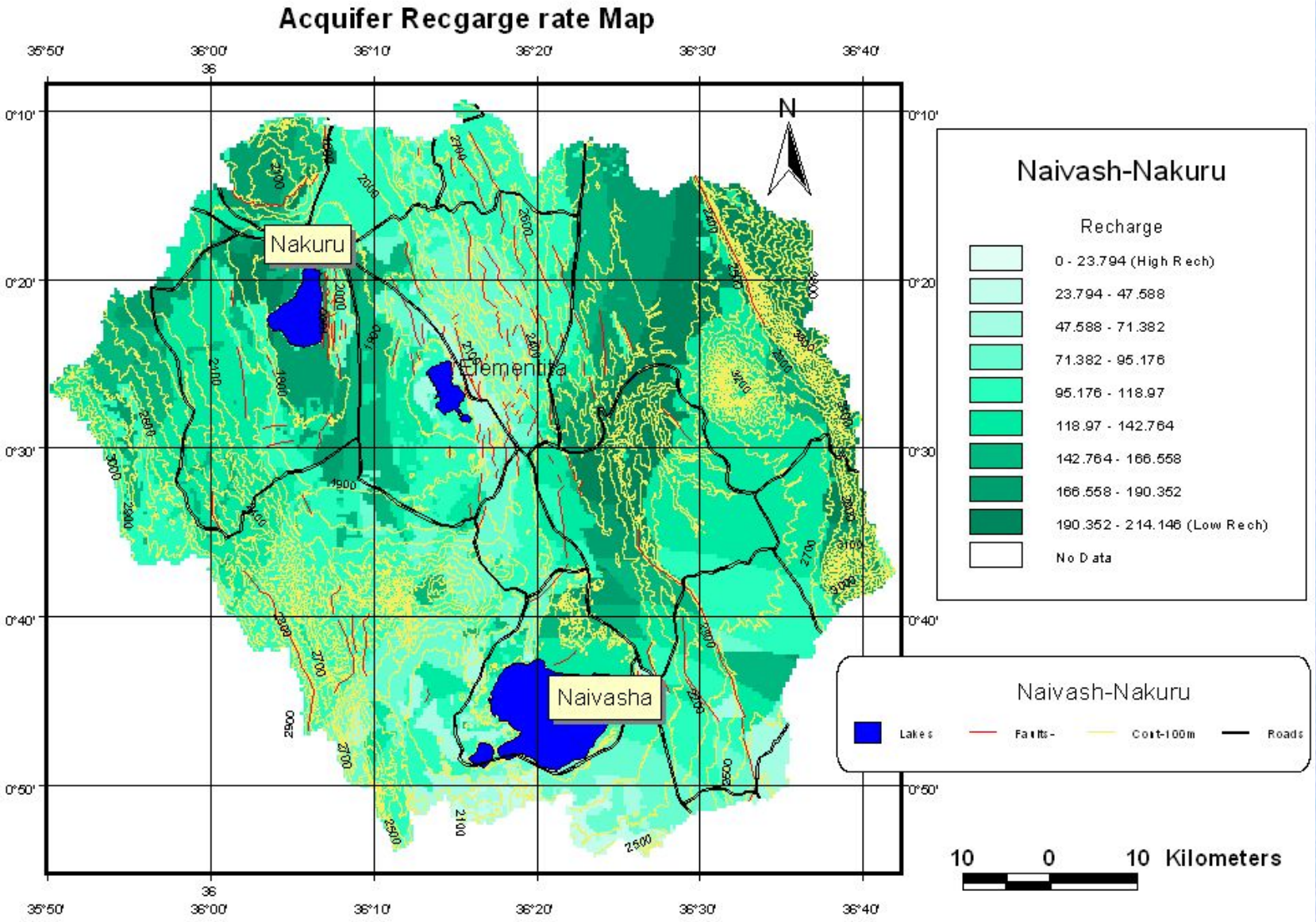
Legend

Temperature (°C)

- 18.5 <= T < 19.0
- 19.0 <= T < 19.5
- 19.5 <= T < 20.0
- 20.0 <= T < 20.5
- 20.5 <= T < 21.0
- 21.0 <= T < 21.5
- 21.5 <= T < 22.0
- 22.0 <= T < 22.5
- 22.5 <= T < 23.0
- 23.0 <= T < 23.5
- 23.5 <= T < 24.0
- 24.0 <= T < 24.5
- 24.5 <= T < 25.0
- 25.0 <= T < 25.5
- 25.5 <= T < 26.0
- 26.0 <= T < 26.5
- 26.5 <= T < 27.0
- 27.0 <= T < 27.5
- 27.5 <= T < 28.0
- 28.0 <= T < 28.5

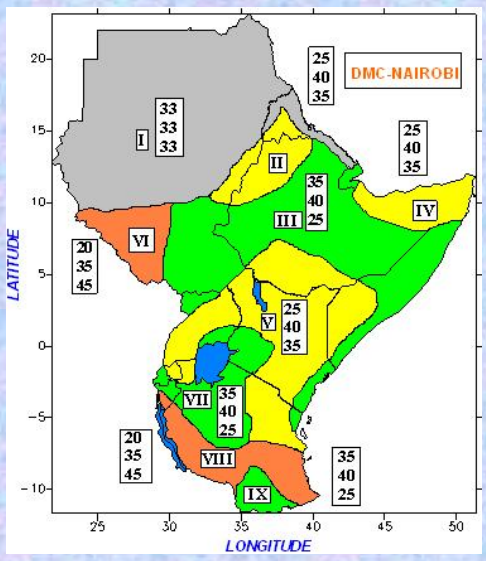
Derived from 3 AATSR scenes:
16-AUG-2006, 19-AUG-2006, 24-AUG-2006

viii) Ground water Monitoring: the sace of Rift Valley, Kenya



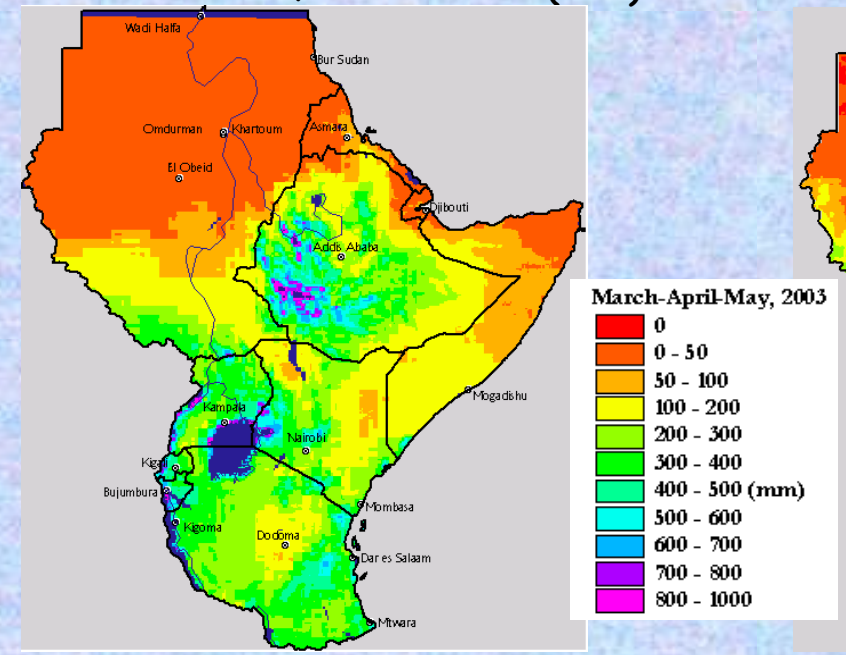
c) Early Warning and Disaster Management

Satellite based rainfall estimation for crop yield assessment

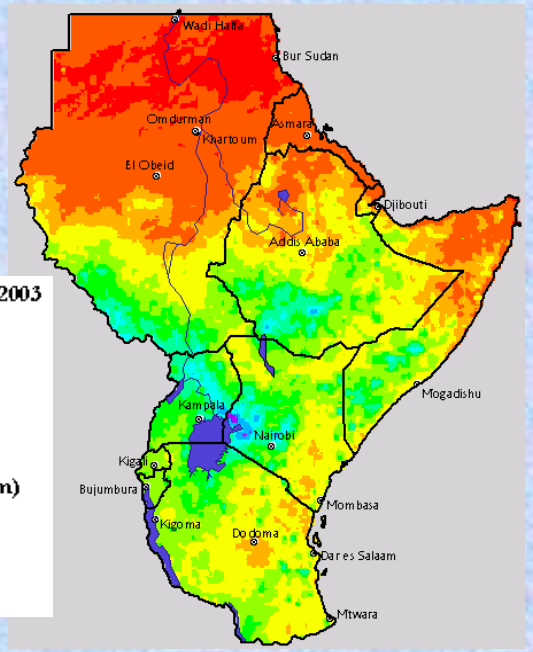


COF 11 Forecast

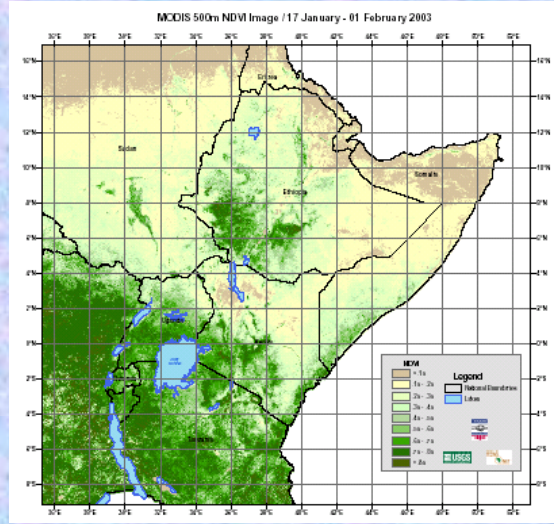
Potential rainfall amounts (mm)

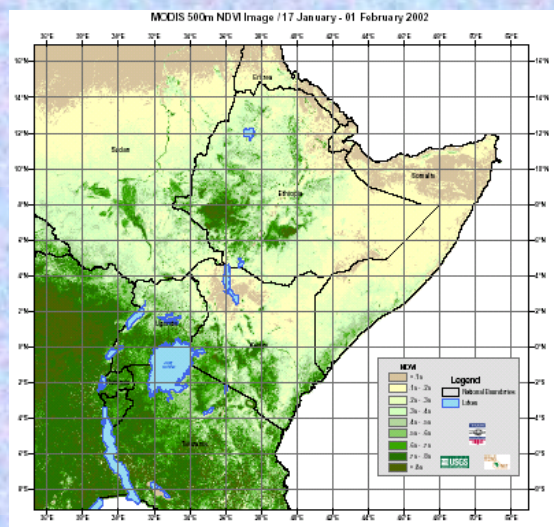


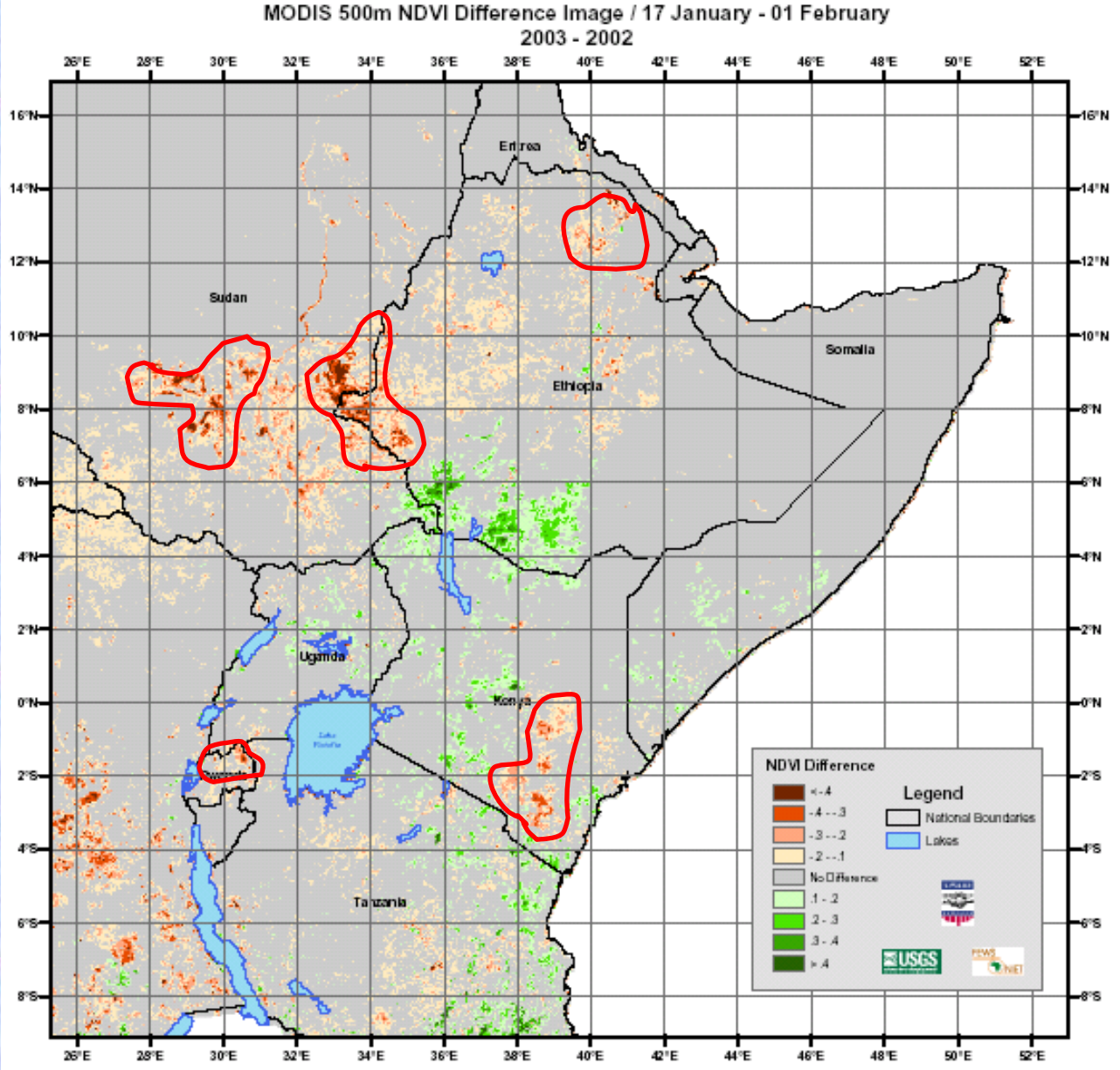
Actual Rainfall Performance



Identification of Hotspots for Famine early warning



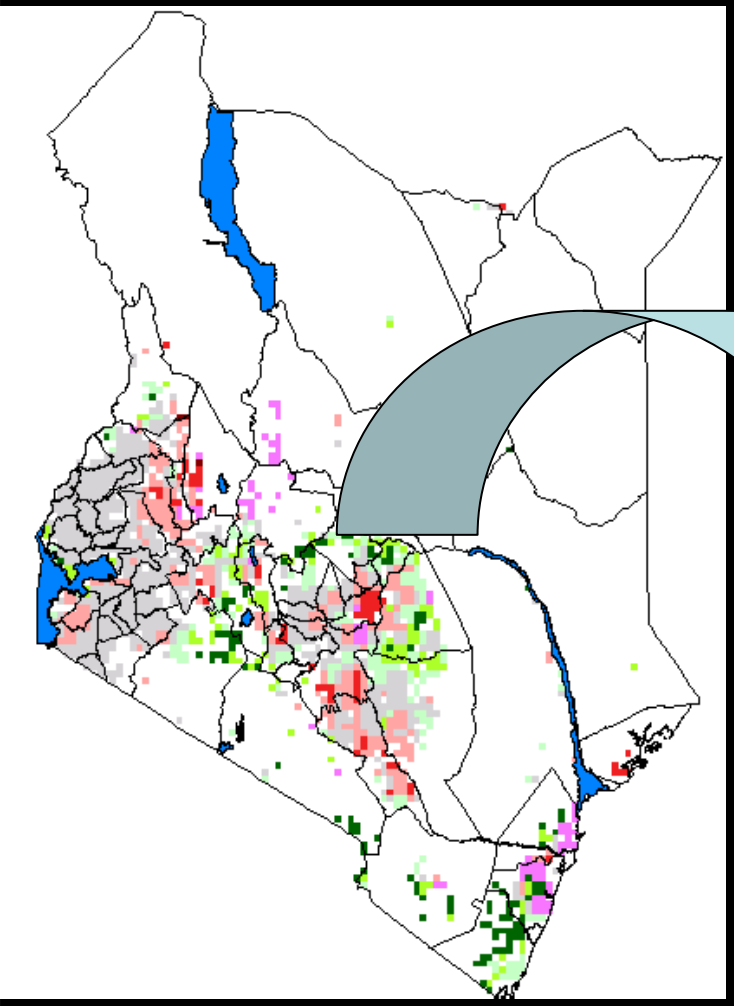


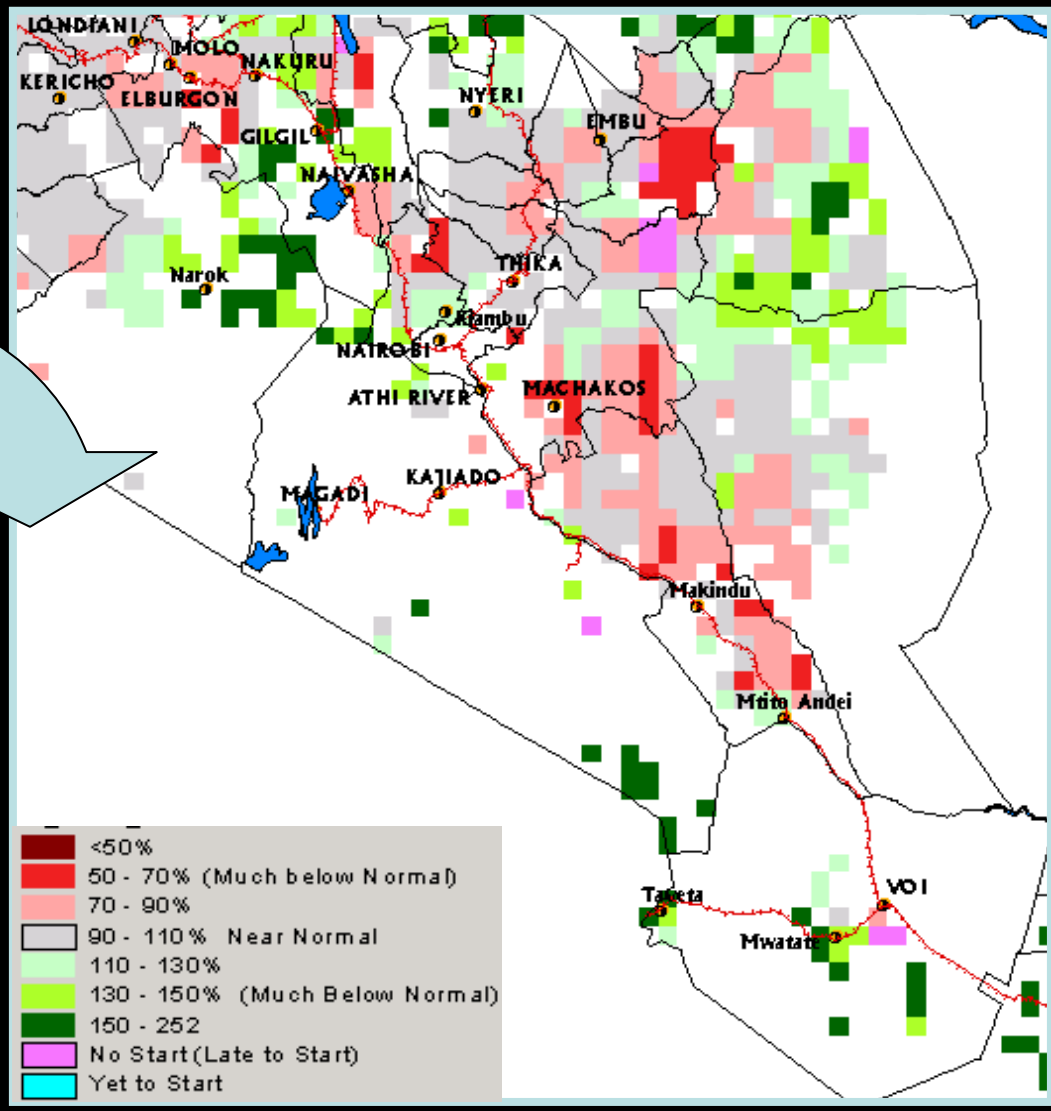


Crop (WRSI) Monitoring

Continuous EWS

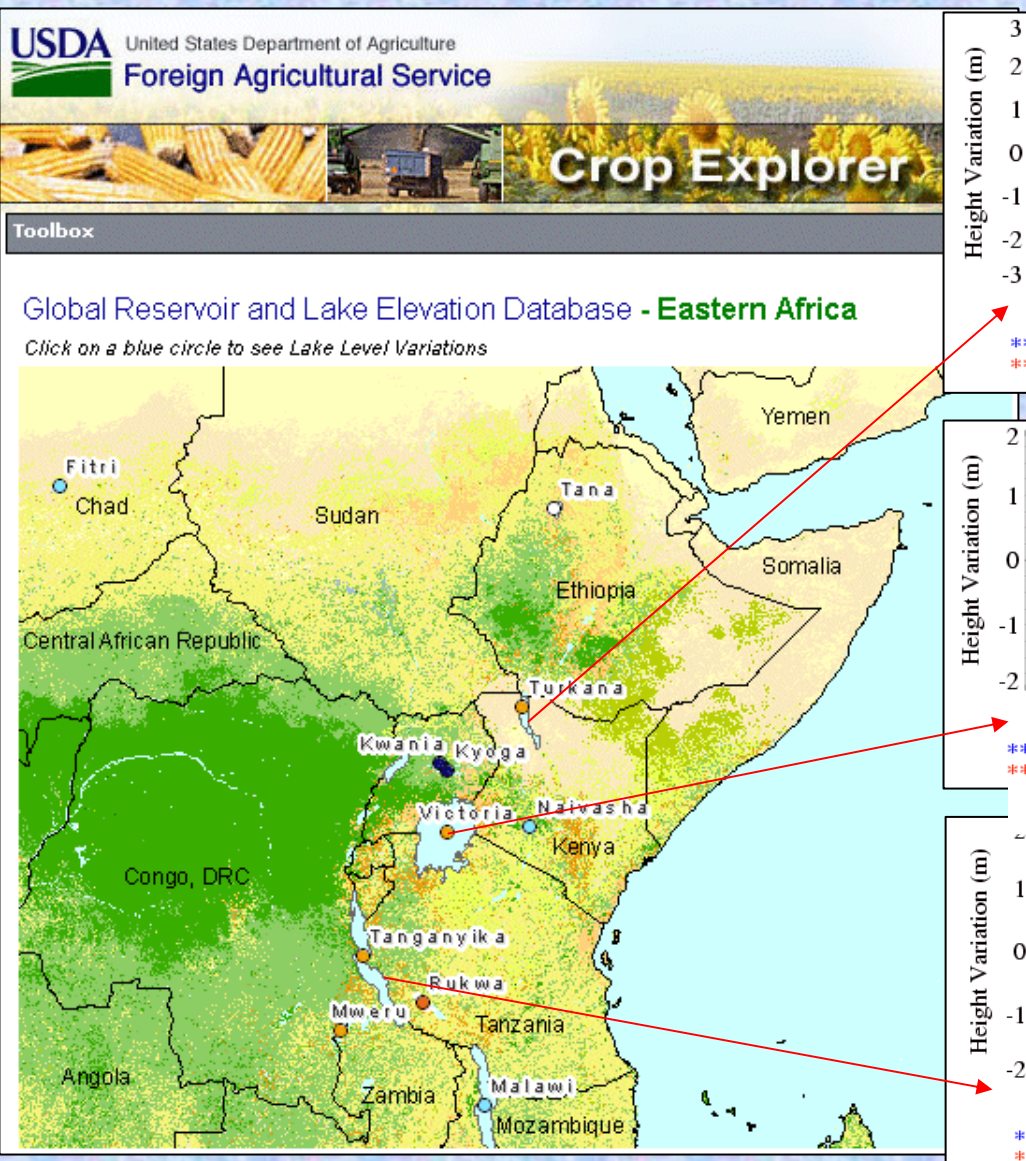
Using more refined Land Use – Land Cover (LULC) layers....

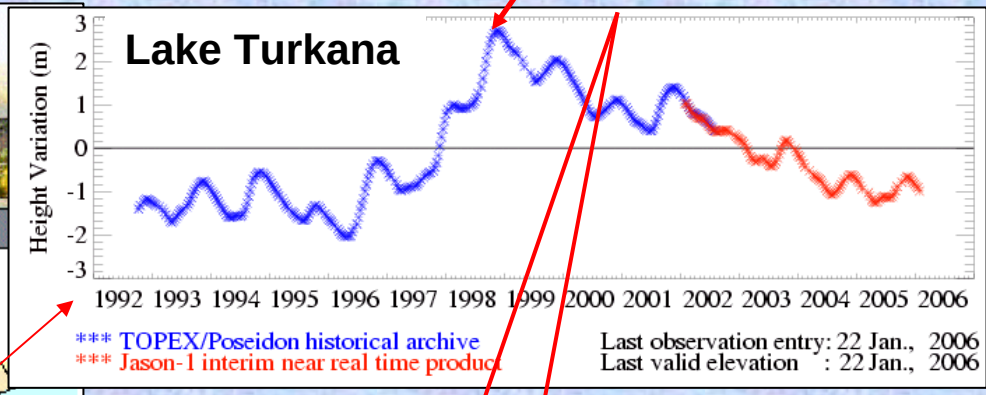


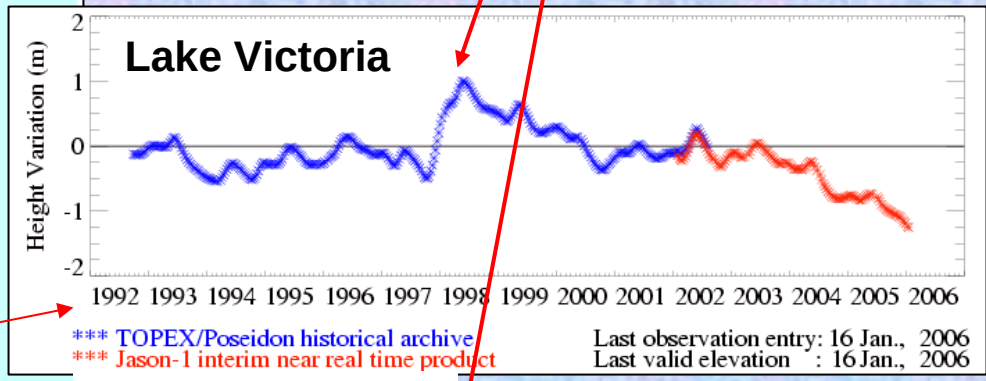


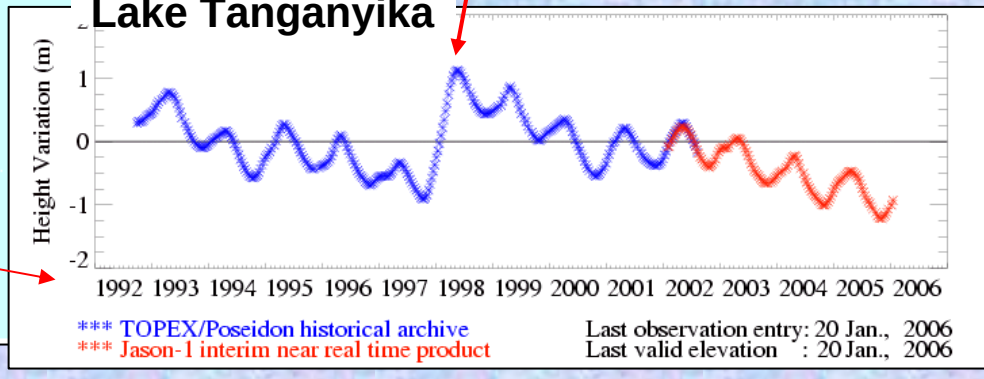
Regional Drought in East Africa

Decrease in lake water levels since 1997/98 El Nino





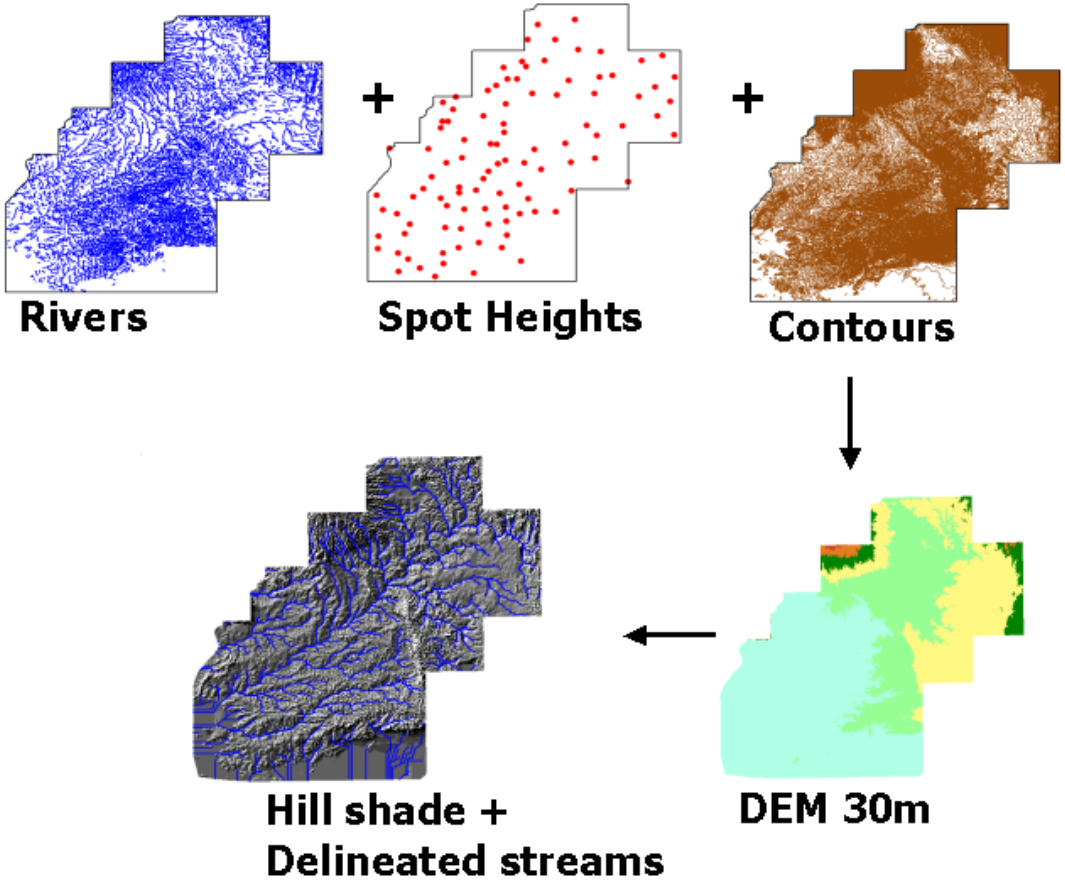


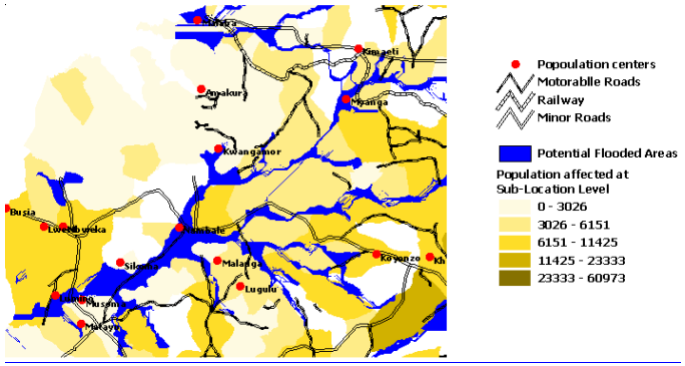


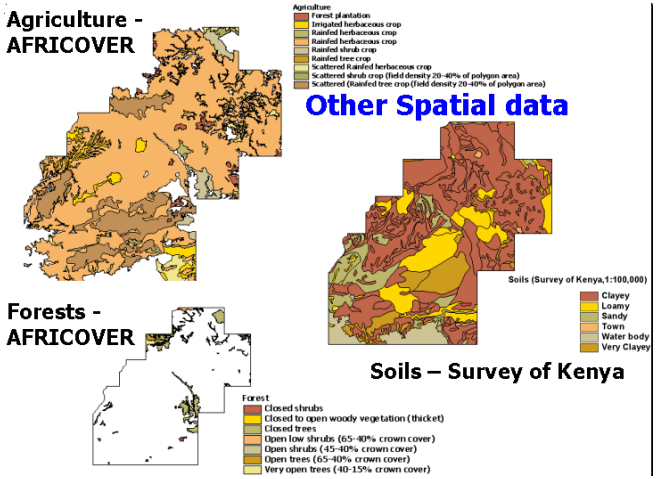
http://www.pecad.fas.usda.gov/cropexplorer/global_reservoir/

Use of Geoinformation in Predicting Flooding:

Nzoia River Basin-Kenya

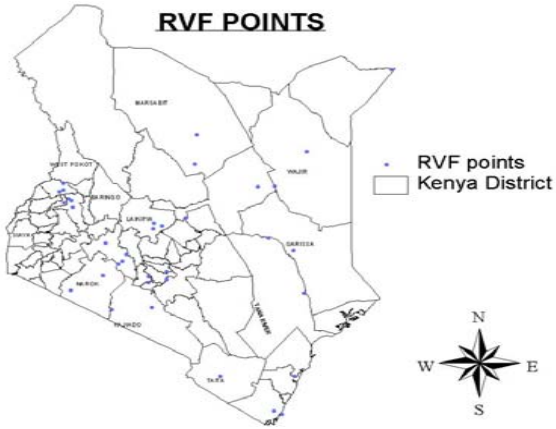




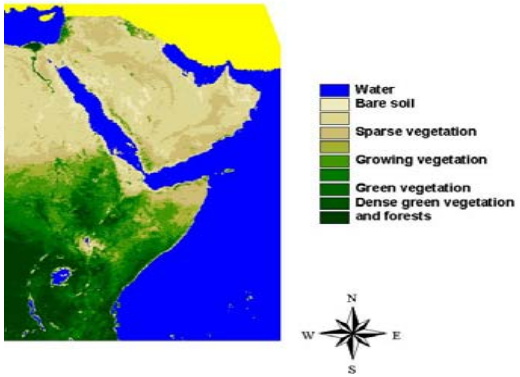


Use of Geoinformation in Predicting Disease Outbreaks: Rift Valley Fever in GHA

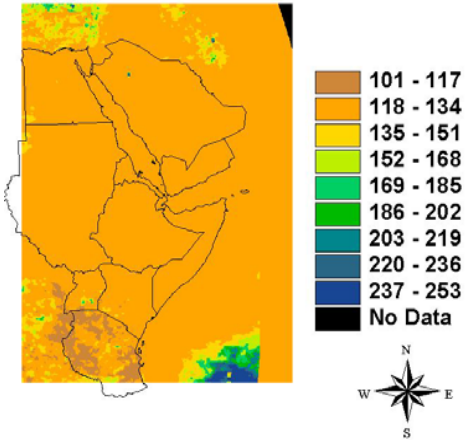
RVF POINTS



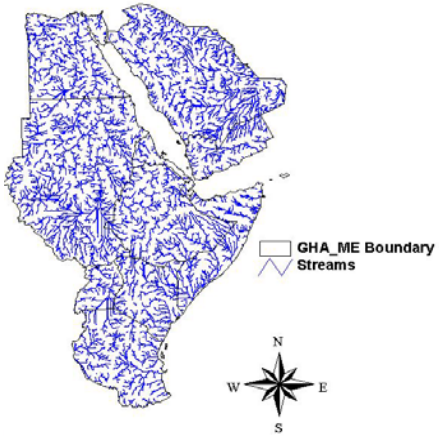
NDVI DATA FOR JANUARY 2003



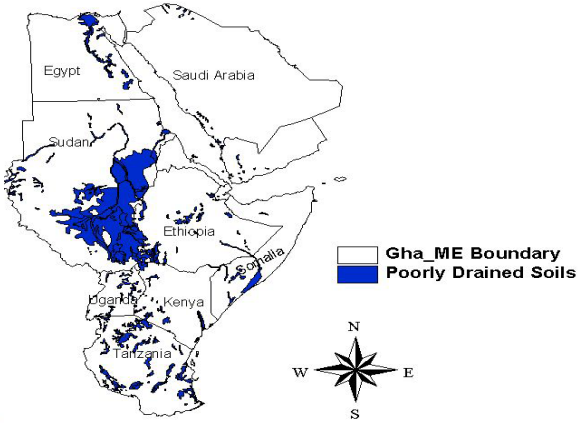
RFE FOR JANUARY 2003



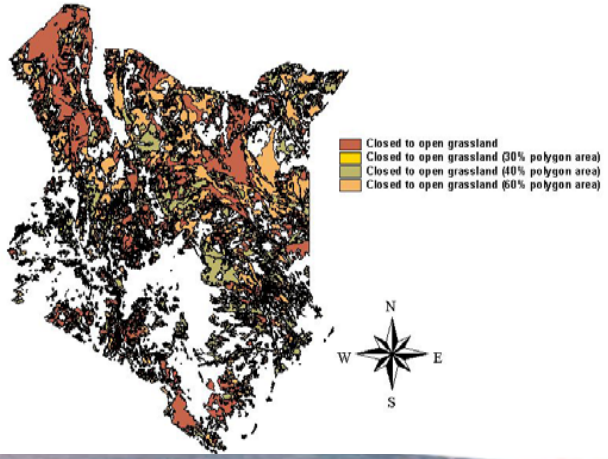
STREAMS OF GHA AND ME



POORLY DRAINED SOILS



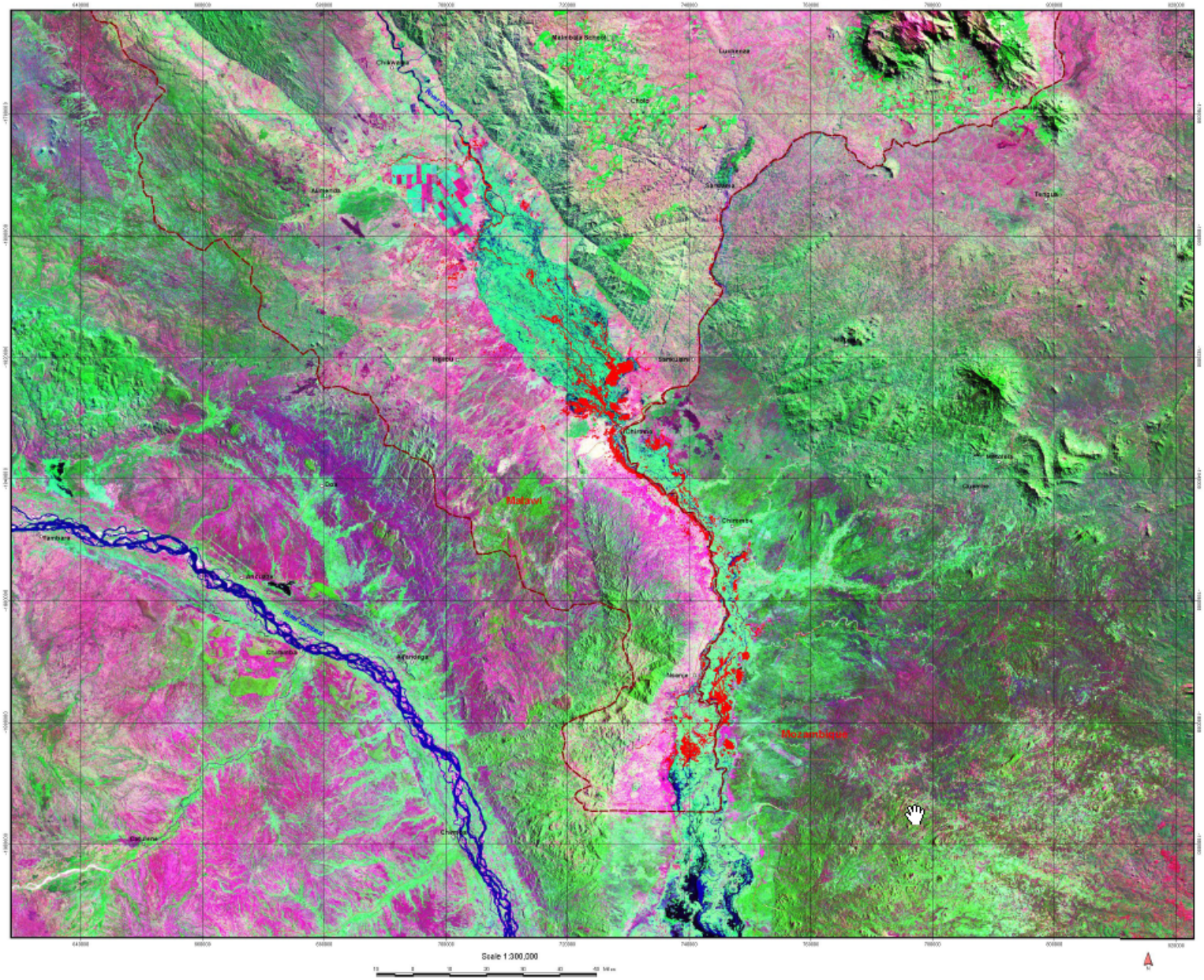
AFRICOVER DATA



Flood monitoring: the Malawi/Mozambique Floods of 2006

In collaboration with the International Charter and Disaster Management

FLOODING EVENTS ON 07TH FEBRUARY 2008 AS INTERPRETED FROM RADARSAT IMAGE (MALAWI, MOZAMBIQUE)



CHARTER CALL
ID 190
Contact information:
rcmrd@rcmrd.org
Web: www.rcmrd.org

RCMRD
USGS
CSA ASC
UNOSAT

MAP INFORMATION

This map illustrates satellite- detected flood waters over the affected areas in Malawi, and Mozambique
Red areas represent flood affected areas identified on 7th February 2008
Image data source: Radarsat
Roads and towns data source: Africa Data Sampler

MAP LEGEND

- Bare land
- Forest
- Farms
- Water bodies
- Major Towns
- Other Towns
- Roads
- Rivers
- International Boundary
- Flooded areas

Map Scale 1:300,000

Satellite Data.....Radarsat
Date series.....7th Feb 2008
Other GIS Data..... Africa Data sampler
Projection.....U.T.M Zone 36
Datum.....WGS 84

Prepared and Printed by
Regional Centre for Mapping of Resources for Development (RCMRD)
February 2008

Flood Water Identification in Central Gambia

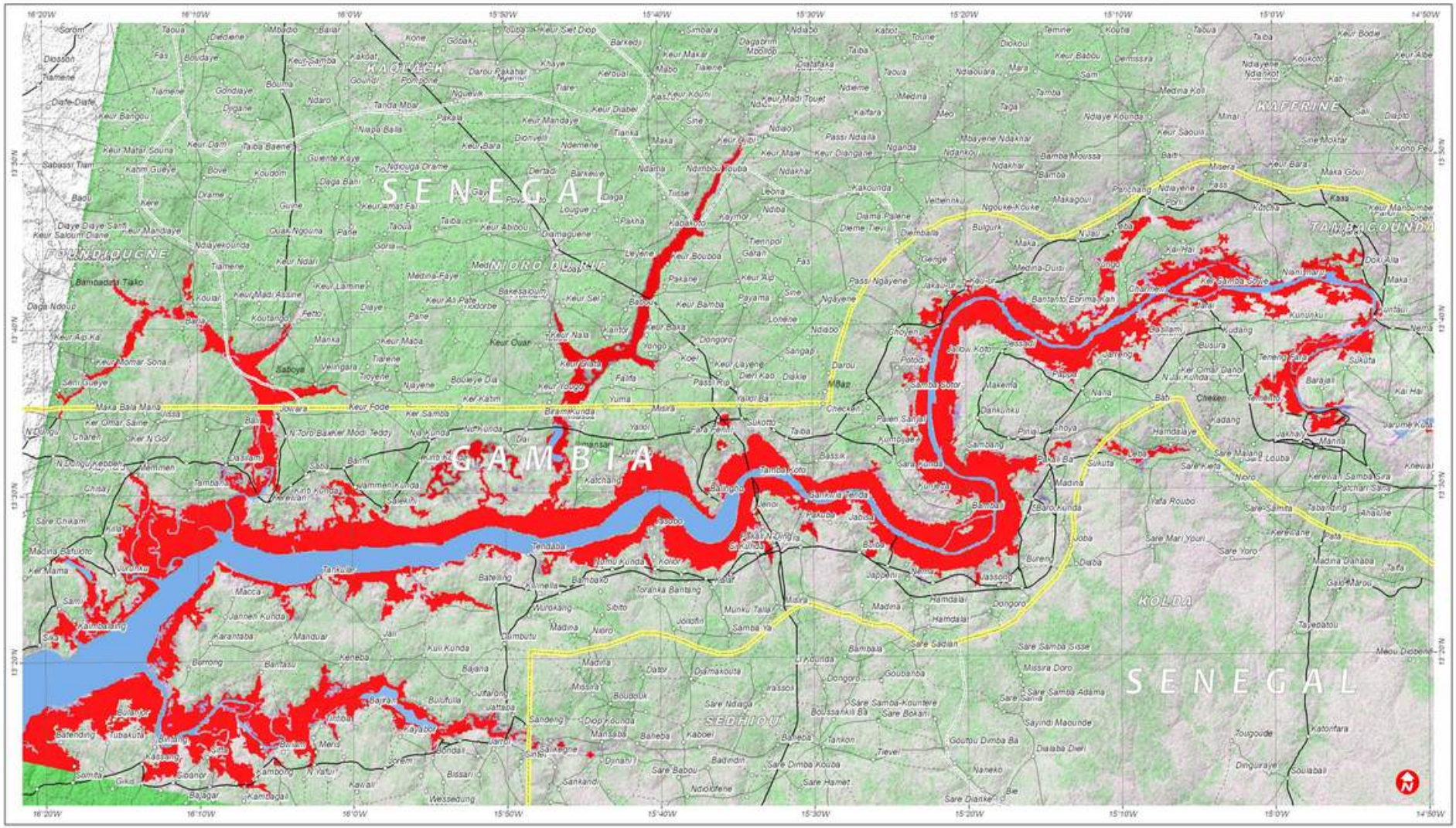
Flood Analysis with ESA Multitemporal Composition ASAR WSM Data Recorded 18 September 2007 and 07 March 2006

Flood Event September 2007

21 Sept. 2007

Version 1.0

Glide No: FL-2007-000153-GHA



Map Information

This map illustrates satellite detected flood water over the flood affected area in Gambia (depicted in red). Flood water analysis was made using a multi-temporal composition of ASAR radar data recorded on 18 September 2007 and 7 March 2006. The multi-temporal composition was produced by ESA on behalf of the Space Charter. Additional MODIS terra data from September 2007 was used in this analysis. This flood detection is a preliminary analysis & has not yet been validated in the field. UNOSAT is collaborating with WFP and ITHACA in support to the humanitarian operation in West Africa.

The depiction and use of boundaries, geographic names and related data shown here are not warranted to be error-free nor do they imply official endorsement or acceptance by the United Nations. This map was produced by the United Nations Institute for Training and Research (UNITAR) Operational Satellite Applications Programme (UNOSAT). UNOSAT provides satellite imagery and related geographic information to UN humanitarian and development agencies and their implementing partners.

Map Legend

- Capital
- Large Town
- Town / Village
- Airport
- Port Facility
- International Border
- District Boundary
- Main Road
- Minor Road / Track
- Trail
- Railroad
- Flood Water Extent as of 18 Sept. 2007
- Pre-flood Water Extent as of 7 March 2006

Map Scale for A3: 1:400,000

0 2.5 5 10 15 20 Kilometers

Satellite Data	ASAR (WSM)
Radar Dates	7/3/06 & 18/9/07
Sensor Resolution	150 m
Radar Processing	ESA
Flood Analysis	UNOSAT, ESA
GIS Data	NGA, USGS, SALB, GIST
Map Production	UNOSAT (21 Sept.07)
Projection	Lambert Conformal Conic
Datum	WGS-84

ITHACA

WFP World Food Programme

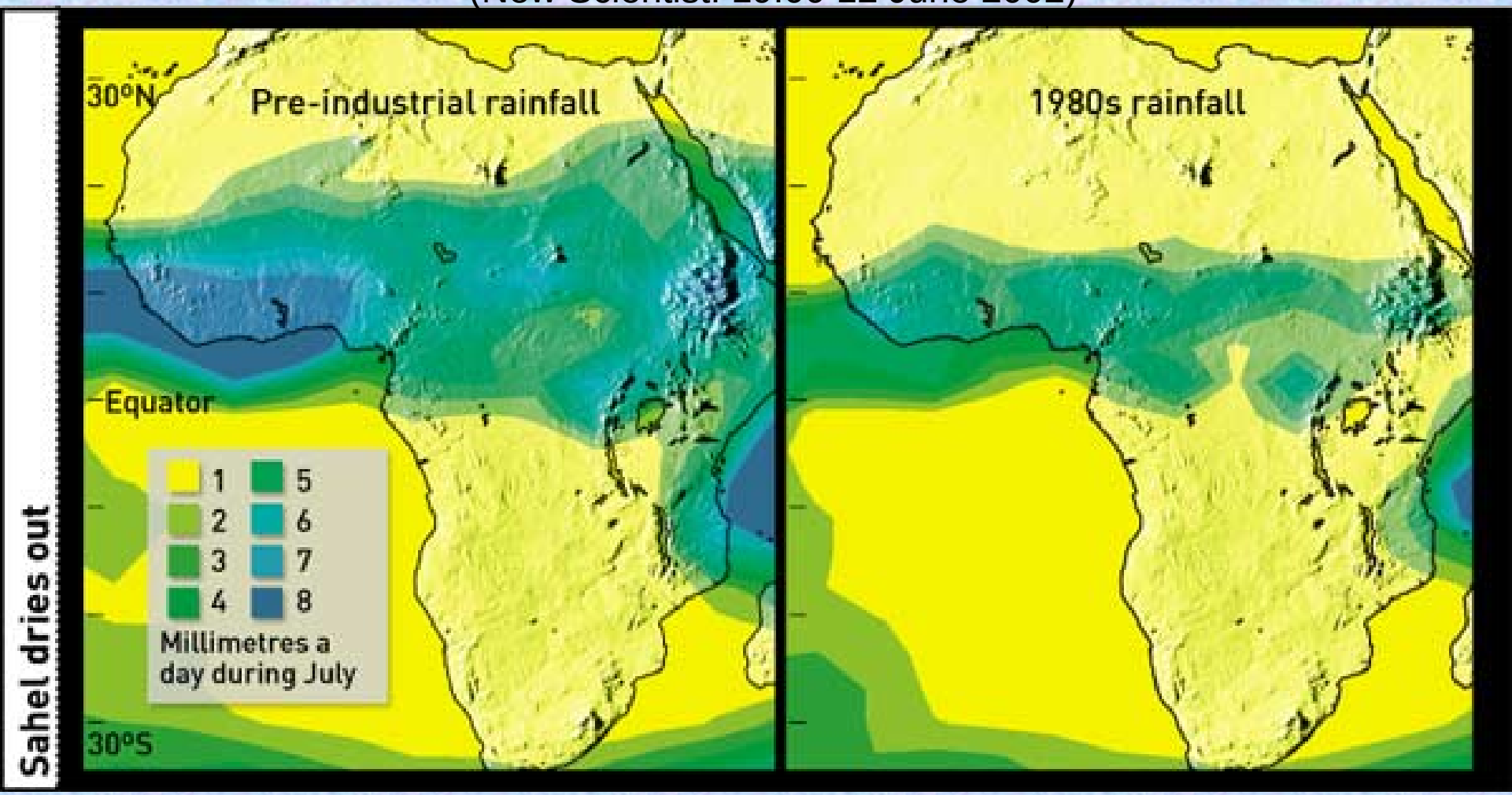
UNOSAT Contact Information:
info@unosat.org
24/7 Hotline
+41 76 487 4998

UNOSAT satellite imagery for all

www.unosat.org

Effects of Climate Change in Africa

(New Scientist: 19:00 12 June 2002)

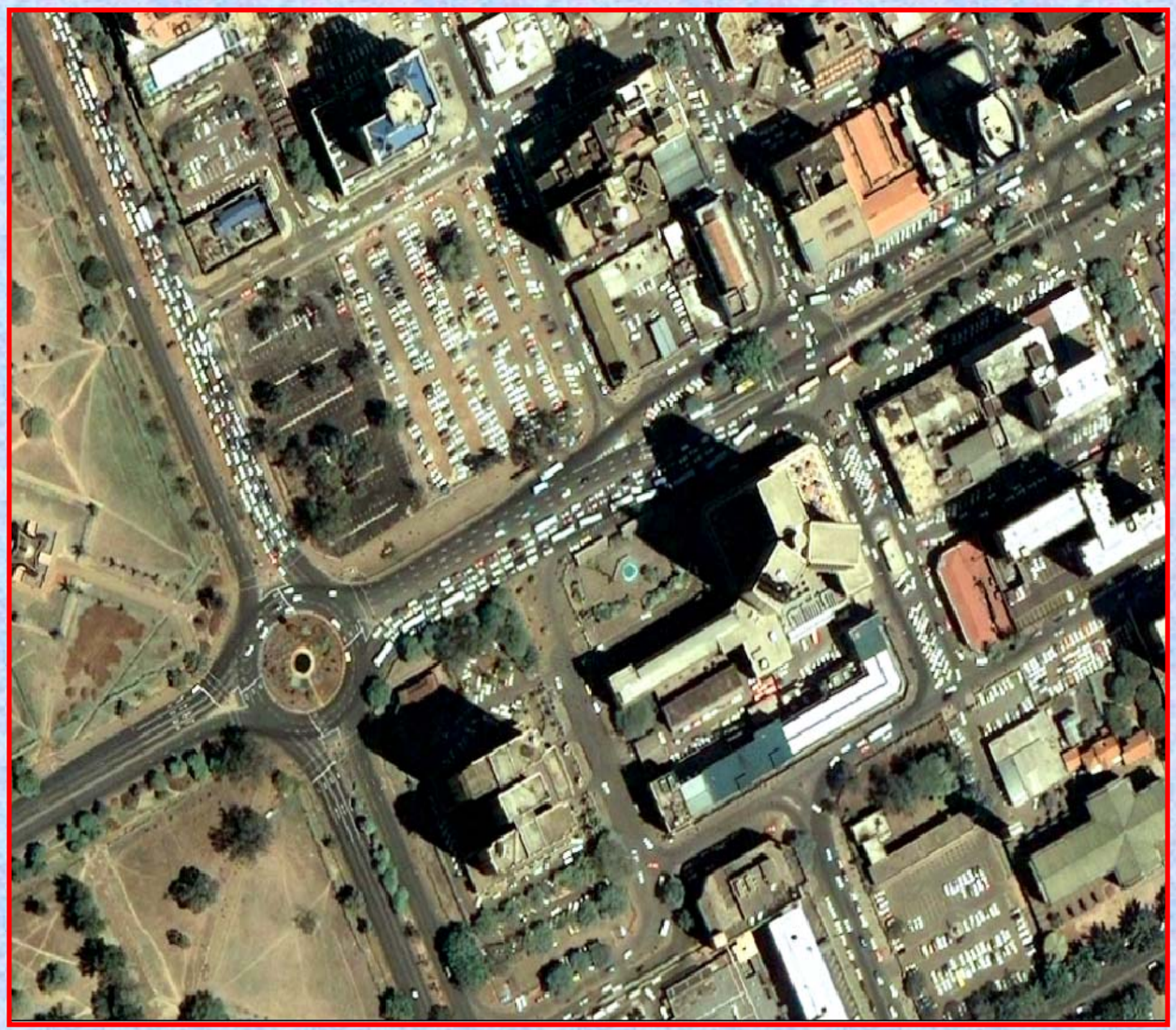


“During the worst years, between 1972 and 1975, and 1984 and 1985, up to a million people starved to death.”

4. Recent Advances in Geospatial Sciences and Technology and Emerging Business Opportunities and Partnerships in Africa

High resolution satellite images

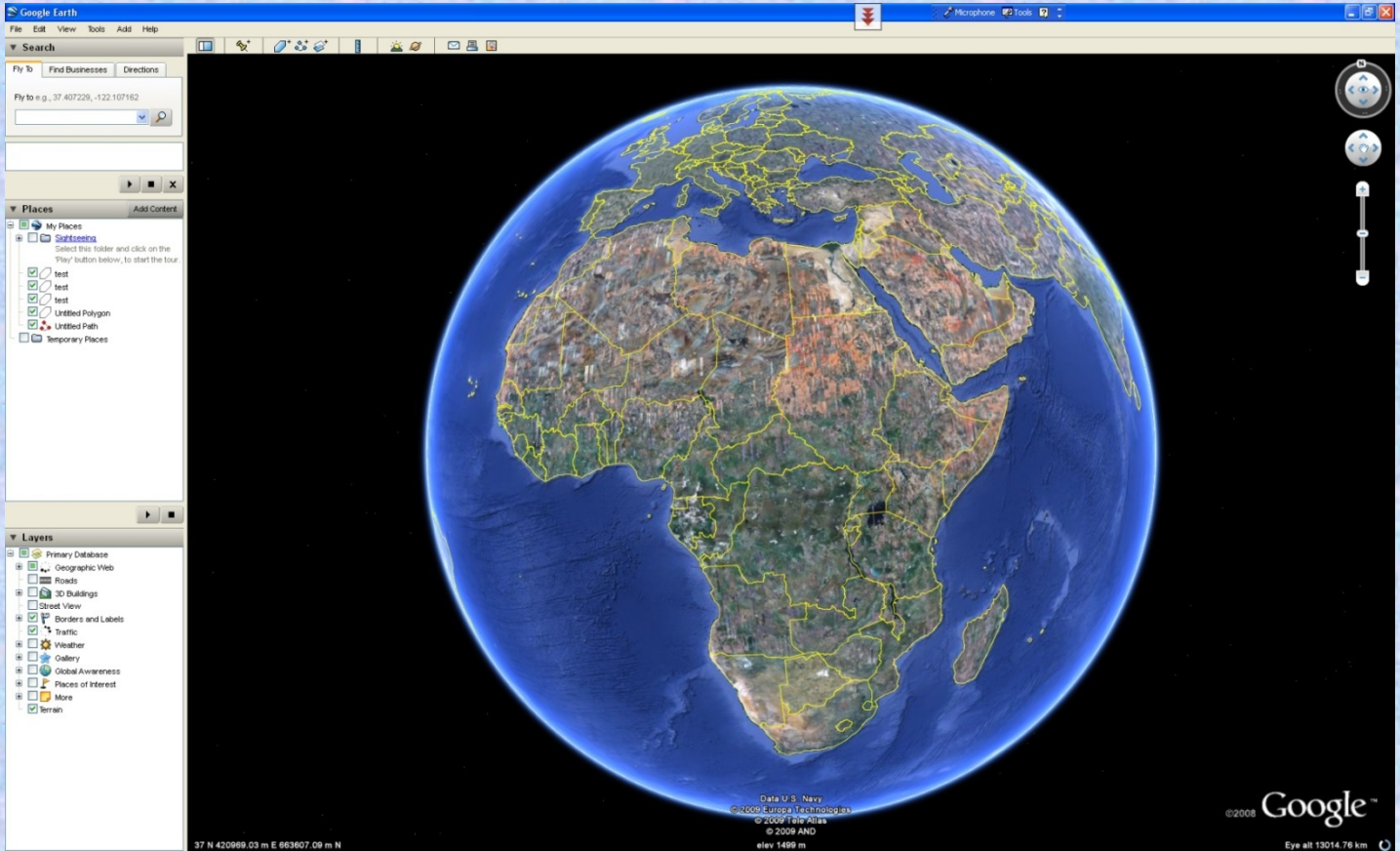
Spatial, Spectral, Temporal



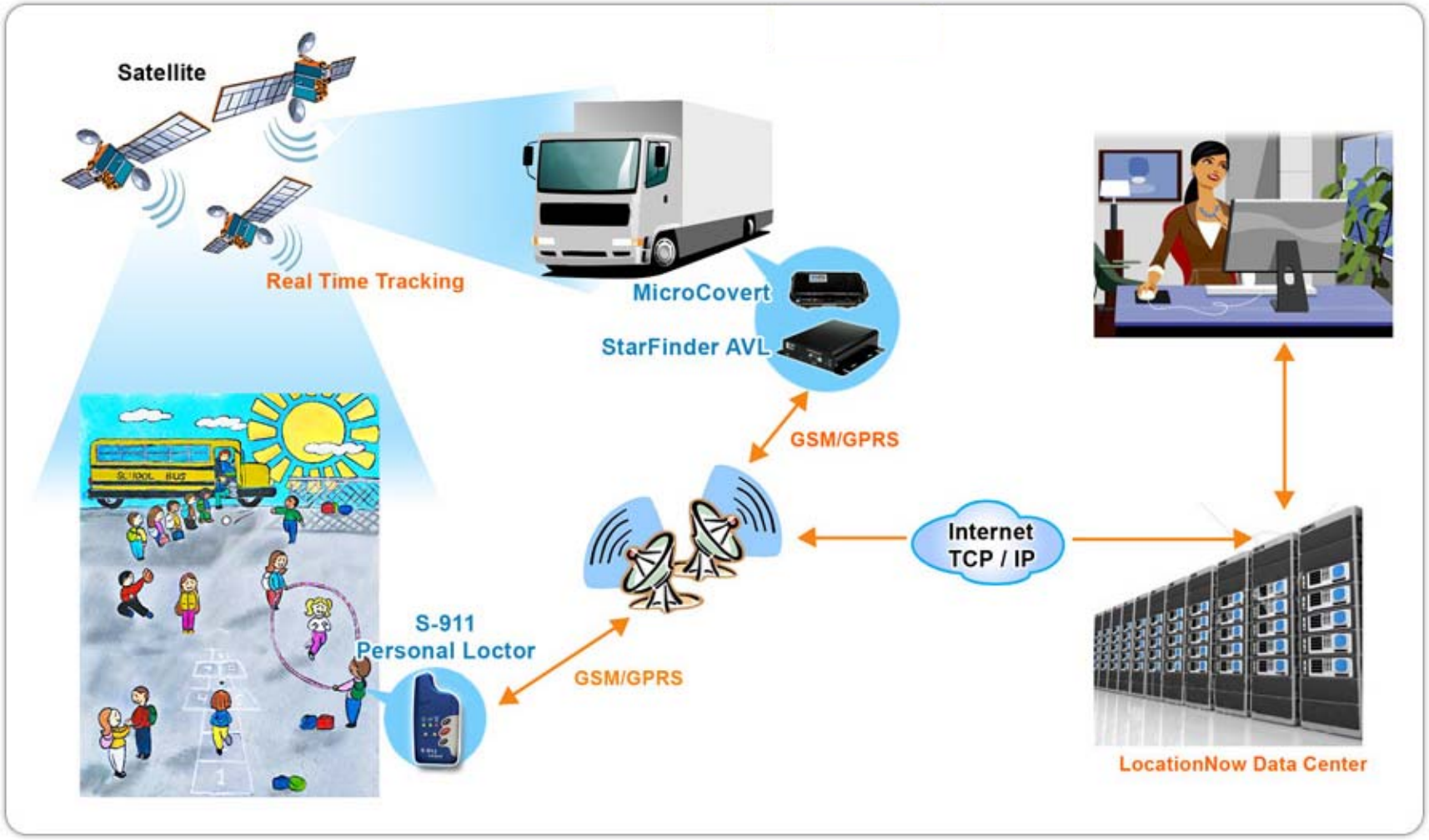
3D Mapping

Internet Mapping Services

- Proliferation of high resolution satellite imagery that are readily available via the Internet
- New means of creating, processing, integrating, analyzing and distributing digital geospatial data / products
- Development of on-line map services and street maps
- Improvement in data management technologies that are enabling faster transmission of large datasets



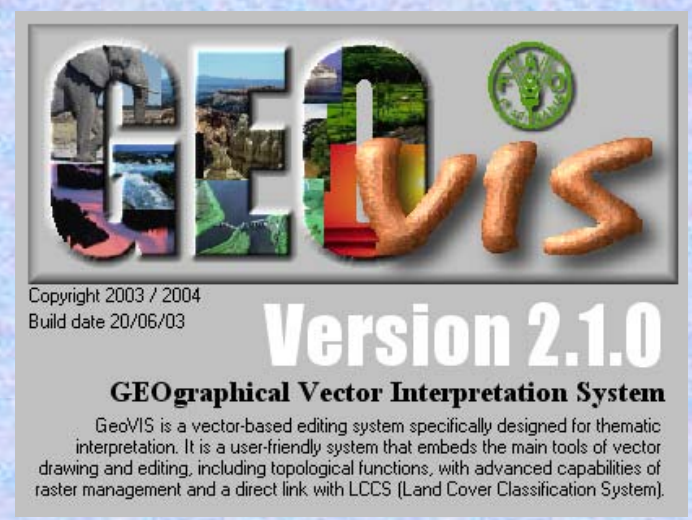
❖ Diversification of application areas of geo-information beyond the traditional areas (e.g Real Time Tracking)



- Development and integration of geospatial and wireless technologies that allow use of maps

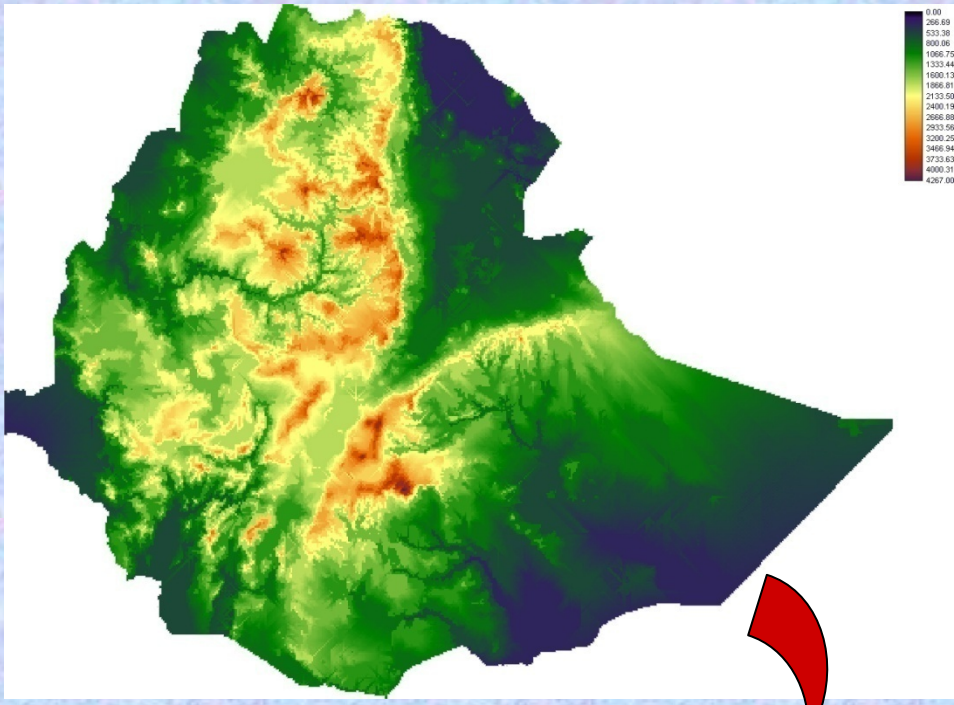
- Development of integrated systems such as PDAs that contain computer, GIS/RS software, GPS, cellphone, camera/video

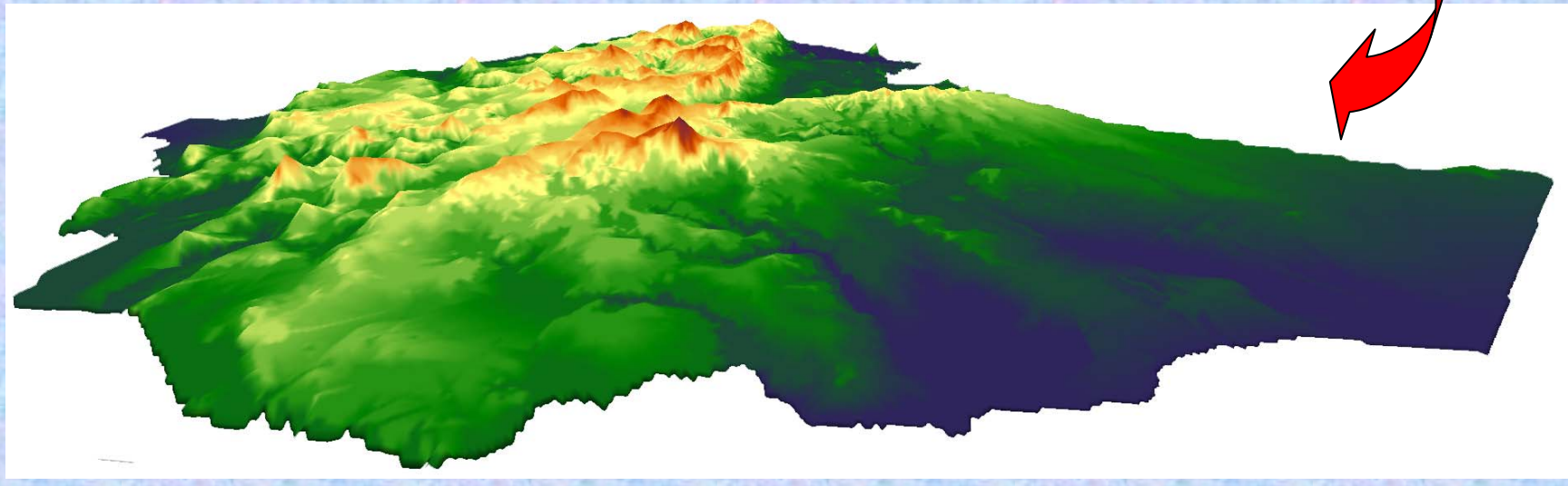
- Declining prices in commercial GI software
- Advent of open source GI software

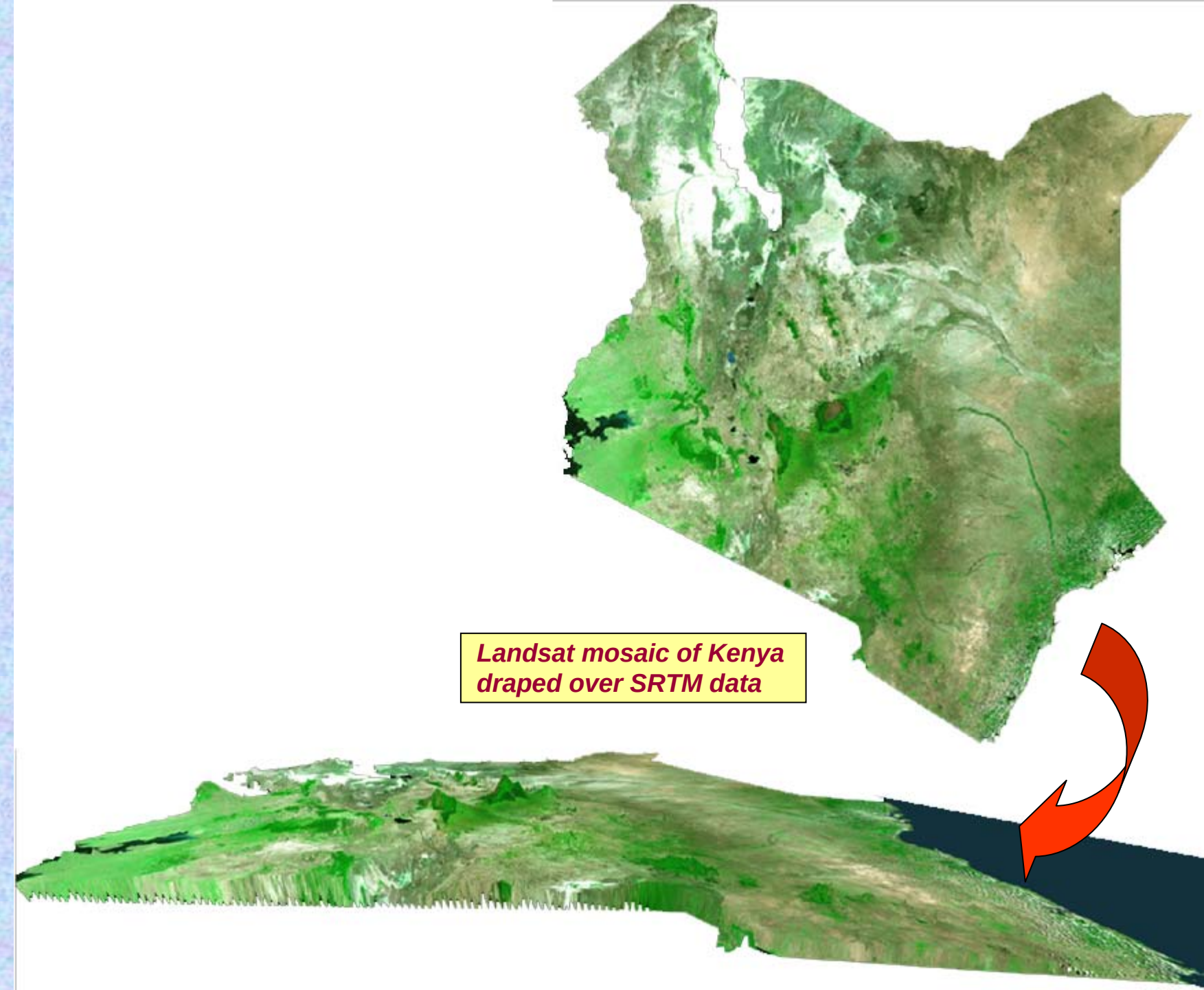


DEM (SRTM) of Ethiopia

- Declining prices of satellite data
  e.g affordability of Aster satellite data
- Availability of free satellite data
  e.g Landsat, 90m SRTM data, etc






Landsat mosaic of Kenya
draped over SRTM data

❖ Emergence of new e-learning opportunities (e.g UNIGIS)

5. Partnerships and Applications

- Most of the applications presented above illustrate the importance of strategic partnerships

- **The importance of:**
  - North – South Partnerships,
  - South – South Partnerships
  - Public – Private partnerships
  - Public – Public Partnerships
  - Private – Private Partnerships

  cannot be over-emphasized

- Following are other key partnerships in Africa

Key Partners in Early Warning Systems in Africa

US Partners

United States Agency of International Development

Chemonics International

Foreign Agricultural Service, USDA

National Aeronatics and Space Administration

National Oceanic and Atmospheric Administration

United States Geological Survey

International/ Regional Partners

Food & Agriculture Organization

World Food Programme

IGAD

FEWSNET

LEWS

Regional Centre for Mapping of Resources for Development

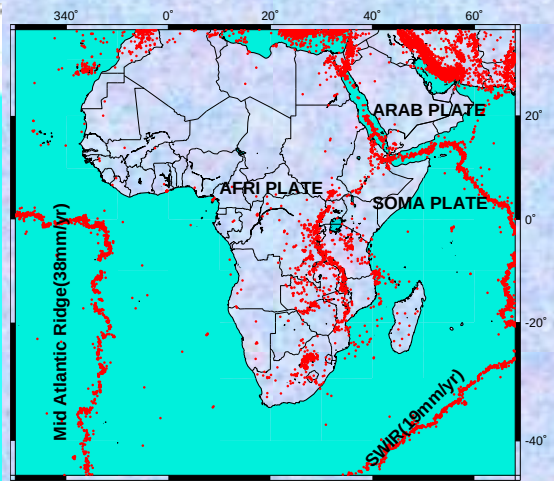
GNSS Regional Applications-AFREF Initiative

PARTNERS: IAG, FIG, ECA, National Surveying & Mapping Agencies

Objectives:

- To establish a continental reference system as a basis for national reference networks.
- To establish permanent GNSS base stations such that users will be within 500km of a base station and that data is freely available to all users.
- To realize a unified vertical datum and to support efforts to establish a precise African geoid.

Research on Monitoring Crustal movements



SERVIR
Regional Visualization and Monitoring System
About SERVIR
SERVIR is a Regional Visualization and Monitoring System that integrates earth observations and forecast models together with in situ data and knowledge for timely decision- making to benefit society.
About SERVIR
SERVIR Brochure
SERVIR Presentations
SERVIR Video
SERVIR Team
SERVIR Highlights

SERVIR Regional Portals
Mesoamerica
Africa
NASA
USAID
FROM THE AMERICAN PEOPLE
CATHALAC
RCMRD
GEO
GROUP ON
EARTH OBSERVATIONS

SERVIR Societal Benefit Areas

Global Earth Observation System of System

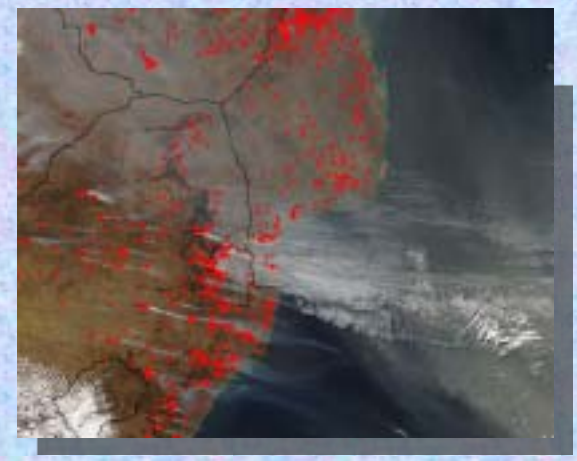
- Natural and human-induced disasters
- Human health and well-being
- Energy resources
- Climate variability and change
- Water resources
- Weather information, forecasting and warning
- Terrestrial, coastal and marine ecosystems
- Agriculture and desertification
- Biodiversity

SERVIR-Africa: Applications

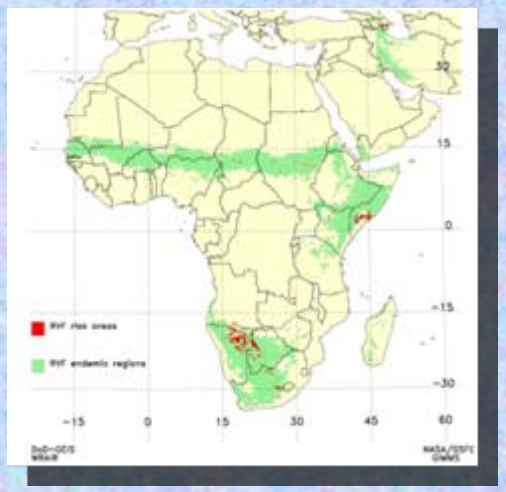
Tangible results making a difference in people's lives

- Disaster Analyses
- Environmental Monitoring
- Health Risk Assessments
- Climate Change and Biodiversity
- Short Term Weather Prediction

Flood forecasting and post-event flood mapping



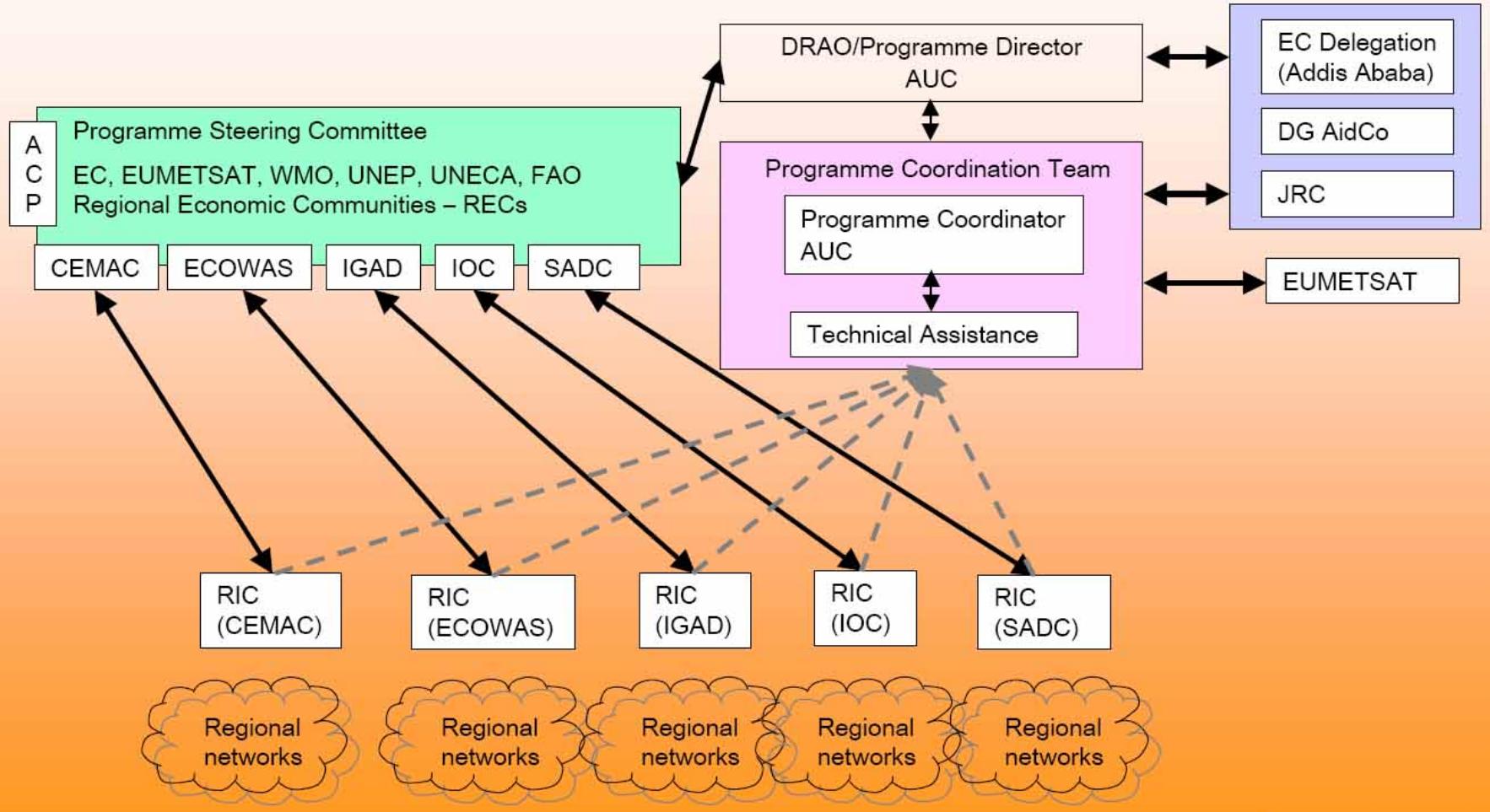
Fire 'hot spot' monitoring



Rift Valley Fever risk mapping

Potential impacts of climate change on biodiversity

AMESD Programme Structure



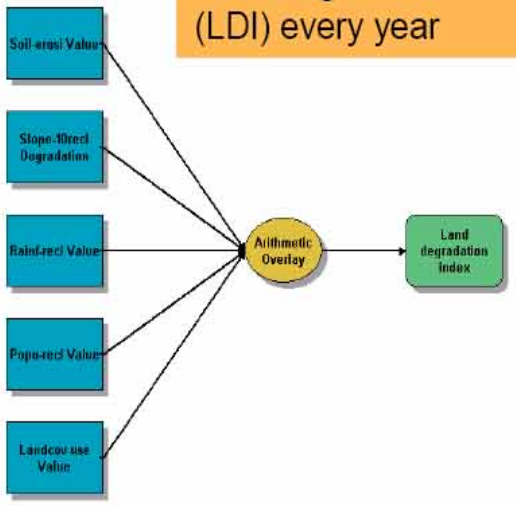
Region IGAD : some examples

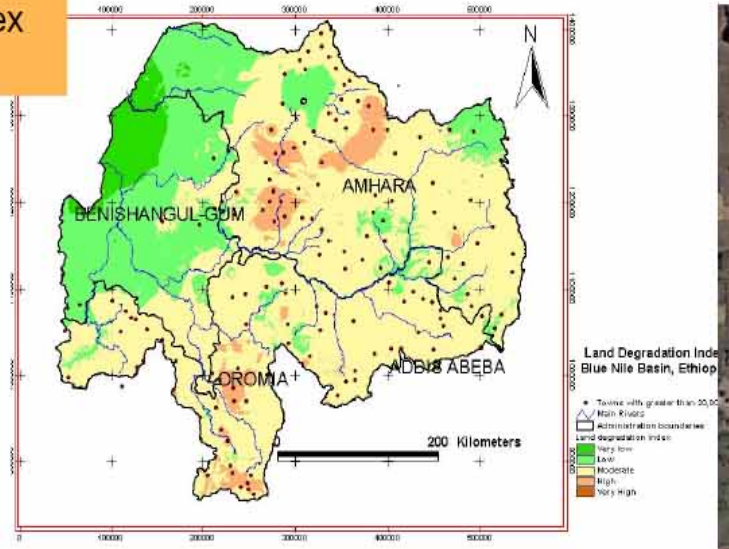
The Key environmental Issues are:

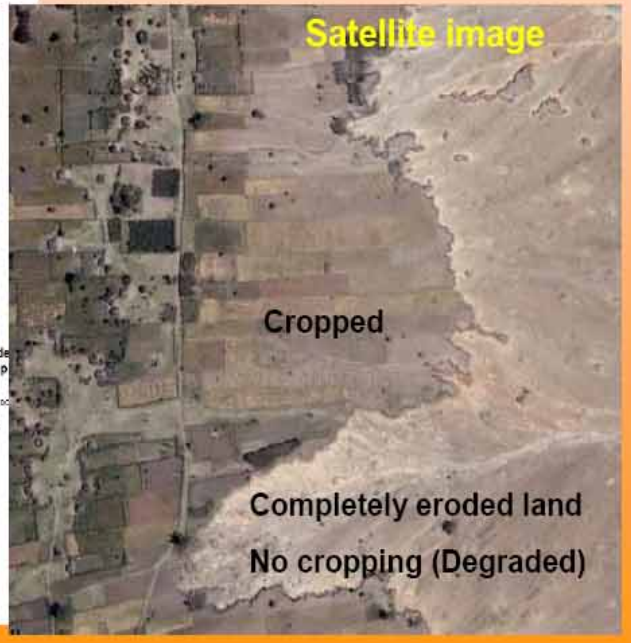
- *Deforestation*
- *Uncontrolled and unplanned land use*
- *Accelerated soil erosion*
- *Extensive Land degradation (Loss of the fertile top part of soil horizon)*

Product:

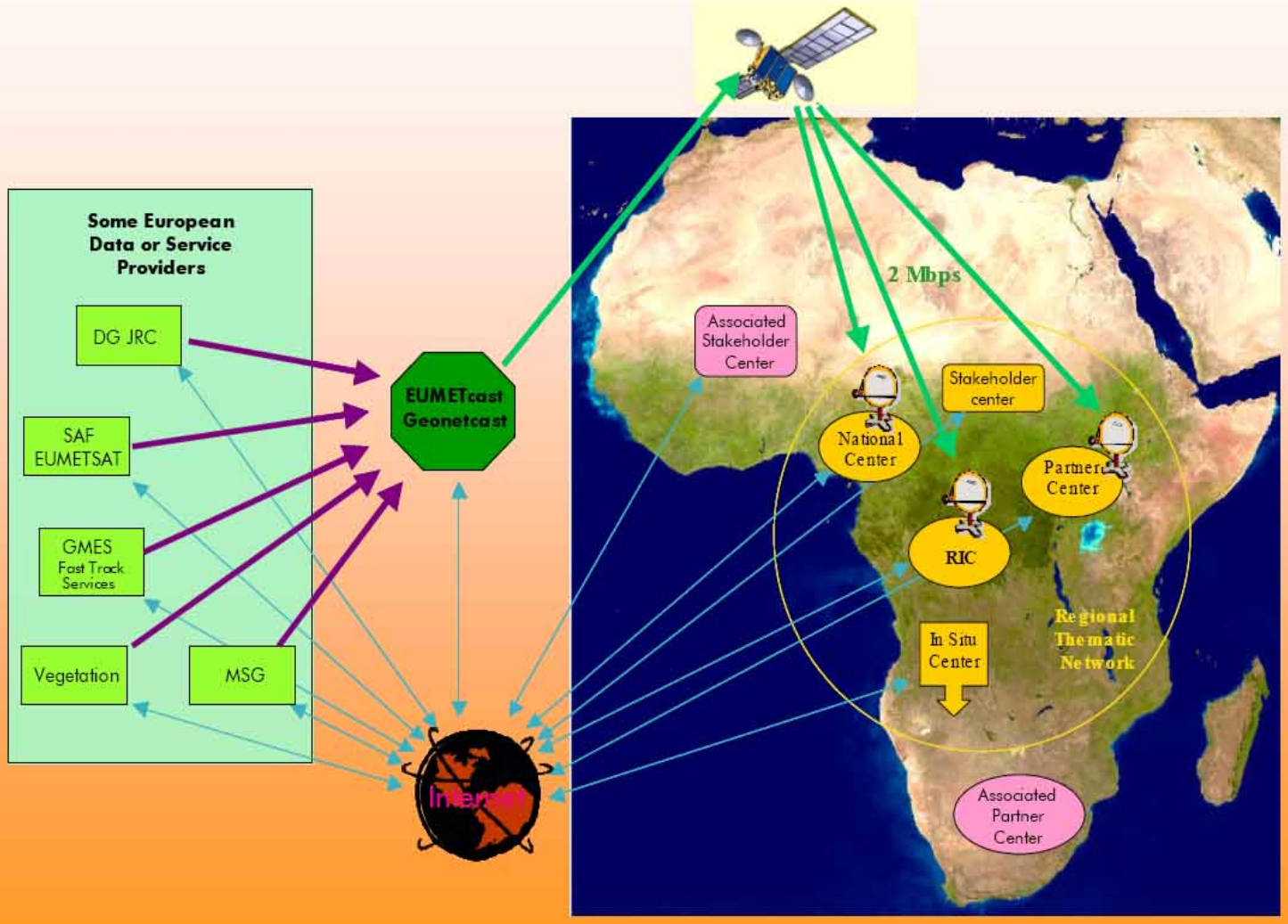
Land degradation index (LDI) every year





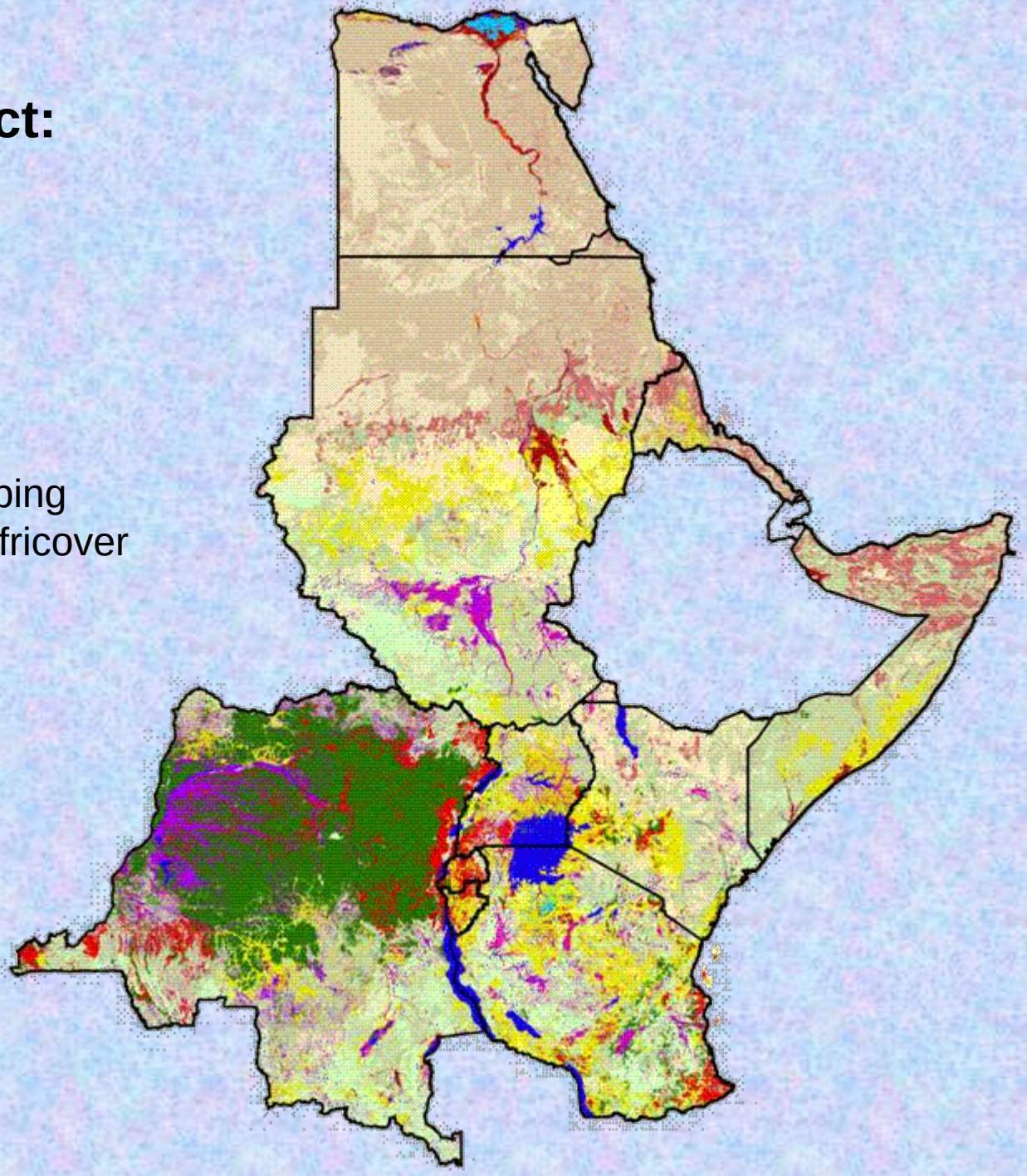


Data access through Eumetcast and Internet

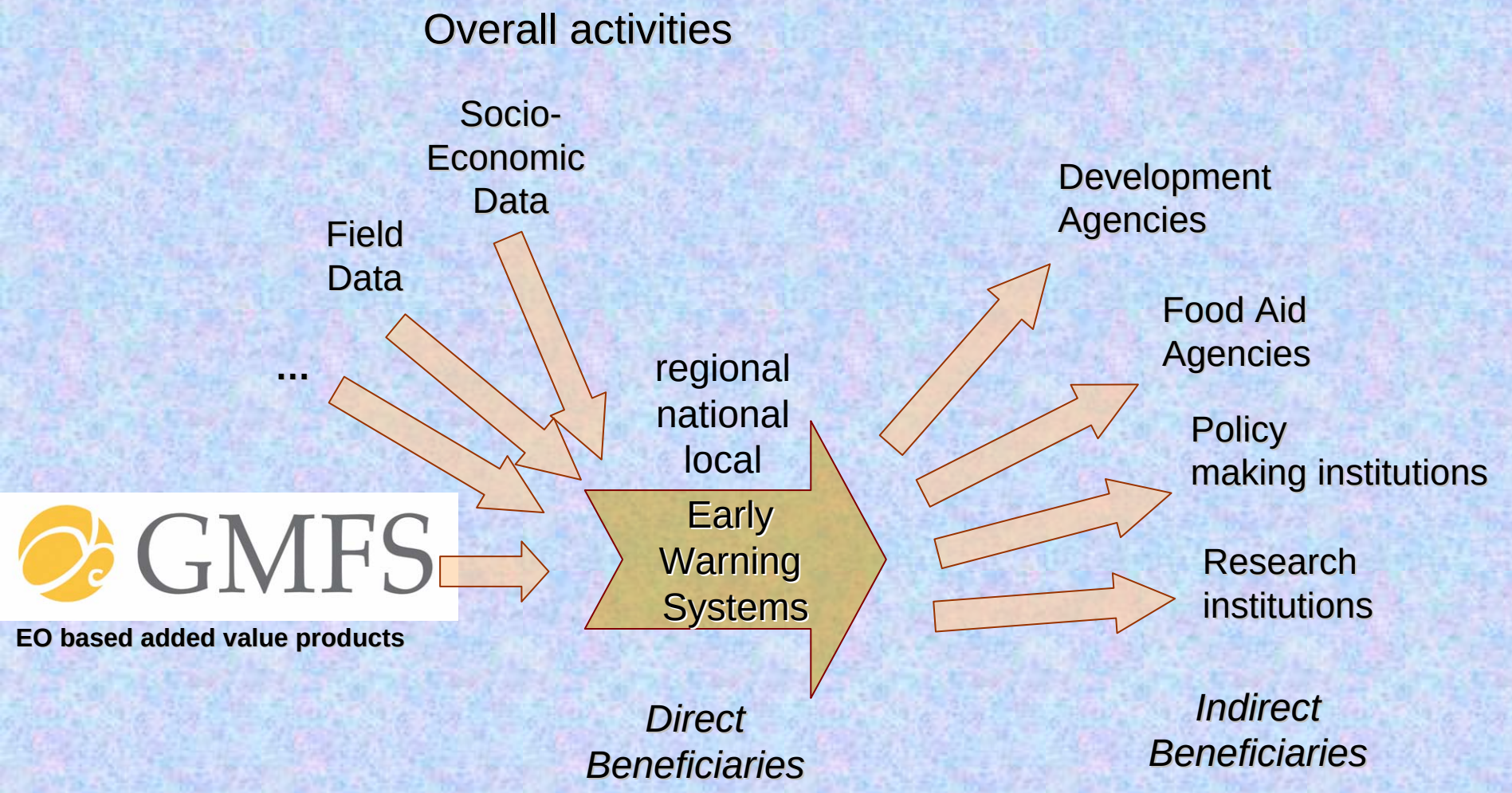


FAO-Africover Project:

Land use / Land cover mapping
In 10 countries in Eastern Africover



The Global Monitoring for Food Security (GMFS) Initiative



African Space Programs

e.g the DMC satellites
- Nigeriasat (Nigeria)
- Alsat (Algeria)
- etc

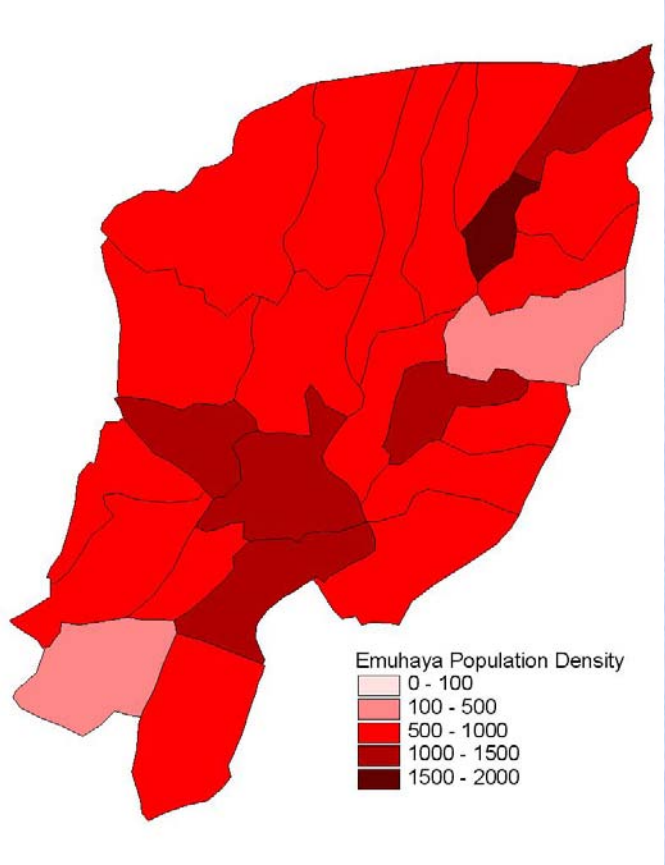
Other key initiatives are:

- Mapping Africa for Africa (MAFA)
- Data access initiatives (Eumetcast, USGS, CBERS, etc)
- EIS-Africa
- SDI Newsletter
- AARSE, AfricaGIS, CODIST, etc

My role as Member of Parliament towards

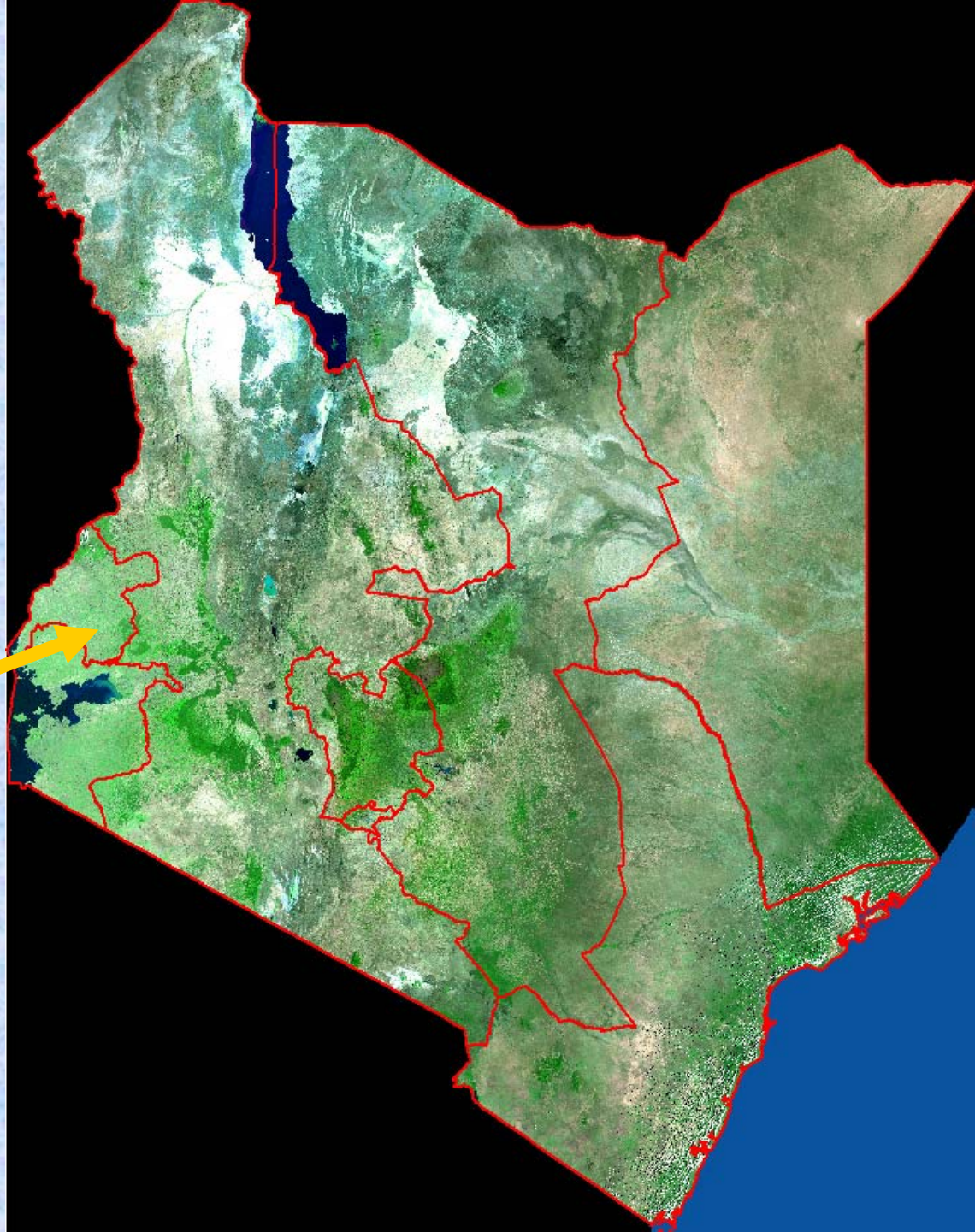
6. Mainstreaming Geo-Information in Community Management and Development

The case of Emuhaya Constituency Development Information System (CDIS)

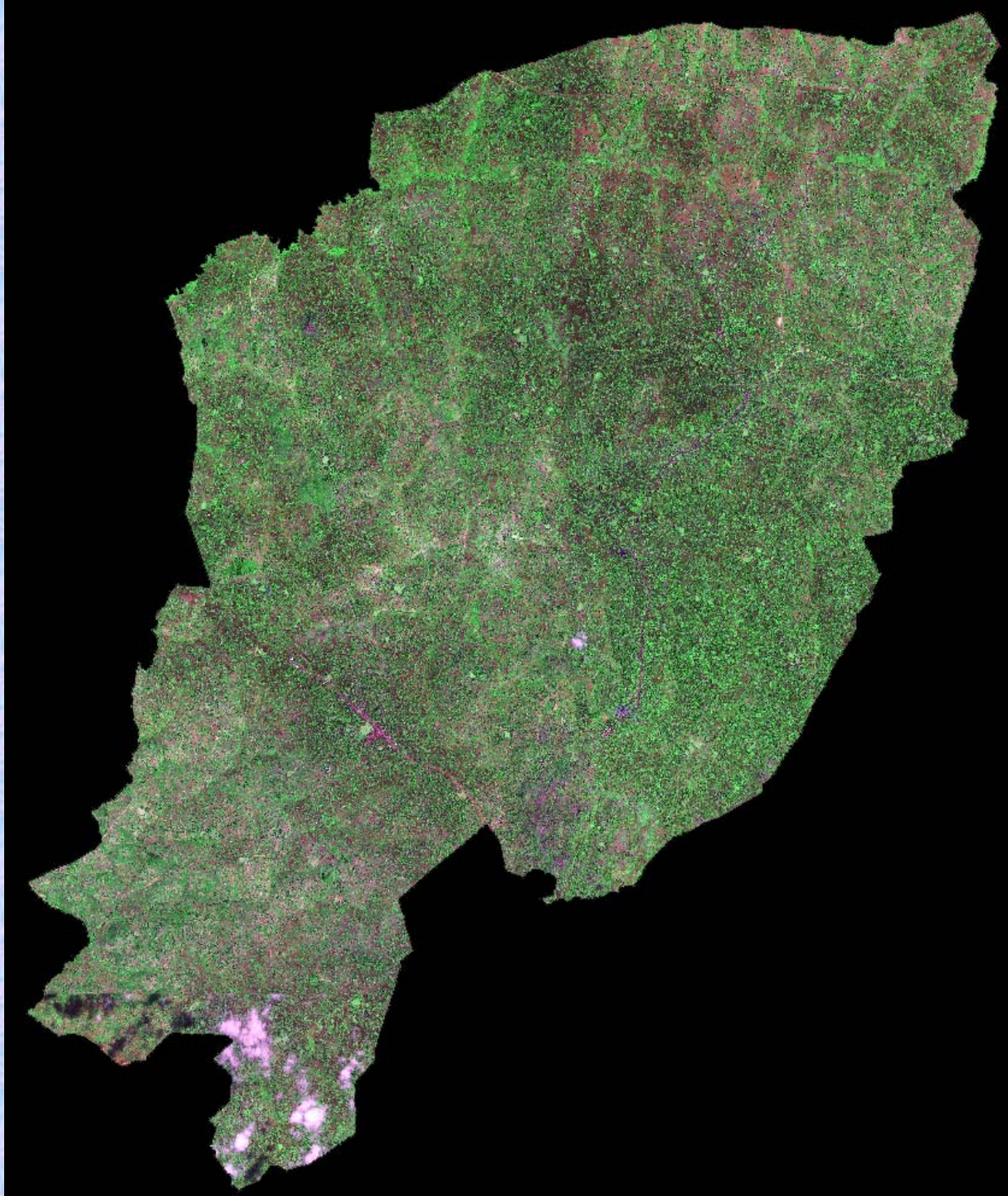


Background of Emuhaya Constituency

- Located in western Province of Kenya



- Covers an area of about 177km^2



- Area Member of Parliament

Road Map Towards the Emuhaya CDIS

- In 2003, the Government of Kenya began devolving development funds to grassroot level through the Constituency Development Fund (CDF)
- This calls for sound planning and management at constituency level
- Upon my election as MP, I prepared the 2008 – 2015 Strategic Plan for my constituency (Emuhaya Constituency)
- To meet the objectives of the Strategic Plan, GI technologies will be used
- That is why I embarked on developing the first ever CDIS in Kenya.
- The CDIS will serve as a model for other constituencies.

Goal and Objectives of the Emuhaya CDIS

Goal of CDIS

The goal is to create a ‘smart system’ that stores, manages, analyzes, manipulates and displays constituency spatial data for improved development planning & management, food security and poverty alleviation.

Objectives of CDIS

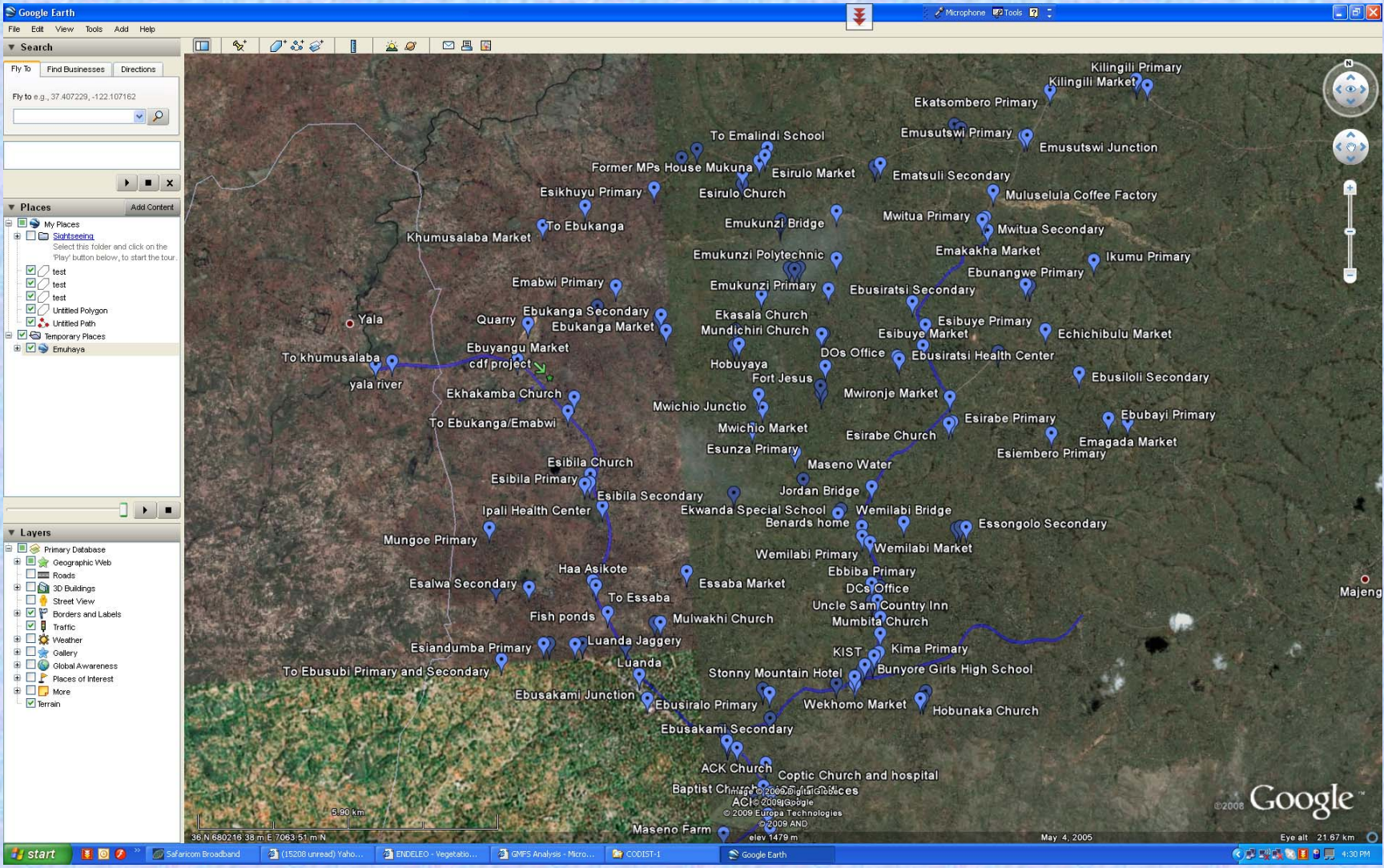
- To create a geo-information system at constituency level that comprises:
  - Administrative and political boundaries and their attributes (population, voters, etc)
  - Polling stations and their attributes
  - Detailed GIS database (including georeferenced photos and videos) of key infrastrastructure and amenities in the constituency (roads, bridges, schools, hospitals/clinics, churches, etc)
  - Land use / land cover types and changes over time
  - A food security early warning system at sub-location level
  - Location and distribution of previous, current and planned CDF projects

- To create an internet map service on www.emuhaya.org for wider access and usage by stakeholders, including the corporate & donor community

- To set up an operational GIS facility in Emuhaya Constituency.

Sample GI Applications for Emuhaya Constituency

All schools, hospitals, and key facilities in Emuhaya Constituency have been mapped into Google Earth



Online monitoring of crop development at Sub-Location level using NDVI

http://endeleo.vgt.vito.be/

Compares the 'vegetation health & density' (NDVI) of the year of interest with the 10-year average (1998-2008)

Select your geographic area

Conservancy
District
Emuhaya constituencies
Forest Reserve
National Parks

Ebuhando
Ebukanga
Ebukhaya
Ebukhubi
Ebukhunza

Select the landcover class

Total Area

Select year to compare with 10-year average (1998-2008) :

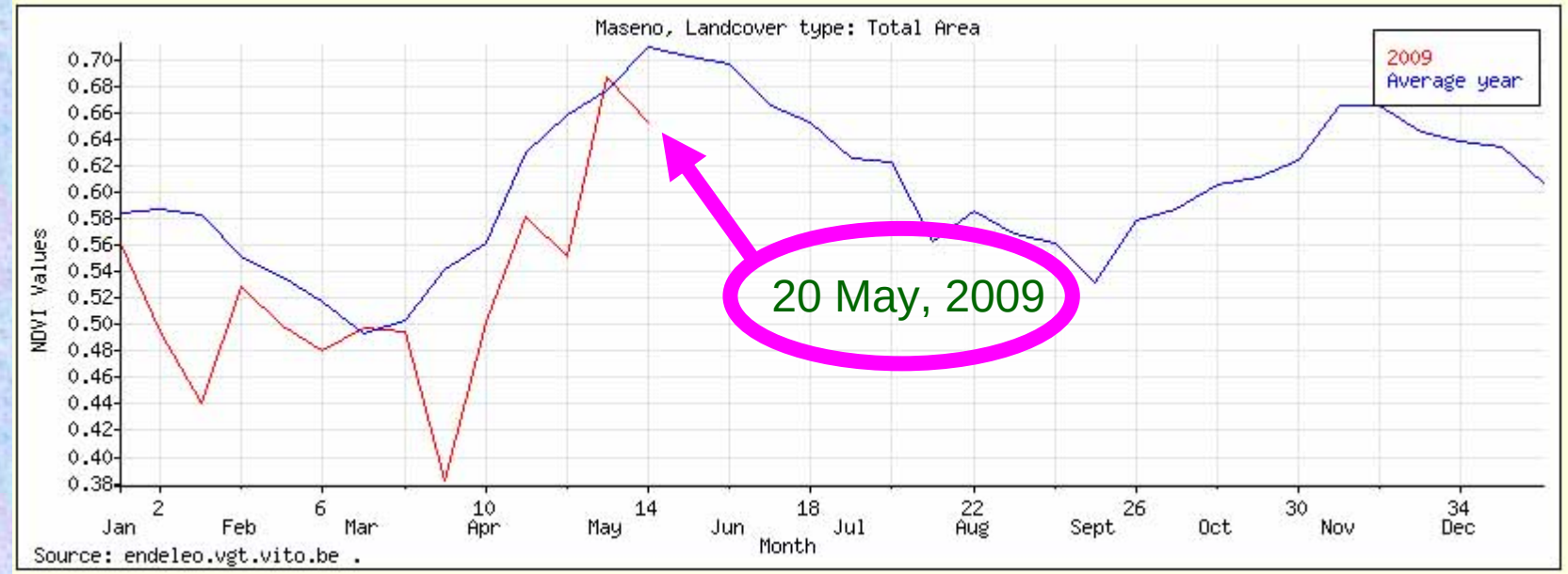
2009

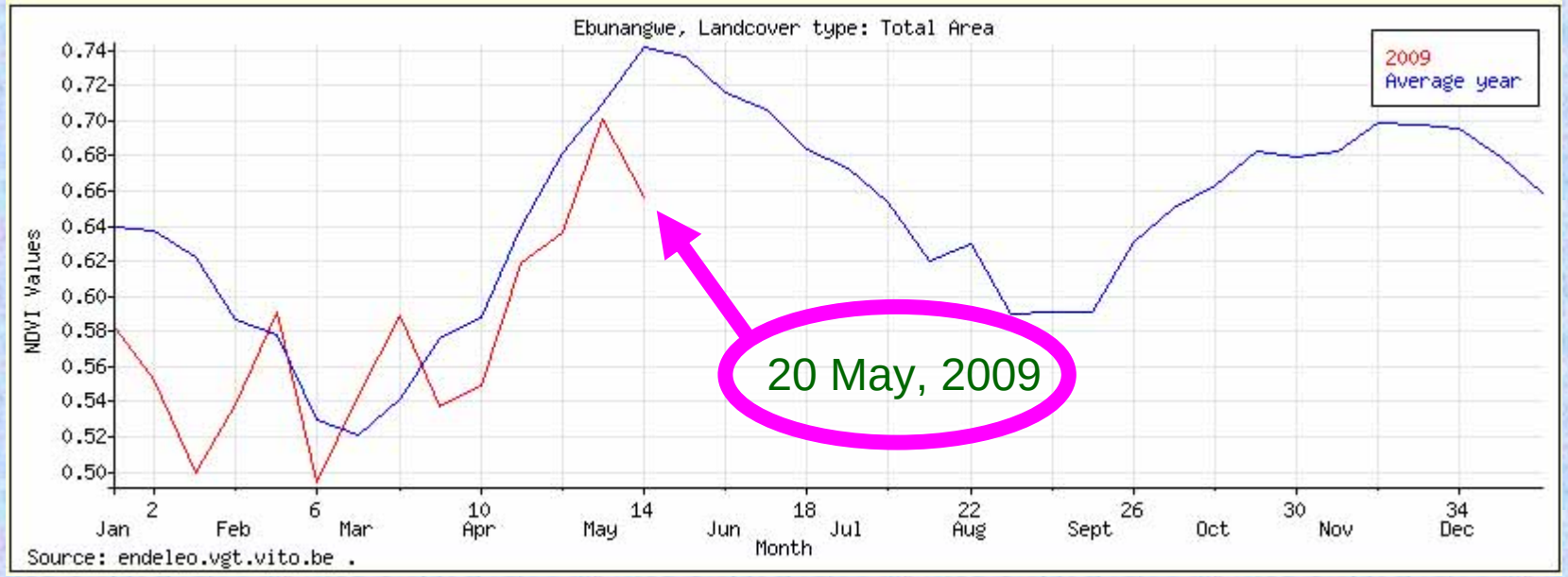
Analyze

Back to Endeleo home page

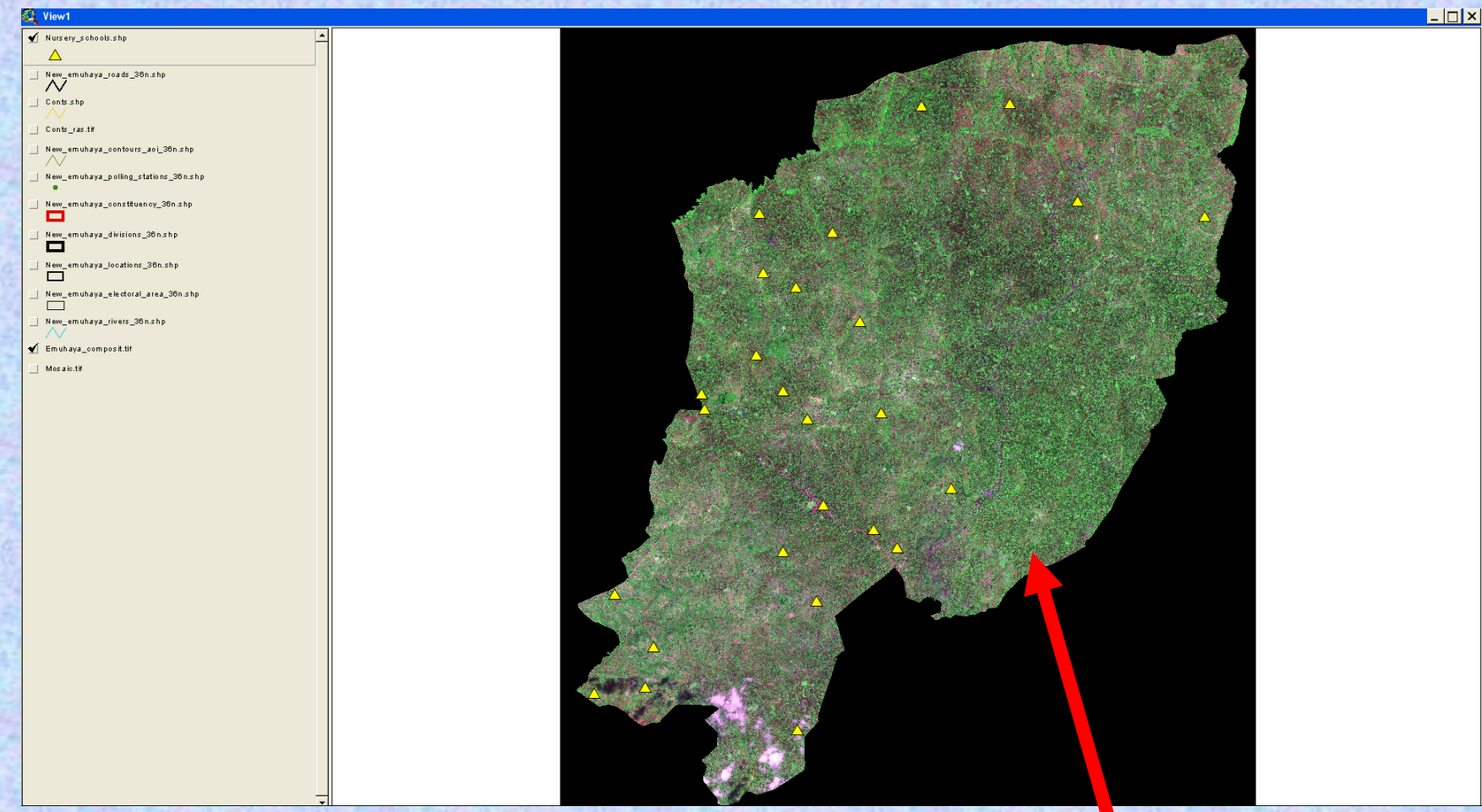
How to use the graphs tool?

Agricultural Monitoring using NDVI



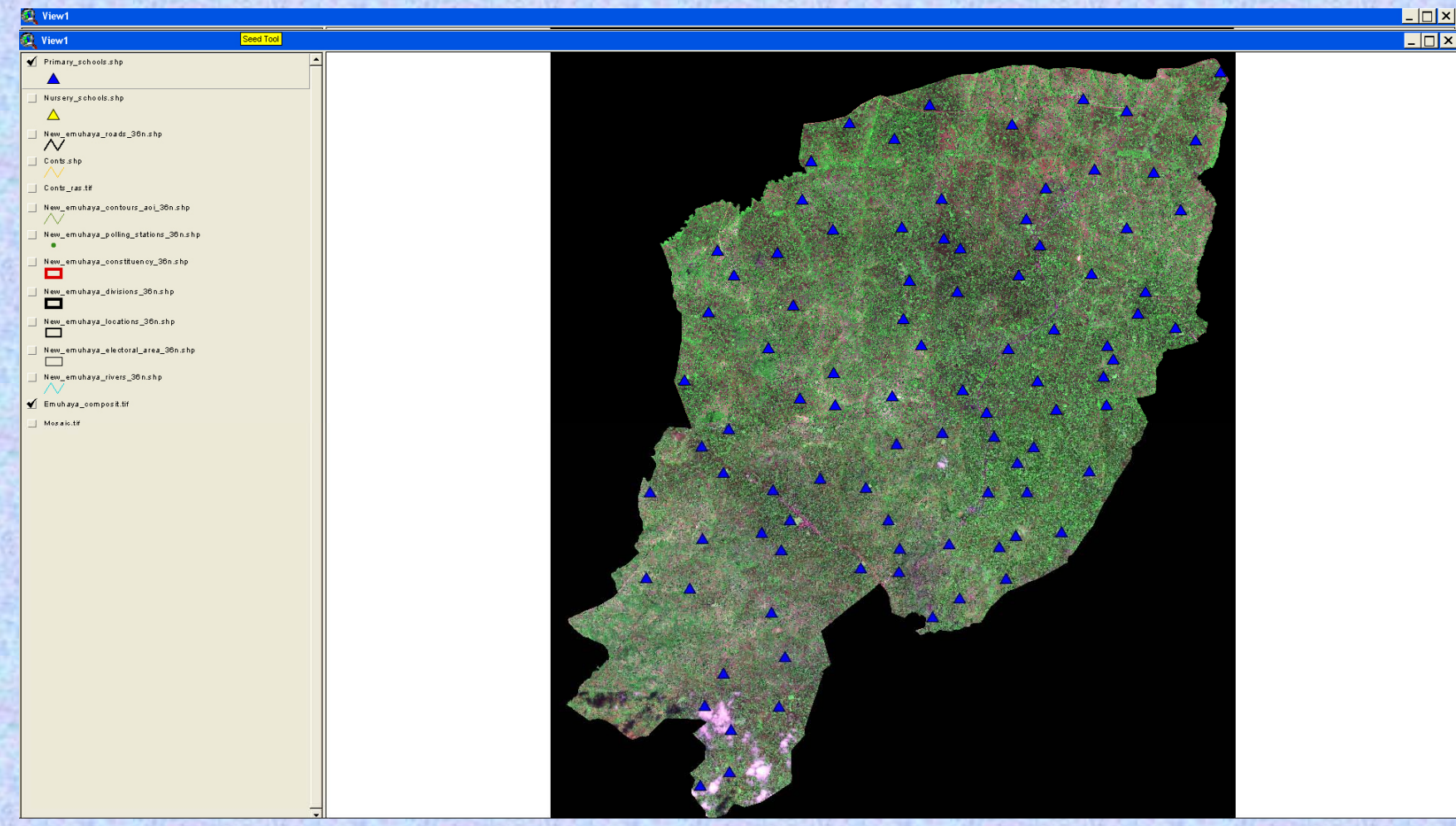


Distribution of Nursery Schools in Emuhaya Constituency

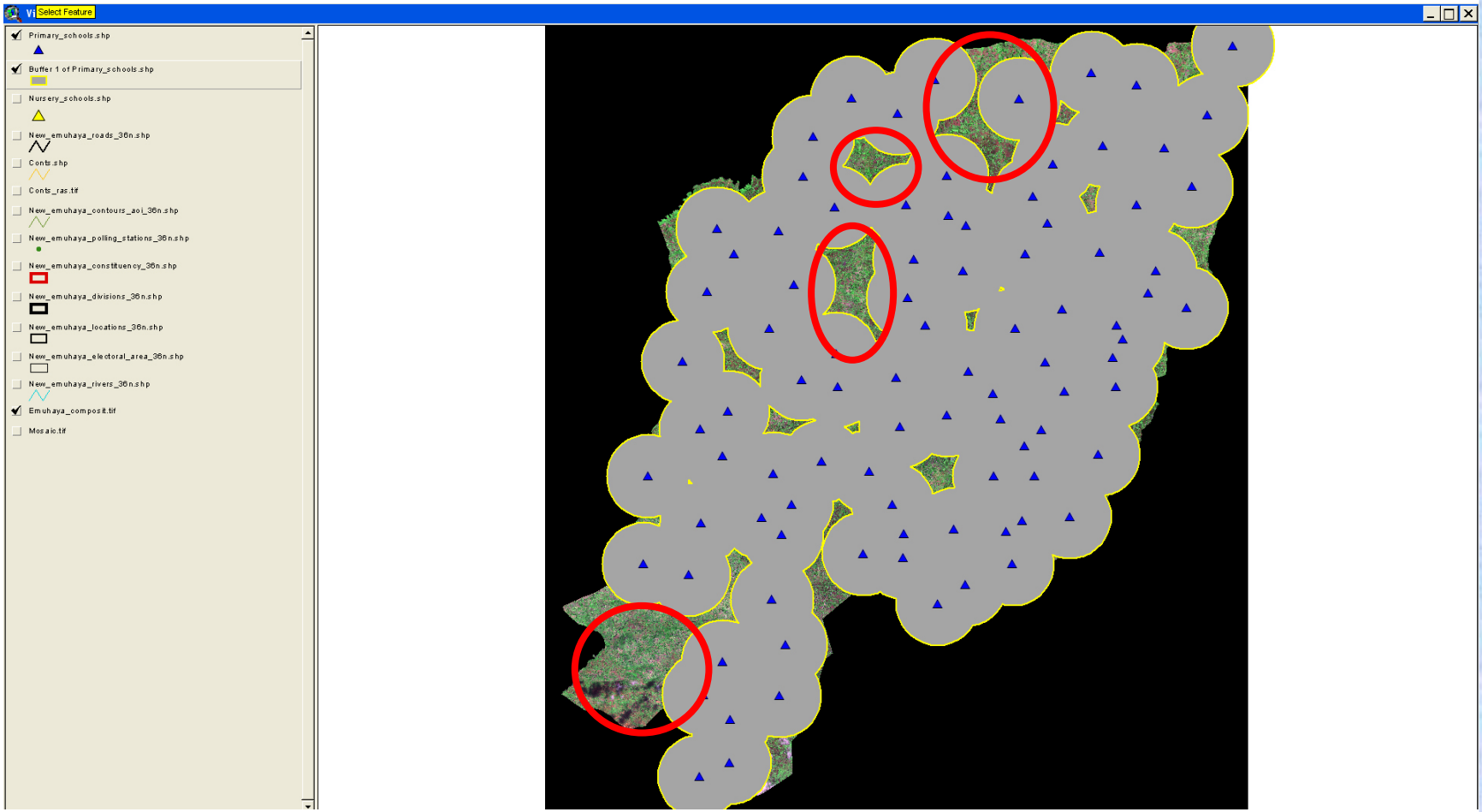


Ikonos Image

Distribution of Primary Schools in Emuhaya Constituency



Areas beyond 1Km radius from nearest Primary School



One of my challenges is to improve such schools
and ensure provision of quality education to all

http://www.emuhaya.co.ke

Emuhaya Constituency | Official Website | Welcome - Microsoft Internet Explorer

Address http://www.emuhaya.org/

A WORLD WHERE MEN & WOMEN HAVE A VOICE

Equitable Gender Status For a All People
Community Support Initiatives For Both Men & Women.
Be Part Of It. Email: bucodeo@ke.emuhaya.org

Welcome | Profile | Administration | Development | CDF | Information | Contact Us

Hon. Wilbur K. Ottichilo

People Of Emuhaya

A MESSAGE FROM HON. DR WILBUR OTTICHILO - M.P

For a long time, the people of Bunyore experienced the devastating effects of absolute poverty exacerbated by continued dwindling of resources and increase in the level of employment. With the new political dispensation, a new look at the development dimensional Emuhaya is mooted. This has created the need for a strategic development plan, which is referred as the "Emuhaya Strategic Development Plan" (ESDP) Emuhaya Strategic Development Plan has been developed by professions from the area though a participatory planning process. The plan is part of the nation wide effort at poverty alleviation and wealth creation of expound in the Government of Kenya Poverty Reduction Strategy paper. (PRSP) of 2004 and the economic recovery flame work for wealth creation of 2003/2004. The plan forms part of the important documents for the present and future generation of Emuhaya.

As the current Member of Parliament, I wish to take this opportunity to assure the people of Emuhaya of my commitment to the goals and objectives of this document and to a appeal to them and any other interested persons or groups to support the implementation activities outlined in the document.

The following funds will be accessed as part of the implementation process: The Constituency Development Fund, the constituency Bursary Funds, the Constituency Roads Maintenance Levy and the Local Authority transfer fund (LAFT). Other expected baskets for financial sourcing will include the budgetary resources allocated to Government departments and agencies within the District and the Constituency Community Resources, Non-Governmental Organizations, the private sector and hopefully, the development Partners. It is my sincere hope that this document will form the basic for the development of Emuhaya and being the first of this kind in the district, serve as an excellent guiding example for the development of the western region.

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7. Challenges of GI Applications and Partnerships in Africa and the Way Forward

Activities that can Support the Use of Geo-Information in Sustainable development in Africa

- Support Awareness creation among decision makers
- Support geo-information capacity building
- Encourage / Promote formulation of national GI policies
- Support promotion of establishment of GI coordinating mechanisms to enhance data access, exchange & use
- Support Regional Centres & institutions involved in the promotion of GI and SDI
- Support implementation of Africa Reference Frame (AFREF)
- Support development, updating and automation of fundamental datasets
- Support preparation & implementation of GI curricula
- Support development of GI networks

The Future of GI Development in Africa is Bright Due To:

- Current +ve economic growth by most countries
- Increasing democratization and good governance
- Rapid development in ICT
- Liberalization of the communication sector
- Recognition of GI as an engine of socio-economic development
- Increasing introduction of GI courses in tertiary institutions
- Increasing availability of satellite data
- Decreasing software & hardware prices & availability of OSS
- Development of Internet / Web Mapping
- Increasing use of GIS a mapping & data analysis tool
- Increasing development of GI market
- Increasing public-private & north-south partnerships
- African initiative to launch a constellation of EOS
- Increasing demand of GI to meet Africa's development Initiatives (MDGs, NEPAD, Blair Commission, G8 Initiative on Africa, etc)

THANK
YOU