Geo-information:
A Key Pillar for Modern-day Decision Makers

Presented By:

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Introduction

Trends and Opportunities in EO, GIS and allied Geo-ICTs

Talking Development: Examples of role played by GI Technologies in planning and decision making:
  - Africa
  - Emuhaya Constituency, Kenya
  - Vihiga County, Kenya

Conclusion
INTRODUCTION: MODERN-DAY DECISION MAKER
Geospatial technologies (EO, Navigation & Positioning, and Communication), and allied ICT technologies
Information for Planning, Policy and Decision Support
Transformative Interventions
The 3is Framework™

Information | Interventions | Impacts
TRENDS AND OPPORTUNITIES

In Earth Observation, GIS and allied Geo-ICTs
Trends & opportunities in GI
with focus on Africa

❖ Increasing number and variety of EO satellites and airborne & in-situ sensors
❖ Reducing costs of EO data
❖ Increasing number of freely available EO data (e.g. Copernicus, Landsat, etc.)
❖ Increasing integration and number of supportive technologies (e.g. cloud computing, mobile telephony, etc.)
❖ Increasing number of continental GI programs (e.g. GMES & Africa, SERVIR-Africa, Horizon 2020, etc.)
❖ Increasing number of international and national policy and legal frameworks supporting GI applications (e.g. African Space Policy, SDGs, Paris Agreement, etc.)
❖ Emerging GI application areas (e.g. crop and livestock insurance, Internet of Things, etc.)
Technology advances over the years made it technically possible for more people and organizations to be connected......

GIS Projects

GIS Systems

Distributed Networks

Public(s) Services

Stand Alone

Coordinated

Cooperative

Cloud

.... Allowing a myriad of applications in all sectors
Smartphones have GPS gadgets
Examples of role played by Geo-information Technologies in planning & decision making

- In Africa
- In Emuhaya Constituency
- In Vihiga County
In 2014, the Lake Turkana Wind Power Project, the largest renewable energy project in Sub-Saharan Africa was launched in northern Kenya and today has 365 turbines installed at Loiyangalani in Marsabit, Kenya.
Water Quality Challenges

The Case of Lake Victoria, East Africa

Mapping Suspended Matter, Chlorophyll and Yellow Matter from Space

Total suspended matter derived from Envisat-MERIS Sensor

Total Chlorophyll derived from Envisat-MERIS Sensor
Lake level fluctuation monitoring from Satellite

Lake Victoria’s water level on October 21, 2006 was approximately 10.41 meters, the lowest water level since 1923.

Owens Falls Dam (at Lake Victoria’s only outlet) was commissioned in 1954 at Jinja, Uganda.

Lake Victoria’s water level on October 21, 2006 was approximately 10.41 meters, the lowest water level since 1923.
The Devolved System of Governance in Kenya

- Constitution provides for devolved Government system
- New Government system ushered on March 4th 2013:
  - National Government
  - 47 County Governments
- Parliamentary system at national level comprising:
  - The National Assembly (349 Members of Parliament)
  - The Senate (67 Members of Senate)
- County Governments comprise:
  - The Executive (Governor & ministers)
  - The County Assembly / Parliament (elected ward representatives)
- Constituency Development Fund (CDF): a fund that supports development at constituency level
- County Government Budget for recurrent expenditures and county development

Note: Counties in Kenya comprise between 2 – 17 Constituencies
Emuhaya Constituency

Pleiades image, 3rd Feb. 2016
Examples from the Education Sector
Elununi Primary School, Central Bunyore Ward

Needed permanent buildings

Data collected via smartphone on 17th July 2014

Elununi Primary School in 2016
New Education Infrastructural Projects: Ebunangwe High School
Status of Electricity in Public Education Facilities
Status of electricity connectivity in Education Facilities in Emuhaya Constituency in **August 2015**

- **Has electricity** - 66 facilities (100%)
Accessing school
No child should walk more than one kilometre to primary school.

Emwatsi Pri. Sch.

Ebuyangu Junction

Ebucheli Pri. Sch.

Ebucheli Primary School
Examples from the Health Sector
EMUHAYA CONSTITUENCY: PUBLIC HEALTH FACILITIES BY
AVAILABILITY OF MATERNITY WARDS

This map is NOT an authority on delimitation of boundaries

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**Legend**

- **Centres**
  - Market
  - Shopping Center
  - Other
  - Has Maternity Wards
  - Has No Maternity Wards
  - Unclassified

- **Swamp Type**
  - Papyrus Swamp, Marsh, Bog
  - Seasonal Swamp
  - Constituency Boundary
  - County Ward Boundary
  - River

**Road Classification**

- Class - B
- Class - C
- Class - D
- Class - E
- Class - R
- Class - U
- Unclassified
- Railway
Current and Proposed Coverage of Health Facilities at 1.5 Km Radius

(Approx. 7 sq. Km each carrying an estimated population of about 10,000 people, i.e., potential total catchment of about 120,000 people)

Construction completed in 2015
Consortium completed in 2016
Land purchased in 2015

Ebukoolo Disp.
Essaba Disp.
Esirulo Disp.
Emurembe Disp.

Photo taken on 26th August 2015

Land purchased in 2015
National and County Roads in Emuhaya Constituency

LEGEND
- National Road
- County Road

ROADS WITHIN EMUHAYA CONSTITUENCY (KM)
- National Road 20.58Km (14%)
- County Road 127.04Km (86%)
The great people of Emuhondo sub-location in Ebusamia location, N.E. Bunyore Ward in Emuhaya sub-county received **1M shillings today to fund the construction of Mwituha police post from Emuhaya constituency CDF**. This comes after they acquired an acre of land through CDF funding. Construction is commencing soon.

Strengthening security and instilling peace in Vihiga county is a priority for my people.

#VihigaAgenda #OttichiloTanoKwanza #MaendeleoBilaCorruption
Example of Visibility Forum:

Launch of Emuhaya Constituency GIS / ICT Centre

THIS GIS / ICT CENTRE
WAS OFFICIALLY OPENED
BY
HON. FRED MATIANG’I
CABINET SECRETARY FOR INFORMATION COMMUNICATION & TECHNOLOGY
ON
16TH FEBRUARY, 2015
Vihiga County
Constituencies, Wards and Polling Stations

Campaign Intelligence System (CIS)
3D visualization of Vihiga County:
• Registered voters in 2017 at ward level (blocks)
• Registered voters in 2017 per polling station (lines)
Competition Analysis

Vihiga County 2013 Gubernatorial Results
(Leading Candidate by Electoral Area)
GI activities in Vihiga County are coordinated by the Department of Physical Planning, Land and Housing.

The GI activities have been conceived along the County Development Information System (CDIS) framework to effectively support the various functions defined under the Fourth Schedule on Distribution of Functions between National and County Governments. These include:

- Health
- Education
- Infrastructure and transport
- Agriculture
- Environment and natural resources
- Commerce and industry
- Etc.
The **CDIS** comprises the following sub-systems:

i. Land Information Management System (LIMS)
ii. Agricultural Management Information System (AMIS)
iii. Transport Infrastructure Information System (TIIS)
iv. Health Services Information System (HSIS)
v. Education Services Information System (ESIS)
vi. Environment Monitoring System (EMS)
vii. Public Amenities Management Information System (PAMIS)
viii. Businesses Information System (BIS)
ix. Spatial Planning Information System (SPIS)
x. Housing and Buildings Information System (HaBIS)
xii. County Revenue Information Management System (CRIMS)

The CDIS will support the **3is Framework** (Information–Interventions–Impacts) in Vihiga County
Vihiga County to date ........

- Geo-information needs assessment undertaken to inform the CDIS

- Establishing the Geospatial Technologies Services under the Department of Physical Planning, Land & Housing
  - Prepared budget for GIS software, hardware and consultancy
  - Commenced recruitment of GI staff
  - Airbus Defence and Space has provided very high resolution Pleiades imagery (50cm) covering the entire County

- County Government of Vihiga is keen on the following:
  - Strategic partnerships in the area of GI capacity building,
  - Strategic partnerships in implementing the various components of the CDIS (Airbus: Land Information Management System, GMV: Spatial planning, & eHealth)
  - South – South and North – South collaboration in research and technology transfer and best practices

- As Governor, I wish to:
  - Make Vihiga a model county in Kenya in the application of geospatial technologies in the implementation of SDGs
  - Champion GI in all counties in Kenya through the Council of Governors (CoG)
The role of Geospatial technologies in facilitating good governance, sound planning, and sustainable development cannot be over-emphasized.

Developments and trends in Geospatial and other allied technologies only point to a favorable course for decision makers.

As a Governor, heading a County Government, and a Geospatial scientist, I purpose to use, demonstrate and champion the application of Geospatial technologies in supporting better planning and decision making in Africa.

This is how we will empower Africa to meet Agenda 2063, the Sustainable Development Goals, among other targets.
Thank You