Development of a National Spatial Data Infrastructure for Uganda (UGSDI)

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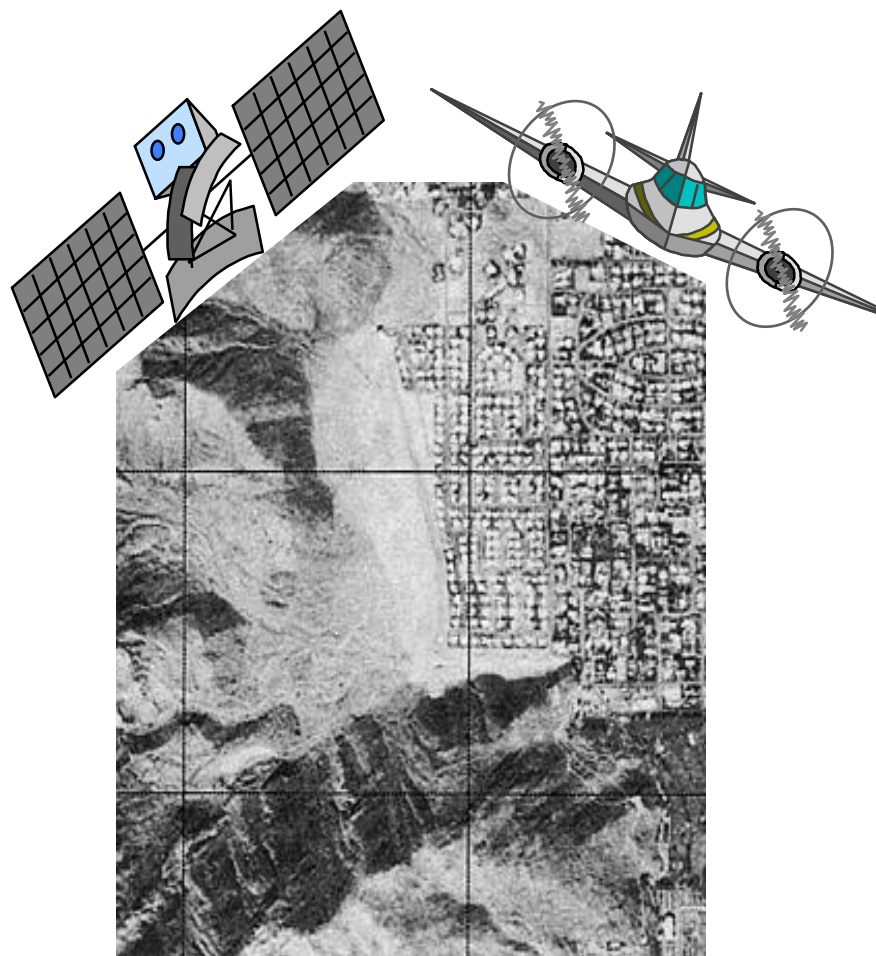
ENERGY SECTOR GIS WORKING GROUP
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Purpose of Presentation

- To Explain the SDI Concept, components and Benefits

- To explain the historical events on the establishment of NSDI in Uganda

- To agitate for new improved approach to SDI development

Outline

- Explanation of GIS as a Concept

- Link between GIS and SDI

- GIS and SDI diffusion in Uganda

- Where are we and Why are we not moving?

- How should we move faster

WETLANDS IN EASTERN UGANDA
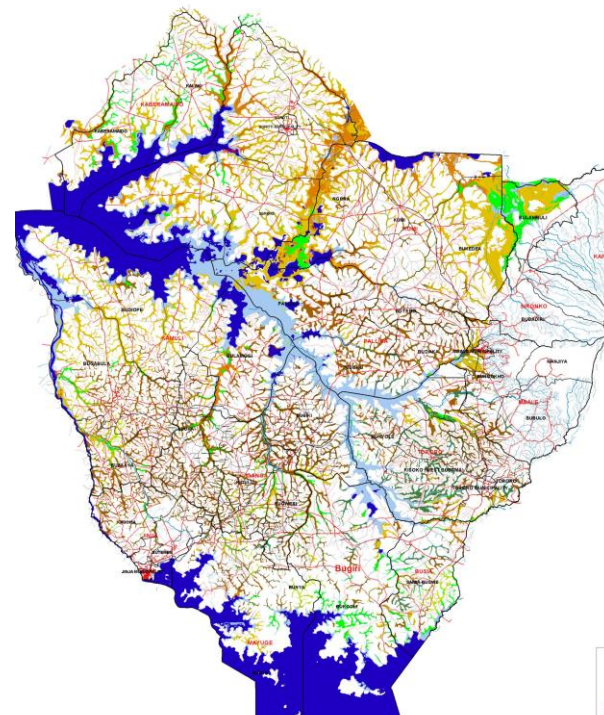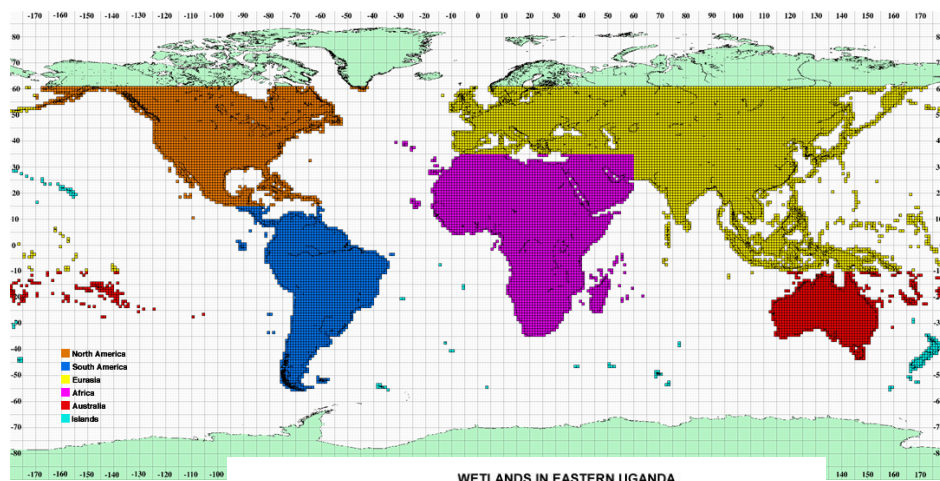
How GIS Works

Natural Resources Data

Environmental Data

Economic Data

Natural Hazards

Health Data

Soils Inventory

Base Map

Points

Lines

Polygons

Annotation
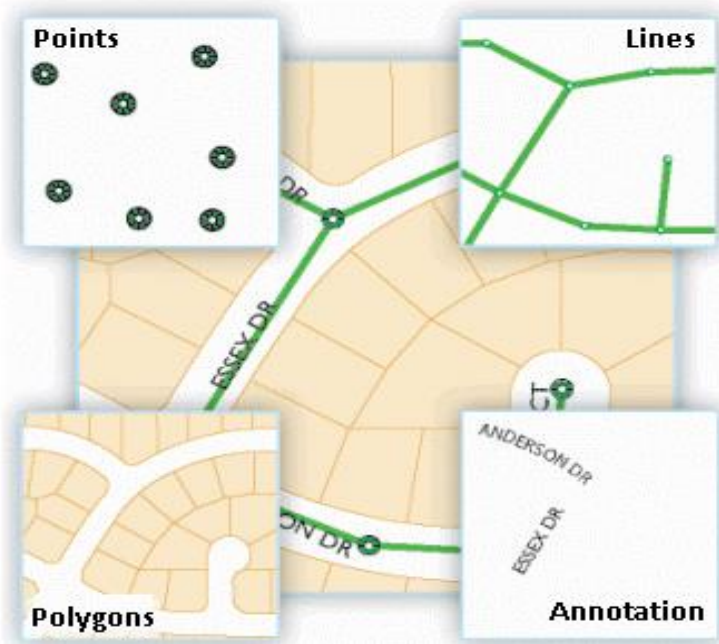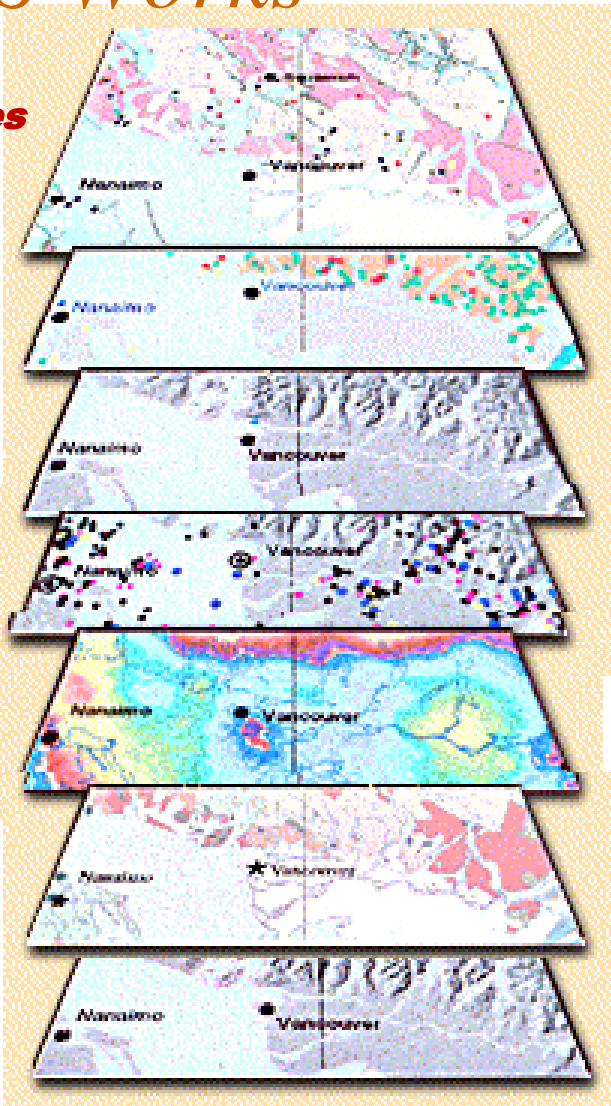
Shape	ID	PIN	Area	Addr	Code
	1	334-1626-001	7,342	341 Cherry Ct.	SFR
	2	334-1626-002	8,020	343 Cherry Ct.	UND
	3	334-1626-003	10,031	345 Cherry Ct.	SFR
	4	334-1626-004	9,254	347 Cherry Ct.	SFR
	5	334-1626-005	8,856	348 Cherry Ct.	UND
	6	334-1626-006	9,975	346 Cherry Ct.	SFR
	7	334-1626-007	8,230	344 Cherry Ct.	SFR
	8	334-1626-008	8,645	342 Cherry Ct.	SFR

Peculiarities of GIS Data Utilisation

- One GIS based solution requires use of multiple data themes

- Data collected for one purpose can be used for another

- Data collection is very expensive

- Institutions only collect data under their mandate

- A lot of synergies in institutional mandates.
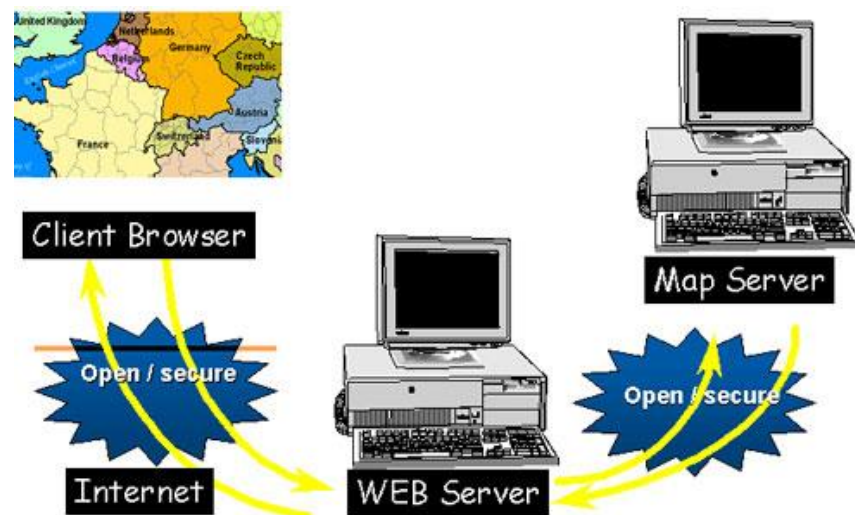
Growth of GIS Concept

- From Paper to Digital Mapping

- From Digital Mapping to Limited GIS Analysis

- From Single GIS to interconnected GIS

- Opportunities caused by Developments in ICT and Earth observation.

Example of old maps

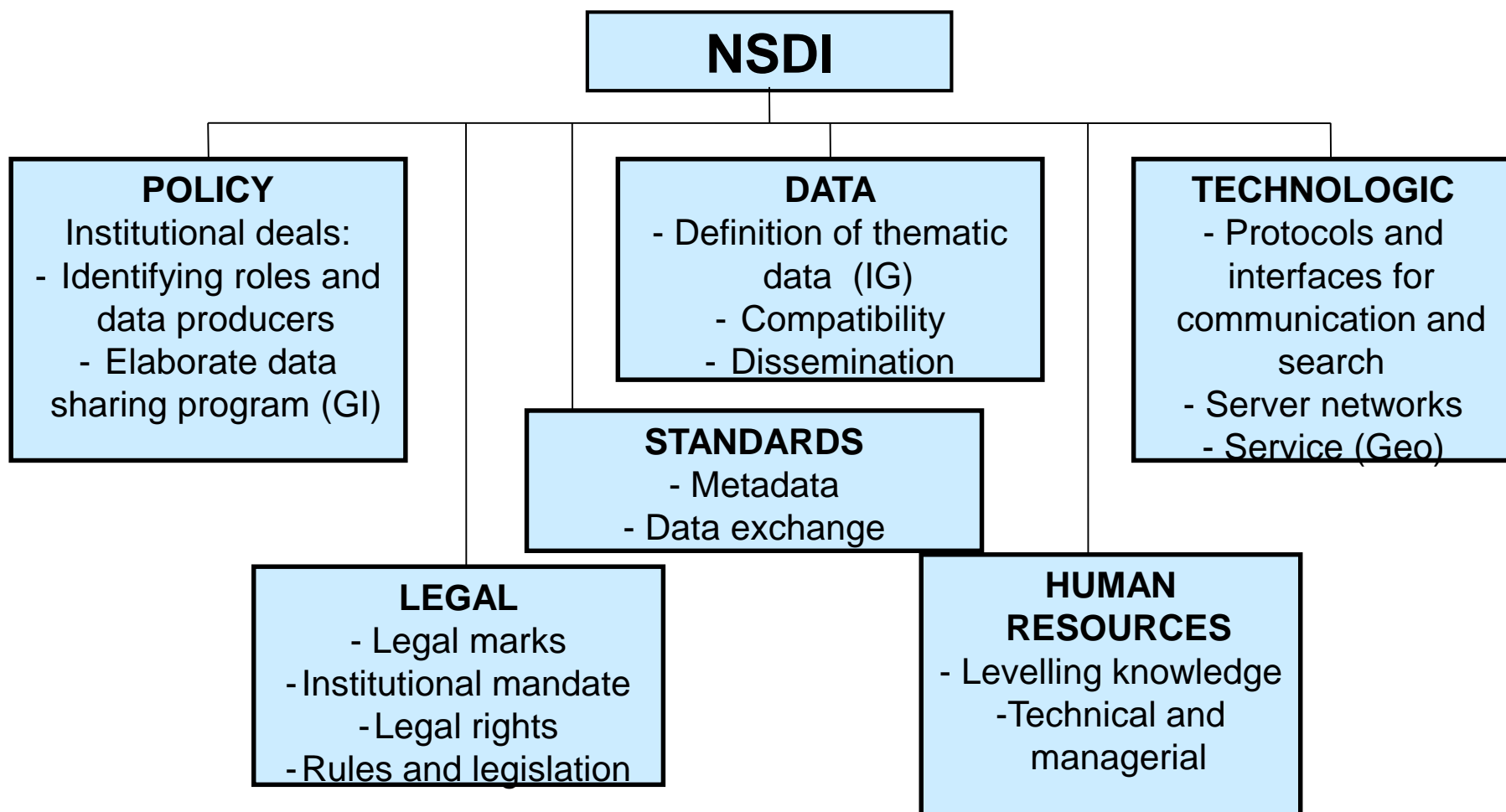# *Transition of Concept from GIS to SDI*

- No Institution can satisfy all its data requirements

- No institution has mandate and expertise in collecting all themes of data

- Institutions hold onto their data and are never willing to give it away

- Many institutions duplicate efforts of other institutions in collecting and managing spatial data

- Solution in to create infrastructures for sharing spatial data

A National Spatial Data Infrastructure Consists of…

NSDI

POLICY
Institutional deals:
- Identifying roles and data producers
- Elaborate data sharing program (GI)

DATA
- Definition of thematic data (IG)
- Compatibility
- Dissemination

TECHNOLOGIC
- Protocols and interfaces for communication and search
- Server networks
- Service (Geo)

STANDARDS
- Metadata
- Data exchange

LEGAL
- Legal marks
- Institutional mandate
- Legal rights
- Rules and legislation

HUMAN RESOURCES
- Levelling knowledge
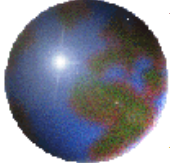- Technical and managerial

Benefits of Spatial Data Infrastructures

- Remove Duplication of data: Don't capture a dataset if a similar dataset exists

- Removes inconsistencies : Data is developed with common standards – It can be exchanged easily

- Facilitates Easy planning of infrastructure: Viewing of data in a unified way e.g. building plans overplayed with utilities to avoid building on top of utility pipes / cables

- Encourages specialization: One agency of government responsible for a dataset- no wastage of resources in many institutions competing

- Promotes use of Geo-spatial data – Improves planning and decision making

Reference data

Settlement

Transportation

Hidrography

Boundaries
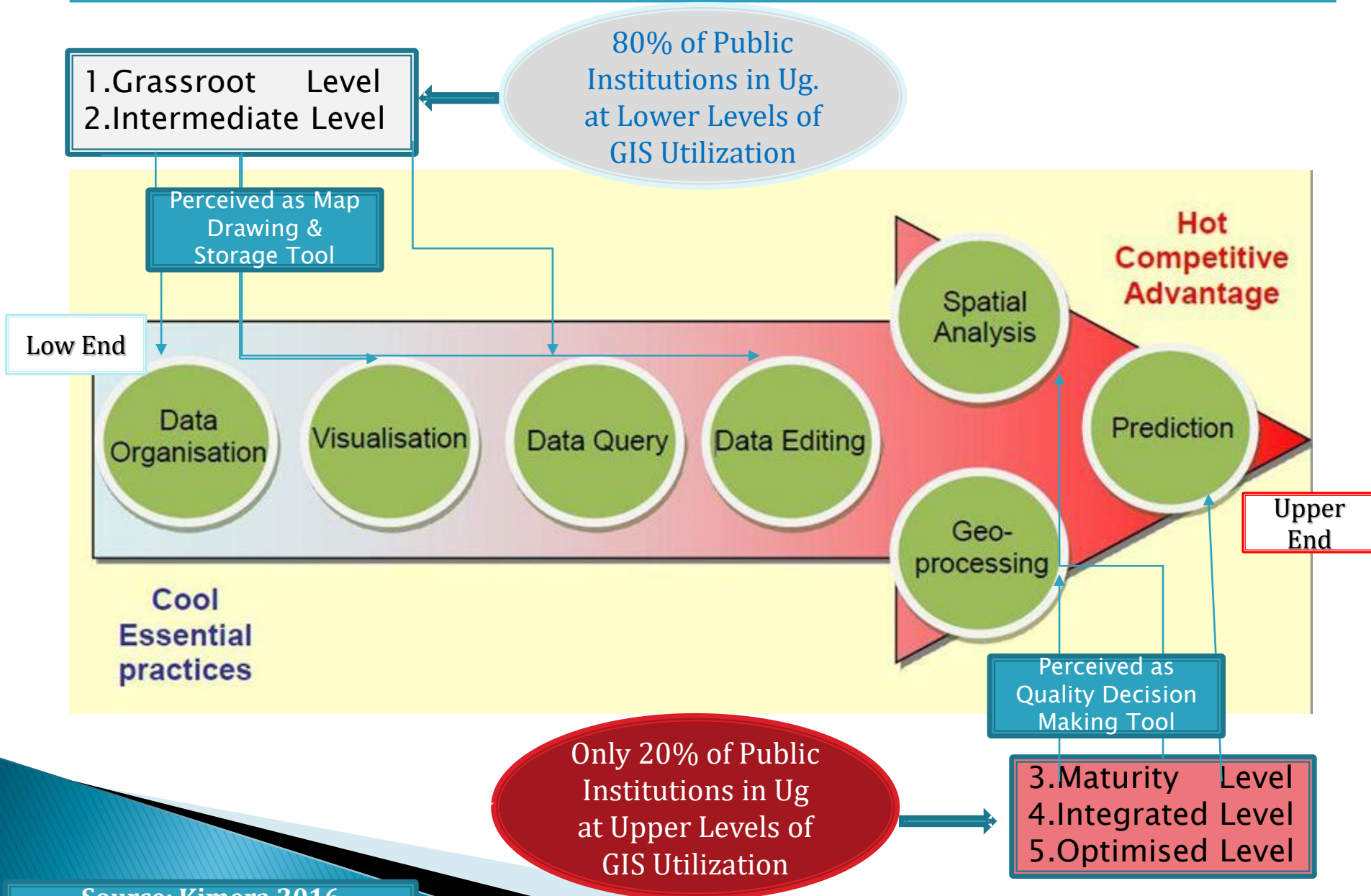
Geodetic control

Elevation

Imaging
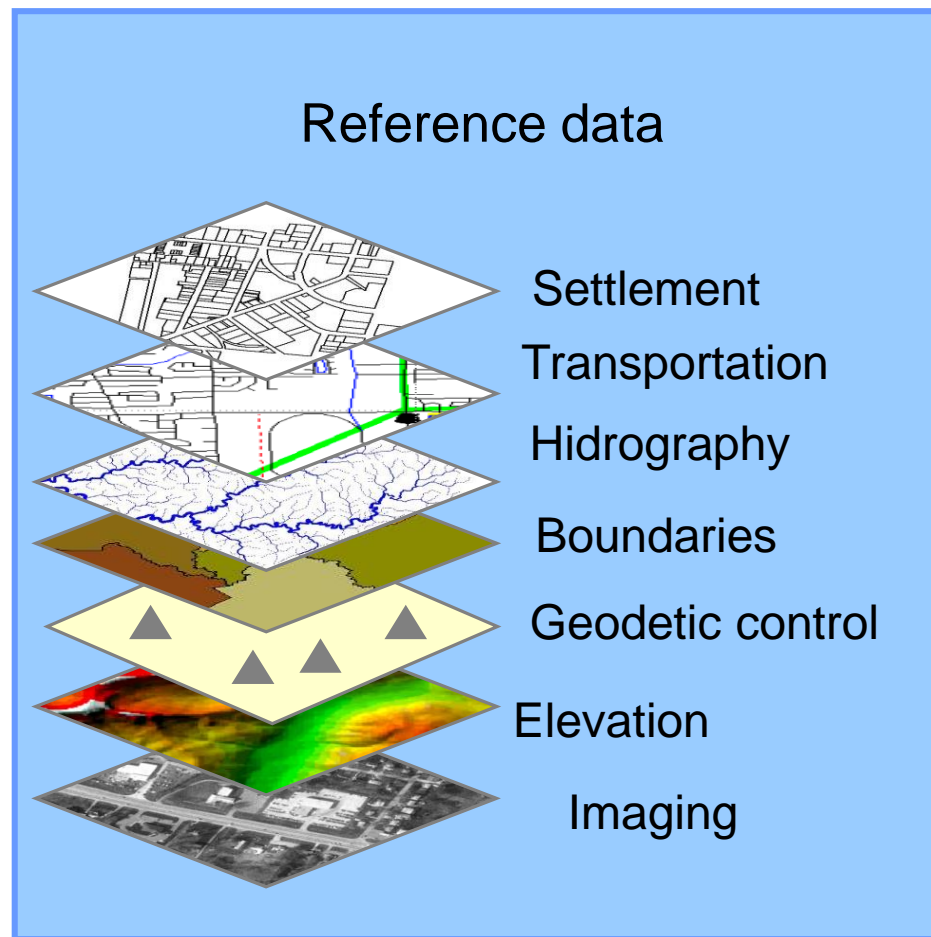
GIS Diffusion in Uganda

- Early Adopters:
  - Mainly donor funded projects – Forest Department (NBS) – Quantification of Biomass - early 90s
  - NEMA – Mid 1990s
  - NWP – Wetland Inventory and Mapping - MID 1990s
  - NARO-Kawanda– Inventory and classification of soils - Mid 1990s
  - Surveys and Mapping Department : CAMPUS Project

Discussions–GIS Utilization in Public Agencies

80% of Public Institutions in Ug. at Lower Levels of GIS Utilization

1. Grassroot Level
2. Intermediate Level

Perceived as Map Drawing & Storage Tool

Low End

Hot Competitive Advantage

Spatial Analysis

Data Organisation

Visualisation

Data Query

Data Editing

Prediction

Geo-processing

Cool Essential practices

Upper End

Perceived as Quality Decision Making Tool

Only 20% of Public Institutions in Ug at Upper Levels of GIS Utilization

3. Maturity Level
4. Integrated Level
5. Optimised Level

Summary of spatial Data Issues in Uganda

- Un-coordinated Efforts in Spatial Data Activities
- Institutional Mandates non existent or overlapping
- Data not structured based on industry standards
- Policies for accessibility not clear/non existent
- Lack of documentation of datasets
- No uniform and consistent Data standards
- Limited datasets, quality aspects questionable
- Uncoordinated donor spatial activities

Historical perspective of SDI development in Uganda

- Early individual efforts: (1989 – 2001)

- Environmental Information Network EIN – Coordinated by NEMA (Department of Surveys and Mapping, WWF, UBOS, WCS, MAAIF, Department of Physical Planning, NARO, NFA, Department of Meteorology, UWA, MIENR, Water Resources Dept.)

- 2001: Study by Government on Development of GIS – Ministry of Finance to coordinate NSDI

- National Integrated Monitoring and Evaluation Strategy (NIMES) – 2003: Department of Coordination and Monitoring at the Office of the Prime Minister (OPM

The Nation

Historical perspective of SDI development in Uganda

- Study by Geography Department, Makerere University supported by GSDI – Makerere was to host NSDI.

- In 2010, a feasibility study was conducted by ESRI Canada and GIC Ltd (on behalf of Infodev), to prepare for the establishment of a National Spatial Data Infrastructure in Uganda - NPA was selected to host NSDI

- Some of the Early Promoters (Hon. Gorreti Kitutu, Mr. Amadra Ori-Okido, Mr. John Diisi, Mr. Bernard Muhwezi, Mr. Ali Karatunga, Prof. Swaibu Lwasa, Mr. Philip Mpabulungi, Dr. Jane Bemigisha, Mr. Richard Oput, Mr. Herbert Tushabe, ……..

Why are we not moving?

- Lack of Legal and Regulatory Framework
- Limited awareness among the politicians and decision makers
- Limited capacity within the Geo-spatial Community
- Cultural factors – dedication, time management, planning..
- Are we following a wrong model?

Legal Regulatory Framework

- Draft Policy in Place (see next slide) provides for governance structure, treatment of spatial datasets, custodianship and data sharing legal issues

- A law shall be drafted to implement the policy
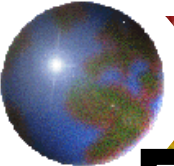
UGSDI Council

UGSDI – Technical Committee

2 Permanent members

Standards Working Group
Standards 1
Standards 2
Standards 3
Standards 4
Standards 5

Policy Working Group
Policy 1
Policy 2
Policy 3

IEC / Capacity Building Working Group
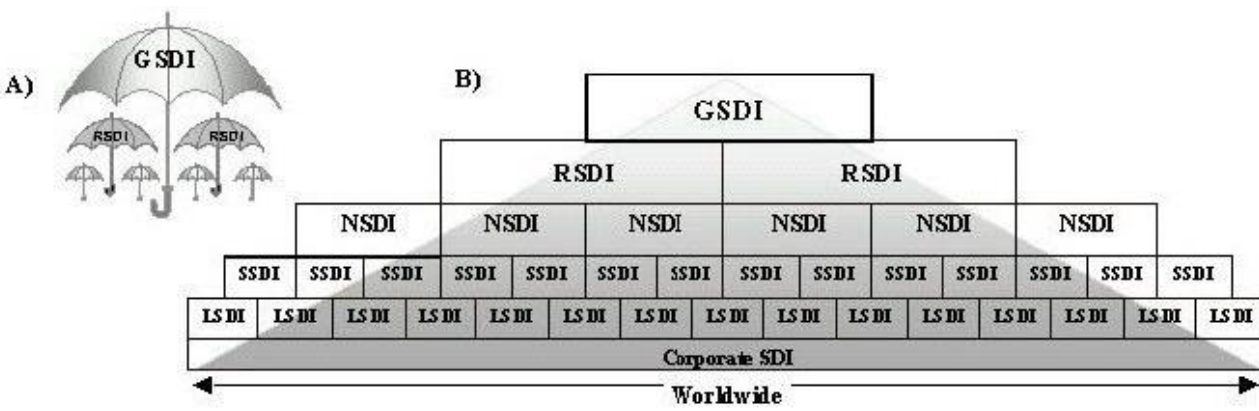
GEO-SPATIAL INFORMATION COMMUNITY

Coordinating Agency
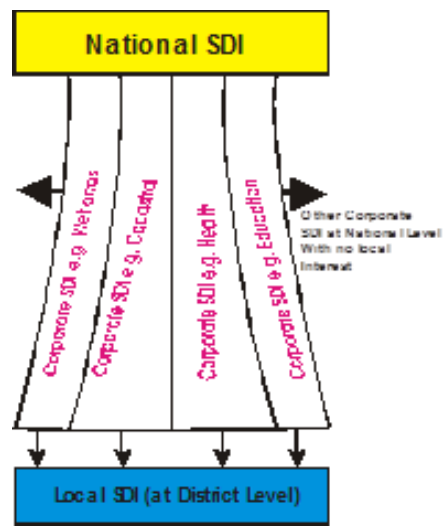
Progress so far – Draft Policy
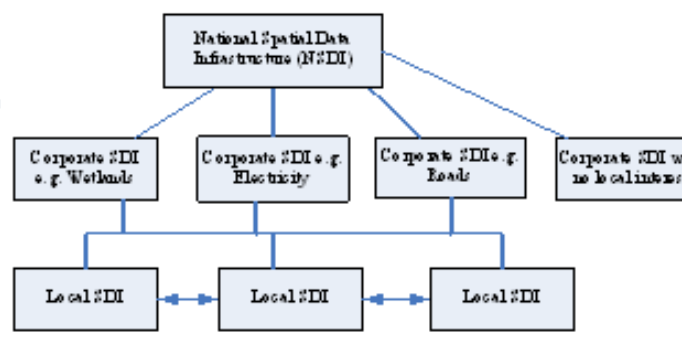
Models of SDI Diffusion

- Umbrella Model
  - Build National SDI to support Local SDI

- Building block Model
  - Build Local SDI to support National SDI

- Tree Model
  - Build Corporate SDI to support National and Local SDI

How should we move faster?

- Promote Sub – Networks: Energy Sector GIS WG, Land Information Systems WG, Disaster Risk Atlas, Geo-IM Working Group, Environment and Water resources GIS WG, Healthy and Social – economic WG, Citizen information WG….., (- tree Model)

- Finalise Policy and Legal Framework (push for a Presidential Directive if legal framework delays)

- Work through active sub-networks to enforce some aspects of NSDI such as standards, metadata

- Continue with capacity development to create a critical mass

- Create awareness at cabinet level – Make use of supportive cabinet ministers

Concluding Remark

- Almost 30 years ago since GIS started disseminating the Ugandan market
- GIS Utilisation still low as most applications have not reached maturity stage.
- Barriers for spatial data utilisation are still in place
- Efforts for developing a National Spatial Data Infrastructure are moving at a slow pace – No policy, no law and no regulations.
- Sector GIS seems to be moving faster than national efforts
- How can we use sector efforts to build a National Spatial Data Infrastructure?