THE RELEVANCE OF GEOSPATIAL DATA IN THE DELIVERY OF INFRASTRUCTURE MASTER PLAN (2013 - 2043)

By

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at

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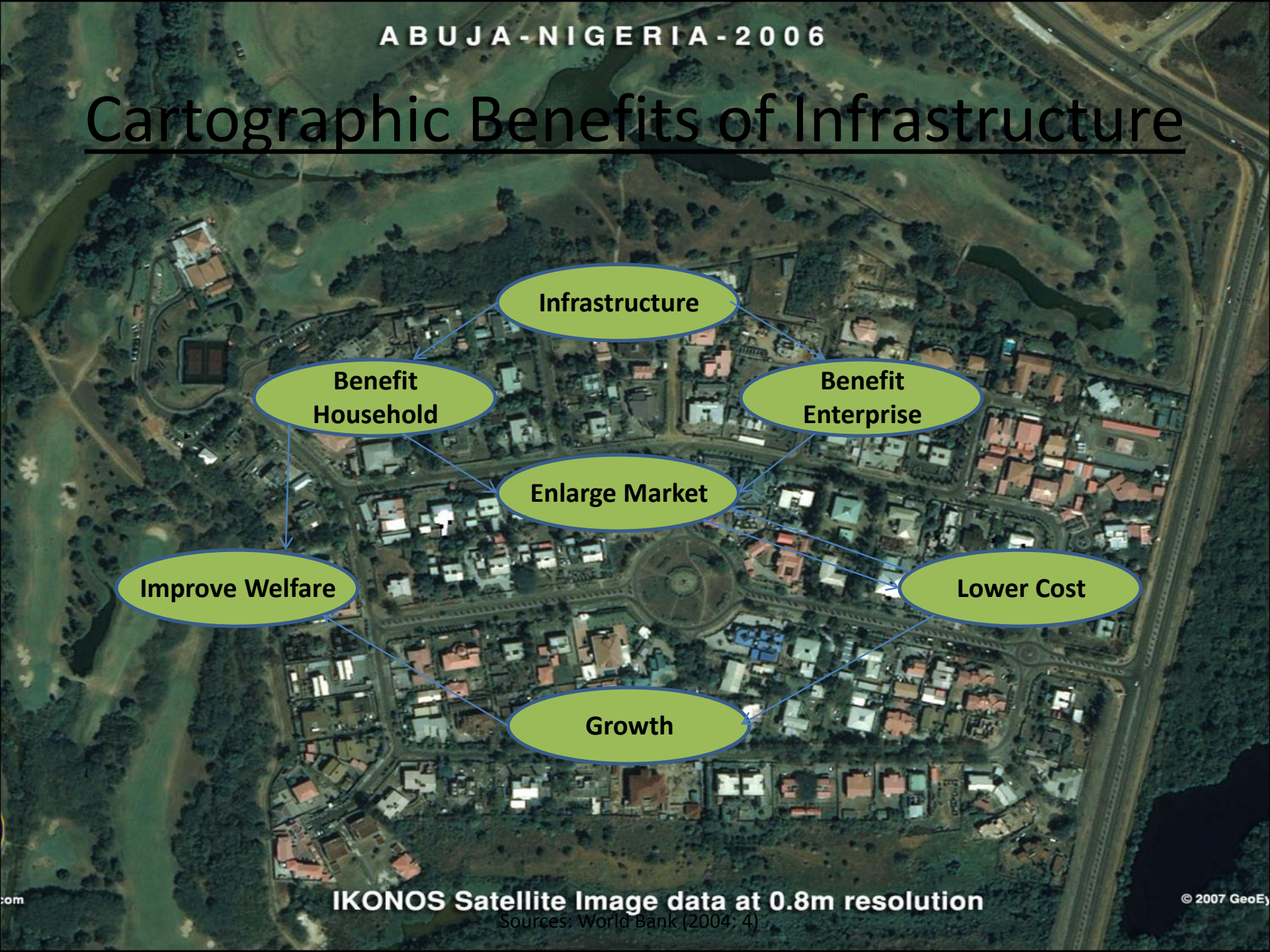


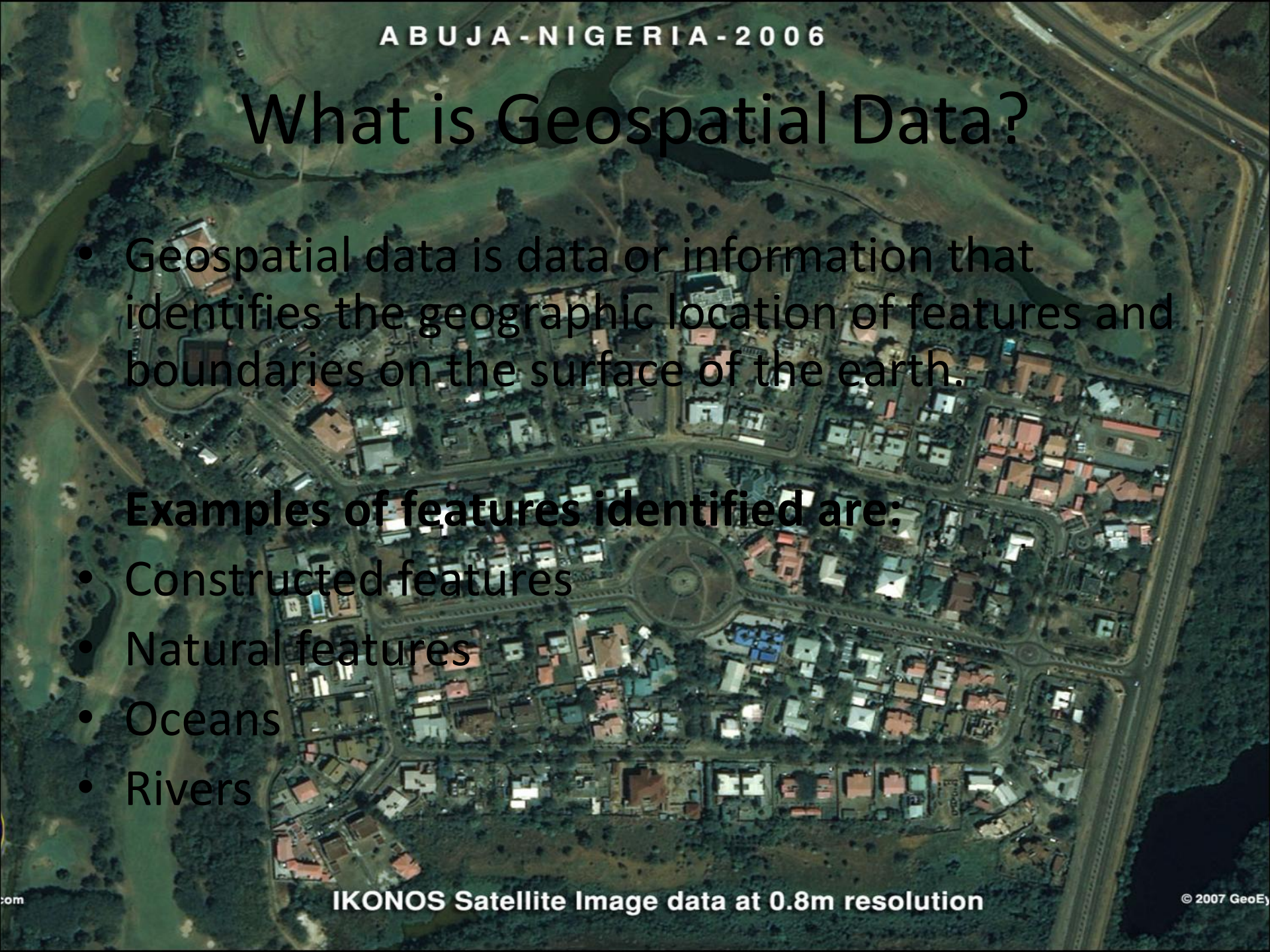
Cartographic Benefits of Infrastructure

Sources: World Bank (2004: 4)

Definition of Infrastructure

- Infrastructure is the physical assets, which are define as the "Fundamental Facilities and Systems serving the country, city, area or neighborhood, such as transportation and communication systems, power, plants and school" (Leong, 2004.5)

- It is the stock of fixed capital equipment in a country including factories, schools, hospitals, etc, considered as a backbone of economic growth of a country

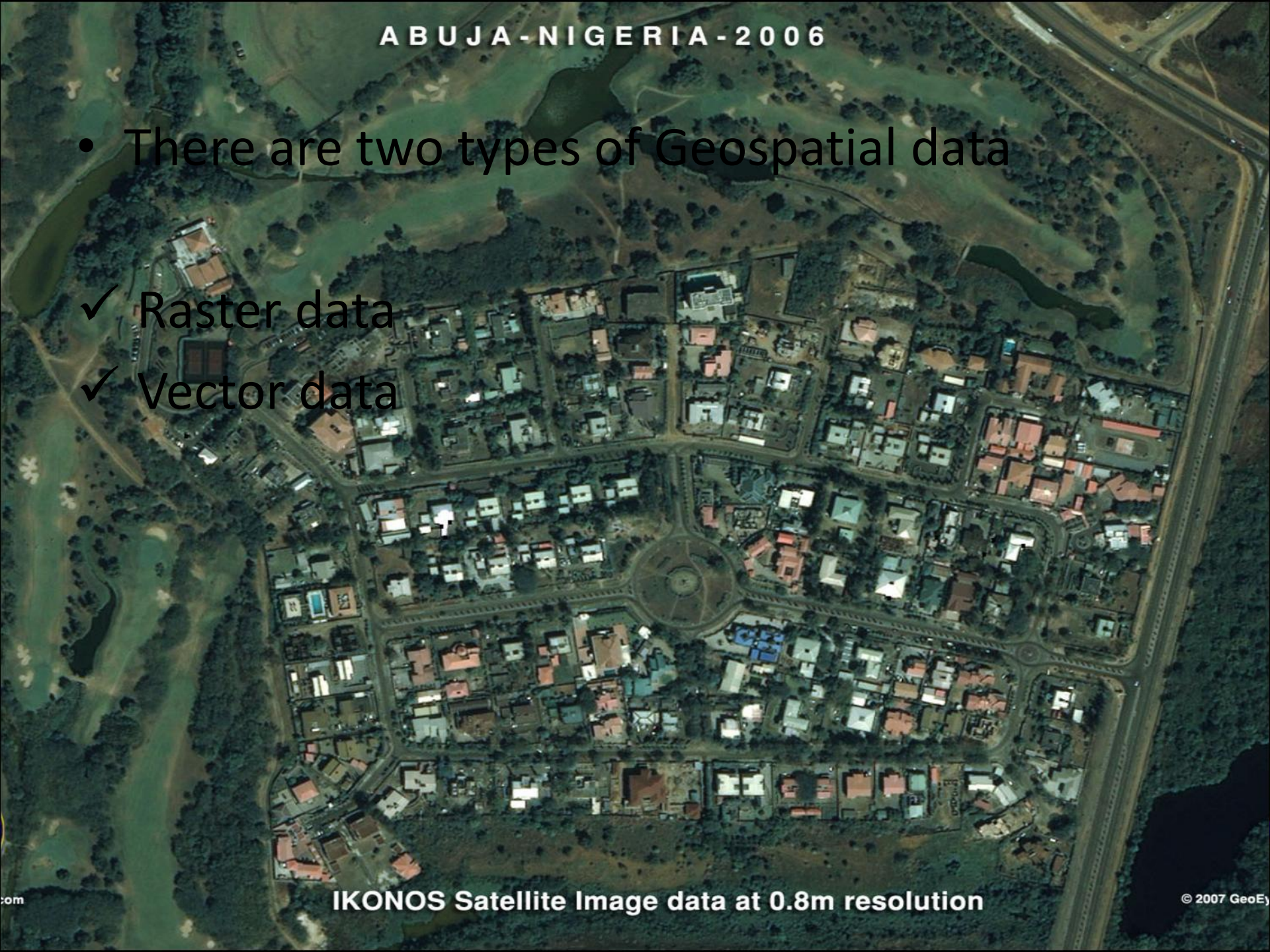


What is Geospatial Data?

- Geospatial data is data or information that identifies the geographic location of features and boundaries on the surface of the earth.

Examples of features identified are:

- Constructed features
- Natural features
- Oceans
- Rivers



- There are two types of Geospatial data

✓ Raster data

✓ Vector data

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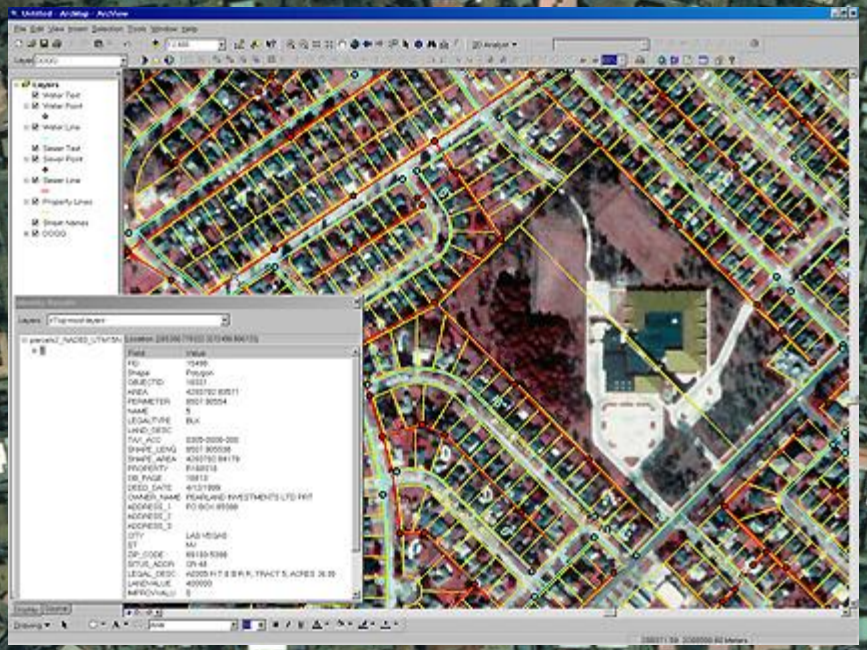
Vector data

Vector data uses the simple geometric objects, lines and areas (polygons) to represent spatial features



Vector Data overlaid on aster data

IKONOS Satellite Image data at 0.8m resolution

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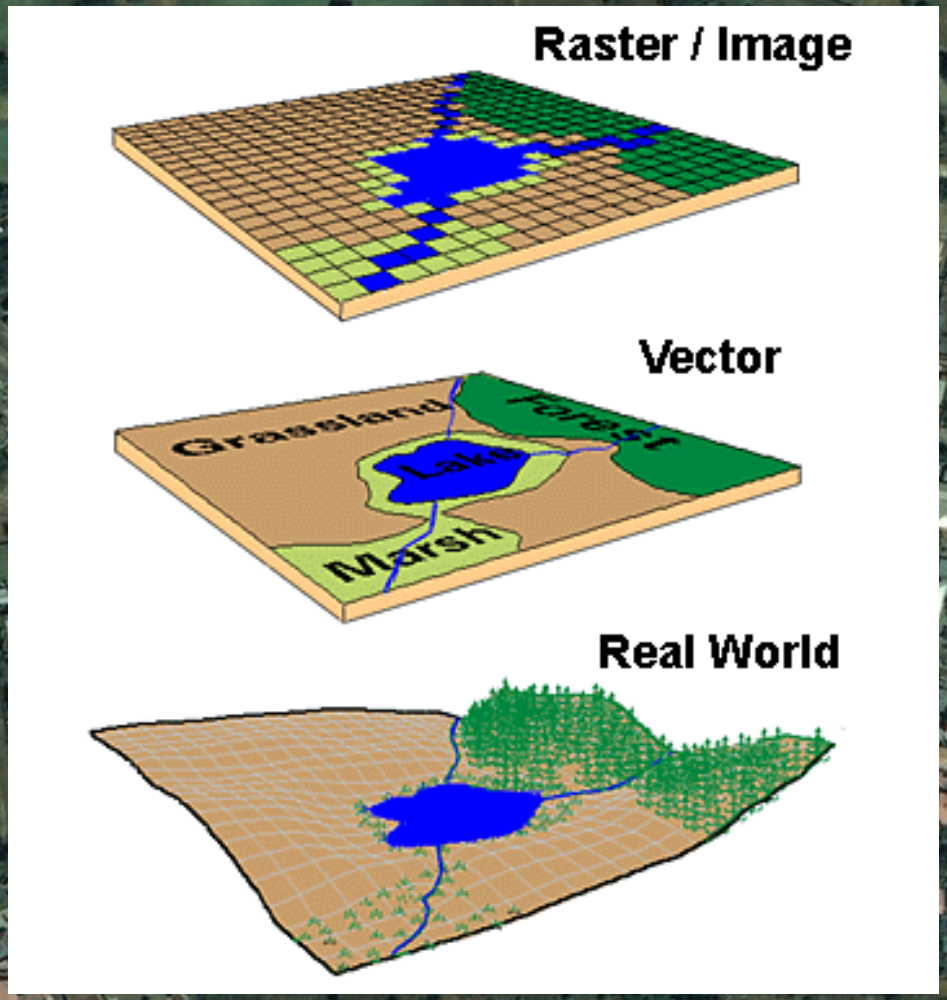
Raster data

Raster data uses a grid to represent its geographic information. Points are represented by single cells, lines by sequences of neighboring cells, and areas by collection of grouping cells

Raster Data

IKONOS Satellite Image data at 0.8m resolution

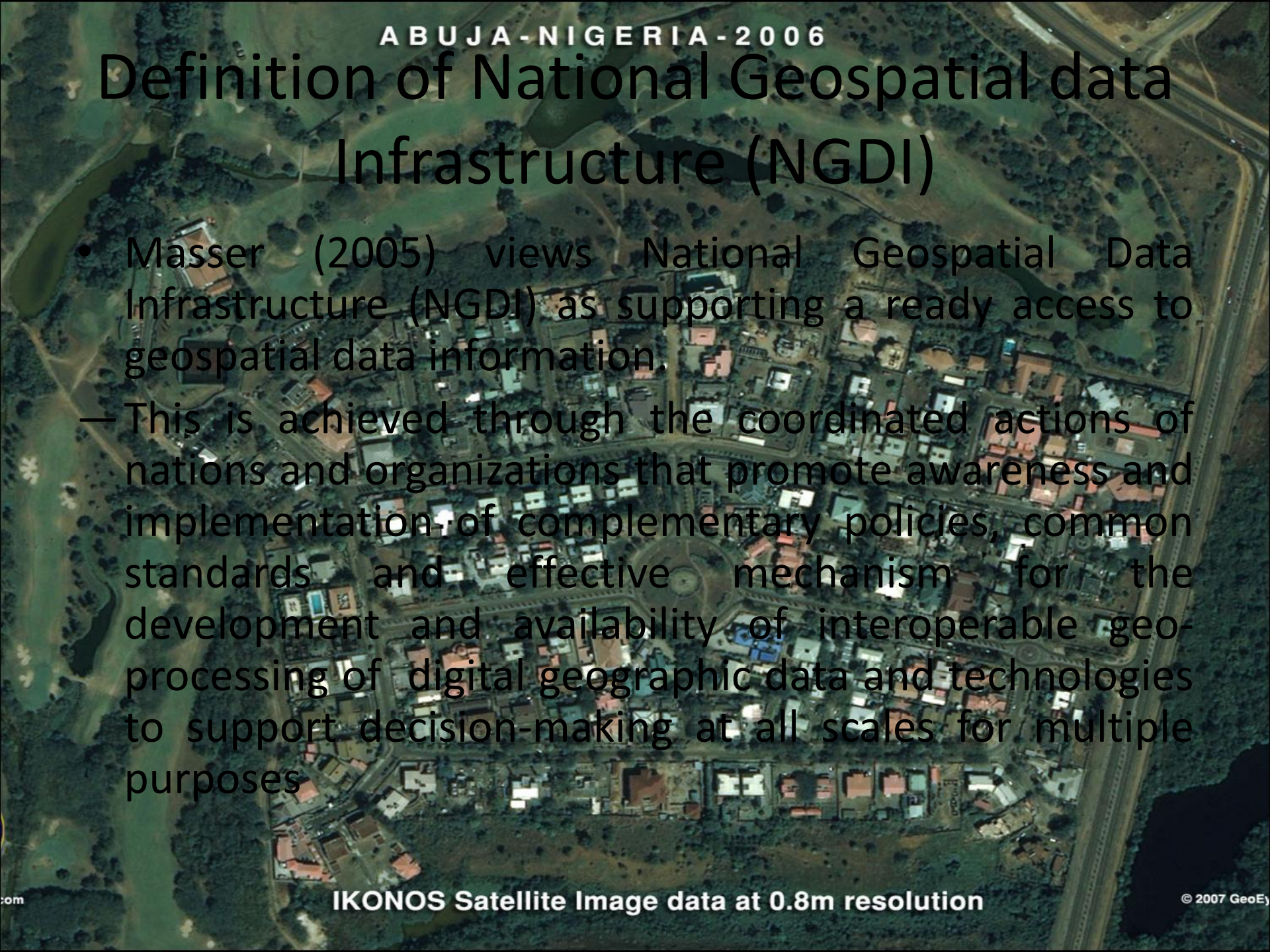
Combination of Vector and Raster data



A combination of Vector and Raster Data

The challenges of sourcing Geospatial data in Nigeria

- Maps are in analogue format which were model of supply of geosciences data and information.
- Poor documentation of maps, results, analysis, data etc.
- Inconsistencies, duplication and standardization problems have persisted.
- Most analogue data were poorly geo-referenced hence poor quality in terms of positional accuracy and reliability.

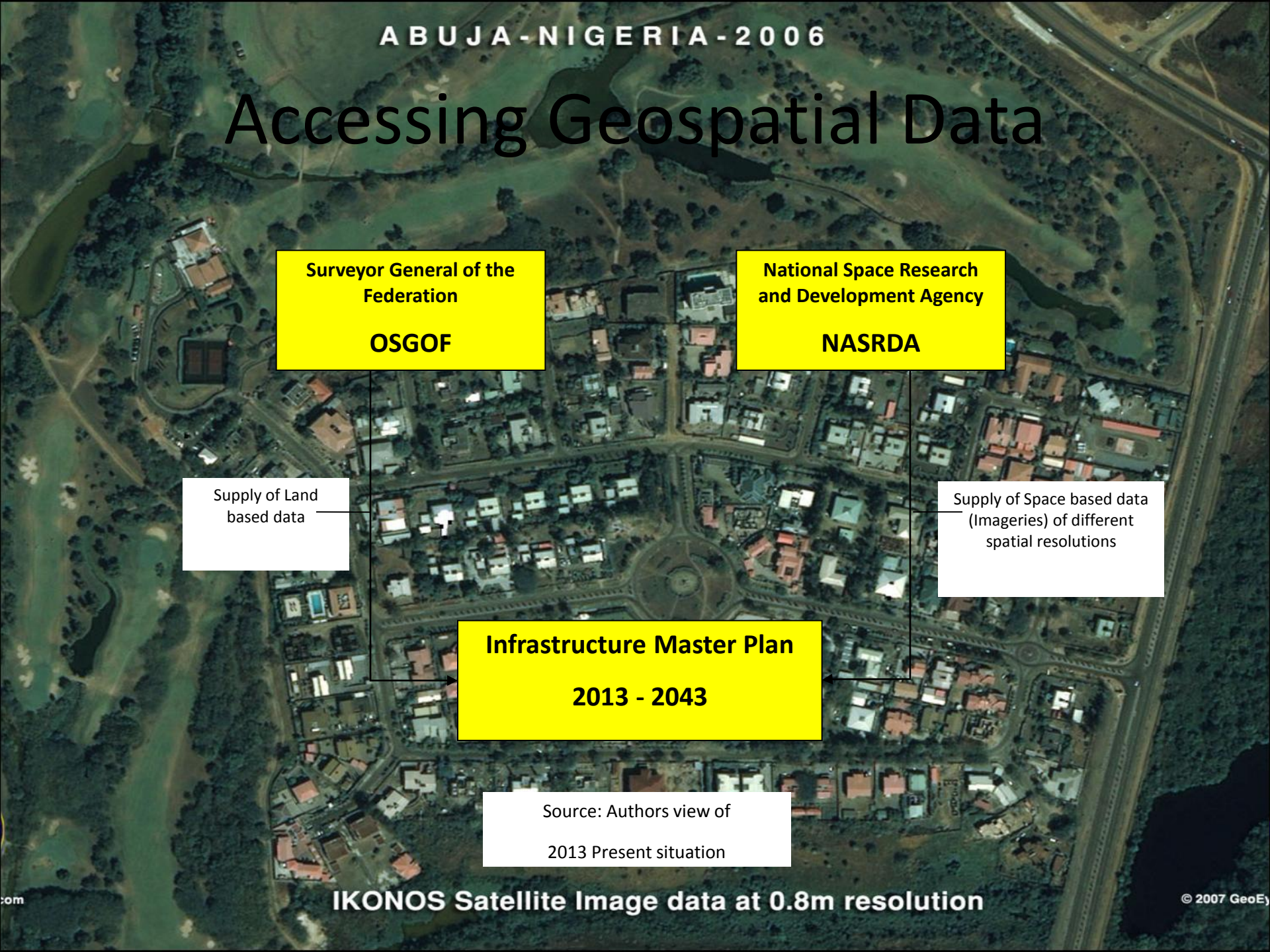


Definition of National Geospatial data Infrastructure (NGDI)

- Masser (2005) views National Geospatial Data Infrastructure (NGDI) as supporting a ready access to geospatial data information.
  - This is achieved through the coordinated actions of nations and organizations that promote awareness and implementation of complementary policies, common standards and effective mechanism for the development and availability of interoperable geo-processing of digital geographic data and technologies to support decision-making at all scales for multiple purposes

The Role of National Geospatial data Infrastructure (NGDI) as stated by Nwilo (2003) are summarised below

- Provides necessary geospatial data for mapping and environmental monitoring;
- Reduces the risk of loss of life, cargo and other properties and environmental damages in the ocean, seas and rivers;
- Provides the necessary framework for improved response to marine spills of oil and other hazardous wastes;
- Provides the necessary frame for the support of all use of space-based techniques;
- Provides the foundation upon which more detailed and/or sophisticated data sets and related application are based;
- Functions as the basic building blocks upon which all other application is dependent;
- Are of critical importance in facilitating national innovation and economic opportunities;
- Are of critical importance in the design and delivery of essential public services and benefits;
- They are of relevance in mineral exploration in society;
- The availability and access assist in avoiding duplication of efforts by different agencies and end users in producing the same data sets;
- Provide the necessary standards for integration of other similar networks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Accessing Geospatial Data
Surveyor General of the Federation
OSGOF
National Space Research and Development Agency
NASRDA
Supply of Land based data
Supply of Space based data (Imageries) of different spatial resolutions
Infrastructure Master Plan
2013 - 2043
Source: Authors view of
2013 Present situation
IKONOS Satellite Image data at 0.8m resolution
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Importance Of Geospatial Information for the Implementation National Integrated Infrastructure Master Plan Of (NIIMP)

Data Theme	Data Set	Agencies Responsible	Remarks
Geodetic Control Network	Geodetic control ponds Height datum Geoid model	Surveyor General Office (OSGOF	Data available but not accessible freely
Ratify Imagery	Aerial photograph Satellite imagery	National Space Research and Development Agency (NASRDA)	Data available but not accessible freely
Hydrographic	Coushine Natural water bodies	Federal Ministry of Water Resources and the various parastatals under it	Non existent
Boundaries	Governmentat Units Population places Enumeration area	Nat. Boundary Commission Nat. Population Commission Nat. Population Commission	Partially available but not accessible freely
Geographic Names	Place names	Nigerian Post Services Post Code Federal Min. of Culture, Tourism & National	Available and accessible
	Feature names	Orientation	Not available
Land Management Unit/Area	Land parcels/cadastre Land Tenure	Fed. Min. of Lands, Housing and Urban Development	Weak evidence Just taking off
	Street address	Land Reform Commission	Not in existence
	Post code	Local Government	Available
	Land use planning zone	Nigeria Postal Services Federal & State Land Ministries.	Mostly analogue
Transport	Roads Road Centerlines	Fed./State/Local Ministries of Works Fed./State/Local Ministries of Works	Partially available but not accessible
	Railways Airports Ports	Fed. Ministry of Transport Ministry of Aviation Fed. Min. of Transport (NIWA)	Non existent for all
Structures	Bridges/Tunnels	Federal/State Ministries of Works	Not available
Utilities and Services	Power	Federal Ministry of Power and the Parastatal	Not available
	Telecommunications	Federal Ministry of Communication and Parastatals Fed. Ministry of Transport	Some are available but scattered and not accessible
Natural Environment	Land cover	Fed. Min. of Env. & State Ecological Fund Office	Scanty and not accessible
	Soils	Fed. Min. of Agriculture and the Parastatals	Available but not accessible
	Geology	Ministries of Solid Minerals Geological Survey	Available but inaccessible

Difficulty in sharing Geospatial Information for the actualization of National Integrated Infrastructure Master Plan Of (NIIMP)

- Majority of officers or technocrats that are either directly or indirectly connected with the implementation of NIIMP are ignorant of the availability of geospatial information.
- Absence of metadata affects discovery and understanding of information contents.
- Integration of information from different levels with varying scales, standards and contents is problematic reducing information utility.
- Absence of appropriate spatial information and its knowledge is causing duplication and wastage of resources and time, leading to uninformed decision-making.
- Collection of similar information delays the project and in many cases rapid changes in the real world reduces the effectiveness of plan and difficult to implement.
- Certain information cannot be collected unlike weather and decision makers have to rely on estimates and judgments which is not appropriate for a developing economies like Nigeria.
- No proper guidelines or models are available to the MDAs for information sharing. Hence hoarding it in justly and unknowingly

(Rajabifard et al 2002)

Rationale for National Geospatial data Infrastructure (NGDI)

- To unlock the hidden potential in the usage of geospatial data to stimulate economic activity;
- To reduce duplication of efforts among agencies;
- To make geospatial data accessible to the public by encouraging the use of standards;
- To improve quality and reduce costs related to geo-information;
- To facilitate value-added services by enabling combination of data from multiple resources; and
- To increase the benefits of using the wealth of disintegrated data, and establish key partnership with States, cities, academia and the private sector to increase data availability

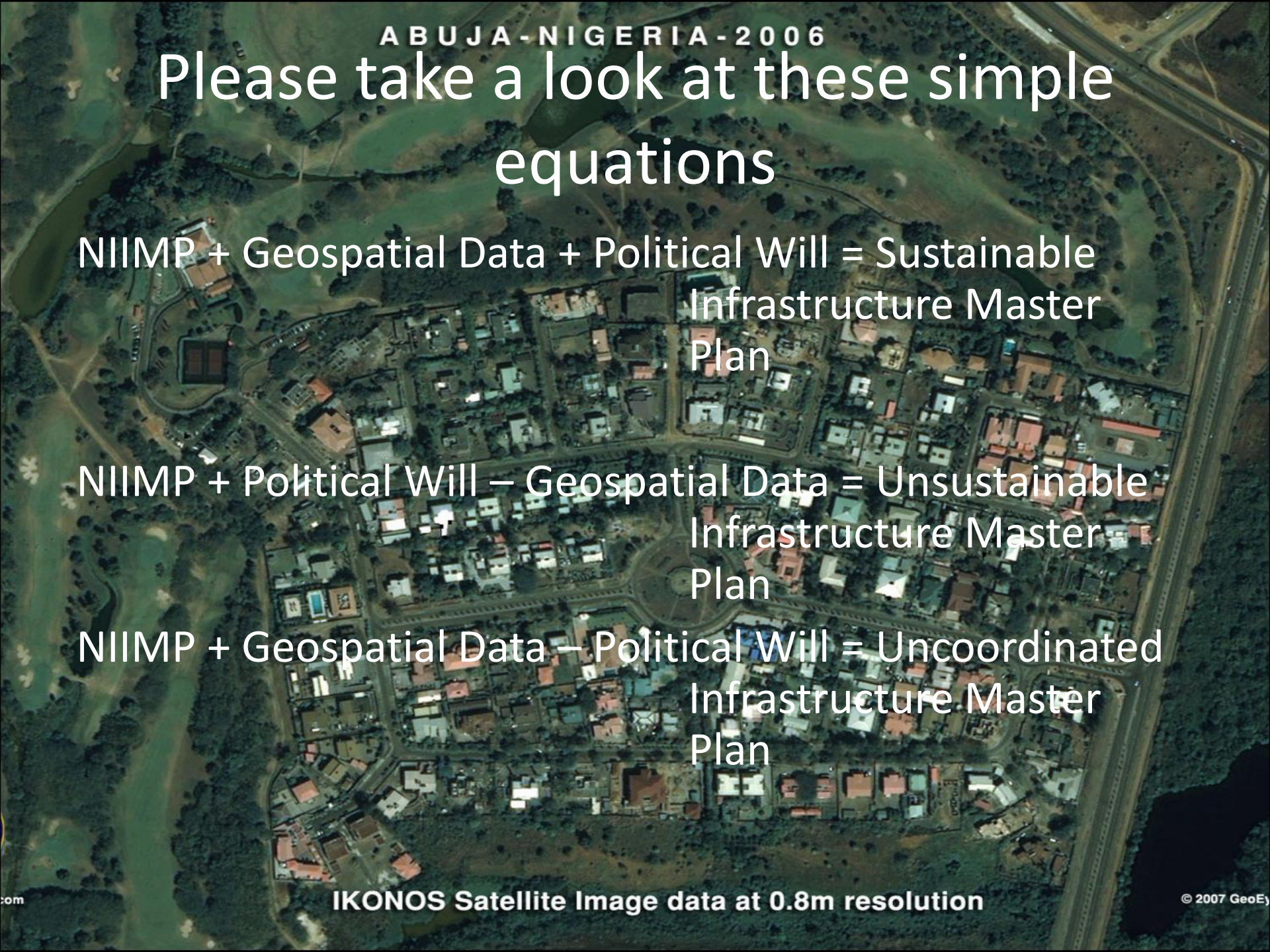
Rationale for Scientific Database In National Planning Commission (NPC)

Scientific database stores

- Geospatial Data
- Statistical data
- It is analyzable and can be queried
- Unlock hidden Information if properly utilized
- It helps in modeling and visualizing information spatially

Proposed Recommendations for delivery of NIIMP

- To organize a stakeholders workshop on the application of Geospatial data in delivery of National Integrated Infrastructure Master Plan (NIIMP)
- To identify implementation strategy by utilizing geospatial data in NIIMP
- To agree on the choice of data model and data structure for the database with respect to the implementation of NIIMP
- To identify the cost implications and benefits including cost-benefit analysis derivable from utilizing geospatial data in the delivery of NIIMP



Please take a look at these simple equations

NIIMP + Geospatial Data + Political Will = Sustainable Infrastructure Master Plan

NIIMP + Political Will – Geospatial Data = Unsustainable Infrastructure Master Plan

NIIMP + Geospatial Data – Political Will = Uncoordinated Infrastructure Master Plan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Thank You
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