PERSPECTIVE ON INCLUDING SPACE TOOLS IN POLICY DEVELOPMENT

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INTRODUCTION

Definition:

Policy development includes:

- Identification of an issue(s)

- deciding what is needed to solve the issue(s),

- what should be done to solve the issue(s),

- how to solve the issue efficiently ,economically and on time,

- who should be responsible for handling task.

SPACE TOOLS IN THE PROVISION OF DATA

- The dynamics of our planet can be better understood by utilizing the wealth of data that is available from using space technologies.

- Data from space are available as tools to study geophysical, hydrological, meteorological and climatological Earth processes and hazards.

- Theses data are available in :
  - in large volumes
  - covering large areas
  - available on a 24 hours bases
  - accessible and ready to use

- We are able to monitor changes in water, land, and weather across countries, and the information obtained are used to address a wide range of problems, such as floods, droughts, and land use issues.

- Data of these type are a major tools in Policy Development and implementation .

THE USE OF SPACE DATA IN SOME SELECTED SECTORS

The applications of space/satellite technologies, including Communication satellites, Earth Observation satellites, Navigation satellites etc. in the following sectors:
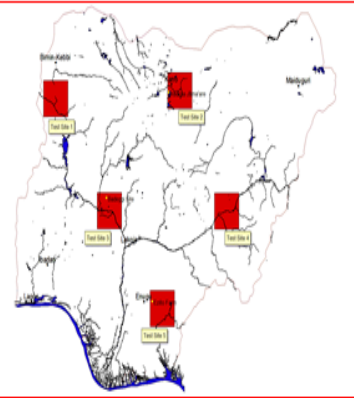
- AGRICULTURE :

  - Most applications of space in agriculture to reduce cost of production.

  - Space solutions to provide early warning information and risk identification to support planning and mitigation.

  - Earth Observation (EO) provide accurate updated maps of natural resources to support sustainable management. The availability of water and land for instance is central to agriculture.

  - Governments need to embrace or deploy space tools in its policy articulation to improve their agricultural sector in order to provide food security.
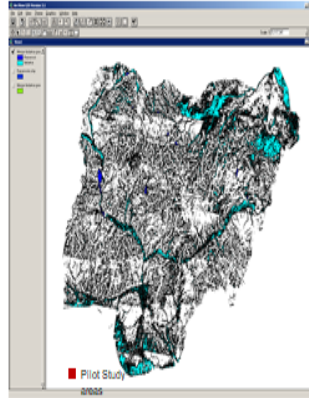
Some Application of Space Data to Agriculture in Nigeria:

Development of Fadama Land Information Management System (Flims)

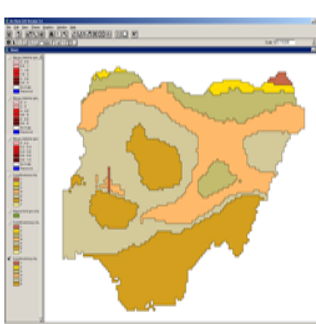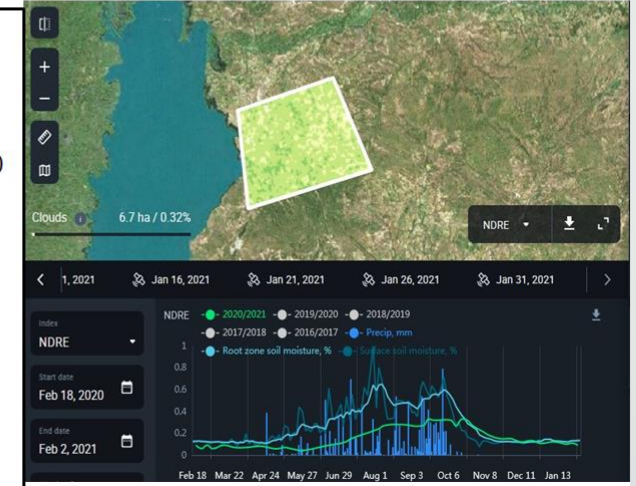Development of Fadama Land Information Management System (FLIMS): To Boost Rice Production In Nigeria and to assist in the enhancement of fadama (or wetland) based rice cultivation. This project is seen to improve Nigeria's potentials for increased rice cultivation and rice production monitoring.

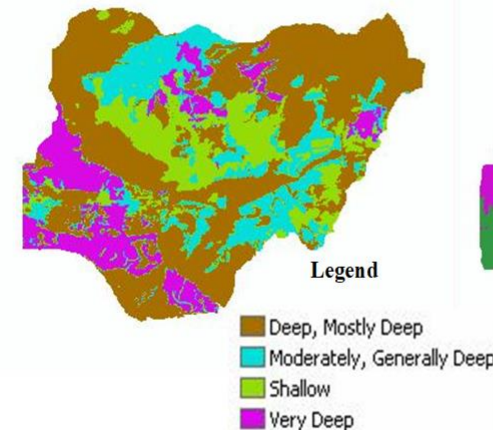Project has established the use of satellite and climatic data (rainfall and temperature) to:

i. Map national extent of Fadama land (wetland) available in Nigeria.

ii. To identify suitable areas for up-land and Fadama rice production in Nigeria.

iii. Determine minimum, moderate and maximum potential yield of Fadama and upland rice for strategic national planning.

iv. Presently approximately 2M ha of Fadama Land is being cultivated for wetland rice.

v. Over 3.5m ha of inland valley or Fadama land is available for strategic planning and cultivation to increase rice production in the country.

Study area and location of test sites for rice cultivation.

National extent of Fadama (wetland) in Nigeria
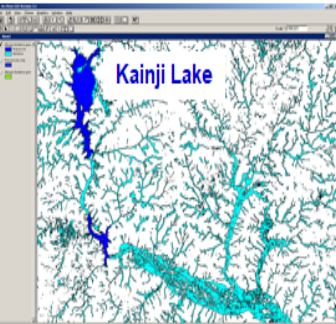
Fadama or wetland areas in a close-up view.

Min potential yield for Fadama rice

Space Based Digital Farm Monitoring for 2020 Dry Season Farming (CBN Anchor Borrower)
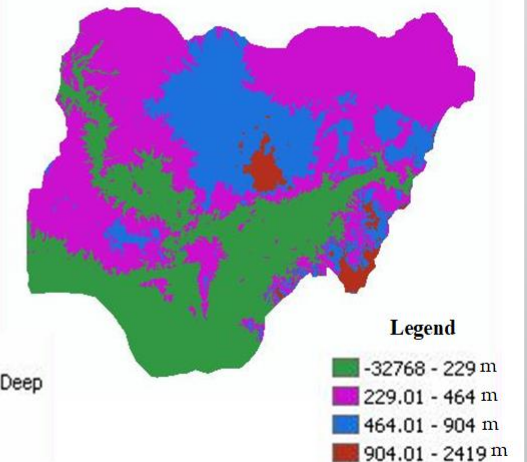
The project focuses on the monitoring of farms for the Central Bank of Nigeria using space based technology during the 2020 dry season farming.
205 Farms have been validated from space and are currently being monitored for:
Crop growth,
Crop health,
Crop Performance,
Yield Estimates.

GIS Based Agro-Ecological Zoning for Nigeria

Legend
- Deep, Mostly Deep
- Moderately, Generally Deep
- Shallow
- Very Deep

Legend
- -32768 - 229 m
- 229.01 - 464 m
- 464.01 - 904 m
- 904.01 - 2419 m

Soil Depth Classes of Nigeria

Height Classes of Nigeria

THE USE OF SPACE DATA IN SOME SELECTED SECTORS CONT.

- **CLIMATE CHANGE AND ENVIRONMENT :**

  - **Developing countries generally have limited adaptive resources. The increased risk of droughts, flooding, extreme weather events and rising temperature can be of severe impact.**

  - **Satellite data are used to monitor the above to underpin models that predict climate change risk and inform adaptation and mitigation strategies.**

Climate change is one of the most pressing global challenges of our time and this underscores the inevitability of space-based technology in providing critical climate data to understand and mitigate climate change for the purpose of ensuring the monitoring of the implementation of the Paris Agreement and SDG 13: Climate Action

Some Application of Space Data for Climate Change and Environment in Nigeria

## Assessment of changes in Aerial Extent of Lake Chad using Satellite Remote Sensing Data

1963

1972

1987

2000

Satellite imageries of Lake Chad for the year 1963, 1972, 1987 and 2000.
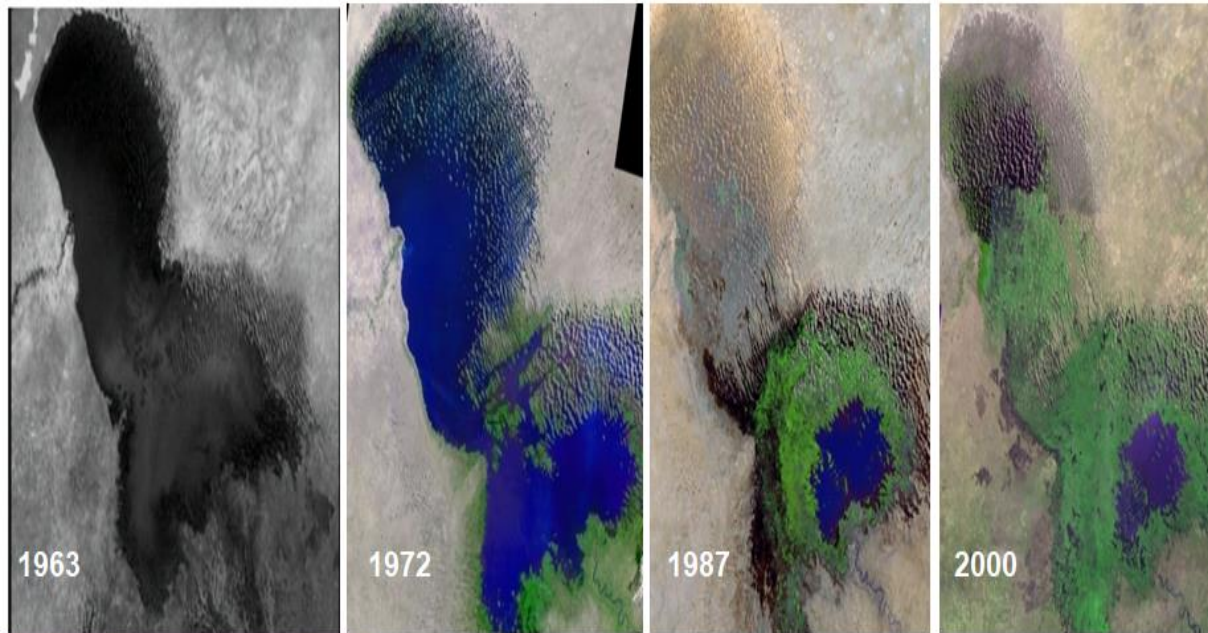
Year	Area Extend
1963	20,900km2
1972	16884km2
1987	1,746km2
2000	304km2

Human Impacts hotspot map on vegetation in Gwagwalada

1987

2001

2016

Legend
- Human Impacts
- Non Vegetation
- Vegetation
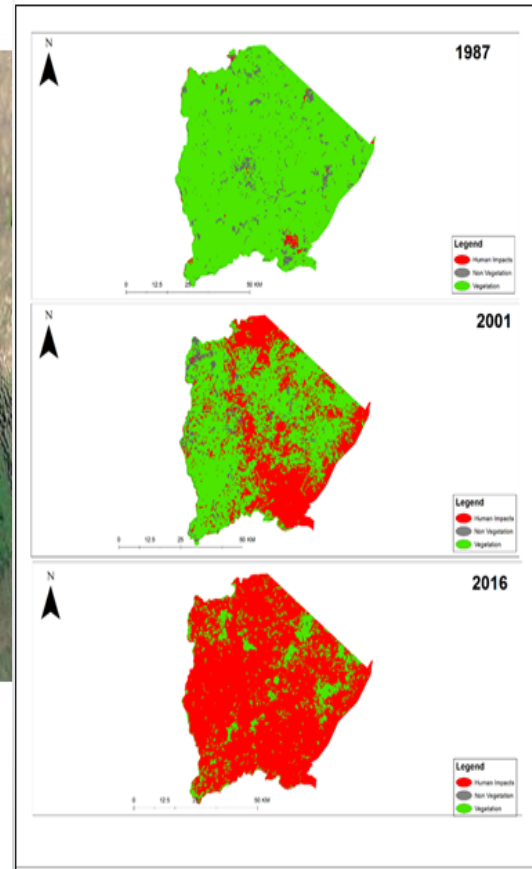
	1987 Area in Km2	1987 Area in %	2001 Area in Km2	2001 Area in %	2016 Area in Km2	2016 Area in %
Human Impacts	764.55	0.79	34720.31	35.73	82820.74	85.23
Non-Vegetation	5060.88	5.21	4234.14	4.36	28.26	0.03
Vegetation	91353.01	94.01	58223.99	59.91	14329.45	14.75
Total	97178.44	100	97178.44	100	97178.44	100

■ Human Impacts ■ Non-Vegetation ■ Vegetation
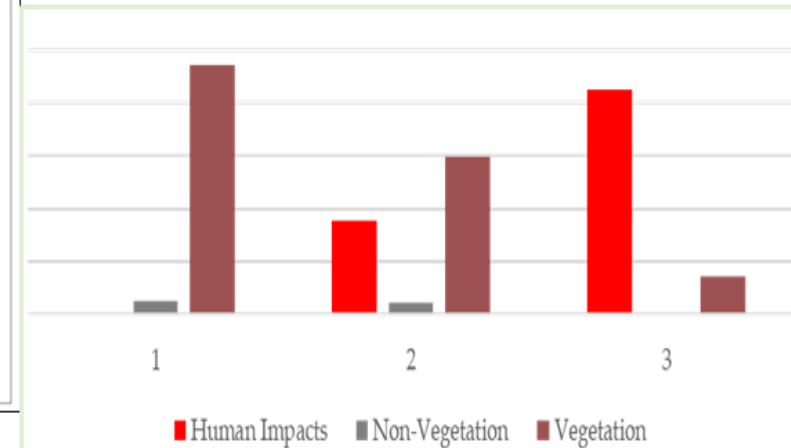
- **DISASTER RESILIENCE :**

   - Developing countries are mostly affected by disaster essentially due to lack of preparedness, weak infrastructure and inadequate emergency response capability.

   - The use of satellite data enable greater preparedness, resilience and response, thereby increasing the survival and recovery rate of people and economies in affected areas.

   - E.O satellites and SatComs are used simultaneously to provide information on the location of affected communities and on the road-ways that are safe or unsafe for navigation thus optimize response efforts.

   - The use of satellite data enhances disaster resilience by aiding disaster prevention, disaster preparedness, resilience and response.
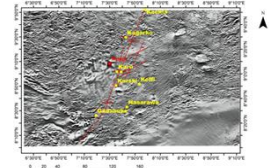
THE USE OF SPACE DATA IN SOME SELECTED SECTORS CONT.

Some application of Space data to Disaster Resilience in Nigeria
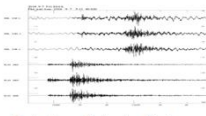

Investigation of The Earth Tremors Across Nigeria
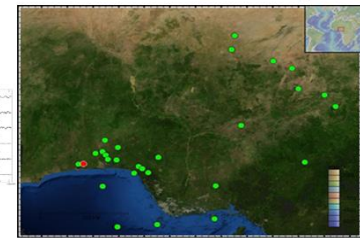
Map of Erosion Site in The SE using NX
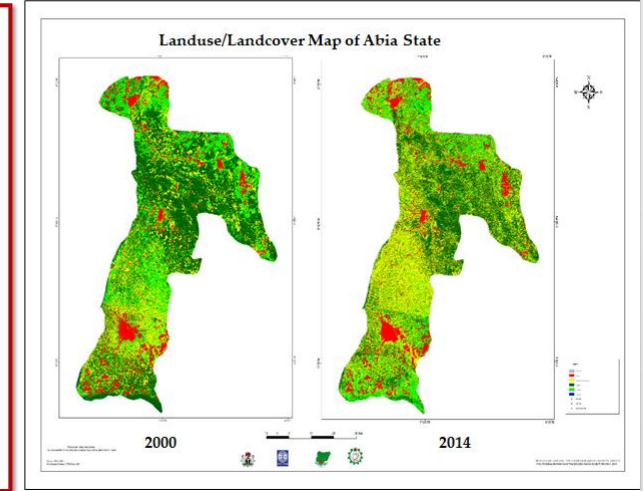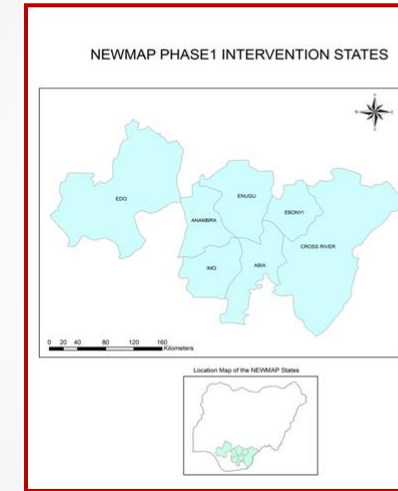

Response to Flood in 2011 and 2012
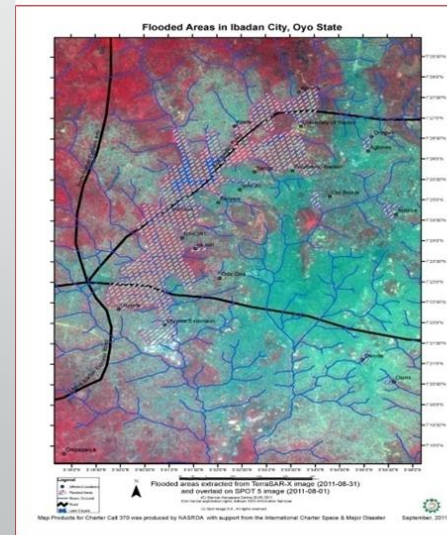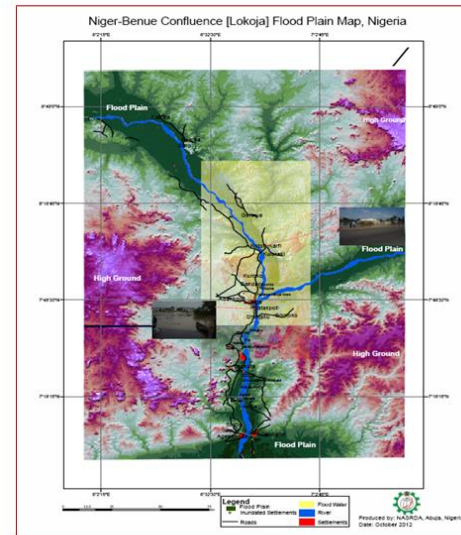
FORESTRY:

- Satellite imagery provides accurate and cost-effective surveillance and monitoring of forestry resources at frequent intervals so that changes to land coverage are monitored and detected quickly.

- The issue of illegal logging or outbreaks of pests and diseases are detected promptly at a lower cost than any other method of data collection.

- Space technology provides intelligence for policies that reduce deforestation and degradation.

- Space based data is used to reduce carbon emissions, promote sustainable resource use and maintain plant health.

- Space application in policy making will thus focus on reducing carbon emission, sustainable resources use, law enforcement and plant health.

Application of Space Data for Forestry in Nigeria
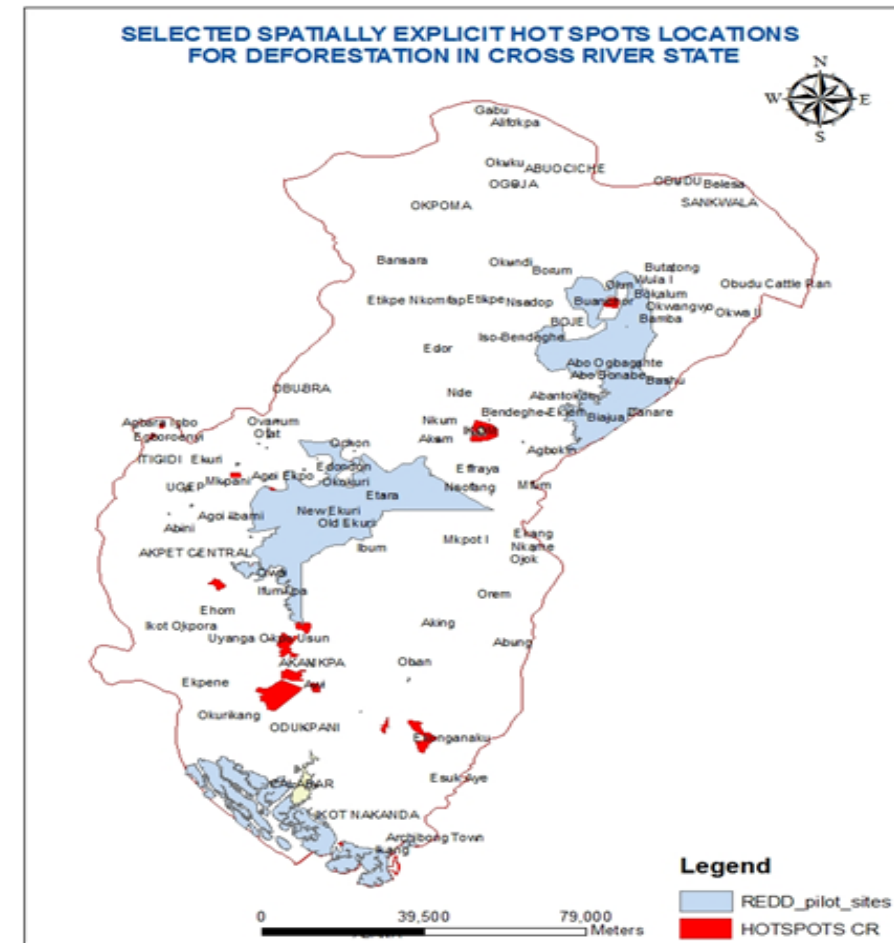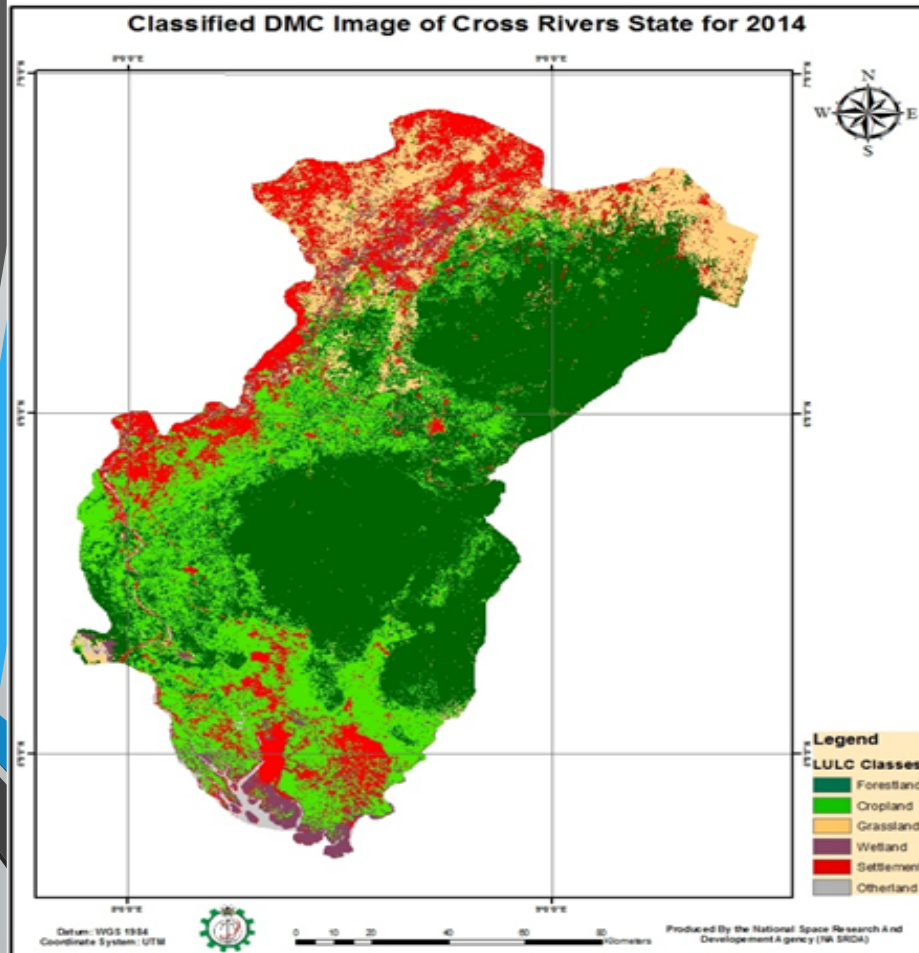
URBAN AND TRANSPORT:

- By 2050, the UN estimates that the urban population will reach nearly 70% of the global community.

- This can only be managed with land use and land cover policies that account for the growing and future demand for urbanization.

- Policy makers should have access to data on land use and land cover change as well as accurate predictions on how these might change over time.

- Satellite technologies offer an authoritative data source for government that needs structured urban planning, and update of property data base in the face of rapid urban change.

- EO is used to detect hotspots of activity and location data supports the development of universal geographic reference systems.
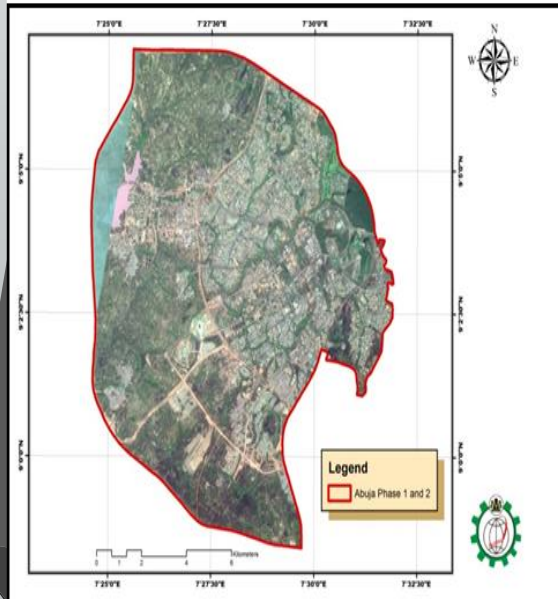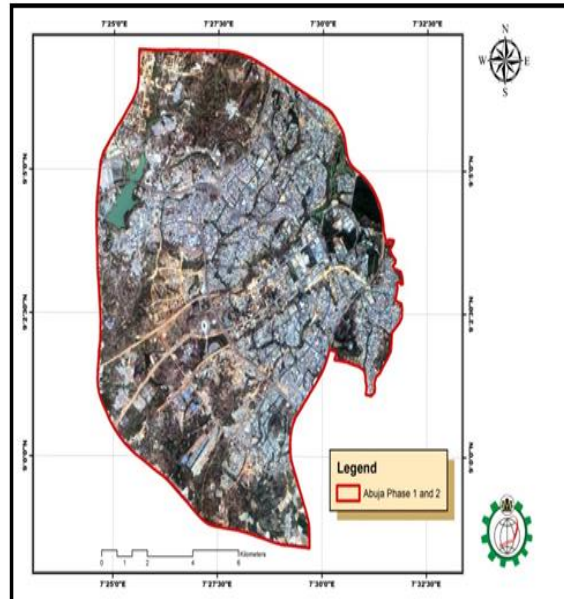
THE USE OF SPACE DATA IN SOME SELECTED SECTORS CONT.

Some Application of Space tools in Urban and Transport in Nigeria

Map for Monitoring of Slum Development With N2

- The dataset used in this study are NigeriaSat-2 and Spot 5 high resolution satellite imagery.
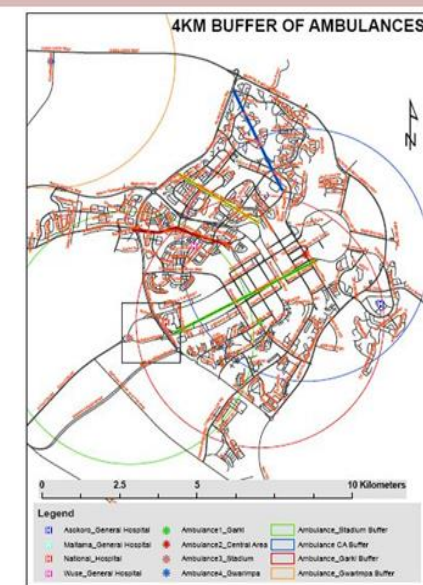
Spots 5 Image, 5m Resolution of 2005

NigerianSat 2 Image, 5m Resolution of 2012

REAL TIME MODEL FOR ROAD SAFETY MEASURES IN NIGERIA USING GEOGRAPHICAL INFORMATION SYSTEMS AND REMOTE SENSING.
NIGERIASAT-2

NASRDA, 2013

SPACE TOOLS IN POLICY DEVELOPMENT .

According to the International Partnership Programme of the UK Space Agency report of 2020 for developing countries,

- The nexus between space technology and how government can make sustainable policies that will enhance development in:

    - Agriculture
    - Climate Change and environment
    - Disaster resilience
    - Forestry and Urban Transports.

- The Report also establishes that space data is an essential part of policy formulation process and

- Space data will help Policy makers to understand their challenges, their strength, need for urgent actions in making policies.

Space tools in Policy Development in Nigeria.

Grid3 Nigeria Project: Phase 1

GRID3 PHASE-1 STATES INCLUDING FCT

NIGER

BENIN

CAMEROON

Kaduna   Bauchi

Niger

FCT

Lagos   Enugu

Cross River

Legend
- Bauchi
- Cross River
- Enugu
- FCT
- Kaduna
- Lagos
- Niger

0 55 110   220   330   440 KM
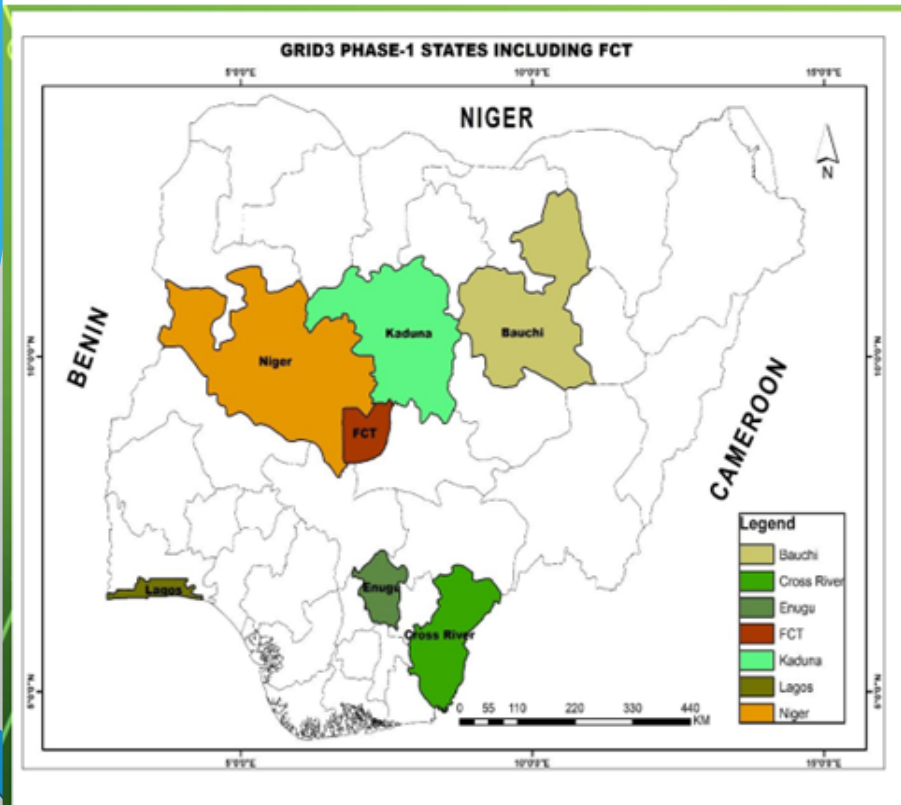
The ultimate goal of the project is to ensure that the Nigerian people, benefit from better evidence-based resource distribution and data driven policy-making. The objective include:

➤ To increase access to geospatial data for decision makers in Nigeria through the continuous availability geodatabase.

➤ To increase capacity of data managers through capacity building activities across the country.

➤ To increase coordination in the collection and management of data in Nigeria through the GRID³ portal.

CONCLUSION

- Advances in Space Science and Technology have become a major tool for socio-economic development

- Thus space is a major tool for policy articulation, formulation, implementation and monitoring.

- Climate change issues present challenges in terms of the need for global information and data on key planetary indicators that can provide the information required for governments and policy makers to make well-informed decisions.

Thanks for your attention