Nigeria Health and Mapping Summit 2011
Enlisting National Mapping Agencies in Improving Health Outcomes

Summary Report of the Conference
Abuja, Nigeria

October 18-19, 2011

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Nigeria Health and Mapping Summit participants, Abuja, Oct. 18-19, 2011.

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EXECUTIVE SUMMARY

The Federal Government of Nigeria collaborated with MEASURE Evaluation, which is funded by the U.S. Agency for International Development (USAID), to organize the *Nigeria Health and Mapping Summit 2011: Enlisting National Mapping Agencies in Improving Health Outcomes*. The conference, which took place at the Reiz Continental Hotel in Abuja October 18-19, 2011, is the first of its kind at the country level in Africa, as it marks the first time government representatives from the health and mapping sectors have met on such inter-ministerial or agency levels to harmonize national efforts to improve health outcomes through more effective leveraging of the National Geospatial Data Infrastructure (NGDI), also known as National Spatial Data Infrastructure or NSDI. The conference also represents a continuation of health and mapping sector collaboration that was launched in April 2009 at the Committee on Development Information, Science and Technology (CODIST) I pre-conference workshop in Addis Ababa, Ethiopia, *Enlisting National Mapping Agencies in the Fight against HIV/AIDS: Building Partnerships with Ministries of Health and Social Services and National AIDS Commissions*. The 14 Nigerian participants at the CODIST I pre-conference workshop recommended a similar meeting in Nigeria. The *Nigeria Health and Mapping Summit 2011* is a fulfillment of that recommendation.

The use of geographic approaches in improving health outcomes, including the fight against HIV/AIDS, is increasing. However, health ministries, national AIDS coordinating agencies, and other social service ministries often lack capacity to use spatial data and tools such as geographic information systems (GIS). Health ministries and national AIDS coordinating agencies could benefit from building collaboration and linkages with existing in-country capacity and NGDI efforts. NGDI initiatives guide the development of standardized spatial data and capacity to collect, manage, and use spatial data at local, national, and global scales. Nigeria has an established NGDI and, through it, has built capacity within the country for the creation and use of spatial data and tools. A national mapping agency (NMA) is the entity responsible for coordinating NGDI efforts and is the source of expertise in the creation, maintenance, and use of spatial data and GIS software. The conference, which drew 120 participants from the health and mapping sectors, including implementing partners, training institutions, the National Planning Commission, and media, sought to initiate a pan-Nigeria community of practice to increase involvement of the Nigeria Federal Ministry of Health in the NGDI process and to build linkages between these health sector agencies and NGDI actors, including NMAs. The specific objectives of the meeting were to:

- facilitate cooperation between Nigeria's health and mapping sectors in the fight against HIV/AIDS and related health and social service challenges;
- increase awareness and sharing of geospatial resources within Nigeria to enhance decision making for health sector programs; and
- identify challenges to development of the NGDI and create an action plan to help address them.

The approach adopted in the planning and organization of the gathering ensured that the process:

- was country-led and country-owned through setting up of a steering committee to drive the planning, organization, and setting of conference agenda items;
- included a concept paper on the background, objectives, and outcomes, as well as benefits to the country, to be derived from the conference;
- was participatory, reflective, and allowed for consensus building;
- shared existing efforts and opportunities for collaboration;
- ensured political commitment and buy-in of highest government decision-makers;
- included identification of local capacity needs; and
- developed a communiqué to summarize the achievements of the conference, as well as commitments for the future.

For more information about the summit planning process, see appendix A. The two-day event was divided into an opening ceremony, two technical sessions, and breakout session for group work (see appendix B for the agenda). The opening ceremony provided opportunities for policy-makers and government functionaries (executive and legislative) to declare their support and make goodwill messages in support of the activities. In addition, there was a keynote address entitled "Geospatial Resource Sharing and National Spatial Data Infrastructure Development within the Context of the Nation's Transformation Agenda," which was delivered by a distinguished senator of the Federal Republic of Nigeria, Prof. Robert Ajayi Boroffice, a leading figure in space science in the country. Participants at the conference expressed appreciation for the address as it encapsulated the essence of the *Nigeria Health and Mapping Summit 2011*.

The technical sessions consisted of two tracks: presentations by health organizations on geospatial resources maintained versus needed, as well as on top NGDI challenges affecting the organization's work; and presentations by national mapping organizations about the geospatial resources available to assist the health sector (data, software, hardware, technical expertise, training, etc.). Discussions focused on current or upcoming projects and geospatial resources that will be developed or needed by an organization, including opportunities for collaboration and top NGDI challenges affecting the organization's ability to work effectively with the health sector.

The second day commenced with highlights of the health sector challenges and constraints based on the various on-going mapping activities. A presentation that demonstrated experience from a country with good spatial data infrastructure linked with effective and improved social services, with emphasis on the health sector, was made. The second day also included group work to prioritize the challenges limiting the creation of linkages between the mapping and health sectors.

Two key results of the conference were the identification of the main issues affecting Nigeria's ability to improve health outcomes, especially the need for coordination of various efforts in the health and NGDI sectors; and the drafting of a communiqué that would be presented to the executive and legislative arms of the government, as well as relevant stakeholders (e.g., donors and ministerial agencies), with the intent of improving the NGDI needed to combat HIV/AIDS and related health and social service challenges.

INTRODUCTION

Health and social service agencies that wish to use GIS or other spatial tools are often hampered by lack of GIS capacity. This capacity gap makes it challenging to find or create data and use GIS software effectively. However, many countries including Nigeria have an NGDI program that can assist health sector organizations as they seek to use GIS and other spatial tools.

In 2009, USAID's MEASURE Evaluation project and the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) partnered with the United Nations Joint Programme on HIV/AIDS (UNAIDS) and the United Nations Economic Commission for Africa (UNECA) to host a first-of-its-kind workshop in Addis Ababa, Ethiopia, to help facilitate linkages between the health sector and NGDI actors in Africa. The workshop attracted 188 participants from 36 countries, including 14 participants from Nigeria. As a result of the meeting, UNECA member states approved resolutions calling for improved cooperation between the health sector and national mapping agencies (NMAs), including ensuring that key players in the health sector — ministries of health and social services, as well as national AIDS commissions — actively participate in NGDI efforts.

The Federal Government of Nigeria, in collaboration with MEASURE Evaluation, held the *Nigeria Health and Mapping Summit 2011* to make linkages between representatives of the health sector, NGDI agencies, and other relevant stakeholders. The conference, which was led by representatives from key Government of Nigeria ministries, sought to build on the momentum created by the 2009 meeting in Ethiopia, and by the GIS and mapping activities being conducted with the assistance of various development partners including WHO and Health Systems 20/20 (HS 20/20), to increase cooperation between the national health and mapping sectors in Nigeria.

Based on its robust NGDI program, as well as the presence of regional centers of excellence in GIS, Nigeria was well-suited to hold such a national meeting. Additionally, NGDI representatives from Nigeria have expressed a desire to expand cooperation with the health sector for the development and sharing of spatial data.

Increased collaboration between the health sector and NGDI actors would have several benefits for the government and development activities being supported by partners, including U.S. government activities, as NGDI/NMA agencies are responsible for creating and maintaining many of Nigeria's spatial data sets. Strong linkages between NGDI/NMA actors and health and social service ministries can ensure that the most recent spatial data are available to inform program planning. The Federal Ministry of Health could in turn share its data with NGDI/NMA agencies so that health and social service data can be used to inform program planning in other sectors. This multi-sector awareness would ensure that health and social service issues are considered in other programs, such as agricultural and economic development.

In addition to sharing of data, other benefits of collaboration include:

- expanded stakeholder buy-in for the national GIS and mapping strategy and action plan;

- opportunities for increasing sustainable GIS capacity in health and social service ministries by partnering with NGDI actors for workshops and trainings; and
- increased country ownership of U.S. government programs, as data from these activities are integrated into the national data infrastructure.

This report provides a description of the *Nigeria Health and Mapping Summit 2011*, including a discussion of how the conference was organized, collaborating agencies, steering committee, participants, the agenda, presentations, group work, and results.

Sponsors, Collaborating Agencies, and Facilitators

The *Nigeria Health and Mapping Summit 2011* was supported by MEASURE Evaluation (www.cpc.unc.edu/measure) with assistance from USAID (www.usaid.gov) and PEPFAR (www.pepfar.gov), and collaborated with the HIV Division of the Department of Public Health of the Federal Ministry of Health, National Population Commission (NPopC), Office of the Surveyor General of the Federation (OSGOF), and National Space Research and Development Agency (NASRDA). The *Nigeria Health and Mapping Summit 2011*'s steering committee membership is provided in table 1. This committee was responsible for planning and coordinating the event. Additionally, each organization represented on the committee provided staff members who helped plan and implement the workshop, whose contributions were essential in ensuring the success of the meeting.

Table 1: Workshop Sponsoring Organizations and Functional Representatives

Organization	Representative
National Space and Research Development Agency (NASRDA)	Dr. Ganiy Agbaje Director, Mission Planning, IT, & Data Management Chairman, Summit Steering Committee
HIV Division, Department of Public Health, Federal Ministry of Health (FMoH)	Dr. Azeez Aderemi Deputy Director, Strategic Information Unit, HIV Division
National Population Commission (NPopC)	Fadairo Adeniyi Francis Deputy Director, GIS Automated Mapping Cartography Department
National Primary Health Care Development Agency (NPHCDA)	Dr. Charles Mamman Head, Monitoring and Evaluation, Planning, Research and Statistics, NPHCDA
National Health Insurance Scheme (NHIS)	Shaibu Indawaba Assistant General Manager, Monitoring and Evaluation Unit
Office of the Surveyor General of the Federation (OSGOF)	Surveyor Barde Jatau Director, Boundaries
National Health Information Management, Department of Health Planning Research and Statistics	Dr. Akin Oyemakinde Deputy Director
MEASURE Evaluation	Kola Oyediran Senior Resident Technical Advisor/Country Lead

Nigeria Mapping and Health Sector Background

In Nigeria, as in some other countries in Africa, the responsibility for producing and maintaining spatial data is spread across multiple ministries and agencies. In other countries, however, spatial activity is centralized. Regardless of the number of players, typically one entity coordinates the NGDI process in those countries. In most of the cases, the NMA is the institution in charge of leading the NGDI process, although this might vary from country to country. While the NMA may coordinate NGDI efforts, there are multiple groups representing a variety of interests, both in the public and private realm, contributing to the NGDI. Likewise for health, the Department of Health Planning, Research and Statistics is typically responsible for overseeing the national health information system. However, many other departments are involved, such as the National Primary Health Care Development Agency, Department of Public Health, and National Health Insurance Scheme, as well as implementing partners, nongovernmental organizations (NGOs), and the donor community. The *Nigeria Health and Mapping Summit 2011* provided a unique opportunity for representatives from these realms — NGDI and the health sector, especially HIV/AIDS — to explore opportunities to strengthen the data infrastructure.

PARTICIPANTS

A total of 129 people participated in the *Nigeria Health and Mapping Summit 2011*, of which 119 were active workshop participants and 10 were chairmen or facilitators. Three media representatives also attended. Appendix E provides a list of participants and their affiliations.

In terms of fulfilling the objective of bringing together participants from throughout the NGDI community and the health sectors in Nigeria, there were attendees from both the health and mapping sectors; and also both public and private organizations were well-represented (figure 1). Table 2 shows the number of participants by agency or group.

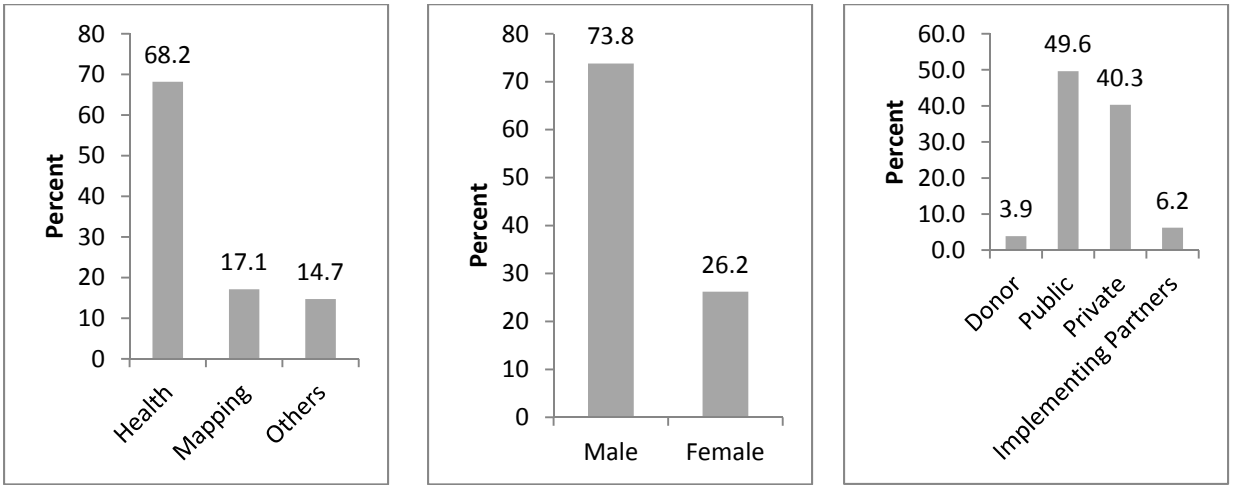


Figure 1: Percent of participants by sector (health, mapping, other), gender, and type of organization (donor, public, private, or implenting partners).

Table 2: Number of Participants by Agency or Group

Organization	Number of Participants	Organization	Number of Participants	Organization	Number of Participants
ABU	2	ICAP	1	Pathfinder	1
AIDS Relief	2	IHVN	5	PFD	1
AIDSTAR-One	2	JSI	1	Polari Digitech	4
APIN	1	MAPS	1	The Population Council	1
ARFH	3	MEASURE Evaluation	5	Pro-Health International	2
AVON Health Ltd	2	NACA	4	Public Health	1
C4CC	1	NAFDAC	1	RECTAS	1
CACO	1	NAN	2	Safe Blood International	1
CHAN-NICAB	1	NASRDA	5	Sesame	2
CISHAN	1	National Assembly	2	SFH	1
CRS	1	NBS	1	SFH/ERN	1
CUBS/MSH	1	NBTS	1	SIB	1
DHPRS	3	NEI	1	Sleek Vision	1
ECEWS	1	NELA	1	TSHIP	1
ECNX Ltd	1	NHIS	4	UI	1
Ehealth Nigeria	1	NMCP	1	UNAIDS	1
FGH	1	NMEMS	1	Unilag	1
FHI 360	2	NPC	3	USAID	1
Fistula Care	1	NPHCDA	3	Voxia	1
FMWASD	3	NPopC	4	World Health Organization	2
Heartland Alliance	1	OAU	2	World Bank	1
HIV Division FMoH	11	OSGOF	2		
HS2020	2	PATH 2	3		

DAY ONE: OPENING CEREMONY

The *Nigeria Health and Mapping Summit 2011* commenced with the arrival of dignitaries such as the representative of the Honourable Minister of Health, Keynote Speaker, Distinguished Senator (Professor) R.A. Boroffice and other invited guests. The session started at 10:34 a.m. with the introduction and invitation of guests to the high table:

- Distinguished Senator, Professor Robert Ajayi Boroffice, Chairman Senate Committee on Science and Technology
- Professor C. O. Onyebuchi Chukwu, Honourable Minister of Health represented by Dr. Mansur Kabir, Director of Public Health, Federal Ministry of Health
- Dr. Wapada Balami, Co-ordinator, National HIV/AIDS Control Programme in the Federal Ministry of Health
- The USAID Mission Director in Nigeria Ms. Dana Mansuri, represented by Mr. Akin Atobatele
- The World Health Organization Country Representative, represented by Dr. Klint Nyamuryekuage
- The Country Lead/Senior Resident Technical Advisor MEASURE Evaluation, Kola Oyediran
- The Chairman, Summit Steering Committee, Dr. Ganiy Agbaje

The opening prayer was said by Dr. Samson Bamidele and was followed by the national anthem, led by the master of ceremony.

A welcome address and chairman's opening remarks were given by Dr. Wapada Balami, coordinator, National HIV/AIDS Control Program, Federal Ministry of Health. He thanked the special guests on the high table for their presence and the organizers for putting together such an event, which he described as being timely. He hoped that at the end of the two-day conference, participants will have set the agenda for harnessing of geo-spatial programs to improve health delivery; and the setting up of a platform for improving national data collection.

Objectives of the Summit

Kola Oyediran, the country lead for MEASURE Evaluation, presented the objectives of the *Nigeria Health and Mapping Summit 2011*. He began by thanking all the invited guests and the participants for their presence. He traced the origins of the *Nigeria Health and Mapping Summit 2011* to a similar 2009 event in Ethiopia organized by the United Nations Economic Commission for Africa, which had participants from 14 Nigerian mapping agencies. The rationale for the *Nigeria Health and Mapping Summit 2011*, he said, is to:

- facilitate collaboration between the health sector and the mapping sector;
- increase awareness and sharing of geo-spatial resources;
- help the decision maker in the decision making process;
- permit linking of data from different sources;

- strengthen NGDI;
- help provide better quality data;
- focus the use of mapping resources on the health sector;
- improve the capacity of practitioners in both mapping and the health sectors; and
- increase and improve linkages between data producers and data users.

Going further, he listed the following as the expected outcomes of the *Nigeria Health and Mapping Summit 2011*:

- increased co-operation between the health and mapping sectors;
- improved health outcomes; and
- providing a model for other countries to follow.

USAID Opening Remarks

On behalf of USAID Mission Director Dana Mansuri, remarks were delivered by Akin Atobatele of USAID. He observed that the *Nigeria Health and Mapping Summit 2011* was an outcome of a similar event held in Ethiopia in 2009. He emphasized the timeliness of the conference, as it would encourage the tie-in of Nigerian practitioners into the U.S. government's Global Health Initiative, which emphasizes sustainable country-led initiatives using GIS. He emphasized that Africa cannot achieve the United Nation's Millennium Development Goals (MDG) without Nigeria, and that it was important for Nigeria to embrace the use of geo-spatial platforms. He also informed the audience that the *Nigeria Health and Mapping Summit 2011* also fits into the "USAID Forward" plan, a recent blueprint by USAID to refine its foreign policy goals. He listed the following as some of the benefits of the conference: a stronger monitoring and evaluation in the health sector; and helping science and technology development in Nigeria.

Keynote Address by Professor R.A. Boroffice, Senate Committee Chairman on Science and Technology

The keynote address, "Geospatial Resource Sharing and National Spatial Data Infrastructure within the Context of the Nation's Transformation Agenda," was delivered by the Distinguished Senator (Professor) and Chairman of the Senate Committee on Science and Technology Robert Ajayi Boroffice (a transcript of his presentation is in appendix C).

Sen. Boroffice began by thanking the organizers the opportunity to be a part of the *Nigeria Health and Mapping Summit 2011*. He emphasized his belief in the NGDI and its benefits for Nigeria. He stated that most countries, including Nigeria, would not meet the MDG due to poor data collection. Relating this to the health sector, he reminded the audience that three of the MDG (goals 4, 5, and 6) were health related and, as such, it was important to utilize processes that would improve data collection. He listed the following as strategies to be utilized to harness and improve the utilization of GIS:

- development of technological abilities and skills

- utilization of the public private partnership scheme
- development of a Geospatial clearing house accessible to all
- combating the reluctance by agencies to release data for policy analysis
- ensuring access to Geospatial information for disease control

Further, he gave the following as some of the uses of geospatial infrastructure:

- regarding health, maps such as these are used to support better planning; are useful in understanding the relationship between health and other factors such as environment, labor, etc.; and allow for prediction of occurrence of outbreaks.
- regarding the use of such remote sensing devices as satellites, the images produced offer visual ways of showing outcomes of health surveys and the maps produced can be used to explore the geographic spread of diseases, such as HIV/AIDS.

Sen. Boroffice provided the following as the uses of the NGDI: efficient national planning; increase in revenue; boost in agriculture; boosting tourism; improved healthcare delivery; and efficient exploration and exploitation of natural resources. He identified the following as components of NGDI: a data cataloging tool; a data storage tool; data access systems; and tools for analysis. He said deployment of the NGDI will facilitate co-operation among practitioners, increase awareness about the use of satellite technology, and it would lead to the development of a national health information system. He listed the following as the problems of the development of a NGDI:

- spatial data infrastructure and its products have not been identified as critical components for policy making;
- funding challenges; and
- a poor structure for the collection and distribution of data.

In conclusion, he made a recommendation that the outcome of the *Nigeria Health and Mapping Summit 2011* be made available to stakeholders and policy-makers to increase and improve funding chances.

Goodwill Message

The goodwill message was given by Dr. Klint Nyamuryekuage on behalf of the WHO country representative. He lauded the objectives as highlighted by Kola Oyediran and gave the following as benefits to be derived from the *Nigeria Health and Mapping Summit 2011*:

- reducing effort duplication and cost
- improving quality of data
- better mapping would help reduce inequalities
- better mapping would help for better intervention

Declaring the Summit Open

On behalf of Professor C.O. Onyebuchi Chukwu, Honorable Minister of Health, the *Nigeria Health and Mapping Summit 2011* was declared open by Dr. Mansur Kabir, Director of Public Health, Federal Ministry of Health. Dr. Kabir said he regretted the absence of Prof. Chukwu, who was on another official mission outside of Nigeria. Prof. Chukwu's comments, delivered by Dr. Kabir, included the following highlights:

- Stated that GIS is a key initiative to ensure and provide sustainable universal access to HIV/AIDS prevention, treatment and care services and to ensure equitable distribution of health facilities in Nigeria.
- Thanked Federal Ministry of Health (FMoH) partners (UN agencies, USAID, the United Kingdom's Department for International Development, Canadian International Development Agency, and Japanese International Corporation Agency) for their support of various government initiatives directed at improving the well-being of Nigerians, of which better mapping is an example.
- Called on all stakeholders to make concerted efforts at improving access to health care services in rural areas.
- Called for cooperation among all stakeholders involved in NGDI in Nigeria so as to make NGDI work in the country.
- Reassured stakeholders that FMoH is willing and ready to cooperate with other stakeholders to make health NGDI a reality.
- Implored all stakeholders to continue giving technical support to health mapping projects.

He expressed hope that the goals of the conference would be communicated to enhance and improve government policy. He also assured the audience that FMoH would collaborate effectively with relevant agencies to ensure attainment. He then declared the *Nigeria Health and Mapping Summit 2011* to be open.

Vote of Thanks

Dr. Ganiy Agbaje, chairman of the *Nigeria Health and Mapping Summit 2011* steering committee, thanked the invited guests and participants for their presence and wished the participants fruitful deliberations. The vote of thanks was followed by the national anthem, group photo, tea/coffee break, interviews of key guests, and departure of dignitaries.

DAY ONE: TECHNICAL SESSIONS

The technical session consisted of two sessions (table 3). The first session included presentations by the health organizations on geospatial resources maintained versus those that are needed, as well as NGDI challenges relevant to the organization's work. There were four presentations by the health organizations that have been involved or planning to carry out mapping of health facilities or services. The second technical session included presentations by the mapping sectors on the geospatial resources available to assist the health sector (data, software, hardware, technical expertise, training, etc.); current or upcoming projects and geospatial resources that will be developed and/or needed by the organization, including opportunities for collaboration and NGDI challenges affecting the organization's ability to work effectively with the health sector.

Table 3: List of Day One Presentations

Technical Session One: Health Organizations — Dr. Klint Nyamuryekuage, WHO, chairman	
12:30 p.m.	The following presentations were made by health organizations on geospatial resources maintained versus needed, as well as on top NGDI challenges affecting the organization's work: • GIS and Primary Health Care in Nigeria, presented by Dr. E.I. Odu, director of Planning, Research and Statistics, National Primary Health Care Development Agency • The Use of GIS Mapping to Determine the Distribution of Accredited Health Care Facilities in NHIS, presented by A.B. Indabawa, Department of Planning Research and Monitoring, National Health Insurance Scheme • Mapping HIV/AIDS Services in Nigeria, presented by Dr. Aderemi Azeez, Strategic Information, HIV/AIDS Division, Department of Public Health • Service Availability Mapping NHMIS Unit, FMoH Experience, presented by Mr. Balogun Adeleke, Department of Planning Research and Statistics.
Technical Session Two: Mapping Organizations — Dr. Demola Omojola, Department of Geography, University of Lagos, chairman	
3 p.m.	The following presentations were made by mapping organizations on geospatial resources available to assist the health sector (data, software, hardware, technical expertise, training, etc.); current or upcoming projects and geospatial resources that will be developed and/or needed by the organization, including opportunities for collaboration; and top NGDI challenges affecting the organization's ability to work effectively with the health sector: • Towards Creating A Standard Format for Geospatial Data Collection, Analysis and Dissemination for Improved Health and Socioeconomic Policy, presented by Alfa Mohammed, Director, Cartography, National Population Commission • Nigeria in Space – An Impetus for Improved Health Outcomes, presented by Dr. Ganiy I. Agbaje, Director, ICT & Data Management, National Space Research & Development Agency • A presentation by Surveyor U. R. Edozie, Office of Surveyor General of the Federation • Geospatial Resources Maintained Versus Needed at RECTAS and Major SDI Challenges, presented by Surveyor Adewale Akingbade, Regional Centre for

Both sessions were followed by a panel discussion that fielded questions from the audience. Table 3 provides a list of the presentations by session. The presentations were followed in the evening with social networking activities among participants.

Technical Session One: Presentations by Health Organizations

Dr. Klint Nyamuryekuage of WHO, chairman of the session, introduced presenters and provided guidance on how the session would proceed. He mentioned that each presenter will have 15 minutes and that discussions would follow after all the presentations have been taken

The first presentation on GIS in primary health care in Nigeria, delivered by Dr. E.I. Odu, director of Planning, Research and Statistics, National Primary Healthcare Development Agency (NPHCDA), included an analysis of the primary health care concept:

> ***Essential health care*** *based on practical, scientifically sound and socially* ***acceptable*** *methods and technology made universally* ***accessible*** *to individuals and families in the* ***community*** *by means acceptable to them, through their full* ***participation*** *and at a cost that community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination.*

In applying GIS to public health care, accessibility is key, said Dr. Nyamuryekuage. Where to access healthcare and the means with which to access healthcare are problems facing rural populations, he said. A key indicator of health service performance is the proximity of populations to public health care centers. He gave the metric figure for proximity of population to health care facilities as the proportion of population living within one hour or 5 km of a healthcare facility. He listed the following as the uses of GIS to primary healthcare:

- physical access to primary healthcare facilities
- human resource capacity, needs, and distribution
- coverage of health programs
- spatial utilization patterns
- variation of service quality in urban, peri-urban, and rural areas
- location-allocation (i.e., strategic planning and resource allocation)
- highlighting service areas for further research

As an example, he said, the Hlabisa subdistrict of rural South Africa uses GIS to estimate travel times to health clinics, understand primary healthcare center usage patterns, measure disparities in access and usage of primary health care by setting (rural, peri-urban, urban), evaluate clinic usage relative to expectations, and selecting sites for new health facilities that maximize access.

He listed the following ongoing GIS applications to primary health care in Nigeria:

- WHO – 2006/7: Service Availability Mapping of selected 11 States
- MDG – Dec 2010: Service Availability Mapping + Human Resources of 3LGAs/State in 36 States + FCT
- FMOH/NASCAP – Jan 2011: HIV/AIDS Service Availability Mapping of 36 states & FCT
- NPHCDA Disease Control & Immunization Department – Aug 2011: Micro-planning for SIA & RI focusing on delineation of boundaries in 4 States of Northwestern zone Nigeria.
- Rivers State – 2011

Closing his presentation, he suggested the following as the way forward:

- A coordinating mechanism needs to be agreed upon and developed.
- There is a need to establish guidelines and standards.
- A stakeholder meeting for dissemination of various GIS initiatives should be held.
- Recognize that NPHCDA has a strategic advantage for successful coordination of GIS health mapping.
- Forge strong partnerships to conduct a national GIS mapping in 36 states and FCT.
- Establish a national GIS lab.

The second presentation, "The Use of GIS Mapping to Determine the Distribution of Accredited Health Care Facilities in the National Health Insurance Scheme," was presented by Alhaji Shaibu A.B. Indabawa, assistant general manager, Department of Planning, Research and Monitoring, National Health Insurance Scheme (NHIS). His presentation was descriptive, as he showed mapping activities already carried out by NHIS, some of the outcomes, the challenges NHIS has faced, and forthcoming projects.

He listed the following as the activities already carried out by NHIS:

- the development of a questionnaire which was administered in 913 facilities and their coordinates obtained during monitoring of service utilization in 2008 and 352 facilities in the year 2009 bringing the total number to 1,265 facilities;
- data obtained were analyzed and reports submitted to management; and
- a database was created and maps were produced.

He gave a summary of the resources available to NHIS, such as 60 handheld GPS devices, Health mapper, and ArcGIS software. He listed the agency's challenges ahead:

- irregular data collection
- accessibility to some facilities
- in-security in certain parts of the country
- lack of current base maps
- inability to use the database and maps for planning purposes
- cost of geographic data collection

- using area centroids instead of exact locations, which could produce misleading results
- limited GIS training courses in Nigeria

In conclusion, he listed the following as suggested ways forward:

- ensure mapping of all HCFs in Nigeria, including those not yet accredited by NHIS
- use maps for planning purpose, especially accreditation of additional facilities in some zones
- use mapping information for monitoring and evaluation
- continuously build capacity of staff on GIS mapping
- ensure effective collaboration and coordination with other mapping agencies
- procure additional equipment or software for use in GIS mapping

The third presentation, "Mapping HIV/AIDS Services in Nigeria," was made by Dr. Aderemi Azeez, Strategic Information Unit, HIV/AIDS Division, Department of Public Health, Federal Ministry of Health**.** Dr. Azeez began his presentation by giving the need for mapping HIV/AIDS services in Nigeria: for planning and management of HIV intervention programs; and providing relevant information to decision makers and program staff at all levels.

He listed the objectives of the mapping of HIV/AIDS services in Nigeria as follows:

- The overall goal of the national mapping of HIV services is to provide a comprehensive picture of HIV/AIDS health service delivery and other HIV/AIDS linkages at all levels of care in the country.
- Such mapping provides national program managers, decision makers, other producers and users of data with updated information on the distribution (including geospatial maps) of HIV/AIDS health sector services within the country.
- Mapping provides updated information for the scale-up of key HIV/AIDS-related services, such as HIV counseling and testing (HCT), antiretroviral therapy (ART), prevention of mother-to-child transmission (PMTCT), and community based health support services.
- Mapping also provides a way for government (federal, state ministries, and local government departments) to monitor the implementation of HIV/AIDS national responses, including partner support.

He said the following are the attributes mapped in the exercise:

- location (GPS) and locality
- ownership, classification
- presence of infrastructure (water source, electricity, functional beds, etc.)
- types services provided, including health services for HIV/AIDS, TB, and malaria, as well as antenatal care, blood transfusion, and laboratory services
- human resource (e.g. doctors, nurses, lab technicians)
- family planning, M&E, research, and logistics

- standard operating procedures/guidelines awareness and usage

In conclusion, he gave the next steps for the exercise as completing the field work in the remaining states, a linkup with SDI, and GIS software training for relevant federal and state officers.

The last presentation, "Service Availability Mapping National Health Management Information System Unit (NHMIS), Federal Ministry of Health Experience," was given by Balogun Adeleke, head of ICT Unit, Department of Health Planning, Research and Statistics (DPRS), FMoH. Mr. Adeleke's presentation focused on the experiences and successes of his department in the mapping exercise utilizing the National Health Management Information System. He gave the following details of the mapping effort:

- With a grant, DPRS has mapped all service delivery points in some focal areas.
- This work was undertaken with technical assistance from the National Population Commission (NPopC).
- Fieldwork by FMoH and NPopC was carried out in 2010.
- Analysis of work and generation of graphs was done with support from NPopC.
- The focal areas were in the six zones of the country.

He listed some of the activities carried out with respect to service availability mapping by the NHMIS unit. For example, recent initiatives included the creation of unique facility codes for each facility in the country. The NHMIS mapping effort has utilized the point referencing system, he said. In conclusion, he listed the following lessons learned:

- develop relationships with national organizations with experience in GIS
- expand FMoH capacityt
- improve the quality of the final product
- efforts to collect data are enormous, and that investment will be defeated if the data are not available for use by decision makers
- though data for the whole country is ideal, no single entity can do this alone; collaboration is vital
- merging data will go a long way to getting a whole picture of the country
- using the facility codes should help in this regard

The way forward, he said, should include:

- layering service availability mapping and GIS on the NHMIS database for better use of spatial information;
- developing a means to ensure that work done is available to the decision makers and hence used; and
- incorporating health facility codes so that mapping efforts can be linked and merged.

Technical Session Two: Presentations by Mapping Organizations

Dr. Demola Omojola of the Department of Geography, University of Lagos, chaired this session. He introduced the four presenters and provided guidance on how the session would be managed, including the time allotted for each presentation and withholding discussion until all presenters had completed their presentation.

The first presentation by Surveyor U.R. Edozie of OSGOF covered his agency's mandate, which he said includes produce fit-to-use maps and national standards for mapping. OSGOF has produced a street guide for 15 out of the 36 state capitals, he said. Also, a gazette of place names has been produced. Mr. Edozie stated that one problem is lack of compliance with the Survey Implementation Act among the mapping sector community. The second presentation, "Towards Creating a Standard Format for Geospatial Data Collection and Dissemination for Improved Health and Socioeconomic Policy," was given by Alfa Mohammed, director cartography for NPopC.

Agencies that have collaborated with NPopC, he said, included the OSGOF, for the acquisition of administrative and topographic maps at different scales; NASRDA, for high resolution imagery; and National Boundaries Commission, for resolution of boundary issues.

He gave the following as the available tools/information the commission has to support GIS activities in the health sector:

- about 600,000 enumeration area (EA) and 120,000 supervision area (SA) maps covering the entire country
- population data for all states, local government areas (LGAs), and localities in the country.
- shapefiles of Nigeria with roads, settlements, vegetation, water bodies and socio-economic facilities layers
- vital registration (births, deaths, migrations), with data since 2000
- education, health, and other socioeconomic data
- a GIS laboratory in NPopC's cartography department

Available resources in the GIS Division at NPopC include such hardware as servers, desktop computers, laptops, printers, plotters, scanners, photocopiers, handheld GPS devices; software such as ArcGIS, Corel Draw, Macromedia Freehand, ERDAS Imagine, and Microsoft Office; spatial data such as Landsat Imagery (100% coverage of Nigeria), Spot 5 (90% with 60% almost cloud free), and Ikonos, Quick Bird (1.0 & 0.6m Res. covering 534 Settlements in Nigeria); methodologies that enhance spatial mapping; and professionals in spatial data acquisition and management

He listed challenges facing NPopC as:

- inability to break down the rigid walls created by stakeholder- organizations towards data sharing;

- inability to provide a common platform geo-data acquisition;
- lack of uniform data definition for metadata standardization;
- delay in defining data layers for NGDI;
- inability to agree on key agencies to be responsible for different data layers;
- inadequate government support for NGDI; and
- poor wages paid spatial data acquisition and management professionals.

In conclusion, he enumerated the following as the way forward:

- NGDI Committee should be more proactive.
- All stakeholders should be identified.
- NGDI Committee should liaise with the stakeholders on a roadmap towards eliminating duplication of efforts.
- There should be standardization of spatial data content.
- A standardized format for distributable outputs, such as vector and raster formats, should be adopted to aid data compatibility and comparability.

The third presentation on "Geospatial Resources Maintained versus Needed at RECTAS and Major SDI Challenges" was made on behalf of Prof. Isi Ikhuoria, executive director of the Regional Centre for Training in Aerospace Surveys (RECTAS), and was presented by Surveyor Adewale Akingbade.

He began his presentation by defining geospatial resources as:

> *An array of set of bits and pieces that are necessary for the successful production of geospatial data, information and services. These resources can be viewed as people, geographic data, processes and technology.*

He continued by giving a breakdown of some of the facilities available at RECTAS, which include mobile mappers, geodetic receivers, etc. He also said that RECTAS carries out consultancies, both within and outside Nigeria. He listed the following as NGDI challenges in the country as:

- a lack of an official geo-information policy;
- few researchers focusing on the application of geo-science and geo-technology to health in Nigeria; and
- insufficient collaboration with local institutions.

In conclusion, he emphasized the need for effective collaboration and partnership between the health and mapping sectors.

The last presentation was presented by Dr. Ganiy Agbaje, director of ICT and Data Management, NASRDA, on the topic "Nigeria in Space — An Impetus for Improved Health Outcomes."

Dr. Agbaje explained the NGDI structure within the National Geo-information Policy. He identified a series of problems to the development of NGDI in Nigeria:

- It is yet to be recognized by the drivers of policies as an integral part of the national strategy or as a critical resource for sustainable national development objectives.
- Funding is inadequate.
- There is a lack of awareness, traced to low level of geo-literacy among the general public and difference in knowledge and interpretations giving to SDI by the GIS professionals.
- There is a need for capacity building.
- There are other personnel and technological challenges.

He concluded by highlighting the following:

- The application of GIS and the development of NGDI are central to the nation's efforts to eradicating poverty; achieving food security; fighting such diseases as malaria, tuberculosis, and HIV/AIDS; reversing environmental degradation; and increasing the pace of industrialization.
- NGDI will enable government to target beneficiaries of development programs more effectively.
- Indigenous experts must be used, building on existing human capacity, and relevant agencies must collaborate to arrive at informed decisions related to health and well-being of the populace.

DAY TWO

The second day was coordinated and managed by Dr. Ganiy Agbaje, chairman of the *Nigeria Health and Mapping Summit 2011*'s steering committee. The second day consisted of two presentations and a breakout session that included group work. The first presentation summarized current projects with mapping contents to illustrate challenges and constraints to collaboration and coordination, based upon the first day's technical presentations by health organizations. The second presentation on day two was aimed at demonstrating or showing examples of countries with good geospatial data infrastructure and linkages to improve health outcomes and social services in general

Presentations

For the first day-two presentation, Dr. Aderemi Azeez of the Strategic Unit of the HIV/AIDS Division of the Department of Public Health, FMoH took participants through a summary of the previous day's technical session one presentations. Dr. Azeez began by saying that there was a lack of focus of what the objectives of the mapping efforts are within the health sectors.

He listed the following challenges with respect to mapping efforts in the health sector:

- funding
- multiplicity of efforts
- high cost of geographic data collection
- inadequate technical knowledge of GIS mapping
- little or no infrastructure to support GIS activities
- lack of standards (standard operating procedures, guidelines, etc.)
- poor understanding of the importance of GIS mapping for program development at state and local government levels

He listed the following as the challenges to mapping agencies:

- lack of awareness by consumers on the roles/capability of the mapping agencies
- awareness/dissemination problems involving NGDI
- poor co-ordination
- over commercialization
- lack of current data on locality and vital statistics
- apathy to collaboration
- slow response from mapping agencies to program mapping information demand

The second presentation on the experiences of some countries with good spatial data infrastructure linked with effective and improved social services in the health sector was given by Dr. Omojola of the Department of Geography, University of Lagos, Nigeria. He began by tracing the origins of the use of geography to health, using the following examples:

- In 1840, Robert Cowan used maps to show the relationship between fever and overcrowding in Glasgow, Scotland.
- In 1843, Robert Perry described a six-fold difference in the prevalence of fever in different neighbourhoods.
- Using mapping, Dr. John Snow revealed that a contaminated well was responsible for a nineteenth century cholera epidemic in London.

He said there was compelling evidence that location and place shape health outcomes. He defined spatial data infrastructure, according to *The SDI Cookbook* (version 2.0) as "the critical mass of processes, policies, standards, enabling technologies, mechanisms and key data sets required to make geospatial data readily available to the growing community of end-users."[1] He gave the following as examples of GIS use in the health sector in the United States:

- communicable disease prevention and control
- public health, community health assessment, and chronic disease prevention
- environmental exposure and disease risk

Dr. Omojola gave the following examples to show encouraging GIS use within the health sector in Nigeria:

- guinea worm eradication project
- onchocerciasis mapping.
- schistosomiasis mapping.
- communicable disease and control (leprosy and tuberculosis)
- GTZ – Lafia mapping of health facilities in Niger state
- EPI support mapping

In conclusion, he gave the following as the observed challenges and lessons learned from GIS use in the U.S. health sector:

- data quality and availability
- trained workforce and costs
- defining communities, which is the relevant geographic aggregation unit
- confidentiality
- misinterpretation of results.

The two presentations benefitted from panel discussion that fielded questions from the audience. Presentation materials that were shared with participants are in appendix F.

[1] Nebert DD (ed). *Developing Spatial Infrastructures: The SDI Cookbook* [version 2]. Needham, MA: Global Spatial Data Infrastructure Association; 2004.

Group Work

The two presentations were followed with a breakout session of facilitated discussion to agree on and prioritize challenges that affect sharing of geospatial resources and development of NGDI. The session focused on group work to achieve the following objectives:

- identify opportunities for health sector representatives to collaborate with NMAs and other NGDI actors;
- articulate the most significant issues affecting mapping of health data; and
- determine resources available to help resolve issues and strengthen NGDIs.

Participants were assigned to groups based on health and mapping sectors in order to ensure group dynamics and ensure understanding of key concepts as it relates to NGDI. A list of the participants was used in the distribution and to see a tabular listing of participants assigned to groups. The work of each group was facilitated by group leaders. As their primary tool to achieve the group work objectives, facilitators relied on a worksheet (see appendix D) containing a description of the work to be done, a short survey to identify the GIS capacity at disposal in each organization, and a matrix of the most important issues faced by these same organizations.

Participants were divided into six groups with about 20 participants each. Niyi Fadairo, a leading steering committee member, and staff of the NPopC explained the group activity. The work of each group was facilitated by either a steering committee member or a participant with a strong understanding of geospatial data infrastructure problems, challenges, and plausible ways of resolving identified issues. Each group selected a rapporteur who reported the group's findings back to a plenum session. The group work focused on the following objectives:

- allowing participants to identify key NGDI issues and challenges affecting their ability to improve health outcomes in Nigeria, and to identify potential solutions;
- allowing participants to work as a group to discuss and prioritize issues, which should strengthen working relationships among conference participants;
- allowing participants to work as a group to recommend solutions;
- articulating group results to the full body of conference participants;
- identifying opportunities for health sector representatives to collaborate with national mapping agencies and other NGDI actors;
- articulating the most significant issues affecting mapping of health data;
- determining resources available to help resolve issues and strengthen NGDIs; and
- issue a *Nigeria Health and Mapping Summit 2011* communiqué expected to serve as plan of action and as an advocacy tool.

In the course of their work, each group was charged with using a provided list of possible issues to identify and rank the five most significant NGDI issues or challenges affecting their organizations' abilities to improve health outcomes in Nigeria. The full issue list had been organized into categories based on lessons learned from the CODIST I pre-conference workshop and on the areas of interest represented by the six subcommittees of Nigeria's NGDI committee. This synthesis of approaches yielded nine categories — spatial data, linking health data to spatial

data, software, hardware, personnel, training, awareness and collaboration, standards and policies, and sustainability and funding. The only NGDI subcommittee not represented in the nine categories was one that focused on legal matters. The cumulative scores across all groups are provided in figure 2.

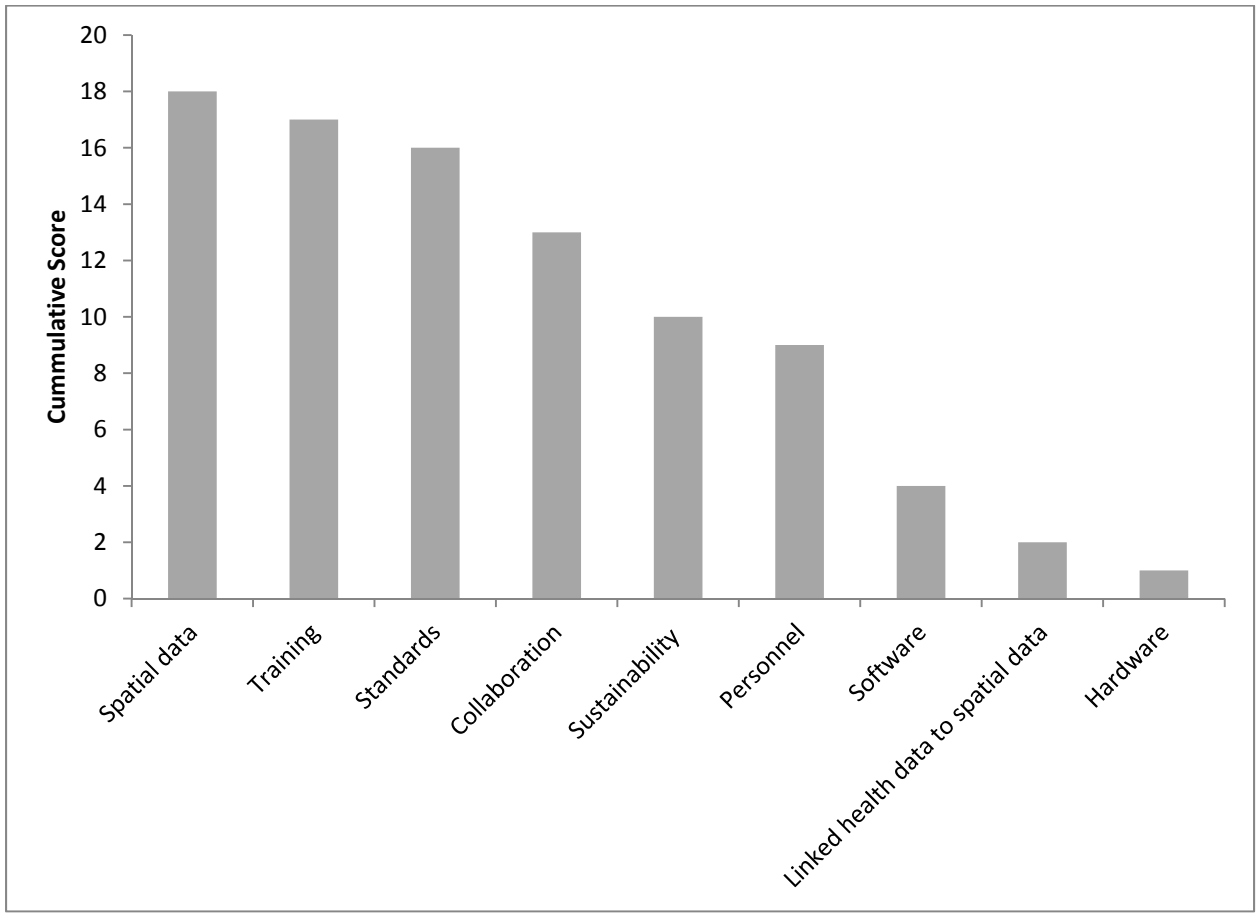


Figure 2: Cumulative scoring from the six work groups of their top five major issues affecting mapping of health data (with each group's highest priority given 5 points, the next highest priority given 4 points, etc.) shows "spatial data" received the highest total score as the most significant issue.

Based on cumulative score, participants considered issues related to spatial data – as opposed to linking health data to spatial data – to be the most significant. More specifically, the greatest sources of concern were problems with a lack of knowledge of what spatial data are available, knowing what spatial data organization might need, availability (shortage) of data for current needs, and access to the data due to internet speed and other technical factors.

Second in rank based on cumulative score was training. The concern for training is that most organization requires additional training to make effective use of GIS tools and methods.

The participants ranked standards and policies as the third most significant. The sources of concerns were snags that national geospatial data sharing policy is not clearly defined or

understood, data systems are not interoperable which prevents sharing of data, and GIS hardware and software standards are not clearly defined or understood.

The fourth most significant issue was awareness and collaboration, which encompassed awareness of other organizations' efforts as well as opportunities to collaborate. Participants also considered important the sustainability and funding and personnel (i.e., the majority of the participants were concerned that most organizations lack personnel with GIS/mapping skills or expertise).

Because the ranking and evaluation of these issues were group exercises involving participants from both the mapping and health sectors, groups were able to facilitate a discussion to explore reasons behind these challenges and identify opportunities for overcoming them. Among suggestions for the way forward were the following:

- Identify and strengthen of country coordinating mechanism for advocacy and implementation of the project.
- Disseminate the outcome of this workshop to all stakeholders nationwide.
- Develop a strategy to involve state and local governments.
- Collaborate.
- Implement the NGDI.
- A meeting should be held in 2012r to review and study the successful use of GIS in the health sector.
- Training is needed (RECTAS).
- Organizations are needed to mobilize and seek training.
- Spatial data needs for health sector organizations should be defined.
- Inclusion of GIS works in organization or department budget for health interventions is needed.
- The conference should be organized annually and there is need for a practical section in future gatherings.
- MEASURE Evaluation should have a dedicated Web page on the *Nigeria Health and Mapping Summit 2011*, which would contain the outcomes and the other information.
- There is need for available GIS Web sites for mappers.
- Agencies should have their facilities available for the utilization of other government agencies at minimal or no cost.
- The *Nigeria Health and Mapping Summit 2011*'s communiqué should be published and widely disseminated to all relevant stakeholders.
- All available spatial data should be placed in the public domain for easy reach.
- Assessments of all training centers should be done to determine their capacity to provide quality and effective training.
- Embark on advocacy for an annual health and mapping summit for continuity.
- Capacity building is important.
- Training of health sector personnel on the use of GIS to influence health outcomes should be done.
- Collaboration and coordination are important.

- Multi-sectoral collaboration should be done to foster advancement of GIS application in all sectors of the economy.
- A GIS resource library should be created for banking all available GIS spatial data.
- A resource place for all GIS available resources should be provided.
- A national geo-information policy should be enacted, and public enlightenment on the policy should follow.
- Getting information on available spatial data, showing how to acquire the data, via metadata and clearing house is important.
- A stronger link is needed between mapping (geospatial data providers) and the health sector.

Participants were asked to fill out a brief survey addressing GIS capacity in their organization. Due to time constraints, not every participant completed the form; however, it was possible to collect information from many participants. For example, some noted that their institutions do have some GIS capacities in terms of human resources.

In addition to the group work results, the steering committee and participants produced a summary report and communiqué to be shared and use as advocacy during planned meetings with the Honorable Minister of Health; Honorable Minister of Science and Technology; Senate committees on health, science, and technology; and House of Representative counterparts. The communiqué, provided in the next section, identified outcomes as:

- confirming the importance of forging robust networks between the health sector and the other key players, starting with the national mapping agencies, when it comes to the use of geographic information in support of health including HIV/AIDS programs;
- finding that overcoming the challenges in establishing and maintaining these linkages requires national-level leadership to ensure sustainability;
- illustrating that NGDIs are better built around addressing real problems instead of being ends in themselves (in this context, the exigency of social services, beyond just health sector, can be seen as an effective driver of NGDI implementations); and
- underlining the importance of holding similar conferences regularly, annually or every other year if the cost of annual summits is prohibitive.

SUMMIT COMMUNIQUÉ

The communiqué issued at the end of two-day *Nigeria Health and Mapping Summit 2011* and approved by participants is as follows:

Communiqué Issued at the
First National Health and Mapping Summit
Held at the Reiz Continental Hotel, Abuja
18-19 October 2011

Development of a sustainable system for the production and the utilization of quality data is key to the attainment of the Millennium Development Goals (MDGs) especially the health related ones.

Disease mapping and research is useful in the understanding of the functional relationship between diseases and their intrinsic spatial characteristics such as location, type, diffusion poles, socio-economic and behavioral patterns of the patients. Geospatial Data Infrastructure provision for Health Services will lead to improve health outcomes.

Mindful of the above and in an effort to achieve collaboration between Health and Mapping agencies in Nigeria, the Government of Nigeria in collaboration with USAID through MEASURE Evaluation organized the Health & Mapping Summit 2011 with its objective geared towards facilitating cooperation between Nigeria's health and mapping Ministries, Departments and Agencies (MDAs) in the fight against HIV/AIDS and related health and social service; increase awareness and sharing of geospatial resources within Nigeria to enhance decision making for health sector programs and create an action plan to help address identified challenges.

After two-day highly enlightening Summit, with over 140 participants in attendance we the stakeholders in the National Geospatial Data Infrastructure (NGDI) hereby resolve as follows:

- Develop a coordination mechanism for the linking of NGDI to the Nigeria health sector. The operation and secretariat of its implementation is proposed to be accommodated within the Department of Planning, and Research of the Federal Ministry of Health (FMOH) to serve as an NASRDA coordinated NGDI sectoral Node.
- Create an online resource centre on health geo-information.
- Facilitate the process of enacting a geo-information policy.
- Conduct an assessment for geo-spatial data needs for the health sector.
- Establish dedicated Web site for Nigeria *Nigeria Health and Mapping Summit 2011* at the DHPR of the FMoH.
- Hold a *Nigeria Health and Mapping Summit* annually as a forum to showcase research/projects within the health sector.
- Involve and harmonize the efforts of relevant local training institutions in developing human capacity on geospatial studies in the health sector.

- Engage with other sectors such as water resources, agriculture, environment, etc. to start similar conferences.
- National Planning Commission to support MDAs to develop effective funding mechanism through a budget line for the application of NGDI in their programs.
- Create an Internet forum for stakeholders to share technical discussions.

By adopting the *Nigeria Health and Mapping Summit 2011* communique, the Federal Government of Nigeria and stakeholders have recognized the value of linking health and mapping sector data and efforts. This is a first of its kind formalization of the value of such linkages by nations and subsequent commitment to pursue such linkages. The communiqué can serve as a model for other countries in Africa. To view the draft reports of the Nigeria Health and Mapping Summit 2011 and Communiqué, please see the Federal Ministry of Health Web site www.fmh.gov.ng or MEASURE Evaluation Web site www.cpc.unc.edu/measure.

Workshop Web Page

To provide access to *Nigeria Health and Mapping Summit 2011* results, Federal Ministry of Health has posted the final report on the Ministry Web page and MEASURE Evaluation also has published a Web page that contains presentations and other materials. Each section of the outline provides links to relevant content, such as the agenda, presentations, and reports. The Web page can be accessed at www.measureevaluation.org/nigeria.

Conclusions

A key objective of *Nigeria Health and Mapping Summit 2011* workshop was to encourage and foster the creation of linkages among the Nigeria NMA and health agencies in the country. These linkages can lead to a stronger data infrastructure, better data for decision making, and less duplication of effort in building spatial data and capacity. Although building these linkages will require a long-term effort, the workshop did achieve some important short-term results:

- strong representation of mapping and health, and related organizations from public and private sectors including academia;
- overwhelmingly positive comments received during the *Nigeria Health and Mapping Summit 2011* and from a post-conference remarks;
- tangible results of the group work sessions, including identification of the most significant issues affecting mapping of health related data including HIV data in participant organizations and issuing of *Nigeria Health and Mapping Summit 2011* communiqué;
- adoption of all of the *Nigeria Health and Mapping Summit 2011* communiqué by the participants and agreement to present the conference report including the communiqué to the executive and legislative arms of government for their concurrence and political supports; and
- enthusiasm by organizers and participants for future *Nigeria Health and Mapping Summits* that extend beyond health but include other social services such as education, water, agriculture etc.

To continue the momentum generated by the *Nigeria Health and Mapping Summit 2011*, Federal Government of Nigeria in collaboration with MEASURE Evaluation's next steps are to:

- prepare a comprehensive a *Nigeria Health and Mapping Summit 2011* report and post it on the Federal Ministry of Health Web page in order to continue encourage and foster the continued collaboration of summit participants;
- present the final report to the Honourable Minister of Health, Honourable Minister of Science and Technology, Chairmen Senate Committees on Health and Science and Technology, House Committee Chairmen on Health and Science & Technology and other relevant stakeholders;
- support the airing of a 30-minute program about the *Nigeria Health and Mapping Summit 2011* on the National Television Station; and
- assess the value of future conferences, especially extending beyond the health sector.

As of the time of writing this report, the discussion with Ministry of Health on the development of the virtual community practice in the Ministry of Health Web page as it relate to health sector and mapping activities is being explore.

A two-day event such as the Nigeria Health and Mapping Summit 2011 is limited in what it can accomplish, and should be seen as part of a longer and larger process. The key to successful realization of the *Nigeria Health and Mapping Summit 2011* goal and objectives is the involvement of all key stakeholders who formed part of the steering committee, but particularly the representatives from the NMAs and the health sector agencies. Ultimate success or failure rests on the will and desire within each organization or sector to make such linkages. Encouragingly, based on responses to a post-conference evaluation survey, participants felt the event was a helpful first step in the long process of building linkages across the health and mapping sectors, and there was an expressed commitment among participants to build and strengthen those linkages.

APPENDIX A: SUMMIT PLANNING PROCESS

Highlights of the summit planning process over 14 months, from August 2010 to October 2011, include the following:

- **Obtained buy-in from USAID mission:** two months (August to October 2010).
  a. Submitted proposal to USAID field office in Nigeria.
  b. Discussed proposal with USAID mission and made revisions based on need to coordinate with other activities in the country (e.g., HS 20/20's mapping efforts).
- **Obtained buy-in from health sector:** five months (November 2010 to March 2011).
  a. Submitted revised proposal to lead stakeholder within the Federal Ministry of Health (i.e., HIV and AIDS Division of the Department of Public Health and Department of Health Planning, Research and Statistics).
- **Obtained buy-in from mapping sector and other key stakeholders:** five months (January to May 2011):

  Note: This duration was increased by the need to (1) postpone the summit until after presidential elections scheduled for April 2011 and (2) have the results of the HS 20/20 mapping project, which was scheduled to be concluded in June 2011.

  a. Met with key stakeholders (USAID, Government of Nigeria, and HS 20/20).
  b. Initiated contact with the national mapping agency:
     i. identified the key representative of the mapping sector (i.e., Dr. Ganiy Agbaje, Director, Mission Planning, IT, & Data Management, Chairman of the National Geospatial Data Infrastructure (NGDI) Committee, National Space Research Development Agency and Mr. Francis Adeniyi Fadairo, Cartography Department of the National Population Commission);
     ii. shared draft summit proposal with mapping sector representative and revised the summit proposal based on comments and suggestions on how the summit should be organized and potential participants; and
     iii. mapping sector representative proposed formation of a steering committee to guide the planning and actualization of the summit as to harmonize the summit effort and existing NGDI activities within the country (steering committee expected to have representative from health and mapping sector).

- **Formed Summit Steering Committee with representation drawn from health and mapping sectors:** The Summit Steering Committee consisted of representation from the health sector (HIV and AIDS Division of the Federal Ministry of Health, National Primary Health Care Development Agency, National Health Insurance Scheme and Department of Health Planning, Research and Statistics of the Federal Ministry of Health - due to their previous and current efforts in mapping activities within the health sector). The mapping sector representative included the Office of the Surveyor General of the Federation (OSGOF), National Population Commission (NPopC), National Space Research and Development Agency (NASRDA), and Regional Centre for Training in Aerospace Surveys, which is a training institution with focus of training professionals working on maps.

- **Collaborated with key stakeholders via the steering committee to revise agenda, determine participants to invite, and select a meeting location:** three months (June to August 2011):

  a. set tentative date for summit: to avoid interfering with the festive period (e.g., month of Ramadan), the summit was scheduled not to occur in August 2011;
  b. received feedback from key stakeholders on summit proposal, including the overall structure and duration of the meeting, key activities to include, and which other stakeholders to invite;
  c. drafted a detailed agenda that integrated stakeholder feedback on the summit proposal; and
  d. proposed a pre-summit meeting to help guide the process via face-to-face discussions.

- **Conducted a pre-summit meeting with key stakeholders in order to make final decisions on critical details:** two weeks (early September 2011):

  a. send e-mail inviting steering committee to the pre-summit meeting schedule for two days;
  b. conducted a pre-summit meeting and activities, as well as provided updates to the steering committee members (updates on venue, letter of invitation, and final review of agenda took place during the meeting); and
  c. identified key note speakers and topic of discussion as well as chairmen for the technical sessions.

- **Finalized planning for the summit:** one month (mid-September to mid-October 2011):

  a. made final revisions to agenda;
  b. booked meeting location;
  c. sent invitations to speakers, participants, and the media;
  d. announced meeting to general public (created print version for e-mail distribution and posted an announcement on the MEASURE Evaluation Web site);
  e. created meeting materials, including banner, handouts, group work sheets;
  f. hired a videographer to record the meeting; and
  g. hired an event planner organization to liaise with the steering committee and manage the details of summit execution.

- **Held summit:** 1 week (Oct 2011).

- **Post-summit identification of action items and documented process:** three months (October to December 2011):

  a. held post-summit meeting of key stakeholders to discuss and document action items;
  b. created summit report for distribution to summit participants and for posting on the Internet; and
  c. created 30-minute video for airing on national television.

APPENDIX B: SUMMIT AGENDA

NIGERIA HEALTH AND MAPPING SUMMIT

ENLISTING NATIONAL MAPPING AGENCIES IN IMPROVING HEALTH OUTCOMES

18 – 19 OCTOBER 2011

REIZ CONTINENTAL HOTEL, ABUJA, NIGERIA

DAY 1 (October 18)

Opening Ceremony

08:30 – 09:30	**Registration**
09:30 – 09:45	**Arrival of the Guests of Honour** • Chairman, House Committee on Health • Chairman, House Committee on Science and Technology • Chairman, Senate Committee on Health • Chairman, Senate Committee on Science and Technology • USAID Mission Director
09:45 – 10:00	**Arrival of the Honourable Ministers** • Honourable Minister of Health • Honourable Minister of Science and Technology
10:00 – 10:10	**National Anthem and Opening Prayer**
10:10 – 10:20	**Welcome Address:** Dr. Mansur Kabir, Director of Public Health, Federal Ministry of Health
10:20 – 10:30	**Chairman's Opening Remarks:** Professor Ita Okon Bassey Ewa, Honourable Minister of Science and Technology
10:30 – 10:35	**Objectives of the Summit:** Kola Oyediran, Country Lead/Senior Resident Technical Advisor, MEASURE Evaluation
10:35 – 10:45	**USAID Opening Remarks:** Ms. Dana Mansuri, USAID Mission Director
10:45 – 11:10	**Keynote Address:** Distinguished Senator (Professor) Robert Ajayi Boroffice, Chairman, Senate Committee on Science and Technology *"Geospatial Resource Sharing and National Spatial Data Infrastructure Development within the Context of the Nation's Transformation Agenda"*
11:10 – 11:25	**Goodwill Messages** • WHO Country Representative • Chairman, Senate Committee on Health • Chairman, House Committee on Health • Chairman, House Committee on Science and Technology
11:25 – 11:35	**Declaring Summit Open:** Professor C. O. Onyebuchi Chukwu, Honourable Minister of Health

11:35 – 11:45 **Vote of Thanks:** Dr. Ganiy Agbaje, Chairman, Summit Steering Committee

11:45 – 11:50 **National Anthem**

11:50 – 12:20 **Tea/Coffee Break**

12:20 – 12:30 **Departure of honourable ministers and other dignitaries**

Technical Session One

Chairman: Dr. Klint Nyamuryekuage

12:30 – 13:30 **15-minute Presentations by Health Organizations**

- Presentations by health organizations on geospatial resources maintained versus needed, as well as on top NGDI challenges affecting the organization's work

Presenting Department and Agencies

- Dr. E. I. Odu, Director of Planning, Research and Statistics, National Primary Health Care Development Agency
- *S. A. B. Indabawa, Department of Planning Research and Monitoring,* National Health Insurance Scheme
- Dr. Aderemi Azeez, Strategic Information, HIV/AIDS Division, Department of Public Health
- Mr. Balogun Adeleke, Department of Planning Research and Statistics

13:30 – 13:45 **Questions and Comments**

13:45 – 14:45 **Lunch**

Technical Session Two

Chairman: Dr. Demola Omojola, Department of Geography, University of Lagos

15:00 – 16:00 **15-minute Presentations by Mapping Organizations**

- Geospatial resources available to assist the health sector (data, software, hardware, technical expertise, training, etc.)
- Current or upcoming projects and geospatial resources that will be developed and/or needed by the organization, including opportunities for collaboration
- Top NGDI challenges affecting the organization's ability to work effectively with the health sector

Presenting Department and Agencies

- Alfa Mohammed, Director, Cartography, National Population Commission
- Dr. Ganiy I. Agbaje, Director, ICT & Data Management, National Space Research & Development Agency [NASRDA]
- Surveyor Barde Jatau, Office of Surveyor General of the Federation
- Professor Isi Ikhuoria, Executive Director, Regional Centre for Training in Aerospace Surveys (RECTAS)

16:00 – 16:15 **Questions and Comments**

16:15 – 16:45 **Tea/Coffee Break**

18:00 – 19:00 **Cocktail Party/Social Networking Event** to allow resource seekers to connect with resource providers

DAY 2 (October 19)

08:30 – 08:45	**Introduction to Day Two Activities:** Chairman, Dr. Ganiy Agbaje
08:45 – 09:15	**Health Sector Challenges and Constraints:** Mapping content to illustrate challenges and constraints to collaboration and coordination, with Dr. Aderemi Azeez
09:15 – 10:00	**Effective Health and Mapping Sector Collaboration:** Demonstrating the experience of country or countries with good spatial data infrastructure linked with effective and improved social services (especially health sector), Dr. Demola Omojola, Department of Geography, University of Lagos
10:00 – 10:15	**Questions and Comments**
10:15 – 10:45	**Tea/Coffee Break**
10:45 – 12:30	**Breakout Session:** Facilitated discussion to agree on and prioritize challenges that affect sharing of geospatial resources and development of NGDI
12:30 – 13:00	**Report of Breakout Session**
13:00 – 14:00	**Lunch**
14:00 – 15:00	**Summary of Next Steps**
15:00 – 15:30	**Tea/Coffee Break**
15:30 – 16:00	**Reading of Summit Communiqué**
16:00 – 16:10	**Closing Remarks:** Chairman, Summit Steering Committee
16:10 – 16:15	**Closing Prayers**
16:15 – 16:30	**Departure of Invited Participants**
16:30 – 17:00	**Steering Committee Post-Summit Meeting**

MEASURE Evaluation is funded by the U.S. Agency for International Development (USAID) under terms of Leader with Associates Cooperative Agreement GHA-A-00-08-00003-00 and implemented by the Carolina Population Center, University of North Carolina at Chapel Hill, in partnership with Futures Group, ICF International, John Snow, Inc., Management Sciences for Health and Tulane University. The information provided here is not official U.S. government information and does not necessarily reflect the views of USAID or the U.S. government.

APPENDIX C: KEYNOTE ADDRESS BY DISTINGUISHED SENATOR (PROFESSOR) ROBERT AJAYI BOROFFICE, CHAIRMAN, SENATE COMMITTEE ON SCIENCE AND TECHNOLOGY

"Geospatial Resource Sharing and National Spatial Data Infrastructure Development within the context of the Nation's Transformation Agenda"

- Keynote Address Delivered

By

Distinguished Senator Prof. R. A. Boroffice

[The Asiwaju of Akoko]

at the

NIGERIA HEALTH AND MAPPING SUMMIT 2011: ENLISTING NATIONAL MAPPING AGENCIES IN THE FIGHT AGAINST HIV/AIDS

18 – 19 October, 2011,

Abuja, Nigeria

Geospatial Resource Sharing and National Spatial Data Infrastructure Development within the Context of the Nation's Transformation Agenda

The Hon, Minister of Science & Technology

The Hon Minister of Health

The Chairman, Senate Committee on Health,

The Chairman, House Committee on Science & Technology

The Chairman, House Committee on Health

Director-Generals & Directors

Gentlemen of the Press

Introduction – The Millennium Development Goals

Barely four (4) years to the deadline for the attainment of the Millennium Development Goals (MDGs), which is targeted to combat poverty, disease, illiteracy, environmental degradation and discrimination against women, it is becoming clear that a number of developing countries especially in Africa will fail to achieve the MDGs. The root cause of this has been identified to emanate from a number of factors which include poor quality data collection for development planning, organization and management practices including lack of adequate infrastructure and skilled human capacity to develop the natural resources and manage the environment in a sustainable manner.

Three (3) of the Eight (8) Millennium Development Goals are Health focussed and they are:

Goal 4: Reduction of Child Mortality

Goal 5: Improvement of Maternal Health

Goal 6: Combat HIV/AIDS, Malaria, and other diseases

To achieve the MDGs objectives, participating countries were expected to articulate policies, strategies and plans which will facilitate the achievement of the Goals. Nigeria is committed to the realisation of the MDGs by 2015 in line with the United Nations Millennium Declaration adopted in September 2000 and this we have demonstrated with the establishment of the Office of the Millennium Development Goals in the Presidency.

The main strategies for achieving MDGs include technology and skill acquisition, natural resource management, infrastructure development, and public private partnership. Accordingly, many societies around the globe are embarking on initiatives and developing agenda towards achieving these goals.

The first response of Nigeria government towards achieving the MDGs was the National Economic Empowerment Strategy (NEEDS), launched in May 2004. NEEDS is expected to lay solid foundation for sustainable poverty reduction, employment generation, wealth creation, healthcare, and value orientation. It was anchored on the belief that Nigeria has all it takes to be one of the leading economies in the world and intended to break the nation away from its current rentier status. This initiative dove-tailed into our current Vision 2020-20.

Likewise, the 7-Point Agenda of the Yar'adua Administration is a sustainable development vehicle aimed at achieving the MDGs and tailored to achieve:

- Sustainable growth in the real sector of the economy
- Physical Infrastructure: Power, Energy & Transportation
- Agriculture
- Human Capital Development: Education & Health
- Security, Law & Order
- Combating Corruption

- Niger Delta Development

The centrepiece of the current Nigeria government's reform programme towards MDGs and Vision 2020-20 is the ***Transformation Agenda***. The transformation agenda focuses on key areas such as good governance, job creation, healthcare, power, development of the real sector, improvement of security, solid mineral development, infrastructural development, education, fighting of corruption among others.

To ensure the active participation of all relevant Nigerian experts in the transformation agenda and welcoming good initiatives, the President Goodluck Jonathan recently said: *"our goal is to engage Nigerians with requisite knowledge and expertise wherever they may be to join in fast-tracking development of the Nigerian State"* and that *"our doors remain open to welcome useful, workable, constructive and patriotic suggestions adequately transmitted to us."*

The 2004 MDG report on Nigeria exposed several weaknesses in project implementation procedures and the system of information gathering and management in Nigeria. It for instance noted that there is lack of sustained gathering of relevant information to aid policy decision-making. For example the report noted that:

> *"There is potential to reach some of the targets related to achieving universal primary education, ensuring environmental stability and developing a global partnership for development. However, based on available information, it is unlikely that the country will be able to meet most of the goals by 2015 especially the goals related to eradicating extreme poverty and hunger, reducing child and maternal mortality and combating HIV/AIDS, malaria and other diseases."*

Furthermore on data issues the report noted:

"The reluctance by official agencies to release data for policy analysis and excessive bottleneck often associated with information dissemination should be addressed with the seriousness that is required."

Achieving the Transformation Agenda requires a common standardized geospatial clearinghouse – housing information about available locational data (geospatial data) for sustainable planning, which is accessible to key Federal and State government agencies, and the private sectors within the country.

HIV/AIDS Burden

If health is wealth, then a healthy nation is a wealthy nation. Nigerians cannot be healthy in a filthy environment with inadequate health care facilities. The natural environment is part of our life support system and is important for developing and maintaining human health, creating national wealth and reducing poverty. This implies that the national environmental assets must be maintained at a level that meets the need of the present generation without jeopardizing the interests of future generations. If properly managed, the environment can be geared to meeting our productive socio-economic needs on a sustainable basis. In this respect the health of Nigerians is key to the Transformation Agenda of the present government.

However, as one of the countries most affected by the HIV/AIDS pandemic, third only to India and South Africa and with about 10% of the global HIV/AIDS cases estimated to be in the country (Eze, 2009), Nigeria risk not being able to achieve the Goal 6 of the MDGs (Combat HIV/AIDS, Malaria, and other diseases) if urgent steps were not taken to ensure easy access to geospatial databases that will assist in disease control, prevention, and intervention strategies. The Nigerian HIV/AIDS pandemic is made up of multiple epidemics spatially located in different parts of the country.

Twenty-four (24) years after the first case of HIV/AIDS was reported (1986), the disease has become a massive epidemic which has become not only a health burden but also a socio- economic problem.

Disease/Health Mapping

Maps reveal spatial or geographical/locational patterns in the information of interest or under investigation. Maps are used in disease (such as

HIV/AIDS, Malaria) control to support planning, management and decision making. Though these activities can be carried out without mapping, mapping makes it easier to visualise some spatial aspects which might not be clearly visible by looking at many pages of statistical data.

Disease mapping and research is useful in the understanding of the functional relationship between diseases and their intrinsic spatial characteristics such as location, type, diffusion poles, socio-economic and behavioural patterns of the patients. These characteristics in conjunction with factors of health facilities, ignorance, poverty, labour demand and supply, gender and occupational issues are useful in modelling the causation, spatial process and diffusion pattern of diseases. More so, disease mapping and research allow us to predict the occurrence of major infestations, enhance their prevention and intervention strategies, as well as plan for optimal location of health facilities (Ajaegbu, 1981, Balaji, 2001).

A wide variety of base maps and geo-referenced background data can be used in disease control. Maps and geo-referenced data are available from a variety of sources. The Office of the Surveyor-General of the Federation is the main source of base maps at different scales while the Space Agency is the primary source of remotely sensed data. Other Government departments, particularly Agriculture, Water, Mines and Transport may also have useful base maps.

Remote Sensing involves using satellites to detect and measure electromagnetic energy emanating from distant objects made of various materials. These objects can then be identify and categorize by type, substance and spatial distribution. Integration of remotely sensed data in social scientific research has been used to understand patterns of land use, disease outbreak, population distribution and urban settlement.

The spatial trend of the HIV/AIDS epidemic is more visible from maps showing the outcome of national sentinel survey. The spatio-temporal distribution of the disease can be mapped to indicate trends of the epidemic. This will also allow us to explore geographic variations in

exposure to some life-style or behavioural factors in order to understand the HIV/AIDS aetiology in the country.

Geographical Information System (GIS) and National Geospatial Data Infrastructure (NGDI).

The implementation of the MDGs will involve experts in major fields of space technology applications, namely remote sensing (RS), Geographical Information Systems (GIS) and satellite based positioning systems; satellite communication applications; meteorological satellite applications; and natural hazards monitoring. This initiative is expected to encourage further cooperation across institutions/agencies to enhance national capacity-building and strengthen our capabilities towards providing opportunities and facilitating equitable sharing of the benefits of space technology development and applications across the country.

The fuel driving the engine of growth and sustainable development of any nation is the nation's access to reliable and adequate geospatial information (GI). Geospatial Information and Communication Technology are indispensable elements of effective governance, including e-government and transparency in government, good science and better decision-making. The NGDI is a strategic initiative concerned with the management of national information assets. Information Communication Technologies (ICT) is a major driving force in the implementation of an efficient National Geospatial Data Infrastructure (NGDI) as it permits Geospatial Information sharing and growth.

The effective use of GI and application to our national development will ensure among others:

- Efficient and sustainable national planning and development
- Improved national revenue generation
- Effective inventory and monitoring of the environment
- Boost in agricultural production
- Efficient exploration and distribution of petroleum resources

- Boost in tourism
- Efficient political administration of the nation, and
- Improved Health-care, Educational and Sport facilities planning, development and delivery.

Nigeria is one of the countries in Africa that have taken steps towards establishing a National Geospatial Data Infrastructure (NGDI). The NGDI system and data holdings will effectively address Nigeria's geospatial data needs which are germane to her socio-economic development. Accurate geospatial products and the NGDI capabilities and benefits provided by a common standardized geospatial clearing house accessible by key government agencies and regional governments within the country will be used for infrastructure, contingency, and security planning, disease control, environmental monitoring, etc.

The NGDI being developed and coordinated by the National Space Research & Development Agency [NASRDA] is a system that will provide the hardware, software, and processes necessary to house, manage, produce, share, distribute, and utilize Geospatial Products and Services. The NGDI will include a metadata catalogue describing the holdings within NGDI; storage capabilities to house significant quantities of geoinformation; mechanisms to enable timely access and sharing of the holdings; and tools to enable analysts and other end users to use the NGDI holdings to address sustainable development including health issues.

Data from Nigeria Satellites

Nigeria Space Agency – the National Space Research and Development Agency [NASRDA] was established with a mission to pursue the development and application of space science and technology for the socio-economic benefits of the nation and the Nigeria space programme constitutes an important component of the national strategy for socio-economic development through space application and participation in the global industry.

In pursuance of Nigeria Space Programme, the Agency took a bold step and launched her first Earth Observation (EO) satellite – NigeriaSat-1 in September, 2003. NigeriaSat-1 is one of the Disaster Monitoring Constellation (DMC) satellites with 32m spatial resolution in 3-spectral bands of Red, Green, and Near-Infrared. Other space craft in the constellation are Alsat-1 belonging to Algeria, Bilsat belonging to Turkey, UK-DMC belonging to the UK, and CHINA – DMC. It is acknowledged worldwide that the constellation has been a success story. Nigeriasat-1 still remains in orbit surpassing its projected life span of 5years.

Following the successful launch of NigeriaSat-1 and the euphoria and research opportunities generated, Nigeria launched two more EO satellites – NigeriaSat-2 and NigeriaSat-X in August 2011. NigeriaSat-2 is a high resolution satellite (2.3m in Pan, and 5m Multi-spectral with stereo imaging mode). NigeriaSat-X is a medium resolution imaging spacecraft (22m – Multi-spectral) built by the Nigerian engineers. In addition Nigeria is awaiting the launch of her communication satellite - NigComSat-1R in December 2011. The data from these satellites will serve as catalyst to the development of the country's National Geospatial Data Infrastructure (NGDI).

Data Sharing

One of the key elements in establishing NGDI/NSDI is the notion of partnership among stakeholders by way of data sharing. This Summit's focus to achieve dialog among stakeholders from the health and mapping sectors, is a major step in the right direction. This would lead to greater awareness and sharing of geospatial resources, help build capacity within the health sector, and ultimately strengthen the national geospatial data infrastructure (NGDI).

As a major user of geoinformation product, the summit will set the pace in the development of major NGDI nodes for various sectors of geoinformation producers and users. In line with objectives the summit it will:

- Facilitate cooperation between Nigeria's health and mapping sectors in the fight against HIV/AIDS and related public health and social service challenges
- Increase awareness and sharing of geospatial resources within Nigeria to enhance decision making for public health and social service programs
- Lead to the development of National Health Information System that incorporates the spatial component.

The major challenges that have bedeviled the implementation of NGDI in Nigeria are:

i) That it is yet to be seen by the drivers of our policies (MDGs, NEEDS, & 7-Point Agenda and Transformation Agenda) as an integral part of the national strategy or as a critical resource for sustainable national development objectives.
ii) Adequate funding for its establishment.

Conclusion

The Millennium Development Goals constitute a set of time-bound and measurable goals and target for combating poverty, disease, illiteracy, environmental degradation and discrimination against women. The National Economic Empowerment Development Strategy (NEEDS), 7-Point Agenda, Transformation Agenda in Nigeria are home-grown derivatives of the United Nations Millennium Declaration of 2000.

The relevance of science and technology (especially geospatial information) was under-estimated in the implementation of the MDGs objectives in Nigeria and hence the first report on the MDGs implementation in Nigeria noted that there is lack of sustained gathering of relevant information to aid policy decision-making. The report is of the opinion that it is unlikely that the country will be able to meet most of the goals by 2015 especially the goals related to eradicating extreme poverty and hunger, reducing child and maternal mortality and combating HIV/AIDS, malaria and other diseases.

Poor quality data collection, organization and management practices including lack of adequate infrastructure and skilled human capacity will make the realization of the MDGs by most African countries unachievable. In this modern era, establishing a Geospatial/Spatial Data Infrastructure (GDI/SDI) is germane to achieving sustainable development.

The Nigerian Space Programme which has resulted in the launch of the NigeriaSat-1 in September 2003, NigeriaSat-2 and Nigeriasat-X in August 2011, and the expected for launch of Nigcomsat-1R in December 2011 will serve as catalyst to the development of the country's National Geospatial Data Infrastructure (NGDI).

The NGDI being established in Nigeria when fully operational will serve as the bedrock for the effective implementation and attainment of the Transformation Agenda of the present government and hence the MDGs, because of the capabilities and benefits provided by a common standardized geospatial clearing house accessible by key government agencies and state governments within the country.

It is strongly recommended that the outcome of this Summit be made to get to the right quarters so that the on-going initiative by the National Space Research and Development Agency [NASRDA] on the development of NGDI for the capture, management, sharing and integration of reliable and spatially referenced data to serve as a critical resource for sustainable national development is full supported and adequately funded.

Thank you for your attention.

Senator Prof. R. A. Boroffice.

National Assembly

Abuja, NIGERIA

APPENDIX D: GROUP WORKSHEET, FACILITATOR INSTRUCTIONS, AND GEOSPATIAL QUESTIONNAIRE

GROUP WORKSHEET

What are the top five NGDI issues or challenges hindering your organization's efforts to improve health outcomes in Nigeria?

Use the following list to identify the top five issues or challenges. Provide a ranking for only five individual items (the rank column should have only five numbers in it when you are finished). 1 = Top issue or challenge. 5 = fifth most important issue or challenge.

Category	Issue or Challenge	Rank
Spatial Data (points, lines, and polygons) Examples: • Points = health facilities • Lines = roads • Polygons = administrative divisions, such as states and local government areas	Spatial data are unavailable to meet my organization's needs.	
	Spatial data are available, but organizational restrictions prevent or limit access to them.	
	Spatial data are available, but the cost is too high to acquire them.	
	Spatial data are available, but quality is too low or metadata are too lacking to allow their use.	
	Spatial data are available, but they are too out-of-date to use.	
	Spatial data are available, but Internet speed or other technical factors prevent access.	
	My organization does not know what spatial data are available.	
	My organization does not know what spatial data it might need.	
	Other (please specify)	
Linking Health Data to Spatial Data Examples: • Link health data to health facility locations using facility IDs • Link HIV indicators to administrative divisions using names for local government areas	My organization's health data lack geographic identifiers for GIS/mapping.	
	My organization's health data have geographic identifiers, but are not linked to spatial files for GIS/mapping.	
	My organization's health data are linked to spatial files, but there are linking mismatches or inconsistencies.	
	My organization does not know whether geographic identifiers are available to link its health data to spatial files.	
	Other (please specify)	
Software	My organization lacks GIS software.	
	My organization has GIS software, but needs additional training to use it effectively.	
	My organization does not know what GIS software is available or would be best to use.	
	Other (please specify)	

Category	Issue or Challenge	Rank
Hardware	My organization lacks the hardware or computing power needed to collect GPS or GIS data and/or to run a GIS.	
	My organization does not know what hardware or computing power it would need to collect GPS or GIS data and/or to run a GIS.	
	Other (please specify)	
Personnel	My organization lacks personnel with GIS expertise.	
	Other (please specify)	
Training	My organization needs additional training to make effective use of GIS tools and methods (please specify what training is needed):	
	Other (please specify)	
Awareness and Collaboration	My organization is not aware of what opportunities exist to collaborate with the mapping sector and/or how it can contribute to the NGDI process in Nigeria.	
	Other (please specify)	
Standards and Policies	National geospatial data sharing policy is not clearly defined or understood.	
	Organizational geospatial data sharing policy is not clearly defined or understood.	
	Clearinghouse or metadata requirements are not clearly defined or understood.	
	GIS hardware and software standards are not clearly defined or understood.	
	Data systems are not interoperable, which prevents sharing of data.	
	Other (please specify)	
Sustainability and Funding	My organization does not have sufficient funding to build or sustain GIS capacity.	
Other (please specify		
Other (please specify		
Other (please specify		

Summarize Results:

Rank	Issue or Challenge	Recommended Solution(s)
1		
2		
3		
4		
5		

FACILITATED DISCUSSIONS

IDENTIFYING AND PRIORITIZING CHALLENGES TO HEALTH AND MAPPING SECTOR COLLABORATION AND NGDI DEVELOPMENT

The facilitated discussion is a chance for summit participants to get to know each other, identify the top NGDI issues and challenges affecting their work, and develop an action plan to help resolve these issues and challenges in order to improve health outcomes in Nigeria.

Role for facilitator

Your role as facilitator is to help direct discussions and to make sure that your group accomplishes the tasks in the allotted time.

Group Tasks

There are five main tasks for the group to accomplish:

1) **As a group:** Introductions and selection of a rapporteur.
2) **As individuals:** Identify the top five NGDI issues affecting their organizations.
3) **As a group:** Reach consensus on the top five NGDI issues affecting the group.
4) **As a group:** Recommend solutions to address the top five NGDI issues affecting the group.
5) **Rapporteur:** Report group results to the larger assembly.

1) 10 MINUTES: INTRODUCTIONS AND SELECTION OF RAPPORTEUR

Objective of task: Allow participants to get to know each other.

Facilitator directions:

Assuming your group has around eight participants: have group members provide their name, organization they represent, title, brief description of their duties, and how they use geospatial data, tools, or methods.

If your group has too many people for detailed introductions: have group members provide their name and organization the first time they speak to the group.

Following introductions, have groups select a rapporteur to report the group's results to the larger assembly.

2) 30 MINUTES: AS INDIVIDUALS, IDENTIFY THE TOP FIVE NGDI ISSUES AFFECTING GROUP MEMBERS' ORGANIZATIONS AND RECOMMEND SOLUTIONS.

Objective of task: Allow participants to identify the key NGDI issues and challenges affecting their ability to improve health outcomes in Nigeria, and to identify potential solutions. This approach will help identify organizational needs with respect to geospatial resource sharing and NGDI development, and will foster a proactive approach to resolving issues and satisfying those needs.

Facilitator directions:

1) 10 minutes: Facilitators should first walk group members through the content and purpose of the group worksheet, and should explain any unfamiliar terms and attempt to remedy any other misunderstandings.
2) 20 minutes: Facilitators should allow group members to read through the worksheet and fill it out on their own. This will ensure that each person involved in the group work has the opportunity to provide his or her individual input into the process, as all worksheets will be retained for consideration by summit organizers for inclusion in summit results.

3) 35 MINUTES: AS A GROUP, REACH CONSENSUS ON THE TOP FIVE NGDI ISSUES AFFECTING THE GROUP.

Objective of task: Allow participants to work as a group to discuss and prioritize issues. This should strengthen working relationships among summit participants.

Facilitator directions:

Facilitators should lead the group through the process of identifying the top five issues for the group as a whole.

- This can be accomplished by starting out with one of the participant's responses and then soliciting the opinions of the other group members until a consensus is reached.
- Issues should be articulated with enough detail to allow identification of causes and recommendation of solutions.

4) 30 MINUTES: AS A GROUP, RECOMMEND SOLUTIONS FOR THE TOP FIVE NGDI ISSUES.

Objective of task: Allow participants to work as a group to recommend solutions. This should strengthen working relationships among summit participants, and should allow for substantial input from both the health and mapping sectors in defining the future of NGDI development in Nigeria.

Facilitator directions:

Facilitators should lead the group through the process of recommending solutions to the top five NGDI issues or challenges identified by the group.

5) 30 MINUTES: RAPPORTEUR WILL REPORT RESULTS TO THE LARGER ASSEMBLY.

Objective of task: Articulate group results to the full body of summit participants.

Facilitator directions:

Facilitators should ensure that group results are documented and reported by the rapporteur. The facilitator for the overall exercise will solicit group results from the individual rapporteurs and look for commonalities among the outputs from the different groups.

GEOSPATIAL QUESTIONNAIRE

Nigeria Health and Mapping Summit
Questionnaire on GIS Capacity, Data, and Collaborations

Country	Nigeria
Name of your institution	
Postal address	
Main phone number	
Fax number	
Contact person (please indicate name, title, phone number, and e-mail address)	
Web site (URL)	
Current GIS projects (short description)	
Is your organization involved in the NGDI development process (yes/no)?	
If yes, how is your organization involved?	

GIS Personnel	**Total Number**		
	Number by Degree	**License**	
		Master's	
		Ph.D.	
		Other	

GIS/GPS/image processing software available (please indicate version and number of licenses)	

Hardware used for GIS and/or image processing	**Qty.**	**Operating System**	**Make and Model**	**RAM**	**Hard Drive Size**	**Proces-sor(s)**

GPS devices (please indicate the quantity and model, e.g., Garmin GPS 72 or eTrex)	

	Dataset Name	Short Description and/or Web Address (URL)
Geospatial Data Holdings		

	Institution	Description of the Collaboration
Collaboration with other institutions in the country regarding GIS activities or NGDI development		

APPENDIX E: LIST OF SUMMIT PARTICIPANTS

Name	Organization	Type of Organization	Type of Activity
Clara Ejembi	Ahmadu Bello University (ABU),	Public	Academic/Training
Dr Gobir A.A.	Ahmadu Bello University (ABU),	Public	Academic/Training
Tessy Ochu Arua	AIDS Relief	NGO	Health
Chidi Nwizu	AIDS Relief	NGO	Health
Dr Abimbola Sowande	AIDSTAR-One	NGO	Health
Kelechi Amaefule	AIDSTAR-One	NGO	Health
Uga Ogochukwu	APIN	NGO	Health
Awoleye Joshua O.	Association for Reproductive and Family Health (ARFH)	NGO	Health
Dr Abiodun Hassan	Association for Reproductive and Family Health (ARFH)	NGO	Health
Richard Fakolade	Association for Reproductive and Family Health (ARFH)	NGO	Health
Akan Udoete	AVO Health	Private	Health
Iheadi Onwukwe	AVO Healthh ltd	Private	Health
Dr Amino Zakari	C4CC	NGO	Health
Kennesh Obi	CACO	NGO	Health
Anne Adalizih	CHAN- NICAB	NGO	Health
Modupe Isibor	CIHP/ICAP	NGO	Health
Akuse John	CISHAN	NGO	Health
Niyi Olaleye	CRS	NGO	Health
Grace Grace	CUBS/MSH	NGO	Health
Adeleke Balogun	Department of Health Planning, Research and Statistics (DHPRS) Federal Ministry of Health	Public	Health
Fafuroti Ola. Jacob	Department of Health Planning, Research and Statistics (DHPRS) Federal Ministry of Health	Public	Health
Akinrinade HO	Department of Health Planning, Research and Statistics (DHPRS) Federal Ministry of Health	Public	Health
Dr. Mansur Kabir	Department of Public Health, Federal Ministry of Health	Public	Health
Morah Gloria	ECEWS	NGO	Health
Aghatise Joseph	ECNX Ltd	Private	Mapping Agency
Adam Thompson	Ehealth Nigeria	Private	Mapping Agency

Name	Organization	Type of Organization	Type of Activity
Amina Abba Gana	FHI 360	NGO	Health
Sanni Adedokun	Family Health International (FHI360)	NGO	Health
Joy Obaje	Federal Ministry of Women Affair and Social Development (FMWASD)	Public	Other
Duru John	Federal Ministry of Women Affair and Social Development (FMWASD)	Public	Health
Ali Shafii	Federal Ministry of Women Affair and Social Development (FMWASD)	Public	Other
Ringpon Joseph G.	Fistula Care Project	NGO	Health
Mukhtar M	Friend of Global Health (FGH)	NGO	Health
Mubasiru Lamidi	Heartland Alliance Nig	NGO	Health
Morka Mercy	HIV Division, Federal Ministry of Health (FMoH)	Public	Health
Ijaodola Olugbenga	HIV Division, Federal Ministry of Health (FMoH)	Public	Health
Dr Peter N.	HIV Division, Federal Ministry of Health (FMoH)	Public	Health
Dr W.I. Balami	HIV Division, Federal Ministry of Health (FMoH)	Public	Health
Ikwulono Gabriel	HIV Division, Federal Ministry of Health (FMoH)	Public	Health
Ombugadu O.A.	HIV Division, Federal Ministry of Health (FMoH)	Public	Health
Ohenmwen Dickson	HIV Division, Federal Ministry of Health (FMoH)	Public	Health
Dr Aderemi Azzez	HIV Division, Federal Ministry of Health (FMoH)	Public	Health
Alex Onwuchekwa	HIV Division, Federal Ministry of Health (FMoH)	Public	Health
Dr Issa Kawu	HIV Division, Federal Ministry of Health (FMoH)	Public	Health
Abatta E.O	HIV Division, Federal Ministry of Health (FMoH)	Public	Health
Chinyere Omeogu	HS2020	NGO	Mapping Agency
Okonkwo Rita	IHVN	NGO	Health
Rukaar VROIGN	IHVN	NGO	Health
Adegbola Racheal O.	IHVN	NGO	Health
Peter Michael	IHVN	NGO	Health
Ola Clement	IHVN	NGO	Health
Kola Falayajo	JSI	NGO	Health
Banji Ipadeola	MAPS	NGO	Health
Adeola Seweje Chimunda	MEASURE Evaluation	NGO	Health
Dr Yinka Falola	MEASURE Evaluation	NGO	Health

Name	Organization	Type of Organization	Type of Activity
Anoemuah			
Balarabe Gaya	MEASURE Evaluation	NGO	Health
Samson Bamidele	MEASURE Evaluation	NGO	Health
Dr Sampsone Ezikeanyi	MEASURE Evaluation	NGO	Health
Louis Edema	NACA	Public	Health
Iluyomade Oluseyi	NACA	Public	Health
Femi Ajibabi	National Agency for the Control of AIDS (NACA)	Public	Health
Kayode Ogungbemi	National Agency for the Control of AIDS (NACA)	Public	Health
Joy Agbenyo	National Assembly	Public	Other
Prof Robert .A. Boroffice	National Assembly	Public	Other
Idowu O.O.	National Blood Transfussion Service (NBTS)	Public	Health
Biyi Fafunmi	National Buereau of Statistics (NBS)	Public	Other
Aleofuna Chinyere	National Health Insurance Scheme (NHIS)	Public	Health
Shuaibu .A. Indabawa	National Health Insurance Scheme (NHIS)	Public	Health
Ahmed. I. Ndaman	National Health Insurance Scheme (NHIS)	Public	Health
Aliyu Mohammed	National Health Insurance Scheme (NHIS)	Public	Health
Mr F. Adeosun	National Malaria Control Program (NMCP)	Public	Health
Mrs Taiwo O.	National Planning Commission (NPC)	Public	Other
Yusuf Kachako	National Planning Commission (NPC)	Public	Other
Mooreino Diftuffe	National Planning Commission (NPC)	Public	Other
Moronu Chike	National Population Commission (NPopC)	Public	Other
Fadairo A. Francis	National Population Commission (NPopC)	Public	Mapping Agency
Okagwu Obiakonwa	National Population Commission (NPopC)	Public	Mapping Agency
Alfa Mohammed	National Population Commission (NPopC)	Public	Mapping Agency
Siaka A,K	National Primary Health Care Development Agency (NPHCDA)	Public	Health
Dr. E.I. Odu	National Primary Health Care Development Agency (NPHCDA)	Public	Health
Cletus Ameh	National Primary Health Care Development Agency (NPHCDA)	Public	Health
Olojo O.O.	National Space Research Development Agency (NASRDA)	Public	Mapping Agency
M.S. Haruna	National Space Research Development Agency (NASRDA)	Public	Mapping Agency

Name	Organization	Type of Organization	Type of Activity
Adeleka J.A.	National Space Research Development Agency (NASRDA)	Public	Mapping Agency
Mustapha I.	National Space Research Development Agency (NASRDA)	Public	Mapping Agency
Dr Ganiyu Agbaje	National Space Research Development Agency (NASRDA)	Public	Mapping Agency
Ashaolu . C.A	Nationl Food and Drug Agency Control (NAFDAC)	Public	Health
Dr Adeyinka Oludiran	NELA	NGO	Health
Olayemi Okeniyi	News Agency of Nigeria (NAN)	Public	Other
Belle Olubukola	News Agency of Nigeria (NAN)	Public	Other
Tayo Olugbemi	NMEMS	NGO	Health
Mukhtar Gaya	Northern Education Initiative (NEI)	NGO	Education
Afolabi Olusegun	Obafemi Awolowo University (OAU), Ile-Ife	Public	Academic/Training
Adesegun Fatusi	Obafemi Awolowo University (OAU), Ile-Ife	Public	Health
Surv U.R. Edozie	Office of the Surveyor General of the Federation (OSGOF)	Public	Mapping Agency
Ayoola A.O	Office of the Surveyor General of the Federation (OSGOF)	Public	Mapping Agency
Helen Ibrahim	Partners for Development (PFD)	NGO	Health
Dr Ibrahim Yisa	PATH 2	NGO	Health
Wole Fajemesin	PATH 2	NGO	Health
Chinwe Onumonu	Pathfinder	NGO	Health
Lailah Gumbi	PATH 2	NGO	Health
Femi Odujeko	Polaris Digitech	Private	Mapping Agency
Femi Oyewole	Polaris Digitech	Private	Mapping Agency
Niyi Okuboyejo	Polaris Digitech	Private	Mapping Agency
Uche Anyalewechi	Polaris Digitech	Private	Mapping Agency
Ayodeji Oginni	Population Council	NGO	Other
Yinka Adekogbe	PRO- HEALTH Int'l	NGO	Health
Chris Ogedengbe	PRO- HEALTH Int'l	NGO	Health
Adewale Akingbade	RECTAS	Public	Mapping Agency
Idris Saliu	Safe Blood Intl	NGO	Health
Ayobisi Osuntusa	Sesame Workshop	NGO	Health
Tunde Abiola	Sesame Workshop	NGO	Health

Name	Organization	Type of Organization	Type of Activity
Chioma Ofoegbu	SFH/ENR	NGO	Health
Chinwe Omani	SIB	NGO	Health
Emeka Obiekii	Sleek vision	NGO	Health
Eimunjeze Kevin	University of Ibadan (UI)	Public	Other
Ademola Omojola	University of Lagos (Unilag)	Public	Mapping Agency
Akin Atobatele	USAID	Donor	Health
Supo Oyedepo	Voxiva	NGO	Health
Dr. Klint Nyamaryekpe	WHO	NGO	Health
Aarushi Bhatangar	World Bank	Donor	Health

APPENDIX F: PRESENTATION SUMMARIES AND MATERIALS

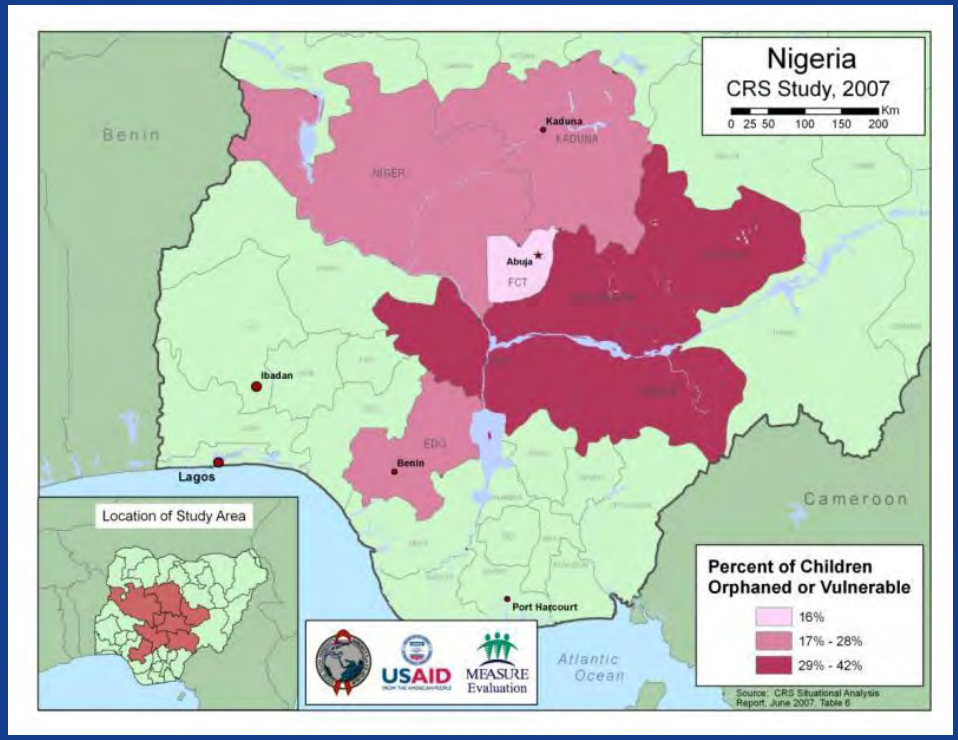
Nigeria Health and Mapping Summit
October 18 – 19, 2011

Brief Overview

Kola OYEDIRAN and James STEWART
MEASURE Evaluation

Value of GIS and Mapping for Provision of Health Services

- Allows targeting of populations in need
- Helps decision makers see data patterns (picture worth 1,000 words)
- Facilitates better questions



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MEASURE Evaluation

Value of GIS and Mapping for Provision of Health Services

- Improves data quality
- Allows spatial analysis of data, such as measuring access to ART

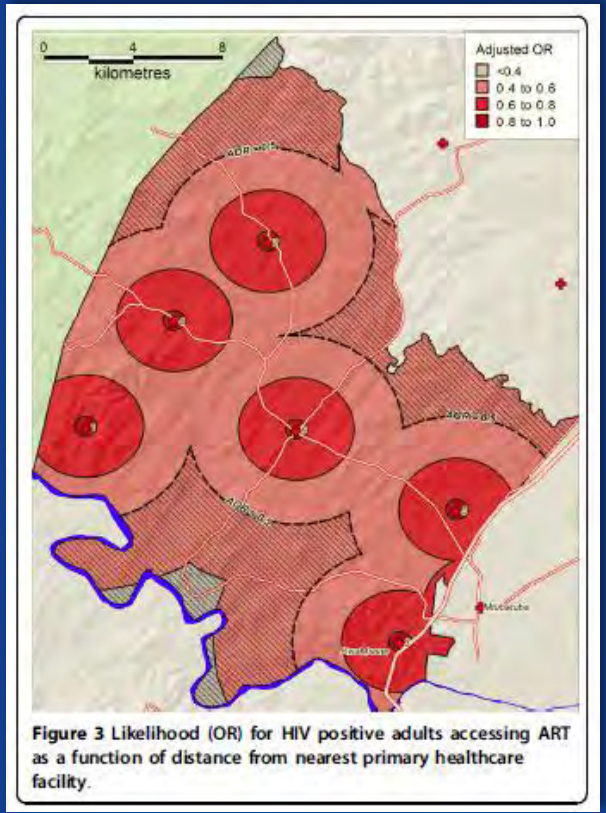

Figure 3 Likelihood (OR) for HIV positive adults accessing ART as a function of distance from nearest primary healthcare facility.

Source: Cooke et al. BMC Public Health 2010, 10:585
http://www.biomedcentral.com/1471-2458/10/585

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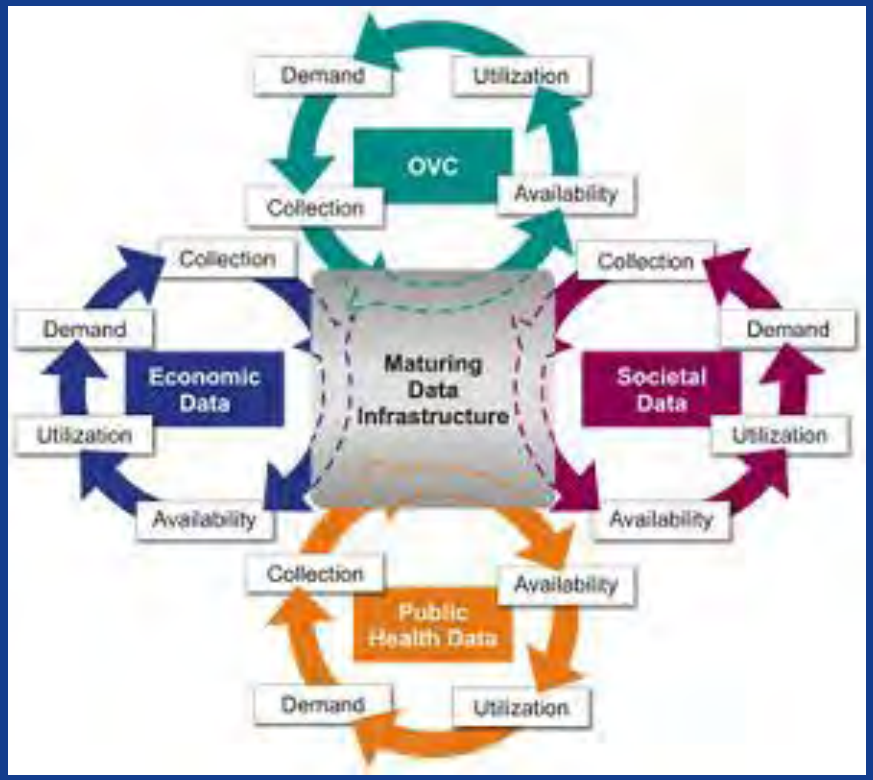
MEASURE Evaluation

Value of GIS and Mapping for Strengthening Data Infrastructure

- Permits linking of data from multiple sectors using common geographic identifiers
- Strengthens the National Geospatial Data Infrastructure (NGDI)



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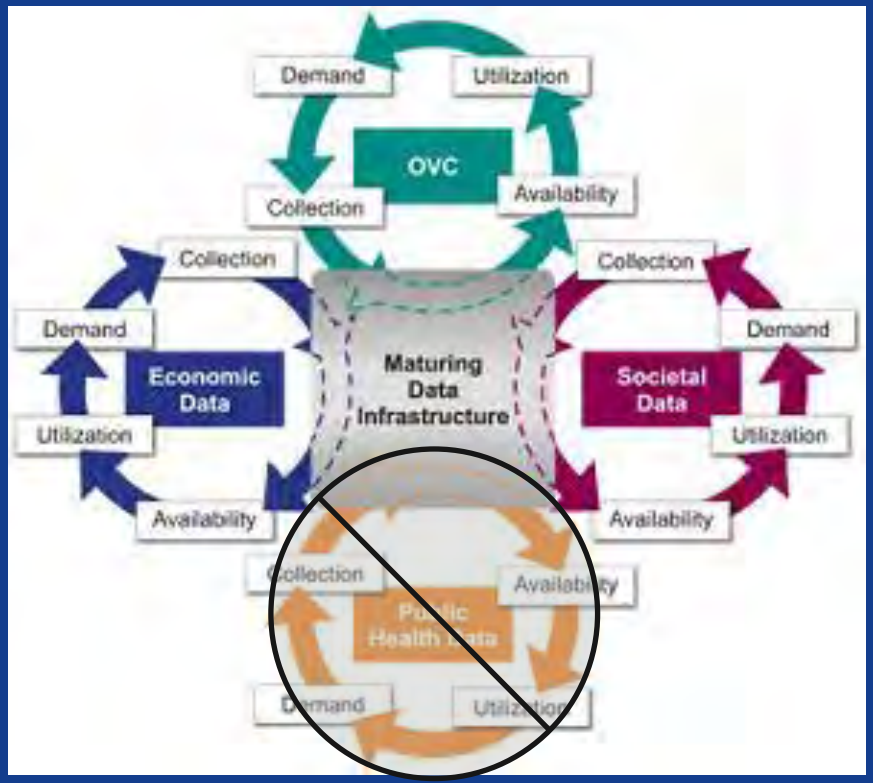
MEASURE Evaluation

Need for Health and Mapping Summit

- Health Sector has received less focus than others (e.g., agriculture, natural resources) when defining GIS needs
- Health Sector can contribute to NGDI



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MEASURE Evaluation

Need for Health and Mapping Summit

- National mapping agencies (NMAs) have GIS data and technical expertise
- Collaboration can harmonize GIS data collection and capacity building efforts in Nigeria

Source: Dongus et al. 2007. International Journal of Health Geographics 6:37.

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MEASURE Evaluation

CODIST I Pre-conference Workshop in Ethiopia, 2009

- First-of-its-kind meeting in Africa
- Nigeria group work
  - 14 participants from health and mapping sectors
  - Saw need for national meeting to collaborate

United Nations UNAIDS USAID FROM THE AMERICAN PEOPLE MEASURE Evaluation

USAID FROM THE AMERICAN PEOPLE MEASURE Evaluation

Nigeria Health & Mapping Summit Improving Health Outcomes

- October 18–19, 2011 in Abuja
- Hosts:
  - Federal Ministry of Health
  - National Space Research and Development Agency
  - National Population Commission
  - Office of the Surveyor General of the Federation
  - MEASURE Evaluation, which is funded by USAID

Objectives of the Summit

- Facilitate cooperation between Nigeria's health and mapping sectors in the fight against HIV/AIDS and related health and social service challenges
- Increase awareness and sharing of geospatial resources within Nigeria to enhance decision making for health sector programs
- Identify challenges to development of the NGDI and create an action plan to help address them

Anticipated Outcomes

- Increased cooperation among health and mapping sectors
- Improved health outcomes
- Summit process documented as a model for other countries

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MEASURE Evaluation

MEASURE Evaluation is a MEASURE project funded by the U.S. Agency for International Development and implemented by the Carolina Population Center at the University of North Carolina at Chapel Hill in partnership with Futures Group International, ICF Macro, John Snow, Inc., Management Sciences for Health, and Tulane University. Views expressed in this presentation do not necessarily reflect the views of USAID or the U.S. Government. MEASURE Evaluation is the USAID Global Health Bureau's primary vehicle for supporting improvements in monitoring and evaluation in population, health and nutrition worldwide.

GIS AND PRIMARY HEALTH CARE IN NIGERIA

By

Dr. ODU Emmanuel

Director of Planning, Research and Statistics

National Primary Health Care Development Agency

Presentation Outline

- Basic concept of GIS
- GIS and Primary Health Care
- On-going GIS efforts in Nigeria
- Progress made by NPHCDA in GIS Mapping
- Suggested 'Way-Forward'
- Conclusion

Basic Concept of GIS

- Geographic Information System (GIS) is a system of capturing, storing, checking, integrating, analyzing, updating and displaying data which are spatially referenced on a geo-spatial map.
- GIS uses the Global Positioning Systems (GPS) as an integral part of its operations.
- It is an innovative approach for information management & has great potential for significant impact on PHC service delivery.

GIS & Primary Health Care - 1;

- PHC Concept

- ***Essential health care*** *based on practical, scientifically sound and socially* ***acceptable*** *methods and technology made universally* ***accessible*** *to individuals and families in the* ***community*** *by means acceptable to them, through their full* ***participation*** *and at a cost that community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination.*

  - Alma Ata

- It forms an integral part of both the country's health system, of which it is the central function and the main focus of the overall social and economic development of the community.

GIS and Primary Health Care - 2

- A large proportion of population reside in rural areas at considerable distances from basic health services.
- An indicator of health service performance is the population's proximity to PHC
  - Metric: proportion of population living within an hour of nearest service (or within 5km distance).
- GIS is helpful in Health planning, management and research in the following areas.
  - **Measuring access and coverage of heath services**
  - Utilization patterns of health services
  - Rational Planning & design of health services.

GIS and Primary Health Care

- GPS technology can be used to record the locations of health facilities using coordinates and data downloaded for further processing using relevant databases and for use on maps.
- GIS is useful in the design, implementation and evaluation of health care programs.
  - Improved access to primary health care is required for the successful attainment of at least three of the UN MDGs (Reduce child mortality; Improve maternal health; and Combat HIV/AIDS, Malaria, TB & other diseases).

GIS and Primary Health Care/....2

GIS in health PHC management can be used to determine:

- Physical access to PHC facilities
- Human Resource capacity, needs & distribution
- Coverage of health programs
- Spatial utilization patterns
- Variation of service quality in urban, peri-urban & rural areas
- "Location-Allocation" (Strategic planning & resource allocation)
- Highlight Service areas for further research

GIS and Primary Health Care - 3

- Case of Rural South Africa

- In Hlabisa Sub-district of rural South Africa GIS used to;
  - Estimate travel times to health clinics
  - Understand PHC usage patterns
  - Measure disparities in access & usage of primary Health care by setting (rural, peri-urban & urban).
  - Evaluate clinic usage relative to expectation.
  - Optimally site a new health facility so as to achieve maximum population level increases in access.

On-going GIS efforts in Health; Nigeria

- WHO – 2006/7: SAM of selected 11 States
- MDG – Dec 2010: SAM + Human Resources of 3LGAs/State in 36 States + FCT
- FMOH/NASCAP – Jan 2011: HIV/AIDS SAM of 36 states & FCT
- NPHCDA Disease Control & Immunization Dept – Aug 2011: Micro-planning for SIA & RI focusing on delineation of boundaries in 4 States of NWZ
- Rivers State - 2011

On-going GIS efforts in Health/...2

- SAM consisted of general characteristics of facilities, types of equipment available, human resource, drugs & interventions available
- Some of the above mapping activities basically dwelt on specific interest areas for services such as immunization, HIV/AIDS etc, and did not provide a holistic picture

NPHCDA Generic GIS Mapping Initiative - 1

Agency has plan/limited budget for a Pilot GIS Mapping of Health Facilities.

Held bilateral meeting with NPopC to discuss the possibility of collaboration to achieve the following objectives:

- Geo-spatially map out the PHC facilities within the country to be able to locate on a map of Nigeria the different categories of PHC Centres
- Show the spatial distribution of the PHC Centres in relation to the population of their catchment communities, service availability and human resources.

NPHCDA Generic GIS Mapping Initiative - 2

- Link the service data generated at the PHC Centres with their mapping using the GIS software.
- Set up a National GIS lab in NPHCDA for easy national access to PHC-related data
- Many studies have shown that physical access to health care is the most important determinant of service utilization.

Suggested Way forward

- A coordinating mechanism needs to be agreed and developed.
- Need to establish Guidelines and Standards
- Stakeholder meeting for dissemination of various GIS initiatives.
- NPHCDA has strategic advantage for successful coordination of GIS health mapping.
- Forge strong partnerships to conduct a national GIS mapping in 36 States and FCT.
- Establish a National GIS lab.

Conclusion

- The application of GPS-dependent GIS is of crucial importance in the generating reliable geo-spacial data/information for policy, planning and decision-making for Primary Health Care as well as research.
- Used in a particular district in South Africa to address key PHC parameters for improving PHC.
- Kenyan authorities used GIS to define and implement equity approached in physical access to clinical services as part of planning & Monitoring of Malaria Programme.
- Nigeria needs GIS PHC much more. Harmonization coordination and scale-up of GIS in PHC will help accelerate our progress towards achievement of MDGs targets.

Thank you

THE USE OF GIS MAPPING TO DETERMINE THE DISTRIBUTION OF ACCREDITED HEALTH CARE FACILITIES IN NHIS

A PRESENTATION AT:

NIGERIA HEALTH AND MAPPING SUMMIT,

REIZ CONTINENTAL HOTEL, ABUJA

BY

S. A. B. INDABAWA

ASSISTANT GENERAL MANAGER

DEPARTMENT OF PLANNING, RESEARCH & MONITORING

18TH OCTOBER, 2011

PRESENTATION OUTLINE

- Introduction
- GIS Mapping Efforts
- Results
- Challenges
- Further Work
- Conclusion

INTRODUCTION – 1

- NHIS is an agency of the Federal Government established under Act 35, 1999 to promote, regulate and administer the effective implementation of Health Insurance Programmes in order to ensure easy access to qualitative and affordable health care services in Nigeria.

- The mandate of NHIS is to achieve Universal Coverage of all Nigerians and legal residents by the year 2015

INTRODUCTION – 2

- One of the strategic objectives of NHIS is to ensure equitable distribution of healthcare facilities within the Federation.
- The mapping of these facilities will go along way in assisting the Scheme to assess the progress made towards achieving this objective.
- The mapping will also facilitate the monitoring of the accredited facilities to determine whether they are operating according to the stipulated guidelines.

GIS MAPPING EFFORTS – 1

- The GIS mapping activities in NHIS started with an informal discussion held between Dr K. N. Korve, General Manager, Planning, Research & Monitoring and Dr A. Petu of WHO, leading to a meeting held on June 3, 2008.

- The meeting resolved that WHO will train NHIS Staff on the use of GPS machines and Healthmapper and also loan their GPS machines to NHIS for use, while the NHIS will provide logistics for the training.

- During the training which was attended by 50 participants, a mapping questionnaire was designed to be administered in the facilities to collect data on their location, type, ownership, services offered and human resources available.

GIS MAPPING EFFORTS – 2

Questionnaire for data collection

FACILITY NAME:..... **NHIS CODE**:.....

SECTION ONE – FACILITY LOCATION		
001	**Date (dd/mm/yyyy)**	
002	**State**	
003	**LGA**	
004	**Ward**	
005		
006	**Facility Telephone**	
007	**Facility e-mail address**	
008	**Facility geographic co-ordinates:**	Latitude: **N-**
		Longitude: **E-**
009	**NHIS Accredited Facility?**	Yes No
010	**Facility Location**	Urban Rural
SECTION TWO – FACILITY TYPE, OWNERSHIP AND SERVICES		
011	**OWNERSHIP**	
	PUBLIC:	Federal Government State Government Local Government
012	**PRIVATE**	
013	**FACILITY TYPE**	Primary Secondary Tertiary
014	**SERVICE TYPE**	Primary Secondary Tertiary
015	**IN-PATIENT**	Yes No
016	If yes to 015, number of beds	
017	**IMMUNIZATION SERVICES**	Yes No
018	If yes to 018, number immunized last month	
019	**ANTE-NATAL SERVICES**	Yes No
020	If yes to 019, attendance last month	
021	**IN-HOUSE ACCREDITATION**	Laboratory Pharmacy

SECTION THREE – HUMAN RESOURCES FOR HEALTH		
022	**MEDICAL DOCTORS**	
	Number of Doctors working full time	
	Number of Doctors working part time	
023	**REGISTERED MIDWIVES**	
	Number of Registered Midwives	
024	**REGISTERED NURSES**	
	Number of Registered Nurses	
025	**REGISTERED NURSES/MIDWIVES**	
	Number of Registered Nurses/ Midwives	
026	**AUXILIARY STAFF**	
	Number of Auxiliary Staff	
027	**MEDICAL LABORATORY STAFF**	
	Number of Medical Laboratory Scientist	
	Number of Medical Laboratory Technicians	
	Number of Medical Laboratory Assistants	
028	**PHARMACY STAFF**	
	Number of Pharmacists	
	Number of Pharmacy Technicians	
	Number of Pharmacy Assistants	
029	**COMMUNITY HEALTH WORKERS**	
	Number of community Health Officers	
	Number of Senior Community Health Extension Workers (SCHEWs)	
	Number of Junior Community Health Extension Workers (JCHEWs)	
030	**ENVIRONMENTAL HEALTH WORKERS**	
	Number of Environmental Health Workers	
031	**MEDICAL RECORDS STAFF**	
	Number of Medical Records Officers	
	Number of Medical Records Assistants	
032	**NON MEDICAL STAFF**	
	Number of non Medical Staff	

INTERVIEWER NAME (Last First):.....
RESPONDENT NAME (Last, First):.....

GIS MAPPING EFFORTS – 3

- The questionnaire was administered in 913 facilities and their coodinates obtained during monitoring of service utilization in 2008 and 352 facilities in the year 2009 bringing the total number to 1,265 facilities
- The data were analyzed and reports submitted to management.
- A database was created and maps were produced

RESOURCES AVAILABLE - 1

Equipment:

- 60 GPS machines

- 2 PDAs

- 2 Laptop Computers

- 1 Desktop Computer

- 1 HP LaserJet Colour Printer

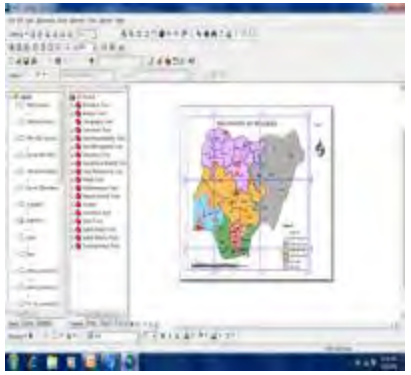
- 1 HP Scanner

RESOURCES AVAILABLE - 2

Software:

- A HealthMapper Software

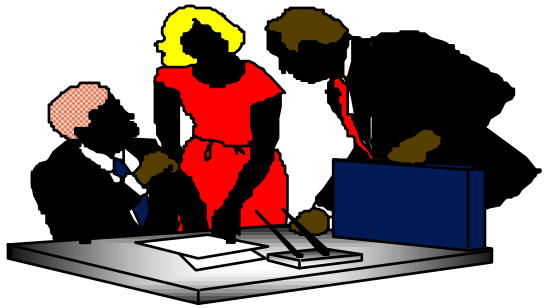
- 2 Licenced ArcGIS 9.3 Software



RESOURCES AVAILABLE - 3

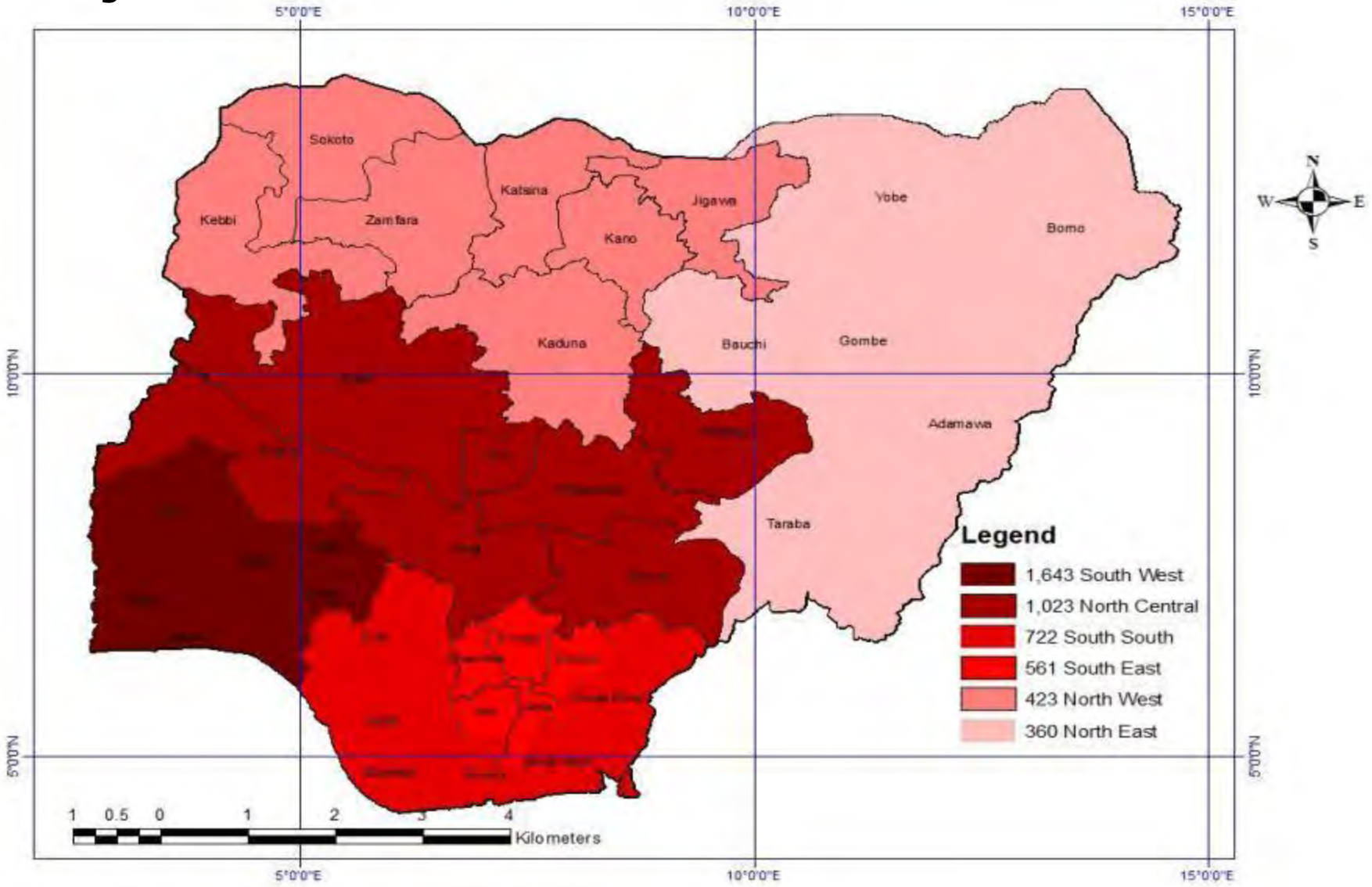
Human Resources:

- In 2008, WHO trained 50 NHIS Staff on the use of GPS machines and Healthmapper, 5 Staff had more intensive training on the use of the Healthmapper.
- In 2010, 3 Staff were trained in South Africa on Arcview software.
- In 2011, 50 Zonal Office Staff trained on the use of GPS machines and ArcGIS software



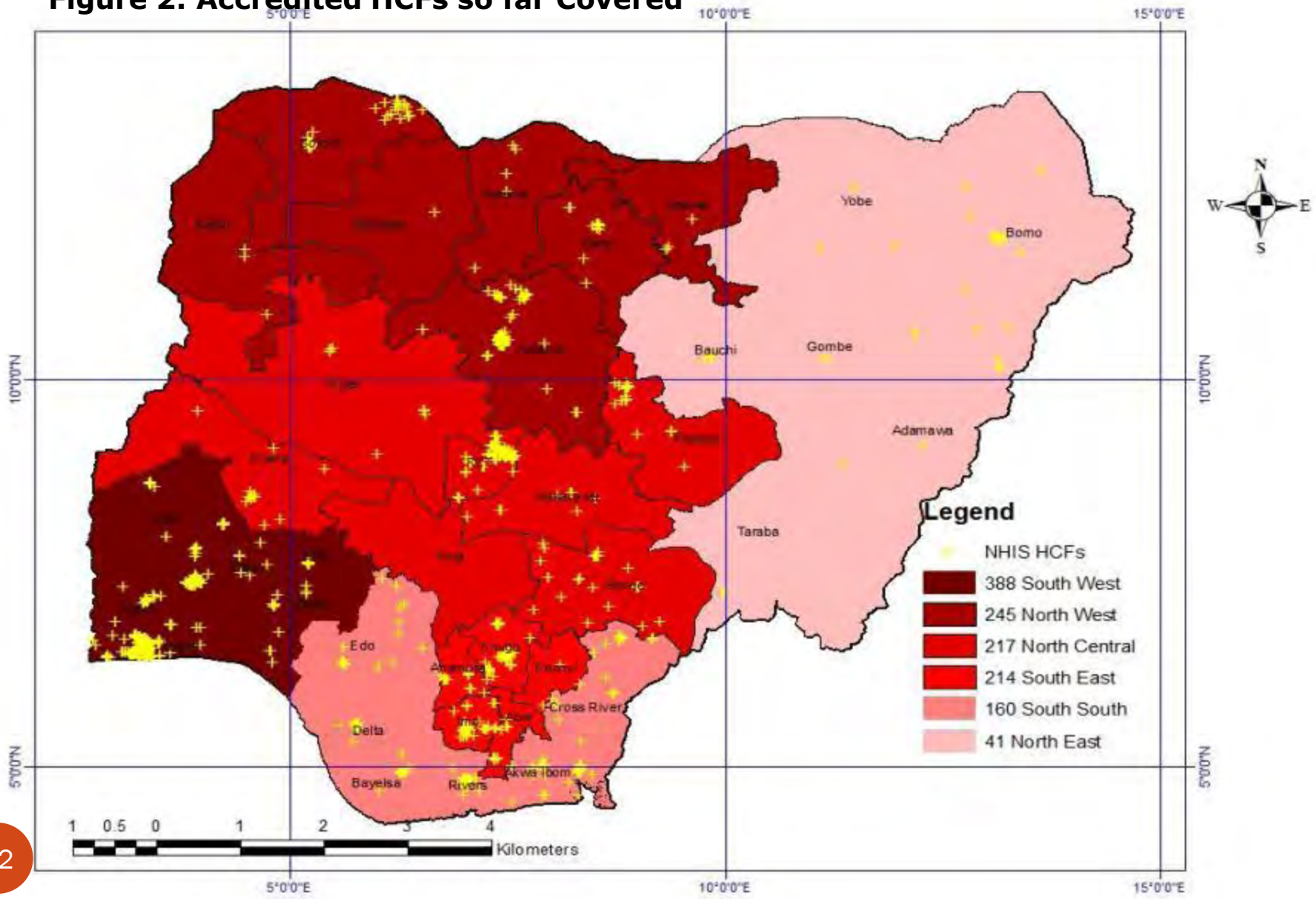
RESULTS - 1

Figure 1: Accredited HCFs



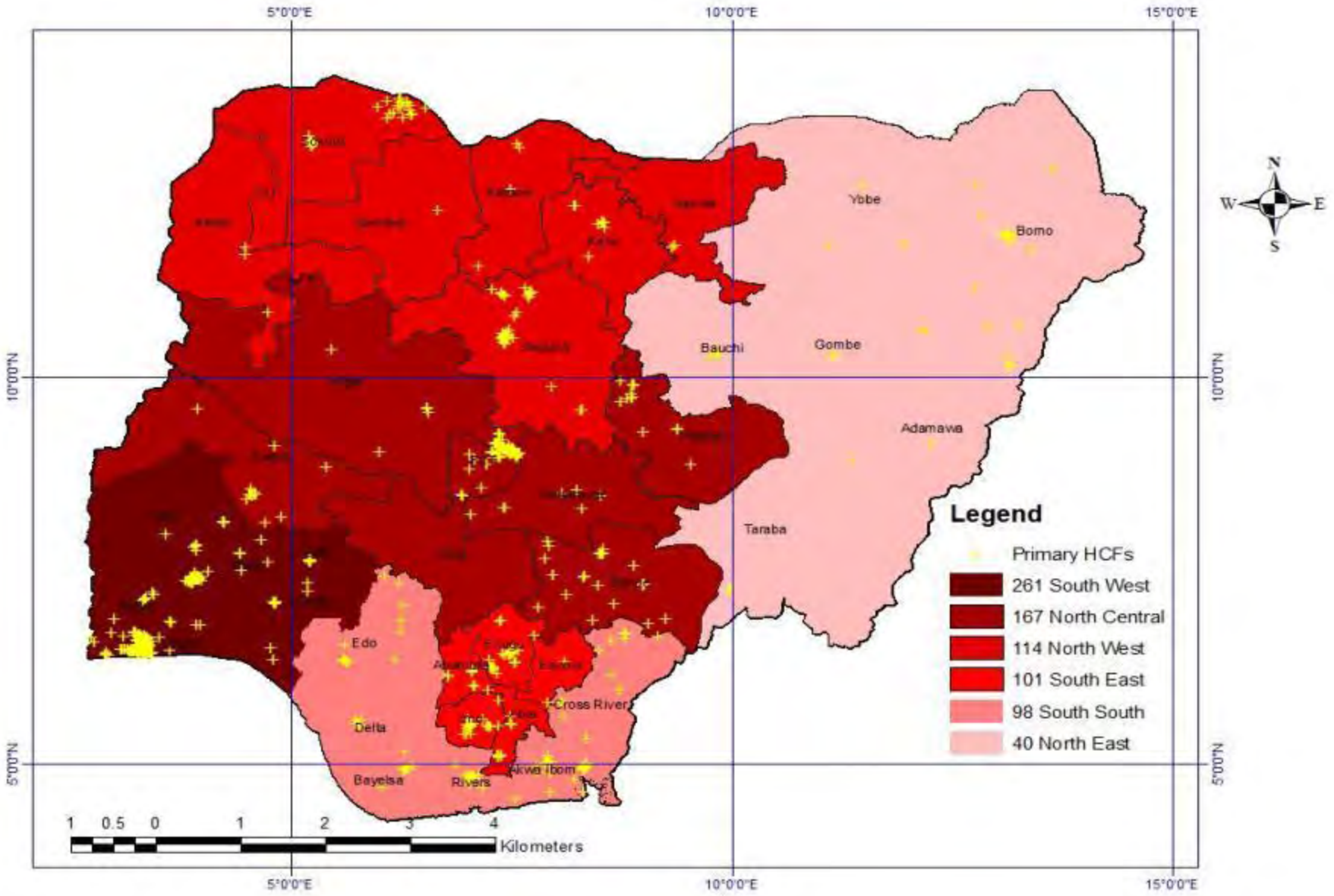
RESULTS - 2

Figure 2: Accredited HCFs so far Covered



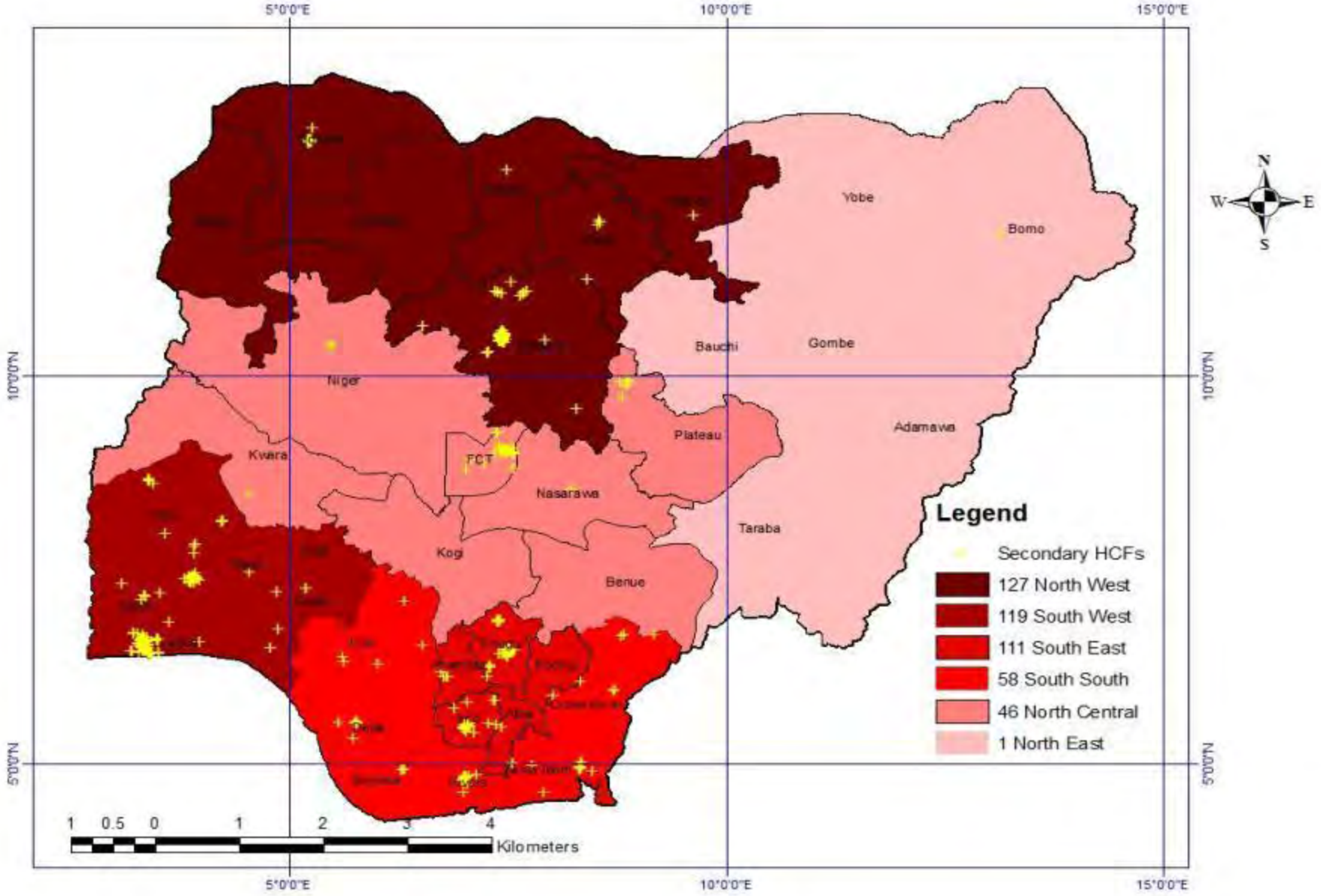
RESULTS - 3

Figure 3: Primary HCFs Covered



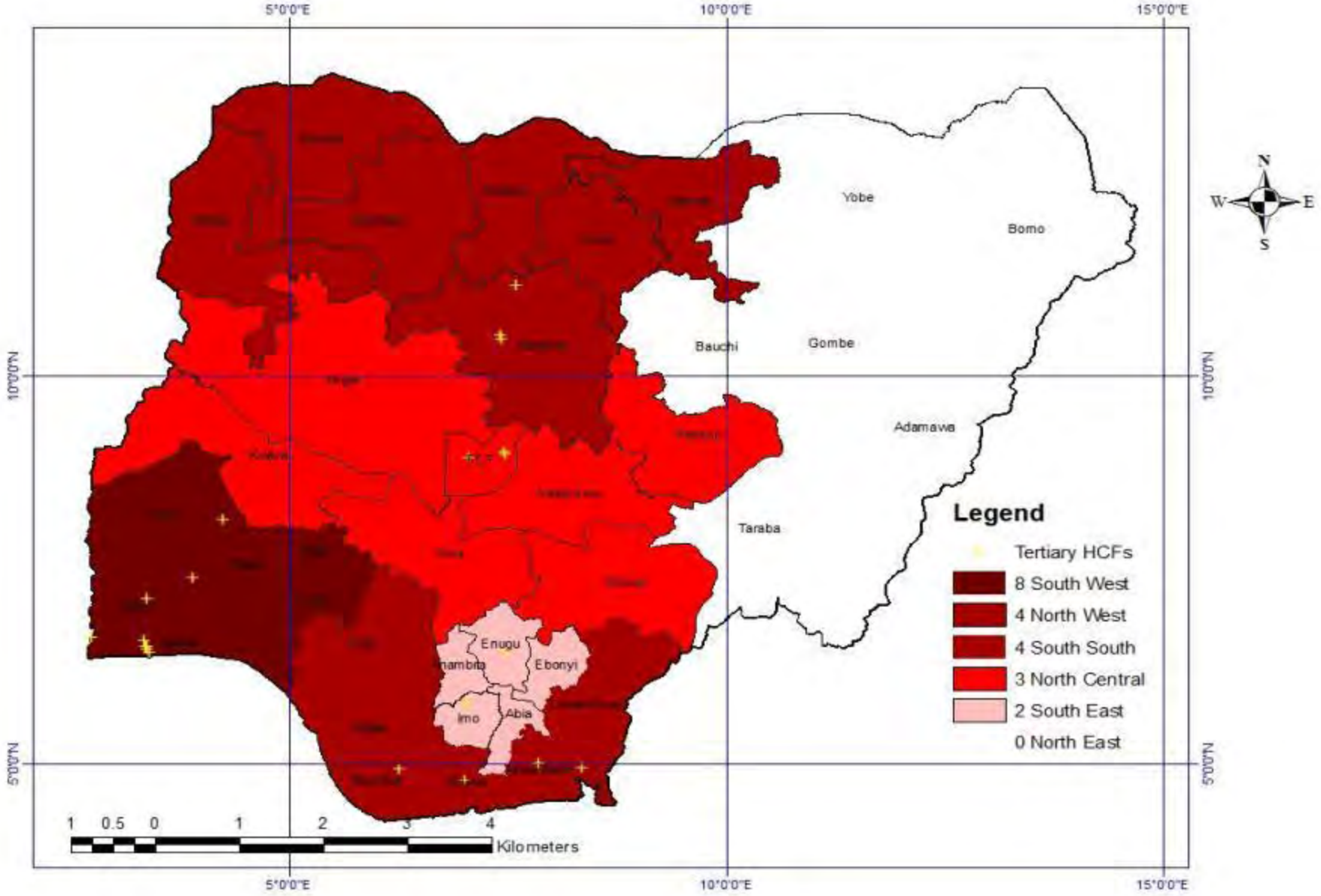
RESULTS - 4

Figure 4: Secondary HCFs Covered



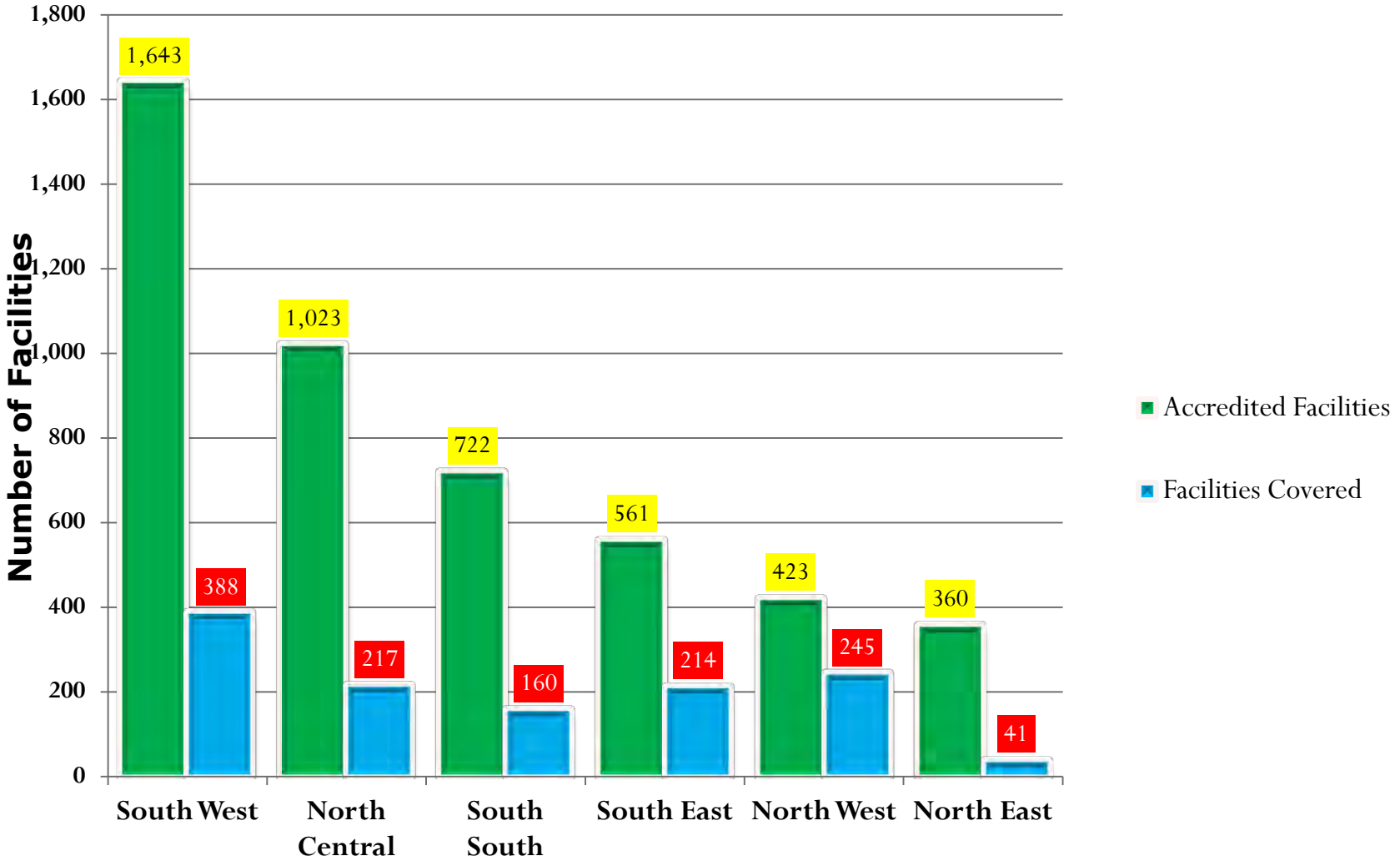
RESULTS - 5

Figure 5: Tertiary HCFs Covered



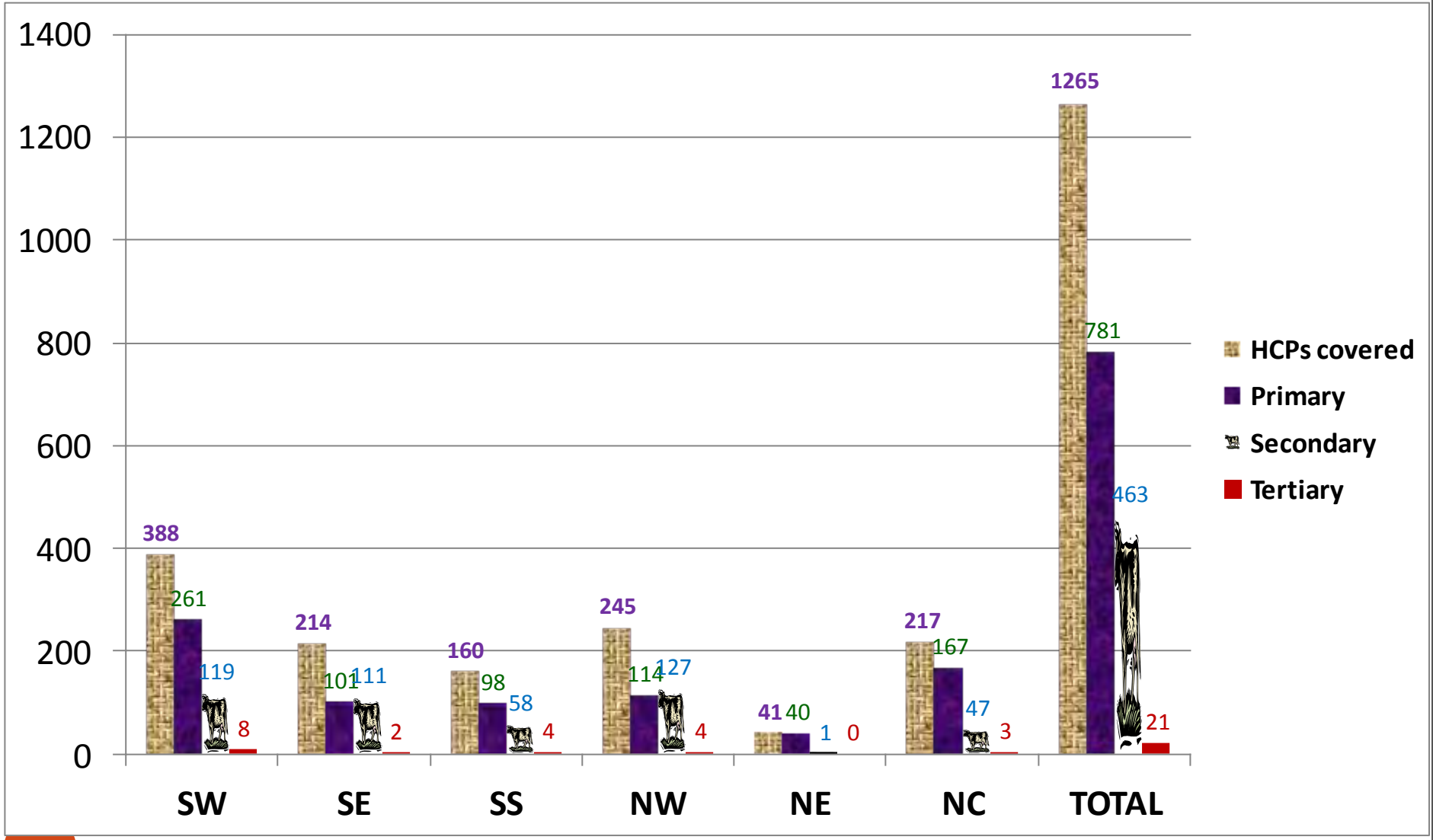
RESULTS - 6

COVERAGE SUMMARY (a)



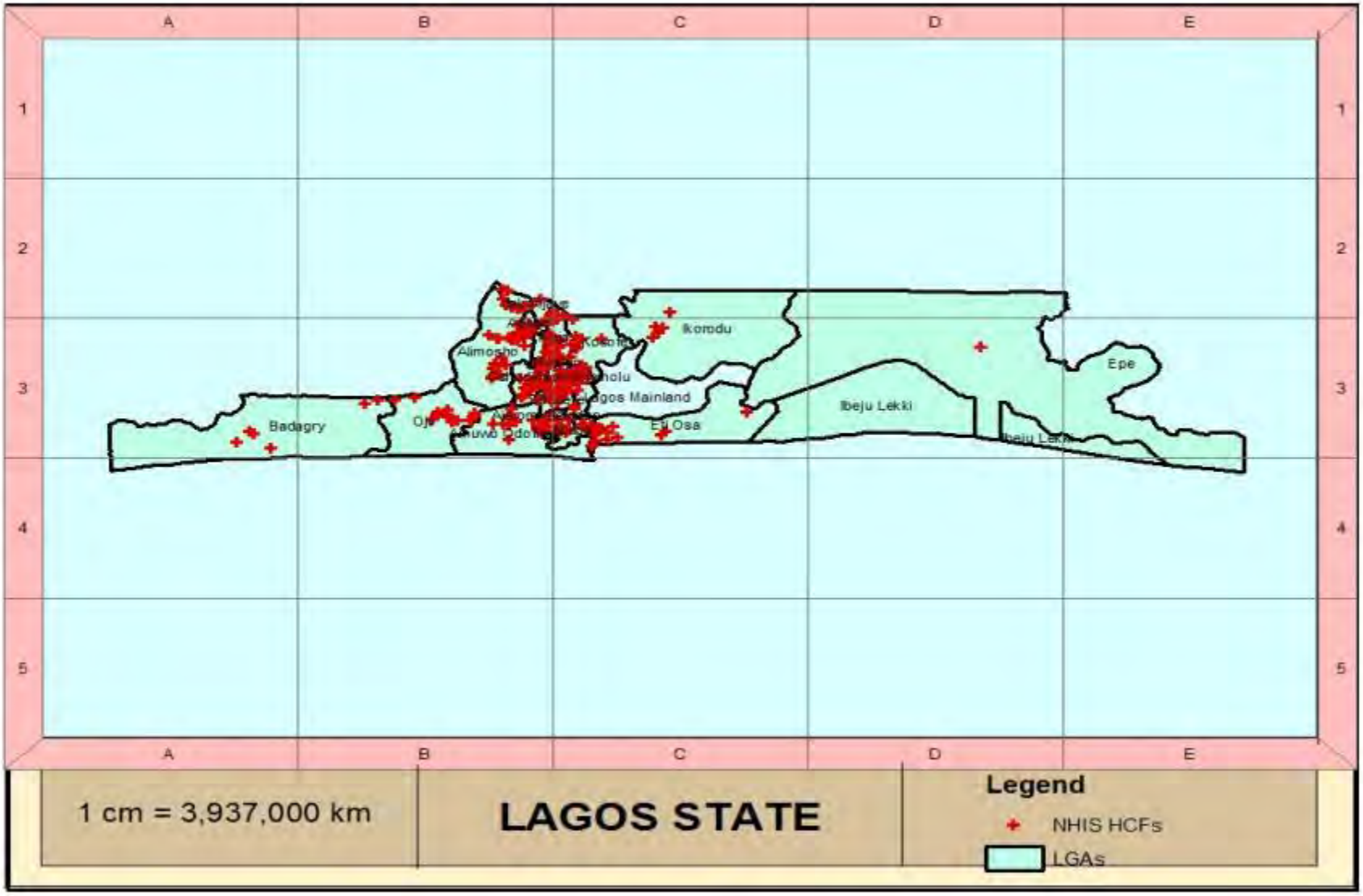
RESULTS - 7

COVERAGE SUMMARY (b)



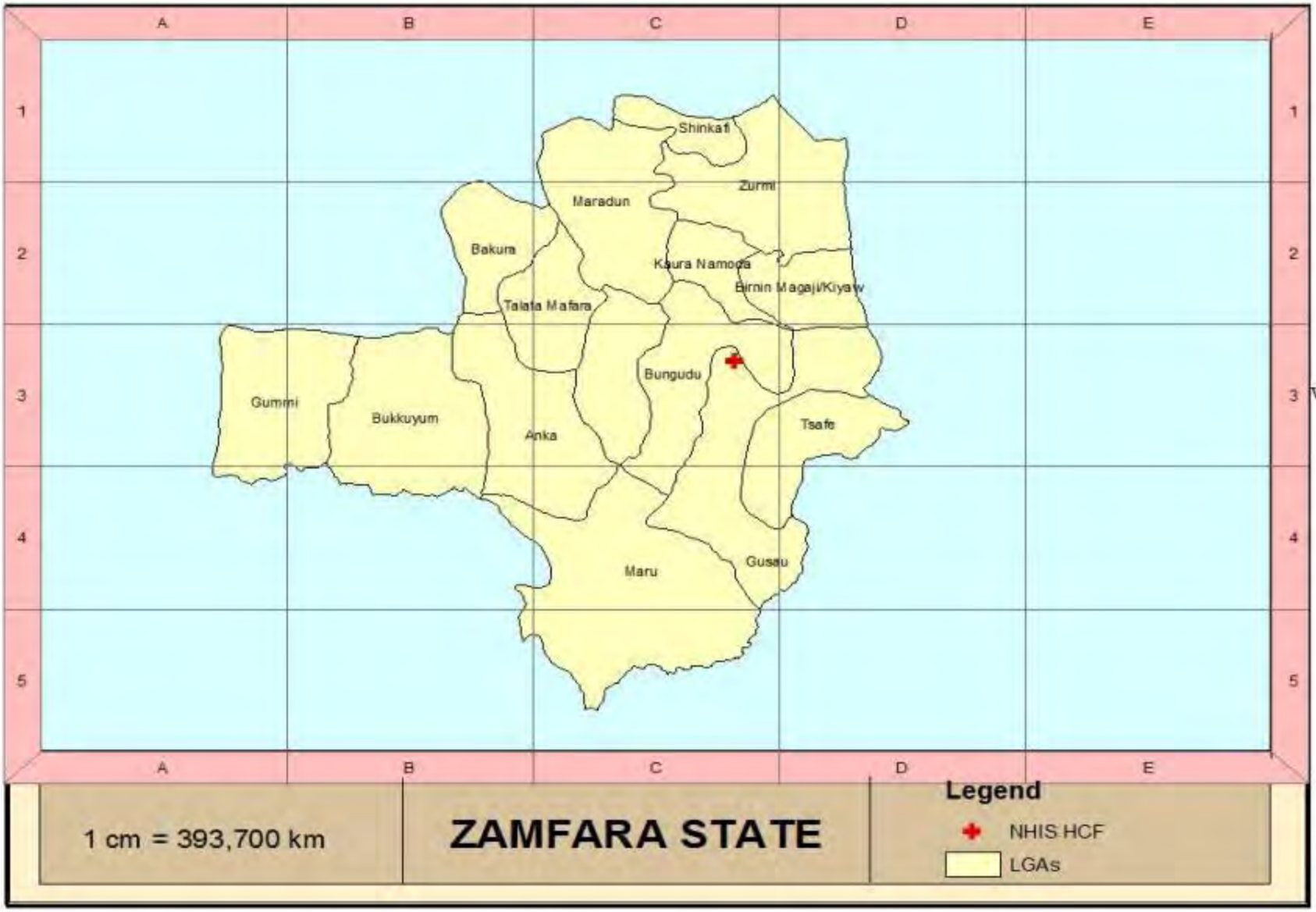
RESULTS - 8

Figure 6: Facilities covered in Lagos state



RESULTS - 9

Figure 7: Facilities covered in Zamfara state



CHALLENGES

- Irregular data collection
- Accessibility to some facilities
- In-security in certain parts of the country
- Lack of Current Base Maps
- Inability to use the database and maps for planning purposes
- High cost of Geograhic Data collection
- Using area centroids instead of exact locations could produce misleading results
- Limited GIS Training Courses in Nigeria

FURTHER WORK

- Ensure mapping of all HCFs in Nigeria, including those not yet accredited by NHIS
- Utilization of maps for planning purpose, especially accreditation of additional falicities in some zones
- Use mapping information for monitoring and evaluation
- Continuously build capacity of Staff on GIS mapping
- Ensure effective collaboration and coordination with other mapping agencies
- Procure additional equipment or software for use in GIS mapping

CONCLUSION

- Information obtained from GIS mapping is key to decision making, e.g. the results shown here indicates that NHIS should lift its embargo on accreditation of HCFs to enable it accredit more facilities in the northern part of the country

- The summit is a giant stride towards ensuring effective collaboration and coordination of organizations involved in GIS mapping, it is hoped that the process will be sustained

- Capacity building is very important to aid utilization of analytical tools, it is hoped that the summit will come up with an action plan to develop the manpower of organizations that use GIS for mapping purposes

THANK YOU

FOR LISTENING

Mapping HIV/AIDS Services in Nigeria.

Dr. Aderemi Azeez

HIV Division, Department of Public Health

Federal Ministry of Health

Mapping HIV/AIDS Services in Nigeria.

Presentation Outline

- Introduction/Background
- Project Broad and Specific Objectives
- Methodology
- Expected outcome

Introduction

- The NEED for Mapping:

  -Planning and management of HIV interventions

  Provide relevant information is available to decision makers and programmes at all level.

- The journey started more in 2006 (to cover only HCT)
- Expanded in 2008 to cover all aspects of HIV/AIDS response.
- Previous efforts at service availability mapping in the Ministry is not comprehensive.
- Stakeholders meetings held.
- Project started in 2010.

OBJECTIVES

OVERALL :

- The overall goal of the national mapping of HIV services is to provide a comprehensive picture of HIV/AIDS health service delivery and other HIV/AIDS linkages at all levels of care in the country.

SPECIFIC

- To provide national programme managers, decision makers, other producers and users of data with updated information on the distribution (including geospatial maps) of HIV/AIDS health sector services within the country.

- To provide update information for the scale-up of key HIV/AIDS related services such as HIV counselling and testing (HCT), antiretroviral therapy (ART), prevention of mother to child transmission (PMTCT), and community based health support services

- To provide evidence to Government (Federal, State Ministries and Local Government departments) for monitoring the implementation of HIV/AIDS national response including partners support

Attributes mapped

- Location (GPS) and locality
- Ownership, classification
- Presence of infrastructures (water source, electricity, no of functional beds etc),
- Types services provided including HIV/AIDS, TB & malaria, ANC, Blood transfusion and Laboratory).
- Human resource (Doctors, Nurses, Lab Sc.etc)
- Family Planning, M&E, Research and Logistics
- SOP/Guidelines awareness and usage

Methodology

- Compilation of list of facilities from the the States and LGA.
- Update and edit list before field that collection.
- Preparation of field data collection instruments- attribute and spatial information.
- Preparation of manual of instruction for field data collection.

Methodology Continues

- Training of field data collector- GPS reading and completion of questionnaire for attribute data.
- Field data collection- using Global Positioning System (GPS) instrument for spatial data and structured questionnaire for attribute data.
- Computer Data Capturing of field returns.
- Data cleaning and validation.

Methodology continues

- Plotting of spatial information using GIS software.
- Map editing.
- Drawing of Tabulation plan.
- Data Analysis and report writing.
- Printing of analytical report and Maps.
- Data dissemination.

Human Resources

- Central Level Training
- State Level Training
- Supervision of the Exercise

Data Analysis

- Soft Ware to be used for Analysis
- Tabulation Plan
- Table Generation
- GIS Data query

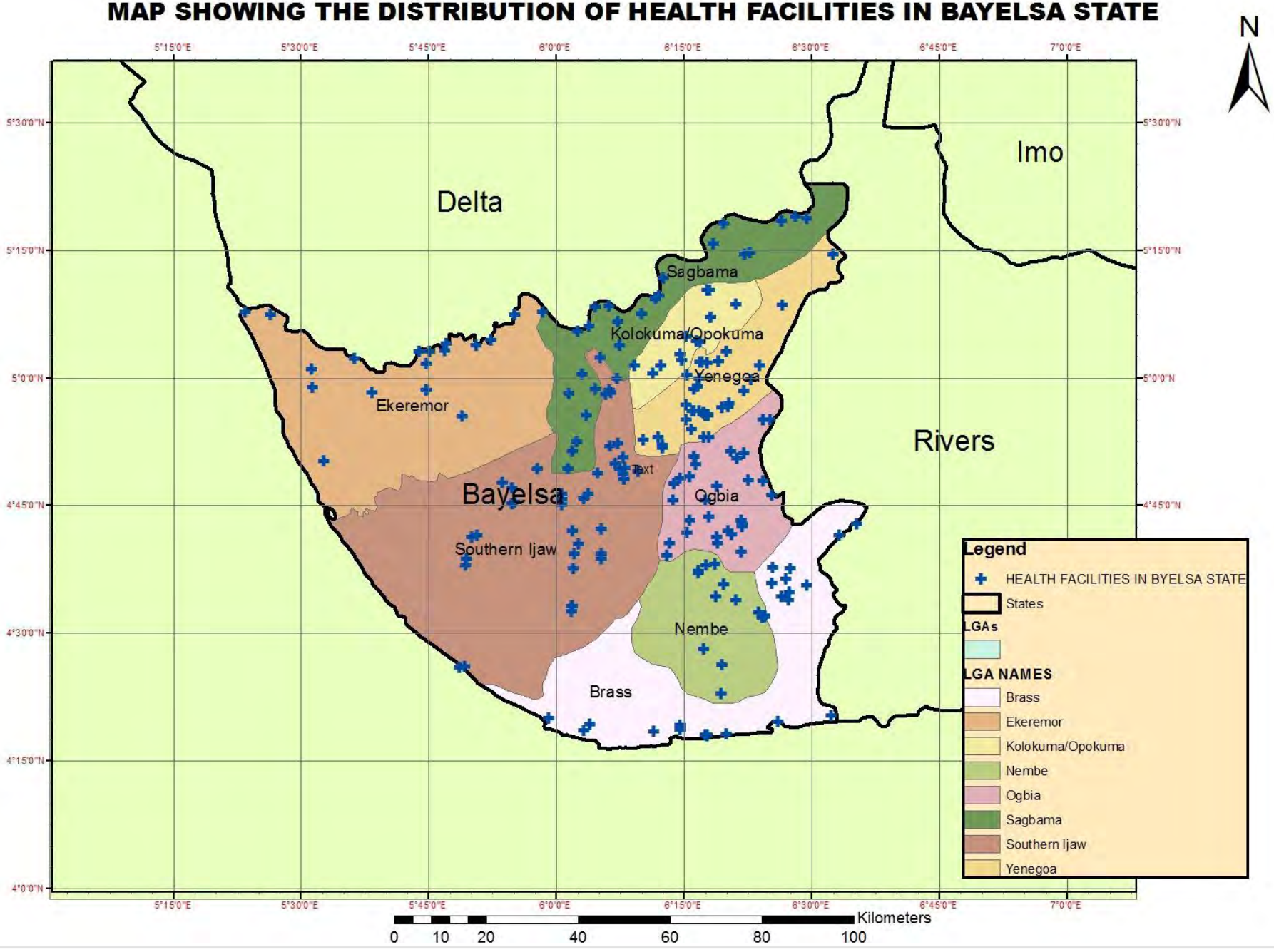
Quality Assurance Measures

- Validation of compiled list of facilities
- Monitoring and supervision of field data collection by stakeholders
- Data Cleaning and validation
- Presentation of data to data producers/users

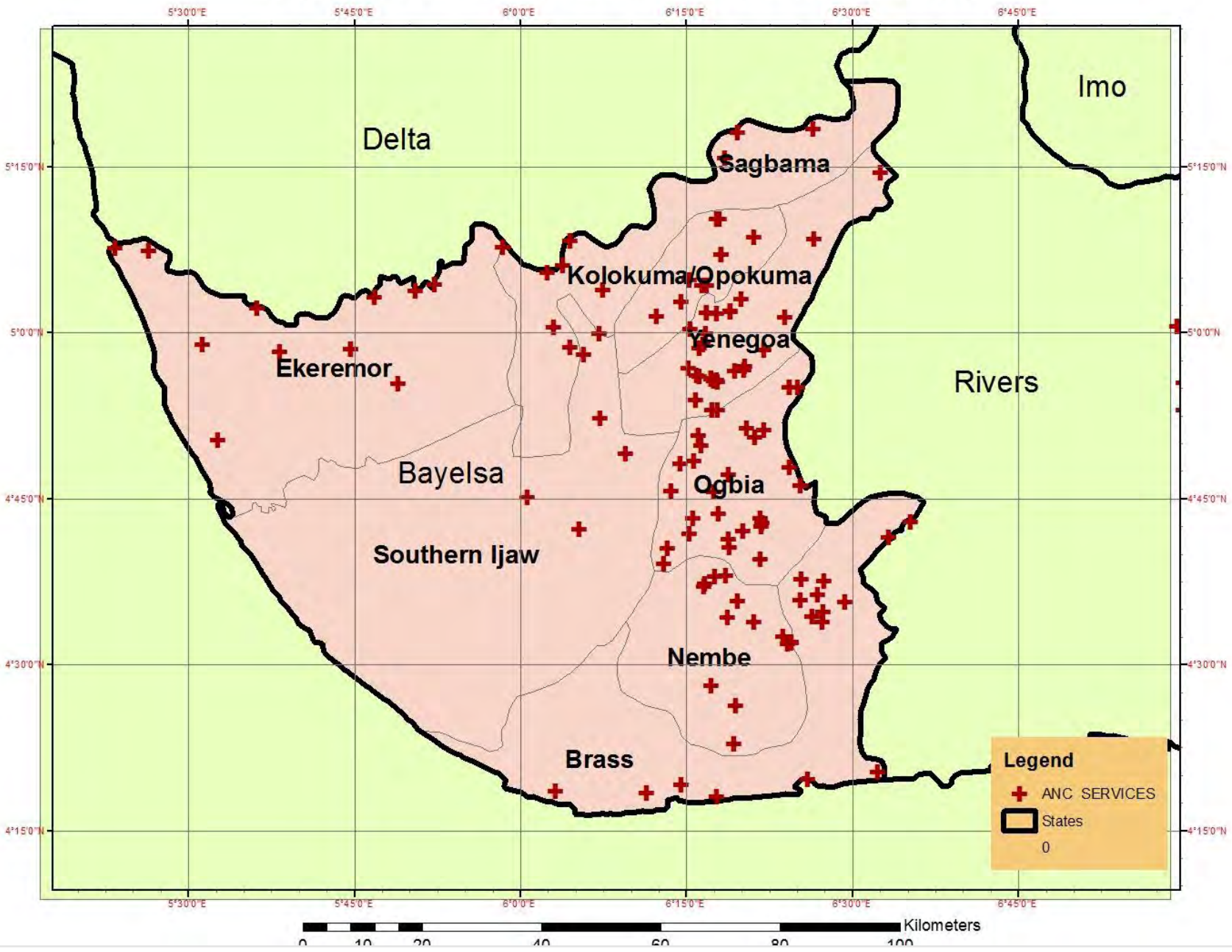
Expected Outcome

- Inventory of all service centres
- GIS Database
- Maps
- Analytical Reports

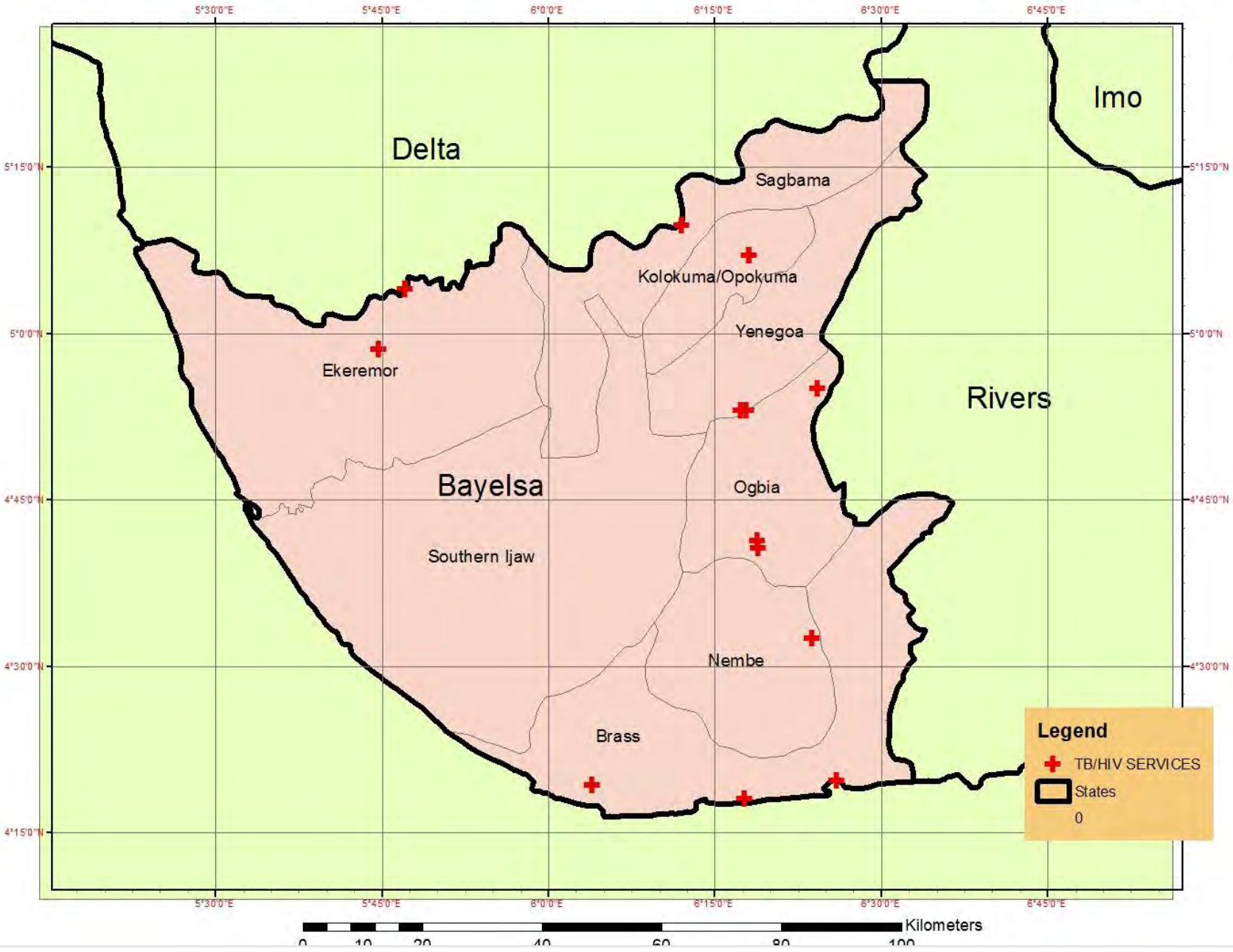
MAP SHOWING THE DISTRIBUTION OF HEALTH FACILITIES IN BAYELSA STATE



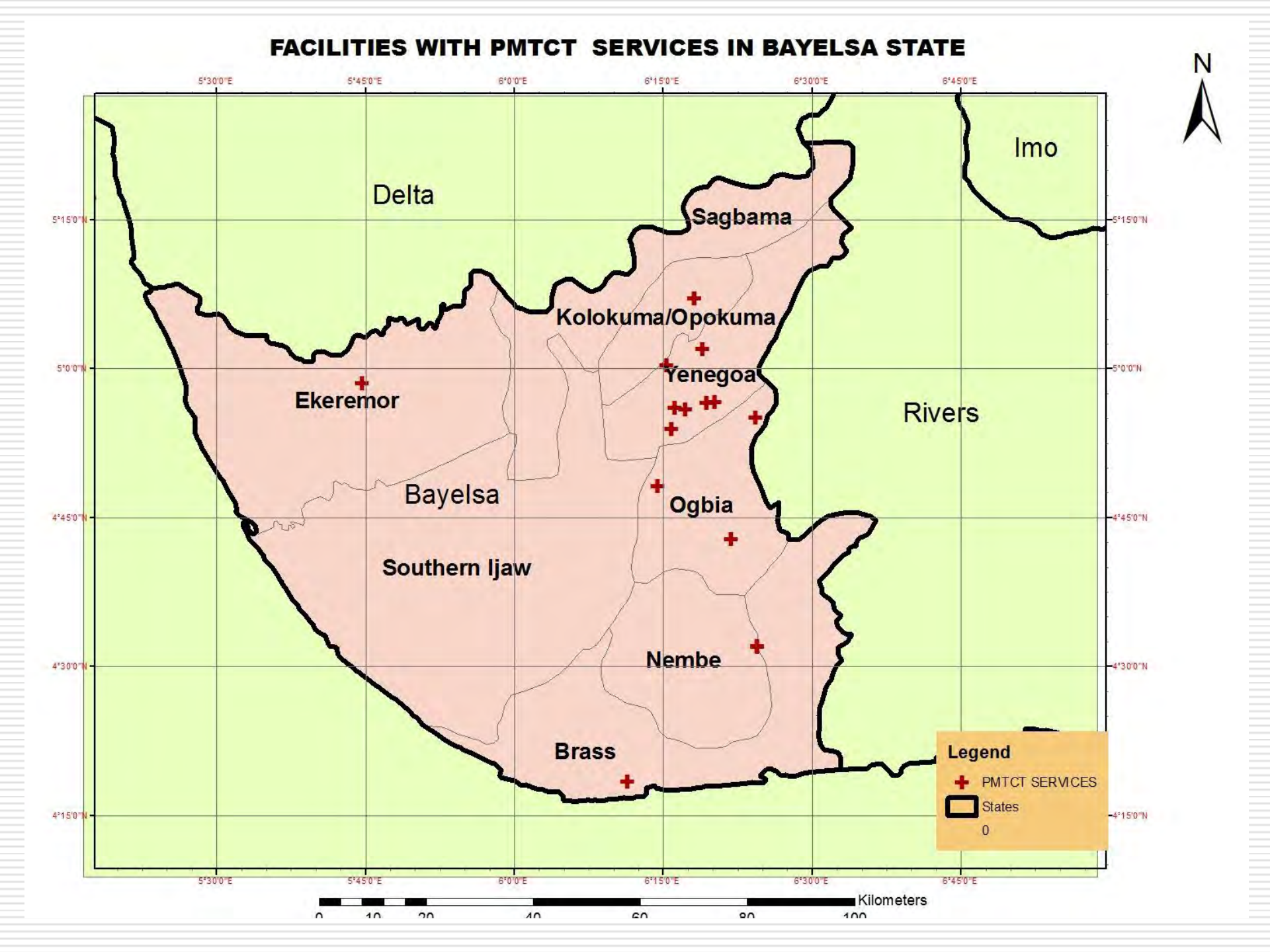
FACILITIES WITH ANC SERVICES IN BAYELSA STATE



LOCATIONS OF HEALTH FACILITIES RENDERING HCT SERVICES IN BAYELSA STATE



FACILITIES WITH PMTCT SERVICES IN BAYELSA STATE



NEXT Steps

- Complete the field work in the remaining states.
- Link up with SDI
- Training of the Federal and State Officers on GIS software

Acknowledgements

Special thanks to:

- WHO, UNICEF, UNAIDS (Nigeria)
- USAID (ABT Associates, Measure Evaluation)
- NACA

For their Technical support

THANK YOU

Service Availability Mapping NHMIS unit, FMOH experience

Mr. Balogun Adeleke
Department of Planning, Research and Statistics
Federal Ministry of Health

Introduction 1

- DPRS has the responsibility for ensuring the availability of information for Planning and other forms of decision making in the FMOH
- A major portion of this work is coordinated by the NHMIS unit
- One of the methods of generating such information is the use of Service Availability Mapping including GIS
- This is a synopsis of work undertaken in the NHMIS unit

Introduction 2

- The major function of the NHMIS is the roll out and maintenance of the NHMIS which includes routine general statistics from all health facilities in the country
  - Private
  - Public
- Due to this, NHMIS has developed a list of all health facilities in the country
  - The last was developed in 2000

Introduction 3

- Mapping of services can be provided if states are:
  - Report using the NHMIS tool
  - using the ICT software to collate data on their SDPS
- Unfortunately most reporting is still done manually and as such national level data is not available
- At federal level only aggregated data exists

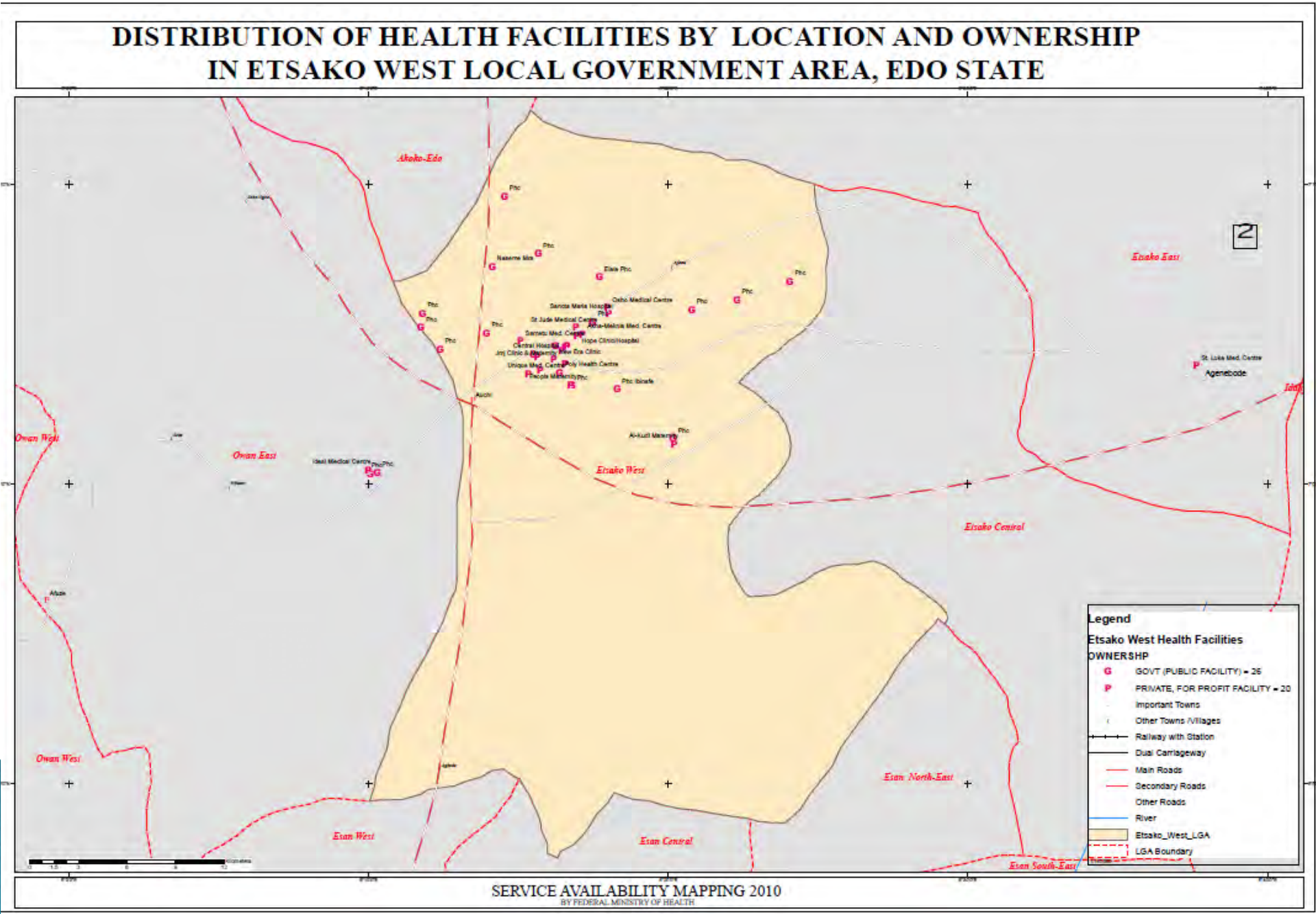
Service Availability Mapping by NHMIS unit

- Recently a number of initiatives have been taken place to improve the use of health information
- The creation of unique facility codes for each and every HF in the country
  - All public Sector health facilities
  - All Registered Private health facilities
  - Does not include PMVs
  - All facilities have facility codes for unique identification for databases and help linking various data sources

Actual Mapping Work

- With a grant from ADB, the DPRS has been able to map all service delivery points in some focal LGA
- This work was undertaken with technical assistance from the National Population Commission (NPopC)
- Field work was carried out in 2010 (FMOH & NPOPC)
- Analysis of work and generation of graphs was also with support from NPopC

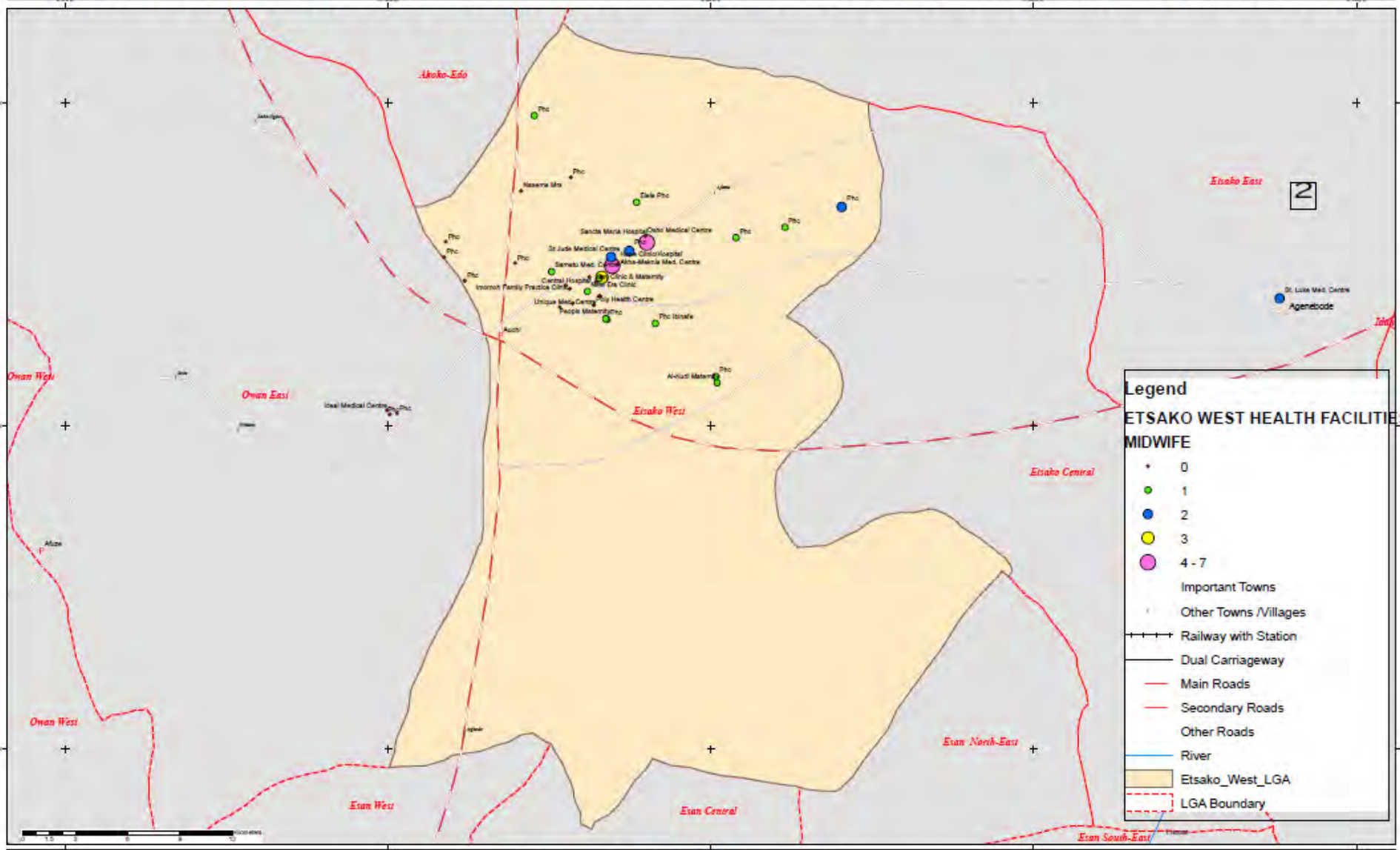
Results of Work Done



Infrastructure

- Previous Slide showed location of health facilities in Etsako by type of ownership
- Data on infrastructure includes:
  - Type (Private vs. Public)
  - Level (Tertiary, Secondary, Primary [PHC, Health post, Dispensary etc.])
  - Source and type of water supply, electricity, disposal system,
  - Types of equipment available
  - Types of SOPs and guidelines available

NUMBER OF MIDWIVES AVAILABLE IN HEALTH FACILITY IN ETSAKO WEST LOCAL GOVERRMNET AREA, EDO STATE

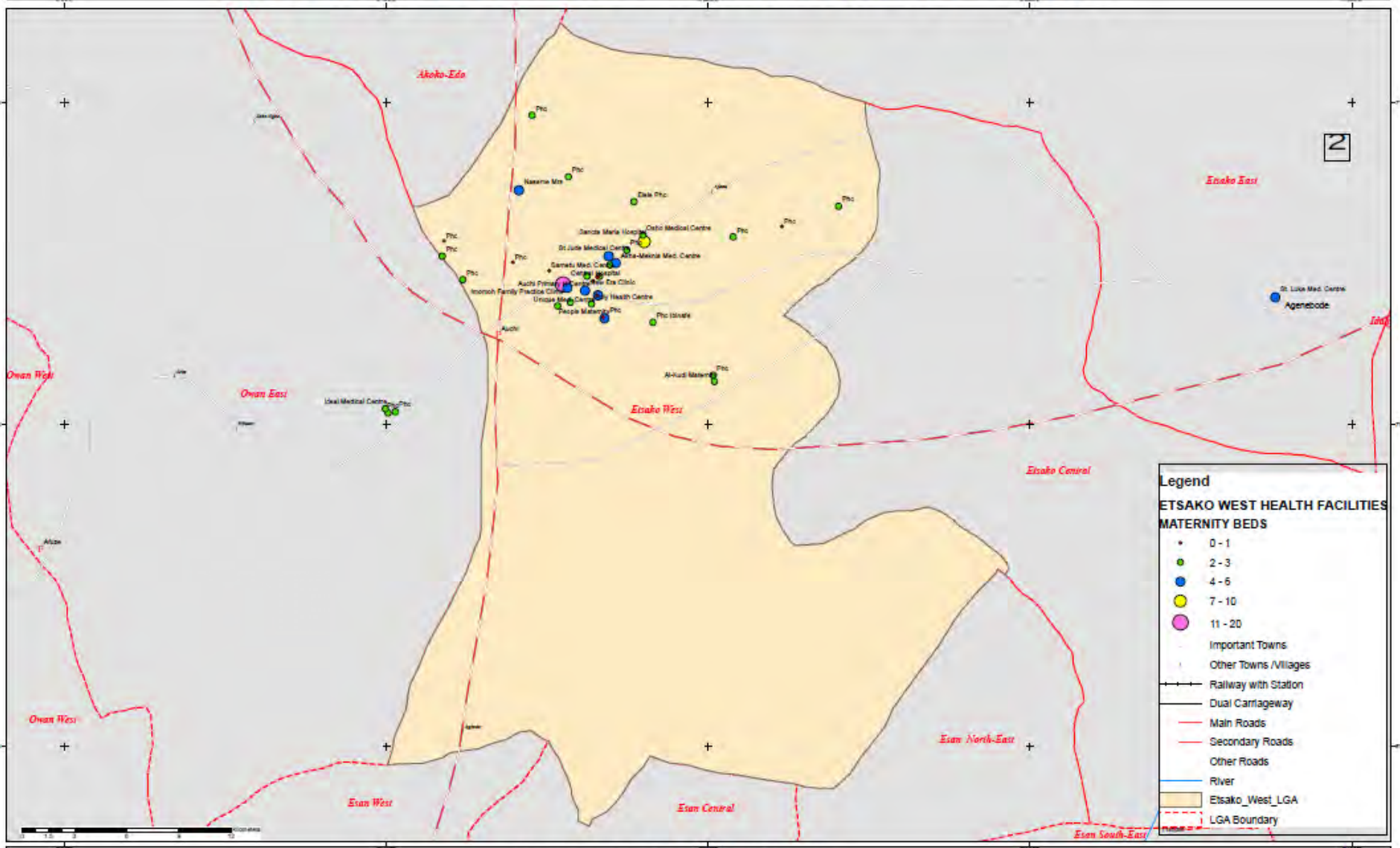


SERVICE AVAILABILITY MAPPING 2010
BY FEDERAL MINISTRY OF HEALTH

Human Resources for Health

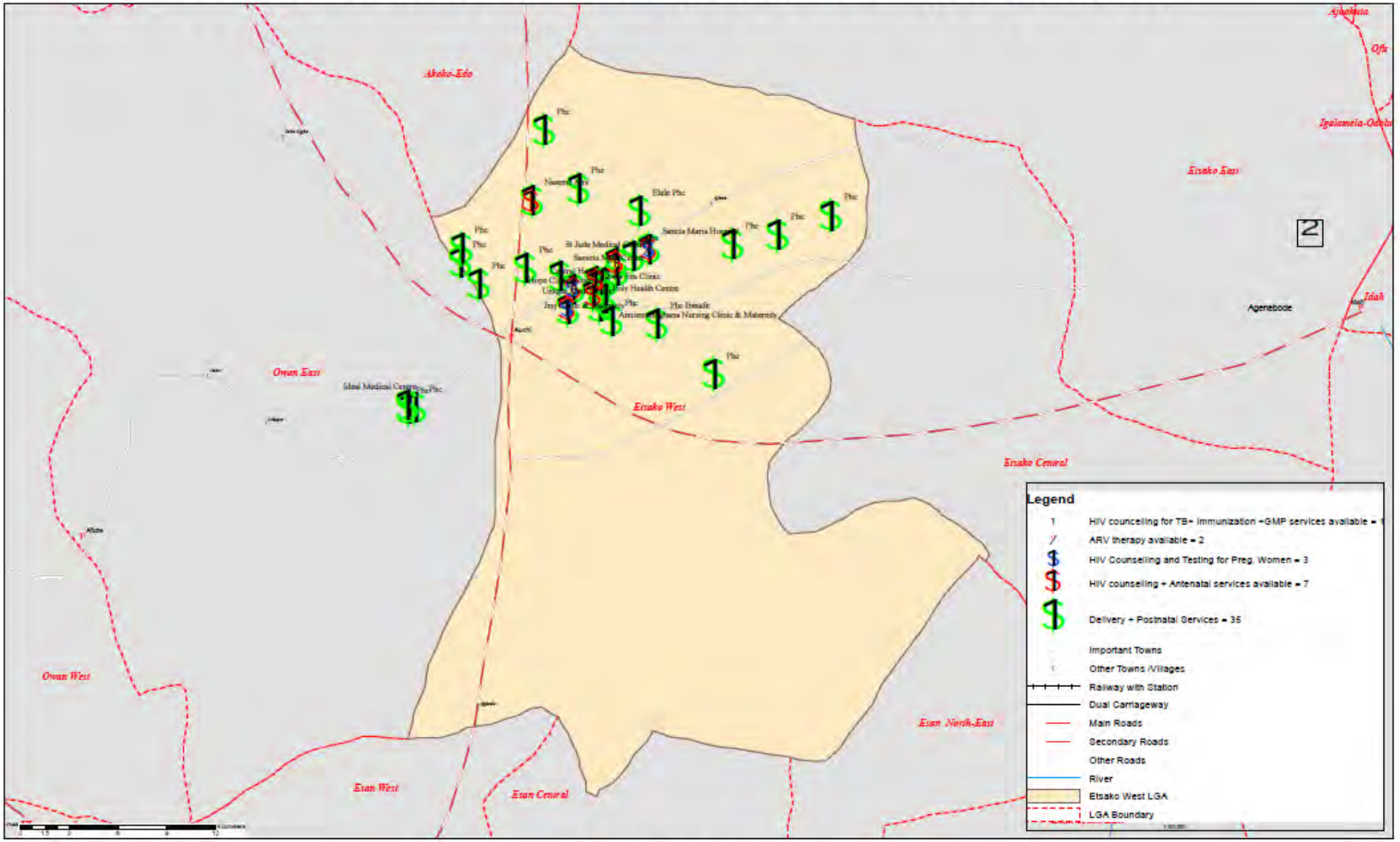
- Previous slide showed information on location of midwives working in Etsako
- Other data on Human resources include:
  - Types of various health professionals available
    - (Doctors, nurses, Pharmacists, Laboratory scientists etc.)
  - Types of training received (mainly MDG related)
    - PMTCT training, HCT training IMCI, LSS etc.)

NUMBER OF MATERNITY BEDS BY FACILITY TYPE IN ETSAKO WEST LOCAL GOVERNMENT AREA, EDO STATE



SERVICE AVAILABILITY MAPPING 2010
BY FEDERAL MINISTRY OF HEALTH

AVAILABILITY OF HEALTH INTERVENTIONS BY FACILITY TYPE IN ETSAKO WEST LOCAL GOVERNMENT AREA, EDO STATE



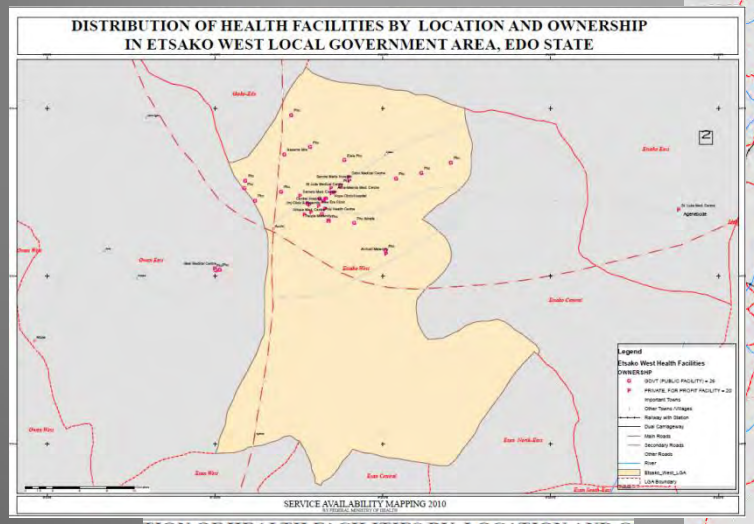
SERVICE AVAILABILITY MAPPING 2010
BY FEDERAL MINISTRY OF HEALTH

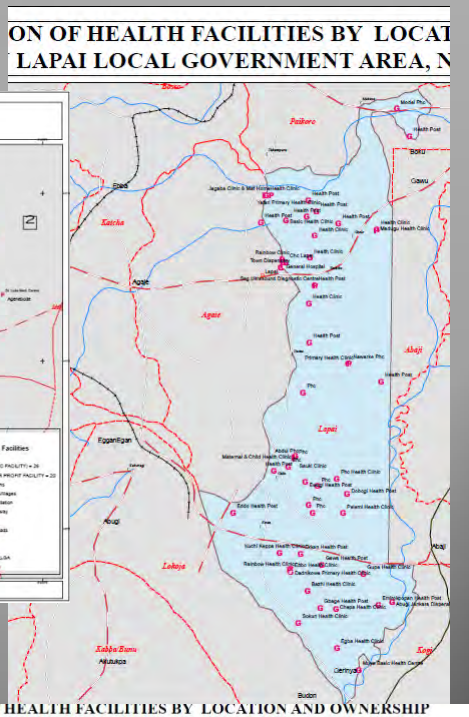
Information Available

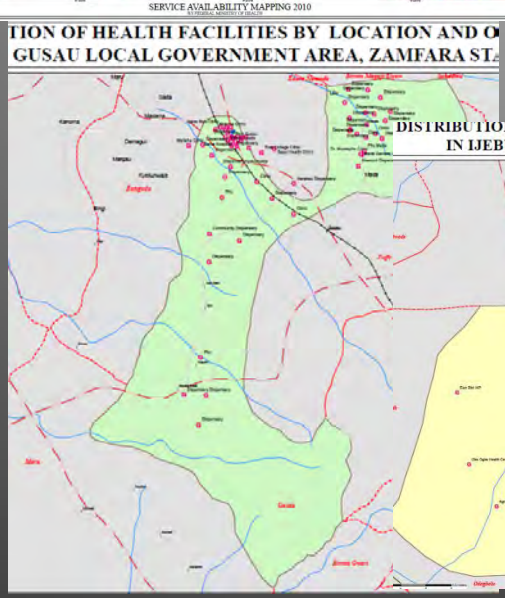
- Previous slides show service availability for some HIV services (ART, HCT, Deliveries)
- Data exists for most services related to the MDGs
- These include
  - Immunization services
  - Maternal Health (ANC, LDS, FP, GMP)
  - TB DOTS,
  - HIV Care (HCT, PMTCT, ARV etc.)
  - Health Systems (manpower, availability of drugs, HMIS,

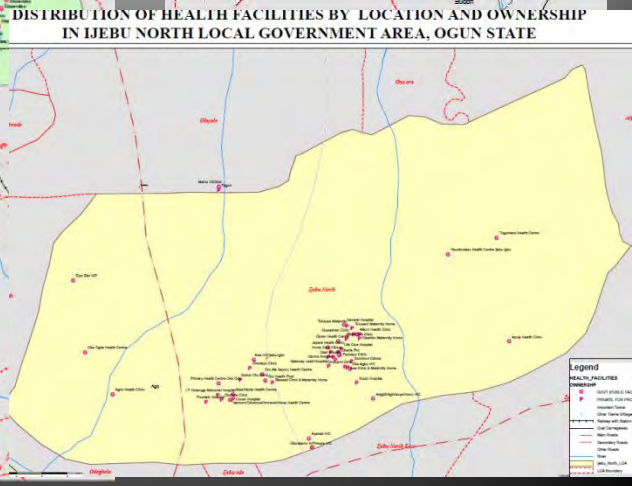
Location of Work till date

- The quantum of information is available for 6 LGAs in the country
- Etsako, Edo State
- Lapai, Niger
- Ijebu North, Ogun State
- Gusau,









Challenges

- Limited funds to continue the work
- Limited capacity for GIS in the ministry
  - Inadequate trained manpower
  - No Software in the ministry
- Limited dissemination of work already done
- Updating the present maps has not been possible

Lessons Learnt

- Developing relationships with national organizations with experience in GIS was rewarding
  - Built up FMOH capacity
  - Improved the quality of the final product
- The efforts to collect data are enormous and it will be defeated if the data is not available for use by decision makers
- Though data for the whole country is ideal no single entity can do this all…. Collaboration is vital
  - If we can merge data it will go a long way to getting a whole picture of the country
  - Using the facility codes should help in this regards

Way Forward

- Layering SAM and GIS on the NHMIS data base for better use of spatial information
- Developing means to ensure that work done is available to the decision makers and hence used
- Incorporating the health facility codes developed GIS done by all so that work can be linked and merged

THANK YOU

TOWARDS CREATING A STANDARD FORMAT FOR GEOSPATIAL DATA COLLECTION, ANALYSIS, AND DISSEMINATION FOR IMPROVED HEALTH AND SOCIOECONOMIC POLICY

BY
Alfa Mohammed,
Director, Cartography
National Population Commission

Objectives of the Summit

Having made these preliminary remarks, the objectives of the summit is line with the topic of this paper:

- "Towards Creating a Standard Format for Geospatial Data Collection, Analysis and Dissemination for Improved Health and Socioeconomic Policy".

  This paper will discuss:

- The constitutional mandate of the Commission and the progress made over the years by National Population Commission (NPopC) in the area of data collection, analyses and dissemination.
- Available geospatial resources of the Commission relevant to the health sector needs.
- Finally, the paper will elaborate on areas of collaboration and conclude with major challenges to the development of the National Geospatial Data Infrastructure (NGDI).

Mandate of the NPopC

- NpopC is one statutory body established by law.
- under section 153 of the 1999 Constitution
- In addition, it derives its mandate and powers from the following statutes and instrument:

(a) NPopC Act, Cap. N67 Laws of 2004

(b) Births, Deaths, etc (Compulsory Registration) Act, Cap. B9 of 2004; and

(c) Letter from the President of the FRN on Co-ordination of Population Activities, Ref. No. PRES/81 dated 19th September, 2000.

Mandate continues

- NPopC statutory duties and powers:

(a)Undertake National censuses, sample surveys etc.

(b) Registration of births and deaths

(c)Prepare and maintain a national framework for censuses and surveys

(d)Collect, collate and publish data on migration statistics;

(e)Formulates the National population policy

(f) Manages the Nation's Population information data bank

(i) Co-ordinate all population related activities

(j) Advise Mr President on population matters.

Implication of the mandate for Geospatial data Generation and dissemination

- The Commission has over the years collaborated with:

- OSGOF for the acquisition of administrative and topographic maps at different scales

- NASRDA for high resolution Imagery

- National Boundaries Commission for resolution of boundary issues.

Focus of the Workshop

The focus therefore is for me to indicate the thoughts of the Commission as I understand them, in terms of:

- Geospatial resources available to assist the health sector (data, software, hardware, technical expertise, training, etc.)
- Current or upcoming projects and geospatial resources that will be developed and/or needed by the organization, including opportunities for collaboration.
- Top National Spatial Data Infrastructure (NSDI) Challenges affecting the organization's ability to work effectively with the health sector.

Available Geospatial resources to assist the health

- About 600,000 EA and 120,000 SA Maps covering the entire Country
- Population Data for all States, LGAs and Localities in the Country.
- Shapefiles of Nigeria with roads, settlements, vegetation, water bodies and socio-economic facilities layers.
- Vital Registration (Birth, Death & Migration) Data since year 2000.
- Education, Health and other Socio-economic data.
- Comprehensive List of all Localities in the Country

Geospatial resources Continues

NPopC has a well established GIS laboratory in Cartography Department.

- Available resources in GIS Division
- Hardware: Servers, desktop Computers, Lap Tops, Printers, Plotters, Scanners, Photocopiers, and many modern handheld GPS
- Software: ArcGIS, Corel Draw, Macromedia Freehand, ERDAS Imagine and Microsoft office.
- Spatial Data: (i) Landsat Imagery (100% coverage of Nigeria),
  (ii) Spot 5 (90% with 60% almost cloud free),
  (iii) Ikonos, Quick Bird (1.0 & 0.6m Res. covering 534 Settlements in Nigeria),
- Methodologies that enhances spatial Mapping.
- Crop of Professionals in spatial data acquisition and management

Geospatial resources Continues

- Sample surveys conducted nationwide in the last 30 yrs

  - Nigeria fertility survey. 1981/82
  - NDHS (Nigeria Demographic and Health survey). 1990, 1999, 2003 & 2008
  - NEDS (Nigeria Educational Data survey). 2004 & 2010
  - Sentinel Survey. 2007
  - HIV/AIDS Surveillance Survey 2010
  - Malaria survey 2010
  - NURHI (Nigeria Urban Reproductive Health Initiative survey). 2011,

- Support many MDAs, NGOs, and International Organisations in planning for field data collection and analyses of field returns.
- Ministry of Health and other stakeholders are all aware of the relevance of the surveys in national planning.

Current or upcoming projects and geospatial resources that will be developed and/or needed by the organization, including opportunities for collaboration.

On going /proposed activities:

- Collaborating with OSGOF for acquisition of relevant digital maps
- With NASRDA for the acquisition of 2.5 m res and imagery for the review and update our EA database for future censuses and surveys.
- Harmonization of boundary issues with National boundaries Commission.
- World Bank grant, for Capacity building, specifically on DBMS and GIS software, and expansion of GIS hardware
- Providing mini GIS Laboratories in all the states of the country.

Action plan for future activities of the Commission

The Action plan for future activities of the Commission starting from 3rd quarter of 2011 to 2016 is itemized below.

- Finalization and publishing of Compendium of localities in Nigeria;
- Geo-referencing of all EA maps.
- Acquisition 0.5m or 0.61 and 2.5 m res. Imagery (NASRDA)
- Acquisition of relevant GIS software and hardware
- Procurement of digital topographical maps of 1:25000 – 1:50000;
- Workshops and seminars on review of EAD training and reference manual;
- Capacity building;
- Procurement of Consumables
- Establishment of mini GIS lab in all state offices and FCT
- Sensitization workshops and seminars.
- Conduct of fieldwork for EAD review
- Production of updated and new EA maps for the Census 2016.

Major challenges to development of the NGDI and creation of an action plan to help address the challenges.

There is abundant spatially referenced data or 'reference-able' data produced by

- OSGOF,
- National Planning Commission,
- NPopC,
- National Bureau of Statistics,
- FMOH,
- Water Resources,
- Min of Works, Housing and Urban Development,
- National Boundaries Commission, all other MDAs, NNPC, SPDC and other Upstream oil and Gas industry,
- The Military, All State Governments, NGOs, many other private organizations, etc. The list is endless.

There is already a Committee handling NGDI. The Committee only needs to sit up and have discussions with all the stakeholders to resolve the following challenges.

Major challenges Continue

The major problems include:

- Inability to break down the rigid walls created by stakeholder-organizations towards data sharing.
- Inability to provide a common platform geo-data acquisition.
- Lack of uniform data definition for metadata standardization
- Delay in defining data layers for NGDI
- Inability to agree on key agencies to be responsible for different data layers
- Inadequate government support for NDGI
- Poor wages paid spatial data acquisition and management professionals.

What should be done

- NGDI Committee to be more proactive
- All stakeholders be identified.
- NGDI committee to liaise with the stakeholders on a roadmap towards eliminating duplication of efforts,
- There should be standardization of spatial data content
- And also a standardised format for distributable outputs like vector and raster formats, to aid data compatibility and comparability.

Conclusion

Finally, this paper has attempted to present:

- The purpose for which NPopC was established.
- The Achievement of the Commission in areas of data provision for Health/public/private sector policy planning
- The capacity of the Commission through the Cartography Department in generating spatially referenced data.
- The action plan of the Cartography Department towards providing spatially referenced work assignment units (Enumeration areas/clusters) for collection of population, health and socioeconomic data;
- Areas of possible collaboration with other stakeholders.
- Areas of assistance by development partners
- And the need for streamlining geospatial data collation to eliminate duplication of efforts, and
- Providing common referencing system as a platform for geospatial data production.

Thank you for listening.

Nigeria HealtH aNd MappiNg SuMMit 2011:

"Enlisting National Mapping Agencies in Improving Health Outcomes"

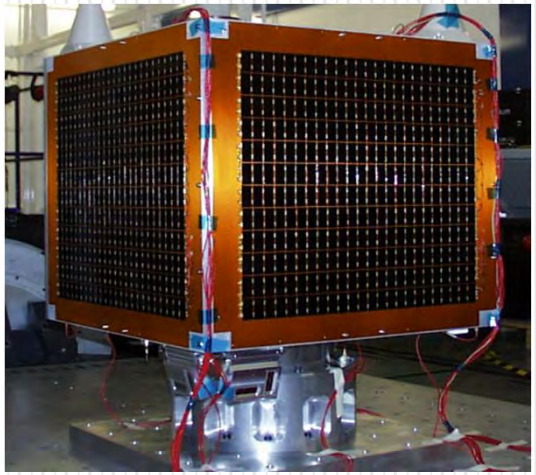
Nigeria in Space – an Impetus for Improved Health Outcomes

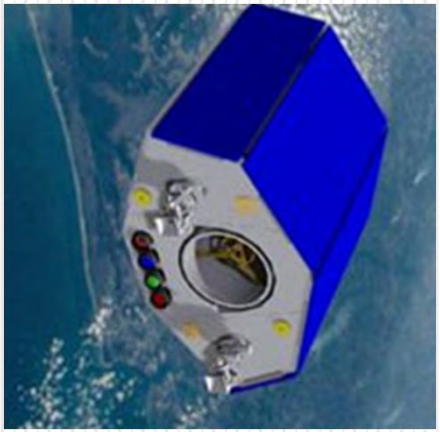
Ganiy I. Agbaje, PhD, fnis

Director, Mission Planning & Data Management

National Space Research & Dev. Agency

gagbaje@nasrda.net





18 – 19 October 2011, Reiz Continental Hotel, Abuja, Nigeria

Introduction - MDGs

Goals to Achieve by 2015

- Goal 1: Eradication of Extreme Poverty and Hunger
- Goal 2: Achievement of Universal Primary Education
- Goal 3: Promotion of Gender Equality and Empowerment of Women
- Goal 4: Reduction of Child Mortality
- Goal 5: Improvement of Maternal Health
- Goal 6:Combat HIV/AIDS, Malaria, and other diseases
- Goal 7: Ensure Environmental Sustainability
- Goal 8: Develop a Global Partnership for Development

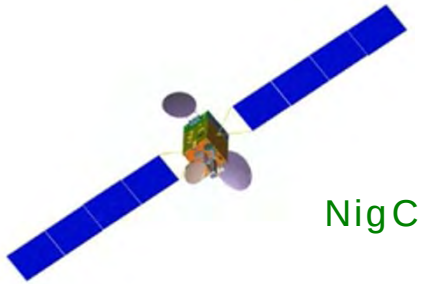
Vector Diseases Control Requirements

- Estimation of Disease burden
- Monitoring of Disease trend
- Identification of Risk Factors
- Planning
- Allocation of Resources
- Implementation

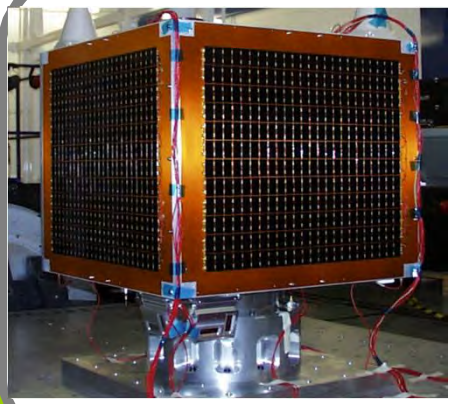
The Common trend in all the requirements is – “Geography/Location”

Earth Observation, Communication, and Navigation Satellites plays vital role in the collection & dissemination of information in a very timely manner providing crucial inputs required for carrying out operationally viable strategies.

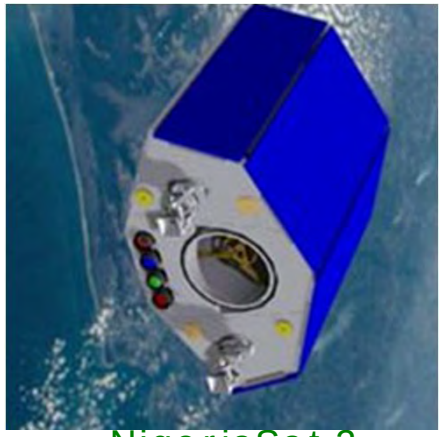
Nigeria's Space Infrastructure



NigComSat-1R



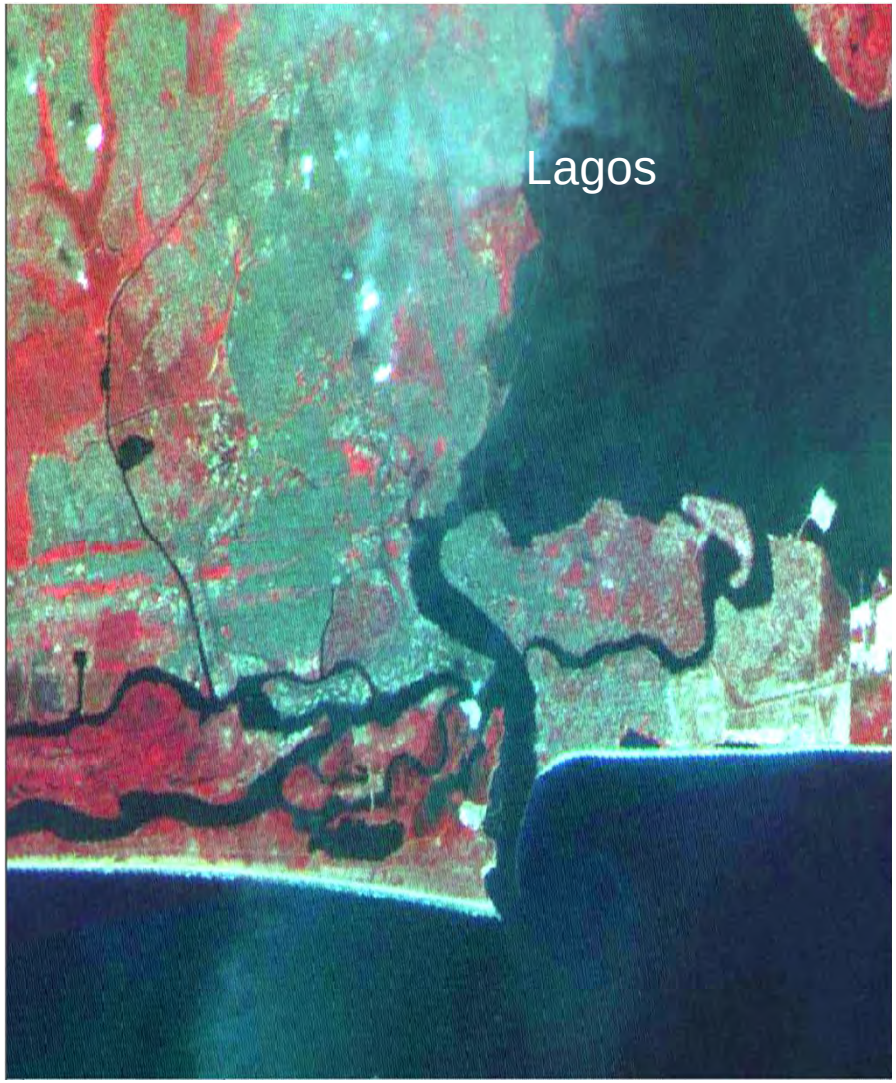
NigeriaSat-1

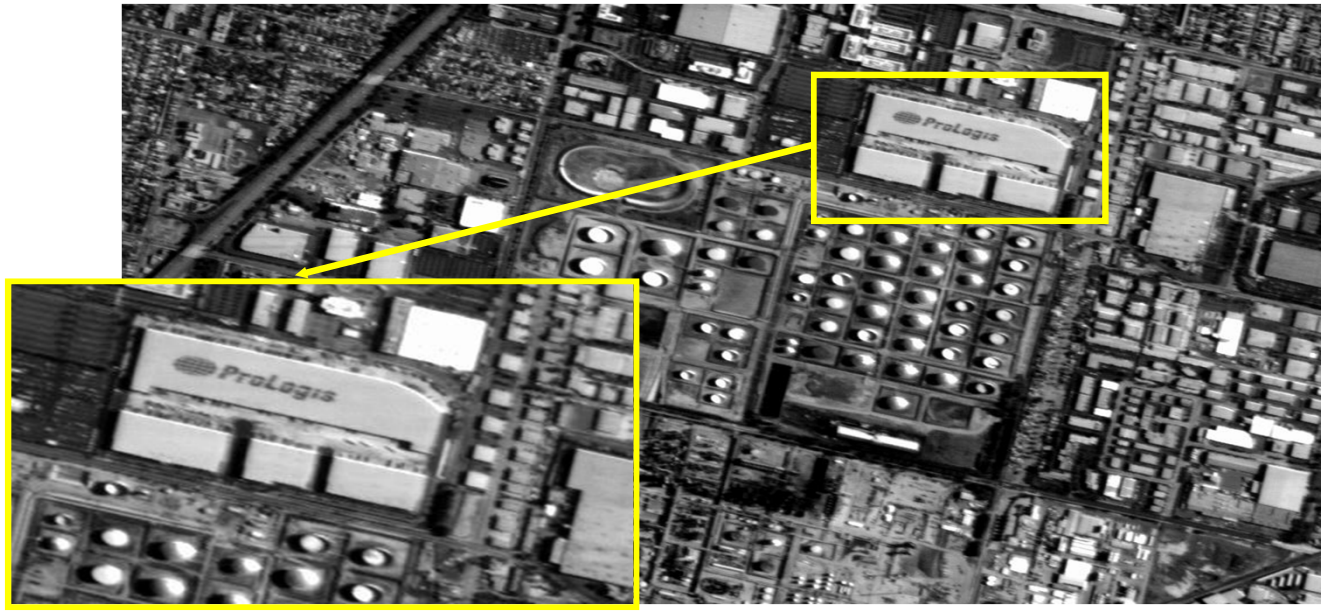


NigeriaSat-2

NASRDA's Satellite Imageries

NigeriaSat-1





Beijing -1 4m pan ≈
Nigeriasat-2 Multi

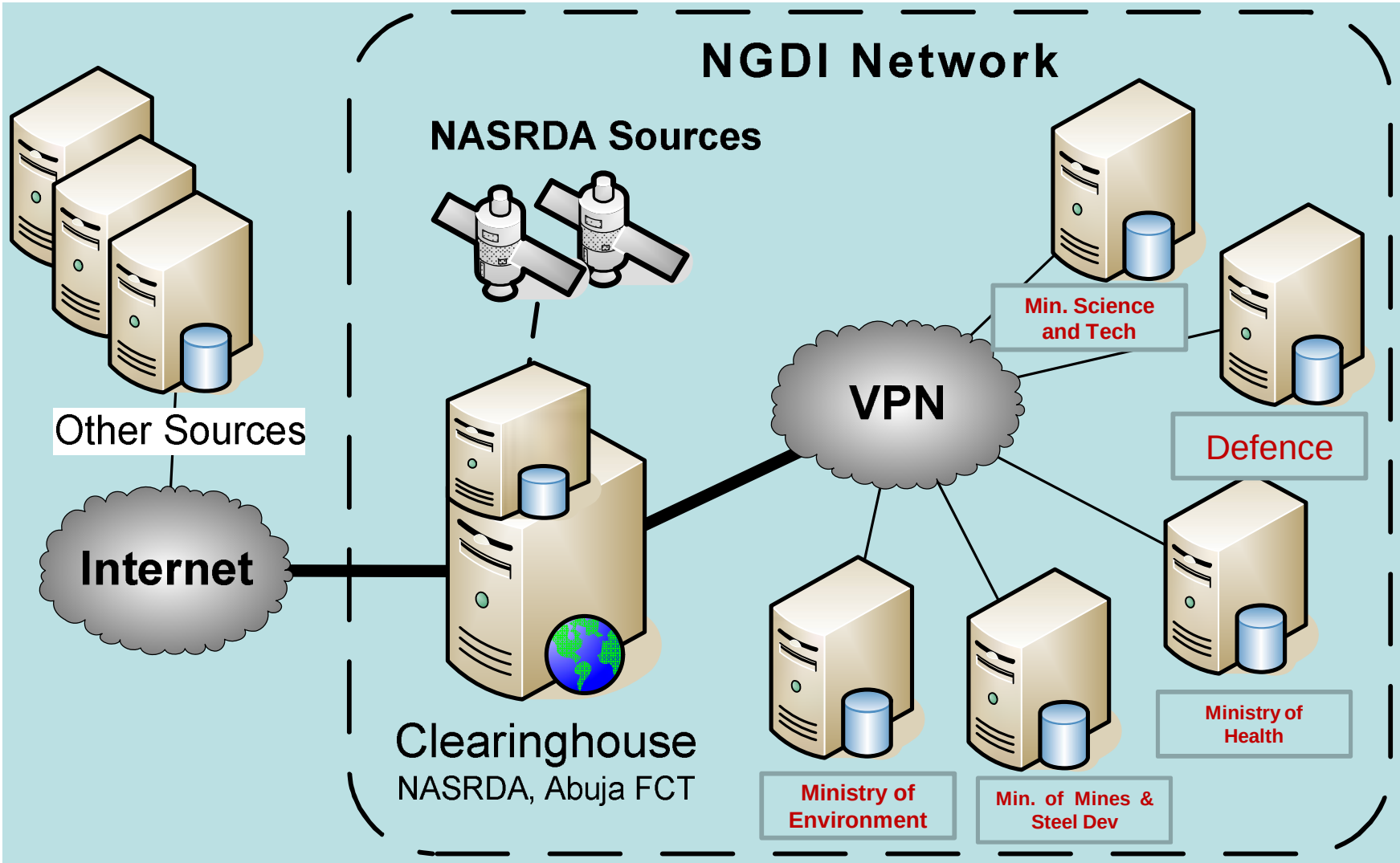
Nigeriasat-X

UK-TOPSAT (2.5m –Pan) ≈ Nigeriasat-2 – Pan

National Geospatial Data Infrastructure [NGDI]

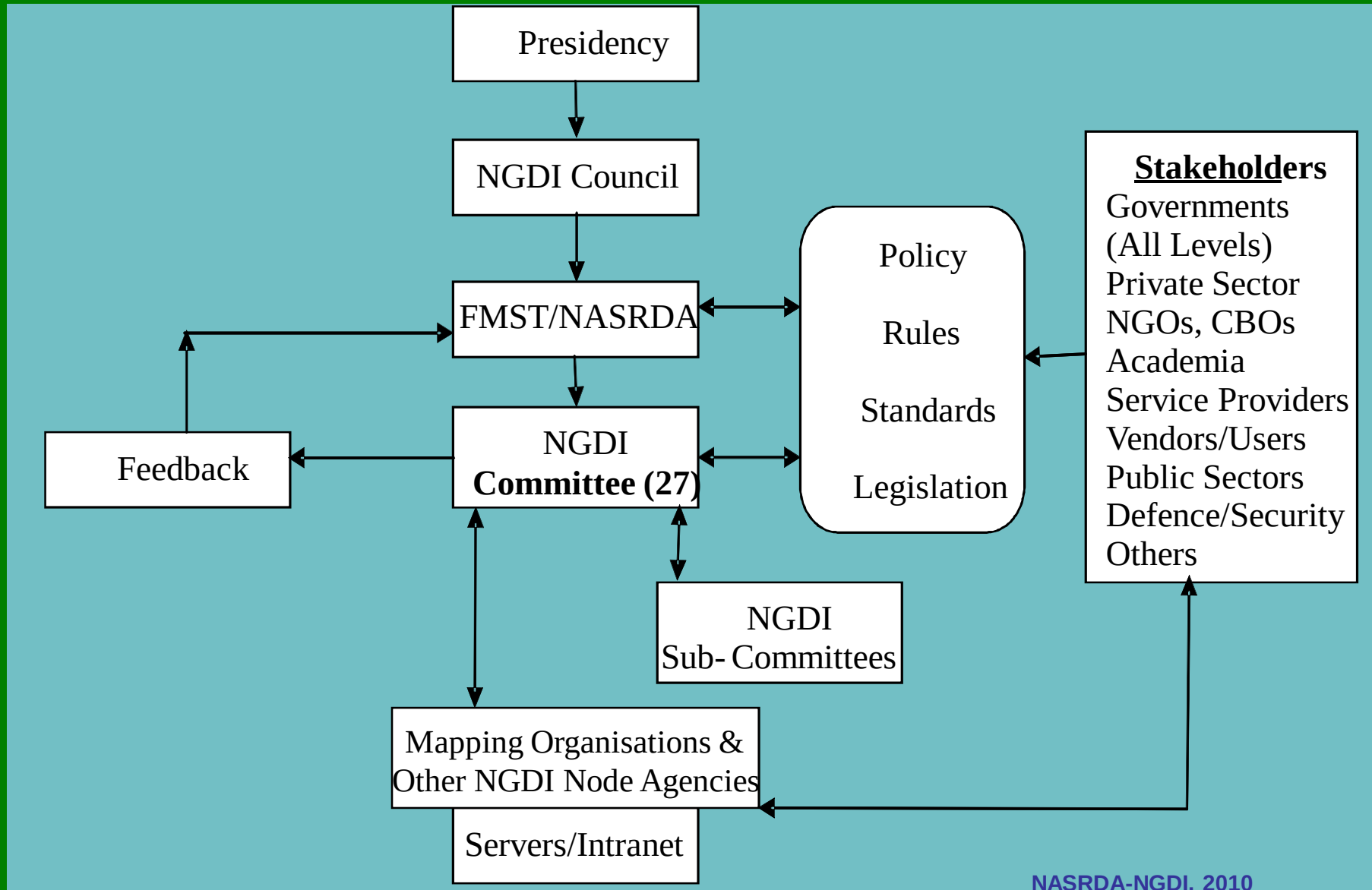
- NGDI Coordination by NASRDA - 2002
- NGDI Policy
  - National Drafting Committee - 2002
  - National Stakeholders' Workshop – 2003
  - National GI Policy – 2003 (www.nasrda.net)
- NGDI Concept
  - Discovery, Harmonisation and Standardisation of geospatial data production and management, and the provision of a platform for data sharing thereby eliminating data duplication and conserving cost and time spent in producing already existing data.
  - To promote greater awareness and public access to standard and coordinated geo-spatial production, management and dissemination by all sectoral institutions with linkages to private sector,

NGDI- Nigerian Model

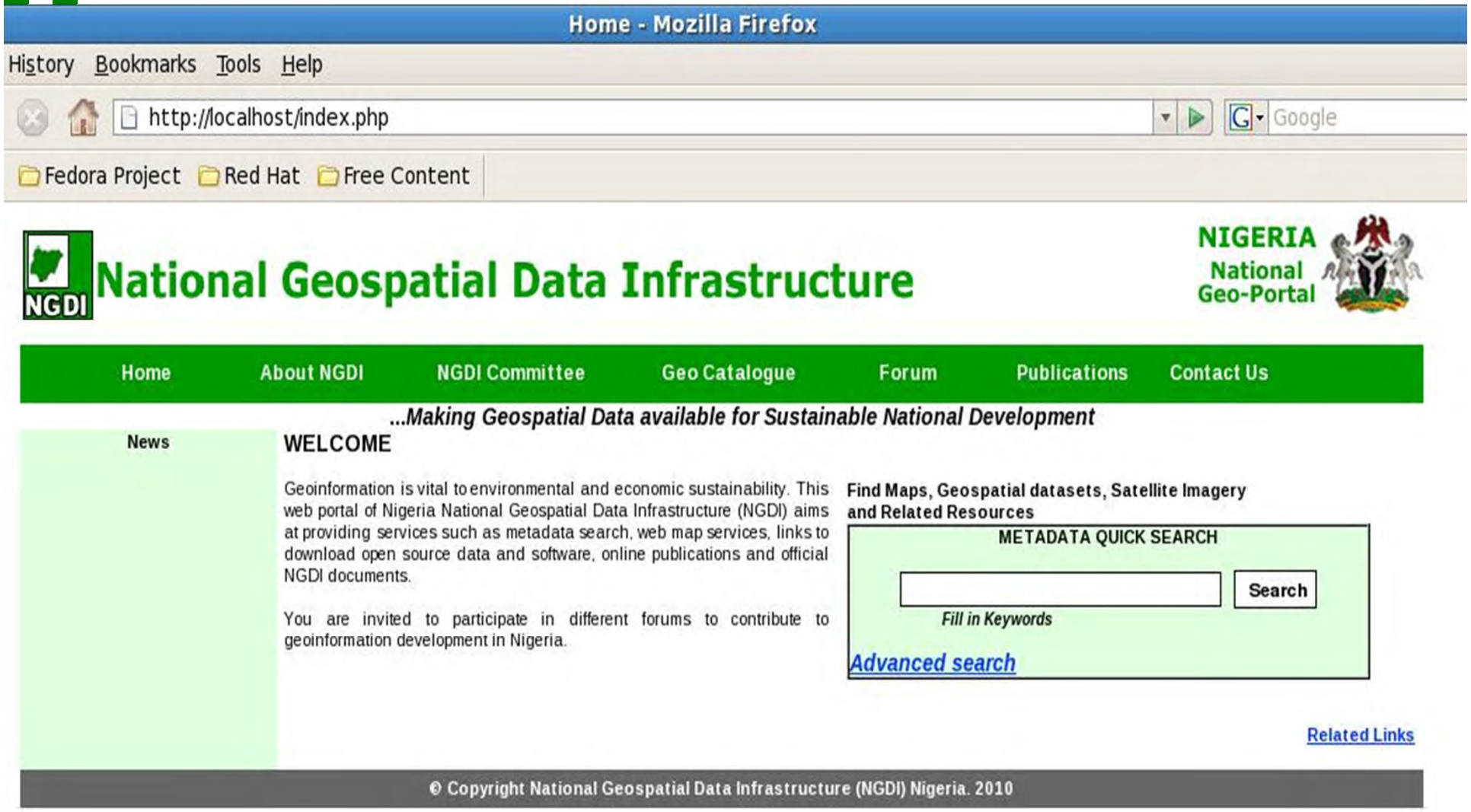


Source: Agbaje *et. al.* 2008

NGDI Organisational Framework

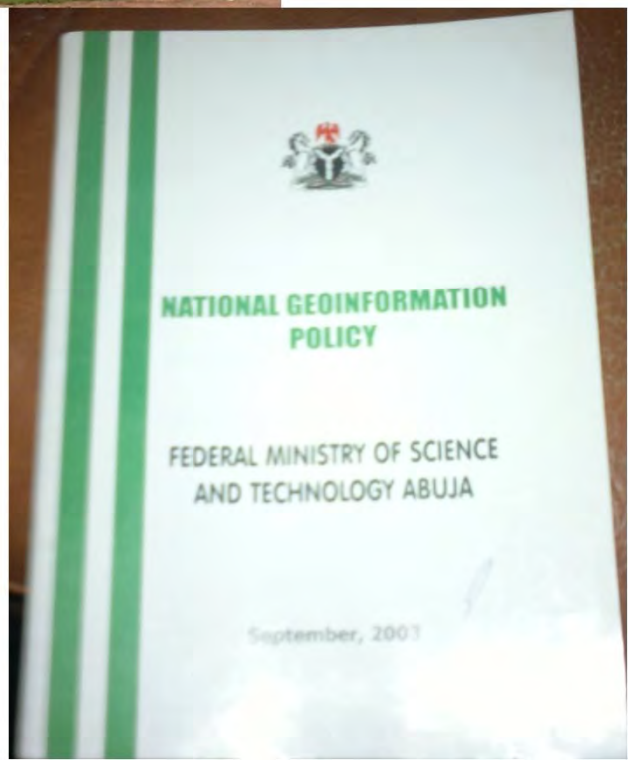


www.ngdinigeria.gov.ng



NGDI/Data Bank Building

CROSS SECTION OF NGDI TRAINING PARTICIPANTS FROM DIFFERENT MINISTRIES



Telemedicine Project

- Telemedicine and Tele-education is one of the target applications of the Nigerian Communication Satellite (NIGCOMSAT-1)

- Hughes VSAT equipment, Polycom video equipment and AMD telemedicine equipment, are installed in the telemedicine mobile unit shown below:

Boroffice et al., 2008

Possible Areas of Collaboration

- Hands-on Capacity Building – GeoAppsPlus Ltd
- Provision of Relevant Geospatial Datasets
- Collaborative health research projects – spatial analysis
- Technical experts – Consultancy – database creation
- Health Information System as NGDI Node;
- Health Data Consultative Forum

NGDI DEVELOPMENT CHALLENGES

- Yet to be recognised by the drivers of our policies as an integral part of the national strategy or as a critical resource for sustainable national development objectives

- Adequate funding

- Lack of Awareness - traced to low level of geo-literacy among the general public and difference in knowledge and interpretations giving to SDI by the GIS professionals.

- Capacity building

- Personnel and

- Technological challenges

Conclusion

- The application of GIS and the development of NGDI is central to our effort to eradicating poverty, achieving food security, fight diseases, such as malaria, tuberculosis and HIV/AIDS, reverse environmental degradation and increase the pace of industrialization.
- NGDI will enable government to target beneficiaries of development programmes more effectively.

Finally

- We must use the indigenous experts, build on existing human capacity, and COLLABORATE with relevant Agencies to arrive at informed DECISIONS as it relates to health and well-being of the populace.

Thank You for Your Attention

Dr. Ganiy I. Agbaje
gagbaje@nasrda.net

OFFICE OF THE SURVEYOR GENERAL OF THE FEDERATION

8 YAWURI STREET GARKI II ABUJA.

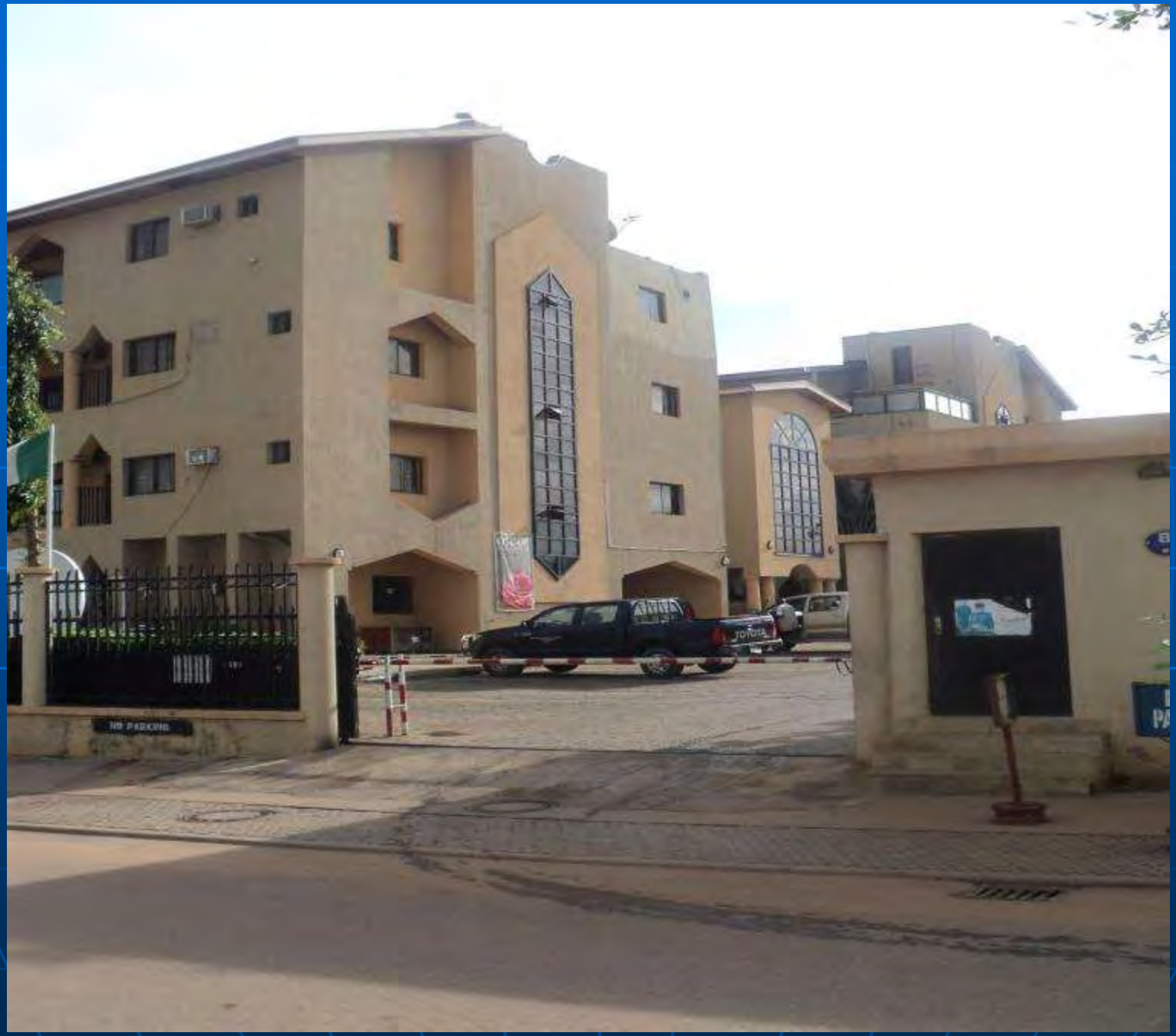
PREAMBLE

- Prior to the creation of the Office of the Surveyor-General of the Federation, (OSGOF), the Federal Surveys Department was a department in the defunct Federal Ministry of Works.
- It became necessary to upgrade the Office into an Extra-Ministerial Department in order to revitalize and reposition it to meet the challenges of the physical and socio-economic development of the country regarding her Surveying and Mapping needs.

BACKGROUND

- The Office attained its current Extra-Ministerial status in April, 2005 by an approval of the Federal Executive Council.
- OSGOF is presently located at No. 8 Yawuri Street, Area 8, Garki II, Abuja. It is headed by the Surveyor General of the Federation who is the Chief Executive and Accounting Officer in charge of the day-to-day running of the office.


OFFICE OF THE SURVEYOR-GENERAL
OF THE FEDERATION, (OSGOF)
DD PRS


NO PARKING

MANDATE/VISION

The overall mandate/vision of the Office of the SGOF is to be the nation's authority on Surveying and Mapping by providing in the most cost effective way, current, fit-for-use readily available maps and geographic information of the country for sustainable national development and security.

FUNCTIONS

- To establish, extend and enhance the existing national geodetic reference system for all surveying and mapping projects.

- To delineate, demarcate, survey, maintain and administer all international and interstate boundaries of the country.

FUNCTIONS

- To produce geospatial products such as administrative maps, electronic national atlas, gazetteer of geographical place-names, road maps and other thematic maps.
- To provide national geospatial standard for the production of digital maps and other geographical information (Survey Coordination)

FUNCTIONS

- Cadastral/Legal Surveys of all Federal Lands & Properties.
- Training, Supervision and Research in Surveying & Mapping in collaboration with the academic institutions.
- Consultancy services to all Govt. agencies and ministries on Surveying & Mapping matters.
- Pooling of all surveyors in Federal Service.

FUNCTIONS

- To execute vital national survey (in consultation with relevant departments of government) of a time-lapse mapping of all areas of exploration and exploitation of solid minerals, oil and gas, forestry and other national resources and ecologically impacted areas such as desertification, gully erosion and land degradation
- Magnetic, gravity, ROW and other special surveys

- The OSGOF through Mapping Department is responsible for;
- The production of geospatial products such as administrative maps, electronic national atlas, gazetteer of geographical place-names, road maps and other thematic maps
- Provision of national geospatial standard for the production of digital maps and other geographical information (Survey Coordination)
- Consultancy services to all Govt. agencies on Mapping matters.


Trimble

ON-GOING PROJECTS

- Conversion of 1:50,000 TOPO Map sheets to Digital Format (80% completed)
- Revision of 1:50,000 TOPO Maps
- Acquisition of Satellite Imageries for mapping void areas
- Pilot Scheme Mapping of Nigeria at 1:25,000 scale
- Generation of Digital Terrain Model (DTM) for various Topo. Map Sheets.

AVAILABLE PRODUCTS

- The following products are available for sale in the Map Depot
- Admin. Map of Nigeria in Hard and Soft copies
- Topographical Map sheets of Nigeria
- Gazetteer of Place Names in Hard and Soft copies
- Road map of Nigeria
- The National Atlas

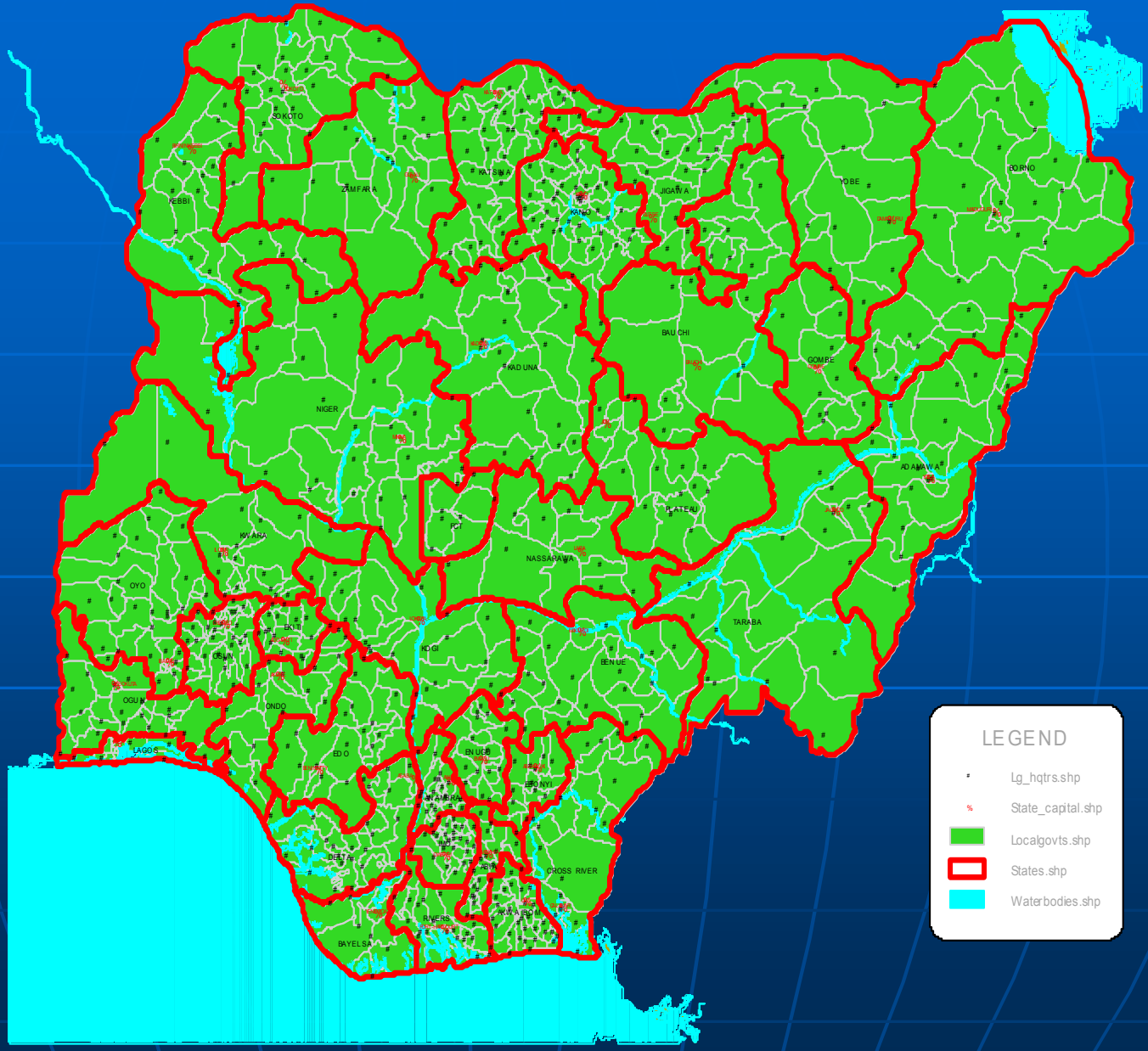
DIGITAL EQUIPMENT

- The OSGOF has acquired the state of the art Digital Equipment for the execution of most of its functions right from the stage of Data Capture to Data Presentation (Map/Plan/Geospatial data)

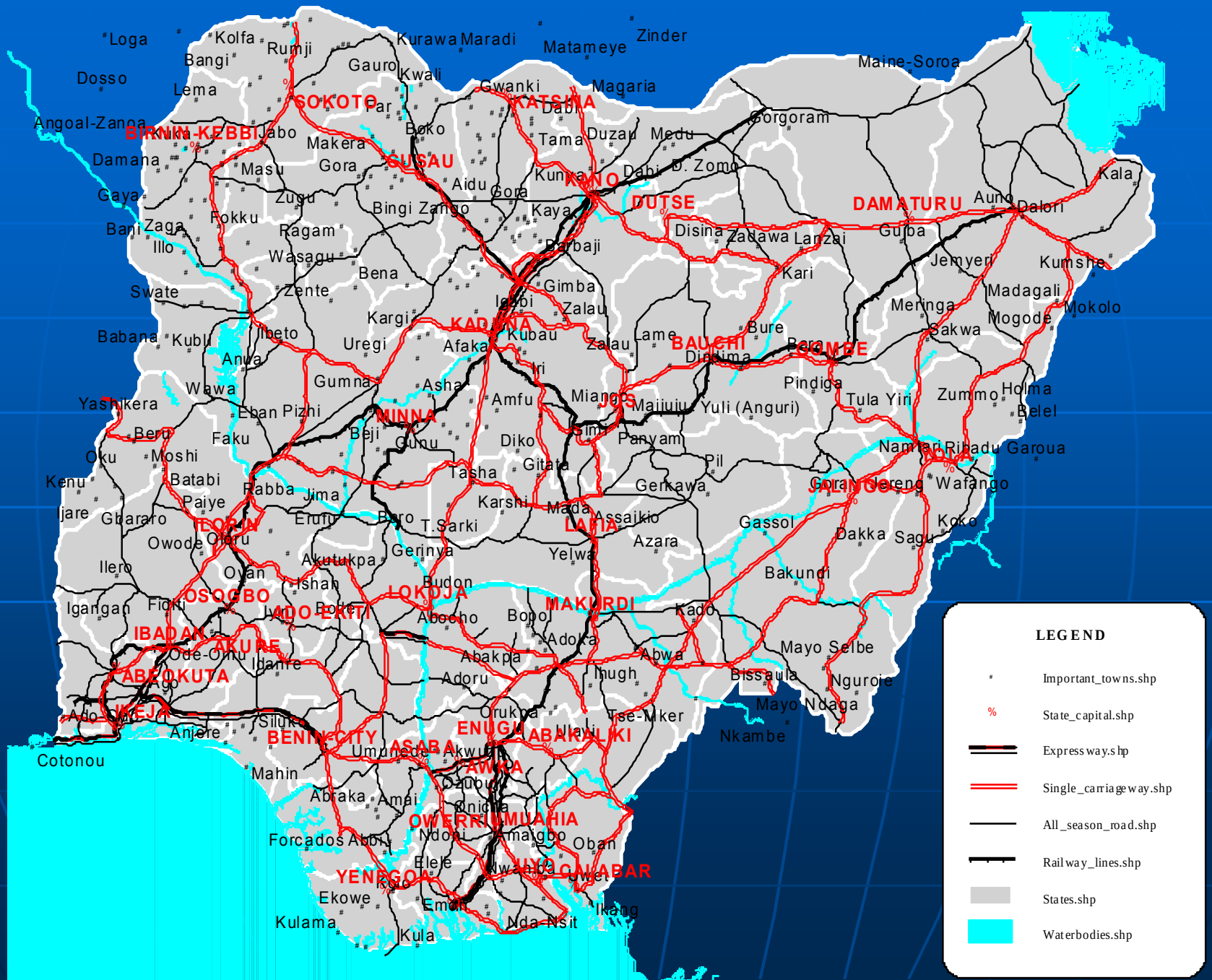
DIGITAL FORMATS

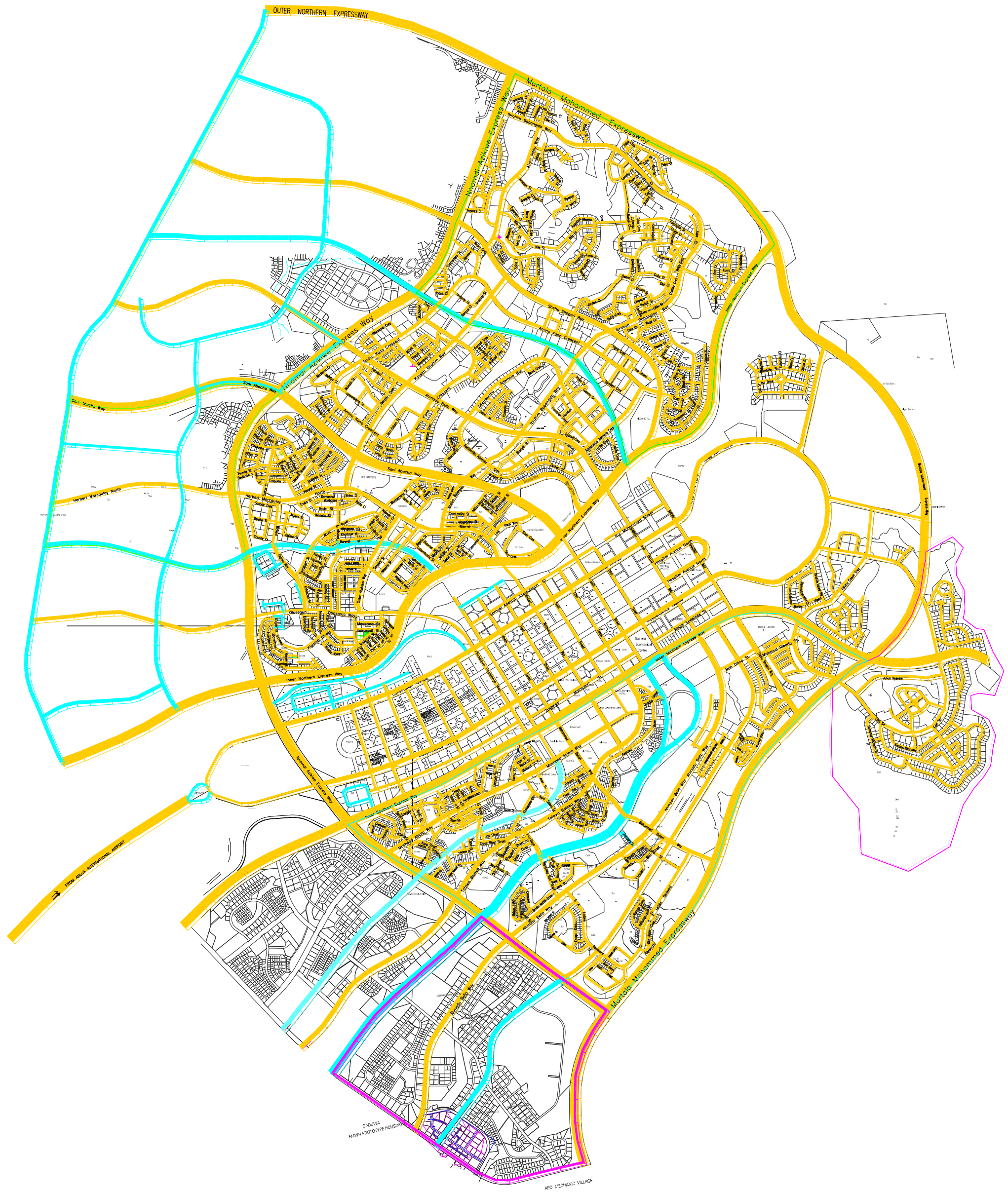
- The Office has developed a number of base maps in the digital environment, which are now ready for customization to individual/organizational requirements. Some of these base maps are illustrated hereunder

ADMINISTRATIVE MAP OF NIGERIA



ROAD MAP OF NIGERIA




OUTER NORTHERN EXPRESSWAY
Murtala Mohammed Expressway
Inner Northern Express Way
Murtala Mohammed Expressway
GADUWA
FMWH PROTOTYPE HOUSING
APO MECHANIC VILLAGE

DIGITAL GAZETTEER OF PLACE NAMES

ID	NAME	STATE	FEATURE	DESCRIPTION	LONGITUDE	LATITUDE
1	A JABA	NASARAWA	VILLAGE	NE OF KEFFI	7.9000000000	8.8666666667
2	A MADAKI	NASARAWA	VILLAGE	SE OF WAMBA	8.7333333333	8.8666666667
3	AA	BENUE	VILLAGE	NE OF ZAKI BIAM	9.6333333333	7.6000000000
4	AA	PLATEAU	VILLAGE	W OF GBOKO	8.8000000000	9.3166666667
5	AAGO-REUBEN	ONDO	VILLAGE	SE OF OKITIPUPA	4.8166666667	6.4166666667
6	AAIJO	BENUE	VILLAGE	NE OF OTURKPO	8.2333333333	7.2166666667
7	AAKAA	BENUE	VILLAGE	SW OF GBOKO	8.9166666667	7.0500000000
8	AAKAR	BENUE	VILLAGE	E OF ZAKI BIAM	9.7833333333	7.5000000000
9	AAKERCHIGH	BENUE	VILLAGE	NE OF ZAKI RIAM	9.7666666667	7.5500000000
10	AAKYOR	BENUE	VILLAGE	SW OF GBOKO	8.6833333333	7.0500000000
11	AALE-BALE	KWARA	VILLAGE	SE OF ILORIN	4.6333333333	8.1666666667
12	AALEYO	KWARA	VILLAGE	S OF ILORIN	4.5666666667	8.3833333333
13	AALFA	SOKOTO	RIVER	FLS SW INTO R.BA-ANA	5.4666666667	13.3833333333
14	AALLAGOAKIRI	BAYELSA	VILLAGE	SW OF DEGEMA	6.5666666667	4.6833333333
15	AAMA	TARABA	VILLAGE	NE OF ZAKI BIAM	9.7000000000	7.8166666667
16	AANAKA	BENUE	VILLAGE	NW OF GBOKO	8.8833333333	7.4833333333
17	AANAKAR	BENUE	VILLAGE	W OF GBOKO	8.5500000000	7.2500000000
18	AANDE	BENUE	VILLAGE	NE OF OTURKPO	8.4333333333	7.2666666667
19	AAREGH	BENUE	VILLAGE	NW OF MAKURDI	8.4000000000	7.7500000000
20	AARO	OYO	RIVER	FLS SE INTO R.OSUN	4.3166666667	7.9333333333
21	AAYONGU	BENUE	VILLAGE	SW OF GBOKO	8.6500000000	7.0666666667
22	ABA	ABIA	TOWN	SW OF UMUAHIA	7.3666666667	5.1000000000
23	ABA	ABIA	RIVER	FLS SE INTO R.IMO	7.4000000000	5.0666666667
24	ABA	ABIA	RIVER	FLS S INTO R.IMO	7.4666666667	4.8833333333
25	ABA	ABIA	TOWN	SW OF UMUAHIA	7.3666666667	5.1000000000
26	ABA	ABIA	RIVER	FLS SE INTO R.IMO	7.4000000000	5.0666666667

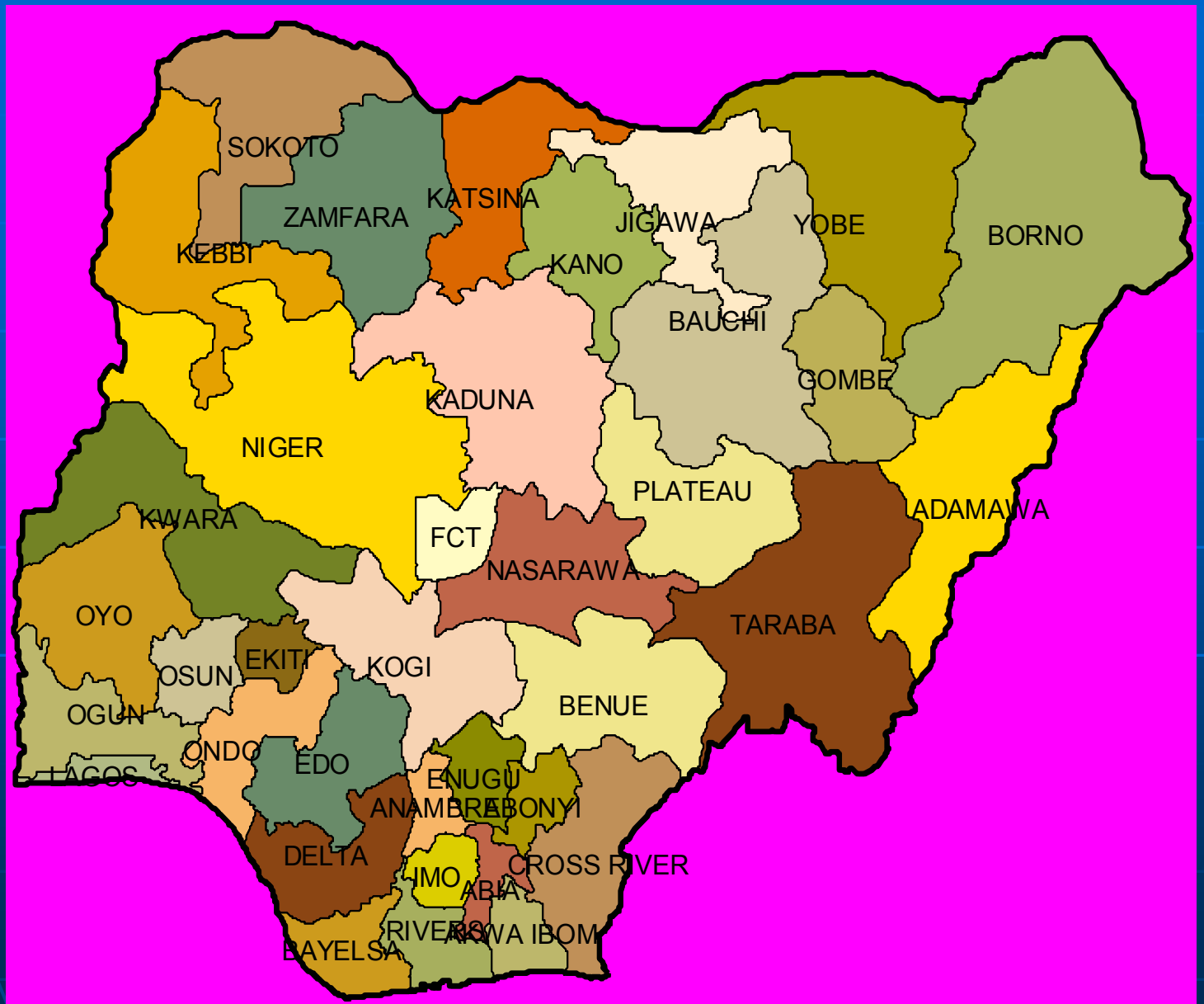
- Land as the basic natural resource of every nation and none renewable, it is incumbent on any nation desirous of development to accurately document, demarcate, survey and manage its land resources for sustainable development;
- The OSGOF through the Boundaries Department is therefore responsible for;
- Delimitation, delineation, demarcation, survey and maintenance of all international, interstate and sometimes inter-local Government boundaries of the Federal Republic of Nigeria

- Liaison with the National Boundary Commission and International Joint Boundary Commissions of the various neighboring countries to Nigeria;
- This Department therefore works on the 4,000KM of Nigeria's International Boundaries and the 88 No. Interstate Boundaries (about 22,000KM);
- Thus the Boundaries department is made up of the International boundaries Division and the Inter-State boundaries Division;

INTERSTATE BOUNDARIES

- The country has 88No. Interstate boundaries which translate into about 22,000km. Of all these, only one or two can be said to have been completely demarcated
- However priority is given to oil producing states in the demarcation of interstate boundaries. This is to assist in the determination of the actual location of oil wells along the boundary corridor to facilitate the payment of the 13% derivation to the oil producing states

INTERSTATE MAP OF NIGERIA



INTERSTATE BOUNDARIES

- The following interstate boundaries are active and at various stages of execution;
- The contract for the *beaconing and final demarcation* of the following boundaries have been awarded (i)Benue/Cross River,(ii)Edo/Kogi, (iii) Gombe/Taraba, (iv)Adamawa/Taraba, (v)Gombe/Adamawa, (vi)FCT/Nasarawa, (vii)FCT/Kaduna, (viii) FCT/Niger, (ix)FCT/Kogi, (x)Plateau/Nasarawa, (xi)Benue/Taraba,

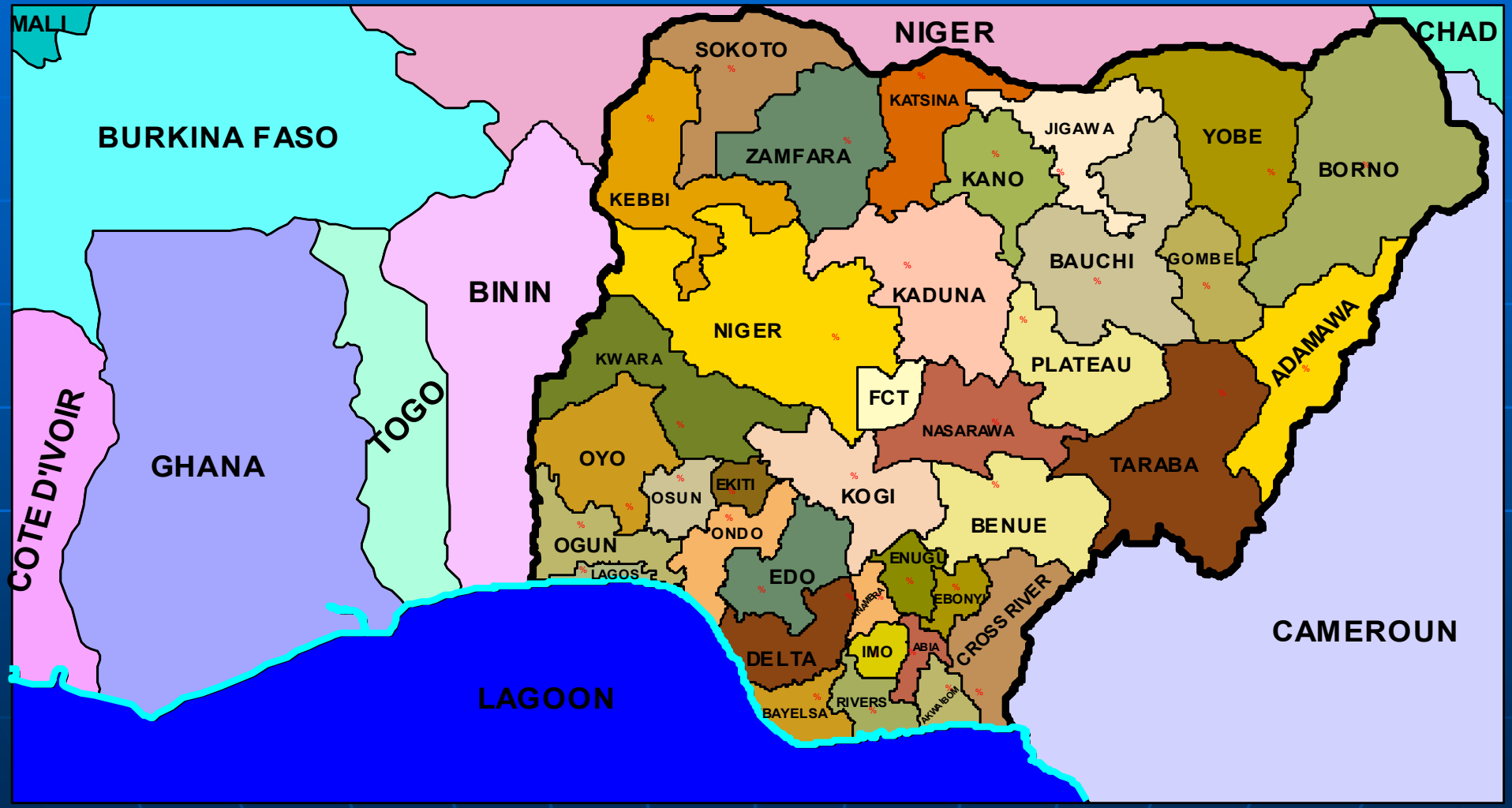
INTERSTATE BOUNDARIES

- (xii)Kwara/Oyo.
- Contracts for the *tracing and provisional demarcation of* the following boundaries have been awarded; (i)Abia/Akwa Ibom, (ii)Bauchi/Yobe, (iii)Edo/Delta, (iv)Benue/Kogi, (v)Ekiti/Kwara, (vi)Ekiti/Kogi,(vii)Anambra/Imo

INTERNATIONAL BOUNDARIES

- Nigeria has about 4,000km of International land boundaries which it shares with Niger Republic, Benin Republic, Cameroon and Chad.
- Nigeria also shares Maritime Boundaries with Cameroon, Sao Tome & Principe, Ghana, Equatorial Guinea and Benin Republic.
- About 40% of the International Land boundaries has been demarcated. However work is ongoing in all the aforementioned sectors.

NIGERIA'S INTERNATIONAL BOUNDARIES



NIGERIA/NIGER

- Reconnaissance survey and Field Completion exercise of the entire boundary (1500Km) has been carried out.
- 1140Km of land boundary with 148No. Main pillars while remaining 360km is defined by the Komadugu/Yobe river.
- 44No. Main pillars reconstructed to international standard and 109No. Intermediate pillars emplaced to address sprawling settlements.

NIGERIA/NIGER

- Contracts have been awarded to reconstruct additional 20No. Main pillars and 46No.intermediate pillars in the 2007 fiscal year.
- Vista clearing as required by bilateral agreement can not be carried out due to poor funding.

NIGERIA/BENIN

- Boundary line of about 770Km divided into 4 sectors namely;
- (i)Coast to Badagry, (ii)Badagry creek to Okpara River or Onigbolo sector, (iii)Okpara River and (iv) Illo/Borgu Sector
- Except for the disputed area of Igbokofi/Towe (pillars 75-78), all the main pillars defining the boundary have been reconstructed.

NIGERIA/BENIN

- The following are the on-going projects in this sector;
- Densification of pillars in Illo/Borgu sector. Contracts have been awarded for the construction of 36No. Main pillars and 100No. Intermediate pillars
- Clearing of 3KM ravine along Adjara River
- Construction of pillars 75-78 and the intermediate pillars between them.

NIGERIA/BENIN

- Vista clearing in Ilara and Iwoye areas (no fund for vista clearing in 2007)
- Delimitation of the boundary line from pillar 35 to the bi-point of the Nigeria/Benin boundary

NIGERIA/CAMEROUN

- Field assessment of the land boundary is being carried out after the ICJ judgment under the auspices of the UN
- This involves the identification of individual pillar sites and turning points along the boundary line
- The project is being funded by the UN, Nigeria,Cameroun and donor agencies
- Work is presently at the Alantika mountain area of the boundary (Adamawa State sector)

The Survey Department is responsible for the following functions:

- To establish, extend and enhance the existing national geodetic reference system for all surveying and mapping projects.

- Cadastral/Legal Surveys of all Federal Lands & Properties

- Consultancy services to all Govt. agencies and ministries on Surveying & Mapping matters

- Pooling of all surveyors in Federal Service
- Sale of Survey Information to Survey Companies and users of Survey products.

ESTABLISHMENT OF GPS CONTROLS

- 181No. Primary GPS Controls have been constructed,observed and adjusted nation-wide, while contracts have been awarded for the construction of additional 194 GPS Stations.
- 69No. 2ND Order Controls have been established in Gombe, Taraba, Borno, Bauchi, Adamawa, Yobe, Lagos and the FCT.

Collaborative Projects

- The office is in collaboration with NASRDA for the provision of Geodetic controls for geo-referencing & geo-rectification of imageries from Nigeria Sat. 1
- We are also working with Ministry of Power & Steel Dev. for the provision of more 1st order controls nationwide for the determination of a transformation algorithm for reference surfaces

Special Surveys

- Right Of Way Surveys of Federal Roads.
- Engineering Surveys.
- Seismic Surveys including Gravity and Magnetic Surveys, and
- Hydrographic Surveys.

ROW SURVEYS

- There are more 20,000km of Federal roads nation-wide
- Since the establishment of OSGOF, the following ROW surveys have been completed;
- Abuja-Kaduna highway,

Lagos-Ibadan highway

Abakaliki-Enugu highway

The following ROW survey are on-going

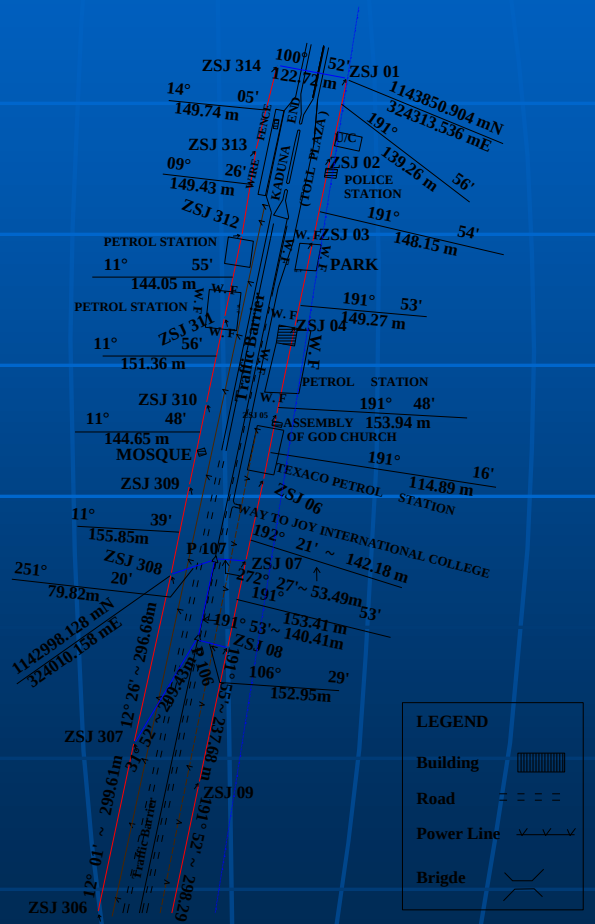
KADUNA-ABUJA ROW

PLAN SHEWING
RIGHT-OF-WAY DEMARCATION AND SURVEY
OF
KADUNA-ABUJA EXPRESSWAY (SECTION 5)
FROM KADUNA TOLL PLAZA TO KILOMETRE 45

SCALE: 1: 10,000

ORIGIN: UNIVERSAL (ZONE 31)

m100 0 100 400m



ROW SURVEY

- Zaria-Kano highway (99Km)
- Shagamu-Ijebu Ode highway (35Km)
- Benin Bye-Pass (30km)
- Kaduna Bye-Pass (31km)

HYDROGRAPHIC SURVEYS

- The objective apart from the prediction of tidal values is to generate enough data for the determination of Geoidal and Navigation parameters
- Two tidal stations have been established in Calabar and Port Harcourt

- THANK YOU

Geospatial resources maintained versus needed at RECTAS and major SDI challenges

Presented by

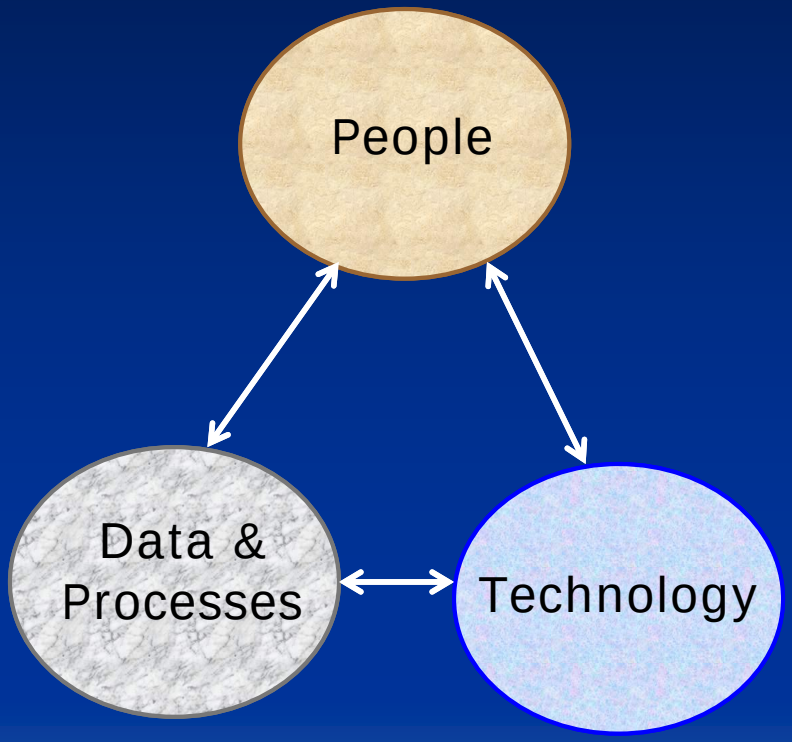
Prof Isi Ikhuoria
Executive Director

Regional Centre for Training in Aerospace Surveys
(RECTAS)
Ile-Ife, Nigeria
edrectas@rectas.org, +234 803 373 2799

At the Nigeria Health and Mapping Summit 2011:
Enlisting National Mapping Agencies in Improving Health Outcomes
Abuja, October, 18-19

Geospatial resources

- An array of set of bits and pieces that are necessary for the successful production of geospatial data, information and services
- The resources can be viewed as people, geographic data and processes, and technology



(Akingbade, 2011)

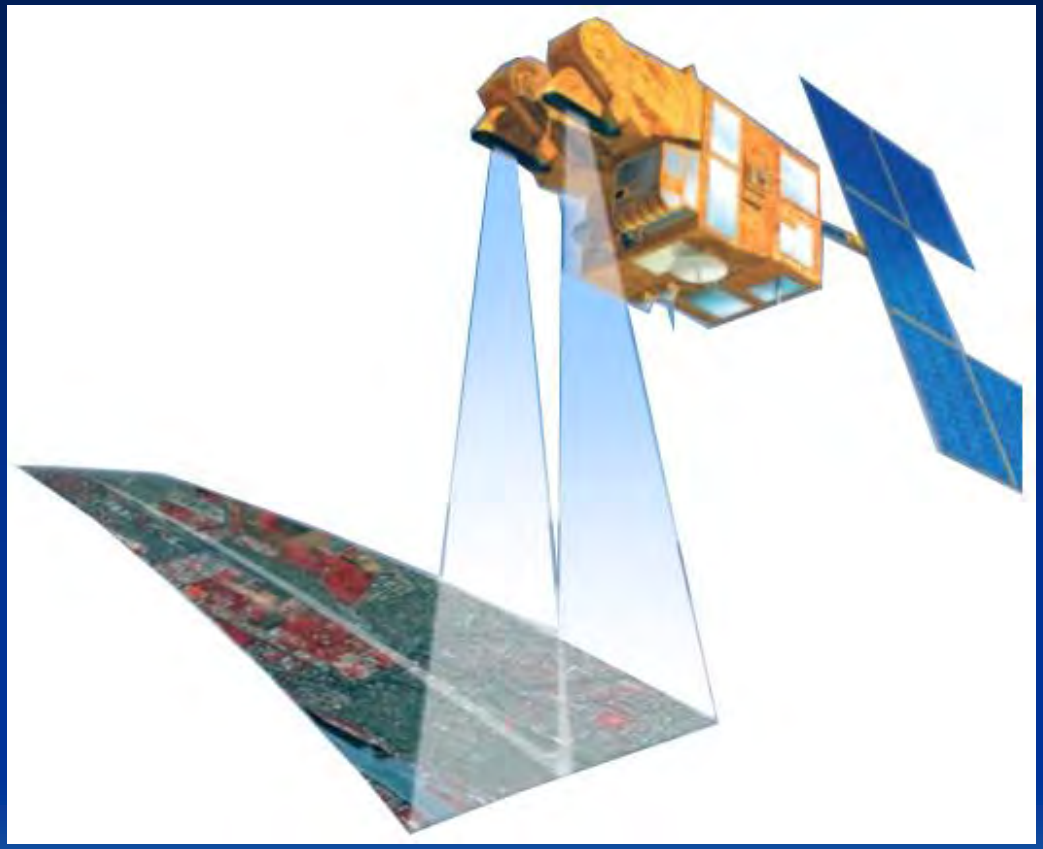
The Centre

- RECTAS was established on 21st October 1972 *under the auspices* of the United Nations Economic Commission for Africa (UNECA).

- RECTAS is a joint Institution of African countries. The participating countries at the moment are Benin, Burkina, Cameroon, Ghana, Mali, Niger, Nigeria (host country) and Senegal.

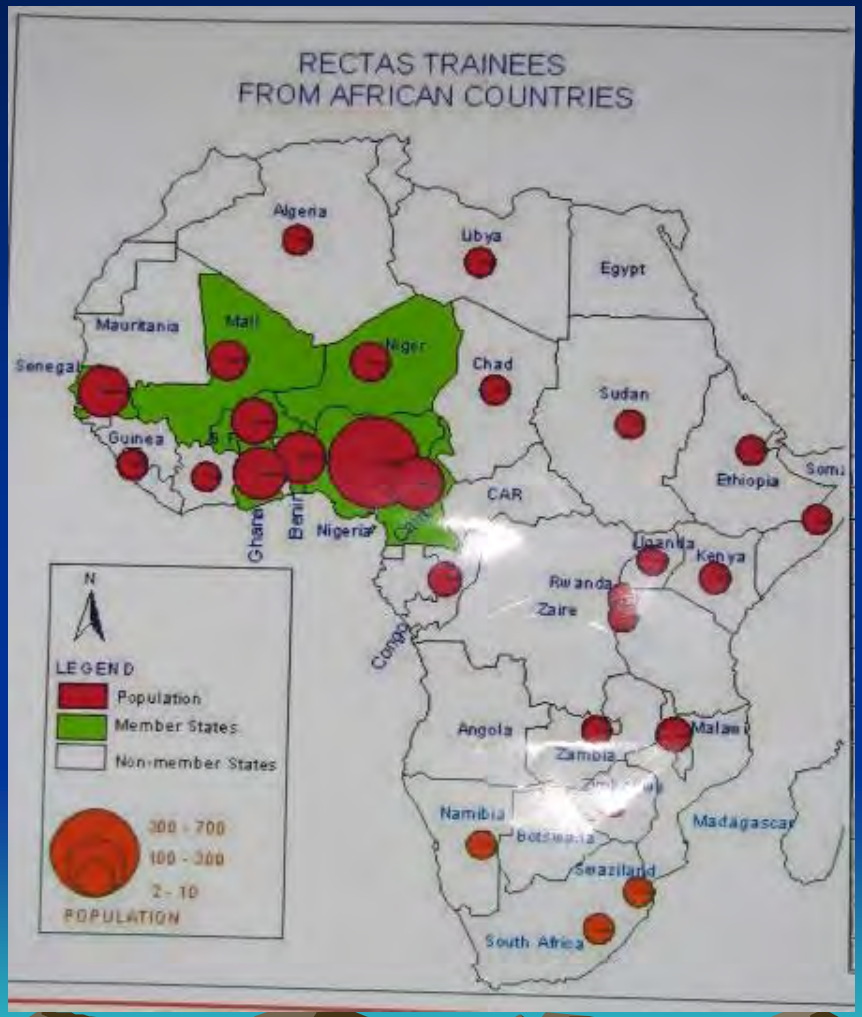
- *Interested countries are to apply for admission*

Focus: Geospatial science training and applications

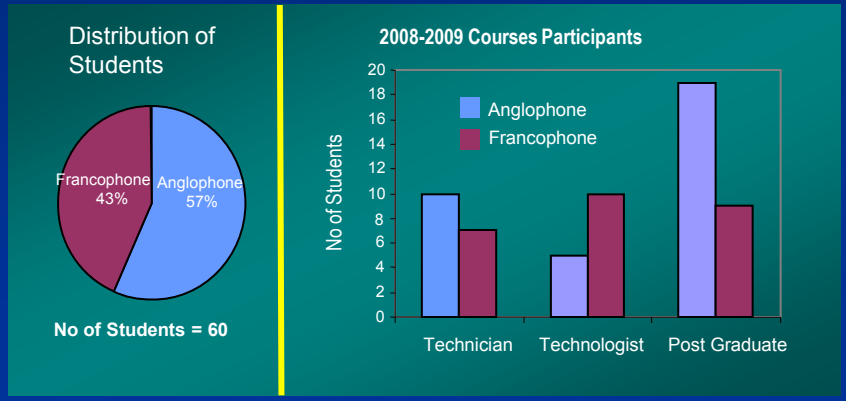


Space-based Technologies

Experience



Graduated 1,516 trainees from 28 countries (1973-2011)



Students enrolment at RECTAS (2008 – 2009)

Geospatial resources: RECTAS personnel for training and research

- Professors: 6 (including Adjunct)
- Associate Professors: 2
- Principal Lecturers: 2
- Senior Lecturers: 4
- Lecturer I: 6
- Lecturer II: 11
- System Administrators: 2
- Librarians: 2

Geospatial resources: Technology

Equip graduates of various disciplines with adequate technical capability in GIS, remote sensing and usage of geospatial data and infrastructure for diversified applications in various sectors, e.g. environment and health, urban governance and land administration

Geospatial hardware & software

- Continuous operating reference station: GNSS receiver (GPS and Glonass), plus GPS Spiders and LEICA Geo-Office software
- Mobile mappers, Geodetic GPS receivers (LEICA) and Hand-held GPS receivers
- ArcGIS, IDRISSI, ENVI, ILWIS, ERDAS Imagine, etc.

Academic programmes/training

SN	Code	Programme title	Language	Duration	Degree
1	MGIT	Masters in Geoinformation Technology	English	18 months	M. Tech.
2	MGIS	Masters in Geographic Information Science	French	18 months	MSc
3	MGLA	Masters in Geoinformation Science and Land administration	English	18 months	MSc
4	GEM	Postgraduate Diploma in Geoinformation and Environmental Management	English	12 months	PGD
5	GPM 3	Professional Masters (P.M.) in Geoinformation production and management	English and French	12 months	P. M.
6	GPM 4	Technologist diploma in Geoinformation production and Management	English and French	18 months	Tech . Dip.
7	GPM 5	Technician Diploma in Geoinformation production and management	English and French	18 months	Ord. Dip.

Short courses:

- Modular formats of 3 weeks duration
- Customised formats of 1-3 weeks duration

On request, the short courses can be tailored to meet specific needs in the health sector. For example:

- Planning for HIV/AIDS and family planning programs
- Analysis of the effects of environment on early childhood mortality
- National programmes on immunisation
- Geographic analysis of malaria endemic areas, seasonality and intensity of transmission
- Public health delivery: waste management, environmental health and diseases surveillance

Geoinformation in childhood health management

1. Where is this child living in Abuja?
2. How will this child receive vaccinations at the appropriate ages?
3. How will this child have access to balanced diet or good nutrition?

Geospatial data

- RECTAS carry out consultancy activities within Nigeria and in other African countries
- The consultancy activities include mapping
- The outputs are delivered directly to the clients

Consultancy

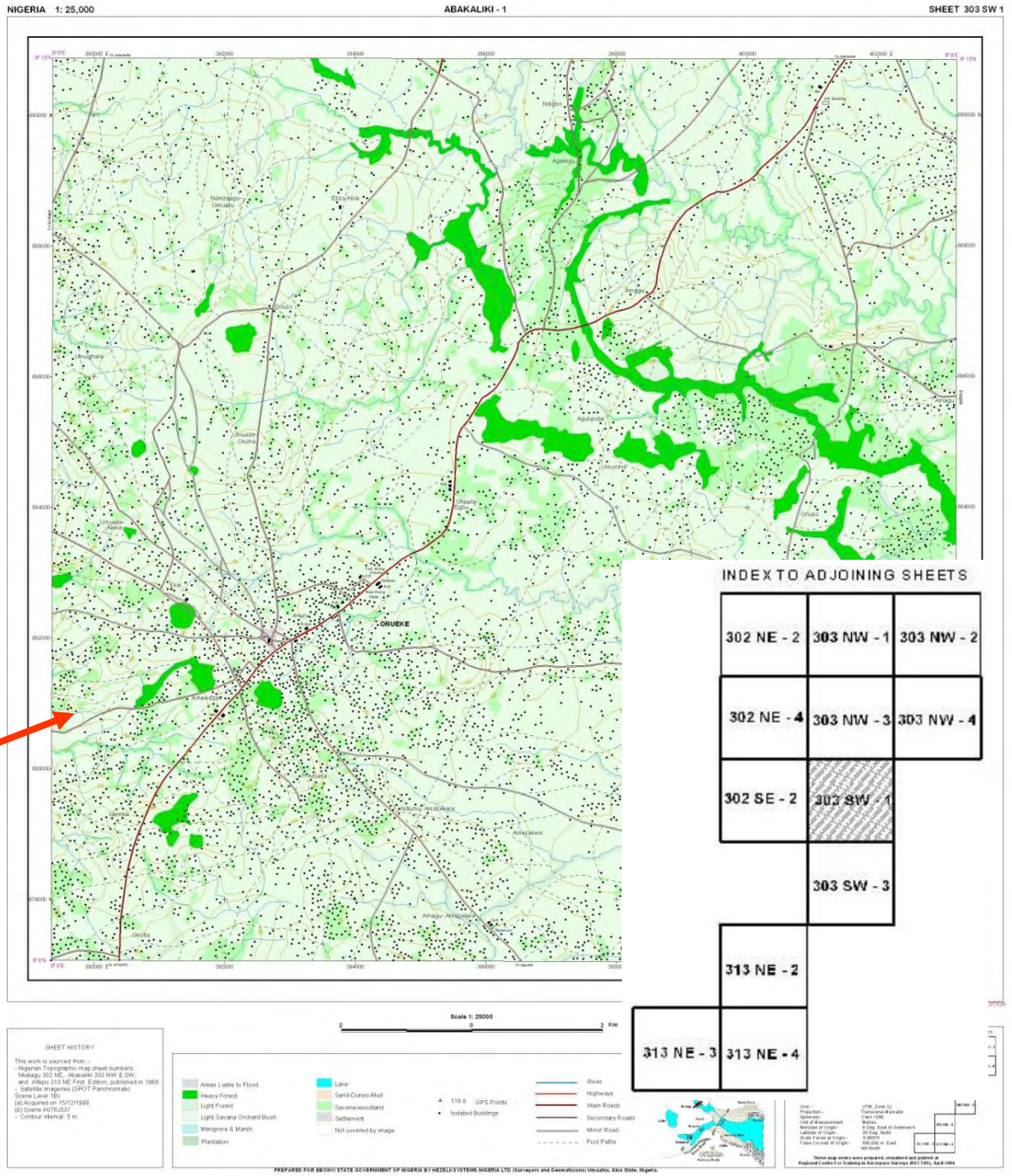
RECTAS undertakes consultancy services in the application of Geoinformation in any field of endeavour.

Sheet 303 SW1

ONUEKE

topo Map

1:25,000



NSDI challenges

- Data exchange with local (Nigeria) mapping organisations: no official geoinformation policy
- Few researchers and practitioners have focussed on application of geo-science and geo-technology in the health sector of Nigeria
- Collaboration with local training institutions (better now)

Needs: Collaboration and Partnerships

- Research in the health sector
- Capacity building: human and technical
- National and international health institutions

Other Needs

- Continuous upgrading of facilities
- Fellowships for long-term training, with specialisation in various aspects in the health sector
- Grants for research on the applications of Geoinformation Science in the health sector
- Consultancy projects in the health sector
- Intervention and advisory missions to health institutions in Nigeria on the application of geo-technology in the health sector

Thank you for your attention

HEALTH RELATED PROJECT WITH MAPPING CONTENT TO ILLUSTRATE CHALLENGES AND CONSTRAINTS TO COLLABORATION AND COORDINATION

Day 2 Presentation by Dr. Aderemi Azeez
Strategic Unit of the HIV/AIDS Division
Department of Public Health, FMoH

FUNDING

- Multiplicity of efforts

  previuos effort not inadequate

  prefer customised efforts
- High cost of Geograhic Data collection

Technical support

- Inadequate technical knowledge of GIS mapping in the ministry at all levels
- Little or no infrastructure
- Lack of standards/SOP/Guidelines

State and LGAs

- Poor understanding of the importance of GIS mapping for programe development

Mapping agencies

- Lack of awareness by consumer on the roles / capability of the mapping agencies.
- Awareness/ dissemination of the policy
- Over commercialization/collaboration of the of the statutory roles
- Poor coordination

  – no forum to discuss the geo-referenceable data collected by the NPC, NBS

Mapping agencies (II)

- Lack of current data on locality, vital statistics
- The response pace from mapping agencies to programme mapping information demand is slow
- Apathy/willingness to collaborate

THE EXPERIENCE OF SOME COUNTRIES WITH GOOD SPATIAL DATA INFRASTRUCTURE LINKED WITH EFFECTIVE AND IMPROVED SOCIAL SERVICES IN THE HEALTH SECTOR

Ademola Omojola
Remote Sensing and GIS Laboratory
University of Lagos
Akoka, Lagos

Nigeria Health and Mapping Summit, Abuja, 18-19 October 2011

CONTENTS

1. Spatial Data and its use in the Health Sector
2. Spatial Data Infrastructure (SDI)
3. SDI in Nigeria
4. SDI in the US – A good practice example?
5. GIS use in the Nigeria Health Sector
6. Examples of GIS use in the Health Sector in the US
7. The Way Forward in Nigeria for GIS use in the Health Sector

SPATIAL DATA AND ITS USE IN THE HEALTH SECTOR

- Health and Geography nexus has a long pedigree, e.g.:
  - 1840 – Robert Cowan used maps to show the relationship between fever an overcrowding in Glasgow
  - 1843 – Robert Perry described a six fold difference in the prevalence of fever in different neighborhoods
  - 1845 – Dr. John Snow revealed the contaminated well responsible for the London's cholera epidemic by mapping
- Maps help to unravel the hidden potentials in data
- Compelling evidence that location and place shape our health
- This has been demonstrated in both developed and developing nations at various spatial scales
- Generally, spatial data helps to explain the trend, pattern, association, clusters, advocacy, plan, manage and monitor services

SPATIAL DATA INFRASTRUCTURE (SDI)

SDI Cookbook (Version 2.0) definition breakdown

"Critical mass of:

- processes
- policies
- standards
- enabling technologies
- mechanisms, and
- key datasets

required to make geospatial data readily available to the growing community of end-users".

Called different names in different countries and at different administrative scales

SPATIAL DATA INFRASTRUCTURE (SDI) ……

SDI provides a basis for:

- spatial data discovery,
- evaluation, and
- application for users and providers

- within all levels of:
  - government,
  - the commercial sector,
  - the non-profit sector, academia, and
  - by the citizens in general

Then, the implications for the health sector can be better appreciated if we have SDI in Nigeria is as defined.

SPATIAL DATA INFRASTRUCTURE (SDI)……

General SDI ideals

- An SDI must be more than a single data set or database;
- an SDI hosts geographic data and attributes, sufficient documentation (metadata),
- Means to discover, visualize, and evaluate the data (catalogues and Web mapping),
- Some method to provide access to the geographic data.
- Includes additional services or software to support applications of the data.
- Also include the organizational agreements needed to coordinate and administer it on a local, regional, national, and or trans-national scale.
- Note that the core SDI concept includes within its scope neither base data collection activities or myriad applications built upon it,
- The infrastructure provides the ideal environment to connect applications to data – influencing both data collection and applications construction through minimal appropriate standards and policies.

SDI IN NIGERIA

- Nigeria Inaugurated a Committee of experts and stakeholders in Geographic Information Systems (GIS) in 1998
- Aimed at identifying, classifying and coordinating geo-information resources all over the country.
- To facilitate making geo-information resources available to all users at minimal cost.
- The committee was to identify fundamental data that are of critical national importance and to recommend effective procedures for monitoring and coordinating the activities of geo-information parastatals, multinational companies and any other relevant geo-information producer in Nigeria
- Major new initiative 2002 when taken over by NARSDA – National Geospatial Data Infrastructure (NGDI)
- NARSDA through the Federal Ministry of Science and Technology in 2003 drafted the National Geo-information Policy
- But where are we today?

SDI IN NIGERIA……

Rated as doing well in Africa (review by ECA)

- Among 14 Countries with SDI coordinating bodies in Africa
- Among 9 Countries with SDI Committee, Sub-Committees, Working Groups
- At least a meeting held in a year
- Among 13 Countries with Geographical Names Authority
- Among 16 Countries with new mapping initiatives
- Among 15 Countries with maps revision

The questions to ask ourselves:

- *Are these enough?*
- *What can we benefit from SDI initiatives through this summit*?

SDI IN THE US : A GOOD PRACTICE EXAMPLE?

Federal Geographic Data Governance in the US (OMB, FGDC, NSDI, NGAC)

OMB and FGDC

- Long history – since 1953 by the Office of Management and Budget (OMB) circular A-16.
- Initial emphasis was however on framework data and thus originally aimed at federal surveying and mapping activities
- The circular has been revised several times -- now *Coordination of Geographic Information and Related Spatial Data Activities*.
- In 1990 a revision to circular A-16 led to the creation of the FGDC which was to be a delegated coordinating body for geospatial data
- Made up of leaders from about 30 federal agencies, about 22 listed in 2002.

SDI IN THE US : A GOOD PRACTICE EXAMPLE?.....

Federal Geographic Data Governance in the US (OMB, FGDC, NSDI, NGAC)

NSDI and NGAC

- In 1994, NSDI was created by the Executive Order 12906 by President Bill Clinton
- NSDI was to "support public and private applications of geospatial data in such areas as transportation, community development, agriculture, emergency response, environmental management, and information technology."
- Responsibility for implementation was still given to FGDC (no power to make or enforce rules)
- With minor modifications to provide a special role for the new Department of Homeland Security, President George W. Bush continued the NSDI in his Executive Order 13286 in 2003.
- In January 2008, the US Secretary of the Interior (Dirk Kemptorne) announced the formation and membership of the National Geospatial Advisory Committee (NGAC).
- To perform spatial data development and coordination – prior activities of the FGDC – but not limited to federal government agencies alone and has power to make and enforce rules

SDI IN THE US : A GOOD PRACTICE EXAMPLE?.....

Observations and Lessons from the US NSDI

- National Spatial Data Infrastructure (NSDI) has been around since 1994
- There are only a few success stories though the concept was described as a wonderful concept — liberating and energizing
- The Federal Geographic Data Committee (FGDC) charged with coordinating those efforts does not have the power to make or enforce rules
- Federal agencies created "stovepipes of excellence" and cooperate only when desirable, very rarely because of outside pressure.
- Has a federal focus and often does not meet the needs of state or local government — let alone the private sector or public

SDI IN THE US : A GOOD PRACTICE EXAMPLE?.....

Observations and Lessons from the US NSDI.....

- State governments did better -- they even got funding from the FGDC and many have state GIS officers coordinating activities of municipals, counties and tribal governments
- In June 2009, the Congressional Research Service published a report called *Geospatial Information and Geographic Information Systems (GIS): Current Issues and Future Challenges*. The report tries to address the questions of "how effectively [is] the FGDC . . . fulfilling its mission" and "how well is the federal government coordinating with the state and local entities
- On July 23, 2009, the Energy and Mineral Resources Subcommittee of the House Natural
- Resources Committee held an oversight hearing on federal geospatial data management.
- Rep. John Sarbanes of Maryland quoted a U.S. General Accounting Office (GAO) report from his briefing material saying that only 4 of the 17 [sic] FGDC member agencies were in compliance
- Unfortunately, most of the discussion in the oversight hearing was about eliminating redundant data collection, not much was about filling gaps.

SDI IN THE US : A GOOD PRACTICE EXAMPLE?.....

Some documented suggested solutions to the US NSDI shortcomings:

- The problems are not at all technical but organizational
- Creation of a new Federal Geographic Information Office
- Radical empowerment of FGDC to coordinate
- Creation of a new body representing non-federal agencies
- Development of a Congressional oversight committee to watch and guide overall activities

GIS USE IN THE NIGERIA HEALTH SECTOR

- Contrary to the opinion been reflected, its use started in the early 1990's
- In fact one of the earliest adopter of the technology in Nigeria – Federal ministry of Water Resources and FORMECU
- These programs was with attendant training activities and the introduction of several software packages – COTS and customized such as ATLAS GIS, ArcView, Health Mapper and Epi-Map/Epi-Info
- Key spatial data were generated by the program – LGA administrative boundaries map, GPS points of boreholes in intervention states etc

GIS USE IN THE NIGERIA HEALTH SECTOR……

- Mostly coordinated and funded by International organizations, Health sector examples include:
  - Guinea Worm Eradication Project – UNICEF WATSAN/WES
  - Onchocerciasis Mapping (REMO) -- WHO/UNICEF Health Section
  - Schistosomiasis Mapping -- UNICEF Health Section
  - Communicable Diseases Control (Leprosy and TB) -- The Federal Ministry of Health/ UNICEF Health Section
  - GTZ- Lafia Mapping of Health facilities in Niger State
  - EPI support Mapping – National Immunization Agency
  - Several new ones – although major bottlenecks of conceptualization, dearth of allied data and funding are now high

EXAMPLES OF GIS USE IN THE HEALTH SECTOR IN THE US

The applications are legion, but may be grouped as follows:

- **Environmental exposure and disease risk**
- **Communicable diseases prevention and control**
- **Public Health:**
  - injury
  - chronic diseases prevention,
  - community health assessment and planning

EXAMPLES OF GIS USE IN THE HEALTH SECTOR IN THE US…

Environmental Exposure and Disease Risk

Effects of non-ionizing radiation such as electromagnetic radiation and the incidence of cancer

- Air Emission pollution assessment – Asthma, bronchial illness etc
- Lead exposure
- Drinking water pollution – septic contamination, nitrates pollution, volatile organic compounds
- Environmental Equity – neighbourhood/communities disproportionate exposure to risks

EXAMPLES OF GIS USE IN THE HEALTH SECTOR IN THE US…

Communicable Diseases Prevention and Control

- **Vaccine preventable diseases**
  - Immunization programs targeting
  - Hepatitis A and Pertussis (whooping cough)
  - Animal Rabies
- **Vector-borne and parasitic communicable diseases – community targeting for prevention**
  - Malaria
  - Lacrosse Encephalitis
  - Onchocerciasis (filarial worm infection)
  - Lyme disease
  - Schistosomiasis
- **Sexually-transmitted disease**
- **Tuberculosis**

EXAMPLES OF GIS USE IN THE HEALTH SECTOR IN THE US…

Public Health

- Injury
  - Unintentional injuries – motor vehicles associated, earthquakes
  - Intentional injuries – homicides

- Chronic Diseases Prevention (accounts for about 70% of all deaths in the US and GIS is used as healthy and unhealthy behaviors also cluster in population)
  - Targeting marketing messages to reduce tobacco and alcohol use
  - Cancer clusters
  - Pediatric Cancers
  - Heart Diseases

- Community Health Assessment and Planning
  - Planning Service delivery – primary care, health care access, and other human health services (*city/household level data*)
  - Community Health Assessment
  - Bringing Health Assessment to the Community
  - Mapping community assets for public health and health services planning (*Internet*)
  - Access to other human services

EXAMPLES OF GIS USE IN THE HEALTH SECTOR IN THE US…

Observed Challenges and Lessons

- Data quality and availability
- Trained workforce and costs
- Defining communities – which is the relevant geographic aggregation unit?
- Confidentiality
- Misinterpretation of results

THE WAY FORWARD: GIS USE IN THE HEALTH SECTOR

- Training is key – geospatial thinking, ethical issues, planning GIS applications for health analysis etc
- Collaboration especially on key common spatial data e.g. household level data have multitude interested users and stakeholders:

  PHCN, Water Corporations, Gas Utilities, Population Commission, Electoral Commission, Health, National Security (Police and other Armed Forces), National Planning, LGAs, Postal and Courier Services, Location-Based-Services, Marketing and retailing organizations etc.
- Streamlining and defining needed data at the sectoral or thematic level
- Leveraging contemporary developments in geospatial data deployment and analysis
  - Mobile application deployments for data collection and products consumption
  - Crowd sourcing -- RSS feeds, Ushahidi etc
  - Web application deployments – very good platform for communication and cooperation
  - Enterprises solutions – enterprises such as the health sector now rely on server GIS where customized applications are initiated.
  - Several open-source free software and data from servers (Google, Bing, Yahoo, OpenStreet etc) showing crucial spatial layers that can be especially used for geo-visualization and advocacy.