

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



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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 and 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 Kempthorne) 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.