

National Information Technology Infrastructure and Spatial Data Management

G. O. Ajayi*

Abstract

Geoinformation has become an indispensable tool in planning and decision-making worldwide. As a result of the convergence of information, telecommunications, broadcasting and computers, the ICT sector now embraces a large range of industries and services. Hence, National Information and Communication Infrastructure must be developed for integration into the Global Information Infrastructure (GII). Obviously, telecommunication infrastructure constitutes a major backbone of the GII. Information and Communication Technology has now provided unprecedented facilities and opportunities to developing countries to leapfrog into the knowledge-driven global economy and enjoy the benefit for socio-economic development offered by the information age.

1.0 Introduction

Nigeria is fast moving into being an information and knowledge-driven society – especially with the current emphasis on Information Technology. Recent initiatives by the Federal Government, including the approval of the national IT Policy by the Federal Executive Council in March 2001, the establishment of NITDA as the implementation body of the IT policy in April 2001 as well as seeing Information Technology as a national priority, make it clear that within a few years an unprecedented capability will exist for sharing of data. Also, the awareness and utilisation of the advanced

*Late Professor Ajayi was the Director General of NITDA before his death in 2004.

technologies viz. Advanced Computers, High Resolution Satellite data, GPS, GIS, etc., and the power of Spatial Information System oriented towards decision-making and resource management, is growing rapidly in the country.

The task of organising a national infrastructure for the maintenance of structured geospatial datasets in a large country like ours is a challenging one on account of its data-generating agencies in the public and private sectors being widely distributed at various levels of administrative zone. The endeavour, besides laying down the policies and technologies, has also to concentrate on bringing the stakeholders (agencies and institutions) together to share their data and identify opportunities for integrated planning of sustainable development. The major goal of National Surveying and Mapping Infrastructure (NSMI) or National Geospatial Data Infrastructure (NGDI) will be to improve the ability of geospatial information acquisition, processing, storage, management, distribution and utilisation.

2.0 Geoinformatics

Geoinformatics represents today the most efficient tool for managing data in space and time. Geoinformatics data can describe all natural and artificial objects being on the earth's surface, as well as any natural, cultural and human phenomena, referring to a given geographic location. Reliable and sufficient geoinformation has become the fuel driving the engine of growth and sustainable development of any nation. In many developed countries, over 80% of planning and decision-making are based on geoinformation.

The geoinformatics data is a special sort of information data that describes spatial relations of the local, regional or global environment: What is where? Where is what? Today, technical level in the country, most especially with the launching of Nigeria Sat-1, enables us to achieve intelligent connection; efficient acquisition, processing, analysis and display of map reference data. The geoinformatics data created this way is able to satisfy the users' demands in wide circles, using information technologic elements. The geoinformatics data represent one of the most valuable sorts of data because of their strategic character, wide applicability in public administration, local governments and business life. Most of the massive socio-economic

problem normally associated with rapid urbanization could be solved using spatial data to make broad based decisions.

The most fundamental elements of spatial data are those that are used for creating the highest number of further datasets called basic data. Those basic data represent the data-infrastructure, which naturally includes the system of standards, regulations, and services. In the most developed countries – based on a strategy developed as a result of wide agreement – defining the know-how of production, the servicing fields are mostly the following:

- Reference, reference system data,
- Public administration borders,
- Aerial photos, orthophotos,
- Relief, terrain relations,
- Traffic network,
- Hydrography,
- Cadaster,
- Surface cover and its subsystems,
- Demographic survey and tourism,
- Environmental protection,
- Geology,
- Eco-system, and
- Others.

3.0 Information Technology and National Geospatial Data Infrastructure (NGDI)

Information Technology has already conquered almost all fields of life, supporting private sphere, business world, public administration and governmental sections, increasing the efficiency of information procedures. The information revolution is changing everything about the world we live in, including the practice of development. ICT has the potential to create jobs, improve access to basic services, and increase the sharing of information between people living in different parts of the world.

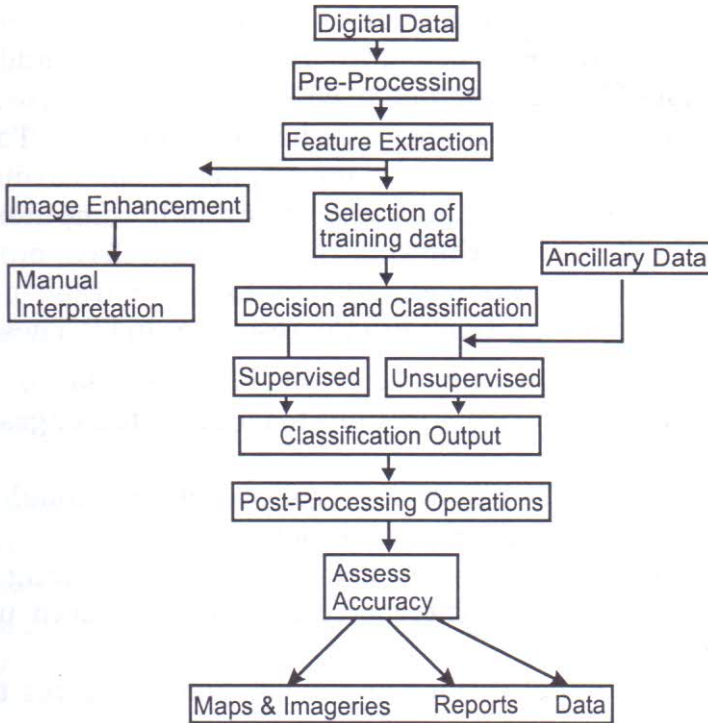
One can see explosion-like development in the fields connected to geoinformatics data. Currently in this country, the efficiency of applications stays much behind the level offered by technology in many application fields. This is because of unsolved economic, organisational and legal questions. Considering the complexity and expenses of geoinformatics data production, the increase of efficiency of

geoinformatics information procedures and also the regulation of the procedures, are basic governmental tasks. A good National Geospatial Data Infrastructure (NGDI) will therefore aim at:

- providing easy, consistent and effective access to geo-referenced
- geospatial information for promoting economical development and to foster environmental sustainability;
- formulation of common solutions for discoveries access and use of geospatial data in response to the needs of diverse user groups;
- building relationship among data-generating agencies by coordinating the production and sharing of geoinformation;
- standardisation of data exchange formats, meta data and policies of desensitisation of data;
- saving duplication of efforts by various data-generating agencies thereby removing unnecessary overlap.
- ensuring continuous support for the development of NGDI by increasing awareness and understanding vision, concept and benefits of NGDI.

A functional NGDI cannot be achieved without an efficient national ICT Infrastructure. ICT component of NGDI will ensure a coordinated effort in the production, management, sharing and use of reliable/standardised geoinformation at the various levels of government local, state, national and international-with linkages with the private sector. For instance, the high-resolution data made available from Nigeria Sat-1 require a high-capacity computer system for analysis. Therefore, the development of hardware and software, data processing and data interpretation, as well as the possibility of merging satellite data with additional topographical or geophysical and thematic information, are required to make satellite remotely sensed data an extraordinary tool for decision processes.

Typical GIS combines data from many sources.



4.0 NITDA Strategies and Plans

NITDA has become a clearinghouse for Information Technology in Nigeria with the mandate to implement the National IT Policy and regulate IT activities in the country. Within two years of its establishment, NITDA has embarked on laudable programs that will leapfrog the country into becoming an information technology-dependent society thereby utilising the latest IT advancement for the economic development of the nation. In line with the above-mentioned objectives of NGDI, NITDA strategies are in three major areas:

- Human Resource Capacity Building,
- Infrastructure Capacity Building, and
- Institutional Capacity Building.

4.1 Human Resource Capacity Building

Qualitative manpower is one of the most important determinants of viable and sustainable economies. Developing quality manpower in IT and related disciplines will help the nation develop a pool of scientists, engineers, technicians and software developers. These human resources will advance the country technologically to be able to

