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The use of GIS Technology for Land Management in Parakin Ife Central LGA, Osun State, Nigeria

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ABSTRACT

Land is a vital natural resource that hosts and sustains all living things namely; plants, animals and man. It is the bedrock of human sustenance, settlement development and usually used for diverse uses. Despite its global availability, land is still scarce due to its locational value and other utility attributes. In most urban areas, inadequate land management, control and allocation poses enormous crises and challenges for sustainable development of land, therefore there is need for proper management and control of land as a resource. This study is aimed at applying geospatial technique in providing possible solutions for land management and master plan implementation in Parakin area of Ife central LGA of Osun State. The existing master plan, and other spatial data, that is the topographic map and administrative map covering the study area was scanned, geo referenced and digitized and subsequently built into a geodatabase. The generated data was converted to KML and overlaid on Google earth in order to extract the high resolution image covering the area which was subsequently used to analyze the compliance of the master plan and the recent high resolution image covering the same area. In addition, multi-date Landsat imagery covering the area was classified in order to determine the trend of the land use land cover. The study shows that the area has changed in terms of land use and land cover from an agricultural zone to a residential area with inadequate compliance of the master plan and with the implementation on ground as shown on the high resolution satellite image.

Keywords: Land management; Land Administration, Geometric and Attribute Data, GIS.

1.0 INTRODUCTION

Land is a vital natural resource that hosts and sustains all living things namely; plants, animals and man. It is a fixed socio-economic asset that aids production of goods and services and hosts virtually all activities that take place on earth (Magel, 2001). Land is also one of the three major factors of production; capital, labour and land. It is a generally held belief that the use and control of land as a productive asset requires the establishment of a legal and institutional framework for land management. But that framework has exercised very little influence in Nigeria on the way property rights to land have developed over the years. According to (Ojigi, 2012) for over thirty years in Minna and environs, there has been a rising profile of informal settlement and slum, particularly on the urban fringes and the phenomenon is disturbing, as its potent huge obstacle to quality development of the city. This is also observed in Parakin and its environs and it is largely due to the strong feelings which the subject of land evokes. The reasons for this are not farfetched. Firstly, the supply of land is virtually fixed; yet it is required to provide security (either productive, investment or both) in such forms as food, shelter as well as a base for the Nigerian economy. Secondly, land management in Nigeria comprises a multitude of irregular units in the ownership, use and management by different individuals, corporate bodies and even the state. Therefore there is need for proper and accurate management of land for the security of the different users. Even with Land registration is the process of recording, and in some countries guaranteeing information about the ownership of land either through the storage of contract documents about the land (deeds registration) or by compiling special inventories of land ownership (title registration). The function of land registration is to provide a safe and certain foundation for the acquisition, enjoyment, and disposal of rights in land (Larsson 1991). But with the emergence of Geographical Information System (GIS) which has been another aspect of the revolution of Information technology which is being widespread and accepted by many, this technology has a role to play; some parts of the causes of our environmental problems seem to stem from a lack of useful up-to-date and accurate information. Its role is storing and managing a great deal of data about the images and all the related attributes to allow their manipulation, analysis and finally presentation according to choice. GIS' great ability in presentation facilitates the analysis, computations, prediction and retrieving

through many types of processing, especially overlaying of different layers extracted from multi-date remotely sensed data.

With GIS therefore, land management becomes less tedious and disregards analogue equipment. More details, which are hitherto reduced with the use of graphical format information, are now clearly shown. It is faster, easy and time-saving (Adeniyi P.O, 1991)

2.0 MATERIALS AND METHODS.

Study Area

Parakin Obalufe is an Estate owned by Ife Central Local Government Council. It is located between latitude $7^{\circ} 29.52'$ and $7^{\circ} 31.11'$ North and longitude $4^{\circ} 32.19'$ and $4^{\circ} 33.98'$ East. It covers an area of 294.73 acres. The scheme is situated on the North Western side of Ile-Ife and it is bounded on the North by Obafemi Awolowo University Campus, on the East by Oluorogbo High School, Eleyele layout and Ife Girls High School; on the south by a stream known as Omi Ebo.

Fig. 1: Study Area Map

Table 1: Data Types

S/N	DATA	YEAR	SCALE	SOURCE
1	LAYOUT PLAN	1974	1:1000	ICLG
2	SATELITE IMAGERY	2011	5m	GOOGLE EARTH
3	LANDSAT8 IMAGE	2002	30m	NASA
4	GPS	2015		FIELD SURVEY

3.0 DATA COLLECTION AND ANALYSIS

In this study, two sets of primary data were used; these are the geometric and attribute data.

Geometric data refers to locational data, which include northings, easting and heights, defining the boundaries of the entire area and individual parcel of land.

Attribute data refers to information about individual parcel, such information may include among others: owner's name, age, sex, state, local government area, occupation of owner, use of land, status, building type, certificate of occupancy (number and year), and tenure among others.

For the collection of geometric data for this research, ground survey was carried out in order to obtain the geometric data of Parakin estate to enable us define the boundary of each parcel of land. And for the attribute data, an interview (social survey) was conducted with one of the officers in Ife central local government to get information of the land and its owners.

The scheme of Parakin estate in analogue form was obtained, scanned and georeferenced using an existing georeferenced satellite image 2011 of Ife central local government to subset the area covered by Parakin estate. The study area was digitized in order to convert to digital to be able to manipulate it, then the points collected from the ground survey were overlaid along with the attribute data from the interview and a database was created storing all these data for spatial search operation. Database is the process by which real world entities and their interrelationships are modeled and analyzed such that maximum benefits are derived while utilizing maximum amount of data (Kufoniyi, 1998). The Parakin scheme was also symbolized to show the different land parcel designation. Landuse and landcover in Ife central local government area was subsetted from the Landsat image 2002 using ICLG shapefile and was classified to show the landuse of the study area.

Fig. 2: Flowchart of Methodology

4.0 RESULTS AND DISCUSSION

Fig. 3: Digitized layout plan of Parakin showing plots designation

Fig. 4: LULC of Ife Central LGA with points of plots revoked

Fig. 4.1: LULC of Ife Central LGA with points of plots collected from the field

Fig. 5: Screenshot of satellite image of the study area with part of the database, confirming the accuracy of GIS technology

Fig. 5.1: Screenshot of satellite image of the study area with part of the database, showing up-to-date information of the study area

4.0 CONCLUSION

The application of modern technology is quite helpful in land management; the basic purpose is to provide accurate and easily accessible information. The result obtained from this research shows that the use of GIS technology for land management in Parakin estate can help a great deal in keeping accurate records of land and its owners.

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