

Land use Land Cover Highlight for Jibia Local Government, Nigeria

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ABSTRACT

Land use and land cover is very important for appropriate planning and budget of a community. In Jibia several activities are carried on the land without actually knowing the percentage of the land cover of features. Remote sensing and GIS technology are valuable tools in managing land use and land cover. This research described the land use and land cover coverage of the entire LGA land using Remote Sensing and GIS. Landsat Satellite imagery of 2009 of the study area was processed and classified into 5 groups namely; Build up/sharp sand, Farm Land/trees, Vegetation/shrubs, Water body and Barren land. Statistical analysis was employed to show the percentage distribution of the land. The study shows the percentage coverage of land physical feature which in turn describe the land use. The research revealed that agriculture is the major activity in the study area. It also concluded by recommending the need for adequate measures to avoid desert encroachment and government support to enhance agricultural produce.

KEYWORDS: Land Use, Land Cover, Remote Sensing, GIS

How to cite this paper: Lugga M. S | Babale Z. T | Yamel A. G "Land use Land Cover Highlight for Jibia Local Government, Nigeria" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-4 | Issue-4, June 2020, pp.919-921, URL: www.ijtsrd.com/papers/ijtsrd31134.pdf



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I. INTRODUCTION

Land cover refers to the surface cover on the ground, whether vegetation, urban infrastructure, water, bare soil, or other. Land use refers to the purpose the land serves like recreation, wildlife habitat, or agriculture (NRCAN, 2015).

Land cover and land use are two ways of observing Earth's surface, answering two basic questions: What is this (land cover)? What is it for (land use)? Before being able to answer these questions, it is, however, important to clarify the problem of what objects are to be observed and/or what are the observation units to be considered. Issues such as the complex problem of mixed objects and mapping or statistical approaches therefore need to be dealt with. Land cover, as the observed physical cover, and land use, as the function it serves, are in most cases interrelated (Duhamel C, 2011).

Identification, delineating, and mapping land cover is important for global monitoring studies, resource management, and planning activities. Identification of land cover establishes the baseline from which monitoring activities can be performed, and provides the ground cover information for baseline thematic maps. Land use applications involve both baseline mapping and subsequent monitoring, since timely information is required to know what current quantity of land is in what type of use and to identify the land use changes from year to year (NRCAN, 2015).

Desertification can be by disruption in ecological balance caused by poor land use and ever increasing demand being made on the available resources by the expanding population and socio – economic systems of the affected areas (LCBC,1990).

Land cover can be determined by analysing satellite and aerial imagery. Land use cannot be determined from satellite imagery. Land cover maps can provide information to help managers best understand the current landscape (NOAA, 2020).

The large area coverage provided by satellite sensors can provide data for desertification analysis and land use land cover (LULC) mapping thereby making Remote sensing data and Geographical Information System (GIS) techniques to provide reliable information for spatial modeling in determining the land cover.

This study aims at land use and land cover mapping of the study area using remote sensing and GIS technique.

II. AIM AND OBJECTIVES

The general objective of this paper is to highlight land use land cover in the study area. It was specifically aimed to assess the impacts of desertification by the applications of remote sensing and GIS.

- To perform image classification of the study area
- To perform statistical analysis of the classified image

III. STUDY AREA

Jibia LGA is a Local Government located in Katsina State in the northern part of Nigeria. Jibia sits along on the Nigerian border with Niger, it shares borders with Batsari, Kaita, Katsina and Batagarawa LGA of Katsina State and Zurmi LGA of Zamafara State. The population of the LGA was approximately 169,748 as of 2006 and the area is 1037 Km². The LGA is located within geographical coordinates 13⁰ 05' 30" N and 7⁰ 13' 35".

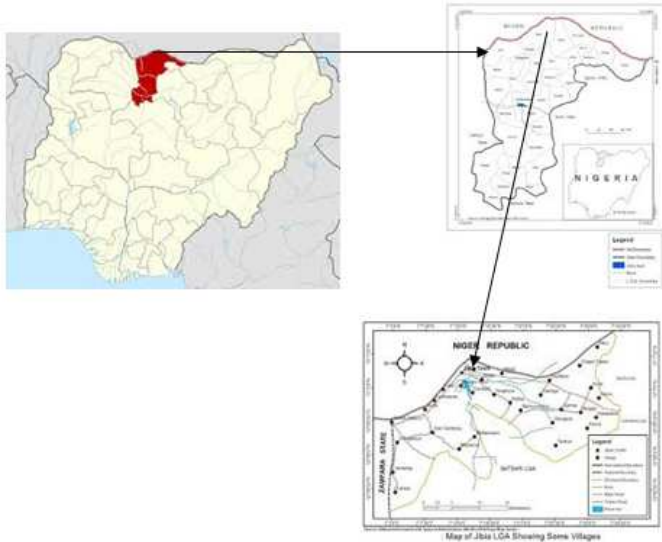


Figure 1: Map of the study area

IV. METHODOLOGY

1. Materials Used:

The materials used are software, hardware and datasets.

The hardware used are :

- A. Laptop computer

Software used

- A. Erdas Imagine 9.1
- B. ArcGIS v10.1 Desktop
- C. Microsoft Excel.
- D. Microsoft word

The dataset used are:

- A. Landsat satellite Image of 2009
- B. Topographic map of Jibia LGA

2. Methodology:

The procedural steps used in the analysis of the datasets in this study are summarized in figure

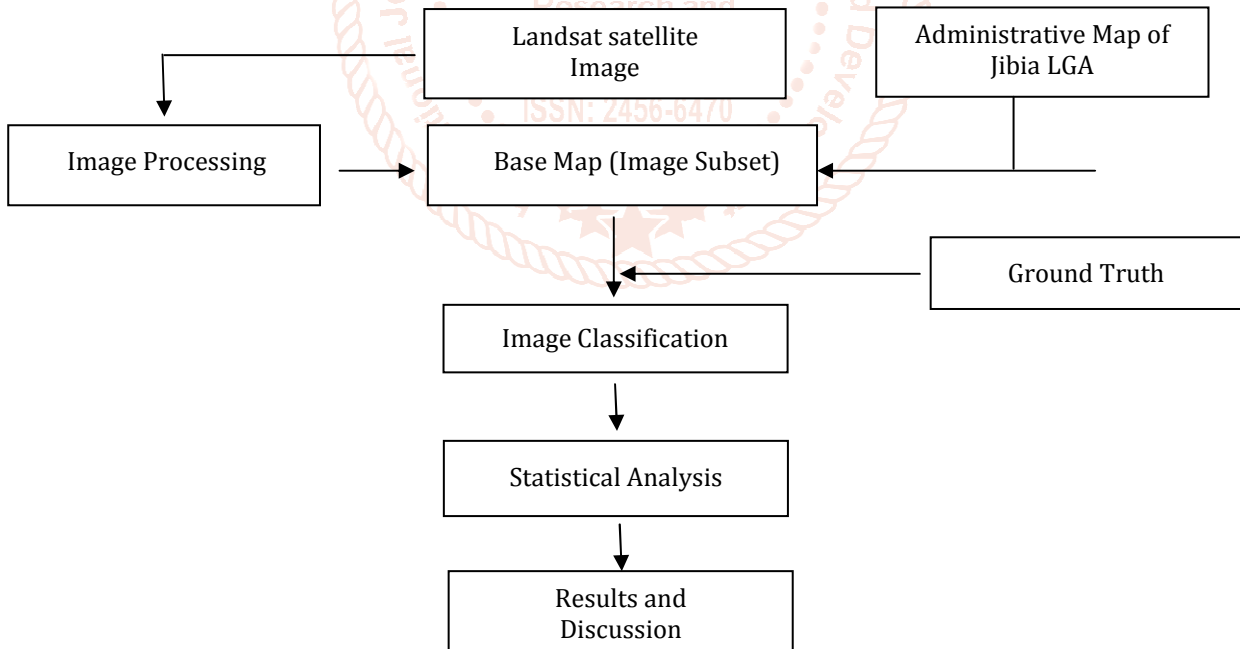


Figure 2: A flow diagram of the steps used in carrying out the research.

➤ **Satellite Image/image processing:** Landsat satellite imagery was obtained for the year 2009. A digital image rectification and restoration was done to correct the distorted image, the digital image was geometrically corrected using geo- referencing so-called ground control point with known co-ordinates to the corresponding pixels in the image. And also image enhancement on the scene (2009) was performed.

➤ **Images classification:** This was done to categorize all pixels in an image into land cover classes or themes. This is either supervised or unsupervised classification. This study used unsupervised classification. Five classes namely barren land, water body, vegetation/trees, farm land/shrubs and build up/sharp sand were selected.

V. RESULTS AND DISCUSSION



Figure 3: Landsat image of 2009

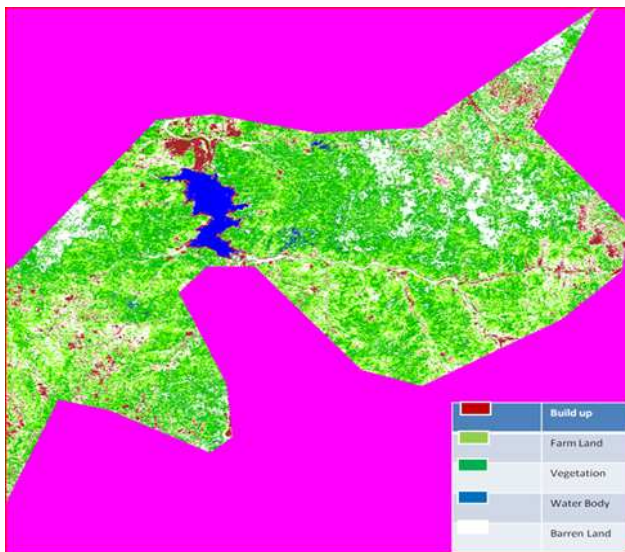


Figure 4: Classified image of 2009

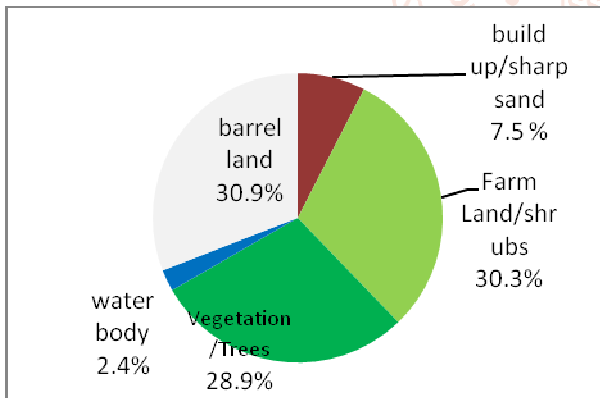


Figure 5: Pie chart of 2009 classified image

Table1: Area and percentage occupied by each class.

Classes	Area(Ha)	Percentage
Build up/sharp sand	8091.100	7.546
Farm Land/trees	32456.07	30.269
Vegetation/shrubs	30943.76	28.859
Water body	2582.23	2.408
Barren land	33152.05	30.918
	107225.21	100.000

From Table 1, figure 5, barren land occupies the largest land area with 33152.05ha (30.918%), followed by farmland/shrubs with 32456.07ha (30.269%) and then vegetation/trees with 30943.76ha (28.859%). Water body covers the least area with 2582.23ha (2.408%) and then build up/sharp sand areas with 8091.1 ha (7.546%).

VI. CONCLUSION

In this paper GIS based analysis of remote sensed data was employed show the land use land cover of Jibia LGA. The analysis shows that most of the occupants in the study area depends on agriculture. It shows the presence of a Dam used for irrigation and other agricultural purposes. 30% are farm lands/trees which is almost four times the builup/sharp sand. Shrubs for grazing and the percentage of barren land may lead to desertification if not tackled on time.

VII. RECOMMENDATION

1. Adequate measures should be taken to avoid desert encroachment.
2. Agricultural support should be given to farmers to improve their production
3. A temporal GIS analysis should be done do detect LULC changes in the study area

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