

# ASSESSMENT OF HUMAN IMPACTS ON LANDUSE AND VEGETATION COVER CHANGES IN MUBI REGION, ADAMAWA STATE, NIGERIA; REMOTE SENSING AND GIS APPROACH

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## ABSTRACT

This paper is an assessment of the impact of man's activities on the landuse and vegetation cover of Mubi region. Landsat MSS Landuse/vegetation image of 1978 and Spot XS landuse/vegetation image of 1995 were used to study the landuse/vegetation cover changes of the region between 1978 and 1995 – a period of 17 years. Ilwis 3.2a, Arcview 3.1 and Idrisi 32 were used for georeferencing, digitizing and map analysis respectively. The methods used for change detection include area calculations (trends, rates and proportion), and overlay for the nature and the location of the changes. The study revealed that 68.08% of the region's land areas were put under man's use in 1978, the percentage increased to 74.82% in 1995. Woodlands, the only natural vegetation cover was also found to decrease from 31.12% in 1978 to 21.60% in 1995. Land degradation was evidenced within the period because 3.58% of the land area has turned into rock outcrops as a result of natural and human activities. For instance 21.27% of the extensive/grazing agriculture land area in 1978 has turned into rock outcrop in 1995. Extensive agriculture, animal grazing, intensive agriculture and irrigation farming collectively reduced 34.10% of the woodlands area between 1978 and 1995. Finally, extensive agriculture, animal grazing, intensive agriculture, tree crop farming and irrigation agriculture were found to be the direct human activities affecting landuse and vegetal changes in the region, while woodcutting, bush burning and road construction were also found to be other possible factors.

**KEYWORDS:** Remote Sensing, GIS, Landuse/Vegetation Cover, Human Impact, and Land degradation

## 1.0 INTRODUCTION:

Mubi region, a small portion of the savanna, covers the semi-arid sudan zone in the north. The sudan zone, which borders the southern fringes of the sahara desert is now subjected to land degradation through human pressure. There is widespread concern that the potentials of the savanna may not be realized in the presence of this pressure and that the civilization that has built up through the ages in the sudan and sahel zones may be threatened (Baltimore 1987).

Since the beginning of the 19<sup>th</sup> C, vast portions of the earth's surface have been modified, whole ecosystems destroyed, and global biomass altered or eliminated (Fellmann et al 2005). The most important of the land surface

changes in this part of the country has been that of man activities, especially grazing, farming, bush burning, wood cutting and other activities such as road construction (Baltimore 1987).

The knowledge about land degradation has become increasingly important as the nation plans to overcome the problems of haphazard, uncontrolled development, deteriorating environmental quality, loss of important wetlands, and loss of fish and wildlife habitat. Landuse data are needed in the analysis of environmental processes and problems that must be understood if living conditions and standards are to be improved or maintained at current levels especially at this population exploding era.

One of the prime prerequisites for land degradation is information on the existing

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**Ikusemoran Mayomilanduse** patterns and changes in landuse through time. The knowledge about human impacts on landuses such as agricultural, recreational, as well as information on their changing proportions, is needed by legislatures, state and local Government officers to determine better landuse policy, to identify future development on pressure points and areas, and to implement effective plans for regional development.

Remote Sensing/Geographic Information System (GIS) have been applied to landuse and landcover change detection all over the world. Mattikalli, (1995), applied Remote Sensing and GIS to the land use of the River Glen catchments in England by acquiring data from 1931 to 1989. His work revealed that much of the grassland changed to arable land during the study area. Musa and Adebayo (2004), applied Remote Sensing and GIS to the study of environmental degradation of Mubi region. The work revealed that much part of the region had been degraded by human activities. This paper therefore sought to assess the impact of these human activities on the land degradation in Mubi region.

### 1.1 The objectives of the Study

The specific objectives include:

- ◆ mapping landuse/landcover changes of Kainji Lake and its environs using Remote Sensing and GIS techniques.
- ◆ to determine the trends, rates, nature, location and magnitudes of landuse and landcover changes of the study area.
- ◆ assessing the location and the percentages of the human impact in relation to the total land area.
- ◆ identifying the main human activities resulting in land degradation in the region

### 1.2 The Study Area

Mubi region of today was the then northern part of old Sardauna province which now forms Adamawa northern senatorial district. The region lies between latitude 9: 30° N and 11: 00° N of the equator, and longitude 13: 00°E and 13: 45°E of the Meridian. The region is bounded in the north by Borno State, in the west by Hong and Song LGAs and in the south and east by the Republic of Cameroon. It has a land area of

4728.77km<sup>2</sup> and a population of 681,353 in the 2006 National population census. Mubi region was part of the Northern Cameroon under the Germans until 1922 when the area was placed by the United Nations, under Britain as Trusteeship Territory. The region was then subjected to the administration of Northern Nigeria. It remained so until 1961 when a plebiscite was conducted for the people to decide either to be part of the independent Nigeria or join Cameroon Republic. The people voted in favour of Nigeria and hence, the Northern Cameroon was incorporated into the Federation of Nigeria on 1<sup>st</sup> June 1961. Thereafter, the erstwhile Trusteeship Province was renamed Sardauna Province in honour of the then premier of Northern region, Sir Ahmadu Bello. The region is now the Mubi Emirate Council. Today, the region consists of five LGAs namely, Madagali, Maiha, Michika, Mubi North, and Mubi South. (Adebayo 2004)

The relief of the region can be divided into three zones: the highlands/mountains ranges which occupy the eastern part of the region along the Cameroon border; the uplands with elevation ranges between 400 and 800m and cover about 40% of the region; and the lowlands zone along river Yedseram especially the western part of Michika and Madagali LGAs. The months of May to September constitute the wet season in the region. Annual rainfall ranges from 900mm to 1050mm. Lithosols, Luvisols and Gleyic cambisols were the main soil type. Mubi region falls within the Sudan savanna belt which comprises grasses, aquatic weeds along river valleys, and dry land weeds interspaced with shrubs and woody plants. Agriculture is a major employer of labour in Mubi region, virtually, all the households in the region engage in one form of farming or the other but mostly at subsistence level. (Adebayo and Daya 2004)

### 1.3 Scope of the Study

For this study, due to inadequate data, the study is limited to latitudes 10°01" to 10°59" and longitudes 13°10" and 13°44", which means that the southern part of the Maiha LGA, covering latitude 9° 30" and 10° 01" are not included in the study.

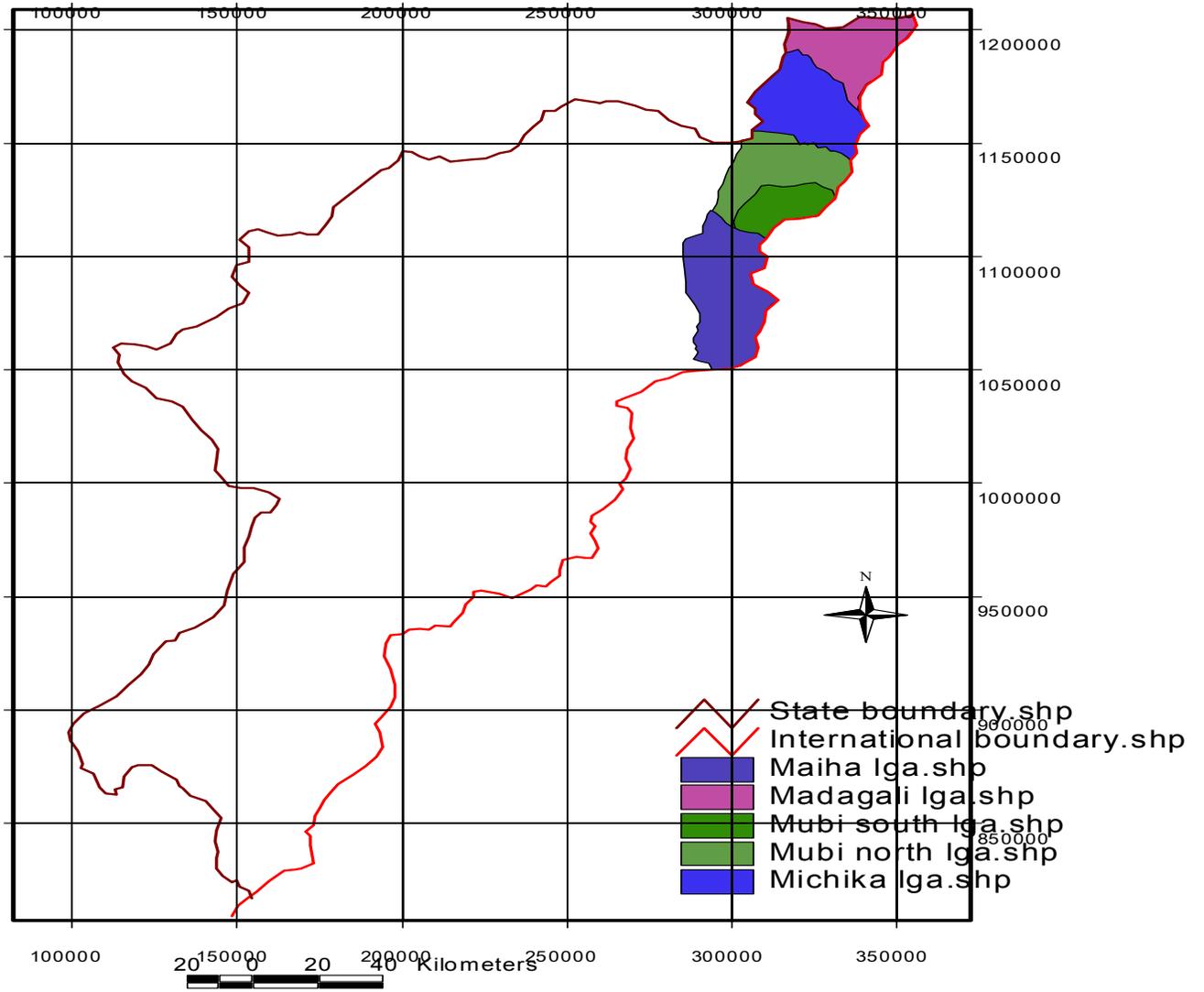


Fig.1: The study Area