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THEME:

Inclusive And Integrated Strategies For African Development: Sustainable Development.

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EFFECT OF ANTHROPOGENIC ACTIVITIES ON AGRICULTURAL PRODUCTIVITY IN PARTS OF BWARI AREA COUNCIL ABUJA, NIGERIA

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Abstract

Anthropogenic activities impact directly and indirectly on people's livelihoods, their vulnerability and food security. The need to focus studies on land degradation in understanding how agricultural systems respond to various changes in the social, economic and environmental context in which agriculture takes place, rather than focus solely on the population pressure as an indicator of the use or the non-use of soil and water conservation technologies. This paper examines the effect of anthropogenic activities on agricultural productivity in parts of Bwari Area Council, Abuja, Nigeria. Qualitative and quantitative research techniques was used. Satellite imagery for 20 years (1998-2018) and structural questionnaires were used. Findings show that deforestation has the highest means score of 10.53 and was ranked the most common source of anthropogenic activity in the study area, followed by overgrazing with 13.10 and was ranked 2nd most source of anthropogenic activities in the area, poor human activities was ranked 3rd with a means score of 10.21 has a source of human anthropogenic activities while over population was ranked 5th with a means score of 4.52. The paper concludes there is little natural vegetation remaining in the area, which should be conserved acutely despite its rapid urbanization. Hence proper planning on future expansion of the area should be based on sustainable practices, if the best and optimum use of land is to be achieved.

Key Words: Anthropogenic, Land degradation and Agricultural Productivity

INTRODUCTION

Human impact on the environment or anthropogenic impact on the environment includes changes to biophysical environments (Sahney, 2010) and ecosystems, biodiversity, and natural resources (Hawksworth, 2008) caused directly or indirectly by humans, including global warming (Cook, 2016), environmental degradation (Sahney*, 2010).* Modifying the environment to fit the needs of society is causing severe effects, which become worse as the problem of human overpopulation continues (Stockton, 2015). Some human activities that cause damage (either directly or indirectly) to the environment

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on a global scale include human reproduction, overconsumption, overexploitation, pollution, and deforestation, to name but a few. Some of the problems, including global warming and biodiversity loss pose an existential risk to the human race (*Perkins*, 2017) and overpopulation causes those problems.

In most parts of the world, land degradation occurs due to human activities and natural factors. According to Ademiluyi *et al* (2008), Africa has among the fastest rates of deforestation in the world associated with competing land uses which are mainly agriculture and human settlements. The rising demand for fuel wood and charcoal is also a major cause of deforestation and land degradation in this region where biomass is the main source of energy for domestic uses. (Matano *et al*., 2015) The high population growth rates and migration in response to shortage of land resources are important factors contributing to the degradation of agricultural land (Diagana, 2003). Maitima *et al* (2004) explained that soil erosion is a common phenomenon in the intensively grazed areas of sub Saharan Africa due to lack of pasture management practices. Here, expansion of livestock farming practices, the increase in their numbers and in some places integration with rain fed agriculture in low potential areas leads to soil erosion. Land degradation by depletion of soil nutrients is widespread in areas of subsistence farming especially as a result of removal of crop residue from farmlands either by burning or for domestic energy.

Anthropogenic activities impact directly and indirectly on people's livelihoods, their vulnerability and food security (McDonagh et al, 2006). Bationo *et al* (2006) stated that land degradation is the most serious threat to food production, food security, and natural resource conservation in Africa. They explained that the African population is trapped in a vicious cycle between land degradation and poverty, and the lack of resources and knowledge to generate adequate income and opportunities to overcome the challenges of land degradation. Due to anthropogenic activities, Net Primary Productivity (NPP) index decreased in South Africa with a 41 per cent reduction in croplands (Bai and Dent

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2007) About 17 million people, 38 % of the South African population, depend on these degrading areas. Using GIS analysis, Kayhko *et al* (2010) demonstrated effects of land degradation on forest resources in Zanzibar, Tanzania.

Land use changes in Nigeria have transformed land cover to farmlands, grazing lands, human settlements, and urban centres at the expense of the natural vegetation (Abdullahi et al., 2010). These changes are associated with deforestation, biodiversity loss, and land degradation (Maitima *et al*, 2009). For example, in the early 2000s, approximately 30 % of Nigeria's land was affected by very severe to severe land degradation and an estimated 12 million people, equivalent to a third of the Nigeria's population, depended directly on that land which was being degraded (Bai and Dent, 2008).

While making an attempt to address degradation issues, the iterative nature of causative agents is given less consideration. For instance, it has become a general tendency to treat increasing population pressure and unsustainable agriculture practices as primary cause of land degradation (Vezina *et al*., 2006), whereas the effects of other socio-economic and environmental factors are under-estimated. This is being echoed particularly by two researchers; firstly by Boardman (2006) who stated that to understand land degradation due to water erosion, "the greatest need is for a full recognition of socio-economic drivers," and secondly, by Jones (1996) who stated, "as the interest of land degradation grows in the field of developmental studies, meanings are implicitly negotiated and Western Scientists begin to revise their worldviews on land degradation." True to saying that land degradation issues are partly socially constructed, both locally and at broader scales (Lestrelin & Giordano, 2007), developmental activities in any form(s) may contribute to causing land degradation (Vezina *et al*., 2006).

Considering all things, the key question which often springs to mind is: should we make a holistic approach to address land degradation issues? Mazzucato and Niemeijer (2000) states: "the need to focus studies on land degradation in understanding how agricultural

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systems respond to various changes in the social, economic and environmental context in which agriculture takes place, rather than focus solely on the population pressure as an indicator of the use or the non-use of soil and water conservation technologies." This is particularly important because efforts towards intervening in ongoing land degradation of any kind may likely change if insights into the socio-economic web of the communities are unravelled. Anthropogenic problems creep in when the society undergoes some kind of transition (Easterling & Apps, 2005), particularly in respect to social and economic terms. This paper examine the effect of anthropogenic activities on agricultural productivity in parts of Bwari Area Council, Abuja, Nigeria.

Study Area

Bwari area council of the Federal Capital Territory (FCT). lies between 9° 08' 25" North and 7° 22' 25" East. Abuja has an area of 8,000km^2 and it lies wholly within the geo-political region referred to as the middle belt, and it forms part of the Guinea Savannah ecological zone (Chup, 2004). Abuja is

bounded to the west and north by Niger State. It also shares boundary with Kaduna State in the North East, Nasarawa State in the West, and Kogi State in the South. A straight line drawn across Abuja from north to south covers a distance of about 87km, and from east to west is about 90km (Chup, 2004).

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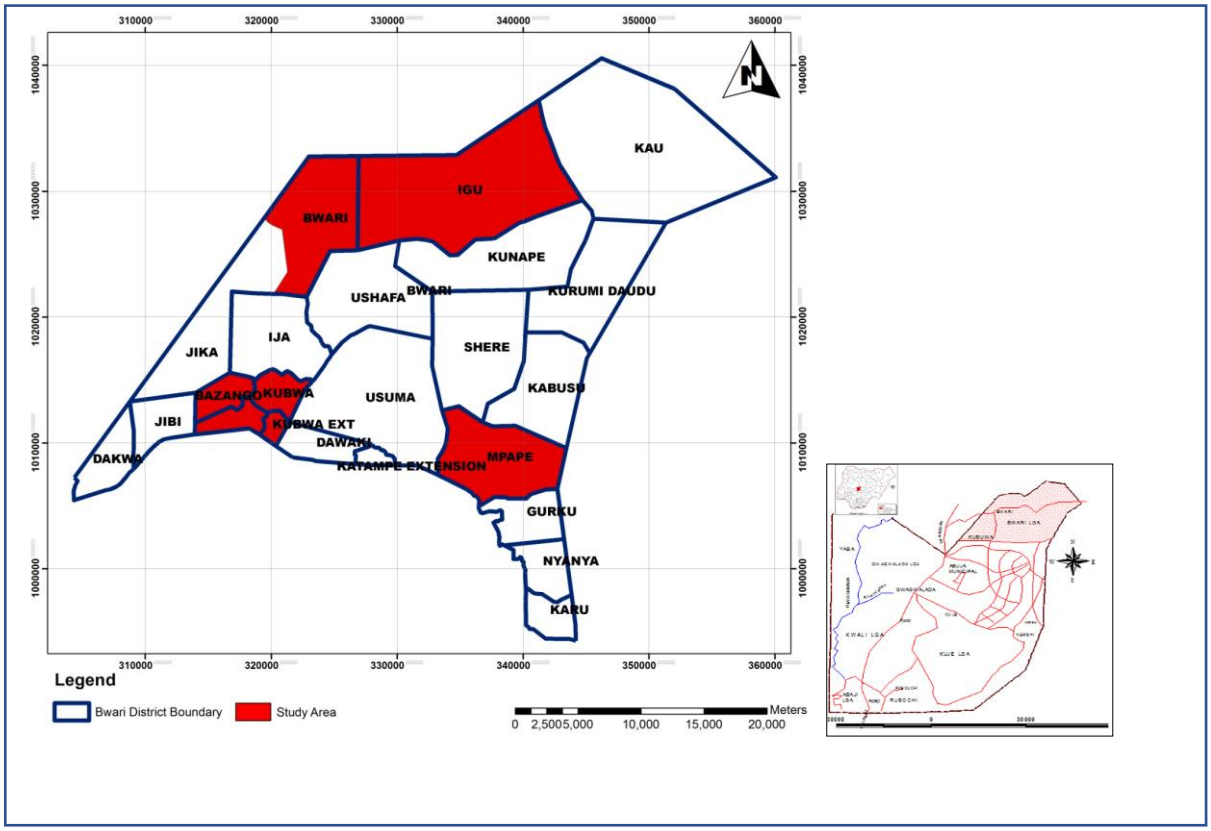

Figure 1: Study Area Map (Source: Geography Department, FUTMINNA 2019)

Methodology

The types of data used comprise both primary and secondary. The primary data were collected from the study area through the field work. It involves the personal observation, structured questionnaire and the used of GPS, while secondary data include satellite imagery (LandSat) for three (3) decade (1987-2017). Change in Landuse over time was detected by comparing the different and level of degradation in the area. Agricultural land will be delineated in order to determine the level of degraded agricultural land. Structured questionnaires were administered to the residents of the study area and its environs. Landsat imagery of the area and its environs was acquired and used to produce landuse landcover of the area. The areas mostly affected by anthropogenic activities were located in the map through several field works using Global Positioning System (GPS). Descriptive and Linkert scale analysis was used to analysis the data.

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Results

Source of anthropogenic activities

Source of anthropogenic activities was examined in the study area using 5 linket scale of analysis, it was discovered that deforestation has the highest means score of 10.53 and was ranked the most common source of anthropogenic activity in the study area, followed by overgrazing with 13.10 and was ranked 2nd most source of anthropogenic activities in the area, poor human activities was ranked 3rd with a means score of 10.21 has a source of human anthropogenic activities while over population was ranked 5th with a means score of 4.52. (Plate I show anthropogenic activities in the study area)

Table 1: Source of anthropogenic activities

Variables	5	4	3	2	1	Mean STD	Ranking	Remarks
Deforestation	7	13	21	35	21	10.53	1st	Strongly agree
Overgrazing	3	7	29	31	27	13.30	2nd	Strongly agree
Urbanization	7	15	27	30	18	9.29	4th	Undecided
Over exploration	9	16	21	32	19	8.38	5th	Agree
Over population	19	19	19	22	18	4.52	6th	Disagree
Poor activities	7	11	32	24	23	10.21	3rd	Agree

NB: 5 = Strongly agree; 4 = Agree; 3 = Undecided; 2 = Disagree; 1= Strongly disagree Source: Authors Field Survey, 2019

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Plate 1: Nature of Anthropogenic activities in the study area

People Involved in Anthropogenic Activities

Figure 2 shows the nature of people involved in anthropogenic activities in the study area, it reveals that 11% of the respondents were residents of the study area, 10% of the respondents were business men, 17 % of the respondents were herdsmen, 27% of the respondents were miners while majority of the respondents were farmers.

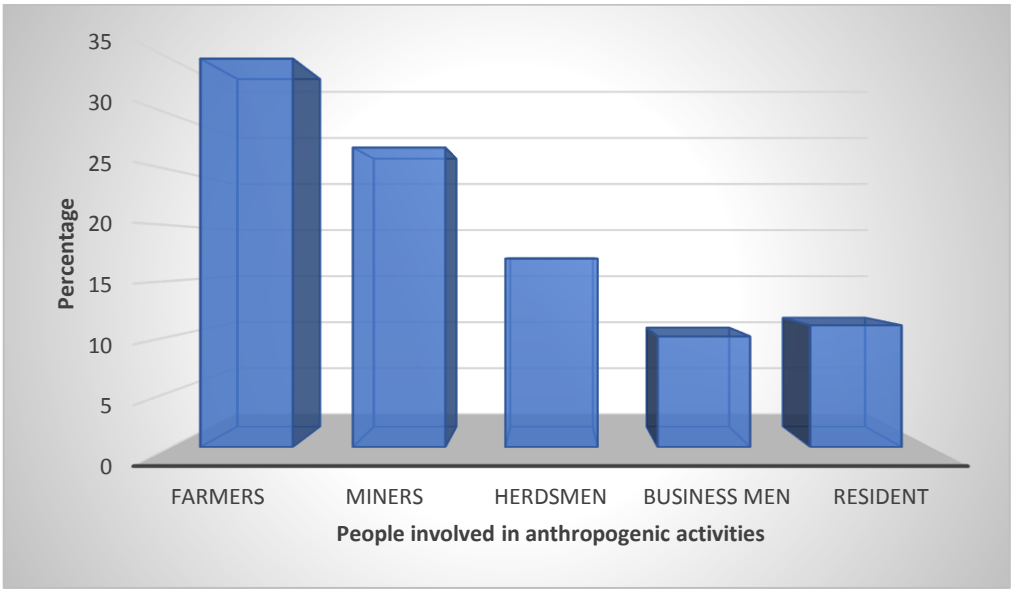

Figure 2 People involve in anthropogenic activities

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Major Anthropogenic Activities in the Study area

Major anthropogenic activities in the study area was reveal in Figure 3, it shows that 17% of the respondent agree that constant graving is the major cause of anthropogenic activities in the area, 22% of the respondent said it is mining activities, 27% of the respondents said it was burning of forest while majority of the respondents said it was regular cutting down of tree.

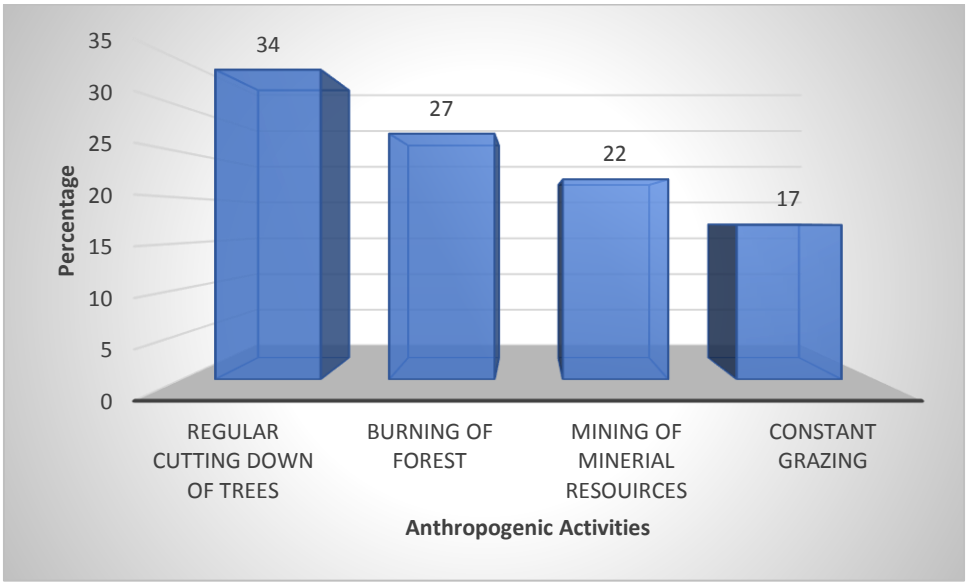

Figure 3: Major anthropogenic activities in the study area

Landcover change based on the anthropogenic activities

This analysis in Figure 4 shows interval between 1998 and 2018, both positive and negative changes in land use and land cover categories were experienced. It reveals that built up areas and farmland increased at the rates indicated therein. The significant rate of change is in built up land which increased at the rate of 72%.

It revealed a tremendous increase residential commercial, industrial, institutional, public and semi public, industrial and road network were classified under built-up area. The built-up area increased from 64.79 kilometres square (km^2) between 1998 to 331.12 km^2in 2008, farmlands for agricultural activities increased from 70.87 hectares in 1995 to 195.54 km^2in 2018.

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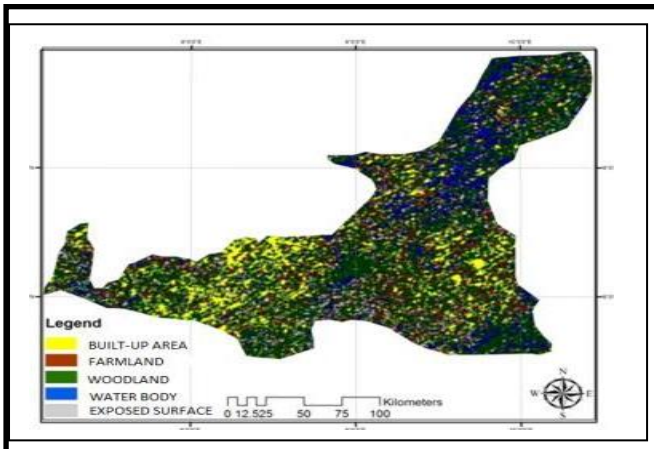
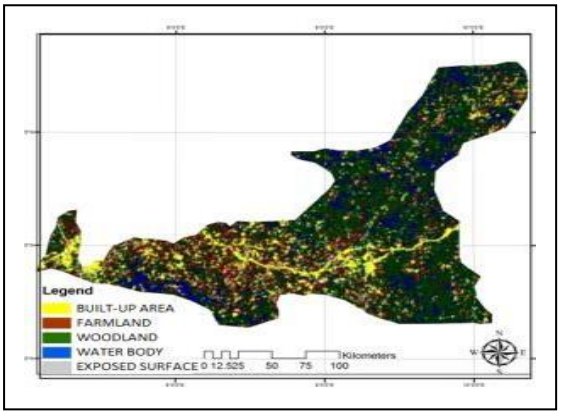
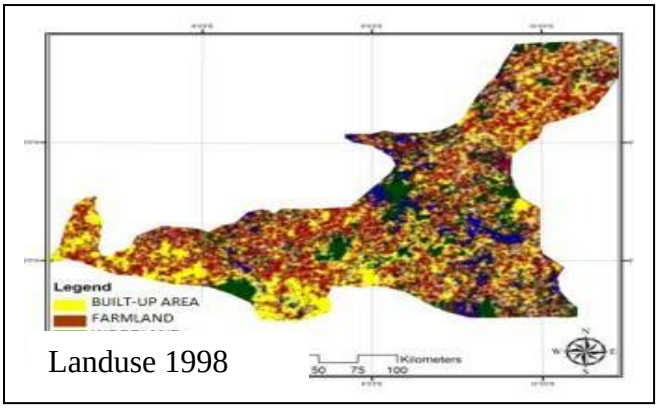


Landuse 1998

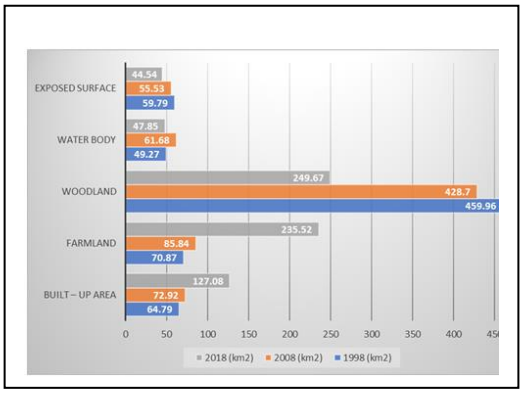


Landuse 2008



Landuse 1998

Landuse 2018



Changes between 1998, 2008 and

Mitigation and adaptation measures put in place in the study area.

Various mitigation measures were adopt by the respondents to mitigate against the effect of anthropogenic activities on landuse in the area, it shows that training programme, increase the area standard management, increase the area of farming encouraging individual, involvement of the local people, intensifying cooperation and encourage the development are some of the measures used by the respondents in the study area.

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Table 2: Mitigation measures

Items	5	4	3	2	1	**Mean STD**
Training programmes	2	9	21	47	32	17.99
Increasing the area.	2	7	30	39	33	16.57
Increase the area of farming	4	15	33	38	21	13.70
Encouraging individual	2	11	31	36	31	14.82
Involvement of the local people	4	7	33	38	29	15.61
Intensifying cooperation	3	8	31	41	28	16.08
Encouraging the development	2	9	21	47	32	17.99
Inventorying degraded lands,	2	7	30	39	33	16.57
Development of a National	4	15	33	38	21	13.70

Conclusion

Despite the fact that the study area is becoming more and more urban, the indigenous landuse type of farm holdings and villages is still in existence. The availability of land in the area which supports agricultural production makes farming the major landuse type and occupation of the residents. However, agriculture doesn't translate to higher income earning, among the different categories of respondents studied in the area, as their overall income still remains low. The different categories of landuse activities in the study area being mapped in this study shows huge and, in some cases, serious degradation. This study would therefore draw the conclusion that as already established, there is little natural vegetation remaining in the area, which should be conserved acutely despite its rapid urbanization. Hence proper planning on future expansion of the area should be based on sustainable practices, if the best and optimum use of land is to be achieved.

To fight with the problems of anthropogenic activities on agricultural productivity in the study area, it is suggested that the use of remote sensing and GIS in conjunction with geospatial data is of vital importance. There is need for the use of an urban information database that can be generated using remote sensing data and GIS techniques. Top priority should

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be given to the issues related to the planned development of the area, in order to reduce land degraded in the future. The paper recommends that land uses that are non-agricultural should be sustainably utilized and areas with natural vegetation should also be reserved with strict laws enacted to maintain them.

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