

## IMPACT OF LAND USE CHANGES ON WELLBEING OF RESIDENTS AROUND ONIGAMBARI FOREST RESERVE IN OYO STATE, NIGERIA

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### ABSTRACT

Land can be put to many productive uses based on man's needs. However, these uses often result in changes in the ecosystem with attendant effects on human wellbeing. Therefore, the impact of land use changes on wellbeing of residents around Onigambari forest reserve in Oyo State, Nigeria was investigated. Multi-stage sampling procedure was used to select 137 respondents for the study. Interview schedule was used to elicit information on socioeconomic characteristics, causes of land use changes, livelihood activities and wellbeing status before and after land use changes. Percentages, means, were used for data analyses. Average age of respondents was  $50.5 \pm 14.47$  years, majority (89.2%) were married, had high literacy level (76.7%), male (68.3%) and had farming as the main source of income (65.0%). Climate change ( $\bar{x}=1.97$ ), loss of fertility and low productivity of lands ( $\bar{x}=1.73$ ) and land fragmentation by inheritance ( $\bar{x}=1.73$ ) were the main perceived causes of land use changes by the respondents in the study area. Overall well-being of the respondents was relatively better before ( $\bar{x}=13.9$ ) than after ( $\bar{x}=9.6$ ) the land use change. It is therefore concluded that land use changes had negative impact on the wellbeing of the respondents in the study area, leaving them worse off. There is need to regulate land use around the forest reserve in order to sustain the wellbeing of residents around it.

**Keywords:** Climate change, Land use, Well-being status, Onigambari forest

### INTRODUCTION

Land and forest have direct impact on human livelihood and well-being; in terms of provision of resources to satisfy human needs, economic development and enhancement of means of making a living. Forest is a renewable natural resource that covers about 31% of the earth (FAO and UNEP, 2020). Forest is important to the existence and survival of man on earth. It provides habitats for vast diversity of plants and animals ranging from microscopic to macroscopic underneath, land and arboreal organisms. Forests play an important role in mitigating climate change by absorbing the carbon dioxide emitted into the atmosphere from human activities, chiefly the burning of fossil fuels for energy and other purposes, into the terrestrial carbon sink. Forests provide food, medicine and livelihoods for people around the world. Forests also play important roles in producing and regulating the world's temperatures and freshwater flows, they provide a cooling effect through transpiration and shade.

Forests contribute to atmospheric moisture and rainfall patterns over land through evapotranspiration. They act as a hub for biodiversity. In addition, forests provide ecological and aesthetic benefits to natural systems and people. They also help in hydrological cycle regulation and protect soil cover (Bracki, 2019; Bennett, 2017; Ali, Riaz and Iqbal 2014; Percy, Jandl, Hall and Lavigne 2003). Although forest is a renewable resource, it is also finite and limited due to rigidity or inelastic nature of land. Likewise, land can be put to multiple uses, and in most cases land covers with forest are totally changed for non-forest purposes. Land use changes

had put forest to irreplaceable risk because forest is losing its intrinsic values and ecological importance.

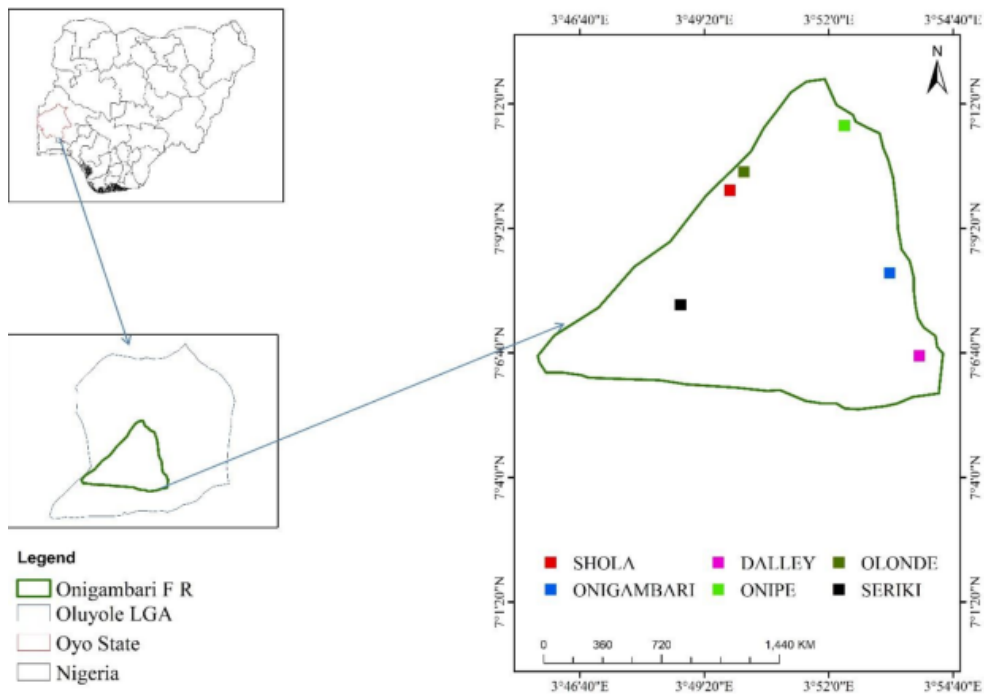
However, land is a fixed asset that supports human livelihoods in different facets of lives. It serves as backbone for agricultural production and an indispensable factor of production of all human needs that promotes economic growth. The basic need of man is the means of survival, which actually is the means of making a living. Human needs are numerous and will want to satisfy all at the same time. But means of satisfaction of these needs are often counterproductive or create conflicts. That is, in a bid to satisfy a need, the satisfaction of another relevant need is been hindered. Land use change is driven by urbanization which is due to increase in human population. But the process of urbanization has continued to impact on the land-use pattern of urban areas, thereby changing the existing land-use which affects agricultural areas, putting food security and people's livelihood in jeopardy. Therefore, land-use change has become an issue of much scientific interest (Saleh, Badr, El-Banna and Shahata, 2014); since it has direct impacts on human livelihood and wellbeing. If this is not put under control; it may hinder the moves to securing sustainable livelihoods as an aim of Sustainable Development Goal 15 (Life on land). Human activities around Onigambari Forest Reserve in Oyo State have caused a number of changes on its ecosystem, resulting in land use and livelihood changes. This trend could have impacted the wellbeing of its residents. The need to empirically substantiate or debunk this thought informed this study. So, this study set to examine the impact of land use changes on wellbeing of residents around

Onigambari Forest Reserve in Oyo State, Nigeria. The objectives of the study are to:

- i. determine the socioeconomic characteristics of the respondents,
- ii. examine the trend in land use changes around the forest reserve areas,
- iii. investigate the causes of land use changes in the study area and
- iv. assess the wellbeing status of residents before and after the land use changes.

**METHODOLOGY**

This study was carried out at Onigambari forest reserve area located in Oluyole Local Government, Oyo State. It is located between latitude 7°26'1"N and longitude 3°51'E. There are 19 neighbourhood villages around Onigabambri Forest Reserve where six villages were selected based on their proximity to the Forest Reserve as shown in Figure 1.



**Figure 1: Map of study area showing the sampled villages in Oluyole LGA**

Data for this study were obtained from primary and secondary sources. Primary data were collected from residents living around the forest reserve area using a well-designed interview schedule. Secondary data was collected from Geographic Information System (GIS) to show satellite imageries of the forest reserve area. The population of this study comprised of all residents living in villages around Onigambari forest reserve area.

Multi-stage sampling procedure was used to select respondents for the study. Onigambari forest reserve was purposely selected based on availability of data in the Forest Department in Oyo State Secretariat. Then, purposive sampling technique was used to select three villages in both sides of forest reserve area, making six selected forest villages. The selections of these villages were based on their proximity to forest reserve area. Also, proportionate technique was used to select 10% of the households of each village to give 137 households out of 1351 households based on population size of each forest village area and

number of households. Then, head of households were randomly selected for the study. Out of 137 copies of questionnaire administered, only 120 (87.6%) were retrieved. The dependent variable of this study is well-being status of residents living around forest reserve area. The well-being of respondents in response to land use change was obtained through psychology scale which includes emotional well-being, economic well-being, social well-being and material well-being components before and after the land use changes. The well-being status was generated by using Z score to get indices of wellbeing before and after which were later categorized as worse off and better off using mean as bench mark. The data collected were analyzed using both descriptive and inferential statistics. The descriptive statistics involved the use of frequency and percentages.

**RESULTS AND DISCUSSION**

Table 1 presents the socio-economic characteristics of the respondents. The mean age of the respondents was 50.5±14.47 years. This shows

that young adults dominated the population. This slightly departs from the findings of Philips and Ceesay (2020) that majority of the people living around Ijaiye Forest Reserve, Oyo State, Nigeria were between the ages of 31 and 45 years and their average age was  $47.5 \pm 13.9$ . Most (68.3%) of the respondents were male. This shows the role that males play as the head of families and in agricultural activities in the study area. This corroborates the report of Philips and Ceesay (2020) that family headship among people living around Ijaiye Forest Reserve, Oyo State, Nigeria was male dominated.

Majority of the respondents in the study area were literate; as only 23.3% had no formal

education. This shows high level of literacy in the study area. This corroborates the report of Faleyimu and Akinyemi (2014) that there is high level of literacy among resident of urban forest in Okitipupa, Ondo State, Nigeria. Majority (89.2%) of the respondents were married. Farming was the source of income of most (65.0%) of the respondents. This shows that farming was the major source of income of the respondents living around the forest reserve which corroborates the report of Ullah, Noor, Abid, Mendako, Waqas, Shah, and Tian, (2021) that the source of income of majority of people in Basha Forest, Baltistan, Pakistan was farming.

**Table 1: Distribution of respondents based on socioeconomic characteristics**

Socio economic characteristics	Percentage	Mean	Standard deviation (n = 120)
<b>Age (years)</b>			
< 31	10.8	50.5	14.47
31 – 40	11.7		
41 – 50	35.8		
51 – 60	16.7		
> 60	25		
<b>Sex</b>			
Male	68.3		
Female	31.7		
<b>Education</b>			
No formal education	23.3		
Formal education	76.7		
<b>Marital Status</b>			
Single	3.3		
Married	89.2		
Widowed	7.5		
<b>Occupation</b>			
Farming	65		
Trading	18.3		
Lumbering	9.2		

**Trend in land use changes around the forest reserve areas**

Table 2 shows that there was gradual loss of forest cover from 95.61% in 1990 to 69.38% in year 2020. The estimated loss of forest cover during this period (1990 – 2020) was about 26.23% at the rate of 0.87% per annum. Farmland was the major

land use that had changed significantly between Year 1990 and 2020 in Onigambari forest reserve. In year 1990, farmlands covered 1.98Km<sup>2</sup> (1.4%) of the land use in Onigambari forest reserve. But in year 2020, the use of land for farmlands had spread throughout all parts of the reserve; it covered about 28.51Km<sup>2</sup> (25%) of the land (Figure 2 and 3).

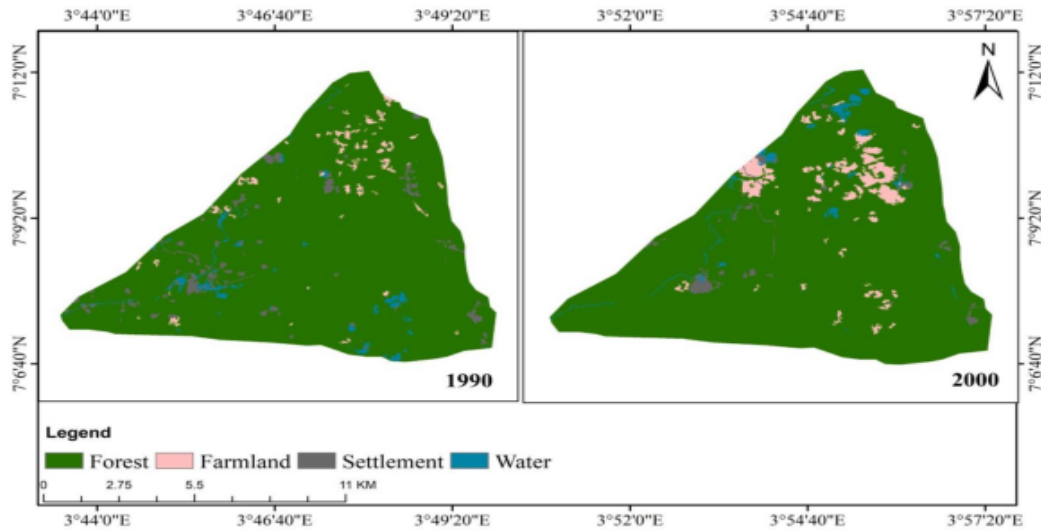


Figure 2: Classified imagery of Onigambari forest reserve, Oyo State (1990 and 2000)

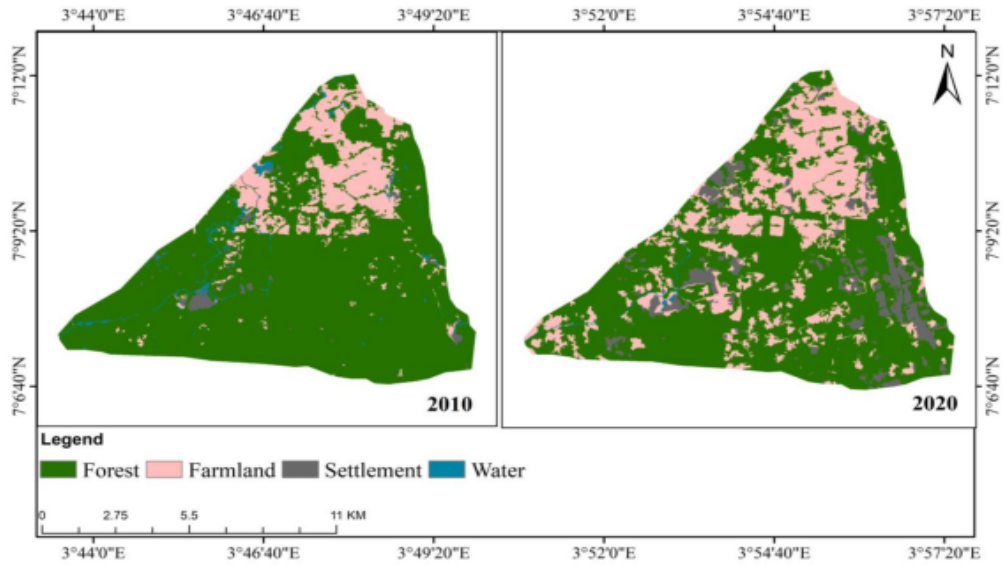


Figure 3: Classified imagery of Onigambari forest reserve, Oyo State (2010 and 2020)

**Table 2: Statistics of classified images**

LULC classes	1990 area Km <sup>2</sup>	%	2000 area Km <sup>2</sup>	%	2010 area Km <sup>2</sup>	%	2020 area Km <sup>2</sup>	%
Forest	106.85	95.61	105.46	92.49	93.41	81.92	74.77	69.38
Farmland	1.978	1.44	5.05	4.53	17.17	15.06	28.51	25.00
Settlement	3.42	1.40	1.77	1.46	1.66	1.46	10.41	4.03
Water	1.77	1.55	1.74	1.52	1.78	1.56	0.34	1.59
<b>Total</b>	<b>114.02</b>	<b>100</b>	<b>114.02</b>	<b>100</b>	<b>114.02</b>	<b>100</b>	<b>114.02</b>	<b>100</b>
Overall accuracy	<b>73%</b>		<b>68%</b>		<b>76%</b>		<b>81%</b>	

Key: LULC – Land use land change

**Perceived causes of land use changes around Onigambari Forest Reserve**

Table 3 shows the perceived causes of land use changes. Various causes of land use change were ranked in order of severity. Climate change ( $\bar{x}=1.97$ ) was ranked as the major cause of land use change in the study area. This could be true due to its impacts on flooding, and land degradation (Ebele and Emodi, 2016). Land fragmentation by inheritance ( $\bar{x}=1.73$ ) and loss of fertility and low productivity of lands ( $\bar{x}=1.73$ ) were ranked second in order of causes of land use change in the study area. Land fragmentation by inheritance will cause land to be divided among families and relatives, therefore individual new landowners can decide solitarily

what purpose the land can be used for. Then the land can be easily sold which increase potential for land use change. Loss of fertility and low productivity of lands could necessitate shifting cultivation in search of fertile land for agricultural production, in which new or virgin land will be opened up for agricultural activities. This is line with the report of Acheampong, Macgregor, Sloan and Sayer (2019) that farmers surveyed and encroached on the adjoining forest for fertile land to cultivate their food crops for consumption. Appiah, Blay, Damnyag, Dwomoh, Pappinen, and Luukkanen, (2009) noted that this process of forest clearing for agriculture is the major cause of deforestation in the Ashanti region and Ghana.

**Table 3: Distribution of respondents based on perceived causes of land use changes (n=120)**

Causes of land use change	Not at all	To a little extent	To a large extent	( $\bar{x}$ )	Rank
Increase in population	0.0	32.5	67.5	1.68	4 <sup>th</sup>
Urbanization	4.2	35.8	60.0	1.56	5 <sup>th</sup>
Sales of land for residential building	8.3	44.2	47.5	1.39	6 <sup>th</sup>
Land fragmentation by inheritance	10.8	5.0	84.2	1.73	2 <sup>nd</sup>
Development of infrastructural facilities in rural areas	6.7	51.7	41.7	1.35	7 <sup>th</sup>
Lack of government regulation on land use	74.2	3.3	22.5	0.48	8 <sup>th</sup>
Loss of fertility and low productivity of lands	8.3	10	81.7	1.73	2 <sup>nd</sup>
Climate change	1.7	0.0	98.3	1.97	1 <sup>st</sup>

Key: ( $\bar{x}$ ) = Mean

**Wellbeing of residents before and after land use change**

Table 4 shows that mean emotional wellbeing of the respondents before and after land use change were ( $\bar{x}=4.09$ ) and ( $\bar{x}=1.78$ ) respectively. While economic wellbeing before and after were ( $\bar{x}=5.11$ ) and ( $\bar{x}=3.22$ ), social wellbeing before and after were ( $\bar{x}=3.11$ ) and ( $\bar{x}=2.64$ ) however, material wellbeing before and after land use change were ( $\bar{x}=1.67$ ) and ( $\bar{x}=1.96$ ) individually. First off, the implication of these results is that respondents' wellbeing components before land use change were better than after land use change except for material wellbeing which was

better off after land use change. This could be because people are able to acquire of material things now due to overall development, technologies and infrastructure in the country. Furthermore, Table 4 revealed that mean of respondents' overall wellbeing before ( $\bar{x}=13.9$ ) was relatively better than their overall wellbeing after ( $\bar{x}=9.6$ ) the land use change with mean difference of ( $\bar{x}=-4.38$ ). This implies that land use changes impacted negatively on wellbeing of the respondents.

**Table 4: Respondents' wellbeing before and after land use change**

Variables	Before land use change	After land use change
Emotional wellbeing	4.09	1.78
Economic wellbeing	5.11	3.22
Social wellbeing	3.11	2.64
Material wellbeing	1.67	1.96
Overall wellbeing before	13.99	9.60
Wellbeing mean difference	-4.38	

#### Well-being status of the respondents before and after land use change

Table 5 showed that generally majority (57.5%) of the respondents' wellbeing were better off before land use change, worse off (54.2%) after land use change while, 55.8% were worse off overall (difference in wellbeing). This means that generally, respondents' wellbeing was worse off after the land use changed. It can also be deduced that land use change has negative impact on the respondents' wellbeing. This may be due to environmental factor, impact of climate change, loss of soil fertility and low productivity of land as discussed earlier being

the major cause of land use change in the study area. This agrees with the report of Deng, Li, Huang, Shi, and Li (2013) that due to the impacts of climate variation and land use change on agro ecosystem services, the outputs humans obtained in agricultural production will decrease, with increase in investment and input production factors such as fertilizers and pesticides. Likewise, Wang, Chai and Li, (2016) reported that although per capita income of residents may be increased, but due to reduction of cultivated land, food security will be threatened, and their purchasing power will be reduced. This will eventually threaten people's wellbeing.

**Table 5: Wellbeing status of the respondents before and after land use change**

Wellbeing status	Before land use change	After land use change	Difference in wellbeing
Worse off	42.5	54.2	55.8
Better off	57.5	45.8	44.2

#### CONCLUSION

Based on the findings of this study, there was land use change as there was gradual loss of forest cover in the study area. Climate change, land fragmentation by inheritance, loss of fertility and low productivity of lands were the major cause of the land use change. There was a negative impact in their wellbeing after the land use changes. It is therefore concluded that land use changes had negative impact on the wellbeing of the respondents in the study area, leaving them worse off. The sustainability of the wellbeing of the people in the study area is a function of the land use changes. Therefore, there is need to regulate land use changes around the reserve in order to sustain the wellbeing of residents around it.

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