

## Assessment of Current Livelihoods of the Communities in Ogun Forest Reserve

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### Abstract

**Background:** The declining forest size as a result of much dependence of people on the forests is a matter of utmost concern. This study assessed the current livelihood of communities in in Ogun forest reserve, Nigeria. The objective is to understand the local livelihood and how it impacts the forest.

**Methods:** Twenty communities were assessed purposively (homogenous sampling) and five hundred and thirty respondents were interviewed randomly. Data were entered in Microsoft Excel 2010(STATA version 13) was statistically analyzed using descriptive statistics and presented as tables and charts.

**Results:** The results showed that the respondents cannot be termed poor and majority of them possess productive assets. The major occupation of the households is farming in either food or cash crops. Only about 18.35per cent have farm size less than 2ha, while the rest have more. The income of the respondents is profitable and rewarding. Households' spending on agricultural supplies and savings are 87.64% and 73.04% respectively. Malaria is the most prevalent health challenge of the respondents with the use of medicinal trees for the cure of their ailments or for prevention of sickness. The type of constraints affecting the livelihood strategy often influences the mitigation measures undertaken by respondents.

**Conclusion:** The study concluded that there is alarming increasing population that is heavily depending on forest for their means of livelihood. Therefore, the government should have a clear defined goal to preserve the forest and provide employment opportunities or alternate means of income for the livelihood of the rural communities.

**Keywords:** livelihood, communities, coping strategy, forest environment

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### I. Introduction

A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. 'A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base'<sup>1</sup>. This definition is a popular definition and has been used by several researchers adopting a rural livelihoods approach<sup>2</sup>.

However, forests are important renewable natural resources generating livelihood requirements for more than 25% of the world's population<sup>3</sup>. The contribution of forest to sustainable livelihoods cannot be overemphasized. It is estimated that about 500 million people across the world depend on forest resources for their livelihoods. In Nigeria for example, over 90% of the rural population, depends on agro forestry for livelihood<sup>4</sup> deriving over 10% of the Gross Domestic Product from the forest sector. Forest resources have been identified as one of key sources for livelihoods and food security of tribal households<sup>5</sup> and it provides a wide spectrum of livelihoods for tribal communities in the form of direct employment, self-employment and secondary employment. The conservation and sustainable use of forest ecosystems and biodiversity is essential to support sustainable development with biological resources providing raw materials for livelihoods, sustenance, trade, medicine and industrial development<sup>6</sup>.The dependence of people on forests for their livelihood and household income varies from 15 to 84% depending on the community and the region<sup>7</sup>.Concern over the fate of the traditional forests and the tribal communities who depend on forest resources for their livelihood has led to strengthen the forest ecosystem and create new forest based employment and income

generation avenues by utilizing the existing renewable resources. Globally an estimated 350 million people mostly in developing countries depend on forest resources as their primary source of income, food, nutrition and medicine<sup>8</sup>.

The long-term contribution of forest resources to the livelihood strategies of the rural poor had long been appreciated as significant<sup>9,10,11,12</sup>. In the forestry context, forest or trees resources that the rural poor can freely access might form a critical part of their lives. A primary role of forest or tree resources in the lives of the rural poor is thus as a “safety net”, as one of many strategies to avoid falling into destitution<sup>13</sup>. In the context of Africa, forests are vital for the welfare of millions of people, especially the rural poor and marginalized, and their wise use could improve livelihoods and quality of life. Over two-thirds of Africa’s 600 million people rely directly and indirectly on forests for their livelihoods, including food security. Wood is the primary energy source of at least 70% of households in Africa<sup>14</sup>. In some situations, forests provide income, in others they act as safety nets for the rural poor. Forests may also fulfill many ecological functions that are vital to the livelihoods of the rural people; for example, they provide habitats for animals and plants and help in water and soil conservation, which are indispensable to the livelihoods of the people.

Furthermore, the multi-functional nature of forests means that they can support and sustain local livelihoods, as well as alleviate poverty in a variety of ways, and also support Africa’s economic, social, cultural and environmental development, especially in rural areas. Natural and planted forests represent more than natural capital. They contribute to human capital by providing arrange of goods, such as wild game, fruits or traditional medicines that improve health<sup>15</sup>. Income from the sales of forest products, such as woods, medicinal herbs, gums, latex, resins and spices, provide financial capital that can be used as working capital for trading activities or to educate children<sup>16</sup>.

Since time immemorial, forests and their associated products have remained essential in sustaining livelihoods and about 1.6 billion people globally are substantially reliant on forests for livelihood sustenance<sup>17</sup>. Similarly, numerous studies on forest-livelihood nexus have demonstrated the critical role of forests in livelihood sustenance and diversification and as a pathway for poverty alleviation<sup>18</sup>. However, some people depend solely on forests as their only source of subsistence, with its contribution sometimes being found to offset other household livelihood portfolios such as agriculture<sup>19</sup>.

Notably, <sup>20</sup>providing alternate source of income for the livelihood either through employment opportunities or by a source of income from cultivation will help reduce the pressure on protected area. Similarly, <sup>21</sup>low forest productivity, with ever-increasing loads of local livelihoods, has generated a progressive vicious circle, leading to drastic qualitative and quantitative depletions of forest resources, and this has added much to the adversities of climate change. The African forests are no exception. For millions of people living in forest environments, the forest forms a dominant part of their physical, material, economic and spiritual lives, but its importance is often undervalued.

Also, extensions of social forestry programmes to reserved and protected forest lands with the participation of local people in management of the protected area ought to be promoted by developing participatory management plan. Furthermore, <sup>22</sup>the more income from outside and the more savings, the fewer households rely on forests. The higher the non-forest income of households, the less dependent is the household on forest, which is in agreement with other<sup>23,24,25,26</sup>.

Also, the importance of forests and forestry sector to Nigerians and the economy cannot be overstressed, as they have contributed to sustenance of people's livelihoods and generation of income for governments both in the past and currently. In spite of this, reliable database that gives accurate extent of forest in the country is not presently available, thus, various estimates for forest size exist in literature. There is an almost unanimous agreement that the country's forest estate is progressively declining in size, perhaps worsened by the lack of any current management plan for managing forests in the country. These have not only hampered many of the country's forest management strategies, they have also limited the potentials toward many incentives and benefits accruable to countries and communities with increasing forestland cover.

The forest, as well as providing a wealth of material outputs of subsistence or commercial value, is the basis for livelihood systems based on hunting and gathering, or of rotational agriculture systems that depend on the ability of bush fallow to revive the productivity of the land. The forest thus constitutes an integral part of the habitat and of the social and cultural structure of those living within it. However, rather than only evaluating the importance of forest resources based on the number of people depending on them, it is even more important to understand the local livelihood and how it impacts the forest. In view of this, we hypothesize that the current livelihood of the respondents are dependent on the forest.

## II. Methods

### Study area

The study was taken in Omo Biosphere Reserve, Ogun state which derives its name from River Omo that traverses it. It is located between latitudes 6° 35' to 7° 05' N and 4° 19' to 4° 40' E in the Ijebu area of Ogun State in southwestern Nigeria. The Reserve was constituted in 1925 and covers about 130 500 hectares in which 460 hectares is the *Core Zone (Strict Nature Reserve)*, 14,200 hectares is the *Buffer Zone* and 115,940 hectares is the *Transition Zone*. The Reserve is in the mixed moist semi evergreen rainforest zone. The northern parts of the Reserve is relatively dry forest with typical species such as *Sterculiarhinopetala* while *Naucleadiderrichii* and *Terminalia superba* are common in the wetter central parts. In the wet forests on sandy swampy soils in the south *Lophira* and trees in the *Meliaceae* family are common.

### Design and Sampling

A Geographical Information System (GIS) spatial coverage of the district and the location of the communities were mapped. In order to minimize selection biases, homogenous sampling was used; this is to observe closest communities or enclaves to the forest. Twenty communities were sampled out of which five hundred and thirty four sampled households were interviewed from the biosphere reserve communities. Random samples were drawn from each of the community for the sample on a proportional basis. A 5% sampling target was set purposively for each community within the survey. In survey research, a 5% sample size is considered sufficient<sup>27</sup>.

### Data Analysis

The data were mainly primary data with the use of questionnaires and trained interviewers that communicated in the local languages in respect to evaluate and assess rural household livelihoods, and their livelihood strategy within the communities. Focus group discussions was also carried out to elicit the people's opinion about their livelihood strategies.

Household survey data were entered into a Microsoft Excel 2010 database and was statistically analyzed using STATA version 13. Basic descriptive statistics and frequency tables were used to summarize the answers to each of the household survey questions in order to understand different livelihood strategies and contributors to wealth. For this study, the livelihood framework was used in the research process and served as a guide when designing the household survey. Questions were formulated to collect household data to assess their asset or capital status, these capitals include; natural, physical, human, financial, and social. Questions were also designed to understand how households cope with shocks, trends, and seasonality.

## III. Results

### Types of Assets Owned by Respondents

It is indicated (Table 1) that 80.52 per cent of the households had at least a radio which left the asset in the class of majority and cannot be thus classified as a wealth indicator. This is similar to assets such as cell phone, bank account, and mattress (>50%). However, assets such as axes, cutlass, hoe are termed productive assets and are owned largely by not less than 90 percent of the interviewed households. There are few exceptions that also possess nonproductive assets as some businesses cannot operate without these types of assets. Some ( 40.3%) need motorbike to carry their produce to the farm as means of transportation and commercial purpose during off season. A few (5.6%) also have car/truck as well for means of transport and commercial purpose.

**Table 1: Types of Assets Owned by Respondents**

Assets	Number	Percentage
Radio	430	80.52
Bicycle	20	3.75
Generator	107	20.04
Motor Bike	215	40.26
Car/Truck	30	5.62
Cell Phone	492	92.13
Bank Account	310	58.05
Axe	496	92.88
Cutlass/Large Knife	534	100
Hoe	502	94
Beds/Bedmat	498	93.26
Goats	0	0
Sheep	0	0
Chicken	238	44.57
Cattle	0	0
Others Specify	115	21.54

\*Other assets include such items as; dogs, lamp, tools, kitchen utensils, furniture..

**Income Distribution of the Respondents**

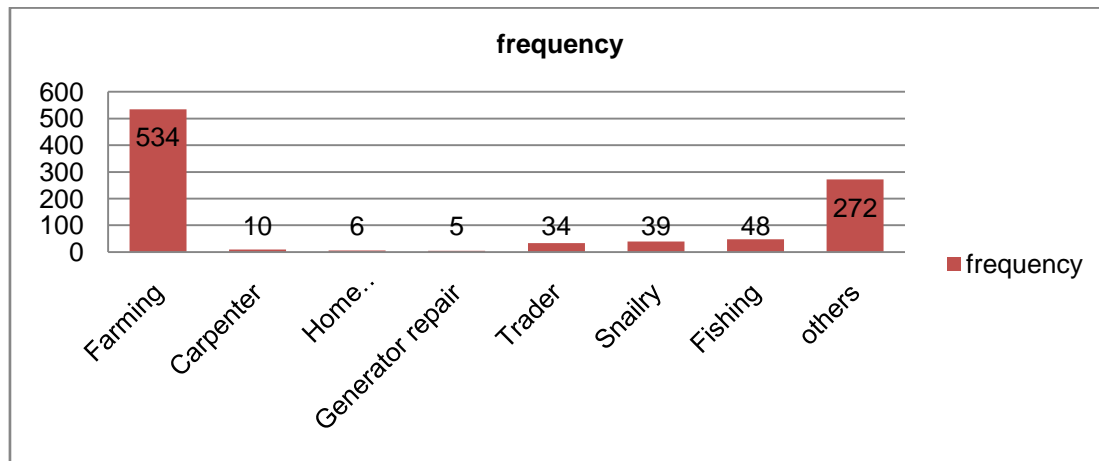
The result (Table 2) revealed that background information collected about annual income of the respondents’ shows that above average (58.05%) of the respondents have a relatively medium income, while only 7.68 per cent have high income. However, 34.27per cent of the respondents have low income.

**Table 2: Income Distribution of the Respondents**

Income(Annual/₦)	Frequency	Percentage
Low <500000	183	34.27
Medium 500000 - 1000000	310	58.05
High >1000000	41	7.68
Total	534	100

**Distribution of Major Occupation of the Respondents**

Identified livelihood sources in the study area (Fig.4.1) include farming, (which is the most prominent) fishing and snailry. other respondents’ (272) are involved in civil service (teachers), mechanic, sawmilling, casual trading, driving and welding works. The whole sampled population (Fig. 1) is engaged in farming even though it is just only for their household use. Howbeit, others are engaged in other occupation as means of livelihood. Identified livelihood sources in the study area include farming, (which is the most prominent) fishing and snailry. Other respondents’ (272) are involved in civil service (teachers), mechanic, sawmilling, casual trading, driving and welding works.



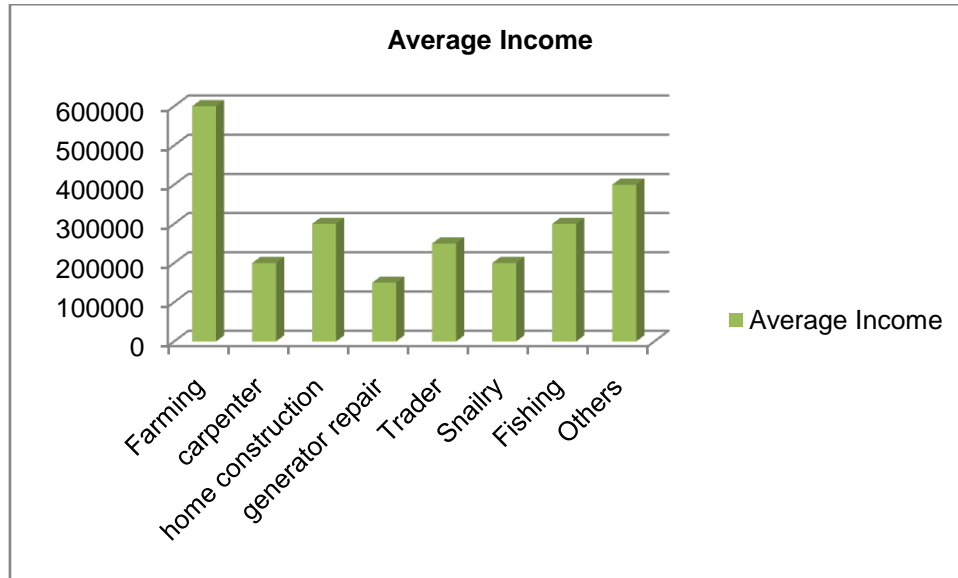
Others: civil servants (teachers), mechanics, sawmillers, casual trade, drivers, welders etc.

**Figure 1: Distribution of Major Occupation of the Respondents**

**4.2.3 Distribution of Household Skills by their Average Income**

Linking annual income to livelihood sources (Fig. 2), the study found that farming command the highest average annual income followed by other livelihood sources like teaching, mechanic, sawmilling, driving and welding works. Although the respondents did not split their income for those who combine other work with farming. Therefore, the actual average income of the particular occupation could not be verified.

Home construction and fishing were reported to have similar average yearly income of ₦300000 (Fig. 2). Traders have an average yearly income of ₦250000. Snail farming is reported to have a yearly average income of ₦200000 while generator repair have the least yearly average income of ₦150000.



\*Others; teachers, mechanics, drivers, welding, sawmill, casual trade etc.

**Figure 2 Distribution of Household Skills by their Average Income**

**Distribution of Respondents according to Farm Size**

The most common farm size in the study area was 5-6 hectares (23.2%) followed by those farming on 1 – 2hectares of farm land (18.4%) as shown in Table 3. Respondents with 9 – 10 hectares are the least common (0.9%).

**Table 3: Distribution of Respondents according to Farm Size**

Farm size( Ha)	Frequency	percentage
1 to 2	98	18.35
3 to 4	267	50
5 to 6	124	23.22
7 to 8	40	7.49
9 to 10	5	0.94
<b>Total</b>	<b>534</b>	<b>100</b>

**Health Challenges of the Respondents**

Among health challenges identified in the study area (Table 4) malaria was perceived to be the most prevalent (64.04%). This was followed by measles (50.4%) which was said to occur in both young and old most especially during dry season and ulcers (26.78%). But while there were no cases of internal infections and AIDs, hypertension was the least perceived health challenge in the study area. Other sicknesses include diarrhea, skin infections, hypertensions, and typhoid which have 10 per cent, 14.6 percent, 5.2 percent, and 2.06 percent respectively. Less than 1percent experience respiratory disease like catarrh while accident victims (most especially motorbike accidents) have 7.3 per cent of the total respondents.

**Table 4: Distribution of the Respondents by Health Challenges**

Sickness/Disease	Frequency	percentage
<b>Malaria</b>	342	64.04
<b>Diarrhea</b>	54	10.11
<b>Measles</b>	269	50.37
<b>Respiratory</b>	5	0.94
<b>Internal Infections</b>	0	0
<b>Skin Infections</b>	78	14.61
<b>Hypertensions</b>	28	5.24
<b>Ulcers</b>	143	26.78
<b>Mental Illness</b>	0	0
<b>Accident</b>	39	7.3
<b>AIDS</b>	0	0
<b>Typhoid</b>	11	2.06
<b>Others</b>	36	6.74

\*others-unexplainable types of fever, tiredness etc

### Agricultural Crops Cultivated

The study (Table 5) also documented agricultural crops cultivated by rural households for income, direct consumption or both. The most commonly cultivated crops for consumption include; maize, vegetables, cassava, mango, orange, yam/cocoyam and plantain. Other cultivated crops for consumption include; sweet potatoes, pineapple, cashew and watermelon. The most commonly cultivated crops for income were; cocoa, plantain, orange, palm kernel, kola, cassava, maize and mango. Other crops include: vegetables, pineapple and cashew.

**Table 5: Agricultural Crops Cultivated**

Crop	Consumption		Sale	
	Frequency	Percentage	Frequency	Percentage
maize	413	77.34	100	18.73
cassava	218	40.82	116	21.72
yam/cocoyam	203	38.02	12	2.25
cocoa	0	0	404	75.66
watermelon	33	6.18	0	0
plantain	125	23.41	366	68.54
sweet potatoes	45	7.43	30	5.62
palm kernel	13	2.43	189	35.39
vegetables	268	50.19	56	10.49
kola	20	1.76	142	26.59
orange	118	22.1	222	41.57
pineapple	64	11.99	60	11.24
mango	244	45.69	101	18.91
cashew	48	8.99	54	10.11
beans	0		0	0

### Use of medicinal trees

Table 6 shows a summary of the importance of medicinal trees to rural households. The respondents were asked to state three types of medicinal trees they collect and what they use them for. In counting of the most common plants mentioned by the respondents, many households, more than 80 per cent reported the use of traditional medicines, and the wealth of households did not significantly contribute to traditional plant use. The average number of times per year household members collect their own plants for medicine varies per year. Overall, households that use traditional plants acquire their plants by collecting directly from the forest. The minority of households reported (4.02%) that they do not use traditional medicines.

**Table 6: Use of medicinal trees (n=534)**

Local names	Botanical Names	Uses	Consumption	Percentage
Yaani	<i>Enantra Chlorantha</i>	Malaria	460	86.14
Mahogany	<i>Kaya Gradifolia</i>	Malaria, Typhoid	363	67.98
Mango	<i>Magnifera indica</i>	Malaria, Typhoid	420	78.65
Neem	<i>Azadraetha Indica</i>	Jaundice, malaria, Liver problems	442	82.77
Bitterleaf	<i>Vernima Amygdalina</i>	Measles, Malaria,cleanser	386	72.29
Scented Leaf	<i>Oceimum gratissimum</i>	Diarrhea, Pile, Malaria	316	59.18
Cashew	<i>Anacardium occidentaos</i>	Diabetes, Malaria, Jaundice	289	54.12
Aloe Vera	<i>Aloe barbadensis</i>	Digestive problems, heart	204	38.2
Ahun	<i>Alstonia boneii</i>	Yellow fever, Malaria, typhoid	334	62.55
Lime	<i>citrus autafolia</i>	Cough, Catarrh, infection	375	70.23
Oro Wewe	<i>Euphorbia laterifolia</i>	Skin diseases	414	77.54

### Frequency of households spending

Table 7 shows where households spend their income and the percentages of households' spent income in each of these areas. The areas include paying debts (45.5 per cent), putting money into savings (73.04%), transportation (51.69%), food (71.54%), agricultural supplies (87.64%), school fees (36.89%), medical fees (16.29%), clothes (66.29%), and farm labor (46%). Other items category includes; business expenses, fuel, vehicles, and bicycles etc.

**Table 4.7:** Frequency of households spending

Expenditure	Frequency	Percentage
pay existing debts	243	45.5
put it in savings	390	73.04
transportation	276	51.69
purchase food	382	71.54
Agricultural supplies	468	87.64
school fees	192	36.89
medical fees	87	16.29
clothes	354	66.29
Labor	247	46
Other	399	74.72

**Constraints to livelihood and coping strategy**

The type of constraints affecting the livelihood strategy often influences the mitigation measures undertaken by farmers in the study area. The study established that factors beyond farmers control relating to climate change affect farmers’ livelihood strategies, with varied consequences to their livelihood outcomes and the physical environment on which they depend for their wellbeing. The respondents indicated that high invasion of pest, period of hunger, crop loss, illness and labor formed the bulky of farmer’s constraints to adequate crop production.

89.4 percent indicated the use of pesticides to combat pest invasion on about 94.7 per cent of the farmers who identified pest as a major constraint while the differential resort to other indigenous method. 44.53 per cent indicated illness as constraints to their livelihood strategy; this is remedied by the use of medicinal trees by 96.7 percent and 13.9 percent who visit hospital respectively. Shortage of labour (52.65%) was another constraint affecting the farmers and to mitigate these problems, some farmers 66.9 per cent resorted to the use of hired labour.

Hunger (63.45%) and crop loss (62.76%) are also some of the frequent constraints the households face. Hence, 89.23 per cent resorted to buying foods during this period of food insecurity. Others constraints were theft 32.19per cent, but interestingly about 25.7per cent indicated the use of traditional method of wading thieves off their farm. These include tying red cloth, using snail shells, clothes with old cowries, etc. Death constraints have 1.78percent of the respondents either due to sickness, accident or old age.

**Table 8: Constraints to livelihood and coping strategy**

Constraints	% of Farmers Indicating Constraints	Mitigation Measures	% of Farmers Identifying Indicator as Coping Strategy
Hunger	63.45	Buying Foods	89.23
Crop loss	62.76		
Illness	44.53	Use of Medicinal Trees/Hospital	96.7/12.8
Death	1.78		
Shortage of Labor/Income	52.65	Use of Laborers	66.9
Theft	32.19	Use of traditional means	25.7
Damage to or Loss of Dwelling or other structures	18.41		
Bush Fires	20.82		
Pest	94.70	Use of Herbicides	89.4

**IV. Discussions**

Summarily, the majority of the sampled households can be classified as medium in wealth status. It is possible that the more capital assets households are endowed with, the more they diversify into different livelihood activities<sup>28</sup>.

The productive assets largely owned by majority of the households made them not to be termed poor. This is confirmed<sup>17</sup> that households with the capacity to acquire productive assets such as more land, labor, livestock, seeds, and tools were less likely to be defined as poor, and that productive assets were useful in defining poverty at the household level. During the period of study, it was discovered that a large number of the respondents have houses in the town/cities and do only migrate for farming purposes. Therefore, it will be misleading to draw inference solely based on the assets declared within the forest environment where they farm.<sup>29</sup> Forests can increase the resilience of communities by providing food, wood energy, shelter, fodder and fiber,

as well as by generating income and employment to allow communities and societies to prosper, and finally by harboring biodiversity. Important assets like livestock, goats, and sheep are forbidden to be reared therefore none of them possess such assets within the forest environment.

It is observed that there is a clear income group differential among the respondents. Income is generally taken as an index of social status and influence of a person. Though, income is not an exclusive basis of influence but certainly an important basis. Although, it was noticed that most of them tend to hide information regarding their actual income, this is because most of the residents are living in illegal communities springing up as a result of weakness in monitoring on the part of the forest managers and the government. But, their continued migration is an indication that their farming business is profitable and rewarding.

Following the scholarly<sup>30</sup>, a livelihood comprises of the capabilities, assets (stores, resources, claims and access) and activities required for a means of living. The outcome of the focus group discussions confirmed that fishing and snail farming happen to be mostly practiced after farming in which women are also actively involved in these forms of trade. The average yearly income in farming was the highest and connotes the main reason for large communal existence. According to 1992 report,<sup>31</sup> total population of the inhabitants of the forest was about 20,000 people. It has since then risen to alarming population over the years. The total population estimates of 20 communities sampled out of over 400 communities now present were 10,395 people. The population will continue to increase until a more compelling measure is put in place.

Presently, the environment is still in a state of continual development which in turn is already hampering the forest. As greater the challenge of feeding the ever increasing population, the remaining forest should be preserved as it has greater benefits for both human and the environment.<sup>32</sup> Nearly half (49%) of all recent tropical deforestation is the result of illegal clearing for commercial agriculture. The study also finds that around half of this illegal destruction was driven by overseas demand for agricultural commodities including palm oil, beef, soy, and wood products. In addition to devastating impacts on forest-dependent people and biodiversity, the illegal conversion of tropical forests for commercial agriculture is estimated to produce 1.47 giga tonnes of carbon each year. Other occupational activities were perhaps giving a satisfactory yearly average income enough to keep the households within the environment inasmuch as food is secured.

Based on research studies, there has been a long debate between farm size and productivity of farmers, while some found an inverse relationship between farm size and productivity<sup>33</sup>, other studies show that larger farms could be more efficient than smaller farms by adopting advance technology and proper monitoring<sup>34</sup>. In addition to carrying out studies,<sup>35</sup> the evidence on the farm-size efficiency relationship is mixed. It is important to clearly define the terms and methodologies adopted in investigating the relationship between farm size and the efficiency of farms based on the particular region. However, from this study, proper monitoring of labor and cost incurred on the farm investment yielded increase in productivity.

Conclusively, malaria is the most prevalent health challenge of the respondents. It was gathered from various studies that that the mosquitoes that transmit malaria (called "vectors") breed more readily in places where forest has been cleared<sup>36,37,38</sup>. In other words, malaria is prevalent in a human infested forest where their various activities have changed the originality of the forest. The rate of occurrence of malaria to other ailments was high in the study area signaling an agreement with the various previous studies above that malaria prevailed more in an environment where there are lesser trees, mostly in a human populated environment.

Other ailments such as measles usually accompany malaria. Interestingly, some complained of ulcer which likely occurs as a result of early rise to the farm without taking breakfast oftentimes. Skin infections results from insect bites causing rashes.

The rich soil and vast land has however encouraged cultivation of crop over time. In addition, the Ministry of Agriculture also has an office within the forest zone to collect revenue on farm produce activities within forest sanctuaries. However, the Ministry of agriculture deals with schedule crop produces (Cocoa, palm kernel, rubber, kola nut) to be graded in terms of quality control before exportation in order to ensure they are free from unwanted elements e.g. stone. This contrasting objectives are not clearly defined by the government hence the people that are supposed to be part of forest conservation are destroying it for lack of clear knowledge.

Predominantly, almost the entire population of the rural sampled households makes use of medicinal trees for the cure of their ailments or rather for prevention of sickness. This is in agreement with recent<sup>39</sup> estimate that 80 percent of people worldwide rely on herbal medicine for some aspect of their primary health care needs. Around 21,000 plant species have the potential for being used as medicinal plants.

Although, knowledge and preferred choice of plants differ from one household to another which makes documentation of these medicinal plants and their various uses to wane overtime due to poor handling from one generation to the other. This is similar to the research<sup>40</sup> which showed that the knowledge on the use of medicinal plants is enormous but if this traditional knowledge is not rapidly researched and recorded, indications are that it will be lost with succeeding generations. However, as the demand and awareness of medicinal plant continue to increase in this age, there is need for conservation of these plants and sustainable use



of them. The prevalent illness derived from the uses of the medicinal trees indicates that malaria is the most treated ailment in the study area.

Household spending is an essential part of aggregate demand. As the income increases, types of goods or services in which households spend on differs. While low income earners will spend on the basic needs e.g. food, shelter, transport and clothing, high income earners will spend on luxurious goods or better still save to wait for investment opportunities. In this study, household spending is another means to determine the wealth status and the strength of the livelihood of the respondents because as income rises so does spending. Over 70 percent of the sampled household put their money into savings while 87.64percent spends on agricultural supplies which can be categorized under productive assets. This is an indication that the sampled households are making a reasonable sustainable income in the forest environment on their farming business. Spending and saving are mutually exclusive, which indicate that if income is fixed, any change in households' savings will inversely affect spending and vice versa. Although, economy doesn't benefit as much when increases go toward high income earners because they are more likely to save or invest additions to income instead of spending. The spending on farm labor by the respondent is relatively around average despite the fact that they usually make use of labor. This can be explained by the fact that part of the labor they hired overtime became residents of the environment having their own farmland as well after observing that the environment is good for farming. Therefore, some of them pay off their land rentage/usage with their labor to the village heads. The households spend less amount on medical bills due to the immense use of medicinal trees for their health needs except in case of serious ailments e.g. accidents, in which they go to the hospital for proper treatment.

The rising threat of pests accompanying climate change directly affects the global food supply meaning this problem will only get worse as the climate warms<sup>41</sup>. This warm climate is becoming more vividly noticeable at Omo forest where the elderly of the respondents complained that a lot has changed over the years. These include warmer climate, drying up of tributaries, heat, severe erosion, pest invasion, declining crop yield unlike the past. The use of natural cure has impacted them positively because majority of the respondent indicated that the hospital facility is too far which was the main reason why they are not consulting the hospital in case of illness and moreover, their knowledge on the use of medicinal plants.

To the larger part of the households, labour was the main mode in crop production. In the past, farmers reported that they relied on their children for their farm labour requirements. But today, most of them now are in schools. Majority of those who complete their education ignore farming and immigrate to the urban centers and cities in search of jobs.

The crop loss can be explained as a result of pest invasion and constant use of the land for farming while hunger invariably occurs as a result of hunger period households' experience any time their grown arable crops have been exhausted indicating that this proportion did not have surplus to keep and sell and those that do have, do not have means of preserving the excess hence they sell off at the period of plenty and then buy during scarcity. The ability to accumulate assets under normal conditions enables households to draw on them during times of stress. Assets may be personal, socio-political, infrastructural, economic or ecological<sup>42</sup>. The focus on livelihoods resulted in an awareness of the different abilities of households to cope with stressors, which undermine their ability to access food. While some households were observed to be severely affected during short-term setbacks and fluctuating levels of food security, others seemed to cope and recover<sup>43</sup>.

## **V. Conclusion**

The results from this study suggest that communities around the protected Omo biosphere reserve are heavily dependent on forest resources for the means of their local livelihood sustenance which is in agreement with the hypothesis. The forest is the source of their livelihood, health, assets, and other social needs. Though, they are often challenged by certain constraints but the types of constraints they face often influence the mitigation measures taken by them.

There is no doubt that the rural households have negatively impacted the forest reserve due to the population densities that are becoming alarming and uncontrolled. The views of the rural households regarding the forest as source of life are holistic. Nonetheless, there is a need to adopt better approaches to forest management otherwise insensitive implementation of the goals and policies of different government ministries/parastatals and their existence within the forest (e.g. Ministry of Agriculture) is creating undesirable outcomes that compromise the sustainability of the forest. Moreover, a lot of the respondents are illegal migrants who must be purged out of the reserve if the government intends to take meaningful steps in preserving the forest. On the other hand, there should be a clear defined goal of the government to preserve the forest by increasing forest protection awareness, initiate practical measures aimed at sustaining the forest by participation of the rural communities in decision making process of forest resources management. Furthermore, provision of employment opportunities or alternate means of income for the livelihood of the rural communities is highly necessary.

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