



**AN ASSESSMENT OF FUELWOOD UTILIZATION AND ITS IMPLICATIONS ON
RURAL LIVELIHOODS IN MIKANG LGA, PLATEAU STATE**

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ABSTRACT

Access to clean sources of energy for cooking and heating has been considered as a panacea for achieving the Sustainable Development Goal (SDG) 1 and 3 of eradicating poverty and ensuring enjoyment of a better quality of life. It is however pertinent to note that fuel wood has continued to play a key part in the livelihood of households in rural areas. A purposive random sampling survey employed in the study area (Mikang LGA), revealed that women and children are the ones mostly engaged in the collection and supplies of firewood for their households. The major source of firewood in the locality is identified to be self collection from the bush accounting for about 50% of the total sources of firewood. The search for firewood involves women and children trekking several kilometers in order to gather enough firewood for their families. About 81% of these women and children trek up to 1km to 4km in search of firewood. Financial constraint is the key factor responsible for the heavy reliance on firewood. In

essence, this has prevented household's access to other cleaner sources of energy (kerosene, gas and electricity). There is also ignorance on the part of residents in the locality on the dangers associated with heavy dependence of firewood as a chief source of energy. About 10% of the sampled population was believed to be suffering from health challenges associated with smoke and open fires (asthma, lungs problem, eye problems and tuberculosis). A change in the physical environment has been recorded mainly in the form of increased heat than usual. This is perhaps due to the increase build-up of carbon dioxide in the area as a result of firewood combustion. Certain species of plants and animals were noticed to have gone extinct possibly due to the destruction of their natural habitats in the quest for firewood. It is therefore important to note that fuel wood utilization plays a key role in the livelihood of residents in rural areas of developing countries because their economy is biomass-based and virtually all their activities and means of livelihood involve the use of fuel wood. Activities such as; cooking, heating, local brewing, crafts work, meat smoking for preservation, meat roasting for ready consumption and blacksmithing. Unless efforts are made to make access to clean sources of energy for rural households such as provision of improved stoves to rural households in developing countries (United Nations Foundation, 2010), achieving the Sustainable Development Goals of eradicating poverty and improved quality of life (better health) is still a dream yet to be achieved or it is several miles away from being a reality.

Keywords: Fuel wood, Households Livelihood and Implications.

1. Introduction

Fuel wood has been considered as one of the major energy source available to rural dwellers in most African countries. The processes involved in harnessing this source of energy for municipal use has attendant effects on its user. Ekouevi, 2011 posited that “The source of energy used by a household especially those that rely on solid fuels have been observed to pose a serious health challenge especially on women and children”. The World Health Organization (WHO) estimates that 1.9 million people die prematurely every year from exposure to smoke from traditional cook stoves and open fires. Apart from the health challenges associated with the use of fuel wood, it also has consequences on the environment. There is a direct relationship between man and trees. Trees are referred to as carbon-sinkers because they absorb the carbon dioxide exhaled by man and in turn provide oxygen for man for respiration. The absence of trees in an environment will therefore expose the soil not only to intense insolation from the sun but also increase the build-up of carbon in that environment which in turn will have some effect on the micro-climate. It has therefore become pertinent to create awareness and sensitize the rural populace on the implications of overdependence on fuel wood as a chief source of household energy. A laudable approach to addressing this issue is the launch of a Public Private global alliance on clean cook stoves led by the United Nations Foundation (UNF) to help 100 million households adopt clean and efficient stoves and fuels by the year 2020 (UNF, 2010). A driver of this mobilization is the recognition of the fact that considerable health benefits in line with the Sustainable Development Goals (SDG), can be achieved by improving indoor air pollution (IAP) with the use of efficient cook stoves and clean fuels (AGECC, 2010). Government as well as stakeholders in the energy and environment sector should rise to the occasion by ensuring that cleaner and alternative sources of energy that are environmental friendly and with minimal effects on human health are made accessible to rural dwellers.

2. Literature Review

In most developing countries, there is still heavy reliance on traditional biomass fuels, particularly wood fuels (fuel wood and charcoal). For example, in Ethiopia, fuel wood is identified as the common and most important fuel type for majority of households. The sources of fuel wood include; self-collection from non-private forests, private plantation and market fuel wood sellers. Purchasing of fuel wood from market sellers has replaced self collection as the primary fuel wood source for households. Household size, economic status, availability of crop residues and modern fuels and location are amongst the main factors affecting the energy choice of households. Charcoal seems to be the main fuel substitute/supplement to fuel wood and is also widely used by majority of households. However, transition towards use of modern fuels is taking place at a slow rate among wealthy households, and this is largely restrained by limitations in people's perception, infrastructure and fuel supply. This indicates the fact that the role of government is of extreme importance in the process of energy transition and development of people's livelihood (Ji She, 2014). It is worthy to note that Charcoal and fuel wood utilization by households has gotten attention as far back as 1986 from specialist within the bank and other sectors like; energy, forestry, environment, health, agriculture and rural development, gender and climate change (Ekouevi, 2011).

In Sub-Saharan Africa, the Regional Programme for the Traditional Energy Sector (RPTES) supported analytical work and upstream studies between 1983 and 2003 on the provision of clean energy to households. Works on household energy in the African region has been supported by the Biomass energy Initiative for Africa (BEIA) since the year 2009. The Africa Energy Team has been working towards the implementation of the Biomass Energy Initiative for Africa (BEIA) since March 2009 till date. The BEIA is funded through trust fund resources. The primary objective of the BEIA is to test promising building blocks dealing with biomass energy that have the potential to be incorporated into the future bank's leading portfolio. The BEIA is focusing on four themes which are; enabling market conditions for high-quality and high-performance cooking stoves, modernization of the charcoal industry by improving the industry's environmental sustainability and energy efficiency in charcoal production and use, demonstrating the feasibility of social bio fuels and increasing power capacity with bio electricity-use, biomass as fuel for power generation for off-grid or add on capacity (BEIA, 2009).

In Tanzania, it is estimated that only about 11 percent of the country's population has access to electricity and only 3 percent of the population is said to have access to clean household fuels, primarily kerosene. As at 2008, more than 95 percent of households in the country relied heavily on fuel wood or charcoal for cooking and only 1 percent used improved cook stoves (UNDP & WHO, 2009). Biomass fuels are predominant in Tanzania, accounting for about 90 percent of the total primary energy supply. The primary biomass fuels are fuel wood, charcoal and bio-residues (TaTEDO, 2010). The World health organization (WHO) in 2009 estimated that every year 15,900 Tanzanian children under 5 die of pneumonia and 3,000 adults die prematurely of chronic obstructive pulmonary disorders resulting from solid fuel use.

The East Asia and Pacific (EAP) Region of the World Bank is in the process of finalizing its flagship report on Energy access - "one Goal, Two Paths". The report explores strategies along two paths to achieve universal access to electricity and clean and efficient cooking solutions in the region by the year 2030. The report addresses access to modern cooking fuels mainly liquidified petroleum gas (LPG) and biogas in rural areas as well as the provision of improved cook stoves that reduce indoor air pollution and provide greater combustion efficiency. Issues covered by the report include; institutional frameworks, financial requirements and policy responses. The World Bank Carbon Finance Unit (CFU) initiatives are amongst the larger global effort to combat climate change. CFU uses financial resources contributed by governments and companies with a total of about 25 billion dollars as at 2011. The funds were intended to purchase project-based green house gas emission reductions in developing countries and countries with economies in transition ((Ekouevi, 2011).

Household size positively affects collection of fuel wood from non-private forests and negatively on purchasing from market. The number of family members indicates the sufficiency of labor, which is extremely important to fuel wood collection. It has been argued also that the economic status of a household itself does not significantly affect the energy choice of a household, as other indicators of household financial situation such as farmland area, livestock number, use of crop residues and modern fuels are influential in determining the choice of energy (Jumbe and Angelsen, 2011).

It is believed that wealthier households will first use charcoal in place of firewood before turning to modern fuels such as LPG and electricity, while poorer households may switch to even more inferior fuels such as crop residues and dung. The macro-economic situation of a nation is

regarded as the chief driver of energy transition, such that the adoption of modern fuels by households relies on the infrastructure improvement of the region (Akther, 2010).

Consumption of traditional fuels has negative environmental, economic and health impacts. The increased use of firewood and charcoal leads to deforestation. It results in ecological imbalance, also increased use of agricultural residues and animal dung deprives the land of essential nutrients that are necessary for soil fertility. Smoke from the use of fuel wood and dung for cooking is known to contribute to acute respiratory infections. This smoke result in indoor air pollution and this is severe in poor households which do not often have separate living and cooking places (Geissler et al, 2013).

Energy is the essential material basis for economic and social development. Utilization of energy resources however leads to a serious threat to the climate, environment and human health. Rapid urbanization and industrialization in advanced and developing countries tend to determine the trend of energy consumption, with energy consumption tending to rise inevitably. Reducing emissions become the important orientation of environmental policy world over. With economic growth, living standards improving and consumer attitudes changing, diversification of household energy consumption is inevitable. It is essential to conduct energy saving and emission reduction in all aspect of life. A lot of pollutants from household energy consumption are harmful to human health, particularly to women and children in rural areas. The World Health Organization (WHO) estimates that household air pollution from the use of biomass in inefficient stoves would lead to over 1.5 million premature deaths per year in 2030 (Zhang Xin, 2011).

3. Research Methodology

Primary data for the study was obtained directly from the field through the use of a structured questionnaire, direct field observations, photo clips as well as short interviews. The secondary data was gotten from the web, journals, articles as well as other published and unpublished works related to the topic. The variable on which secondary data was collected was the health challenges related to smoke and open fires. The types of data collected include; sex, household size, marital status, educational level, employment status, health challenge, average monthly income, source of fuel wood, average distance covered per day in search of fuel wood, frequency of search for fuel wood (daily, weekly, monthly), alternative source of energy and why preference of fuel wood to other energy sources as well as the challenges in harnessing the alternative sources of energy.

A total of 7 communities were selected from the four districts based on purposive availability. The communities are not evenly distributed amongst the 4 districts, Koeneom has the least communities, and hence just a community was selected under the district (Lifidi). Piapung district is has 9 communities and 2 communities were selected (Piapung A and Piapung B). This was done in order to achieve a fair representative sample of the districts. Montol district has 10 communities and 2 out of the 10 were also selected (Lalin and Baltep). Garkawa has a total of 11 communities of which 2 communities were also selected (Pankai and Gaulam). The areas selected had a dispersed nature of settlement, only about 200 households approximately are found in each of the selected areas. Taking 10% of 200 yields 20, thus a total of 140 households were sampled. A sample of 20 households was taken from Koeneom while 40 households each were sampled in Piapung, Montol and Garkawa districts.

The questionnaire was the main instrument of data collection and others were; interviews, photo clips and direct field observation. A structured questionnaire containing three sections (A, B and C) was administered to respective households. Section A included questions on their socio-demographic characteristics, Section B had questions on their energy use (fuel wood) and Section C had questions on the implications of fuel wood utilization on their livelihood. A total of 140 questionnaires were administered, with a set of questionnaire for each household. Respondents were selected on the basis of purposive availability as at the time of administering the questionnaires. Questionnaires were retrieved from the respondents almost immediately after filling. Photo clips of people trekking after gathering firewood were also taken. Google Earth Pro

software was used to obtain the coordinates of the 7 communities and Tunkus (the capital of Mikang) were household samples were taken. A short interview was conducted with sellers of fuel wood in the sample communities to ascertain how selling of fuel wood impacts their livelihood.

Chi-Square statistical technique was employed to test whether there is a significant difference between fuel wood utilization and the livelihood of households in Mikang LGA, Plateau State.

4. Study Area

Mikang LGA is one amongst the 17 local government areas in Plateau State. It lies within latitude $9^{\circ}00'00''$ N and longitude $9^{\circ}35'00''$ E and an area of 739km^2 . It has a postal code of 940.

Mikang LGA is divided into 4 districts which are; Koeneom, Piapung, Montol and Garkawa. The administrative headquarters of the local government is situated in Tunkus situated in Montol district. These 4 districts are made up of towns and villages. The major towns are Piapung, Tunkus and Garkawa. Koeneom district comprises of 6 communities which are; Lifidi, Lun-Niyu (Lifin), Nwoop, Pangshot, Pangsot and Zomo. Piapung district has about 9 communities under it and they include; Gotlong, Koetes, Longbis, Pangjiem, Piaber, Piapung, Poekot, Tangguk and Zamkoekop. Montol district has 10 communities which are; Baltep, Betkang, Dinmuanpus, Laham, Lalin, Pockot, Pocyuum, Swakan, Talme and Tunkus. Garkawa district has 11 communities which are; Gingim, Jimakwi, Killa, Kongnati, Lahil, Longkrom, Poensong, Rotha, Swoshal, Tudun wada and Yakoep. Mikang LGA is made up of a total of about 36 communities comprising of the four districts. Major towns in the LGA are Tunkus, Piapung and Garkawa.

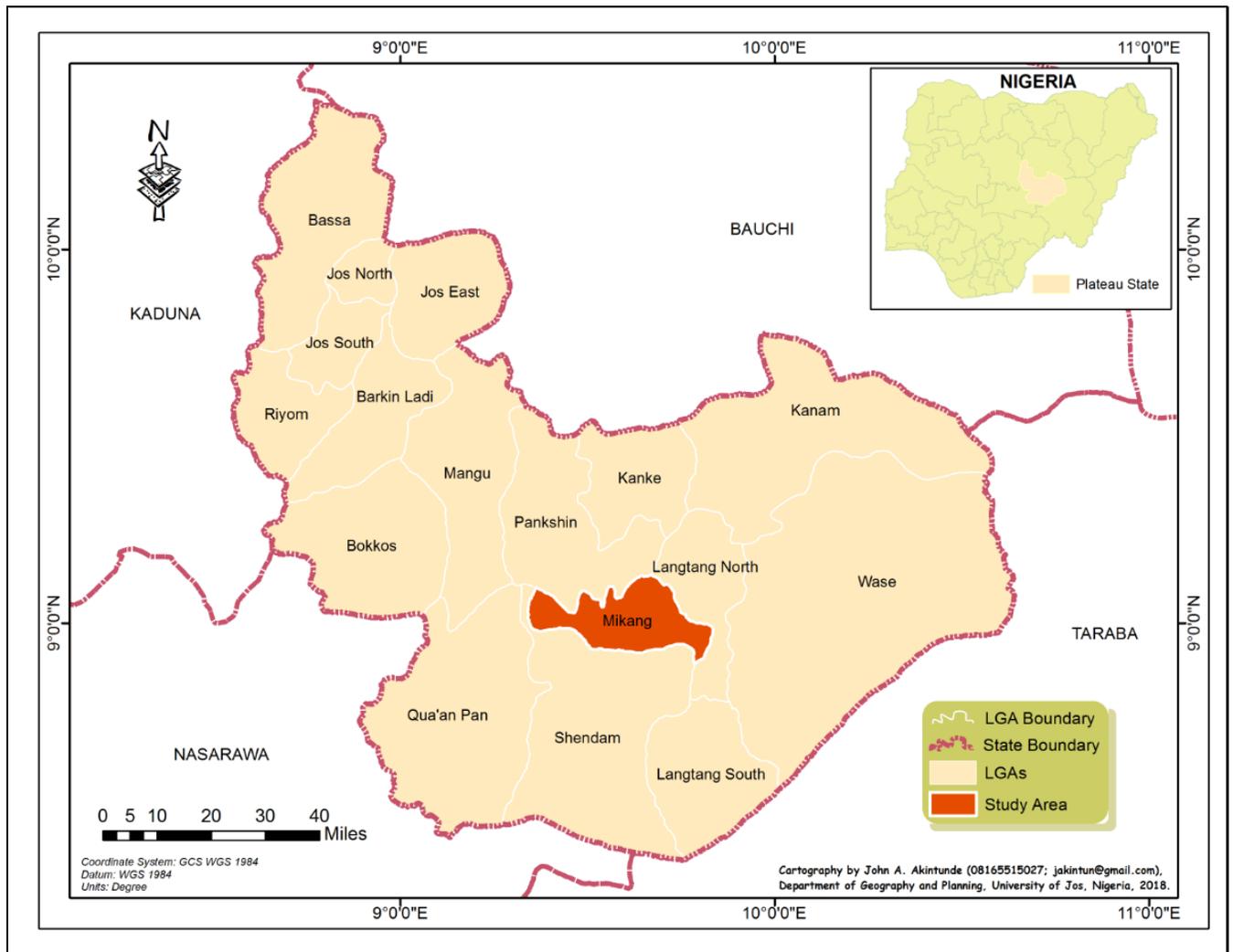


Fig 1: Map of Plateau State Showing Mikang LGA

Source: J.A.Akintunde (2018)

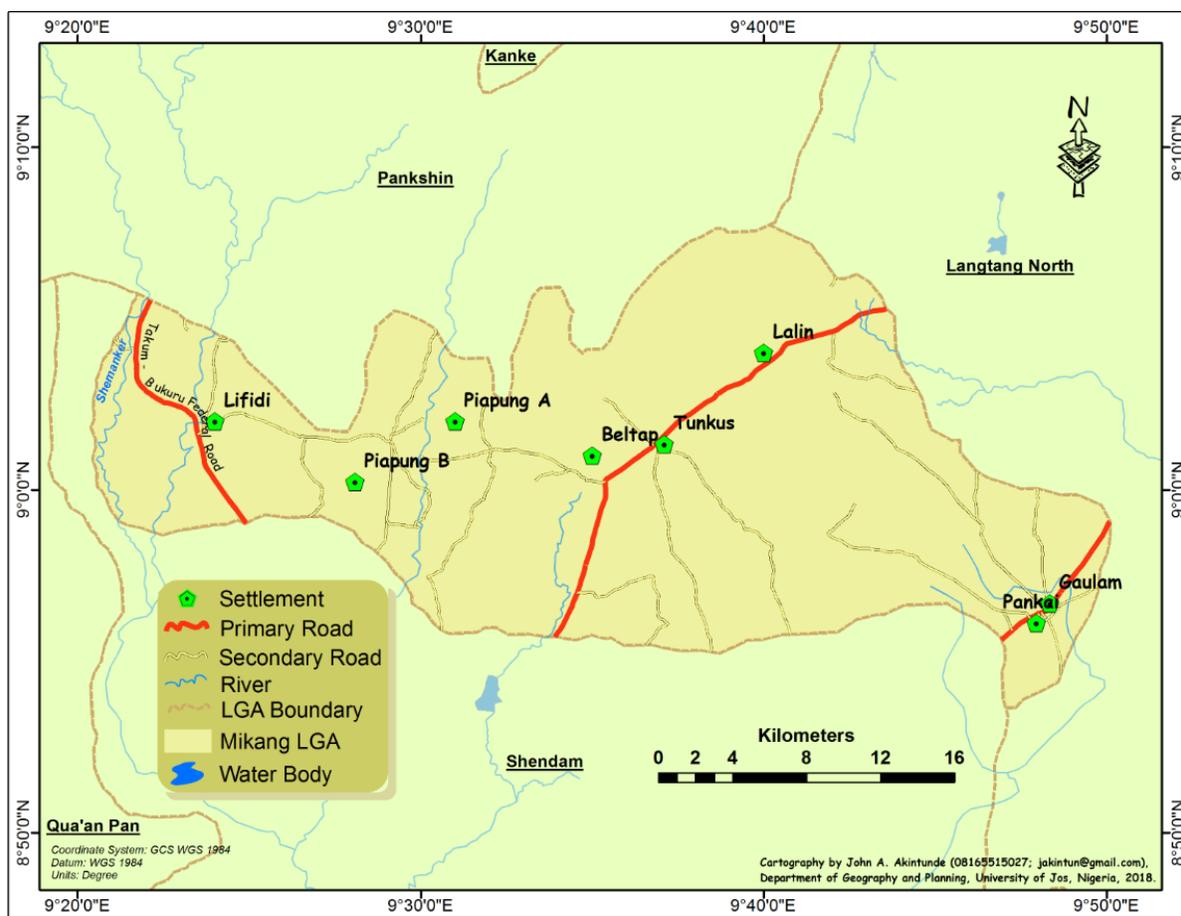


Fig 2: Map of Mikang LGA showing sample areas.

Source: J.A.Akintunde, (2018)

5. Results

5.1 Various uses of Fuel wood in the locality

Owing to the fact that fuel wood (firewood) is the chief source of energy for rural households, almost all forms of activities are done using firewood as a source of energy. These activities range from crafts work, cooking, heating, local brewing e.t.c. These activities are in turn linked to the livelihood of the people, the crafts works, blacksmithing as well as local brewing or meat roasting for ready consumption is expected to yield some form of income for people who engage in them. It is the proceeds realized from these activities they use to feed and clothe their families as well as meet other needs of their household.

The data obtained revealed that a large number of people purchase fuel wood from vendors. The implication is that there is a market for the selling and buying of firewood in the study area. Buyers purchase fuel wood for various uses while suppliers sell fuel wood to make some additional income. This has important implications for livelihood. Fuel wood is not only consumed by households. For some, its supply to a waiting market of buyers is a means of livelihood, a source of income or additional earnings to enhance a better quality of life than it would have been without it. Many household items may have been purchased from proceeds from the sales of fuel wood by members of households. This would also include food items not directly grown by the households or sold by them as petty traders.

Table 1: Various Uses of Fuel wood in the locality

Various Uses of Firewood	Frequency
Cooking	102
Heating	57
Local Brewing	44
Crafts Work	35
Meat smoking for Preservation	52
Meat Roasting for ready Consumption	48
Blacksmith	33
Total	371

Source: Field Survey, 2018

Cooking and heating accounted for the highest use of fuel wood in the study area. Most households in the study area utilize firewood for more than one use. However, the Table 3 gives a summary of the number of uses for the various activities. Plate 1 also shows a person roasting meat in the market for ready consumption.



Plate 1: A man roasting meat for ready consumption in the Old Market in Tunkus (Montol District)

Source: Field Survey, 2018.

5.2 Health Challenges

The use of solid fuels like firewood and agricultural waste amongst others generate smoke which is harmful to the human health. The smoke is believed to contain large amount of particulate matter (PM) and other gaseous pollutants that can cause health challenges such as; acute lower respiratory infections (ALRI's), chronic obstructive pulmonary diseases, lung cancer, tuberculosis, eye problems, asthma, cataract and low birth weight (WHO, 2009).

Data obtained revealed that only about 10% of respondents suffer from smoke and open fire related health challenges. The remaining 90% of those that experience health challenges suffer from health challenges not related to smoke and open fire. These challenges included; hepatitis, malaria fever, pneumonia, diabetes, HIV and high blood pressure.

Table 2: Health Challenges faced by households related to smoke and open fires

1	Asthma	5	Cooking, heating, local brewing, crafts work, Meat roasting for ready consumption and preservation
2	Tuberculosis	2	Cooking, heating, local brewing, crafts work, blacksmithing Meat roasting for ready consumption and preservation
3	Eye Problem	5	Cooking, crafts work, Meat smoking for preservation and local brewing
4	Lungs Problem	2	Cooking, heating, local brewing, crafts work, Meat roasting for ready consumption and preservation
	Total	14	

Source: Field Survey, 2018.

It can however be deduced from available data that those who suffer from Asthma, Tuberculosis, Eye problem and Lungs problems are people who use firewood for a wide range of activities almost as presented in Table 2.

5.3 Environmental Changes

Destruction of forests and cutting down of trees has an effect on the environment because they play a vital role in modifying the climate of an area. They protect the land surface against intense solar radiation and filter the air we breathe. Changes in some climatic elements witnessed in the environment include; increased heat, decreased, increase heat, decrease heat, late onset, early onset, early cessation and late cessation.

Destruction of natural forest and cutting down of trees for firewood is capable of leading to the destruction of habitat of certain plants and animals thereby leading to their extinction from the immediate environment. About 50% of the respondents opined that they have noticed extinction of certain species of plants and animals in the area. The other 50% also did not notice any form of extinction of plants and animal species or at least claimed they did not know about any such extinction. These plants and animals believed to be going extinct are; python, rabbit, hare, monkeys, weaver bird, Rubber tree as well as Iroko tree.

5.4 Test of Hypothesis

H₀: There is no significant difference between the types of fuel wood utilization for household livelihoods in Mikang L.G.A

Ha: There is a significant difference between the types of fuel wood utilization for household livelihoods in Mikang L.G.A.

The Chi-Square test reveals that there is significant difference between fuel wood utilization and the livelihood of households in Mikang LGA. Although residents in the locality utilize firewood for activities ranging from; cooking, heating, local brewing, meat roasting for ready consumption, meat roasting for preservation, crafts work and blacksmithing, which in turn provide some income for them to be able to meet the basic needs of their families (food, clothing and shelter), it still doesn't follow from the hypothesis that their livelihood solely depends on their use of firewood as a chief source of energy. They can as well get their means of livelihood from other sources that don't necessarily involve the use of firewood

6. Conclusion

The study was able to establish that fuel wood is indeed harmful to human health as cases of illnesses related to smoke and open fire were recorded. Despite the health challenges related to the utilization of fuel wood as a chief source of energy, the residents still rely heavily on it for their daily survival. They utilize it for several activities which include domestic and commercial purposes. Their livelihood cannot be unconnected with their use of fuel wood. From the results obtained also, the means of earning a living by hunters is been threatened as a result of loss of biodiversity, will could be attributed to the destruction of the natural habitat of these animals in the quest of fuel wood search.

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