

THE ROLE OF NON-TIMBER FOREST PRODUCTS (NTFPs) IN RURAL POVERTY REDUCTION AROUND THE KANGARI HILL – FOREST RESERVED, NORTHERN SIERRA LEONE.

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ABSTRACT: Products derived from the forest apart from timber, are what we commonly referred to as nontimber forest products. It is against this backdrop that this study prioritized the examination of such products together with their roles in rural poverty reduction in Kunike Barina chiefdom, around Kangari Hill – forest reserved, Northern Sierra Leone. The specific objectives of this study were: to identify the various Non-timber Forest Products that are harvested in the study area, its purposes, as well as the level of dependency rate on its extraction in the Kangari hill – forest reserved for rural poverty minimization. Kunike Barina chiefdom found around Kangari Hill – forest reserved was sampled as the research area and a total of 50 people were randomly chosen from five selected communities around the reserved including few forest produce gatherers, farmers and miners. Data required to complete this study were collected using a well-defined questionnaire, personal interview and taking of some photo evidences. Data were analyzed using statistical mean and average parameters and the results obtained are presented in tables and charts. Concomitantly, 44% of NTFPs gatherers in the study area were caught within the median age of 41-50 and a total of twenty-eight (28) different types of NTFPs were discovered in the study area. Meanwhile, majority of the available ntfps (41.6%) were used for food. Since it was however revealed that almost the entire membership of the sampled villages in the study area, presently depended on mining activity for their survival other than N.T.F.Ps harvesting, consequently, provision to increase awareness on the values of N.T.F.Ps and its commercialization were recommended.

KEY-WORDS: NTFPS, Kangari Hill – Forest Reserved (khfr), Non-wood forest products (nwfps).

I. INTRODUCTION

Speaking from concept view, the living and sometimes, the non-living substances or materials that are very useful which are not timber but are been produce and gathered in a forest, are what we generally refers to as non-timber forest products. They originally include fruits and nuts, vegetables, fish and game animals, medicinal plants, resins, minerals(Those that found in the forest), water and a range of barks and fibers, bamboo, rattans, and a host of other palms, mushrooms and grasses. (Canada.ca Natural resources management.wv.com - Non Timber forest products). As any products of biological origin aside timber, derived from forests (F.A.O), the conservation, management and protection of a forest for the continuous flow or production of NTFPs for local household used and market expansion, have, in recent decades, partially become an integral part of the world's interest and the interest of conservation bodies. From recent findings, it is believed that NTFPs can successfully serve as an alternatives or supplements to manage a forest.(The State of the World's Forest 2020. Forests, biodiversity and people – brief). In this regards, tactically including NTFPs in forest management and planning can be potentially viewed as one of the most productive and sustainable forest management strategy. In order words, this simply means that we can use the importance of NTFPs in a strategic management planning of a forest in order to help in not only increasing the diversity of NTFPs itself, but to as well as greatly ensured a sustainable forest which in effects, result to the increment of forest biodiversity population along with its economic values(Adepoju, A. A. and Salau, A. Sheu, 9 April 2007).

Moving forward, it is agreed that long ago, some of the world's most valuable and precious non-timber resources were highly underestimated or neglected (though not all). Focuses were only placed on timber production.

But lately in the 90s, we finally saw the rise in the interest of gathering, conserving and sustainably collecting majority of those neglected but value Non-timber forest products for both subsistence and commercial used. (Adepoju, A. A. and Salau, A. Sheu, 9 April 2007). Comprehensively, NTFPs in summary provides income, livelihood security, nutritional value and cultural importance and have been categorically classified into: “Product type:” (e.g. live plants, prepared beverages, animal fats, prepared bark products), “End use” (e.g. chewing sponge or stick, cloth, edible leaves, wine, resin). “Animals:” (e.g. Insect, Porcupine, Rabbit, Monkey, Squirrel etc.). Ethno botanically, they may be or can be classified according to “local end uses:” (e.g. construction materials, edible fruit, fuel, medicine, poisons). And finally they can be categorized, according to

“plant form and parts used:” (e.g. non-wood tree parts, tree fruit, herbs, climbers, shrubs, etc. (fao.org/3/Y1457e/Y1457e12.htm) Concomitantly, the subset of NTFPs is Non-wood forest products (NWFPs) which exclude fuel-wood and wood charcoal. Both NWFPs and NTFPs may include wild foods, medicines, animals etc.,. It is no longer a news that men and women including children, get involved in the collection and sale of non-timber forest products – and in the process of collection, these men and women have different knowledge on the gathering or collection of different products; and it is interesting to know that women are most often known to collect forest foods only. This is done as a mean of supplementing the nutritional demands of their households desired. (en.m.wikipedia.org/wiki/Non-timber_forest_product). NTFPs have several synonyms anyway. These includes: Alternative, Secondary products, non-wood, special, minors, etc.

II. MATERIALS AND METHOD

Description of study area



Figure A: Shows the demarcation and location of Kangari Hill – forest reserved in the map of Sierra Leone. Kangarihill – Forest reserved - Kangari Hill - Forest Reserve is a non-hunting forest reserve found at the center of Sierra Leone .The area became a forest reserve in 1924. Lying between 200 and 500 meters above sea level, the reserve has an area of 8,573 hectares (85.73 km²), although parts of it area have been encroached upon by farming and mining. The Reserve is one of the few places in Sierra Leone where the endangered forest elephant survives. The forest is located in the Kunike and Bonkolenken Chiefdoms in the Tonkolili District, Northern Province and the

Valunia Chiefdom in the Bo District, Southern Province. It occurs about 210 km east of Freetown. The total land area of Kangari Hills Forest Reserve covers about 210 sq km and has been protected as one of the few relics of the Upper Guinean forest ecosystem in the country. Key protected wildlife species include a remnant population of forest elephants, chimpanzees and other primates, as well as 115 documented bird species (Boracic and others, 2010). The forest is also used as a source of medicinal herbs and spices. However, the forest reserve is home to an important forest wildlife community, including forest and savanna dependent birds, chimpanzees and elephants. Also, the forest at Kangari is part of a range of hills, i.e. being Kang-ari, which means outside the reserve. The hills are drained by a number of rivers and some valleys support swamps suitable for agriculture. The forest served as the source of two main rivers passing through the center of the country – The Pampana River to the northeast and the Moa River to the southwest.

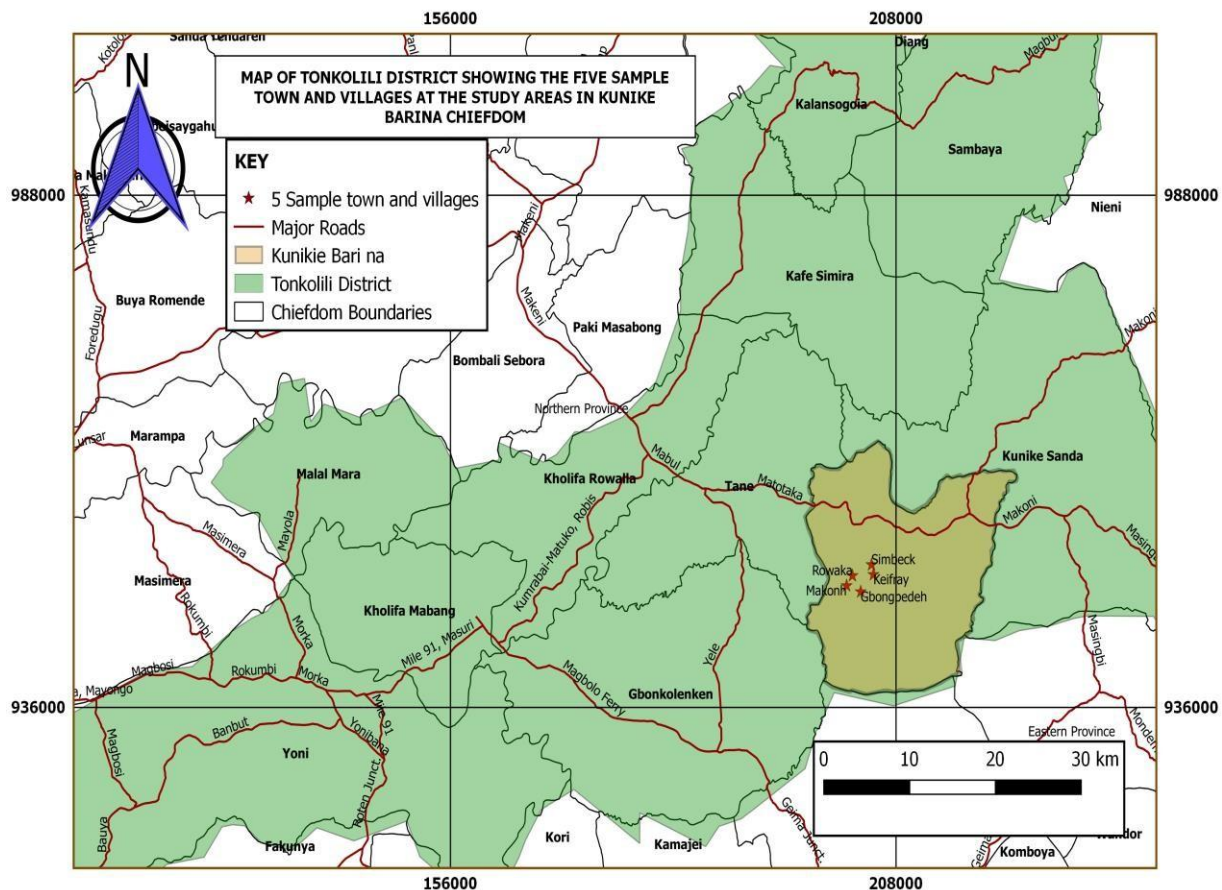


Figure B: shows the map of Tonkolili district and Kunike Barina chiefdom (Northern Sierra Leone).

Kunike Barina Chiefdom – The chiefdom is found in the Tonkolili District, Northern Province of Sierra Leone. Its capital is Makali. According to the Sierra Leone Population Census statistic in 2015, the present population of Kunike Barina Chiefdom is approximately 25,245. The total land area of the chiefdom is about 415.3 km² (Area). Roughly enough, Kunike Barina has a total number of 13,166 males and 12,079 females respectively. The predominant tribe found in the chiefdom is the Temne. The present paramount chief (Obai) of the chiefdom is called Pa Alhaji Alimany Sorie Katoneh elected in 2010. The dominant activities in the chiefdom include mining, farming, logging and gathering of forest resources.

Sampling Methodology : Kunike Barina is somewhat a large chiefdom with a total number of approximately twenty (20) towns and villages. Because of this, a probability sampling methodology – precisely, a simple random probability sampling method was used to collect all the data needed to complete this study. A simple random probability sampling is one which allows a researcher to divide a large population into a simple random group for

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data collection. (britannica.com/science/statistics/Random_variables-and-probabilitydistributions.) Thus, this sampling technique was used to collect my data.

Sample size and selection of respondents : The study area (Kunike Barina Chiefdom) is said to be approximately having a total land area of about 415.3 km² with a total population of 25,245 people presently occupying a total number of nearly twenty towns and villages. As a result of this, a total of fifty (50) community members (0.5%) were selected to represent the entire chiefdom. These total sample size were randomly chosen from five towns and villages within the chiefdom around the Kangari hill – forest reserved including farmers, miners and few forest produce collectors. Ten (10) respondents (0.1%) each from among the randomly selected five villages and towns were contacted using questionnaires to collect the required data needed to complete this study.

Instrument, Tools/Data collection procedure

Data considered important to complete this research, were collected through by:

- Issuing out of a well structure questionnaires
- Direct interview of the respondents and
- Photo evidences.

III. DATA ANALYSIS

The data which were collected in the field as part of this research work were analyzed using a simple comparative statistic which include total mean, median and percentage parameters. This was done so in order to figure out the overall and main objectives of the study which included; finding out about the different types and various uses of the available N.T.F.Ps that were found and gathered in the study area, together with results obtained from the assessment of the dependent and utilization trend on all the harvested N.T.F.Ps found in the study area.

Presentation of results : The data obtained to complete this study are simultaneously presented in the form of bar charts, pie charts, table and an excel spreadsheet following respondent's parameters which includes: sex and marital status of the respondents, Age class the of respondents; academic Level of respondents; list of Nontimber forest products found in the study area; N.T.F.Ps harvesting/gathering participation (Men, Women and Children); various uses of N.T.F.Ps in the study areas, comparing gathering/harvesting frequency (twenty (20) years back to present); comparing the benefits and utilization rate (ten to twenty(10-20) years back, to present).

IV. RESULTS

Demographic Characteristic of Respondents

Fifty respondents were targeted following a simple random probability sampling methodology from among five selected communities around the Kangari hill – forest reserved (Northern Sierra Leone).

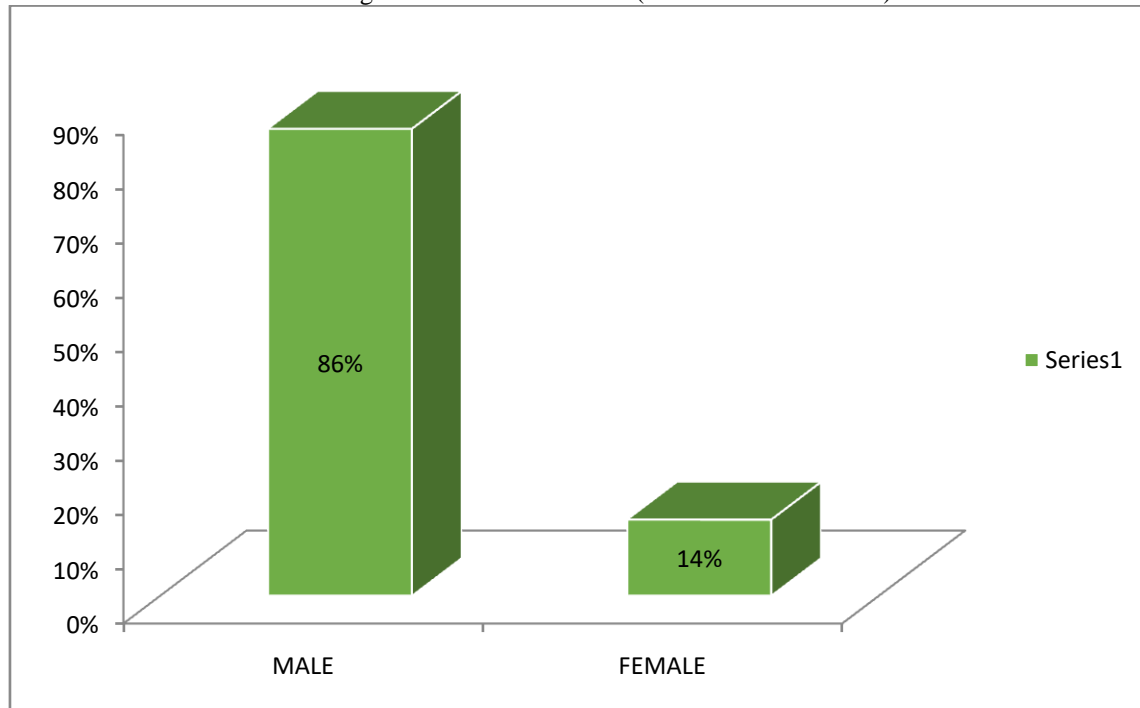


Figure 1: shows the percent of males and females N.T.F.Ps gatherers.

Amount of males and female N.T.F.Ps gatherers

From among the selected few, eighty-six percent were males, while fourteen percent were females. However, forty percent of the males were farmers. And the others were miners, with few as forest produce gatherers.

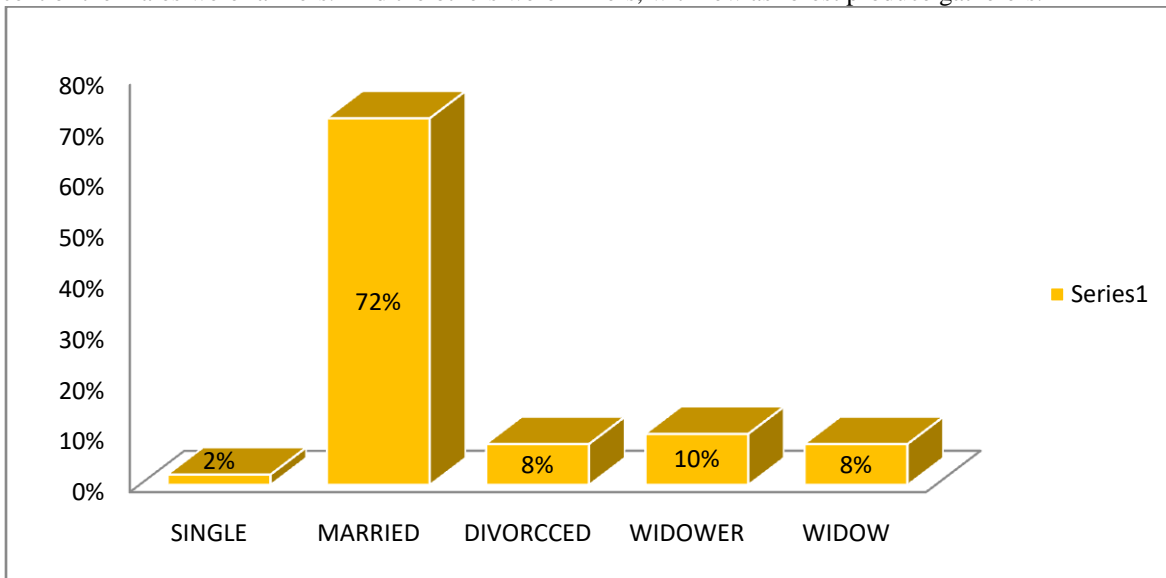


Figure 2: shows the percent of marital status of N.T.F.Ps gatherers in the study area.

The Marital status of N.T.F.Ps gatherers in the study area.

From among the contacted few, seventy-two percent of the respondents were married and two percent were single. Concomitantly, eight percent of the total respondents were divorced while ten and eight percent were widowers and widows respectively. Almost, all of the respondents were native of their respective communities.

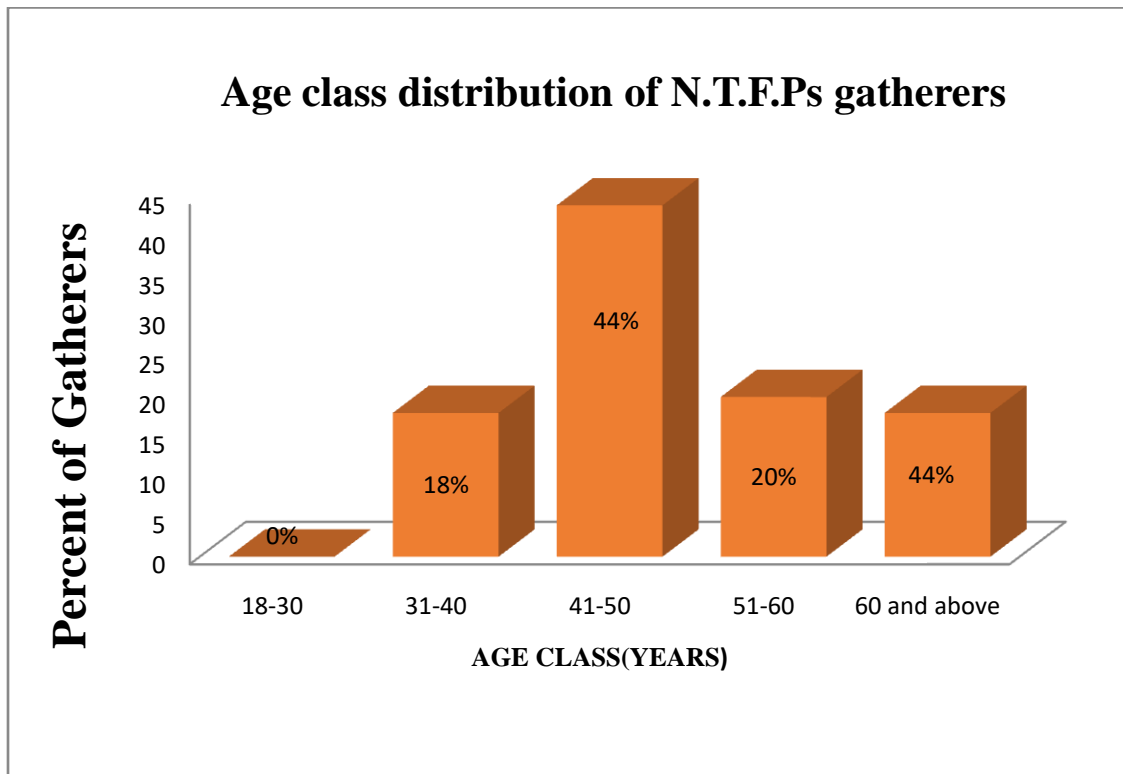


Figure 3: shows the Age class of the NTFPs gatherers in Kunike Barina chiefdom.

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Age class of N.T.F.Ps gatherers in the study area.

From the data obtained, it was visual that majority of the respondents from the total sample size, were found within the mean and median age of 41 to 50 years, representing forty-four percent(44%) of the total respondents, whiles twenty percent(20%) were found within 51 to 60 years. Eighteen percent (18%) were captured within the mean and median age of 31-40. However, Zero percent (0%) respond were recorded from children as they were considered as helpers to their parents with little or no energy to undertake activities that will help provide for the home.

Table 1: Academic Level of N.T.F.Ps gatherers in the Study Area

| Table: 1. Academic Level of N.T.F.Ps Gatherers in the Study Area | | | |
|--|-------------------------------------|-----------|----------------|
| | Category of education | Frequency | Percentage (%) |
| 1 | Attained Primary School Education | 10 | 20 |
| 2 | Attained Secondary School Education | 4 | 8 |
| 3 | Tertiary Level education | 1 | 2 |
| 4 | Never attended any school | 35 | 70 |
| 5 | Others | 0 | 0 |
| Total: | | 50 | 100% |

Academic Level of N.T.Ps gatherers in the study Area.

As focused were placed on rural communities around the Kangari hill – forest reserved, investigations proved that about seventy (70%) of the total respondents never had no formal education. Twenty (20%) were chanced to attained primary school education, whiles eight (8%) rose to secondary level and two (2%) reached the level of tertiary education. Zero (0%) percent records were obtained for vocational or any other skill training.

Table 2: shows the list of Non-timber forest products found and gathered in the study area.

| USES | Species | TREE NAME | | | Villages | | | | |
|--------------------------|-----------------------------------|-------------|----------------|---------|----------|--------|--------|--------|--|
| | | Temne | Krio | Nkrefay | Ngongbec | Makong | Mamuri | Rowaka | |
| FOOD | <i>Beilschmiedia Manuii</i> | A'gbaa | Tola | | | | | | |
| | <i>Garcimia kola</i> | Bitu Kola | Bitu Kola | ✓ | ✓ | | ✓ | ✓ | |
| | <i>Diallum guineese</i> | Mabamp | Black tombla | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | <i>Hydrogen Dioxide</i> | N'mant | Water | ✓ | | ✓ | | ✓ | |
| | <i>Dioscorea cayensis</i> | E'nyams | Bush yam | | ✓ | | ✓ | | |
| | <i>Diospyrus thomosii</i> | Ta'bel | Bush banga | ✓ | ✓ | | ✓ | ✓ | |
| | <i>Cervidae</i> | or'wall | Bush meat | ✓ | ✓ | | ✓ | ✓ | |
| | <i>Osteichthyes</i> | El'lope | Fish(bony) | ✓ | ✓ | ✓ | | ✓ | |
| | <i>Apis mellifera</i> | Darmai | Honey | ✓ | | ✓ | | ✓ | |
| | <i>Rubus fruitcosus</i> | Ma'bis | Blackberry | | ✓ | | ✓ | ✓ | |
| | <i>Agaricus bisfous</i> | Gbolema | Mushroom | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | <i>Anisophylla Lauvua</i> | Malli | County apple | ✓ | | ✓ | ✓ | | |
| | <i>Pteridopsida</i> | K'tantan | fern | ✓ | ✓ | ✓ | | | |
| MEDICINE | <i>Beilschmiedia Manuii</i> | n'ybaa | lola | | ✓ | | ✓ | ✓ | |
| | <i>Fious craterostoma</i> | Ra'bengaa | Bush Ataya | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | <i>Garcimia kola</i> | Bitu Kola | Bitu Kola | ✓ | ✓ | | ✓ | ✓ | |
| | <i>Xylopia acthiopica</i> | Simiji | Simiji | ✓ | | | ✓ | ✓ | |
| | <i>Carum carvi</i> | Ma' pose | Spice | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | <i>Nauclea latifolia</i> | Gbam gbam | Gbam gbam | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | <i>Cassia Siana</i> | Sheku Turay | Sheku Turay | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | <i>Aframmanum melegueta</i> | | aligator peper | | ✓ | | ✓ | ✓ | |
| CRAFT & RURAL BUILDING M | <i>Laccosperma Secundi florum</i> | - | Rattern | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | <i>Streophanthus Petersianus</i> | Ro'paul | Rope | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | <i>Barmbusoiea Barmbseae</i> | telsus | Bamboo | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | <i>Hakoneohloa maera</i> | | Grasses | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | <i>Arecaceae</i> | El'kent | palm leaf | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | <i>Lignocelluiosic fiber</i> | Karwayna | fibers | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | <i>Anisophylla laminu</i> | Kandi | Kandi | ✓ | ✓ | ✓ | ✓ | ✓ | |

List of Non-timber forest products found in the study area.

This research was specifically designed to achieved objectives like taking a comprehensive record of almost all the available Non-timber forest products that are been gathered for livelihood sustenance and rural poverty reduction in communities around the Kangari hill – forest reserved. As such, during the research work, a total of twenty-eight (28) noticeable N.T.F.Ps were recorded to be frequently gathered or harvested in the study area.

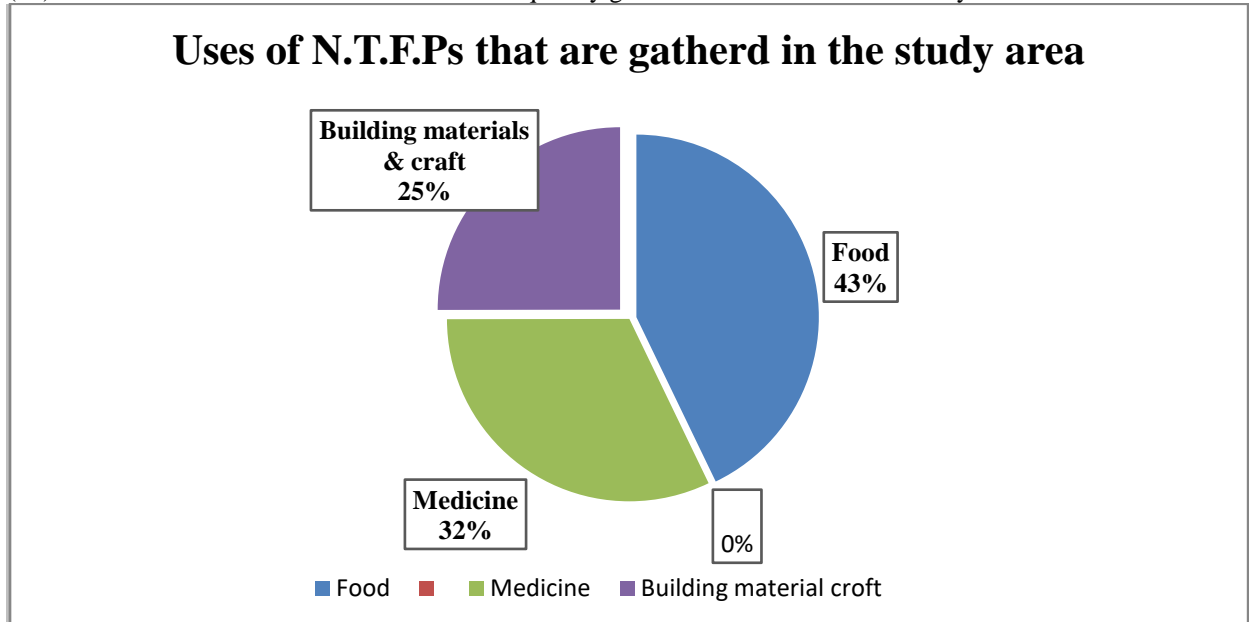


Figure 4: shows the uses of the different types of NTFPs fund in the study Area.

Uses of the different types of NTFPs fund in the study Area.

From among the twenty-eight different types of N.T.F.Ps found in the study area, twelve(12) of them, which represent 42.8% of the total amount, were used for food. Nine(9) of them which represent 32.1% were used for medicinal purpose, while the remaining seven(7), which represent 25% of the total amount, were used for home craft and rural building materials.

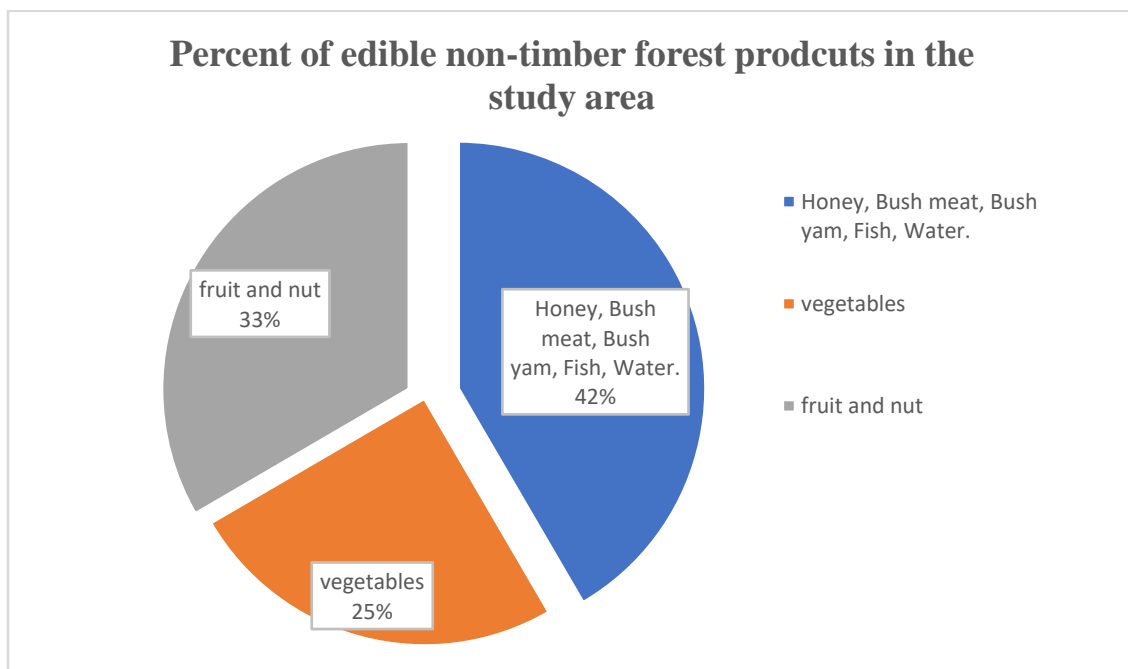


Figure 5: shows the percent of edible Non-timber forest products.

Edible Non-timber forest products found in the study Area.

From the list and categories of N.T.F.Ps found in the study area, the number of edible products seemingly outweighs all the other categories. The edible products recorded were further classed into three groups. They include fruits and nuts (33.3%), vegetables (25%) and others including honey, busy yam, animals, fish and water which represent 41% of the total amount of food items recorded.

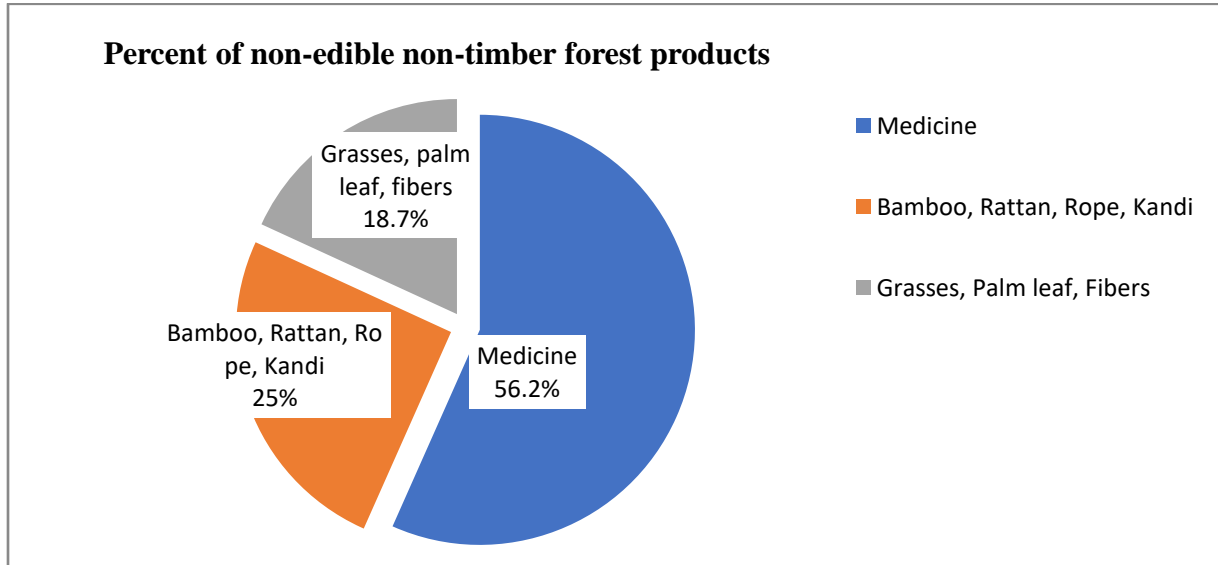


Figure 6: shows the percent of non-edible Non-timber forest products.

Non-edible Non-timber forest products found in the study Area. .

Further emphasis was made to place on record the percent of the different category of all the non-edible non-timber forest goods. And from this investigation, a sum of 56.2% (from the total number of medicinal products and those used for local craft and household material), were recorded to be used purely for medicinal purpose. And 18% were recorded to be coming from useable grasses, palm leaf and fibers, while the remaining 25% included bamboo, rattan, rope and kandii (*Anisophyllea Laurina*), which were used as local building materials.

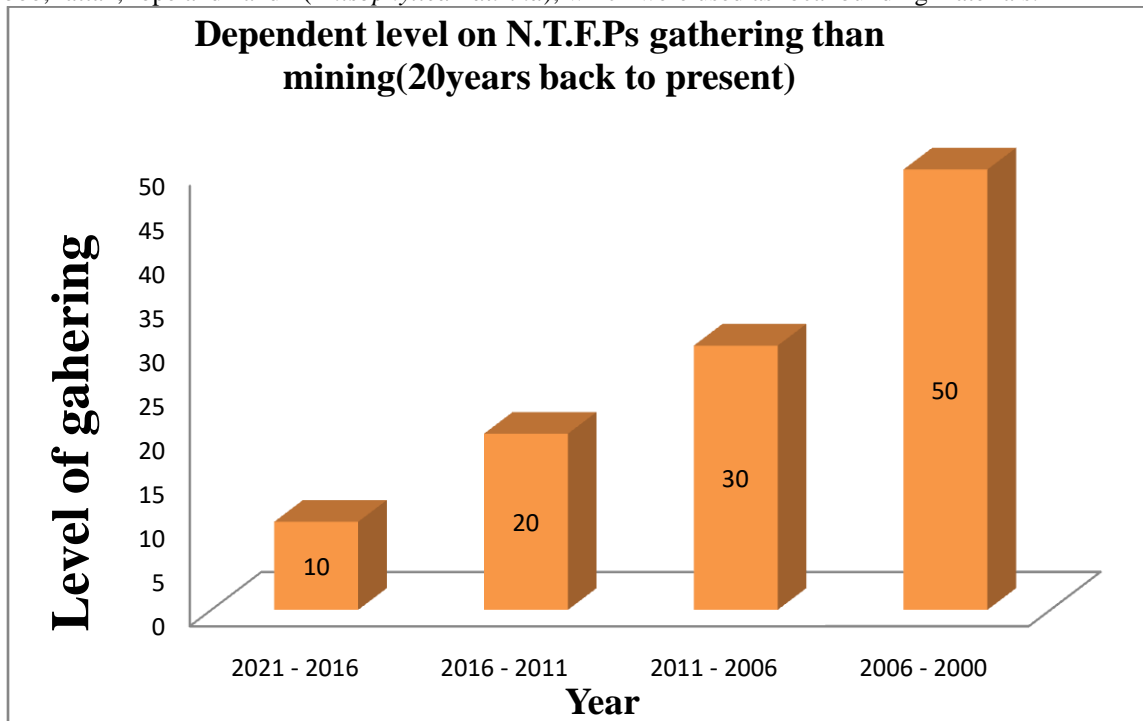


Figure 7: shows the level of dependents on N.T.F.Ps gathering rather than mining.

Comparing dependent level on N.T.F.Ps gathering (twenty (20) years back to present) in the study Area.

Thoroughly investigating the present level of dependent rate on the available non-timber forest products, the people in the study area sincerely confessed that the period when the gathering and collection of non-timber forest products was totally considered as, if not the only way but few among the most competing source of rural livelihood, could be traced only about twenty years (20) back. The gathering of N.T.F.Ps was in fact seems to be only done by mere chance, opportunity or during leisure. This is so because of the ongoing mining activities in the chiefdom as the dominant livelihood job.

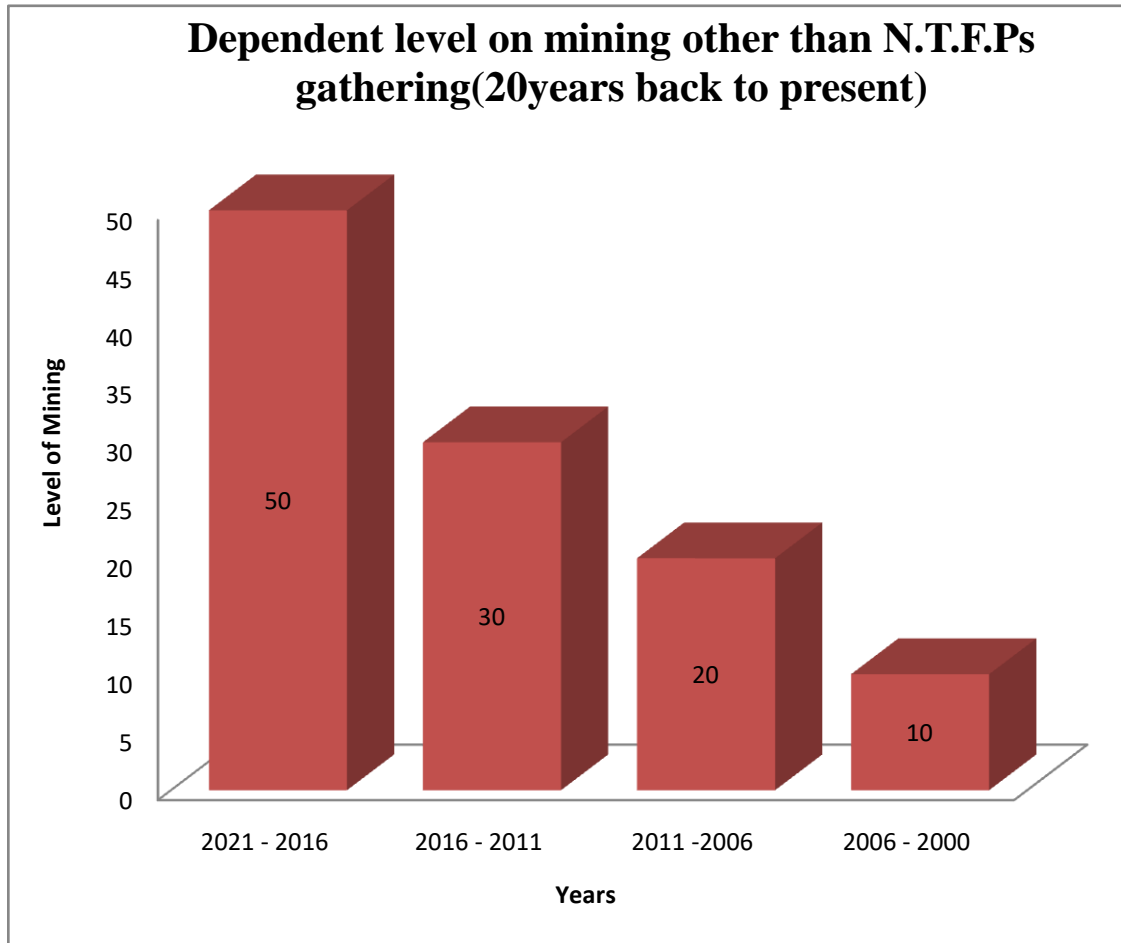


Figure 8: shows the level of dependent on mining rather than N.T.F.Ps gathering.

Comparing the dependent level on mining (20 years back to present) in the study

Since mining became known as a quick way of income and household survival in all the villages around the Kangari hill – forest reserved, a drastic change occurred in the collection and harvesting of N.T.F.Ps which was initially the quickest source of rural livelihood.

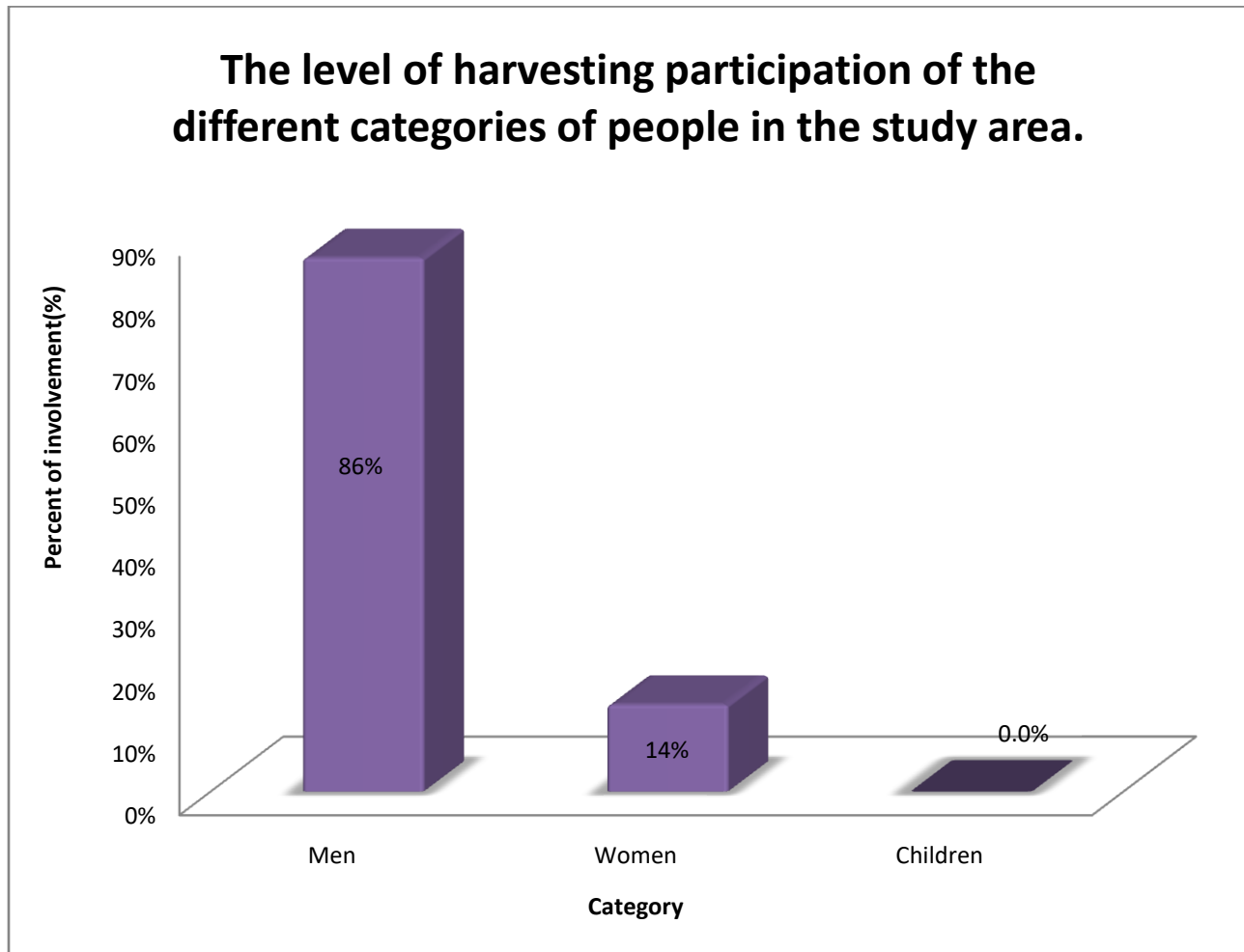


Figure 9: shows the level of harvesting participation from different categories of people (Men, Women & Children).

N.T.F.Ps harvesting/gathering participation (Men, Women and Children).

From among the privileged few who still considered the collection of N.T.F.Ps as a source of, if not livelihood but means of survival, men were the highest group of people recorded to be frequently involved in its collection. Women were recorded to be the least category of people involved in N.T.F.Ps collection. There was little or no record of children going into the forest for N.T.F.Ps gathering as the Kangari hill – forest reserved is seen like an evil forest which is very dangerous for particularly children.

V. DISCUSSION

Sex and Marital status of respondents as obtained in figure 1: eighty-six percent (86%) of the total respondents were males, and fourteen percent (14%) were females. The number of males outweighs the females because the Kangari hill – forest reserved was considered a jungle forest meant only for the strong. A lot of women were always afraid of entering into the forest for any type of activity. As the forest was always as lonely and quiet as a grave yard, women were seen too weak to walk the length and breadth of the forest. They were best regarded to only provide cooked food for their husbands during farm work and to collect fire wood for household use. However, forty percent (40%) of the total male respondents were all farmers, while all the others were miners, with few as forest produce gatherers.

Also the data obtained and showed in figure 2: stated the fact that seventy-two percent (72%) of the respondents were married and it was however recorded that couple of every household always work in harmony, together with their children in order to fend for the home. The same figure continues that two percent (2%) of the respondents were single. This sector from among the total respondent were said to always strive for themselves in terms of food and self-survival with little or no responsibility. Eight percent ((8%), according to the same figure 2,

of the total respondents were divorced, while ten (10%) and eight (8%) percent were widowers and widows respectively. These categories of population from the total respondents were the most vulnerable. They engaged in all kinds of jobs in order to make ends meet. Lastly figure 3 showed that, from the mean and median age of 41 to 50 years (44% of the total respondents), the matured elders of the society in the study area were recorded as the few categories of people who use to go into the Kangari forest (although not always), in order to collect the available non-timber forest products. From closed interview, these category of people were at the same time, heavily engaged in mining activity. However, from the same age class distribution (figure 3), it was very clear to be believed that youths who were at the climax of their youthful age to a fully grown up stage in the study area, were still very strong to handle and support their homes through by farming, mining, forest produce gathering and other activities. Those who were caught within the age of 51 to 60 years (20% of the total respondents) also performed similar livelihood activities. The others, who were found within the mean and median age of 31-40 (18%), formed those categories of respondents who were more engaged in other activities like mining as the fastest and the most competing source of livelihood other than invading the forest for the collection of non-timber forest products.

Academic Level of respondents. As recorded in table 1: of my results, 70% of the total respondents never had any formal education. 20% were chanced to attained primary school education while 8% rose to secondary level and 2% reached the level of tertiary education. Zero (0%) percent records were obtained for vocational or any other skill training. Few of the respondents that attained formal education differ from the majority illiterates only by their abilities of speaking, understanding and interpretation of the general lingua franca of Sierra Leone. However, since the number of illiterates exceeds the privileged few that attained formal education, efforts were always in placed to seeing that the people in almost all the villages lived in harmony, with if not the same, but similar menial or livelihood supporting jobs.

Non-timber forest products found in the study area Table 2: of this study shows that Twenty-eight (28) noticeable NTFPs were recorded to be frequently gathered or harvested in the study area. But however, majority of the people in the study area do not considered the harvesting of non-timber forest products as a prominent livelihood job. This is because, the amounts of non-timber forest products available in the Kangari hill – forest reserved are limited. Few of the people who use leisure hours to visit the forest in order to harvest those available non-timber forest products, did so only once in a while or sometimes on their way home from their farming sites. But however, even when less attentions are been pay to these limited but available non-timber forest goods, yet they provide functions that crossed through medicinal purposes, food provisioning, crafts and rural building materials respectively. Comparatively, this result is corroborated with a onetime research conducted by Dr. Aiah Lebbie, who focuses on the exploitation of the Western Area Peninsula Forest Reserve (WAPFoR), for ntfps in his book title "Distribution, Exploitation and Valuation of Non-Timber Forest Products from a Forest Reserve in Sierra Leone 2001". Lebbie identified 108 different tree species that were targeted for NTFPs, with medicinal species as by far the most frequently harvested products followed by fuel wood, food and construction materials. Similarly so, according to Paul Munro and Greg van der Horst, in their report title "The Role of Non-Timber Forest Products (NTFPs) in Community Livelihoods around the Gola Forest National

Park and Tiwai Island Wildlife Sanctuary", 39 prominent non-timber forest products (NTFPs) were identified across the three main categories of foods, medicines and crafts in the entire sample villages around the Gola Forest National Park and Tiwai Island Wildlife Sanctuary.

Main uses of N.T.F.Ps gathered in the study area. Originally, according to table 2: of this study, twenty-eight different types of N.T.F.Ps were purported to be found and harvested in the study area. And statistically, from the result obtained in figure 4, a total of twelve (42.8% of the total amount) from among the twenty-eight (28), were used for food. And nine of them (32.1%), were used for medicinal purpose, while the remaining seven (25% from the total amount), were used for home craft and rural building materials. This information can be correlated with another fine academic research that was conducted by Tinde van Andel in 2006. He stated clearly under the importance of ntfps for rural livelihood and poverty reduction that Estimates done by the World Health Organization revealed that 80% of the people living in developing countries use wild plants to meet some of their health and nutritional needs. Thus, billions of people, especially those living in rural areas in developing countries, make use of NTFPs on a daily basis.

However, accordingly, farmers who were among the total sample size of respondents, submitted that the Kangari hill – forest reserved might be probably endowed with some unimaginable non-timber forest products, but owing to the strong supervision and restriction from conservation bodies like the National Protected Area Authority (NPAA), majority of these N.T.F.Ps were yet to be still discovered. Some farmers also added that, more than over exploiting the forest as claimed, if the grant to freely harvest the forest with caution, was given to majority of the community members, conservation interest of the reserved forest, will be as well achieved as they will help

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maintained the forest always in order to ensure the continuous flow of its resource. This justified the study done by Mirjam A.F. Ros Tonen K. Freerk Wiersum in their research "The importance of non-timber forest products for forest-based rural livelihoods published May 2003. They emphatically stated in the said report under the "Contribution to sustainable forest use and poverty alleviation" that although some various studies highlighted the important role of NTFPs for local communities, they also have led to doubts about the potential of NTFP extraction from natural forests to contribute simultaneously to forest conservation and poverty alleviation as stated by Arnold and Ruiz Pérez, 1998; Ros-Tonen, 1999a; 2000. They added that its harvest would be found easy to serve ecological, economic and social objectives simultaneously through the sustainable extraction of NTFPs.

N.T.F.P.s dependent level Assessed. Based on the answers submitted to the questionnaires, observations and personal interview conducted and in line with figure 7 and 8 respectively, it was clearly spelled out that all the five sampled towns and villages, heavily depended on farming and mining for rural poverty reduction other than the collection or gathering of non-timber forest products as a source of livelihood. The harvesting of N.T.F.P.s was considered very important, but as it stands, almost all the respondents submitted that there was no household that solely depend on the gathering of N.T.F.P.s for livelihood sustenance. Unlike this research, but Solomon MM (2016) in his book title the "Importance of Non Timber Forest Production in Sustainable Forest Management and Its Implication on Carbon Storage, once mentioned under the role of N.T.F.P.s and community development that NTFPs are regarded as important substances, providing a very good opportunity for sustainable forest management and community development in the last two decades. He further added that there has been increasing recognition of their contribution to household economies, Food security and some national economies. Nonetheless, the contrary was revealed by almost all the respondents in the study area that the present household survival means of the entire homes in the various communities around the Kangari hill – reserved forest presently lies on mining and farming with little efforts given to the collection of N.T.F.P.s. However, the respondents acknowledged and state the usefulness of majority of the collected non-timber forest goods to not be underestimated. The collection of N.T.F.P.s for functions such as provisioning of food, cultural values, rural building materials and medicinal purposes, were still very common. This also correlates with a research that was done by Somnath G. in 2011. Who made it clear in his book title the "Importance of nontimber forest products in native", in point (Value-added N.T.F.P.s and the forest livelihoods), he mentioned that NTFPs have domestic as well as commercial value irrespective of all the research districts. That is, Apart from its direct uses, NTFPs are also collected to produce value-added products. Unprocessed NTFPs are sometimes given less commercial as well as domestic importance compared to value-added products, as the use value of the processed products is greater. For example, some bark, leaves and flowers, when collected from the forests are sold for very low prices, yet when the same products are used to make secondary products, the prices become much higher.

More so, even when figure 7 proved to be the period when NTFPs utilization was more dominant than mining, an instance of running into the forest to seek for medicinal non-timber forest products in order to be administered to someone who has fallen ill, was said to be still very common even till present days. This was in fact, stated by almost all the sample villages visited. These findings can comparatively be sorted with one of the results that was presented by Tinde van Andel again in 2006. He mentioned under "NTFPs and traditional health care that according to the World Health Organization, more than 4 billion people rely on traditional plant-based systems of medicine for their primary health care and that Egypt is the most important medicinal plant exporting country in Africa, and the fifth biggest exporter of medicinal plants in the world.

Nonetheless, based on figure 5: of the results presented above, the respondents in the sample villages added and also acknowledged the fact that majority of the food that were under harvest in the forest were used as either appetizers or food to be eaten between meals to quench hunger. Moreover, figure 6: of this study proved that Craft materials and rural household building materials were still common, irrespective of the period. This resolution matches with a research result that was presented by Ha Noi, Viet Nam in 2008 in his point "NWFPs as nutrition value study", he acknowledged that forest foods have higher nutritional value than domestic animals or garden foods for man's consumptions. He further added that a chemical analysis of some traditional Katu foods corroborates or can prove this, as many wild plants and animals provide food with greater nutrient densities than alternative foods imported through market networks in remote mountain areas. However, the respondents further submitted that the only difference that exists now was that the gathering of non-timber forest products was no longer common or rampant like it used to be especially for the provision of income and the provision of a fully livelihood support as it used to be since ten (10) to twenty (20) years back. But this was said to be as a result of the ongoing mining activities that caught across almost the entire chiefdom. Supported evidences from some personal observations proved that almost all the respondents and the entire communities around the Kangari hill reserved forest, presently depended on mining and farming activities other than N.T.F.P.s harvesting.

VI. CONCLUSION

From empirical evidences and results obtained from the list of those NTFPs that are gathered in the study area, it was completely clear that neither the entire sample villages nor the whole chiefdom (Kunike Barina) could presently rely on the available NTFPs for survival. Though all the respondents acknowledged the potential of the available NTFPs which in summary included those used as foods eaten between meals; medicines especially those that were used to cure children and anyone that fall sick in the village; and lastly, local craft items and rural building material. But yet, the highest population of every community around Kangari hill – forest reserved, depends on the mining of gold. Mining of gold was the dominant activity in the entire Kunike Barina and almost all the villages around the entire chiefdom around the forest reserved depended on it. Minerals that were mined in the forest are considered as NTFPs but the purposed of this research originally focused on materials of biological origin. Thus, focus on finding the extraction processes, importance and its contribution to rural life, were not considered as research priorities. For those other NTFPs of biological origin in the study area, which were considered as the center focus, it was stated that its gathering or harvesting was considered as the least of the most important source of rural livelihoods. And that the period when its gathering was among few of the most competing rural livelihood, could be traced only about ten to twenty (10-20) years back. Lastly, the farmers strongly opined that the level of reliance on NTFPs in their village is drastically low as a result of the high restriction and supervision from conservation bodies like the National Protected Area Authority (NPAA), with little or no idea of how the grant to freely harvest the forest for NTFPs would as well contribute to conservation goals, the respondent admitted.

VII. RECOMMENDATIONS

Based on the achievement of this research objective, results and its conclusion, the under mentioned includes recommendations that are worthy to provide keen attentions to:

- ✓ Owing to the facts that less attention is paid to the harvesting of NTFPs as a source of livelihood, the government through the Ministry of Environment and Forestry should be providing awareness on the values of most of the non-timber forest products found in the reserved, after every one or two months in order to enhance conservation and protection interest.
- ✓ The government through the ministry of Environment and Forestry should formulate policies that will encourage a sustainable harvesting and commercialization of the non-timber forest products found in the Kangari Hill – reserved forest.
- ✓ Conservation bodies including the National Protected Area Authority (NPAA) should lessen its high restriction measures that prevent the rural poor from entering the forest, to a more friendly ones that encourage them to freely harvest non-timber forest products following some laid down rules. This is another way of achieving conservation goals as the people will help to maintain the level of harvesting non-timber forest products, in such a way that will ensure a continuous flow of the forest resources.
- ✓ Considering the facts that *Anisophyllea Laurina* (Kandii Stick) was the most frequently mentioned NTFPs used for rural building and most wooden constructions, emphasis should be placed on its conservation and planting in the forest through the “cut one and plant four” policy.
- ✓ Agroforestry and alley cropping which help to provide diversified non-timber forest products, should be recommended to the rural farmers in the study area in order to diversify and increase their yield in both farm produce and non-timber forest products.
- ✓ The government through the ministry of lands and mineral resources, in collaboration with the ministry of environment and forestry, should define and over-emphasize the restoration pattern of degraded forest land before the issuance of mining permit. This would greatly help to prevent over-degradation of the Kangari Hill – reserved forest.
- ✓ To ensure the effective management of the forest for the utilization and benefits of its products in other parts of the country, the feeder roads that lead to the forest should be regularly maintained.
- ✓ The government should help provide national guidelines that are in line with local norms which help to define a fallowing and harvesting period of selected valuable non-timber forest products in the Kangari Hill – reserved forest for the benefits of all.
- ✓ The government should develop a reasonable forest management and investment plan that concerns about the protection and conservations of some highly valued NTFPs such as rare medicinal plant species, rare nuts, elephant tusks, etc., for conservation interest and to prevent the risk of extinction.

- ✓ The Government should start giving compensation to the rural poor for their efforts in always protecting the integrity of the forest for the continuous flow of its resources. This can be done by recruiting its inhabitants as forest guards.

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