
The Effect of Deforestation on the Economic Activities of the Inhabitants of Abaji Area in Abuja, Nigeria

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ABSTRACT: *This research work is aimed at the effects of deforestation on the economic activities of the inhabitants of Abaji area in Abuja. The study employed a mixed research strategy in the collection, analysis and presentation of findings. The tools of data collection include administered questionnaires and participant observation and reconnaissance survey carried out in the study area to gather baseline information which would aid the design of the study. Information accessed during the visit includes the baseline report on problems encountered with deforestation in Abaji area. Personal interview was conducted to some selected individuals living in Abaji area wards such as agricultural officials or extension workers, farmers, household heads, fuel wood seller and people working at the timber sheds. Questionnaires based on socio-economic characteristics of the households were administered. The questionnaire was administered to meet the stated objectives of the study. Six (6) wards were sampled using stratified random sampling technique. In this situation, the Area Council was stratified into North, Central and Southern zones. 140 households were sampled. Out of 300 respondents sampled in this study, 67.3% are male while 32.7% are females. Most respondents interviewed had some form of education indicating that there is generally fairly literacy level among them except for 9% that have no formal education. The result of the study has clearly indicated that the occupation distribution of 51% of the respondents is farming. Apart from farming, other forms of occupation such as driving, tailoring, lumbering and trading constitute 28% of the response obtained. On the other hand, gathering of fuel wood, collection and gathering of medicinal plants, collection of wild fruits and nuts, collection of wild vegetables, and gathering of fodder, marketing of bush meat etc. constitute 22% respectively. By implication, this means that the bulk of the responses are directly involved in activities that cause deforestation. The study recommends that deforestation effects could be ameliorated by promulgation of government policies that regulate the use of forest products, dissemination of information on forest, environmental sustainability issues, and education on afforestation in order to improve and maintain farmlands, since agriculture has been implicated as one of the primary causes of deforestation, there is need to adopt farming systems that encourage conservation tillage. This should include introduction of organic farming method, hydroponics, greenhouse gardens, slash and char rather than slash and bum, as well as alley farming in which crops are interspersed with small trees.*

Keywords: deforestation, economic activities, Abaji, Abuja, Nigeria.

INTRODUCTION

Forests cover almost a third of the earth's land surface 'providing many environmental benefits including its major role in the hydrologic cycle, soil conservation, and prevention of climate change and preservation of biodiversity (Sheram, 2012). Forest resources can provide long-term national economic benefits. For example, at least 145 countries of the world are currently involved in wood production (Anon., 2014a). Sufficient evidence is available that the whole world is facing an environmental crisis on account of heavy deforestation. For years remorseless destruction of forests has been going on and we have not been able to comprehend the dimension until recently. Nobody knows exactly how much of the world's rainforests have already been destroyed and continue to be razed each year. Data is often imprecise and subject to differing interpretations. However, it is obvious that the area of tropical rainforest is diminishing and the rate of tropical rain forest destruction is escalating worldwide, despite increased environmental activism and awareness. Deforestation is the conversion of forest to an alternative permanent non-forested land use such as agriculture, grazing or urban development. FAO (2010) considers a plantation of trees established primarily for timber production to be forest and therefore does not classify natural forest conversion to plantation as deforestation (but still records it as a loss of natural forests). However, FAO does not consider tree plantations that provide non-timber products to be forest although they do classify rubber plantations as forest. Forest degradation occurs when the ecosystem functions of the forest are degraded but where the area remains forested rather cleared (Anon., 2010). Forests are known as habitats and shelters to millions of species. However, the trees on our planet are being depleted at a very fast rate. According to some estimates, more than 50 percent of the tree cover has disappeared due to human activity. This removal of forest or tree from a land and converting it for non-forest use is called deforestation (Barraclough and Ghimire, 2010).

According to the United Nations Food and Agriculture Organization (FAO 2014), "during the 1990s the world annually lost millions of hectares of natural forest." Estimates by the Food and Agriculture Organization (FAO 2011) are that the tropics lose more than 10 million hectares of forest cover annually. Although humans have practiced deforestation since ages, it was in the mid 1800s that forest began to be destroyed at an unprecedented rate. One of the most worrying factors today is the rainforest of the world is affecting the biodiversity adversely, as well as being one of the major contributory factors to the ongoing Holocene mass extinction. Shifting cultivation is responsible for almost 70% of deforestation in developing countries. The situation is worst in tropical Africa, where deforestation exceeds the projected rate of tree planting by a ratio of 29: 1 (Kang, Reynolds, and Atta-Krah, 1990). According to the FAO (2011 b), forest fallow resulting from shifting cultivation practiced in recent times occupies an area equivalent to 28.5% of the remaining closed forest in Africa, 16% in South America and 22.7% in Asia. Apart from shifting cultivation, tree cutting for fuel and animal feed production have also contributed to deforestation (FAO, 2011b). Deforestation occurs because of many reasons. Trees or derived charcoal are used as fuel or sold as a commodity. In Africa, almost all countries rely on forest to meet basic energy needs. The share of wood fuels in African primary energy consumption represents on average 86% of total African energy consumption (Amous 2010). Cleared land is used as settlements, pasture for livestock, and agricultural

plantations. One reason for forest depletion is to plant cash crops. The reliance on area expansion to meet the needs of rapidly increasing human population has resulted in increased deforestation in Abaji area Council resulting in serious environmental problems including erosion, loss of soil fertility, loss of medicinal plants and fruits, extinction of species, changes in climatic conditions, and displacement of indigenous people. Poverty is another important factor of deforestation. The New York Times (2013) reports that among countries with a per capita GDP of at least US\$4,600, net deforestation rates have ceased to increase very serious impact of deforestation is loss of biodiversity. In many tropical countries, the widespread and often uncontrolled removal of forests continues to deplete soil reserves leading to a significant reduction in environmental services and water quality often with a dramatic loss in biological diversity, it is important to note that one of the serious environmental problems that have been occurring on a very large-scale for quite a long time now is the issue of clearing of forest across the earth. This process is referred to as deforestation; always involve the removal of vegetal cover through cutting down, burning and environmental subjects of concern for both economic and environmental reasons. Once deforestation has occurred, it is always often very difficult to reverse the situation and this will lead to environmental deforestation for instance, creates hostile condition for the majority of the original forest trees, thereby contributing to desert encroachment, increase in acidity, soil nutrient decline and above all, soil erosion. Forest is extremely important to the natural world; hence they protect the soil against erosions and reduce the risk of landslide and avalanches. They may increase the rate at which water supply or released in watershed and also help in sustaining fresh water supplies, therefore, an important factor in the availability of one life's basic needs. In addition to the aforementioned statement, forest also remains important sources of oxygen although they play lesser role than was once thought (Anderson, 2018).

In Nigeria, environmental degradation such as desert encroachment, erosion, flooding and drought to mention few all have a strong link with deforestation. In Abaji Area council for example, escalated soil erosion, flooding, drought, and increase in aridity, all which have strong relationship with deforestation, has affected a significant proportion of the Area, In Abaji Area Council, fertile agricultural land has been taken over by deforestation. As at present, the heaps of fire-wood, bags of charcoal along our major roads, piles of timber exploitation from already over exploited forest is an evident that trees are being cut down every day without replacement which has lead to extinction of species also the productivity of the land is progressively on the decline. Large proportions of arable land have turned into bad land topography with erosion features of different types. The strong hazardous wind that destroy and damage building roofs and growing plant, which for long had been occasional, nowadays are common due to increase in aridity and deforestation. The rate of deforestation in Abaji Area Council is quite alarming which necessitate the Area Council to design various programmes to combat the menace. It was such policies of controlling deforestation that the Federal Capital Territory, Abuja Environmental Protection Agency (AEPA) was established to help in curtailing the causes of deforestation. It is with regard to the above that this study aims at looking at the effects that deforestation has on the socio-economic activities in Abaji Area Council with a view of suggesting solution to the problems.

Deforestation as a major phenomenon that brings about environmental degradation through environmental hazards such as loss of soil fertility, erosion, change in climate, flooding,

disruption of the water cycle to mention but a few, is now becoming a threat to the physical environment of most rural communities in the world (FAO, 2014). Forests worldwide are being threatened by uncontrolled degradation and conversion to other forms of land uses; influenced by increasing human needs; agricultural expansion; and environmentally harmful mismanagement including: lack of forest fire control, lack of ant poaching measures, unsustainable commercial logging, overgrazing, air-borne pollutants, lack of economic incentives, and activities in other sectors of the economy (Amous, 2012). The impacts of loss of soil fertility, scarcity of fuelwood, scarcity of wild vegetable, extinction of mushrooms, soil erosion, loss of biological diversity, damage to wildlife habitats, degradation of watershed areas, deterioration of the quality of life is not insulated from Abaji Area Council in the federal capital territory, Abuja. It is in the light of this observation that this research work is undertaken to find out the effects the remote causes of deforestation and what recommendation can be provided to curb or minimize deforestation in Abaji Area Council.

The general purpose of the study is to assess the effects of deforestation on socio-economic activities on Abaji Area Council. Towards achieving this aim, the following specific objectives are set as follows:

- i. Identify the socio- economic characteristics of the respondents in the study area
- ii. Identify the socio economic activities that are affected by deforestation in the study area.
- iii. Determine the effect of deforestation on domestic energy in the study area.
- iv. Determine the effect of deforestation on agriculture in the study area

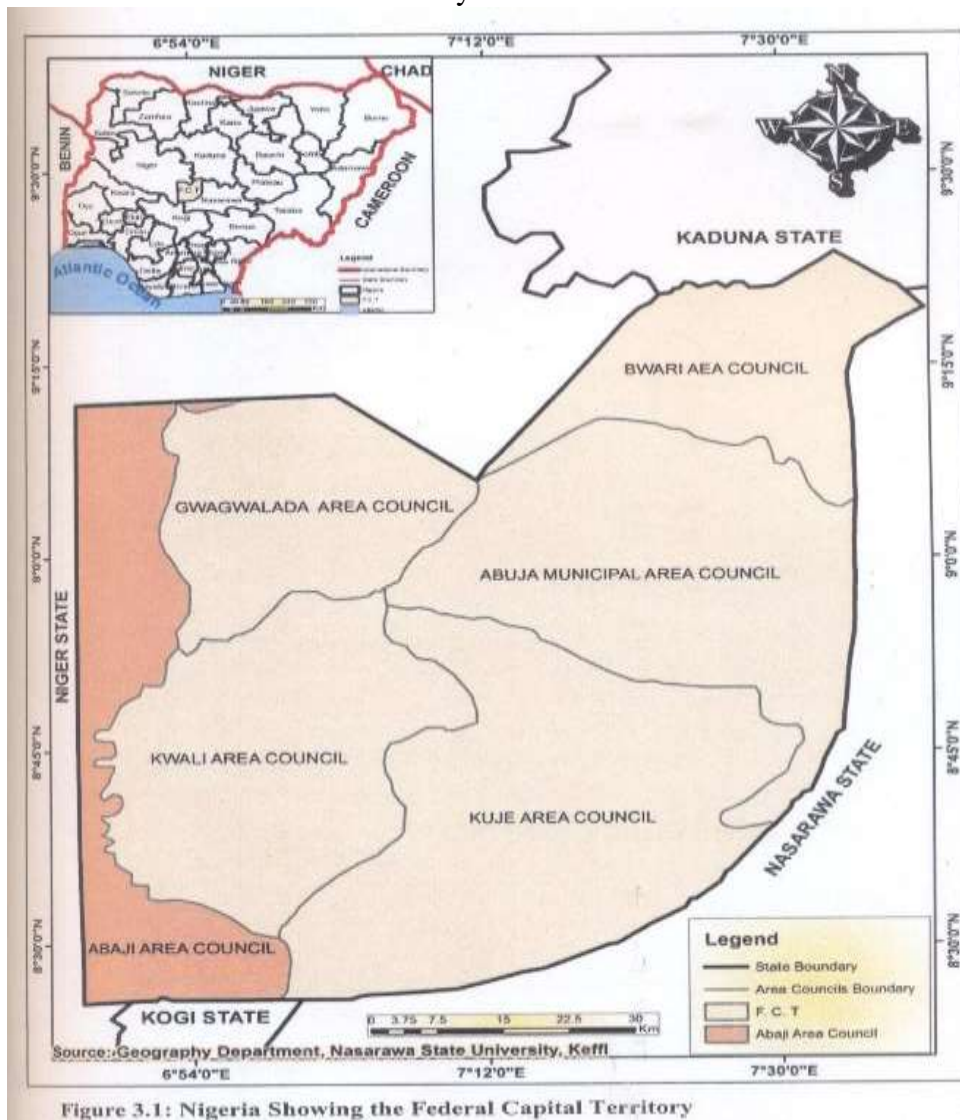
The Study Area

Abaji Area lies between longitude 6° 45'E and 7° 45' E and Latitude 9° 25'N and 8° 25' N. It is located about 70km away from the Nnamdi Azikwe International Airport Abuja. It covers a total area of 1,100square kilometers with a population of over 46,600 inhabitants based on 2006 population census and 60,802 as the projected current population. Abaji town is southernmost part of the Federal Capital Territory and is referred to as Gateway to the Federal Capital. The area exhibits the guinea savannah type of vegetation with tall grasses are interspersed with trees. The trees are scattered' and deciduous in nature (i.e they shed their leaves during the dry season).The common trees in the area include *Lucusafzelia*, *africananogeissus*, *leicarpus*, and *paradoxim*. The accompanying shrubs and grasses are of the *Hymenocardia* and *Andropogon* communities.

The natural vegetation, comprising of grasses, trees and shrubs, is currently being used for grazing, firewood, timber, palm product fruit gathering and, various construction purposes including building. Some of the economic trees found here include the locust bean, shear butter, mahogany, cashew, mango, orange and guava. Rainfall distribution and topography are the most important factors influencing the pattern of vegetation in Abaji. Vegetation is vigorous during the wet season and foliage withers in the dry season. The major agricultural practice includes the cultivation of the growth crops and their fruits. Although, the most of this natural vegetation exists no more; due to main interference with original vegetation cover. The abundance of forest reserves in the Area

Council has led to the establishment of some saw mills which provide planks of various sizes mainly for construction purposes.

The activities of the inhabitants in the study area include farming, fishing, pottery, trading and civil service. Trading is one of the economic activities which is made up of enterprises that have no formal structure in terms of organization and operation. They are generally small scale with regard to initial capital outlay, running cost, financial returns and the number of employees in the enterprise. Other small and medium scale examples are motor vehicle mechanics, tailoring, electronic repairs, vulcanizing, photography and electrical works. There are a number of infrastructures which aid the easy flow of all their social and economic activities.



Source: Geography Department, Taraba State University, 2019.

MATERIALS AND METHOD

In order to achieve the objectives of this research, reconnaissance survey was carried out with a view to gather baseline information which would aid the design of the study. Information accessed during the visit includes the baseline report on problems encountered with deforestation in Abaji area. Personal interview was conducted to some selected individuals living in Abaji area wards such as agricultural officials or extension worker, farmer, household heads, fuel wood seller and people working at the timber shed. Questionnaires based on socio-economic characteristics of the households, was administered. Some of the questions were open ended to allow for flexibility in responding to the questions while some were close ended restricting the respondents to pick from the options of interest to them. The questionnaire has socio-economic questions which include age, education, occupation, in some sources of energy for cooking, method of grazing. Other questions included, if cutting of trees is considered a forestation, if deforestation has changed the density of trees, and reduced plant species. Validation of the questionnaire was determined by putting forth the research questions to the respondents to select options best to their knowledge on the effect of deforestation on their economic activities in the area. This was first done among the household heads of various houses in one Political ward of the Area Council. The reliability of the questionnaire was pre-tested in a pilot survey over a two week period, using trained assistants to ascertain the reliability of the items. This was done outside the study area with the supervision of the researcher. Relevant changes were then incorporated into the questionnaire. Secondary source of data involved the review of literatures from journals, textbooks, news paper, published and unpublished thesis, books written by scholars, internet and the use of base maps to obtain information on the study area.

Six (6) wards were sampled using stratified random sampling technique. In this regard, the area was stratified into North, Central and Southern zones. Two wards were randomly sampled from each of the stratified zones. (Table 3.1), which include Agyana, Pandangi, Rimba, Mamagi, Gurdi, and Ebagi ward. The criterion for the selection was based on the proximity of the wards to catchment forest and also because of the agricultural practices.

Table 3:1: The sample Wards

Abaji North	Abaji South	Abaji Central
Agyana	Rimba	Gurdi
Pandangi	Mamagi	Ebagi

Source: fieldwork, 2019

Population and Sample Size Determination

Agbola (2012) reported that there are about 6821 households in Abaji Area Council accommodating 11245 persons by 2006. This figure was projected to 2018 using Exponential Model at 3.5% annual growth rate to arrive at 9293 households and 15323 persons. The household population represents the population of this research. From this, population, 140 households were sampled at 5% level of significance based on MC Donald' s (2006) formula for sample size determination

$$n = (Z^2 pQ) / D^2$$

Where $Z=1.96$ (constant),

P = No of household by Total Population,

$Q=1-P$ and

D = Level of Significance. Interestingly, the relevance of adequate data for the realization of a study like this cannot be overemphasized. The area of study (Abaji Area Council) which comprises six wards did not have identifiable physical boundaries. The criteria for grouping wards include the sizes and the presence of notable features such as stream, footpath or vehicle road. This has been considered important for the purpose of identification of other features and interpretation. Systematic sampling technique was adopted for the research and the wards were used as strata for sampling. The samples were drawn in proportion to the number of household in each stratum: Analysis of data was done on the basis of the six strata. See table 3.1

Table 3.2 Population/Household Size by wards and their respective Sample Size

Wards	Population (2006)	No of Household (2006)	Population (Projected, 2018)	No Of household (projected,2018)	Sample size
Agyana	1370	1598	1867	2177	58
Pandangi	1450	1100	1976	1499	40
Rimba	1780	1112	2425	1515	42
Mamagi	1054	1961	2221	1309	50
Gurdi	3945	1054	5376	1436	54
Ebagi	1070	996	1458	1357	56
Total	11245	6821	15323	9293	300

Source: fieldwork, 2019

Since systematic 'sampling was adopted, sample ratio or sample interval for household sampling was' determined by dividing the number of household by the sample size for each study ward. See table 3.2

Table 3.3: Projected Household Size by ward, Sample Size and Sample Intervals

Wards	Projected Household Size (2018)	Sample size	Sample Interval (Sample Ratio)
Agyana	2177		1:83
Pandangi	1499		1:83
Rimba	1515		1:75
Mamagi	1309		1:46
Gurdi	1436		1:44
Ebagi	1357		1:84
Total	9293		Average = 69

Source: Fieldwork, 2019

The mean sample interval for the six (6) wards is 69. However, sample interval calculated for each ward was used.

RESULTS AND DISCUSSION

Socio Economic Characteristics of the Respondents

Table 4.1: Sex distribution of Respondents

Sex	No of respondent	Percentage of respondent
Male	202	67.3
Female	98	32.7
Total	300	100

Source: Fieldwork, 2019

The research findings on the sex distribution of the respondent is of relevance in order to effectively achieve the aim of research questions which include gender mainstreaming as a point of enquiry.

Table 4.1 revealed that out of 300 respondents sampled in this study, 67.3% are male while 32.7% are female. This indicated that the male respondents constitute almost two times the number of female respondents. . There is no special explanation for this variation but it can be linked with the choice of sampling technique which offered every person whether male or female, the equal chance of being selected. Thus, it may be inferred from this that, the viewpoints expressed by respondents on the various research questions are representative of their respective populations

Table 4.1.1: Age Distribution of Respondents

Ages in years	No. of respondents	Percentages
21-30	100	33.3
31-40	85	28.3
41-50	70	23.3
50+	45	15
Total	300	100

Source: Field work 2019

Data on Age of respondents revealed that about 33.3% of the respondents lie between the ages of 21-30 years, an age range considered as prime, farmers who belong to this age bracket are those in the active farming age. This finding agrees with that of Kolawole, (2012). Majority of this age group are more preoccupied with active education rather than farming and are dependent on their parents who are into active farming and lumbering activities that destroy the forest ecosystem. On the other side of the chart, only 15% respondents among the age bracket of 51 and above, majority of this age category are post active as a result engage in fuelwood collection and other minor activities. This invariably contributes to deforestation in the area.

Table 4.1.2: Distribution of Respondents According to Education

Education	No. Of respondents	Percentage
Primary	118	39.3
Secondary	85	28.3
Post-secondary	70	23.3
None	27	9
Total	300	100

Source: Field work 2019

Most respondents interviewed had some form of education indicating that there is generally, fairly literacy level among them except for 9% that have no formal education. Results revealed that 39.3% attended primary education, 28.3% attended secondary education and 23.3% attended post-secondary. These will likely enhance their knowledge and use of forest resources alongside adoption of proper farming mechanism though limited because formal education has always been known to positively influence the adoption of improved farming education has always been known to positively influence the adoption of improved techniques among farmers. Again, the fact that host them attained primary school (39.3%) is an indication that they may not be in tune with new farming techniques that lay more emphasis on reforestation, and adoption of intensive farming rather than extensive farming to control deforestation. This corroborate with the finding of Jonathan (2018). Their academic attainment may also make it difficult for them to see the correlation between clearing forests and contemporary issues of climate change and global warming.

Table 4:1.3: Marital Status of Respondents

Marital status	No. of respondents	Percentage
Single	78	26
Divorce	30	10
Widow	24 "	8
Widowe	20	6.7
Married	148	49.3
Total	300	100

Source: Field Work 2019

Marital status of respondents was also considered since it helps to critically draw out the total number of dependents in a household and how inference can be drawn to examine extent of impact on household income and expenditure. 49.3% of the respondents covered indicated being married, 14.7% stated being widowed, 10% have divorced and the remaining 26% are single. It is observed the number of household dependents varies according to the marital status of a respondent. Categorically for those who have married, widowed and divorced the average household size is estimated to be 6 people. The respondents who are single may be presumed to have less burden of dependents except taking responsibility for their parents who might still be alive and this averagely place their total number of dependents of such people at two persons.

Table 4.2: Right of therespondents to forest reserves

Right to Forest ReservesStatus	Frequency	Percent
Right to Forest Reserve	83	27.67
No Right to Forest Reserve	217	72.33
Total	300	100

Source: Field Work, 2019

Commencement of Farming Activities

The survey revealed that 56% of the respondents observed changing patterns in the date for commencement of farming activities. Table 4.2.1 'presents more information about the phenomenon. This assertion was corroborated by the Nigerian Meteorological Department that the study area has been characterized by erratic rainfall pattern in recent times. The two major rainy seasons in the area starts from April to July and August to November and the farming seasons coincides with the rainy seasons due to the reliance on rainfall for cultivation. Due to the erratic nature of the rainfall, periods for planting have been affected dramatically. This' is because it has become increasingly difficult to accurately predict the weather and the climate. Day-to-day and medium-term planning of farm operations has become more difficult. As a result, many farming activities and operations are either commenced rather too early or too late leading to poor yields. This is in harmony with the report of Chomitz et al., (2007) on the implication that poverty are exacerbated by the poor yield syndrome leading to much more pressure on the forest and the livelihood opportunities it provides.

Table 4.2.1: Crops Yield (in tonnes)

crop	Average Yield (Mt/ha)			Production (Mt)		
	2010	2018	% Change	2010	2018	% Change
Maize	1.80	1.79	-0.74	10,278	10,202	-0.74
Rice	1.30	1.27	-2.63	169	139	-21.29
Cassava	15.40	15.30	-0.67	63,140	61,189	-3.19
Yam	13.86	13.87	0.01	1,247	1,248	0.01
Guinea	7.70	7.61	-1.24	28,336	26,467	-7.06
Cocoy	18.94	18.10	-4.44	151,316	156,266	-3.17

Source: Field Survey, 2019

Adaptation Mechanisms on the Effect of Deforestation on Socio Economic Activities

From the survey, respondents indicated the various strategies they have employ to mitigate the effects of deforestation on their livelihood patterns. The study revealed that 38.7 percent of the respondents covered have resorted to application of fertilizer to address decline in soil fertility and improve the yields. Furthermore, 61.4 percent of the respondents are engaged in other alternative livelihood activities such 'as rearing of livestock, fish ponds, snail and grass cutter rearing, bee-keeping to help supplement their major livelihood venture (farming) which has seen. some decline over the years. In addition, it was realized that, over 60 percent of the respondents have employed multiple strategies to 'cope with the situation. This implies that the forest resources provide alternative sources of livelihood to over 60 percent of the communities in-the study area. Hence, the need to protect and sustained the forest. The adaptation techniques provided in this section agree with that postulated by Gortet and Sheikh (2010).

Table 4.2.2: Adaptation strategies to the effects of deforestation

Adaptation strategies	Frequency	Percentage (%)
Application of fertilizer excessively	116	3.7
Rearing of livestock	95	31.7
Fish ponds	32	10.7
Snail/grass cutter rearing	57	19
Total	300	100

Source: Field Work; 2019

Farming Systems

The two major farming systems which are practiced by the respondents are mixed cropping and mono cropping. The survey showed that 91.5 percent of the crop farmers prefer mixed cropping to mono cropping (see Table 4.2.1). This indicates that mixed cropping is the predominant practice for both staples and cash crops. Mixed cropping is where variety of crops are grown on the same piece of land unlike mono cropping where only one crop is grown. The reasons being that 91.5 percent of the respondents prefer mixed cropping to mono

cropping, this is because it helps farmers to get a variety of crops which can be sold at different prices to get more profit, encourages farmers to cultivate all year round and reduces the risk of loss of yields due to unfavourable climatic conditions. This finding agreed to the earlier findings of Jonathan (2018). This serves as adaptation mechanism for the people by way of reducing their vulnerability and their dependency on forest and its resources for livelihood (See Figure 4.2.1).

Effect of deforestation on Domestic Energy in the Study Area Table 4.3: Types of Domestic Energy in the study area

Source of Energy	Number of Respondents	Percentage (%)
Fuelwood	223	74
Crop residue	53	18
Cow dung	10	3
Gas	12	4
Electricity	2	1
Total	300	100

Source: Fieldwork, 2019

communities in Abaji Area Council largely depend on fuel wood as the major source of energy. This is because most of the people are living below poverty line and cannot afford other sources of energy which are more expensive. In this regard, the data obtained with respect to source of domestic energy in, the area reveals that the highest number of respondents, that is, 74% uses fuelwood as their source of energy. On the other hand, crop residue ranked second with 18%. About 1 % of the response obtained went for electricity, while gas was 4 %. This is an indication that in the energy pattern, the main characteristics of rural areas of the 'county in general and the study area in particular have their dependence on biomass energy. The overall energy pattern of the area is characterized by heavy dependence of fuelwood with other types of biomass (cow dung, gas, crop residue and electricity).

According to the respondents covered by this study, fuel wood consumption was the common and major household energy source for home based activities (for cooking, boiling, baking etc). Since there is no sufficient electricity supply almost all the households are depending on fuel wood and this energy source is being threatened by deforestation as the people have to travel long distances to source for them. Despite the fact that fuel wood collection is exhaustive, time- consuming however, they use it as main source of energy because of the lack of options to use other biomass energy source. Although there is evidence that other-biomass energy source such as dung, gas and crop residue become non prevalence in sites, the unsustainable harvesting of fuel wood lead to deforestation and further scarcity of the fuel wood. This indicates that there is a mutual relationship between deforestation and fuelwood availability for domestic use. Since the opinion of more than two-third of the respondents shows that fuelwood is their major source of domestic energy, by implication, this means that there will be demand for fuel wood in the area. Hence, more demand for fuel wood will entails cutting down more trees to meet domestic energy needs.

This study tried to also find out the distance travelled by the inhabitants of Abaji to collect fuelwood at the time of data collection compared with the distance travelled ten years back, 59.8% of the respondents covered responded that they travelled long distance to get available amount of fuelwood relative to ten years back which really indicate the status of deforestation of the study area. this is in agreement with Lawton, et al (2011) who reported that fuelwood gathering and heavy reliance biomass fuels in developing countries has raised global concerns over environmental consequences such as forest degradation and soil erosion. Accordingly, many studies revealed that next to agricultural land degradation, the most leading factor for high deforestation is using fuel wood as a source of energy and it has been suggested that the key issue in the energy sector is reducing the heavy reliance of the households on biomass source of energy to abate the ever increasing deforestation in the country at large. The evidence of respondents who responded travels short distances (59%) for collecting particularly in Egbagyi and Agyana wards is due to introduction of protected areas and restriction of cut-off trees from natural forest of the areas. The rest 41 % of the respondents attributed that there is no difference in time spent to collect fuelwood relative to ten years back because they have their own forest for fuelwood collection, but they have doubted on the sustainability of their forest products, that the degradation of the forest density leads to fuelwood scarcity in the future. This finding agree with Lambin and Mayfroid (2011) who reported that firewood is now scarce that even a small weed on the road side is collected and women spend long hours before obtaining firewood. Similarly, Lawton, et al (2011) established that the maintenance of present level of food production is difficult and that the impact the crisis has on nutrition and health is devastating and poor families have often had to cut down from three to two or one major meals a day. The negative effect of this according to Bryan, (2008) is the possibility that the education of children especially female children might suffer. This is because female children are usually engaged in firewood gathering.

Effect of Deforestation on Agriculture in Abaji Area Council

The presence of trees covers in a particular area contributes substantively to the maintenance of the soil beneath in terms of fertility and structure. Thus, the loss of tropical forests implies increased degradation of forest soils. This will however depends on the magnitude of soil disturbance and the type of soil (Gorte and Sheikh, 2010). The perception of the impact from soil degradation varies from person to person and place to place and this is true of the views opined by the household respondents engaged in this study. Table 4.4 shows the household understanding of the perceived effect of soil degradation as an effect of deforestation in their communities.

Table 4.4 Manifestations of Soil degradation

Manifestations	Frequency	Percent
Reduced soil fertility only	186	62
Increased soil erosion only	80	26.7
Both	34	11.3
Total	300	100.0

Source: Field Work, 2019

The majority of respondents felt that reduced soil fertility (62%) is the predominant effect resulting from the loss of the forests in the communities. The explanations they offered relay with Anon (2012) that, as the leaves, flowers and branches half to the ground or as roots die, the numerous soil-dwelling animals and bacteria act on them, transforming the forest litter into organic matter, which is a reliable supply of soil fertility. Respondents therefore argued that, the unprecedented loss of forests has ruined the role of forest biodiversity in facilitating natural replenishment of soil nutrients. It is identified that the perception of soil erosion being the sole effect resulting from deforestation is not prevalent. 80 respondents (26.7%) indicated so as seen in table 4.4.

Although soil erosion might not stand out as the single most important manifestation of soil degradation in the communities, the close or reinforcing relationship between reduced soil fertility and soil erosion (Keller, 2018), a challenge to be mindful of, hence its impact cannot be downplayed. This probably influenced the perception of 34 respondents (11-.3%) who indicated both reduced soil fertility and increased soil erosion as to how soil degradation manifest in the communities. While the resulting effects from soil degradation may vary between the two communities, a general observation of the views expressed indicates that it has reduced the resilience of the soil in terms of its fertility and structure.

The loss of these attributes of the soil has highly affected agriculture because 96% of the household respondents as well as the key informants argued that crop production has been declining. Respondents stated that because of reduced soil fertility the average yield of main food crops cultivated in the areas have not been remarkably high and even a crop such as cocoyam has experienced continuous decline in production over the years. This is observable from the compiled statistics on production yields of the major food crops as illustrated in Table 4.4.1

Table 4.4.1 Data on production of Major Food Crops (tonnes) in Abaji area council

Name of crop	Production Yield (Metric tons) per year								
	2007	2008	2009	2010	2011	2012	2013	2014	2018
Maize	9,990	8,299	11, 165	11,331	10,669	1,869	14,693	13,472	15,324
Rice	360	1,491	1, 189	1,25	1,332	1,485	385	929	1,020
Cassava	60,770	59,555	63,550	64,021	59,075	60,035	59,910	83,520	97,440
Yam	2,280	2,326	3,985	4,35	6,769	8,315	11,778	10,326	11,089
Cocoya	19,620	18,639	17,364	17,028	13,603	13,221	10,975	8,316	13,476
Plantain	9,860	9,742	11,973	12,438	31,603	37,943	71,571	89,179	95,411
Total	102,880	100,052	109,226	11 0,431	123,051	130,868	169,312	205,742	233,760

Source: Field Work, 2019 (compiled from Abaji Area Council Agriculture Development Unit)

While there are many factors that could have influenced the production trends of crops in the area council such as increase in the 'areas; cultivated and the number of people engaged in agriculture;' -the role played by the application of chemical fertilizers is highlighted. As a result of the reduced crop production, some respondents stated that there has been increased expenditure on the purchase of chemical fertilizers. This is as a result of their quest to enhance

crop yields and production. Because respondents could not provide records on the amount of money they had spent on purchasing fertilizers, the researcher rather examined the amount of fertilizers (often used by food crop farmers) that is distributed yearly by the Agriculture Development Project. And as shown in table 4.4.2, it is realized that between 2004 and, 2018, there has been continuous increase in the total supply of fertilizers except for 2013. This could be explained partly by fact that there has been reduced soil fertility as stated earlier.

Table 4.4.2 Quantity of Fertilizers distributed per year (2012-2018)

Type of fertilizer		Quantity distributed yearly		
	2012	2013	2014	2018
NPK	8,900	2,359	22,455	13,125
SOA	2700	680	4,946	3,61
UREA	2650	178	2,042	5,151
TOTAL	14,250	3,217	29,443	21,893

Source: Field Work, 2019

In comparative analysis, it is realized from table 4.4.2, that the production of most of the crops were higher in 2014 and 2018 compared to the earlier years for which production statistics are presented. This increase of 2014 and 2018 over the previous years may be explained by the high totals of fertilizers supplied for respective years as stated in table 4:4.2. Because increase use of fertilizers plays a vital role towards crop production in Abaji communities, it is possible to argue that, increased expenditure on chemical fertilizers could drain households of their limited income supply. This can impact on the ability to maximize their standard of living because with reduced income, they might not be able to obtain certain basic needs for survival. Also, it means that, those individuals who are unable to purchase these fertilizers, will continue to experienced reduced crops yield and this will definitely affect household food supply. Since most people directly depend on their farms food and income, the reduced crops yield could aggravate poverty in the communities in the form of malnutrition and loss of income.

CONCLUSION AND RECOMMENDATIONS

Based on the results and discussion, the following conclusion were drawn:

Deforestation decreased the number of tree species and wild animals, increased soil erosion and contributed to the occurrences of gullies, flooding, scarcity of bush meat, scarcity of snails, scarcity of firewood, and scarcity of water in the study area. To curb deforestation in Abaji Area Council, policy makers at 'all levels should begin to see the need for new conservation strategies. The traditional approach of restricting access to isolated forests in areas designated as parks and then employing park guards to protect the forests may not achieve the desired goal, rather modern strategies which should take into consideration the needs of the poor masses living in and near the forests should be adopted as well. The local people should be carried along when planning any conservation strategy. This is because no effective conservation can be achieved without the cooperation of the local people.

Sequel to the findings of this study, the following recommendations are made:

Deforestation effect could be ameliorated by promulgation of government policies that regulate the use of forest product, dissemination of information on forest, environmental sustainability issues, and education on afforestation. In order to improve and maintain farmlands.

Since agriculture has been implicated as one 'of the' primary causes of deforestation there is need to adopt farming systems that encourage conservation tillage. This should include introduction of organic farming method, hydroponics, greenhouse gardens, slash and char rather than 'slash and burn', as well as alley farming in which crops are interspersed with small trees.

Balance conservation and development goals, aims at sustainable development which protects the interest of the present and future generations in the use of forest- resources should be adopted in the study area

There is need to educate the people so as to create more awareness on the present and future impact of deforestation in the Area Council, The non-governmental organizations and agencies active in environmental issues, including Forestry Commissions and Departments, should intensify efforts towards sensitizing the people on the need for environmental rehabilitation and conservation. This can be achieved through launching of biodiversity conservation campaigns and seminars.

Since poverty bolsters deforestation and the resulting environmental degradation, efforts should be made to satisfy the basic survival needs of the people. This can be done through poverty alleviation programmes and interventions. Government should create jobs and empower the people in addition to providing critical infrastructural facilities such as electricity which will in turn drive the creation of more jobs.

More areas should be declared protected areas. They should be designated forest reserve and, in addition, parks, botanical gardens and zoos should be established.

Both the Area Councils and Communities should formulate and implement policies that enhance conservation of forestry. This should include economic, demographic and land tenure policies.

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