CONTRIBUTIONS OF FUEL-WOOD TO HOUSEHOLD ECONOMY IN TAKUM LOCAL GOVERNMENT AREA OF TARABA STATE, NIGERIA

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Abstract: Information on the role of fuel-wood to household economy is crucial to their sustainable management. However this role is not properly documented in Takum LGA. Therefore contribution of fuel-wood to household economy in Takum LGA of Taraba State was investigated. A three-stage sampling procedure was used in the study. A total of 180 semi-structured questionnaires were administered using 30% sampling intensity to generate data for this study with only 175 retrieved. Contributions of fuel-wood were evaluated using compendium, household income and fuel-wood harvesting methods as indices of household economy in the study area. Data were analyzed using descriptive statistics and t-test at $\alpha_{0.05}$. The result on compendium of trees used as fuel-wood in the study area indicated that, ten (10) trees belonging to eight (8) families are used for fuel-wood in the study area. The result of t-test showed that fuel-wood contributed ₦9,087.88 ± 6951.91($p<0.05$) monthly to household income in the study area. The result on methods used in harvesting fuel-wood in the study area revealed that, five harvesting methods are used in harvesting fuel-wood in the study area. The result indicated that, harvesting of fuel-wood by cutting method has the highest percentage of 46.3% followed by lop/girdle 28.6%, felling 16.5%, uprooting 5.7% and digging 2.9%, respectively. It is recommended that exploitation should be at par with planting and regeneration.

Keywords: Compendium, fuel-wood, fuel-wood harvesting methods, household income, planting, regeneration

Introduction

Fuel wood has been a major source of energy for many countries across the globe for several years back. It is the oldest energy source in most of the developing countries worldwide. The high level of poverty and inadequate knowledge about other energy sources are responsible for the adoption of fuel wood as a major energy source in many countries of the world. In Nigeria, large number of people depends on fuel wood for their domestic energy. Majority of poor people in Nigeria rely on fuel wood trading as a source of income (Arnold *et al.,* 2006).

However, this role is not studied and documented in the study area. Therefore contributions of fuel-wood to household economy in Takum LGA of Taraba State were investigated. Information on the role of fuel-wood to household economy is crucial to their sustainable management. Fuel-wood is a fibrous rigid material of plant origin. It is broadly classified as hardwood and softwood.

In the developed countries of the world, most fuel-wood comes from dead woody material and small trees and woodlots from public forests. In such countries, public forest were historically managed to accommodate local fuel wood needs and forest department activities often included the creation of village woodlots for populations living distant from the forests. In Africa, wood is depended upon for up to 58% of all energy requirements, and in many savannah areas, demand for wood supply, far exceed the rate of growth (Arnold *et al.,* 2006).

Recent studies revealed that Nigeria produces about 1 million tons of fuel-wood annually of which 80% of it is consumed in the cities, fuel wood accounts for about 50% the national primary energy consumption. Fuel wood is demanded by both households and industrial sectors in all ecological zones of the country. Industrial uses included those by institutions, food and craft industries. Fuel wood is very important in local restaurants, bakeries, local breweries, pottery, blacksmithing and burnt bricks factories. Institutions such as hospitals, prisons and schools also demand fuel wood for cooking. The per capital consumption of fuel wood in the rural areas is 393.43 kg per annum while the urban households consume 255.75 kg per annum (Momodu, 2013).

Despite the advent of innovative modern technological sources of energy, the rural households are still periodically engaged in the use of fuel wood as a major source of their domestic energy. This is due to easy access and it cost effectiveness, couple with our value of over dependence on the earlier traditional source of energy and source of revenue generation pivot for unemployed youths in the rural areas in the country. From the foregoing considerations, it is very important to undertake in depth studies into the contributions of fuel wood to rural household economy in the study area. This will enable us to accumulate adequate, sufficient and reliable data for analysis geared towards meaningful policy formulation for sustainable forest management so as to meet up with future fuel wood demands (Momodu, 2013).

According Zaku (2013b), seven methods are used in harvesting plants for community livelihoods in Gashaka, Taraba State and they include: Felling of trees, cutting of leaves and branches, debarking, digging/uprooting, tapping, plucking and lop/girdle. According to him, collectors of plants for food/fodder uses plucking, lop/girdle, tapping and cutting of leaves/branches while collectors of plants for medicinal utilization used plucking, debarking, cutting of leaves/branches and digging/uprooting. Similarly, collectors of plants for fuel-wood/charcoal used felling of trees method, cutting of branches, digging/uprooting and lop/girdle. Zaku (2013a) identified ninety-seven plants in Gashaka that are being used for community livelihoods with ten of them being used constantly for fuel-wood and charcoal. He noted that fuel-wood and charcoal contributed significantly to household income of respondents. The average monthly income on fuel-wood/charcoal was nine thousand naira only (N9,000.00). He therefore concluded that, fuel-wood and charcoal is a major economic activity of the people of Gashaka. According Zaku (2013b), fuel-wood harvesting methods such as digging, uprooting, excessive cutting of branches and felling of trees for fuel-wood are destructive and can lead to deforestation.

Fuel-wood demand and consumption is a universal phenomenon in Africa. It remains the major source of domestic fuel as well as the main source of energy for the micro economic enterprises. According to Gwandu (1991), fuel wood is the pivot on which the domestic and economic lives of the people revolved. Over the years, the demand and consumption of fuel wood has increased with increases in human population and people now travel far distances before sighting the products (Zaku, 2013a).

Wood is an indispensable source of energy; it is a source of income for the traders but its intensive and indiscriminate harvest imposes heavy environmental burden. This calls for caution in order to sustain fuel wood energy trade and consumption. Fuel- wood has played significant role in domestic and commercial energy consumption world over (Gwandu, 1991; Fuwape, 1992; Arnold, *et al*., 2006; Adetunji*et al.*, 2007; Bensel, 2008; Leslie *et al.*, 2012; Momodu, 2013; Ogunsanwo*et al.,* 2015).

Arnold *et al.* (2006) estimated that, two billion people in the world uses fuel wood and charcoal for cooking and heating. These people have depended on these natural resources for their survival for a very long period of time. Human beings have always had a close relationship with environmental resources and therefore take their livelihood from it. Adetunji*et al.* (2007) put it that, more than half of the developing world inhabitants who are considered very active depend in part or whole on fuel-wood for domestic purposes.

Arnold *etal.* (2006) explained that, researchers on wood -fuel in developing regions of the world believed that, fuel-wood harvesting was a major cause of deforestation in African forest thereby accounting for wide spread forest losses. According to him, fuel wood consumption in Africa was estimated to increase to 544.8 million m3 for firewood and 46.1 million tons for charcoal by 2030. Fuel - wood is a renewable energy source originating directly from forests. Fuel wood consists of any unprocessed woody biomass used to fuel a small fire, most often for cooking or warmth. It is a fuel, such as firewood, charcoal, chips, pellets and sawdust. The particular form used depends upon factors such as source, quantity, quality and application (Adetunji*et al.*, 2007).

Materials and Methods

A three-stage sampling procedure was used in the study. Three wards were randomly selected from each of the two existing constituencies' in Takum LGA. (Takum 1 and Takum 2) and using 30% sampling intensity, Thirty (30) respondents from each of the six wards were then randomly selected to give 180 respondents for this study. 180 semi-structured questionnaires were administered to the 180 respondents in the order of; 45 Harvesters of fuel-wood, 45 Marketers of fuel-wood, 45 charcoal producers and 45 Marketers of charcoal in Takum LGA of Taraba State using the method of Diaw*et al*. (2002). Data were analyzed using descriptive statistics and t-test at $\alpha_{0.05}$.

Result and Discussion

The result on identification of trees used as fuel-wood in the study area indicated that ten (10) trees belonging to eight (8) families are used as fuel-wood in the study area. The families of *Mimisodeae* and *Cesalpinoideae* had two (2) members each while*Annonaceae, Fabaceae, Rubiaceae, Sapotaceae, Verbenaceae* and *Zygophyllaceae* had one family member each (Table 1).

The high number of trees recorded for fuel-wood and charcoal production in the study area implied that, Takum LGA is diverse in terms of tree composition. This diversity can be seen in terms of the high number of the different species and different families of the trees recorded in the study area. The identification of trees as fuel-wood by their local names was very difficult as only few fuel-wood collectors and charcoal producers could do so. The fact that fuel-wood utilization and knowledge cut across all the wards in the study area, implied a strong affirmation that, the communities in Takum LGA relied on fuel-wood and charcoal for domestic cooking, heating and smoking.

Most of these trees that are used for fuel-wood and charcoal production are not documented in Takum LGA and the indigenous knowledge of their relevance is steadily being lost, particularly now that, children who are supposed to inherit this knowledge now spend most of their times in schools than on farms or forest. Also to be noted is the fact that, the cultivation of fuel-wood trees are not encouraged, thus, all the collections of the trees for fuel-wood and charcoal production in the study area are virtually from the wild. If these fuel-wood collectors and the charcoal producers pass away with their wealth of plant knowledge, a huge loss and a large vacuum will be created in the body of plant knowledge dealing with plants that can be used as fuel-wood and charcoal in Takum LGA. The findings of this study is similar to the findings of Zaku (2013a) in a study in Gashaka where he identified ninety-seven (97) plants with ten of them being used for fuel-wood and charcoal production.

Table 1: Identification of trees used as fuel wood in the study area

Common/Local name	Scientific name	Family
1.African oak/Ka'awo	*Afzeliaafricana*	Fabaceae
2.Iron wood/Kiliya	*Prosopisafricana*	Mimisoideae
3.Locust bean/Doruwa	*Parkiabiglobosa*	Mimisoideae
4.West African kopal/Maje	*Daniela oliveri*	Caesalpinoideae
5.Shea butter/Kadanya	*Vitelleriaparadoxa*	Sapotaceae
6.Tamarind/Tsamiya	*Tamarindusindica*	Caesalpinoideae
7.Wild custard/Gwandandaji	*Anonasenegalensis*	Annonaceae
8.African peach/Tafashiya	*Neuclealatifolia*	Rubiaceae
9.Balanites/Aduwa	*Balanitesaegyptiaca*	Zygophyllaceae
10.Black plum/Dinya	*Vitexdoniana*	Verbenaceae

Source: Field Survey, 2017

Table 2: Contributions of fuel -wood to household income in the study area

Source of income	Average (₦)	± Sd	P-value
Income from other sources	12,839.39	17246.18	.000
Income from fuel wood	9,087.88	6951.91	

Source: Field Survey, 2017

The result on the contributions of fuel-wood to household income in the study area (Table 2) revealed that, an average monthly income of ₦9,087.88 ±6951.91 was derived from fuel-wood in the study area. The result indicated that, an average monthly income of ₦12,839.39 ±17246.18 was derived from other sources and this was higher than that which was derived from fuel-wood (₦ 9,087.88 ± 6951.91) by fuel-wood harvesters in the study area. This means that fuel-wood contributed ₦ 9,087.88 ± 6951.91 monthly to household income in the study area. The result of t-test showed that, there was significant difference ($p<0.05$) between the amount from the two sources. Although, fuel-wood contributed to household income by generating ₦ 9,087.88 ± 6951.91 monthly, other sources contributed more to the income of the people in Takum LGA of Taraba State. The decision rule is that when $p<0.05$, significant difference exist between the income from the two sources and when $p>0.05$ means there is no significant difference between the income from the two sources.

Fuel-wood harvesting and charcoal production generates income to the inhabitants in Takum LGA. This income contributed significantly to community livelihoods thereby putting such trees under use pressure. Males engaged in strenuous activities such as felling, digging and uprooting of trees for fuel wood and charcoal while females performed less strenuous activities such as collection of tree branches for firewood from nearby farms.

There is lack of market information about the fuel-wood and charcoal production concord with a lack of standard market pricing policy for fuel-wood and charcoal in the study area. The findings of the study indicated that, fuel-wood and charcoal contributed significantly to household income in the

study area. The findings of this study corroborates with the findings of Zaku (2013b) where he concluded that fuel-wood and charcoal is a major economic activities of the people of Gashaka.

The result on methods used in harvesting fuel-wood in the study area revealed that five harvesting methods are used in harvesting fuel-wood in the study area. The result indicated that, harvesting of fuel-wood by cutting method has the highest percentage of 46.3% followed by lop/girdle 28.6%, felling 16.5%, uprooting 5.7% and digging 2.9%, respectively (Table 3).

Table 3: Methods used in harvesting fuel- wood in the study area

S/N	Harvesting methods	Frequency	Percentage (%)
1	Cutting	81	46.3
2	Digging	5	2.9
3	Felling	29	16.5
4	Uprooting	10	5.7
5	Lop/girdle	50	28.6
	Total	**175**	**100**

Source: Field Survey, 2017

Several methods are used to harvest fuel-wood in Takum LGA of Taraba State. However, the intensity of these methods call for caution as its excesses is destructive to the ecosystem and had led to deforestation in the study area. For instance, charcoal producers dig, uproot, fell or cut down big trees for fuel-wood and charcoal production while fire wood collectors cut fresh young trees and allow them to dry before processing them as firewood for sale. Digging, uprooting, lop/girdle, excessive felling and cutting of trees for fuel-wood and charcoal production. These harvesting methods are not sustainable since exploitation is not at par with planting and regeneration in the study area. The findings of this study agreed with the submission of Zaku (2013b) and Ogunsawo*et al.* (2015) that, plants harvesting methods employed by the people of Gashaka are destructive and can put some species under use pressure due to incessant use.

The study also agrees with the submission of Adetunji*et al.*, (2007) on another study on household energy consumption pattern in Osun State where they reported that the harvesting methods of fuel-wood are destructive.

Conclusion

The followings are the major findings of the study:

- Different species of trees are used as fuel-wood in the study area.
- Fuel-wood contributed significantly to household income in the study area.
- Different methods are used in the harvesting of fuel-wood in the study area.

Based on the major findings of the study, the followings are recommended:

- The identification of the local names of the trees used as fuel-wood and charcoal was difficult as only few respondents could do so. There is therefore the need to document not only fuel-wood trees but the totality of trees in Takum LGA as well as their relevance as this will preserve the indigenous knowledge and relevance of these trees for future references.
- There is lack of market information about the fuel-wood and charcoal production concord with a lack of standard market pricing policy for fuel-wood and charcoal in the study area. There is therefore the need to put in place market information and standard pricing policy for fuel-wood and charcoal in the study area.

Digging, uprooting, lop/girdle, excessive felling and cutting of trees for fuel-wood and charcoal production should be avoided as this is capable of causing deforestation in the study area. Hence exploitation should be *at par* with planting and regeneration in the study area. Also, raising of fuel-wood trees should be encouraged because when people of Takum LGA raised seedlings of fuel-wood trees of their choices on their farms and around their houses, the pressure on wild ones will be reduced.

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