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Economic Analysis of Shea Butter Plant in Ukum Local Government, Benue State, Nigeria

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Abstract: The study investigated the economic importance of an under-utilized "tree of life" Shea butter in Benue State. Multi-stage sampling technique was used in collecting primary data from 120 farmers comprising 80 and 40 farmers that keep shea butter trees and those that do not respectively. The result of their socio-economic characteristics shows similarity in term of age, farmsize, educational background, farming experience and household size; but marked difference in their annual income. Subsequently, the t-test result revealed that the annual income of those who keep the tree on the farmlands is significantly higher (t= 3.33; P# 0.05) than those who do not. Again, the study found that the tree has not been domesticated. However, farmers allow the tree to grow on the farmlands mainly for fire-wood, source of income, medicinal purposes and edible catepillar. Furthermore, the processing of shea butter products was found to be profitable (t=4.654; P# 0.05) and the regression result shows that the presence of shea butter trees on a farmland increases the yield of guineacorn. As the tree possesses positive potentials of enhancing the living standards of farmers, intensified research into various silvicultural possibilities of domesticating the tree, improved processing and marketing of its products are recommended.

Key words: Shea butter % Guineacorn % Regression % Catepillar % Gross returns

INTRODUCTION

With the increasing population in the Nigeria, there is a corresponding increased pressure on land for agriculture and other activities like industrialization, urbanization and mining among others. Consequently, the natural ecosystem has been greatly altered giving way to reduction in biodiversity, extensive land degradation and many other environmental imbalances. As a result, the productivity is abysmally low [1]. The pressure on land has made fallow periods too short for land cleared of forest to recover naturally and performs its traditional role of resources resuscitation. As more agricultural land becomes degraded and unproductive through the adoption of inappropriate western technologies, more forest land is cleared of trees and more unproductive land created [2]. The land resource base on which the livelihood of a large proportion of the population depends has thus continued to decline and with it, food and wood production and other valuable services have also continued to decline. The situation can be improve through better management of natural forests, establishment of non–timber tree plantations and encouraging growing of trees on farms leading to the conservation of the ecosystem. Already, records have shown that trees are often components of West African farming systems. It is also known that, in traditional farming, certain tree species are often left by farmers either as sources of wood for building fruits, medicinal purposes, yam stakes and shade plants etc. Unfortunately, in Nigeria, up till today, the economic potentials of most of these non – timber trees in agriculture are not fully recognized and most times subject to wrong use and gross mis-management. Most of the non–timber trees are not domesticated, or established in plantation as their counterpart timber species and efforts to maintain their abundance in the natural environment are not put in place. They are therefore endangered.

The shea butter tree is one of the several non-timber trees. It is important economically but its potentials as an economic tree are not widely documented in Nigeria.

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The tree is not domesticated but it naturally grows in the wild and on farm lands, farms and around homes. The tree, because of its resourcefulness in tropical Africa was recommended among other trees like *parkia* species as products priorities that need funding for development [3]. Shea butter tree (*Vitellaria paradoxa*), also known as *Karité* (in French), which means 'the tree of life' is an indigenous fruit tree of Sudano-Sahelian, Africa. It is called this name because of the numerous healing characteristics it possesses. There are two subspecies of *V. paradoxa*, one of which (sub-sp. *paradoxa*) extends from Senegal Eastwards to the Central African Republic whilst the other (sub-sp. *nilotica*) occurs in Southern Sudan and Ethiopia, Uganda and northeast Zaire [4]. The tree grows mostly in Africa. In the dry savannah belt of West Africa, the tree is found growing wild in Ghana, Burkina Fasso, Uganda, Sudan and some other West African countries. However, in Nigeria, it is commonly found in the guinea savanna belt or zone of the country and totally absent in Arid zones [5]. According to Adegbehin and Omigeh [6], the specie is found scattered round farmlands in Niger State of Nigeria. The tree is known variously in some local languages as follows: Emie emi (Yoruba), kadanya (Hausa) Ichamegh (Tiv), Okumeh (Ebira) and in the Southern part is commonly known as Ori.

Shea butter tree grows up to 9-12m high exceptionally 25m with large much branched crown covering about 5-10m. The tree produces fruits and seeds (between May and August) which are sub-globosely to ovoid size of a large plum, pericarp about 1mm thick and exudes white latex when green. It contains a fleshy pulp which is sweet and perfumed when matured. It can be eaten raw when allowed to over-ripe. Fruit contains 1-2 large shining brown seeds. The kernel is whitish and rich in fats (45-55%) from which is produced shea butter. According to Keay [5], Shea butter tree requires temperature range of 18°-27° and average rainfall of between 1126mm to 1522mm per year. It thrives well in drained soil and does not need acidic or water logged area. It grows well in derived guinea savanna and Sudan ecological zones among major grass species like *andropogan techtoruim* and *Andropogan gayanus*. It can be propagated by seeds which germinate easily under normal conditions, although growth is slow and transplanting is poor. A strong root system is produced on germination before the production of the first leaves and fruiting occurs at 12 years. Average production is 20kg; others however, bear 200kg [7].

The most interesting part of the tree is that in traditional farming systems, it grows with millet, sorghum, pigeon pea, cotton, cowpea, beans, cassava and even banana. In other words, it can be intercropped with these crops thereby ensuring maximum use of farmlands. Many crops like millet (*pennisitum spp*) and yam have traditionally grown under trees which enrich the soil as well as provide support for improved yields. It follows from the above that many benefit such as increased soil productivity, ecological balance and rehabilitation, welfare enhancement etc. could be derived from tree crops plantation under agro forestry systems.

In addition to its prospects in maintaining the ecological balance and soil fertility for agricultural purposes, shea butter can also provide good fuel wood both as energy for household utilization and source of income, the bark, leaves and roots are medicinal use for curing various illness. Almost all parts of the tree have some practical use. The shell of the nuts can repel mosquitoes. The fruity part of the nut, when crushed, yields a vegetable oil that can be used in soap-making, cooking and skin and hair care. Furthermore, it is highly valued by farmers, mostly because of its fat containing kernels which can be sold both in local and international markets, thereby considerably contributing to wealth creation. The vegetable fat of shea nut according to Hall *et al*., [8] is second in importance only to palm oil in Africa. The commercialization of Shea products according to Boffa *et al*., [9] represents an important source of income to different individuals, for instance, Shea nut was the third export product of Burkina Faso in the 1980's [10]. Similarly, it also provides construction materials, fuel wood and carving wood [8], as the wood of the shea tree is heavy, strong and termite resistant. Also, when burnt, it makes excellent charcoal which strengthens and builds women's economic security. Many people have become self–employed as traditional medicine practitioners, ornamental designers and crafts men etc. by making use of the woods and other relevant parts of shea butter tree.

The fruits are common food both for children and adults. Additionally, the tree produces catepillar which serves not only as nutritious food but also as a source of income to rural women. For instance, among the Tivs in Benue State, the catepillar got from the shea butter tree, known in Tiv language as "IGYU" is specially prepared with sauce and serves as a special delicacy and is found marketed along the streets. Also, t*he* efficacy of the use of shea butter cream for the treatment of fracture and dislocation of joints is very high. In some parts of Africa, it is rubbed on the body believing it can stop bullets from

penetrating the human skin. The commonest of its uses is for treatment of skin infections and irritations as it contains an ingredient called Cinnamic Acid which provides natural protection against the sun's damaging ultraviolet rays. It treats skin disorders like eczema, burns, rashes, stretch marks, acne, wrinkles, skin discolorations, itching and other skin problems and also prevents skin cancer. It is also an excellent agent for softening skin, moisturization hair and serves as an excellent natural product for maintaining both body and hair vitality.

Despite its great contribution to the local economies, shea tree remains undomesticated probably because of lack of tradition to plant local tree species. Indeed, shea tree parklands result from naturally occurring individual trees that are protected by farmers when clearing their fields, thus creating parkland systems [9]. Also, as a perennial woody species, that shed its leaves annually, shea tree plays a major role in nutrients recycling through the decay of its leaves and fine roots at the soil surface and it was found to decompose at a low rate with time [11], suggesting a more sustainable impact on soil fertility. Thus, going by the numerous benefits of this 'tree of life' to humans, ecosystem and the environment, it becomes pertinert to carry out a study aimed at assessing the economics of shea butter in Benue State of Nigeria.

Objectives of the Study: The broad objective of this study is to evaluate the economic potentials of shea butter in Ukum Local Government Area. Specifically, the study will achieve the following objectives: 1) ascertain reasons why farmers allow Shea trees to grow on their farmlands; 2) determine the annual returns obtained from the products of shea butter; 3) determine the effect of shea butter plants on farmers' guinea corn output in the study area and 4) identify the problems of shea butter in the study area.

MATERIALS AND METHODS

This study was carried out in Benue state. The preliminary survey carried out indicated that Shea butter tree is commonly found in Ukum LGA, thus its selection as the study area. The Local Government Area was carved out of katsina-Ala LGA in 1991 and is located between longitude 09°37 and 09°45 East and latitude 07°33 and 07°411 North. It has a population of 216, 930; out of which 108,226 are male while 108,704 are female [12]. Sankera is the headquarters and it made up of thirteen (13) council wards which include; Azendeshim, Bazun, Mbayenge, Lubmur Ateleyange, Ityulub, Tsaav Uyam and Ugbaam. It borders Wukari Local Government Area of Taraba State in North, Katsina-Ala LGA in the South-East and Logo LGA in the West. Ukum Local Government Area is situated in the guinea savannah zone and experience tropical climate with two distinct seasons; the wet and dry season start as from November. The climatic condition favours the production of food crops such as yam, cassava, guinea corn, maize, millet, groundnut and also for some species of tree crop [13]. The largest and most viable market for agricultural products and other economic activities in the Local Government is Zaki-Biam.

From the thirteen (13) council wards in the Local Government, three (3) council wards were selected purposively based on the high shea tree population in the council wards. From the three (3) council wards, five (5) villages were selected using simple random sampling techniques. From each village, eight (8) farmers were randomly selected, given the total of 120 respondents. Primary and secondary data were utilized for the study. Primary data were gathered from oral interviews and structured questionnaires administered to the respondents; while secondary data were collected from agricultural and forestry bulletins, journals, research reports and other relevant literature. Analytical tools such as percentages, mean, frequencies, gross margin, net revenue and regression analyses were used.

RESULTS AND DISCUSSION

Comparison of The Socio-Economic Ccharacteristics of Farmers with Shea Butter and Farmers without Shea Butter on their Farmland: Result in Table 1 reveals the comparison of the socio-economic characteristics of the two groups of farmers; those that allow shea butter tree on their farmlands and those who do not have the tree on their farms. The result revealed that more male constituted the farming population in the study area; 67.5% of respondents without shea butter on their farmlands and 66.2% respondents of farmers with shea butter plants on their farmlands. This lopsidedness may be due to the fact that tradition has suppressed women's role as household heads and thus a seemingly higher proportion of the male counterparts than the female are involved in agricultural production. This corroborates the assertion of Olawoye [14], that women are in most cases considered as mere helpers and not owners of farms even though they carryout most of the farming activities. The result thus underscores the role of women in tree crop farming activities in the study.

Table 1: Distribution of Respondents according to their socio-economic characteristics

		Farmers without Shea butter (N=40)		Farmers with Shea butter (N=80)	
S/N	Variables	Freq.	Percentage	Freq.	Percentage
1.	Sex				
	Male	27	67.5	53	66.2
	Female	13	32.5	27	33.8
	Total	40	100	80	100
2.	Age				
	15-25	10	25.0	26	32.5
	26-35	18	45.0	30	37.5
	36-45	12	30.0	24	30
	Mean	31.58		30.03	
3.	Marital Status				
	Widowed	14	35.0	11	13.75
	Married	10	25.0	31	38.75
	Single	12	30.0	26	32.5
	Divorced	4	10.0	12	15.0
	Total	40	100	80	100
4.	Household Size				
	1-5	18	45.0	28	35.0
	6-10	20	50.0	42	52.5
	11-15	1	2.5	-	-
	16-20	1	2.5	10	12.5
	Mean	6		7	
5.	Educational Background				
	No Formal Education	5	12.5	19	23.8
	Adult Education	9	22.5	15	18.8
	Primary Education	10	25.0	11	13.8
	Secondary Education	13	32.5	29	36.2
	Tertiary Education	3	7.5	6	7.5
	Mean	3		2.85	
6.	Farm Size (Ha)				
	1-2	37	92.5	70	87.5
	21-4	3	7.5	7	-
	41-6	-	-	3	3.8
	Mean	1.73		1.89	
7.	Farming Experience				
	1-10	24	60.0	32	40.0
	11-20	15	37.5	43	53.8
	21-30	1	2.5	5	6.2
	Mean	9.03		11.28	
8.	Annual Income				
	9000-20000	23	57.5	32	40.0
	20001-40000	15	37.5	29	36.2
	40001-6000	5	5.0	3	3.8
	60001-80000	-	-	1	1.2
	80001-1000,000	-	-	13	16.2
	Above 100,000	-	-	2	2.5
	Mean	23,025		65,232.5	

The result also reveals a relatively young and virile people for prospective agriculture and forestry. For example, 70% of farmers with shea trees on their farmland fall under the age group of 15-30 while the remaining 30% of respondents fall under the age group of 36-45 years. However, the mean age of the two categories of farmers do not differ much (30 and 32 years respectively). The result showed that the modal household size (50%) of respondents without shea trees was the range 6-10 persons, whereas 52.5% of farmers having shea trees on their farmlands had a household size of between 6-10 members. Again, their difference in

household size is manifested in their mean; while those who have shea butter on their farm have average of seven (7) persons, those without have six (6) persons on the average, thus showing a favourable household labour supply for both arable and tree farming activities. Moreover, analysis of their farm size does not show much difference in their farm size; the mean farm size for those that have and those that do not have are 1.89 and 1.73 hectares respectively. This result shows that the farmers operate at a small-scale level thus tree crop farming will offer a good means for the optimum and productive utilization of their farmlands.

Furthermore, the result revealed that on average 60% of respondents without shea tree on their farmland had farming experience of between 1-10 yrs, 37.5% had farming experience of 11-20 yrs and 2.5% had farming experience of between 21-30 yrs. Whereas 40% of the respondents with shea trees had between 1-10 years of farming experience, 53.8% had 11-20 years of farming experience and 6.2% of the respondents with shea trees had 21-30 years of farming experience. Again, the mean farming experience of those that have shea butter and those that do not have is 11.2 and 9 years respectively. This implies that the farmers that have shea butter in the farmland have more farming experience than their counterparts without shea butter tree on their farmlands.

However, a remarkable difference according to the result is noticed between the two groups in their annual income.The result revealed that the annual income of the respondents with shea trees on their farmlands is higher than that of farmers or respondents without shea trees on their farm land. At least 6.2% of farmers with shea trees on their farm lands realized between ₦80001-₦100000 annually and 2.5% earned above ₦100,000 annually, unlike respondents without shea trees who earned at most ₦40001- ₦60000 annually which represents only about 3.8% of their total population. This implies that shea butter production is capable of increasing the income level of farmers. This could be attributed not only to the incremental crop yield that results from the farmers' intercrop but also due to several products got from the tree which serves as source of income to the farmers. The fruits, shea butter oil and catepillar (Butterfly larva), for instance were sold for money in local markets. Thus, the tree has great economic potentials for increasing the rural farmers' income. From the study, it was also discovered that farmers can generate returns from fruits and fuel wood of shea tree. These findings agree with those of Boffa *et al*., [9] who found that the tree improved the socio-economic lives of the people of Burkina Faso where it provided shea nut, edible oil, fruits, land stabilization, fuel wood and increased revenue. Therefore, it is clear and obvious that farmers with shea trees on their farmland who harness the economic potentials of shea butter had a higher annual income compared to farmers without shea trees on their farmlands. The wide difference in the farmers' annual income necessitated the follow-up t-test carried out to ascertain whether the difference is statistically significant. The result presented in table 2 indicates that the annual income of farmers who allow shea butter on their farm is significantly (t= 3.328; P# 0.05) higher than those who do not allow shea butter to grow on their farm. This implies that the difference between their annual income is not just by chance.

Reasons for Allowing Shea Tree to Grow on Their Farmlands: The result why farmers allow shea butter to grow on their farmlands is presented in Table 3. The result revealed that the major reasons why farmers allow shea butter in their farm lands are mainly for source of fuel (33.3%) and additional sources of income (20.83%). Medicinal value accounted for 16.7% while the least proportion (12.5%) of respondents allowed the tree on their farmlands because of its fruits/seeds. This implies that the tree is valued more in the study area as source of fuel (firewood) and income. This may be likely due to inherent importance of fire wood and charcoal as cooking fuel in the study area which accounted for them being major objects of trade in the area. These reasons agree with those of Berry and Phil [15] who observed that, tree species naturally growing on farmlands are often left for various reasons as source of fuel, wood for construction/building and home energy, medicinal purposes, sources of income and soil stability and fertility.

Table 2: T-test showing the difference in the income level of respondents

Variables/characteristics (Annual Income)	N	Mean	Std Dev.	Mean difference	df	t-value	Sig (2- tailed)
Have shea butter tree	80	65,232	1.12747E5	42207.50000	118	3.328**	.001
Don't have	40	23,025	8795.35862				

Table 3: Distribution of Respondent according to the reasons for allowing/not allowing Shea Tree to Grow on their farmland (₦=120)

Reasons for allowing	Frequency	Percentage
a. Source of fuel	40	33.33
b. Additional income	25	20.83
c. Medicinal value	20	16.7
d. Fruits and nuts/catepillar	15	12.5
Total	100	83.3
Reasons for not allowing		
a. Not available on my land	8	6.6
b. Not interested	5	4.2
c. Difficult to raise and maintain	4	3.3
d. Not aware of its benefits	3	2.5
Total	20	16.6
Grand Total	120	100

Source: Field survey, 2011

Table 4: Gross returns from the products of shea butter

	Labour cost (₦)	Transport cost (₦)	Maintenance cost (₦)	Loading cost (₦)	Off-loading cost (₦)	Revenue	TVC	Gross Return
Mean	176.06	118.13	134.44	81.88	50.63	1384.88	561.12	823.75
Std Dev.	147.06	119.17	104.07	87.60	689.87	689.87	257220	674.51
Variance	21625.1	14202.14	10831.0	7673.65	4759.	4759	66.16	454963.0
Minimum	.00	.00	.00	.00	400.00	400.00	120.00	50.00
Maximum	630.0	500.0	450.0	400.00	3500.00	3500.00	1550.0	3230.00

Source: Analysis of field data, 2011

Meanwhile, some farmers (6.6%) do not allow shea butter on their farmlands owing to the absence of the tree on their farm while a few believed that the tree is difficult to raise and maintain. Very few (2.5%) are not aware of its economic importance whereas others are not interested in the tree. Generally, the extent of adoption of Shea butter in tree crop farming in the area shows that, if awareness is intensified and ways of raising seedlings artificially are proffered, farmers would adopt it more intensively as is the case with agricultural economic fruit trees.

Costs and Returns in Processing Shea Butter Products: The cost and returns analysis of shea butter is shown in Table 4. The result shows that among the major costs incurred in the processing of Shea butter products, labour cost is ranked highest. The labour cost which had as its mean value ₦176.07, represents about 31.38% of the total variable costs. Thus, the processing process is labour-intensive. Maintenance cost was also prominent as it accounts for about 24% of the total variable cost. This value accounted for the expenses made in the maintenance of the tree and for repairing the tools and implements (such tools as saw engine, axes and cutlasses) used in Shea butter production. Another important cost in shea butter production is the transport cost which has mean value of ₦118.13. These costs came about that after the produce are gathered together in the farm, they are transported from the farm to the house for processing into the final products and then to the market. The cost of transportation depends on the proximity of the farm and the accessibility of the roads. There are also cases where the farmer will have to pay for loading and offloading cost. This explains the cost of loading and offloading (mean value of ₦81.8750 and ₦50.63) respectively). The mean total variable cost of producing Shea products was found as ₦561.12 being in mind that the fixed capital invested on Shea butter production is low whereas the mean value of the gross returns was found to be ₦823.7500. In addition, Shea butter production is profitable and has high potentials for increasing rural income. Also, the result of profitability test (Table 5) indicates that the total revenue of farmers is significantly higher (t=4.65; P# 0.05) than the total variable cost. This implies that the difference between total revenue and total variable cost is not merely by chance but statistically different.

Table 5: Result of t-test of mean difference between the Total Variable Cost (TVC) and Total Revenue

Variables	N	Mean	Std Dev.	Mean difference	df	t-value	Sig (2- tailed)
REVENUE	80	1384.88	689.87	93.64	95.8	4.654**	.000
TVC	80	561.12	257220				

Source: Analysis of field data, 2011

Table 6: Respondent distribution according to Problems hindering Shea butter Distribution in the study area ($\bar{x}$=120)

Major problems	Frequency	Percentage
I. Rainfall	25	20.8
ii. pest and diseases	10	8.3
iii. Bush burning/wildfire	45	37.5
iv. Soil condition	30	25.0
iv. Wind storm	10	8.3

Source: Field survey, 2011

Table 7: Result of Regression showing the effects of Shea butter trees on guinea corn yield

Variables	Regression co-efficient	Std. Error	t- value	Sig.
Constant	84.105	20.457	4.1111	0.000
Number of trees	25.098	2.291	10.956	0.000
R^2	0.606			
Adjusted R^2	0.601			
F	120.041			
N	80			

Dependent Variable: Guinea corn output; Source: Analysis of Field Survey, 2011.

Problems Hindering Shea Butter Distribution in the Study Area: Table 6 presents the problems hindering multiplication and distribution of shea butter trees in the study area. The result reveals major constraints as bush burning or wildfire (37.5%); poor soil conditions (24.2%). The problem of bush burning is such a serious and re-occurring decimal in the study area. For instance, among the Tiv in Benue State where the study was carried out, at the onset of dry season, farmlands are set ablaze by hunters and young able-bodied men in search of wild rat (Yongo in Tiv). These trees according to the sampled farmers are so much affected by fire. This is particularly an idenified area that needs government intervention in the aspect of legislation, compliance and prosecution. Another identified problem of shea butter production is poor soil conditions. This is so because the tree thrives well on fertile soil while its growth on poor soil is usually slow and retarded. Other problems identified by the study are rainfall (20%); pest and diseases (8.3%) and wind storm (9.2%).

Effect of Shea Butter on the Yield of Guinea Corn: Table 7 presents the effect of the shea butter tree on the yield of guinea corn. It is widely known that big forest trees do compete with food crops for sunlight, water and mineral from the soil and as such it is not intercropped but the case of shea butter is different. The tree tolerates food crops like maize, millet, sorghum; and as such can be intercropped with them. The result of the linear regression found that as the number of shea butter increases to a certain extent, the yield of sorghum also increases. This means that the tree has no negative effect on the yield of sorghum rather the presence of the tree enhances the growth and yield of the crop. From the result of the regression shown in the table, the adjusted R^2 explains 60% of the effect of shea trees on the yield, while other factors such as climate, soil condition, variety etc. explains the remaining 40% of the effect on the yield.

Additionally, from the result, the t-value for the number of shea butter tree is significant (10.96) and this implies that if the number of shea butter trees increases by 1 unit, the yield of sorghum increases by 25 units (kg). This result clearly shows that Shea butter trees has significant influence on the output of guinea corn in the study area. This could be attributed to the soil fertility restoration ability of the tree; for instance, the tree sheds leaves which decomposes and add nutrients to the soil and the height of the tree also encourages intense growth of the guinea corn and this translates to high yields. And finally, from the research, it was discovered that shea trees can be intercropped with guinea corn without causing harm to the guinea corn output. It is obvious that our tropical crops are not shade tolerant but the study revealed that most cereal crops are shade tolerant. Therefore, cereal crops are recommended for intercropping with Shea trees since no harm is caused by either of the plants or crops.

CONCLUSION

Based on the findings from the analysis of the data collected for this study, the following conclusions are drawn. Shea butter also known as the tree of life has many

agricultural and economic potentials. Apart from its significant role in stabilizing the ecosystem, its use as nutritious food, source of energy, it has many medicinal uses. The bark, leaves and root were being used as medicinal components. Besides, it can be combined with crop production in intercropping system without any effect on the crops' yield. The tree also provided raw materials, source of income, food and environmental amelioration services for the people in the study area. Through personal observations and discussions with respondents, it was discovered that Shea butter grew naturally on farm lands and farmers only protected it form wildfire and excessive exploitation by human beings. Shea butter was incorporated in tree crop farming in the study area for various reasons like fuel (firewood) bark for medicinal purposes and food as Catepillar (Butterfly larva). The study found out that the following products are got from the tree; firewood fruits/seeds and bark, Catepillar (Butterfly larva) and secondary products like shea butter oil. Some respondents could not adopt shea butter tree farming because they were not aware of its benefits. Some persons however indicated interest to plant it on their farm lands if assisted with seedlings.

Respondents in the study area possess socio-economic characteristics that can promote, develop and sustain tree crop farming systems and activities. In as much as many tree crop farming systems are already in place in the study area, the farmers are more inclined to practices that are traditionally- oriented and those that can provide immediate benefits if adopted. Shea butter is widely known for its inherent economic potentials in tree crop farming but it is not yet domesticated in the study area. Thus, their involvement in tree crop farming is restricted to practices that do not involve raising the tree artificially on farmlands and farms. Its domestication will definitely encourage its adoption by many farmers in the study area.

Shea butter is one of the hidden, under-utilized economic trees that is capable of transforming the lives of rural people for good if incorporated in their farming system. Shea butter significantly contributed to the socio-economic development of the respondents especially in terms of financial returns, household energy, health benefits etc. Therefore, the inclusion of this species in tree crop farming system in the study area should be promoted and encouraged.

Recommendations: Based on the findings and conclusions drawn from this study, the following recommendations are made: Shea butter, an under-utilized multipurpose tree by virtue of its useful potentials as revealed by this study is recommended to be vigorously incorporated in tree crop farming systems among the small-scaled farmers. Detailed research into silvicultural possibilities of raising the tree commercially in plantations should be initiated and pursued vigorously. Already some respondents could not adopt it in their tree crop farm because of unavailability of their seedlings and difficulty in its propagation. Since products like shea nuts, leaves, bark among others from shea butter tree are locally used in producing secondary products like shea butter oil, medicines and wooden sculptures, cottage industries, more scientific means of producing these products for optimum benefits from the tree are recommended. As a catalyst for effective vigour in the adoption of shea butter in tree crop farming system, the forest extension service and forest policy makers should strengthen their linkages with research and sensitize farmers and the public more strongly on the treasures in this forest fruit tree- the "tree of life".

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