
**THE CONTRIBUTION OF AGROFORESTRY TREE PRODUCTS TO RURAL
FARMERS IN KARIM –LAMIDO LOCAL GOVERNMENT AREA OF
TARABA STATE**

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ABSTRACT

*A study to evaluate the contributions and economic benefits of agro-forestry tree products to rural farmers in Karim-Lamido Local Government Area was conducted. Fourty (40) farmers randomly selected from 45.5% of eleven wards were interviewed, using a well-designed and pretested questionnaire. The data obtained were analysed using simple descriptive statistic. The results showed that, all the farmers maintained trees on their farms, the most popular species were *Balanites aegyptiaca*, *Borassus aethiopicum*, *Vitex doniana* *Zizipus*, *Mauritiana* and *Ficus capensi*;; and planted species were *Moringa oleifera*, *Psidium gujava*, *Mangifera indica*, *Anacardium occidentale*. The protected/planted trees contribute several products such as food, fruits, leaves/fodders, medicine, seeds, fibre, oil, and services such as nutrients fixation to the soil. The contribution of agro-forestry tree products to the livelihood of rural farmers was high and accounted for about 50% as indicated in table 4. More awareness on the overall benefits derivable from this practice and its contributions and economic benefit to farmers' livelihood should be intensified through both media enlightenment and tree planting campaign.*

INTRODUCTION

Trees feature prominently in traditional farming systems because of their contributions to farmers' livelihood. Woody species form a major component of the bush fallow system and are widely grown or retained in permanently cropped land. The collective name for land-use systems in which trees are grown with agricultural crops and/or pasture and livestock on the same unit of land is known as agro-forestry. Agroforestry is therefore a viable option of obtaining

farmers participation in tree planting (Otegbeye and Ogigirigi 1991).

The important of trees as direct sources of food in Nigeria, such as leafy vegetables, fruits, nut, seeds, alcoholic drinks, edible fats and oils is on the increase though not adequately recognized and documented, the contributions of trees to rural farmers are of paramount importance if effectively managed. (Das and Roy, (2006) stated that, traditional agroforestry knowledge is based on experience, often tested over long period of use, adopted to local culture and

environmental, dynamic and changing, and lays emphasis on minimizing risk rather than maximizing profit. Multi-purpose trees and shrubs have numerous uses to certain groups of people in some areas. For example, the possibility of making edible oil from the fruits of *Balanites aegyptiaca* is well known in some villages in Jen Ardido Ward but was not known to some parts of the local government area. Tree products used by rural farmers vary, which is in conformity with the assertion by (Huzing, 1994) that the goals of land use system differ among localities as well as among individuals. The variation on the contributions of agro-forestry trees uses is based on their benefits to farmers. These species are either planted or are semi-wild and are protected.

Despite the importance of tree species in traditional agriculture, relatively little has been done to qualify their potential for improving food production on farmers' livelihood. In Karim – Lamido local Government area of Taraba State, rural farmers popularly retained trees such as: *Balanites aegyptiaca*, *Borassus aethiopicum*, *Vitex doniana*, *Tamirindus indica*, *Nuclea latifolia*, *Pilostigma thonnigii*, *Zizipus mauritiana* *Faidherbia albida*, and planted trees such as *Mangifera indica*, *Moringa oleifera*, *Carica papaya*, *Azadirachta indica*, *Eucalyptus camaldulensis* and *Psidium*

gujava on their land for the purpose of food production and soil stabilization. Udofia, (2006) Stated that, the researchers have also appreciated the fact that many traditional agroforestry practices in, developing countries are balanced with surrounding eco-systems, stable, sustainable and highly efficient. However, under the traditional farm practices in recent times, the population of trees have rapidly depleted due to increased pressure on land. (Adebayo and Tukur, 1999) revealed that rural population depends solely on firewood to meet their basic energy needs for cooking and heating. One of the major contributions to the wanton destruction of trees is lack of awareness about the benefits derivable from them. In order to contribute to the solutions of this problem the present study has been undertaken to quantify the benefits of agro-forestry tree products to the livelihood of farmers in rural areas and also to provide information that would make farmers appreciate the actual role of trees on their lands.

In a study to evaluate the benefits of the Agro-forestry tree products in some wards in Karim – Lamido local government area, products and services of agro-forestry trees were given priority because of their impact on rural farmers livelihood.

The objectives of this study are to:

- i. Identify and evaluate the contribution of agroforestry tree products and its benefits to livelihood of the rural farmers' in the study area.
- ii. To examine the prospect of planting more trees
- iii. To make appropriate recommendations base on the results of the study.

METHODOLOGY

The research was conducted in five wards of Karim-Lamido local government area which is located between longitude 10° - 51° west, and longitude 11° - 29° North and latitude 8° - 40° North and latitude 9° - 29° East, to latitude 8° - 38° South. The method used for data collection was through questionnaire and interview schedule of forty sampled farmers in Karim-Lamido Local Government Area. The information collected were on the contribution of agroforestry products to farmers in Karim-Lamido local government area of Taraba State.

Karim-Lamido Local Government Area is made up of eleven (11) wards. Five wards representing 45.5% of the area were randomly selected. In each of the five (5) wards, eight (8) respondents were selected and a well-designed and protested questionnaire were administered. The five wards randomly selected include; Jen

Ardido Ward, Karim "A" Ward, Bikwin Ward, Kaigama Ward and Zailani Ward. Data collected was through individual contact method. The content of the study was read and interpreted to the rural farmers for better understanding and necessary information were gathered from them, and simple percentage was used to analysed the data obtained.

RESULTS

Table 1 showed the type of farmers sampled in the study area, 50% of the farmers were adult men, and 25% were adult female farmers. The young male and young female farmers constitute 25%. Table 2 indicates frequency distribution of respondents with trees on their farms, all the farmers that were interviewed 100% retained trees on their farm land. Table 3 indicated the method of tree establishment on farm plots. Trees established naturally/protected accounted for about 77.5%, while planted species were 22.5%. Through careful agroforestry selection, farmers deliberately shaped tree production on their farm land to fulfil their specific needs. Table 4 indicated the contribution of agroforestry tree to farmers' livelihood was very high (22.5%), high (50%) and low contribution accounted for about 12.5%. Products obtained from agroforestry trees as indicated in Table 5 include food/fruits

with highest percentage of 50%. Leaves/fodders had 30%, and medicine has the least of 20%. Table 6 showed products preferences by sampled farmers, food/fruits ranks highest with 52.5%, followed by fuelwood 25%, herbs rank 15% and least was oil extract 7.5%. Services obtained from agroforestry trees are shown in table 7 include, recreational activities 50%, soil enrichment 25%, wind

break 12.5% and boundary demarcation 12.5% the contribution for agroforestry tree products as sources of family income in Table 8 showed oil extraction to be 50%, leaves accounted for 15%, fruits/nuts 25%, herbs 12.5% while hand fans and mats gave 20%. Table 9 showed some of the agroforestry products used for food and medicine by sampled famers.

Table 1. Types of farmers Sampled in the study area

Types of farmers	Frequency (f)	Percentage (%)
Adult Male	20	50
Adult Female	10	25
Young Male	5	12.5
Young Female	5	12.5
Total	40	100%

Table 2. Farmers with trees on their farms in the study area.

Respondents	Frequency (f)	Percentage (%)
Yes	40	100
No	0	0
Total	40	100%

Table 3. Method of Tree Establishment on Farmers Plot

Establishment Method	Frequency (f)	Percentage (%)
Naturally/protected	31	77.5
Planted	9	22.5
Total	40	100%

Table 4. Contribution Status of Agroforestry Tree Products to Farmers Livelihood in the Study Area

Contribution	Frequency (f)	Percentage (%)
Very high	9	22.5
High	20	50
Very low	6	15
Low	5	12.5
Total	40	100%

Table 5. Products Obtained from Agroforestry Trees in the study area

Products	Frequency (f)	Percentage (%)
Food/Fruits	20	50
Leaves/Fodders	12	30
Medicine	8	20
Total	40	100%

Table 6. Product Preferences by Sampled Farmers in the study area

Product Preference	Frequency (f)	Percentage (%)
Food/fruit	21	52.5
Fuelwood	10	25
Herbs	6	15
Oil Extracts	3	7.5
Total	40	100%

Table 7. Services Obtained from Agroforestry Trees in the study area

Services	Frequency (f)	Percentage (%)
Recreation activities	20	50
Soil Enrichment	10	25
Wind Break	5	12.5
Boundary demarcation	5	12.5
Total	40	100%

Table 8. Sources of income generation from Agroforestry Tree Products in the study area

Products	Frequency (f)	Percentage (%)
Oil Extraction	10	25
Leaves	6	15
Fruits/Nuts	10	25
Herbs	6	15
Basket, Hand fan and mats	8	20
Total	40	100%

Table 9: Some of the Agroforestry trees used for food and medicine by sampled farmers in the study area

Tree species	Part used as food	Part use as Medicine	Treatment
<i>Borassus aetheopium</i>	Fruit and Seed	Root	Sore throat
<i>Balanites aegyptiaca</i>	Fruit/oil	Root/bark:	diarrhea
<i>Annona senegelsis</i>	Fruits/seeds	Roots/bark:	Constipation
<i>Parkia biglobosa</i>	Fruits/seed	Barks:	Ulcer
<i>Mangifera indica</i>	Fruits	Roots/barks:	Diabetes
<i>Moringa oleifera</i>	Leaves/Seeds	Bark:	Anthibacterial
<i>Tamirandus indica</i>	Fruits	Bark:	Colic
<i>Vitex doniana</i>	Fruits	Bark/Leaves:	stimulant
<i>Zizipus species</i>	Fruits	Roots:	Analges

DISCUSSION

The contributions of agroforestry product to sampled farmers in Karim-Lamido local government area includes products; that serve as source of food/fruits, products that serve as source of income, products that serve as source of seeds and oil, products that serve as leave and barks for medicine and service such as inputs to increase crop production through nutrient fixation and also as fodder to animals. The many and varied contributions of the tree component are the key to the ecological benefits of agroforestry (Kang and Wilson, 1987).

Food/Fruits Trees

Rural people sometimes collect food from the forest or trees e.g. mushrooms obtained from trees they maintained in their farm

lands. The quality of forest foods consumed may not be great in comparison with the main food, but they form an essential part of the nutrition and diets.

The trees species below contribute positively to rural farmers in Karim-Lamido local Government Area through provision of fruits food: *Borassus aethiopianum*, *Vitellaria paradoxa*, *Vitex doniana*, *Annona senegelsis*, *Zizipus mauritiana*, *Ficus capensis*, *Balanates aegytiaca*, *Synchronus innucua* etc. Other trees grown to provide fruits food by rural farmers include; *Psidium guajava*, *Mangifera indica*, *Anacardium occidentale*. Bofa, (2006) stated that, trees outside forest represent a major foods source for rural populace park land of Nere

(*Parkia biglobosa*) *Villellaria paradoxa* are maintained because of the food items they offer.

Parkia biglobosa: The pulp of the fruits is eaten while the seed fermented to make local ingredient called “dadawa”. Booth and wickens (1988) stated that, parkia biglobosa is rich in protein (40%) lipids (35%), Linoleic acid and vitamin B2 (0.4 – 0.9mg per 100g) and widely traded in rural and urban markets.

The yellow, flower pulp around the seedpod is a high energy food with up to 60% sugar (20% reducing sugar and 10 – 24% sucrose). This pulp can be eaten raw. Pressed into a cake or made into a refreshing drink with water or fermented in an alcoholic beverage(s). (Leopold and Kreidorman, 1975) further confirmed that *Parkia biglobosa* is used in agroforestry because of its ability to fix atmospheric nitrogen in soil and the seeds are reported to retained viability for a long period of time.

Vitellaria paradoxa (Shear butter). The fruits and the seeds are grounded to produce oil. Traditionally, *Vitellaria paradoxa* is the only source of fat purely for rural people. After removing the fruits pulp, the seed are boiled in water and dried or smoked and stored.

Tamarindus indica: The fruit pulp is soaked in water to be used in preparing porridge (“Kunu”), this tree is common on

farmers farmland in the local government area.

Fruit trees in the industrialised countries are intensively managed just like farm crops and are frequently monocropped and genetically improved.

Trees as Fertilizers: Trees have been use in many agricultural system to restore nutrients to the upper layer of the soil. Rural farmers retained some species of the nitrogen fixing trees on their farms e.g. *Faidherbia albida*, *Pilostigma thonningii*, *Acacia Senegal*, *Balanites aegyptiaca* are multipurpose/classical agroforestry trees which have the ability of fixing high nutrient to the soil and crops. Leguminous trees have the great advantage of fixing nitrogen throughout the year as nitrogen is quite easily leached and only deep-rooted agroforestry trees can pump up this nutrient to annual field crops. The nutrient recycle inputs of trees may be maintained, either by intercropping suitable tree species with crops or using pruned branches/leaves to maintain soil fertility. Planting of compatible and desirable tree species on farm land can result in marked improvement in soil stabilisation, and increased in the organic matter content of the soil through the addition of tree leaf litters, plant residues, which enrich the soil positively. Bayale et al, (2003) indicated a depressing effect of the mulch of *Pakia*

biglobosa by 33% for millet grain yield and by 21% for total drying matter, ponding time and total content were higher on plots that received the highest amount of leaves.

In semi-arid climate, it is common to find higher soil organic matter and nutrient content under tree canopies than in adjacent open land. It is also found out that maize and sorghum in plot samples from soil under trees in northern Nigeria grew 2 to 3 times faster than in soil with no trees. Roots of nitrogen fixing trees have more nodules for nitrogen fixation when they are in close contact with roots of non-nitrogen fixing plants. This enhanced nodulating may be expected to lead to the direct transfer of nitrogen to non-nodulation plant, (Dommeques, 1987).

Trees as Forage

The tree fodders are major sources of livestock feeds. The rural Fulani farmers in Jen Ardidor ward in Karim – Lamido local government area retained some indigenous trees like *Ficus species*, *Balanites aegyptiaca*, *Vitex doniana*, *Borassus aethiopicum*, *Khaya seneglesis*, *Faidherbia albida* for their livestock forage.

This form of forage production is tree/food crop combination, and priority is given to the performance of the food crop during the cropping season between June ending and first week of July every year, they

relocate their livestock to the hilly areas at Bambur. Between January and February after removal of their crops, they come back with their livestock to feed on the residues of the crops and fodders in exchange for manures.

Bridget, (1998) stated that, the cultivation of fodder plots hold out good prospect for agropastoral development there is nothing to prevent farmers from combining various fodder species whose production could be staggered throughout the year and be source of food complements i the form of leaves, pods and fruits.

Medicinal Trees

Forest provide greatest part of rural people medicines and treatments of some ailments in addition to supplement roles, agroforestry tree products are extensively used to help meet dietary shortfalls during particular season of the year. In a survey (Awodola, 1989) confirmed that *Parkia biglobosa* topped the list of acceptable farm trees by farmers in the savannah ecological zone. In West Africa the bark, roots, leaves, flowers, fruits and seed are commonly used in traditional medicine to treat a wide diversity of complaints, both internally and externally.

Trees as Source of Income

Agroforestry trees play a major economic role in the livelihood of the rural farmers and their entire family. Products got from

the agroforestry trees serves as means of income and revenue to the rural populace. Men, Women and youths are self employed in local industry through; using the leaves of *Borassus aethiopicum* to make mats, hand fans. The bark of *Adansonia digitata* are harvested and use for making ropes. Motar, pesttes and implement handles are all gotten from the agroforestry trees. Anon (2003) stated that, products of agroforestry were sold by farmers to earn extra income. Income from agroforestry products can serve as safety net for the poor and can also be a significant source of prosperity if intensively managed and produced. This is in agreement with the greater part of the sampled population in Karim-Lamido local government area of Taraba State.

Trees as Sources of oil, Leaves and Fibre

The seed of *Vitellaria paradoxa* and *Balamites aegyptiaca* are used to produce edible oil. In Nwamushi and Jenpetel village in Karim-Lamido local government area, the rural women used the seed of *Balanites aegyptiaca* to extract cooking oil and is highly valued, because 35cl of the oil is sold between N250 – N500 depending on season. Local oil extracts from *Vitellaria paradoxa* are used in cooking and treatment of fracture/dislocation of bones.

Some agroforestry trees that provides the rural farmers with edible leaves and fibre include trees species like *Adansonia digitata*, *Moringa oleifera* while the barks of some trees species used in producing fibres include *Pilostigma* species, *Anona Seneglensis* and *Adansonia digitata*. (Asuzu and Harvey, 2003) Stated that the fibres of pods (husks) and roots of *Parkia biglobosa* are used as sponges, strings of musical instruments and for the production of small basket.

Trees as Source of Energy

Rural communities depend solely on fuelwood as source of their energy for cooking and heating. Even in the developing countries, wood is still the most widely used source of fuel. Michael (1990) noted that, about one-third of the world's population uses wood and charcoal to produce at least 90% of the energy. Hermosilla, (2000), further stressed that trees are cut down in developing countries as fuelwood or turned into charcoal which are used for cooking or heating purposes and supplies about 70% of energy used.

Farmers reactions to Reasons why government should Encourage tree planting Sampled farmers in Karim-Lamido local government area, gave several reason why government should support and encourage tree planting. They

said that, trees and shrubs offer food, nuts, seeds, timber poles, fuelwood/charcoal, fodder and different products which improve and uplift their living standard. Other opined that since there is increasing demand of tree products and because of wide range of service tree offers, they appealed that government should liaised with Community Based organization to educate and help farmers to plant more classical/multipurpose tree on their lands since they form intergral part of their house hold economy. (Fueape,2011), stated that, adopting aggressive reforestation strategy could solve the problem of reduced forest cover and indiscriminate felling of trees in water catchment areas should be prevented in order to guide against disruption of hydrological cycle.

CONCLUSION

A study to evaluate the contributions and economic benefits of agro-forestry tree products to rural farmers in Karim-Lamido Local Government Area was conducted. Fourty (40) farmers randomly selected from 45.5% of the wards were interviewed using a well designed and pretested questionnaire. The results show that all the farmers maintained trees on their farms the most popular species were *Balanites aegyptiaca*, *Borassus aethiopicum*, *Vitex doniana* *Zizipus mauritania* and *Ficus*

capensis, and planted species such as *moringa oleifera*, *Psidium gujava*, *Mangifera indica*, and *Anacardium occidentale*. The protected/planted trees contribute several products such as food, leaves/fodder, medicine, fruits, seeds, fibre, oil, and services such as nutrients fixation to the soil. The contribution of agro-forestry tree products to the livelihood of rural farmers was high.

More awareness on the overall benefits derived from this practice and its contributions and economic benefit to farmers' livelihood should be intensified through media enlightenment and tree planting campaign which will improve the living standard of the rural populace.

Recommendations

The following recommendations were made for the improvement of farmers living standard;

- Government should place more emphasis on tree planting campaign and supply seedlings to farmers at affordable rate.
- Awareness creation on the conservation of forest resources and tree planting be intensified through media and extension workers.
- Farmers should plant multipurpose and fast growing tree species, and replacement for every tree felled.

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