ANALYSIS OF FARMER'S LIVELIHOODS BENEFITS AND CHALLENGES UNDER THE SHELTERBELT PROJECTS IN THE FRONTLINE STATES OF NORTHWEST, NIGERIA

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ABSTRACT
This study analyzed the Farmers Livelihoods benefits and challenges under Shelterbelt Projects in the Frontline States of North West, Nigeria, (Jigawa, Kano and Katsina). Sample size of 450 respondents was used for the study. Data analysis was achieved using descriptive statistics, standard deviation, mean and Tobit regression. Major agricultural livelihoods were cropping farming, livestock rearing, farm Labour, farm products processing and fish farming having a mean score of 4.34, 4.28, 4.55, 4.19 and 4.21 respectively. While non-agricultural livelihood in the study area were civil service 4.20 and petty trading 4.35. Also, the coefficient of Age, sex, level of education, access to extension services, (P≤0.01) and access to credit (P≤0.05) are factors that contributed to livelihood benefits of the respondents significantly and positively. Constraints associated with shelterbelt are hide out for criminals, habitat for dangerous animals, low access to extension services, revenue from project go directly to government, lack of community participation and management to the shelterbelt, eucalyptus plant compete with crops for soil fertility, it also has water mining ability which affects the open wells of the communities, it was recommended that government or NGOs/ CBOs should convert the shelterbelt to recreational park and tourism potentials. This will ensure constant presence of people thereby reducing criminal activities like Indian hemp smoking, theft and kidnapping in the belt, constant surveillance of the shelterbelt by appropriate agencies to ensure dangerous animals are smoked out, local communities should be allowed to participate in the management and sharing of revenue from the shelterbelt, the extension services should be strengthened through provision of more man power to improve services rendered.

KEYWORDS: Livelihoods, benefits, challenges, shelterbelt and frontline states

INTRODUCTION

It is well documented that many rural households in developing countries depend on a combination of rural livelihood activities in order to meet up with their daily needs. Livelihood activities comprise the capabilities, assets and activities required for a means of living, (Garba, A and Umar, A.G 2023). In most rural households across the world, livelihood structures and patterns are complex and deriving from a combination of interlinked income earning activities which varies enormously according to opportunities, constraints and preferences. Generally, households in a typical rural setting engage in agricultural and non-agricultural livelihood. In most cases rural livelihoods are achieved from subsistence agriculture, either as small-scale farmers or as low paid farm workers while the remaining one-third engage in petty services.

Agriculture had remained the bedrock of the rural household economies, especially among indigenous people. Many reasons account for this. It has been established that majority of rural households especially in developing countries live in rural areas and rely on agriculture for their livelihood (World Bank, 2020). Also, their access to land (a major input in agricultural enterprises) through various forms of traditional land holdings and the potential of agriculture to readily meet their physical needs (food, water, energy, shelter) and to a lesser extent cash needs (goods for reciprocal exchange and inputs in production) may have sustained their dependence on agriculture. Agriculture provides increased on-farm and off-farm employment opportunities capable of raising incomes of the rural households and their purchasing power, (Garba, A and Umar, A.G 2023). It's also observed that majority of farmers are not able to produce enough food to meet their food requirement nor are they able to generate farm income to meet up with their basic needs, they sometimes engaged themselves in non-agricultural livelihood activities around the shelterbelt. Shelterbelts are rows of trees grown across the direction of prevailing winds for the purpose of reducing wind velocity thus minimizing the adverse effects of climatic elements. Shelterbelt are described as narrow strip of trees planted at right angle to the prevailing wind direction arranged in series containing several belts planted some meters apart for effective results. Trees are planted on agricultural land purposely to reduce damage on crops. They are also investments in future and long-term productivity of the soil. They have multipurpose uses which are usually derived after the belt is fully established (Great Green Wall, 2021). They act as windbreaks to check wind velocity on windward and leeward sides, sometimes at a distance of five to ten times expected height of the mature trees. The effectiveness of the shelterbelt is a function of structure and permeability (Garba and Umar, 2023). They are usually established on communal lands and in forest reserves. The traditional shelterbelts in Nigeria are composed of pure stands of *Azadirachta indica* (neem tree) or *Eucalyptus camaldulensis* with ten rows of trees in an escapement of 2.5 m x 2.5 m to give a size of 200 m x 30 m per belt (Francis and Bulus, 2014). Shelterbelts are being used to curb the expansion of desert condition and reduce the subsisting impacts of aridity in northern region. It is crucial that these shelterbelts are successfully established otherwise the objectives behind them may never be realized. The most affected States are Adamawa, Bauchi, Borno, Gombe, Jigawa, Kano, Katsina, Kebbi, Sokoto, and Yobe. These States constitute about 35% of the Country's total land area (Great green wall, 2014)

In Nigeria rural community's shelterbelt are rated to be inhabited by farm households that have lean means of livelihood opportunities, attributed to low productivity, poor quality labour force, low level of technology, inefficient use of available resources and inability of them to access credit facilities to boost production. However, loss of services from the environment is a significant challenge to reducing poverty, hunger and diseases. This is because biodiversity and the environment its supports have a major role towards poverty alleviation. In most cases people in the rural areas relies on environmental resources for their livelihoods, such resources are often under pressure, and the climate change phenomenon has made the situation worst. Human activities resulted in disturbance of the environment. The need to meet demand for food, fresh water, fibre and energy, which have weakened natural ability to deliver key services such as air purification, water, protection from disaster and provision of medicines. One of the major environmental challenges affecting the livelihoods of more than 40 million people in Nigeria is desertification. (Great Green Wall, 2014). It is

now about 59 years for the establishment of the shelterbelt projects in the study area, there was no independent study conducted to analyze farmer's Livelihoods benefits and Challenges of the Shelterbelt Projects in the Frontline States of Northwest, Nigeria.

The study area

The study was conducted in the three shelterbelt frontline States (Kano, Jigawa and Katsina) North West, Nigeria. In Katsina State, about 2,623.97 hectares of shelterbelts were established before year 2002, with the support of agencies such as the World Bank, European Union and International Fund for Agricultural Development (Garba and Umar, 2023).

Sampling procedure and sample size

A multi stage sampling procedure was employed. The multi-stage sampling technique is most appropriate when a researcher intends to reduce the size of the study area while maintaining fair representation. The technique, also, reduces time and cost of surveying samples from very large population (Issa, Kagbu and Abdulkadir, 2016). The technique essentially involves reducing the size of the study population to a convenient size but passing through several stages to ensure representation. At the 1st stage was a purposive selection of the three shelterbelt front line states (Jigawa, Kano and Katsina for security reasons and convenience of the researchers. At the 2nd stage one shelterbelt plantation was also purposively selected from each of the selected shelterbelt frontline state (Yankwashi shelterbelt from Jigawa, Yambawa shelterbelt from Kano and Kaita shelterbelt from Katsina). At the 3rd stage 10 communities having proximity to the shelterbelt were also selected at random from each selected shelterbelt this gives a total of 30 communities. At the fourth stage, random selection of fifteen (15) respondents was done from each of the (30) selected communities. Thus, the total sample size of **450** respondents was obtained for this study.

Method of data collection

Primary data were collected directly from the respondents through the use of structured questionnaires in line with the objectives of the study while Secondary data were obtained from Ministry of Environment Jigawa, Kano and Katsina states and Shelterbelt research station Kano, Forestry Research Institute of Nigeria.

Data Analysis

Data were analyzed using both descriptive and inferential statistics (tobit regression)

RESULTS AND DISCUSSION

Farming and non-Farming Livelihoods of the respondents

a. ***Farming livelihoods***

Agricultural livelihood benefits among rural households in the study area, are presented on Table 1. The result revealed that crop farming (mean = 4.34) is the major livelihood strategy of the respondents. in the study area. This result agrees with previous findings, which identified crop farming as the most important livelihood strategy among rural households (Sinkaiye *et. al*, 2008). Rural households must have adopted crop faming as a livelihood strategy because the crops serve as common staples, are easily sourced locally, cultural and agronomic practices have been developed and mastered over the years and the crops concerned appear to have adapted to local soil and environmental conditions. The result also showed livestock rearing (mean = 4.28) as selected agricultural livelihood strategy in the study area. Furthermore, the result revealed farm labour (mean = 4.55) as a livelihood strategy among rural households. This finding is consistent with report that indicated casual labour in the farms as livelihood strategy of the poorest household

group in rural communities. The result also indicated that farm product processing (mean = 4.19) is a livelihood strategy among rural households in the study area. The finding becomes remarkable in view of the fact that a whole range of agricultural products undergo processing to attract better market, prevent spoilage and wastage, especially at the peak of harvests. No wonder cassava processing, palm fruit processing among others with wide range of marketable products, are becoming lucrative livelihood base among many rural households. According to the result, marketing of agricultural products (mean = 3.35) is an agricultural livelihood strategy among rural households covered in the study. The abundance of fruit and vegetable tree species as well as increased processing of agricultural products has helped to flourish this means of livelihood especially among women in rural communities covered in the study. Other agricultural livelihoods are: Fish farming (mean=4.21), Fish farming is also one of the livelihood sources of the respondents. It is increasingly gaining prominence among farmers due to shortfall in local production and increasing demand. It is a potential area of livelihood diversification. Bee keeping (mean=2.20),it is also referred to as apiculture. It is one of the important non timber forest products (NTFP) that is suitable for livelihood diversification. Its demand is high locally and in the global market. Gardening (vegetables)(mean=3.44), this has been the oldest livelihood diversification activity engaged by the respondents in the study area. (Udofia and Udo, 2010).

b. ***Non-agricultural Livelihood benefits***

However, the livelihood strategies associated with agriculture and farming appears seasonal and may not be sustainable for the households. No wonder, rural households seek for alternative sources of income in non-farm livelihood base to complement. The result showed civil service (mean = 4.20) as a non-agricultural livelihood strategy among rural-resource-poor household. Previous study by Agumagu *et al.* (2006) agrees with this finding. It may be validated in view of the increasing employment opportunities created in various Local Government Areas, rural cottage industries and other service centres in the study areas. Besides, a good number of government and non-governmental agencies have in recent years targeted rural households in their skill acquisition and training programmes for capacity building of many rural beneficiaries. These efforts may have been responsible in improving their chances for civil service employments as shown in the result. Furthermore, petty trading (mean = 4.35) is shown in the result as a non-agricultural livelihood strategy in the study area. Also tailoring and weaving (mean = 3.71) was indicated as a livelihood strategy in the result. This appears to be one of the age-long livelihood bases that have persisted in rural economies despite transformations in modern times. Tailoring and weaving seem to sustain the interest of men and women from resource-poor households and makes minimal and affordable demand in the course of its skill training. Above all, the service it renders in rural areas has made it an indispensable livelihood base. In another result, food vendor (mean = 3.44) were shown as a veritable non-agricultural livelihood strategy in the study area. Other non-agricultural livelihoods for the respondents were, Carpentry and furniture making (mean=3.51), this is a labour activity that can be used for livelihood diversification among the farmers in the study area. Black smith (mean=2.48), it is an age long vocation in most rural areas in Nigeria. Fabrication of hoes, cutlasses, rakes and repairs of farm implements and jewelries is a reliable source of alternative income to the farmers. Vulcanizing

(mean=3.34), repairs of tyres and tubes is also gaining prominence as an important source of income in the rural and urban areas. GSM, Radio and Television repairs (mean=3.28), these are the current media of communication popular among people in rural and urban areas. Many people have access to them and use them effectively. Anyone with skills about their repairs stands a better chance of having alternative income source. Barbing (mean=3.32), modern barbing saloon has reported the old fashion method. Youth are now attracted in to barbing. It is increasingly gaining prominence as an alternative source of income everywhere not only in the rural areas. Shoe shining and mender (cobbler)(mean=3.61). (Udofia and Udo, 2010 and Moller, *et, al,* 2005). This implies that government intervention should be targeted at people with non – farming livelihoods in the study area.

Table 1: Mean Score of Farming and non-farming livelihoods benefits

Variables	Mean	Standard deviation
Farming livelihoods		
Crops farming	4.34	0.89
Livestock farming	4.28	0.95
Fish farming	4.21	1.18
Farm labour	4.55	0.97
Bee keeping	2.20	0.82
Farm products processing	4.19	1.11
Gardening (vegetables)	3.44	0.65
Marketing of agricultural products	3.35	0.88
Non – farming livelihoods		
Civil service	4.20	1.05
Tailoring and weaving	3.71	1.32
Carpentry and furniture making	3.51	1.22
Petty trading	4.35	1.27
Food vendor	3.44	1.06
Black smith	2.48	0.07
Vulcanizing	3.34	0.06
GSM, Radio and Television repairs	3.28	1.04
Barbing	3.32	1.03
Shoe shining and mender	3.61	1.08

Source: Field survey, 2020

Factors influencing livelihood benefits of the respondents

The Tobit regressions model was used to determine the influence of livelihoods diversification of the respondents in the study area. Results of the Tobit analysis on factors influencing livelihood diversification is presented in Table 2. The results show that Pseudo-R – square was 41%, indicating that livelihood diversification can be best explained by the variation in the dependent variable or can be explained by the equation. The coefficient of Age was statistically significant (P≤0.01) and positively related with livelihood diversification of the respondents in the study area. The results also show that the coefficient of sex was significant and positive (P≤0.01) and is related with the livelihood diversification and cam improve the crop production capacity of the respondents in the study area. Table 2 revealed a positive and significant influence between education and the livelihood diversification. It is also evident from Table 3 that the coefficient of farm size was found to be statistically significant (P≤0.01) but negatively related to influence the livelihood diversification the farmers. Access to extension (P<0.01) positively and significantly influenced their livelihood diversification in the study area. The results in Table 2 revealed that the coefficient of Access to credit (P≤0.05) statistically had a significant and positive influence on the livelihood diversification of the respondents. This implies that shelterbelts are necessary tool in fighting desertification and improving the farmers livelihoods in the area also enhance the vegetation status thereby protecting the soil against wind erosion which is one of the major ecological problems of desertification.

Table 2: Factors influencing livelihood benefits of the respondents

ısity of use	Co-efficient	Std. Err.	Z	P- value
	0.7933	0.1113	7.13	0.000***
	2.8456	0.5820	4.89	0.000***
l of Education	1.1108	0.3947	2.81	0.005***
ehold size	-0.1490	0.1486	-1	0.317
size	-4.9913	0.5788	-8.62	0.000***
ing experience	0.0576	0.0482	1.2	0.233
bership of farmers organization	0.0309	0.0428	0.72	0.471
ping pattern	-0.5468	0.4751	-1.15	0.251
ss to Extension	0.0005	0.0001	7.82	0.000***
ss to Credit	1.6823	0.7682	2.19	0.029**
stant	-0.2515	2.4253	-0.1	0.917
450, LR = Chi^2 = 1017.92, Pseudo R – square = 0.40, P – value = 0.000				

Source: Field survey, 2020 ***P=0.01 **P= 0.05

Constraints to shelterbelt utilization in the study area

The result from Table 3 shows that, major constraints of the shelterbelt communities are: shelterbelt serves as habitat for dangerous animal species, low access to extension services, forceful seizure of community farm land by the government, do not allow full use of farmland, host to pest and diseases. (100%) respectively. Other constraints where Eucalyptus plantation destroys soil fertility (89.0%), the shelterbelt serve as hide out for criminal activities (78.0%), revenue generated from the project goes directly to the government (71.0%) and causes farmer – pastoralist conflict (59.0%). Issa, Kagbu and Abdulkadir (2016) also reported pests and diseases, low participation of farmers and poor maintenance of the plantation as the constraints of Yambawa shelterbelt in kano state. The implication is that the communities develop resentment to the plantation. They will facilitate/participate in illegal exploitation of the plantation.

Table 3: Constraints of respondents to shelterbelt utilization in the study area

Constraints	*Frequency	*Percentage	
Hide out for criminals	350	78.0	3nd
Habitats for dangerous animal species	450-	100	1st
Revenue from project goes to the govt.	320	71.0	4th
Low access to extension services	450	100	1st
Forceful seizure of community farm land	450	100	1st
Eucalyptus plantation destroys soil fertility	400	89	2nd
Do not allow full use of farm land	450	100	1st
Host to pest and diseases	450	100	1st
Causes farmer – pastoralist conflict	265	59	

Source: Field survey, 2020 *** Multiple responses**

CONCLUSION AND RECOMMENDATIONS

The conclusions drawn from the findings of this study which analyses Farmers Livelihoods under shelterbelt Projects in the Frontline States of North West, Nigeria. Sampled respondents share similarities as well as differences in socio-economic characteristics. Generally, the respondents were predominantly male, married, farmers and had a favorable attitude towards on-farm tree planting activities. Characteristics of the respondents like farming experience, level of education and access to extension agents may have a positive influence on use of the shelterbelt and livelihood diversification. It is therefore recommended that: converting the shelterbelt to recreational park and tourism potential. This will ensure constant presence of people thereby reducing criminal activities like Indian hemp smoking, theft and kidnapping in the belt, constant surveillance of the shelterbelt by appropriate agencies to ensure dangerous animals are smoked out and also, local communities should be allowed to participate in the management and sharing of revenue from the shelterbelt.

REFERENCES

Agumagu, A.C.; Adesope, O.M.; Nwaogwugwu, O.N. and Oladele, O.I. (2006). Livelihood Interests of Rural Youths in Owerri North Local Government Area of Imo State, Nigeria. Proceedings of the Eleventh Annual Conference of the Agricultural Extension Society of Nigeria. *3rd-6th April.*

Francis A. and Bulus G (2014).The Role of Shelterbelt in Vegetation Development of Desert Prone Area of Yobe State, Nigeria. Research gate. Available @ https://www.researchgate.net/publication/287556396. retrieved on 5th December, 2019.

Garba, A and Umar, A.G (2023). Determinant of farming and non-farming livelihood of farmers under shelterbelt project in front line states of North West, Nigeria. Farm Management Association of Nigeria (FAMAN) Journal, Volume 23 No.1. ISBN-9782607-002

Great Green Wall Programme (2014) National Agency for The Great Green Wall. Working materials.

Great Green Wall Programme (2021) National Agency for The Great Green Wall. Working materials. Abuja

Issa, F. O. Kagbu, J. H. and Abdulkadir, S. A. (2016) Analysis of Socio-Economic Factors Influencing Farmers' Adoption of Improved Maize Production Practices in Ikara Local Government Area of Kaduna State, Nigeria. *Agrosearch 15-24* available @ http://dx.doi.org/10.4314/agrosh.v16i2.3. Retrieved 9th March, 2020

Sinkaiye T.A, Nwaerema B, Ajayi A.O. (2008). Application of Livelihood Analysis among Farmers in Amah Community of Rivers State, Nigeria: Implication for Extension Agents Training". Madukwe, M.C. (ed). Journal of Agricultural Extension, 11, 87-98

Udofia, S. I. and Udo, E.S. (2010). Perception of People about Shelterbelts in Kaita Local Government Area of Katsina State, Nigeria. *An International Multi-Disciplinary Journal, Ethiopia. Vol. 4 (3a) July, 2010* ISSN 1994-9057

Obiaocha N. N and Edna C. M. (2017). Livelihood Resources Available to Rural Households in Southeast Nigeria: Implication for Agricultural and Rural Development in Nigeria. Scientia Agriculturae www.pscipub.com/SA E-ISSN: 2310-953X Sci. Agri. 17 (1) 15-21.