



Contribution of Agroforestry to Farmers Wellbeing in Forest Enclave, Edo State, Nigeria

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ABSTRACT: Agroforestry has recently been experiencing a surge in interest as a cost-effective means to enhance food security and well-being. Thus there is a need to assess its contribution of to farmer's wellbeing. Primary data needed for the study were collected through the administration of questionnaires to agroforestry farmers. Purposive random sampling technique was used to select three forest enclaves in Edo state. A simple random sampling technic was used in the selection of respondents and a total number of 120 copies of questionnaires were administered. Data were analyzed using descriptive statistics such as frequency counts and percentages and inferential statistics such as Chi-square, Pearson Product Moment correlations (PPMC). The study revealed that the mean age of the farmers in the area was 45.6years. Majorities (85.8 %) were male and 78.3% were married, with 54.2% having household size of between 4 - 6 persons. Majority (84.2%) had formal education. Also, 65.8% engage in agroforestry farming as their primary occupation. The results showed that there was positive and significant relationship between farmers' involvement in agroforestry and their economic wellbeing ($\chi^2 = 76.27, P \leq 0.001$), material wellbeing ($\chi^2 = 93.77, P \leq 0.001$), social wellbeing ($\chi^2 = 73.00, P \leq 0.001$) and psychological wellbeing ($\chi^2 = 132.63, P \leq 0.001$), respectively. It is therefore recommended that farmers should be encouraged to increase their farm holding and also organized themselves into association for them to have access to mechanized equipment.

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In Nigeria, there are several sectors that contribute to the total output of the economy. They are grouped into four major sectors, namely agricultural, manufacturing, oil/petroleum and services. The agricultural sector which is our focus is disaggregated into crop production, livestock, forestry and fishing. This sector is particularly important in terms of employment generation and its contribution to the Gross Domestic Product (GDP). In the year 2015, agriculture expansion accelerated to 4.7 percent, crop production was the main drive with a growth share of 82.57 percent (CBN, 2015). Although agriculture no longer serves as the leading contributor to Nigeria's Gross National Product (GNP) or the primary foreign exchange earnings, it is still the dominant economic activity in terms of employment; as this contributes about 46% share of GDP to the economy. Over the years, the sector has witnessed tremendous decline in its contribution to national development. This is evident in the high incidence of poverty among rural populace. The reasons for this widespread poverty in Sub Saharan Africa include destruction of the natural forest, leading to environmental degradation and

reduced productivity. Besides, small farmers usually farm on degraded lands with complex and diverse farming systems (Owese, *et.al* 2009). In light of recurring food shortages, projected climate change, and rising prices of fossil fuel-based agricultural inputs, agroforestry has recently experienced a surge in interest from the research and development communities, as a cost-effective means to enhance food security, while at the same time contributing to climate change adaptation and mitigation. Agroforestry is the cultivation of tree species with arable crops and or animal productions. It has shown to provide a number of benefits to farmers. For instance, it can enhance soil fertility in many situations and improve farm household resilience through provision of additional products for sale or home consumption (Thangataa and Hildebrand, 2012). Agroforestry can be defined as the strategies that introduce indigenous and exotic trees into cropping systems and impact on livelihoods of small-holder farmers in Sub-Saharan Africa (Kwesiga *et al.*, 2003). It is also an integrated approach of combining trees/shrubs with crops and or livestock. It is a

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common practice in most developing countries. The insight that trees on farms provide livelihood benefits is not new, and diversity-based approaches to agricultural adaptation to climate variability have been adopted by many farmers (Nguyen and Hoang, 2013). It has also experienced a recent increase in adoption by farmers in many parts of Africa as demonstrated by (Garrity *et al.*, 2010). In Nigeria, despite an increase in the Human Development Index from 0.43 in the year 2010 to about 0.70 in the year 2014, the wellbeing level is still very low (Human Development Report, 2014). Considering the fact that agroforestry is being considered as one of the means to ameliorate the effect of climate change and also serve as a means of support to livelihood, it is pertinent to document those factors that determine the wellbeing of agroforestry farmers as an entity, and also to find out if agroforestry practices actually have effect on their wellbeing. Farmers' wellbeing is worth considering; it is a contributing factor to productivity and serves as motivation. Wellbeing is a positive physical, social and mental state; it is not just the absence of pain, discomfort and incapacity. It entails not only from the action of individuals, but from a host of collective good relationships with other people that can achieve important personal goals and participate in society, it is enhanced by supportive personal relationships, involvement in empowered communities, good health, financial security, rewarding employment and a healthy and attractive environment (UK Govt, 2006). Well-being should not be confused with the concept of standard of living, which usually is based primarily on income (GDP per capital). Instead, quality-of-life indicators which include physical and mental health, education, recreation and leisure time, availability of environmental services and social belonging (Anheier and Stares 2002; Fleurbaey 2009; Michaelson *et al.* 2009). Wellbeing is difficult to define but much more difficult to measure, but recently due to the interest that arouse among social researchers, wellbeing has taken on a multidimensional freedom view to the extent of having several approaches to its measurement. There are four major indicators considered for wellbeing this includes economic, social, material and psychological. Therefore, this study seeks to investigate the contribution of agroforestry to farmer's wellbeing.

MATERIALS AND METHODS

Study Area: The Study was carried out in Edo State Nigeria. Edo is located in the heart of the tropical rain forest and lies between longitude 5.15°E and 6°45"E of the Greenwich meridian line and latitude 5°45 and 7°30"N of the Equator. It has a total land area of 19,281.93 square kilometers. Politically, the state is divided into eighteen (18) local government areas. Edo

state is a low-lying area except in the northern part where it is characterized by rolling hills rising to a peak of about 572 metres. It has a tropical climate with two major seasons – the wet and dry seasons. Vegetation in deciduous within the lowland rain forest belt of the south and forest savannah in the north. There are abundant natural resources in the state. Virtually all species of hardwood can be found. Such as Iroko, Obeche, Mahogany etc. The state produces a significant proportion of the country's rubber and crepe (Omofonmwan, 2007).

Data Collection: Primary data needed for the study were collected using a multi-stage sampling technique. The first stage was obtained using a purposive random sampling method by selecting six (6) forest reserves; this selection was based on involvement of farmers in agroforestry practices. In the second stage, three forest enclaves were selected based on the appreciable number of agroforestry farmers in the enclaves. These enclaves are Sakponba, Ubiaja and Agbede using 50%, 33% and 17% respectively; this percentage was based on the population of the enclave dwellers in each of the enclaves. A total of 120 respondents were obtained.

Data Analysis: Data for the study was obtained through the use of structured interview schedule to elicit information from the respondents. The interview schedule was both open and close ended questions. Data collected were analyzed using descriptive statistic such as frequency, table, percentages, bar charts and inferential statistic

RESULTS AND DISCUSSION

Table 1 shows that most of the Agroforestry farmers (50.8%) are within the ages 31-50. This implies that the farmers were in their active ages. This correlates with the finding of (Adeola and Adetunbi, 2015) that active age is likely to make them more responsive to the adoption of innovations. The gender distribution shows that the majority 85.8% of the respondents were male; this implies that agroforestry farming in the area is mostly dominated by male. This study is in line with the findings of (Rocheleau and Edmunds, 1997) that reported that tree planting and felling have been primarily dominated by male while women have enjoyed use and access rights to fodder, fuelwood, fiber, fruits and mulch.

The table further reveals that 78.3% were married; this implies that agroforestry farming in the area was dominated by married farmers. This is an indication that agroforestry contributes to their income. The results further reveal that 32.5% had both secondary education and tertiary education, respectively.

Table 1 Socio-economic characteristics of the respondents

	Frequency	Percent (%)
Age		
Less than30	15	12.5
31-40	37	30.8
41-50	24	20.0
51-60	26	21.7
61 & above	18	15.0
Total	120	100.0
Marital Status		
Single	16	13.3
Married	94	78.3
Divorced	5	4.2
Widowed	5	4.2
Total	120	100.0
Religion		
Christianity	100	83.3
Islam	18	15.0
Traditional	2	1.7
Total	120	100.0
Educational Status		
No Formal Education	8	6.7
Informal education	11	9.2
Primary education	39	32.5
Secondary education	39	32.5
Tertiary	23	19.2
Total	120	100.0
Primary Occupation		
Agroforestry farmer	79	65.8
Artisan	2	1.7
Business	2	1.7
Civil servant	18	15.0
Extension worker	1	0.8
Fishing	1	0.8
Pensioner	3	2.5
Teacher	6	5.0
Technician	2	1.7
Trading	6	5.0
Total	120	100.0
Farm size (hectares)		
< 4.98	48	40.0
7.41 – 9.88	41	34.2
12.35 – 14.82	23	19.2
> 17.29	8	6.7
Total	120	100
Reason for agroforestry		
Relaxation	1	0.8
Source of food	47	39.2
Main source of income	72	60.0
Total	120	100.0

Source: Field survey, 2015

This shows that the majority of the agroforestry farmers in the area are educated this is contrary to the apriority expectation that majority of the farmers are illiterate. The results further reveal that 65.8% of the respondents had agroforestry farming as primary occupation.60% of the respondents involved in agro forestry because it serves as a source of income.

Economic well-being of farmers: Table 2 shows the distribution of respondents by economic well-being, the results reveals that the majority (64.2%) of the respondents indicated that they were able to eat three

square meals per day, 35% were able to eat two meals per day while 8% indicated they can only afford just a meal.

Table 2: Distribution of respondents by Economic well being

	Frequency	Percent
Problem satisfying food need		
1 Meal/day	1	0.8
2 Meals/day	42	35.0
3 Meals/day	77	64.2
Total	120	100.0
Problem paying school fees		
Not at all	31	25.8
Twice	52	43.3
At once	30	25.0
Total	113	94.2
System	7	5.8
Total	120	100.0
Problem paying house rent		
Thrice or more	22	18.3
Twice	42	35.0
At once	15	12.5
None	41	34.2
Total	120	100.0
Problem paying utility bills		
Not at all	33	27.5
Occasionally	56	46.7
Regularly	30	25.0
Total	119	99.2
System	1	0.8
Total	120	100.0

Source: Field survey, 2015

This may be due to the fact that respondents practice agroforestry as a source of food. The result reveals that 43.3% could afford to pay their children’ school fees by splitting the payment twice in a term while 25% could afford to pay it once. Furthermore, the 35% pay their house rent in two instalments while 12.5% could afford to pay once. 46.7% pays their utility bills occasionally while 25% could afford to pay bills regularly.

Distribution of respondents by Material wellbeing indicators: Table 3 reveals that 64.2% sometimes have access to basic infrastructure while 15% of the respondents always have access, this could be that most of their family resides in town where access to those things are on ground but not necessarily accessible and that some also resides permanently in the enclave. 48.3% while 21.7% always have access; the reason is not far from the reason that most enclaves in Nigeria are located in remote rural area where basic infrastructure is a nightmare.

Social wellbeing indicators of farmers: Table 4 reveals that most (49.2%) of the respondents lived in mud built houses while 7.5% stayed in a flat. This may be accounted for by the civil servant who engaged in agroforestry. The study also reveals that most(63.3%) of the respondents own their buildings with 55.8%

using pit latrines ,84.2 % using their backyard for waste disposal. 54.2% of the respondents use kerosene as a source of energy.

Table 3: Material well-being indicators of farmers

	Frequency	Percent
Access to basic infrastructure		
Never	25	20.8
Sometimes	77	64.2
Always	18	15.0
Total	120	100.0
Access to public drinking water		
Never	58	48.3
Sometimes	36	30.0
Always	26	21.7
Total	120	100.0
Access to Food market		
Never	14	11.7
Sometimes	47	39.2
Always	59	49.2
Total	120	100.0
Access to health		
Never	36	30.0
Sometimes	41	34.2
Always	43	35.8
Total	120	100.0
Access to nearest public transportation		
Never	5	4.2
Sometimes	98	81.7
Always	17	14.2
Total	120	100.0
Access to all seasons road		
Never	4	3.3
Sometimes	69	57.5
Always	47	39.2
Total	120	100.0

Source: Field survey, 2015

Distribution of respondents by Psychological wellbeing : Table 5 shows the distribution of respondents by psychological wellbeing, 74.2% indicated that they have fairly achieved their purpose in life The result further reveals their personal growth with 7.5% indicated that it is worse, 55.8% indicated that they are the same while 35% believes they are better. Environmental situation reveals 22.5% indicated that their environment is not conducive, 63.3% indicated it is fairly conducive and 12.5% as conducive. Meanwhile the result shows that self-acceptance indicated 9.2% as not applicable, services to others indicated by 70.8% and 18.3% does to enhance their income.

Relationship between the reason for farmers' involvement in agroforestry practices and wellbeing of the respondents: The table 6 shows the Chi-square results for the relationship between the reasons for farmers' involvement in agroforestry practices and their wellbeing. The results shows that there was positive and significant relationship between farmers' involvement in agroforestry and; economic wellbeing

($\chi^2 = 76.27, P \leq 0.001$), material wellbeing ($\chi^2 = 93.77, P \leq 0.001$), social wellbeing ($\chi^2 = 73.00, P \leq 0.001$) and psychological wellbeing ($\chi^2 = 132.63, P \leq 0.001$), respectively.

Table 4 Distribution of respondents by Social wellbeing indicators

	Frequency	Percent
Problem satisfying food need		
One room apartment	26	21.7
Mud built bungalow	59	49.2
Block built bungalow	26	21.7
Flat	9	7.5
Total	120	100.0
Ownership of house		
Tenant	76	63.3
Landlord	44	36.7
Total	120	100.0
Source of drinking water		
Stream	36	30.0
Well	50	41.7
Pipe borne	6	5.0
Pump	3	2.5
Borehole	25	20.8
Total	120	100.0
Type of toilet facility		
None	14	11.7
Bucket	21	17.5
Pit latrine	67	55.8
Water system	18	15.0
Total	120	100.0
Type of waste disposal		
Backyard	101	84.2
Public sewage	1	0.8
Dust bin	17	14.2
Total	119	99.2
System	1	0.8
Total	120	100.0
Type of drainage		
Open	105	87.5
Closed	11	9.2
Total	116	96.7
System	4	3.3
Total	120	100.0
Source of power		
Kerosene lantern	65	54.2
Generator	20	16.7
Electricity	35	29.2
Total	120	100.0

Source: Field survey, 2015

The positive and significant relationship between reason for involvement and wellbeing shows that involvement in agroforestry enhances farmers' wellbeing; this agree with Idumah et al(2014) that agroforestry practices improve crop yield and farmers' income from fuel wood and hence higher income which will aid their wellbeing.

Conclusion: Based on the evidence presented by this study, the wellbeing of agroforestry farmers when compared with the country HDI is better and premised largely on their social, economic, material and psychological states. It is therefore recommended that

Farmers should be encouraged to increase their farm holding and organize themselves into association to access to modern equipment for farming and also farmers should be given the opportunity of gaining access to good transportation to enhance their production and wellbeing.

Table 5: Psychological well-being of farmers

	Frequency	Percent
Purpose in life		
Not achieved	22	18.3
Fairly achieved	89	74.2
Achieved	7	5.8
Total	118	98.3
System	2	1.7
Total	120	100.0
Environmental situation		
Not conducive	27	22.5
Fairly conducive	76	63.3
Conducive	15	12.5
Total	118	98.3
System	2	1.7
Total	120	100.0
Self-acceptance		
Unsatisfactory	30	25.0
Fairly satisfactory	69	57.5
Satisfactory	21	17.5
Total	120	100.0
Purpose of relation with others		
Not applicable	11	9.2
Service to others	85	70.8
Income enhancement	22	18.3
Total	118	98.3
System	2	1.7
Total	120	100.0
Purpose of relation with others		
Not applicable	11	9.2
Service to others	85	70.8
Income enhancement	22	18.3
Total	118	98.3
System	2	1.7
Total	120	100.0

Source: Field survey, 2015

Table 6. Results of Chi-square the relationship between the reason for farmers' involvement in agroforestry practices and wellbeing of the respondents

Variables	χ^2	Df	P-value	Decision
Economic well being	76.27	7	0.000	S
Material well being	93.77	10	0.000	S
Social wellbeing	73.00	19	0.000	S
Psychological well being	132.63	12	0.000	S

Source: Field survey, 2015; Note: S = Significant

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