Journal of Research in Forestry, Wildlife & Environment Vol. 12(3) September, 2020
E-mail: jrfwe2019@gmail.com; jfewr@yahoo.com
http://www.ajol.info/index.php/jrfwe

ISBN: 2141 – 1778
Tokede et al., 2020

PERCEPTION OF FARMERS ON AGROFORESTRY SYSTEMS ADOPTION IN AKINYELE LOCAL GOVERNMENT AREA, IBADAN, OYO STATE, NIGERIA

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ABSTRACT

The study assessed farmers' characteristic variables and perception towards the adoption of agroforestry practices in Akinyele Local Government, Ibadan, Oyo State. Multistage Sampling Technique was used for the study. Five Wards which include Ijaye /Ojedeji, Ajibade/Alabata/Elekuru, Akinyele/Isabiyi/Irepodun, Ojo Emo/Moniya and Ojoo/Ajibode/Laniba were randomly selected from the Local Government Area. Ajeja, Alabata, Akinyele, Moniya and Idowu oko areas were selected from each of the Wards, respectively while ten (10) farmers were selected from each of these areas. Descriptive statistics such as frequency and percentage distributions as well as correlational studies were used to analyse the collected data. 34 % of the respondents were involved in the practice of agroforestry according to the study. The correlation (r value) at (p< 0.01) also shows that there is a significant association between respondents' characteristic variables such as age, educational and marital status and adoption of agroforestry practices, while age, sex, marital and educational status are significant on agroforestry perception. It is recommended that awareness on benefits of agroforestry should be raised in order to create needed awareness and its importance, adequate technical supports should be provided for farmers interested in practicing* agroforestry *and also the efficient use of available farmlands of all types of landholders should be ensured.

Keywords: Farmers' characteristic variables; Perception; Adoption; Agroforestry practices.

INTRODUCTION

The increasing demands for land for agriculture, forestry, industrial development, urban settlement and recreation have led to the wide acceptance of the concept of multiple land use (Alao and Shuaibu, 2013). For countries, like Nigeria that depend heavily on the produce from the land to support their economy, this concept is inevitable (Alao and Shuaibu, 2013). The land area is fixed in relation to the increasing demand on it. Therefore, there is a strong need to seek ways of utilizing the available land area efficiently to the benefit of various land users. Moreover, lands constantly used for crop production lose its fertility. Soil fertility is however, restored when land is left to fallow from five to ten years. As a result of increasing pressure on the land due to the rising population, the fallow period has been reduced to less than a year or not at all. Therefore, soil does not always have enough time to replenish its fertility. Soils under forest cover are fertile and have become targets by farmers for farming (Corbeels, Shiferau and Haile, 2000). Foresters are reluctant to release forest lands for farming because the land available for forestry activities is equally limited. This is the general picture in urban cities in Nigeria, of which Ibadan is a major one, hence the need for agroforestry adoption as well as its practice.

Agroforestry, the combination of forest trees with agricultural crops or with domestic animals, or both, appears to offer a solution to the problem posed by the high demand on the land is a means to meet the dimensional needs of the rural people in terms of food, fuel, timber, construction materials, thereby helping them to lead a self-sustained life (Haque, 1993). Agroforestry has been demonstrated to offer a wide range of benefits to farmers including the

positive effect on their livelihoods through increasing crop yield and increased food security (Akinnifesi *et al*. 2010; Garrity *et al*., 2010), income (Ajayi *et al*., 2009) and improving farmers' ability to deal with the effects of climate change through improved rain use efficiency and yield stability under rain-fed agriculture Luedling *et al*. (2011). Integration of legume trees in maize-based cropping systems improves rain use efficiency and yield stability under rain-fed agriculture. In addition, agroforestry is known for providing benefits to the environment by providing various ecosystem services (Jose, 2009; Nair *et al*., 2009). For example, Ajayi *et al*. (2011) have shown that fertilizer tree systems are inexpensive technologies that significantly raise crop yields reduce food insecurity; enhance environmental services and resilience of agro-ecologies in southern Africa. Structures to retard the process of deforestation and environmental degradation have been adopted reluctantly and, even when adopted, the management and maintenance have been less than desirable. Despite considerable progress in agroforestry research and dissemination, there are a large number of extrinsic variables which help shape perceptions. These variables are the characteristic variables of the farmer, characteristics of the external environment, and characteristics of the innovation. This study focused on the characteristic variables and perception and how they influence farmers' adoption of agroforestry practices.

MATERIALS AND METHODS

Study Area

The study was carried out in Akinyele Local Government Area (LGA) of Oyo State. The study area was selected because Forestry Research Institute (FRIN) has introduced agroforestry to some wards in the LGA. The LGA is situated in western Nigeria on latitude 7^{o} 25' 0 N and longitude 30^{o} 39' 4" E and latitude 7^{o} 42' 039" N and longitude 4^{o} 07' 00'' E (Akinyemi and Efenakpo, 2015). It covers an area of 518 km², using 3.2% growth rate from 2006 census figures, the 2010 estimated population is 239,745 (NPC, 2010). The LGA is made up of 12 electoral Wards which include: Ajibade/Alabata/Elekuru, Akinyele/Isabiyi/Irepodun, Arulogun/Eniosa/Aroro, Ijaye/Ojedeji, Ikereku. Iroko Iwokoto/Talontan/Idi-Oro and Ojo. Others are Emo/Moniya. Ojoo/Ajibode/Laniba, Olanla/Oboda/Labode,Olode/Amosun/Onidundu and Olorisa Oko/Okegbemi/Mele. It is bounded to the north by Afijiyo LGA, to the east by Osun State and Lagelu LGA, to the south by Ibadan North LGA, and to the west by Ido LGA.

Experimental Design

Multi-stage Sampling Technique was employed in selecting the farmers in the study area. In the first stage, five (5) wards of Ijaye /Ojedeji, Ajibade/Alabata/Elekuru, Akinyele/Isabiyi/Irepodun, Ojo Emo/Moniya and Ojoo/Ajibode/Laniba were randomly selected. In the second stage, one district (1) area was selected from each of the ward, Ajeja, Alabata, Akinyele, Moniya and Idowu oko. For the third stage, ten (10) farmers were selected from each of the district area. This gave a total of 50 farmers.

Data Collection

Data were collected by using structured questionnaires covering questions aimed at assessing the socio demographic characteristics and agroforestry perception related to agroforestry systems adoption in Akinyele LGA.

Data Analysis

Data obtained were analyzed using descriptive and inferential statistics. The descriptive statistics used include frequency distribution and percentages which was used to describe the demographic characteristics and agroforestry practice status of the respondents and examine the knowledge and attitude of respondents on agroforestry area. Coefficient correlation was used to show the relationship between characteristic variables and adoption of agroforestry practices and also between characteristic variables and perception of agroforestry practices as well as relationship between perception toward agroforestry and adoption of agroforestry practices.

RESULTS

Table 1 presented the demographic characteristics of respondents. Majority (78%) of the respondents were males while the remaining 22% were females. Age respondents showed that 14% were less than 30 years of age, 24% between 31-40 and 51-60, while

28% were between 41-50 years. Educational status of respondents showed that 44% had primary education, 22% had no formal education, and 18% had secondary education while 16% had tertiary education. Majority (86%) respondents were married while the minorities (14%) were single. On size of farm by respondents, 54% practiced farming on 2-4 acres of land, 24% on not more than 1 acre of land, 18% on 5 - 7 acres and 4% on 8 - 10 acres of land. Type of farming by respondents revealed that 56% of the farmers were into mixed cropping while the remaining 44% are into mono cropping. While 54% of the respondents agreed their farm land is medium, 24% small and 22% agreed their farm land is large. Bullock *et al*. (2013) measured the influence of socio-economic characteristics, physical and financial assets, tenure security and plot-specific attributes on the adoption of soil replenishment practices in cardamom agroforestry systems in the East Usambaras in Tanzania. A logistic regression analysis showed that marital status, household size, remittances, credit access and tenure security significantly affected the adoption of fallows and the application of organic inputs.

Table 1: Demographic characteristics of Respondents

Variables	Description	Frequency	Percentage (%)
Sex	Male	39	78.0
	Female	11	22.0
Total			**100**
Age range (years)	< 30	7	14.0
	31-40	12	24.0
	41-50	14	28.0
	51-60	12	24.0
	61-70	4	8.0
	Above 70	1	2.0
Total			**100**
Educational Status	No Formal	11	22.0
	Primary	22	44.0
	Secondary	9	18.0
	Tertiary	8	16.0
Total			**100**
Marital Status	Single	7	14.0
	Married	43	86.0
Total			**100**
Size of Farmland	>1acre	12	24.0
	2-4 acres	27	54.0
	5-7 acres	9	18.0
	8-10 acres	2	4.0
	>1acres	12	24.0
	2-4 acres	27	54.0
Total			**100**
Type of farming	Mono Cropping	22	44.0
	Mixed Cropping	28	56.0
Total			**100**
Size of Farm	Small	12	24.0
	Medium	27	54.0
	Large	11	22.0
Total			**100**

Table 2 revealed the result of agroforestry practice status of respondents in Akinyele LGA of Ibadan. The result of the findings showed that just 17 (34%) of the respondents were involved while the majority 33 (66%) are not involved.

Table 3 revealed respondents' perception of agroforestry practice. In terms of perception statements of the respondents' items 1 (Agroforestry is difficult to practice) and 5 (agroforestry practice is time consuming) have the highest mean of 3.48, above 2.77 the grand mean value followed by item 3 (agroforestry practice is not properly understood because of its technicality) with a mean score of 2.65. Items 6 (agroforestry practice is not profitable), 7 (agroforestry is expensive to practice), 8 (agroforestry practice is labour intensive), 9 (agroforestry practice cannot be practiced on small piece of land), 10 (agroforestry practice hinders the use of modern farm implement) and 11 (agroforestry practice is not meant for low income farmers) are equally ranked 3rd with a mean of 2.64. Item 4 (agroforestry is a common practice among local farmers.) ranked 4th with a mean of 2.54 while item 2 (agroforestry practice can improve productivity) ranked 5th with a mean of 2.50. The implication is that the majority's perceptions that make agroforestry practice discouraging are its difficulty to practice and the technicality involved in practicing it. Respondents' perception that agroforestry is quite difficult to practice, some respondents' perception that the practice of agroforestry is too technical is an indication of lack of knowledge, which may be due to the problem of no access to agroforestry extension workers which has limited their information about agroforestry practices and as such limited their perception about agroforestry innovations.

Table 2: Agroforestry Practice Status of Respondents

Agroforestry Practice Status	Frequency	Percentage (%)
I am involved	17	34
I am not yet involved	33	66
Total	**50**	**100**

Table 3: Participants' Perception about Agroforestry

Variables	Not at all	Some of the time	Most of the time	All of the time	Mean	Rank
	F (%)	F (%)	F (%)	F (%)		
Difficult to practice.	32 (64.0)	10 (20.0)	8 (16.0)	-	3.48	1st
Can improve farm productivity.	8 (16.0)	9 (18.0)	32 (66.0)	-	2.50	5th
Not properly understood because of its technicality	1 (2.0)	32 (64.0)	17 (34.0)	-	2.65	2nd
Common practice among local farmers	32 (64.0)	10 (20.0)	8 (16.0)	-	2.54	4th
Time consuming.	32 (64.0)	10 (20.0)	8 (16.0)	-	3.48	1st
Not profitable.		32 (64.0)	18 (36.0)	-	2.64	3rd
Expensive to practice.		32 (64.0)	18 (36.0)	-	2.64	3rd
Labour intensive.		32 (64.0)	18 (36.0)	-	2.64	3rd
Cannot be practice on small piece of land.	-	32 (64.0)	18 (36.0)	-	2.64	3rd
Hinders the use of modern farm implement.	-	32 (64.0)	18 (36.0)	-	2.64	3rd
Not meant for low income farmers.	-	32 (64.0)	18 (36.0)	-	2.64	3rd

Table 4 presented the result of the relationship between the demographic feature of respondents and their adoption of agroforestry. The result revealed that adoption of agroforestry practices is significantly related to age (r= 0,544; p=0.000), educational status (r = -0.785; p=0.000) and marital status (r=0.562; p=0.000). While sex (r= -0.026; p=0.855), size of farm (r=0.103; p=0.474), farm type (r= 0.129; p=0.370) and size of land (r=0.074; p=0.608) are not significant. The implication of this result is that age, educational status and marital status of the respondents are the ones that constituted significantly to the adoption of agroforestry.

Table 4: Correlation analysis showing relationship between characteristic variables and Adoption of agroforestry practices of respondents

Variables Description	r- value	p- value	Decision
Age	0.544	0.000**	Significant
Sex	-0.026	0.855	Not Significant
Education Status	-0.785	0.000**	Significant
Marital Status	0.562	0.000**	Significant
Size Of Farm	0.103	0.474	Not Significant
Farm Type	0.129	0.370	Not Significant
Size Of Land	0.074	0.608	Not Significant

** *Correlation is significant at the 0.01 level.*

Table 5 revealed the result of the relationship between respondents' perception of agroforestry and its level of adoption. It showed that there is significant relationship between respondents' perception and the level of adoption of agroforestry. The coefficient correlation (R) is 0.947 and the significance value is 0.00 (p>0.01). The implication is that there is a significant relationship between perception of respondents and their level of adoption of agroforestry practices. Positive perception will promote the adoption of agroforestry practices.

Table 5: Summary of Correlation Coefficient (r) between perception toward agroforestry and adoption of agroforestry practices

Variable Description	Coefficient Correlation (r)	P-Value	Decision
Perception toward agroforestry and adoption of agroforestry	0.947	0.000	Significant

**Correlation is significant at 0.01*

Table 6 presented the result of the relationship between the demographic characteristics variables of respondents and respondents' perception of agroforestry. The result revealed that respondents' adoption of agroforestry practices is significantly related to age (r= 0,608; p=0.000), sex (r= -0.285; 0.045) educational status (r = 0.713; p=0.000) and marital status (r=0.560; p=0.000). While size of farm (r=0.170; p=0.242), farm type (r= 0.258; p=0.069) and size of land (r=0.163; p=0.255) are not significant. The implication of this result is that age, sex, educational status and marital status of the respondents are the ones that constituted significantly to the perception of respondents on agroforestry practice.

Table 6: Correlation analysis showing relationship between characteristic variables and perception of agroforestry practices of respondents

Variables Description	r- value	p- value	Decision
Age	0.608	0.000**	Significant
Sex	-0.285	0.045*	Significant
Education Status	0.713	0.000**	Significant
Marital Status	0.560	0.000**	Significant
Size Of Farm	0.170	0.242	Not Significant
Farm Type	0.258	0.069	Not Significant
Size Of Land	0.163	0.255	Not Significant

* *Correlation is significant at the 0.05 level* ** *Correlation is significant at the 0.01 level.*

DISCUSSION

In this study, it was observed that majority of the respondents were not involved in agroforestry practices despite its advantages. The result of this study supported the findings of Ndjeunga and Bantilan (2005) which revealed that despite the great potential of agricultural innovations, the uptake by smallholder farmers in Africa seems to be slow. The findings also showed that respondents' perceptions were divergent, however many respondents perceive agroforestry as a difficult practice and also too technical. This is in line with the work of Keil *et al*., 2005 who considered information and perception about a given technology, as key to adoption of such technology.

Adoption of agroforestry practices was significantly related to such variables: sex, age, educational status and marital status. While variables such as, size of farm, farm type and size of land were not significant. This is in line with the findings Adedayo and Sobola, (2014) which showed that there was a significant association between the age and educational qualification of respondents and the adoption of agroforestry practices and no significant association between respondents' farm size and the adoption of agroforestry practices. This result is contrary with Mwase *et al*., (2015), who found that age does not affect the adoption of agroforestry. Result of the relationship between respondents' perception of agroforestry and its level of adoption showed that there was significant relationship between respondents' perception and the level of adoption of agroforestry. The coefficient correlation (R) was 0.947 and the significance value is 0.00 ($p>0.01$). This study corroborates the findings of Fischer and Vasseur, (2002); Sood and Mitchell, (2004); Zubair and Garforth (2006); McGinty *et al.* (2008); Mekoya *et al.* (2008); Sileshi *et al*. (2008b) showed that perception influence adoption of agroforestry practices.

Result of the relationship between the characteristic variables of respondents and respondents' perception of agroforestry, revealed that respondents' adoption of agroforestry practices is significantly related to age, sex, educational status and marital status. While size of farm, farm type and size of land were not significant. The finding confirms the study of Adesina and Chianu, (2002) who reported that perception of farmers were influenced by the characteristics of the farmer, which include personal characteristics (gender, age, marital status, educational status).

CONCLUSION

Majority of the respondents did not practice agroforestry meaning the adoption level of agroforestry in Akinyele LGA was low. Respondents' demographic variables: age, educational and marital status influenced adoption of agroforestry practices. There was also significant correlation between the respondents' characteristic variables of age, sex, educational and marital status with their perception of agroforestry. Respondents perceived that agroforestry was difficult to practice which was indication of lack of knowledge. Perception of agroforestry was found to influence the adoption of the practice.

Recommendations

i. It was therefore recommended that extension agents and other stakeholders should intensify effort to disseminate adequate knowledge on agroforestry practices and its advantages of to farmers in the simplest form it could be well understood to farmer.
ii. Awareness on the benefits of agroforestry should be publicized among farmer with the provision of adequate technical supports.
iii. The efficient use of available farmlands of all types by landholders should be encouraged.

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