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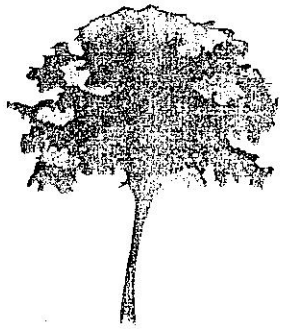

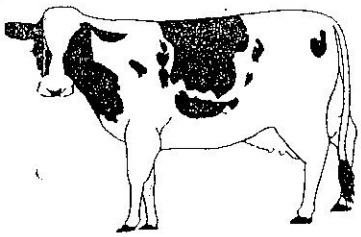

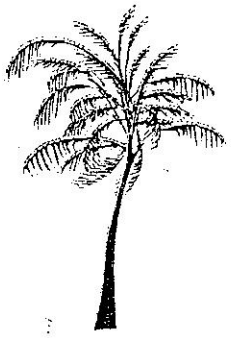

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FACTORS AFFECTING ADOPTION BEHAVIOUR OF AGROFORESTRY PRACTITIONERS IN ATISBO LOCAL GOVERNMNET AREA OF OYO STATE, NIGERIA

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ABSTRACT

The importance of trees and shrubs in fallows or in food crop production systems cannot be overstressed in view of the fragile nature of the tropical environment, increase in population density, rate of forest diminution and increasing land shortage. This has given rise to the technology of Agroforestry. Evolving technology to meet any need will be incomplete without taking cognizance of the end-users no matter how perfect. This study investigates the factors affecting adoption behaviour of agroforestry practitioners in Atisbo local Government Area of Oyo state. Using a purposive simple random technique, a total of one hundred and fifty questionnaires were administered to selected agroforestry farmers in the study area based on membership of Atisbo Farmers' Association of Nigeria (AFAN). Data generated were analyzed using descriptive and inferential test statistics. Results reveal variants of agroforestry system among the respondents. These include; the tree crop system (67.3%); Mixed home gardening (22.7%); Alley cropping (7.3%); Bush fallow (2.0%); and Taungya (0.7%). Farmers income level and extension contact were two variables that significantly associate with adoption of agroforestry technology (χ^2; 7.651, 47. 680; $P<0.05$). There is also a positive and significant correlation between adoption and scale of farming, total farm size, socio status on land and type of agroforestry system. The financial implication of practicing agroforestry system is the most important determining factor affecting adoption and application.

Key Words: agroforestry, adoption behaviour, farming scale, farmers, land use

INTRODUCTION

There is a bourgeoning of the literature on the importance of trees and shrubs in fallows or in association with food crop production systems in land and soil management in the tropics. This is against the backdrop of the fragile nature of the tropical environment, increase in population density, rate of forest diminution and increasing land shortage. Consequently, a land use system which combines production of food and forest products and services, has given rise to the technology of Agroforestry. Agroforestry is a land use system in which trees, shrubs, palms and bamboos are cultivated on the same land as arable crops or livestock for economic reasons and for environmental improvement, to replenish wood stocks while upgrading land through diminishing erosion, water loss, and other natural phenomena (Current *et al*, 1995).

Over the years, agroforestry has become more refined both in concept and practice. According to Budd *et al* (1990), agroforestry entails increasing diversified production, especially under conditions of land shortage. It is not only a means of improving the availability of agricultural tree products, but also a way of relieving pressure on valuable conservation areas. It also contributes to sustained production of crops and livestock either on fragile lands, or in areas of lull economic development and precedence of low external input magnitude. Also worthy of note is the contribution of agroforestry to land rehabilitation and increased production on degraded lands.

All these goals illustrate that agroforestry is expected to contribute to sustained land use by either maintaining or improving the ecological production capacity of lands, or by preventing over-exploitation of sensitive land resources in adjacent areas (Kang and Wilson, 1987).

Nevertheless, the importance of technology is not its development but its usage, which is dependent on adoption by those for whom it is expected to positively impact. However, there are several factors relating to the adoption and applicability of agroforestry systems. Joyce (1992) listed such factors as land and tree tenure, labour requirement, management complexities, differential social prospect, profitability and gender consideration. Vergara and Nair (1985) reported biophysical consideration and socio-economic factors which include pressure on land as influencing social

acceptability of alley. Thus, land tenure systems that do not guarantee continued ownership and control of land are less likely to favour the adoption of long-term improvement strategies such as an agroforestry measure (Francis, 1989; Ogunwale, 2004). In the South east of Nigeria, Francis and Attar-krah (1989), identified the communal control of land rotation as well as communal land tenure system as negatively influencing the adoption of agroforestry systems. In certain parts of south central Nigeria, tenure rules forbid the planting of trees (Osemeobo, 1987). Apart from land tenure, the rights over trees (tree tenure) has also been identified as capable of exerting great influence on the acceptability of agroforestry systems in many areas (Fortman, 1988). In some areas, planting of trees may give partners rights over land on which it is planted (Duncan, 1960; Meek, 1968).

Adoption of agroforestry system has also been closely linked with economic feasibility of the system. In a survey carried out in Edo and Delta States, Osemeobo (1987), concluded that the prospects are high for the integration of tree planting into the traditional farming system. However, its social acceptability apart from relying heavily on cost-sharing devices between government and rural farmers, as well as the availability of an active extension service also depend on the potential of some direct economic output from the tree component in the system. This was reposed by Okali and Sumberg (1985), who reported that agroforestry practice particularly alley farming can be taken on by farmers given a supply of seeds with extension guidance, without any form of credit or financial support.

In South east Nigeria, acceptability of alley farming has been limited by a number of edaphic, sociological and institutional factors. These include low fertility with high acidity levels of soils; incompatibility of woody species tested on established cropping patterns and rotation practices; division of labour and the decision-making process within the household; as well as land and tree tenure rules (Francis and Attar-krah, 1989).

From all of the above, it is evident that the novelty of agroforestry development has critical implications for the adoption of the technology. In the light of this, this study was designed to determine the relationship between identified socio-economic factors and adoption behaviour of farmers practicing various agroforestry systems in Atisbo Local Government Area of Oyo State, Nigeria. A null hypothesis which states that there as no significant relationship between farmers' socio-status on land, scale of farming, total farm size as well as type of system and adoption of agroforestry technology was advanced for the study.

METHODOLOGY

The Study Area

The study was conducted in Atisbo Local Government Area of Oyo State, Nigeria. The land area is estimated at 2,837.417 km^2 while the 1991 census put the population at 97,646. Over 80% of the population are engaged in farming and cultivate various food and tree crops such as maize, yam, cassava, sorghum, melons, cashew, *Mangifera sp.*, *Citrus sp.*, *Teclona grandis*, *Gmelina sp.* and *Gliricidia sp.* Atisbo Local Government Area (LGA) contributes significantly to the food supply of the people of Oyo State and it is often referred to as the "food basket' of the state.

Sampling

There are ten (10) cell groups in Atisbo LGA according to the classification of the Oyo State Agricultural Development Programme (OYSADEP). These include: Tede I, Tede II, Irawo I, Irawo II, Alaga, Ofiki, Ago-Are I, Ago-Are II, Sabe/Agunrege/Owo and Baasi/Corner Owo.

Based on the above, a purposive simple random technique was used to select respondents from the study population using the medium of the Atisbo Farmers' Association of Nigeria (AFAN). Fifteen (15) farmers practicing one form of agroforestry variant or the other were selected from each of the cell groups. This gives a total of one hundred and fifty respondents.

Survey instruments used for the generation of primary data from the sampled respondents include open and close-ended structured questionnaire as well as Focus Group Discussion. Extracts from bulletins, annual reports and magazines form the sources of secondary data collected.

Data Analysis

Descriptive statistics were specifically used to present data on socio-economic status of respondents. A non-parametric statistic, the chi-square test of independence, was used to determine the degree of association between identified socio-economic variables and the farmers' adoption behaviour, while correlation and multiple regression analysis were used to test the study hypothesis.

RESULTS AND DISCUSSION

Table 1: Frequency Distribution of Agroforestry system adopted in the Study Area

Agroforestry System Adopted	Frequency	Percentage
Taungya System	6	4.0
Bush fallow system	3	2.0
Tree Crop System	101	67.3
Alley System	11	7.3
Mixed Home Garden System	29	19.3
Total	150	100

Data on Table 1 shows the inventory of agroforestry systems among practitioners in the study area. Tree Crop System (67.3%), mixed home garden (19.3%), Alley cropping (7.3%), Bush fallow system (2.0%), and Taungya system (4.0%) are the prevailing systems of agroforestry in the area.

The Taungya and Bush fallow systems arose as a result of farmers' encroachment into the Opara forest reserve. This has led to degradation of some parts of the reserve as a result of slash and burn activities of the farmers. However, concession of the forestry department allows subsistence farmers to raise annual crops within rows of regenerated tree crops.

Mixed home garden is widely practiced as an intimate association of multipurpose trees and shrubs with annual and perennial crops, and invariably livestock within the farmers' compounds. The whole crop-tree-animal unit is managed by family labour. Extension works/activities introduced the technique of alley cropping in the study area. This was against the back drop of reduced fertility and output and the novelty of the system as developed by the International Institute of Tropical Agriculture (IITA) in Nigeria. The tree crop system is being extensively practiced with the wagon cultivation of cashew tree intercrop with other food items. The financial gains accruing from cashew tree cropping is the major reason for this dominance. This is connected with the presence of a cashew processing unit located in the area.

Table 2: Variation in Respondent's Perception of Agroforestry Practice in the Study Area

Identified Indices of Perception	F Value	Pr.
Tree crops on farmland compete with arable crops for nutrients and hence constitute a nuisance	1.13	≥ 0.32
Procuring tree seedlings and other motivating inputs is an onerous task	5.67	≤ 0.01
All tree belong to government	1.24	≥ 0.29
Getting information on agroforestry practice is more tedious than benefits derived there from	2.66	≥ 0.07
Shade created by trees impedes the development of arable crops	2.27	≥ 0.10
Cropping tress require a long period of investment	0.01	≥ 0.99
Credits are not available for agroforestry practice.	0.53	≥ 0.58

The study established variation (at 5% confidence limit and degree of freedom 148) in the perception of respondent's limitation to agroforestry practice in the study area (Table 2). However, variation did not exist on farmer's access to tree seedlings and other motivating inputs. Invariably, level of access to tree seedlings and other motivating agroforestry practice inputs is the same among respondents while other identified indices of agroforestry practice perception were perceived differently and hence affects them differently. This finding is in line with human nature.

Table 3: Level of Respondent's Perception of Problem Associated with Agroforestry Practice in the Study Area

Identified Indices of Perception	SA	A	UN	D	SD
Shade created by trees impedes the development of arable crops	12.0	85.3	0.7	2.0	0
Cropping tress require a long period of investment	6.0	90.7	0.7	4.7	0
Credits are not available for agroforestry practice.	2.7	94.0	0.7	2.7	0

NB* SA = Strongly Agree; A = Agree; UN = Undecided; D = Disagree; and SD = Strongly Disgaree

Although significant variations was established In the level of respondent's perception of agroforestry practice limitations identified in the study area (Table 2), majority of the response acknowledged the identified limitations (Table 3). Invariably, credit availability, long gestation period of tree crops, as well as their limitation to arable crop production among other factors are limiting the practice of agroforestry in the study area.

Table 3: Results Showing Relationship Between Identified Socio-Economic Characteristics of Farmers and their Adoption of Agroforestry Practices.

The analysis revealed that farmers' income level and extension contact were the only variables that were significantly associated with their adoption of various agroforestry systems ($P<0.05$). Observed χ^2 values for these variables are 7.65, and 47.680 respectively, with critical χ^2 value of 5.99. The significant relationship between farmers' income level and their adoption behaviour confirms the theory that a technology can be and is readily accepted and adopted once it is affordable (Hook, 1983). The income levels indicate the risk ability of the farmers and his readiness to tryout novel technologies, with regards to extension contact, a higher frequency of contact implies more enlightenment for the farmers

Socio-economic Variable	D.F	χ^2	C.V	Decision
Gender; Male; Female;	1	1.054	3.64	N.S
Marital Status Married Divorce Single	2	4.978	5.99	N.S
Family Size Large Average Small	2	1.027	5.99	N.S
Education Level Literate Semi-Literate Illiterate	2	4.978	5.99	N.S
Religious Background Islam Christianity A.T.R	2	1.027	5.99	N.S
Age; Old Middle Young	2	1.771	5.99	N.S
Income Level High Average Low	2	7.651	5.99	S
Extension Contact High Little Low	2	47.680	5.99	S

Table 4: Correlation and Multiple Regression Analysis of Relationship between Adopted Variables and Agroforestry practices

Adopted Variables	Correlation Coefficient(r)	Co-efficient of Determination (R^2)	Regression Coefficient (b)	T- Value for H_0
Scale of Farming	0.5038	0.2538144	-1.566868	8.761
Total Farm Size	0.2300	0.0567000	-0.009737	1.468
Mode of Land acquisition/ Socio Status on Land	0.2550	0.0710755	-0.004205	-0.132
Type of Agroforestry System adopted	0.0373	0.0023425	0.2666513	4.464

NB* Degree of freedom (d.f) = 100; Multiple R = 0.99288; R^2 = 0.98580; Adjusted R^2 = 0.97842; Std Error = 0.17442; and r- value = 0.195 @ 0.05 level of significance

Data on Table 4 shows that there is a positive and significant correlation between adoption of agroforestry systems and scale of farming (0.50); total farm size (0.23); mode of land acquisition/status on land (0.25); and type of agroforestry system (0.04). This implies that these variables have direct relationship with the adoption of different agroforestry systems, and this relationship is significant.

The co-efficient of determination R^2 on Table 4 shows the percentage variation in adoption of agroforestry systems as explained by each of the independent variables that have significant relationship with the technology in the study thus; the percentage variation could be attributed to the following factors; scale of farming (2.5%); total farm size (5.6%); mode of land acquisition/social status on land (7.1%); and agroforesty system adopted (0.23%).

The results of multiple regression analysis show the effect of each variable in

the relationship between the adoption of agroforestry practices and all the factors included in the study. The regression co-efficient was found to be positive only for agroforestry system adopted (0.266) while it was negative for total farm size (-0.009); scale of farming (-1.566); and mode of land acquisition/socio-status on land (-0.004). The implication of these findings is that type of agroforestry system has positive and direct relationship on the adoption of agroforestry technology in general. The farmers in the study area could be said to adopt systems that brings in more return on their investments than any other consideration. Nevertheless, the null hypothesis is thus rejected.

CONCLUSION AND RECOMMENDATION

The results of this study have provided a basis for major conclusions. There are statistically significant associations between farmers' income level, extension contact and their adoption of agroforestry technologies. Similarly, farmers' socio-status on land, scale of farming and types of agroforestry system are variables that influence their adoption of the practice. More importantly, the economic implication in terms of financial gain accruing from the practice of any technology is the most determining factor for its wholesale adoption and application.

In the light of the above, the following recommendations are proposed:

1. In the designing and packaging of any agroforestry technology, the economic potential of the system should be seen as the most determining factor for its adoption.
2. Proper and adequate attention should be given to farmers' perception in regards to limitations of any system.
3. Frequency of extension contact should also be seen as a factor capable of influencing adoption.
4. Farmers should be kept abreast of current information and state-of-the-art technological improvement with respect to the practice.

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