INTERNATIONAL JOURNAL OF SCIENCE AND NATURE

www.scienceandnature.org

POTENTIAL BENEFITS OF AGROFORESTRY PRACTICES ON LIVELIHOOD AND ENVIRONMENT OF FARMERS IN ODEDA LOCAL GOVERNMENT, AREA OF OGUN STATE, NIGERIA

*[1]Oyebamiji, N.A., [2]Adedire, M. O., [2]Aduradola, A. M. & [3]Agboola, D.A.
*[1]Department of Forestry and Wildlife Management, Federal University, Dutsin-Ma, P.M.B. 5001, Dutsin-Ma, Katsina State, Nigeria (Postal Code: 820001)
[2]Department of Forestry and Wildlife Management, Federal University of Agriculture, P. M. B. 2240, Abeokuta, Ogun State, Nigeria.
[3]Department of Biological Sciences, Federal University of Agriculture, P. M. B. 2240, Abeokuta, Ogun State, Nigeria.
*Corresponding Author: noah_oye@yahoo.com, 08064694878

ABSTRACT
Trees are beneficial in nature, they do not only offer environmental services but they also offer tangible products such as food, timber, fodder, medicine, and fuelwood. This paper assessed potential benefits of agroforestry practices on livelihood and environment of farmers in Odeda Local Government, Area of Ogun State, Nigeria. Multistage sampling procedure was used for the selection of respondents. Structured questionnaires were used to collect information from two hundred and ten farmers selected in the area. Descriptive statistical techniques such as the frequency table, bar chart, and Pearson correlation analysis were respectively used to analysed the data. Predominantly (97.1%) engaged in scattered trees on cropland and improved fallow (81.0%). Scattered trees on cropland showed significant (P<0.05) negative relationship, while improved fallow showed no significance (P>0.05), negative and positive correlation with the agroforestry benefits. Farmers prefer cultivation of arable crops to tree planting and animal rearing, and it was concluded that participation of farmers in agroforestry practices is low. It is therefore, recommended that farmers awareness should be on benefits they can enjoy when practice agroforestry.

KEY WORDS: Agroforestry benefits, participation, awareness and farmers' environmental services.

INTRODUCTION

According to (Leakey, 1996) Agroforestry is defined as a dynamic, ecologically based natural resources management system that, through the integration of trees on farms and in the agricultural landscape, diversifies for increased social, economic and environmental benefits for land- users at all levels. Agroforestry is useful because it offers an array of environmental services both on a macro and micro scale. On a macro scale it mitigates land degradation through the means of controlling water erosion, sheet and rill erosion (soil erosion), reclaiming marginalized land, and "increasing irrigation and agricultural productivity" (Wu and Zhu, 1997). Additionally, the change of macroclimate includes the increase of rainfall through the means of increasing transpiration which in turn increases water vapor available in the atmosphere. Concurrently, there is also the possibility of modification of microclimates. This includes reducing wind speed, stabilizing daily mean temperature, modification of solar radiation, increasing air humidity, and decreasing evaporation (Zhao, 1991).There is the improvement of soil conditions such as soil nutrition, moisture content of soil, water-holding capacity, and effective moisture available of surface soil. Biomass and light energy utilization is also enhanced. In general, though trees not only offer environmental services but they also offer tangible products such as food, timber, fodder, medicine, and fuelwood (Singh *et al*., 1995). Many trees species are used in a variety of shapes, forms, and configurations and produce benefits as agroforestry components to adjacent crops or livestock. Trees provide many benefits including lumber and forest products; shade and wind protection for crops, livestock, building, erosion control, water and nutrient cycling, and wildlife food and habitat (Snell, 1994). However, it is important to note that trees do compete with crops for light and water which can affect the growth of certain non-shade tolerant crops.

Hence, agroforestry technologies offer an alternative solution to resource-constrained farmers, who in the absence of inorganic fertilizers would grow crops, and harvest little or nothing for storage. However, unless farmers widely adopt these technologies as part of their farming system, the potential benefits of agroforestry on livelihoods and the environment will not be realized (Rogers, 2003)

MATERIALS & METHODS

Study Area

The study was carried out in Odeda Local Government, Area of Ogun State, Nigeria which is about 20 kilometers away from Abeokuta. It is located between Latitude 7º 20^{1}N and Longitude 3º 56^{1}E with an altitude of 159m above sea level. Odeda Local Government area is divided into ten wards which include; Odeda, Itesi, Osiele, Obantoko, Alabata, Obete, Opeji, Olodo, Alagbagba and Ilugun. The Local Government land mass is approximately 1, 263 square km with human population of approximately 219,000 Ogbonlowo, (2010). It has annual rainfall of

about 1,232 mm, an average temperature of about 32ºC and humidity as high as 95%. Its vegetations are moderate forest cover and thick grasses. Its land is suitable for forestry, agriculture and livestock farming. The type of crops grown includes maize, cassava, yam, cocoyam, tomatoes, melon, and vegetables among others.

Methodology

Two-hundred and ten farmers were surveyed, using multistage sampling procedure with a 4-stage design. The first stage was the division of the area which have ten wards into three groups, due to their population size, namely- group I (Obantoko, Alabata, Osiele), group II (Itesi, Odeda, Olodo, Alagbagba,) and group III (Ilugun, Obete, Opeji,) which represent a sample of primary selections. In the second stage of sampling, three villages each were randomly selected from groups 1 and III while four villages were also randomly selected in group II. The third stage was the selection of seven farmers in each selected village. The fourth stage was the random selection of 30 villages in the ten wards of the Local Government. Seven farmers were also randomly selected in each village, that is, seven questionnaires were administered to the farmers in each village and twenty-one questionnaires were administered in all in each ward using their native language as a medium of communication (Oyebamiji e*t al*., 2012).

Data Analysis

The responses to the individual respondents' questionnaires with respect to their demographic characteristics, and the relationship between agroforestry practices and their benefits to farmers were processed and analysed using chi-square test of independence and Pearson correlation analysis in the software SPSS 16 windows version (Pallant, 2007; Kinnear & Gray, 2008; Agresti& Finlay, 2009; Bryman& Cramer, 2009).

RESULTS & DISCUSSIONS

Various factors relating to the farm and farmers demographic characteristics tested include age, gender, marital status, family size, education level attained, land acquisition and farm size (Table 1).

TABLE 1: Demographic characteristics of the respondents (n=210)

Parameters	Frequency	Percentage	Mode
Age (years)			
30-39	25	11.9	
40-49	102	48.6	40-49
>50	83	39.5	
Gender			
Male	197	93.8	Male
Female	13	6.2	
Marital Status			
Single	1	0.5	
Married	198	94.3	Married
Divorced	1	0 .5	
Widow/Widower	10	4.8	
Family Size			
1-3	39	18.6	
4-6	132	62.9	4-6
7-9	34	16.2	
>10	5	2.4	
Education			
No Formal Education	85	40.5	
Primary Education	96	45.7	Primary School
Secondary Education	27	12.9	
Tertiary Education	2	1.0	
Land Acquisition			
Purchase	23	11.0	
Inheritance	101	48.1	Inheritance
Gift	3	1.4	
Leasehold	83	39.5	
Farm Size			
<1 ha	4	1.9	
>1<2 ha	63	30.0	
2-5 ha	105	50.0	2-5 ha
> 5 ha	38	18.1	

48.6% of the respondents age among farmers interviewed having majority was 40-49 years old (Table 1), this shows that middle aged farmers were the active human resource in the practices of agroforestry in the study area. This agrees with according to FAO, (1999) which affirm that these groups of people are the economically active population. Also, (93.8%) of the farmers were of male (6.2%) were female (Table 1). Although, it has been estimated that 50 00% of the food in Nigeria is produced by women Olayiwola, (1984); Mijindadi, (1993), men

were still found to be dominating crop production with agroforestry trees and combined with sheep and goat rearing in the study area. 94.3% of respondents were married with the average family size between4-6. Large family size was generally noticeable among the farmers in the study area, Lawal- Adebowale and Oyegbami, (2004) attributed it to the need of farmers to use the family members as farm labour, thereby saving or reducing the cost of production resulting from hire of farm labour (Table 1). 40.5% of the farmers have never been to school while only 45.7% had primary education (Table 1). This agrees with the findings of Lawal- Adebowale (2002), who claimed that the farmers do not value education much because they could not see any link between formal education and farming. 48.1% of the farmers acquired their land for farming by inheritance and this invariably affects their farm size. The highest farm size of the farmers in the study area was between 2-5 hectares (Table1). Farmers depend largely on acquiring their land by inheritance because majority cannot afford to buy land on which agroforestry trees can be grown. This in turn affects the size of farmland they could afford for their farming purposes; since the family land is subjected to fragmentation and this will actually reduce the farm size as also agreed with the findings Lawal- Adebowale, (2004). Out of the twelve agroforestry practices available in the study area, scattered trees on cropland (97.1%) was the most common and predominant practice among the respondents. This was followed by improved fallow (81%) (Figure1) (Oyebamiji *et al*., 2012). Considering (Rogers, 2003) observation, the respondents have tendencies to enjoy more benefits of agroforestry, if they can embrace other practices apart from these two predominant ones. This will further enhance their livelihood and improve their environment.

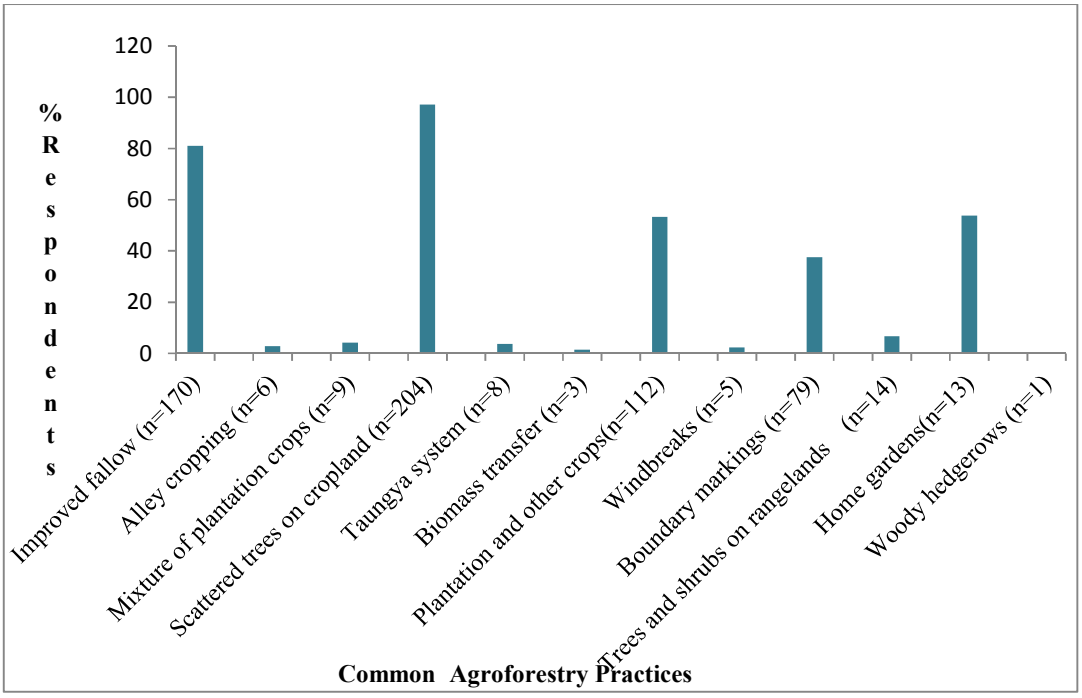

FIGURE 1: Distribution of respondents to agroforestry practices

There were significant (P<0.05) and negative relationship between scattered trees on cropland andagroforestry benefits to the farmers with respect to trees hinder the crop growth and yield (r = - 0.160*) at 0.05 probability level, and no significant and negative relationship in soil fertility (r = - 0.042), trees promote crop yield (r = - 0.049), manure supply (r = - 0.024), windbreak (r = - 0.016) and returns from sales of farm produce (r = - 0.027),while no significant (P>0.05) and negative relationship occurred between improved fallow and trees hinder the crop growth and yield (r = - 0.115) and windbreak (r = - 0.045). Also, no significant and positive relationship occurred between improved fallow and soil fertility, trees promote crop yield, manure supply, erosion control and returns from sales of farm produce at 0.05 probability level (Table 2). This means that since all need food security, improvement of individual or family standard of living, protection of soil from erosion tendencies, fertility of the soil, and other agroforestry benefits, (Phiri *et al.,* 2004) and (Keil*et al.,* 2005) has also confirmed that there is an association between wealth and the planting of agroforestry trees especially for improved fallows. The planting of trees was higher among farmers who are wealthy than among the very poor households as suggested by (Ajayi *et al.,* 2003). The association between trees and soil fertility is indicated by the high status of soils under natural forest, their relatively closed nutrient cycles, the soil-restoring power of forest fallow in shifting cultivation, and the success of reclamation forestry as agreed by (Young, 1999).

TABLE 2: Pearson correlation showing the relationship between scattered trees on cropland, improved fallow and agroforestry benefits to the farmers

Agroforestry Benefits	Scattered trees on cropland		Improved fallow	
	r	p	r	p
Trees hinder crop growth	-0.160*	0.020	-0.115	0.095
Soil fertility improvement	-0.042	0.543	0.037	0.591
Trees promote crop yield	-0.049	0.478	0.044	0.530
Manure supply	-0.024	0.731	0.021	0.761
Erosion control	-0.032	0.646	0.045	0.516
Windbreak protection	-0.016	0.818	-0.045	0.516
Returns from farm produce	-0.027	0.700	0.083	0.229
	*Significant at 0.05 level			

CONCLUSION

Generally, the level of participation in agroforestry practices in the area is low and the farmers' predominant practices in the agroforestry among others are very few. Farmers' method of land acquisition affects their participation in agroforestry, since majority acquired their land by inheritance.

However, farmers expressed their willingness to practice agroforestry and they are also willing to adopt the practices, with the assistance and support of government, Agricultural Development Agencies and other interested organizations in the area of grants, loans and other facilities. As a recommendation, policy makers need to be informed about the benefits of agroforestry so that they can support rural development and provide environmental services. Farmers' level of education as well as their health status should be a great concern to foster their commitment. Ultimately, as a developing nation, local authorities and traditional leaders should be initiated, because they are also in a good position to promote agroforestry.

ACKNOWLEDGEMENTS

I acknowledge my supervisors and those who were involved in the process of this research work. I also sincerely thank all farmers who left their work to attend to me.

REFERENCES

Agresti, A. & Finlay, B. (2009) *Stastistical methods for the social sciences* (Fourth ed.). Upper Saddle River, New Jersey: Pearson Hall Inc.

Ajayi, O. C., Franzel, S., Kuntashula, E. & Kwesiga, F. (2003) Adoption of improved fallow technology for soil fertility management in Zambia: Empirical studies and emerging issues. *Agroforestry Systems,* 59(3), 317-326.

Bryman, A., and Cramer, D. (2009) *Quantitative data analysis with SPSS 14,15 and 16: A guide for social scientists*. Hove, East Sussex, U.K: Routledge.

FAO (1999) State of the World's Forest, FAO, Rome, Italy.

Keil, A., Zeller, M., Franzel, S. (2005) Improved tree fallows in smallholder maize production in Zambia: Do initial testers adopt the technology? *Agroforestry Systems*, 64: 225–236.

Kinnear, P. R. & Gray, C. D. (2008) *SPSS 15 made simple*. Hove (England); New York. : Psychology Press.

Lawal-Adebowale, O. A. & Oyegbami, A. (2004) Determinants of seasonal arable crops production among selected farmers in Ogun State. Moor J. Agric. Res., 5: 311-322.

Lawal-Adebowale, O. A. (2002) Assessment of rainfall distribution pattern and its implications for planning agricultural extension programme in Ogun State. M.Sc. Thesis, University of Agriculture, Abeokuta, Ogun State.

Miindadi, N. B. (1993)Agricultural Extension for Women: Experience from Nigeria. Paper presented at the 13th World Bank Agricultural Symposium on Women in Agriculture Resources Management. Washington, D.C. January 6-7, 1993.

Ogbonlowo, O. J. (2010) Survey of Wildlife Resources and their Utilization in Odeda Local Government Area of Ogun State, Nigeria. A project submitted to the Department of Forestry and Wildlife Management, University of Agriculture, Abeokuta, Nigeria Pp 17-18.

Olayiwola, C. B. (1984)Rural women participation in agriculture: Implications for training extension home economists. Unpublished Ph.D Thesis, Kansas State University, Manhattan, Kansas, USA, pp: 145-220.

Oyebamiji, N. A**.,** Adedire, M. O., Aduradola, A. M. and Agboola, D. A. (2012) Challenges of Agroforestry Practices among Farmers in Odeda Local Government Area of Ogun State, Nigeria. A Paper Presented in the 7th FUTA-AGRIC Conference held between 5th -8th November, 2012 pp:220-225.

Pallant, J. (2007) *SPSS survival manual: a step by step guide to data analysis using SPSS* (3rd ed.). Crows Nest, Australia: Allen and Unwin

Phiri, D., Franzel, S., Mafongoya, P. L., Jere, I., Katanga, R. & Phiri, S. (2004) Who is using the new technology? The association of wealth status and gender with the planting tree fallows in Eastern Province, Zambia. *Agricultural Systems,*79(2): 131-144.

Rogers, E. M. (2003) *Diffusion of Innovations* (Fifth ed.). New York: The Free Press.

Singh P. and Pathhak P. and Roy M. (1995) Agroforestry systems for sustainable land use. Science Publishers.

Snell, T. K., Horne, J. E., Lathrop, W. J., and Kalevitch, A. E. (1994)Large Scale Agroforestry Tree Establishment. p. 249 Ü252. *In* Proceedings of the Society of American Foresters Annual Convention, Indianapolis, IN. 7Ü10 Nov. 1993. Society of American Foresters, Bethesda, MD.

Wu, Y. & Zhu, Z. (1997) Temperate agroforestry in China. *In* A.M. Gordon &S.M. Newman, eds. *Temperate agroforestry systems*, pp. 149–179. Wallingford, UK, CABI.

Young. A. (1991) Agroforestry for Soil Conservation, Pp 11-24

Zhao, L. (1991) Biological control of insect pests and plant diseases in agroforestry systems. In: Avery, M. E., Cannell, M.G.R. and Ong, C.K. (eds) Biophysical Research in Asian Agroforestry. Winrock International, USA, pp.73-90.