Assessment of Information Sources and Farmers' Attitude towards Use of Land Conservation Practices in Ogun State, Nigeria

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Abstract

The contribution of land conservation practices to environmental conservation and sustainable development in food production is pertinent and important to policy formulation. This paper assessed the information sources as well as the attitude of farmers' towards Sustainable Land Conservation Practices (SLCP) in Ogun State, Nigeria. The data for the study was obtained from 388 farmers selected across 10 local government areas of Ogun state using the multi-stage sampling technique. Information collected included farmers' socio-economic and institutional characteristics, attitudinal variables and specific SLCPs used. The SLCPs studied included Structural and Mechanical Erosion Control (SMEC), Agronomic Practices (AP), Cultivation Practices (CP) and Soil Management Practices (SMP). Data were analyzed using descriptive and inferential statistics. The descriptive result showed that respondents had an average of 9 years of formal education, 54% participated in Community Based Organizations (CBOs), and 91% had access to extension services, 55% had land tenancy security and 81% favoured the use of AP more than other SLCPs. About 47% of the farmers cultivated undulating farmlands which were vulnerable to degradation. The majority of the farmers (95%) sourced information relating to land conservation from the extension agents. Farmers in the study area were well disposed to the need for SLCP with more than 50% agreeing to all the favourable attitudes towards SLCP. Farmers' level of education, access to extension information and their participation in CBOs positively influenced their use of the SLCPs. The study shows that, in order to facilitate adoption, programmes and policies relating to land conservation are best relayed to farmers via the extension outfit and the CBOs.

Key Words: Land conservation, Information, Extension, Nigeria

INTRODUCTION

Study Background

In most parts of sub-Saharan Africa, land resources, which are already under great stress, have been exacerbated by climate change, desertification and environmental degradation (Junge *et al.,* 2008). This poses significant threat to sustainability of agrarian activities and food security. Besides food insecurity, the nexus between environmental degradation, poverty and illiteracy has been reported (Ekpenyong, n.d; Babalola *et al.,* 2010) showing that land degradation impacts food production as well as social and economic development of a nation.

In Nigeria, over 10% of the land mass of most communities, especially in places like Ogun state, have been wasted by erosion (Babalola, 2012). The implication is that the afflicted communities stand the chance of losing more of their cultivable land in the nearest future. Therefore, encouraging serious Sustainable Land Conservation Practices (SLCP) or technologies, which entail enabling land users to maximize the economic and social benefits from the land while maintaining or enhancing the ecological support functions of the land resources, has become pertinent and of policy relevance.

Most of the efforts made to reverse land degradation in developing countries such as Nigeria have performed below expectation largely because farmers are rarely consulted, *a priori,* about their specific circumstances, priority problems and their preference for the type of intervention (Awoyinka *et al.*, 2009). Also, the information channel chosen for technology diffusion is of importance to ensure adequate awareness and adoption (Feder *et al.,* 1985).

Information sourcing and innovation adoption. Access to information relating to environmental management especially by land users is imperative in ensuring sustainable development. The public has the right of access to environmental information held by public authority (EIR, 1992). With access to environmental information, the people have full knowledge of the implications of their activities on the environment and are able to participate more effectively in decision making processes or adopt innovations that affect the environment positively (UNESCO, 1992).

Since the late 1980s and early 1990s, the Nigerian government has invested a lot in disseminating information related to environmental conservation through both print and electronic media (Babalola *et al.,* 2010). This was done particularly to address the environmental problems associated with oil exploration, production, processing, transportation, storage and marketing in the country, and also to ameliorate or reverse the ugly trend of soil degradation by erosion in vulnerable communities like Ogun state.

In spite of the remarkable progress made in providing environmental information, land conservation problems still persist. Inadequate information sources uncoordinated policies and legal instruments, weak data base, inadequate enforcement, institutional conflicts, inadequate and untimely funding, and lack of public awareness have been highlighted as some of the constraining factors (Babalola *et al.,* 2010). It is against this backdrop that this paper analyzed information sources and farmers' attitude towards use of land conservation practices in Ogun state, Nigeria.

Land conservation techniques in Nigeria. Soil conservation is an age long practice in Nigeria and in most parts of Sub-Sahara Africa. Indigenous techniques from the pre-colonial era focused on erosion control and water conservation by ridging, mulching, constructing earth bunds and terraces, multiple cropping, fallowing, and tree planting (Igbokwe 1996). After independence in 1960, more emphasis was placed on soil fertility issues. Decreasing funds at the end of the oil boom in the 1980s however

restricted the performance of soil conservation schemes (Slaymaker & Blench, 2002). Sheng (1989) classified land conservation practices in Nigeria as follows:

1. Structural and Mechanical Erosion Control Practices (SMECP): contour bund, and construction of ridges across the slope.
2. Agronomic Practices (AP): multiple cropping, mulching, and crop rotation.
3. Soil Management Practices (SMP): compost and farm manure.
4. Cultivation Practices (CP): minimum tillage.

One criterion often used to evaluate the success of conservation programs is the proportion of farmers adopting the promoted land conservation technologies. Studies have however shown that many public initiatives in developing countries have not fulfilled the expectations of this criterion (Hellin & Schrader, 2003; Hellin & Haigh, 2002; Pretty & Shah, 1997). While farmers tend to adopt techniques that are expected to be profitable, profitability is not a sufficient condition, since demographic and farm characteristics as well as institutional barriers can influence adoption of innovations (Neil & Lee, 2001).

Ryan and Gross (1943) were the first to show that technological adoption varies from farmer to farmer and since then, considerable effort has been devoted to studies which attributes better explain this variability. Most of the literatures on the use of conservation technologies consist of behavioral studies examining the influence of factors such as source of information, farm and farmers' attributes like education, age and erosion perception (Lichtenberg, 2001).

MATERIALS AND METHODS

The study was conducted in Ogun State of Nigeria. Ogun State is located in the South-Western part of Nigeria. It is bounded in the west by the Republic of Benin, in the east by Ondo State, in the south by Lagos State and in the north by Osun and Oyo States. It has a population of about 3,728,098 people, which is approximately 2.70 percent of Nigeria's population (NPC, 2006). Farming is the major occupation of the people, particularly those living in the rural areas. Administratively, the state has twenty local government areas which have been divided into four divisions i.e Egba, Ijebu, Yewa and Remo.

Data Collection and Sampling Technique

Well-structured questionnaire was used to collect primary data from farming households. The multi-stage sampling method was used to select the respondents. Ten local governments were used for the study (Table 1). Two villages were randomly selected from each of the selected local government areas and twenty arable crop farmers were sampled from each village. Thus, a total of four hundred farmers were selected for the study, however, only 388 questionnaires were found useful for analysis.

Table 1. List of selected villages in the chosen local government areas

Rainforest zone			Derived savannah zone		
L.G.A	Village	Distributed questionnaires	L.G.A	Village	Distributed questionnaires
Water-Side	Efiri	20 (17)	Yewa-North	Igbogila	20 (17)
	Abigi	20 (17)		Ayetoro	20 (17)
Ijebu-East	Ijebu Ife	20 (15)	Yewa-South	Ipake	20 (18)
	Ijebu Mushin	20 (17)		Ilaro	20 (17)
Ijebu-Northeast	Ogbogbo	20 (17)	Imeko-Afon	Imeko	20 (18)
	Atan	20 (17)		Ilara	20 (17)
Ijebu-North	Agunboye	20 (17)	Ado-odo/Ota	Owode	20 (17)
	Ago-Iwoye	20 (15)		Ado-odo	20 (18)
Odogbolu	Ogbo	20 (17)	Ipokia	Agosasa	20 (18)
	Odogbolu	20 (16)		Ihunbo	20 (16)
Total		200 (165)	Total		200 (173)

Number of questionnaires retrieved in parenthesis

Source: Field survey (2011)

Method of Data Analysis

Both descriptive and inferential statistics were used to analyze the data collected. The attitude of the farmers towards SLCP was measured by summarizing the responses to a list of questions that seek the knowledge/attitude of the farmers towards sustainable farm practices. To achieve this, a five-point Likert scale containing items with response categories ranging from Strongly Agree (SA) with a score of five points to Strongly Disagree (SD) with a score of one point for statements/questions was developed. The respondents were asked to indicate which option best described their opinion or perception with respect to each question. For a summarization of responses to each question, the scale was further trichotomized as favourable, neutral and unfavourable responses. The information on the individual farmer's attitude was derived from the Likert scale attitude score.

The logit regression model was used to evaluate the factors influencing the use of SLCP among farming folks in the study area. Where the dependent variable is a dummy, the two models often used are the logit and probit regression models. But as Amemiya (1981) has observed, the statistical similarity between logit and probit models make the choice between them difficult. The logit model is however, computationally easier, thus, it was selected for this study. Following Gujarati (1988), the model is specified as follows:

$$\text{Ln} (P_i/(1-P_i)) = ß_0 + ß_1 X_1 + \ldots + ß_6 X_6 + e_i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$$
(1)

Where:

P_i = probability of farmer's adoption of one or more of the various SLCP

$1-P_i$ = probability of not adopting SLCP $ß_0$ = Intercept

$ß_i$ (1,2,3...,6) = Regression coefficients,
X_i (1,2,3...,6) = Independent variables, and
e_i = error term.

The following variables have been hypothesized to influence use of SLCP either positively or negatively:

X_1 = farming experience in years;
X_2 = educational level (at least a secondary school education=1, otherwise=0) X_3 = Topography (flat=1, sloppy=0);
X_4 = participation in government awareness program on climate or environmental variability, land degradation/soil conservation, etc (yes=1, no= 0);
X_5 = membership of Community Based Organization (CBO) i.e farmers' cooperative (yes=1, no=0);
X_6 = access to extension services (information dissemination, coordination, education etc) (yes=1, no= 0);

The Statistical Package for Social Sciences version 17 was used to run the analysis.

RESULTS AND DISCUSSION

Farm and Farmers Characteristics

Results in Table 2 shows that the average year of education of farmers was 9 years indicating relatively low literacy level. Farmers' educational level is expected to have significantly positive influence on their participation in development programmes and in the adoption of innovations (Fawole & Fasina, 2005). The average years of farming experience in the study area was 24 years. Farmers' years of experience in farming is expected to increase use of conservation technologies. It is even more important among farmers with low literacy level (Awoyinka *et al.*, 2009).

Furthermore, Table 2 shows that only 27 percent of the farmers had access to credit. Access to credit, in combination with other assets, is expected to influence farmers' adoption of conservation technology (Nkoya *et al.,* 2004). Fifty four percent of the farmers belong to one form of CBO or the other. These results are consistent with the findings of Awoyinka *et al.* (2009) and Jagger and Pender (2003). Farmers' participation in programmes which teach land management practices is expected have an influence on eventual adoption of SLCP by farmers. Results reveal that 66 percent of the farmers have participated in conservation programme, especially initiated by the Agricultural Development Project (ADP), at one point or the other. About 91% of the farmers had access to extension information services.

Table 2. Farm and farmers' characteristics

Variables	Freq (n= 338)	%
Age (mean)	50	
S.D (±).	10	
Min	25	
Max	80	
Years of Education(mean)	9	
S.D (±).	4	
Min	0	
Max	16	
Years of farming experience (mean)	24	
S.D (±).	12.7	
Min	2	
Max	65	
Access to credit facility		
Access	91	27
No access	24	73
Membership of farming org		
Yes	182	54
No	156	46
Major SLCP related Programme Participated in		
None	115	34
ADP initiative	117	35
FADAMA	61	18
NGO initiative	45	13
Contact with Extension Agents		
Yes	306	90.5
No	32	9.5
Tenancy security		
No	151	45
Yes	187	55
Topography of Farmland		
Flat	179	53
Undulating	159	47

Source: Field survey, 2011

Fifty five percent (55%) of the farmers had land tenancy security of cultivated lands. Farmers' tenancy security on land owned and cultivated could determine the use of SLCP (Gebmedhin & Swinton, 2003). The topography of the farmland may also determine the use of SLCP. The result shows that, although, 53% of the farmers cultivated flat lands, 47% of the farmers cultivated undulating lands. Thus, the existence of farmlands with degradation and vulnerability to degradation is evident in the study area. Farmers cultivating on sloppy or undulating lands are expected to be more conscious of information on SLCP.

Sources of Information to the Farmers on the Use of Land Conservation Practices and Specific SLCP Adopted

Information needs of farmers for production and conservation are especially crucial among rural farmers. Farmers' information sourcing is constrained largely by

availability of fund and language barrier, which is closely linked to literacy level (Babalola *et al.*, 2010).

Of all the sources of information on the use of SLCPs that were examined, Table 3 shows that extension agents played the highest role with 95 percent of the farmers benefiting from their information services. This is consistent with the earlier report that access to extension education is relatively high in the study area. However, 42% of the respondents also reported that they sourced their information on SLCPs from the mass media which included newspaper, television and radio. Several studies have reported the effectiveness of the mass media, particularly the radio and television, in creating awareness about environmental conservation and land management issues (Babalola *et al.,* 2010; Ugboma, 2002; McCarthy & Brennan, 2009). These media, however, do not provide for live interaction, like the other identified sources, which is necessary in facilitating implementation of programmes. Furthermore, Table 3 also shows that of all the SLCPs analyzed, the majority of the farmers (81%) favoured the use of Agronomic Practices (AP).

Table 3. Farmers' sources of land conservation information and specific land conservation practices adopted

Variables	Freq (n= 338)	%
Information sources		
Extension Agent	318	94
Community Based Org	77	22.8
NGO	41	12.1
Mass Media	142	42
Agric Exhibition/ Show	79	23
FADAMA	31	9
Land conservation practices		
Structural and mechanical erosion control practices (SMECP	93	27.5
Agronomic practices (AP)	274	81.1
Soil management practices (SMP)	195	57.7
Cultivation practices (CP)	167	49.4

Source: Field survey, 2011

Farmers' Attitude towards Sustainable Land Conservation Practices

Results in Table 4 shows that more than 50% of the respondents agreed to all the favourable attitudes towards SLCP. The implication of this result is that farmers in the study area are well disposed to the need for SLCP and hence are expected to readily and adequately embrace technologies or innovations for sustainable land conservation.

Table 4. Farmers' attitude towards sustainable land management practices

S/N	Attitude statements	Agree		Disagree	
		Freq	%	Freq	%
1	Planting of legumes improves soil fertility	313	93	25	7
2	Legumes prevent soil erosion	279	82	59	18
3	Legumes act as weed killer	212	64	120	36
4	Tree planting is good for proper land use	269	80	69	20
5	Mulching reduces evaporation	321	95	17	5
6	Water loss due to run off is prevented by mulching	193	57	145	43
7	Manuring improves water conservation in the soil	267	79	71	21
8	More weed problem occurs with manuring	258	76	80	24
9	There is inadequate information on land management	175	52	163	48
10	Only land owners can plant trees	261	77	77	23
11	Crop rotation improves crop yields	284	84	54	16
12	Crop rotation improves soil fertility	288	85	50	15
13	Our farmers would like to engage in irrigation if the facility is available	329	97	9	3
14	It is not necessary to use compost since farmers still use fertilizers to replenish the soil	151	45	187	55
15	Good land management is important for the benefit of future generation	329	97	9	3
16	Environmental problems hinder land productivity	294	87	44	13
17	Without use of agrochemical such as herbicides and insecticides, agriculture is not profitable	148	44	190	56
18	Use of chemicals requires much education	238	70	100	30
19	Fallowing is good for maintaining soil fertility	318	94	20	6
20	Bush fallowing is better than crop rotation for soil fertility maintenance	174	52	164	48
21	Bush fallowing wastes land available for cultivation.	189	56	149	44
22	Bush burning is bad because it causes air pollution	227	67	111	33
23	Bush burning is good because it reduces the cost of land clearing	279	83	59	17
24	I still practice bush burning on my farm	271	80	67	18
25	I prefer mixed/multiple cropping to sole cropping because it increases total revenue per unit of land area cultivated	319	94	19	6
26	I prefer mixed/multiple cropping to sole cropping because it improves soil fertility	177	52	161	48
27	Mixed/multiple cropping is bad because it increases pest and disease infestation	99	29	239	71
28	Generally, I prefer mixed cropping to sole cropping	310	92	28	8

Source: Computed from field survey data (2011)

Determinants of the Adoption of Sustainable Land Conservation Practice

The result of the logit model analysis is presented in Table 5. The significance of the diagnostic statistics (chi-squared and log-likelihood value) shows a good fit for the model. Table 5 shows that the use of SLCP in the study area was influenced by Farmers' level of education ($p<0.05$), access to extension information ($p< 0.01$) and their participation in Community Based Organizations (CBO) ($p< 0.05$). These factors positively influenced the use or adoption of the SLCPs. This implies that the more

literate the farmers are, the more they participate in CBOs and access extension information, the more the adopt SLCP.

Table 5. Logit model: results of the analysis of the determinants of adoption of SLCP

Variables	Coefficient	t-ratio
Constant	0.46	1.407
Farmers years of experience in farming	0.23	0.63
Years of Education	0.72**	2.62
Farm size	0.013	0.032
Topography of land	0.28	1.35
Participating in Government Agricultural Programme	0.76	1.21
Belonging to Community-Based Organization	0.53***	2.82
Access to extension information	0.25**	2.32
Log-Likelihood	-216.01***	
Chi-square	98.307***	
Pseudo R^2	0.546	

Number of observation =338; *** Significant at 1%; **Significant at 5% Source: Computed from field survey data (2011)

CONCLUSION AND RECOMMENDATIONS

The study has assessed the information sources as well as the attitude of farmers' towards Sustainable Land Conservation Practices (SLCP) in Ogun State, Nigeria. The study further evaluated the determinants of SLCP. The study established that farmers in the study area are aware and perceived the need for SLCP. Thus, they source for information related to land conservation especially through the agricultural extension outfit and the mass media. Furthermore, the majority of the farmers favoured the use Agronomic Practices as land conservation measure. The nexus between farmers' personal, institutional and farm-level characteristics and their choice of land conservation practices was also established. The outcomes further show possible areas of policy intervention in environmental conservation.

Based on the survey results, there is a need for aggressive programmes to tackle the problem of low level of education, poor participation in community organizations and increase government support to facilitate the efficiency and spread of the agricultural extension services especially on soil conservation information dissemination and technology transfer.

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BIO-DATA

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