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Adoption of land management technologies amongst small-holder farmers in Ekiti State, Nigeria: Implications for food security

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Land management is an integral effort of stakeholders (for example Local farmers Governmental and Non-governmental Organizations (NGO's)) in ensuring the preservation of land and at the same time facilitating the restoration of soil nutrients status. It is all about preventing soil from being damaged, destroyed or lost, thereby enhancing good land utilization for productive uses. This present study aimed at determining the extent of the adoption of land management technologies (LMTs) amongst small holder farmers in Ekiti State Agricultural Zone with the specific objectives of describing the personal characteristics of farmers in the study areas, identifying various land management technologies, ascertaining the benefits accruable from land management technologies adoption and identifying the limiting factors to the adoption of land management technologies. Multi-stage random sampling technique was used to select the respondents for the study. Eight of the sixteen Local Government Areas (LGAs) of the State were purposely selected based on the participation of the farmers in Agricultural Development *Programmes* (*ADPs*). The selected (LGAS) were: Ikole, Oyo, Ido, Ijero, Ekiti west, Ekiti east, Moba and Irepodun/Ifelodun. Two communities were randomly selected from each of the LGA, making a total of sixteen communities. In all, one hundred and eighty farmers were selected for the study. Structured interview schedules were administered to respondents to elicit requisite information. The results of descriptive statistics revealed that six land management technologies were disseminated, whereas planting of cover crops was the most adopted LMTs (65%) followed by erosion control (59%), afforestation (45%), reforestation (42%) and application of synthetic fertilizer (40%). Benefits deduced from the adoption of LMTs included correct land uses (72%) and security against land degradation (54%). Meanwhile, factors limiting the adoption of LMTs included high cost of LMTs (soil testing) incessant bush burning and inadequate technical know-how of LMTs by the extension agents. Results of correlation analysis revealed a positive relationship between LMTs adoption and age ($r=0.19$, $p \leq 0.05$), farm size ($r=0.07$), ($p \leq 0.05$), years of farming experience ($r= - 0.522$, $p \leq 0.01$), and contact with extension agents ($r=0.08$, $p \leq 0.01$). However, a negative relationship was found between LMTs adoption and education ($r = -0.0251$, $p \leq 0.01$) and income ($r = 0.302$, $p \leq 0.01$). Therefore, in order to enhance sustainable food security in Nigeria all the identified limiting factors to the adoption of LMTs must be urgently looked into by all the stakeholders.

Key words: Land management technologies, adoption, small holder farmers, food security.

INTRODUCTION

Nigeria is undergoing very rapid land and ecological degradation and climate change. To face the challenges posed by these changes, relevant stakeholders like extension agencies, environmental protection agencies

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and biodiversity conservator have roles to play in sustaining the retention of soil structure and thereby enhancing good land utilization for better performance. Schiller (1980) reported that: "the earth has only 7.86 billions acres of land potentially suitable for agriculture, and we are already farming half that total. We can boost agricultural production only by bringing the rest of the land into cultivation or by increasing the output per acre." If Schiller's (1980) first suggestion is to be heeded, there is imminent trouble staring at the human populace because a time shall come when there could be no more land to farm. Therefore, the importance of land management in agriculture cannot be over emphasized. Widely claimed, it is one of the most critical challenges facing agricultural development and food security in the sub Saharan African (SSA).

Kolawole (2008) posited that a large proportion of the soil in the sub-region have continued to be less suitable for agriculture; for instance, in Western and Central Africa, land degradation from extensive agriculture, deforestation and over grazing have peaked so much that about fifty percent of the farm land suffers soil erosion and up to eighty percent of range lands are degraded due to over-utilization (IFAD, 2002). Thus, land and its attendant problems in SSA have continued to receive attention amongst development experts. At the moment, there are quite a number of international initiatives and donor programmes already put in place to address the problem of land decline in the continent.

The importance of soil fertility in food production cannot be over-emphasized. It is believed to be one of the most critical problems now facing agricultural development and food security in the SSA region (Sanchez, 2002; Vanlauwe et al., 2006). Comparing them with soils in other continents, problems peculiar to SSA lands are nutrient deficiency, low organic matter, moisture stress and high erodibility (IAT, TSBF and ICRAF, 2002). The causes of these associated problems are not far fetched as generally believed, continuous cropping, incessant bush burning and uncontrolled forest fires, deforestation, movement of heavy military hardware and other poor management practices are the problems that are always causing poor soil condition in sub-Saharan Africa, to the extent that citizens of SSA are not food secured.

Statement of problem

The overall objective of all agricultural stakeholders is to bring about an improvement in agricultural production. This, they undertake mostly through end-users of research products - that is farmers who are on their farms. Efforts in this regards in Nigeria had not yielded desired result as food is becoming scare on the table of her citizens. The adoption of innovations in agriculture has been studied intensively since Griliches (1957) pioneering work on adoption of hybrid corn in USA. The majority of the previous adoption research has been concerned with answering the questions: (a) what determines whether a particular producer adopts or rejects an innovation and (b) what determines the pattern of diffusion of the innovation through the population of potential adopters (Marsh et al., 1995; Rogers, 1995).

Also, the issue of transfer of agricultural technological information to farmers has taken a greater emphasis within the last decade in the developing countries (Ekong, 2003). One such case was the yearly transfer of research results in agriculture through the Research-Extension Farmers Input Linkage Systems (REFILS), Co-ordinate by Institute of Agricultural Research and Training Ibadan, Oyo State, Nigeria, to subject matter specialists (SMSs). In the meantime, this has been precipitated by the in-depth realization that the huge amount spent on research will be worthless, unless these findings get to end-users of research products who will eventually apply such in their farming practices to boost agricultural production.

In the light of the above, the question that readily comes to mind is what has been happening to the researches on land management in the study area. The extension agents has introduced six land management technologies in a period of twenty years (pre-field visit indicated), but the extent to which these technologies have been adopted and utilized by the small holder farmers is yet to be ascertained. Therefore, in this period of climate change, it is worthwhile to determine the extent of adoption of those land management technologies amongst small holder farmers in Ekiti State. It is also pertinent to know the socio-economic and limiting factors associated with the adoption of land management technologies in the study area. The problem therefore, is that of ascertaining the extent to which farmers in the area have adopted the land management technologies the study area.

Objectives of the study

The main objective of this study was to determine the extent of adoption of land management technologies disseminated by extension through Ekiti State Agricultural Development *Programme* (*ADP*) amongst small holder farmers in Ekiti State of Nigeria. The specific objectives were to:

(i) Describe the personal characteristics of farmers in the study area,
(ii) Identify various land management technologies adopted by respondents,
(ii) Ascertain factors which contribute to adoption of land management technologies,
(iv) Determine factors limiting the adoption of land management technologies.

Hypothesis of the study

To test the relationship between the variables in this

study, one hypothesis was formulated and tested. This hypothesis is as follows: there is no significant relationship between personal characteristics of the respondents and adoption of Land management technologies.

METHODOLOGY

The study was carried out in Ekiti State in South-Western Nigeria. The State is located between longitude 4° 2′ E and on latitude 5° 2′ and 8° 1′ N. According to Nigeria population census of 2006, it has a population of 2, 384, 212 and a majority is practicing farmers. Both cash crops (cocoa and kola nut) and food corps (yam, cassava and plantain) are commonly grown in the State. The rainy season is between March and October, with a peak of 1800 mm.

Multi-stage random sampling technique was used to select the respondents for the study. Eight of the sixteen Local Government areas (LGAs) of the State were purposely selected based on the participation of the farmers in ADPS programme. The selected (LGAS) are: Ikole, Oyo, Ido, Ijero, Ekiti west, Ekiti east, Moba and Irepodun/Ifelodun. Two communities were randomly selected from each of the LGA, making a total of sixteen communities. Respondents were then selected based on the number of registered farmers in ADPs field diary. In all, one hundred and eighty farmers were selected for the study. Structured interview schedules were administered to respondents to elicit requisite information. The respondents were individually interviewed in their communities, the data from the interview schedule were coded and descriptive percentages and standard deviation were used in describing the data. However, linear correlation was used to make inferential deductions

Measurement of variables

The dependent variable number of land management technologies (LMTs) adopted was measured by the number of LMTs adopted by the farmers in maintaining their soil. A field pre-survey exercise (before the commencement of the actual field survey) indicated six LMTS practices (cover cropping, erosion control, reforestation, application of synthetic fertilizer, afforestation and soil testing) amidst farmers. Each practices was scored one point, the possible maximum score for each respondent was six, while the minimum was 1.

RESULTS AND DISCUSSION

Personal characteristics of small holder farmers and adoption of LMTs

The findings in Table 1 revealed that majority (65%) of respondents were within the age group of 40 and 59 years. This favors the increased rate of respondents' participation in farming since at this age they are still very active to cope with the rigorous farming activities. The implication of the age distribution is that many people will actively participate in farming at their age, if there are enough resources in terms of capital and access to land. It was further revealed that 93.33% of sampled farmers were married, 5.55% were single and only 11% were widowed. It was also revealed that majority of the sampled respondent (97.8%) were male farmers, while just 2.2% of the populations were female farmers.

Detailed analysis revealed that most farmers in Ekiti State were male. The findings further revealed that majority (59.44%) of the sampled respondents had no formal education, hence they could not read and write. An overview showed that the farming business is still left in the hands of illiterate and those with low level of education.

It was also found that average farm size was 2.20 ha, with a standard deviation of 1.53. The result further revealed that 10% has less than 1 ha, while about 61.2% of the respondents had 1 to 3.99 ha, whereas 19.4% had from 4 to 6.99 ha. Also, just 9.4% had about 7 to 99 ha. Using Olayide (1980) categorization of Nigerian farmers of small medium (6 to 9.99 ha) and large (10 ha and above) scale farmers, it could be rightly concluded that majority were small-scale farmers. The result of the finding confirmed the reports of various scholars that majority of Nigerian farmers are small farm holders.

Furthermore, the result also showed that 94.4% of the respondent had regular contact with extension agents, 33.3% had contact once in a year, while 2.2% were among those that were seldom contacted. This indicates that the rate of contact of the respondents with the extension agent was high and this will influence their adoption of agricultural innovations.

Respondents' level of awareness of LMTS

The result in Table 2 shows that majority (68.3%) of the respondents sampled are well aware of LMTs, while just 31.7% indicated that they were alien to the technology. The implication is that the respondents are very much aware of the LMTs with extension as the sole source of the awareness.

Types of LMTs

Table 2 shows that the distribution of respondents by the types of LTMs adopted and utilized. Results revealed that most (65.56%) respondents adopted planting of leguminous cover crops in managing their soil. However, erosion control using contour bunds and planting of vertiver grass (58.8%), afforestation (planting of new trees) 45%, reforestation (replanting of harvested tress) 41%, application of synthetic fertilizer 40% and soil testing (13.8%) were other LMTs adopted in management of land in descending order.

LMTs adoption score

The average score of the respondents was 2.47, with a standard deviation of 0.73. The result in Table 3 showed that majority (72.6%) of the sampled respondents adopted between 1 and 2 LMTs, while 22% adopted between 3 and 4 LMTs introduced, whereas just 0.6%

Table 1. Frequency and percentage distribution of respondents by the socio-economic.

Socio –economic characteristics		Frequency	Percentage (N = 180)
Age			
I	20 -29	9	5
II	30 - 39	35	19.44
III	40 - 49	60	33.33
IV	50 - 59	57	31.67
V	60+	19	10.56
Total		180	100
Sex			
I. Male		176	97.8
II. Female		4	2.22
Total		180	100
Marital status			
I. Married		168	93.3
II. Single		10	5.55
III. Widowed		2	1.11
Total		180	100
Educational level			
I. No formal schooling		107	59.4
II. Primary Six		35	18
III. WASC		23	12.8
IV. Tertiary/University		5	2.8
Total		180	100
Contact with extension agents and frequency of visit			
Once in a year		4	2.2
Seldom		6	3.3
Fortnightly		170	94.4
Total		180	100

Source: Field survey, 2010.

Table 2. Percentage distribution of respondents by the type of LMTS adopted.

LMTS score	Number (N)	Percentage (%)	N = 180
1 - 2	129	72.6	
3 - 4	40	22.2	Mean = 2.41
5 - 6	11	0.6	Std. Dev. = 0.72

Source: Field survey, 2010.

Table 3. Percentage distribution of respondents by the numbers of LMTS adopted.

Type of LMTs	Number (N)	Percentage (N = 180)
Planting of cover crops	118	65.56
Erosion control using vertiver grass	106	58.8
Afforestation	82	45
Reforestation	75	41.5
Application of synthetic fertilizer	72	40
Soil testing	25	13.88

Source: Field survey, 2010.

adopted 5 and 6 LMTs. The analysis revealed that not many LMTs were adopted by respondents in land management. The deduction is that farmers may not adopt many LMTs in land management as a result of

Table 4. Factors limiting the adoption of LMTs.

Constraints	Frequency	Percentage (N = 180)
High cost of LMTS	90	50
Incessant bush burning and uncontrolled forest fires	86	47
Inadequate technical know-how by extension agents	73	41
land tenure arrangement	28	16

Source: Field survey, 2010.

Table 5. Distribution of respondents by benefits deduced from adoption of LMTs.

Benefits	Frequency	Percentage (N = 180)
Correct land use	130	72
Security against land degradation	97	54
Security against crop failure	90	50
It use has increase my farm revenue appreciable	45	25

*Multiple responses. Source: Field Survey, 2010.

Table 6. Correlation analysis showing linear relationship between personal characteristics of the farmers and adoption of land management technologies.

Personal characteristics of respondents	Correlation
Age	0.19*
Farm size	0.07*
Years of farming experience	0.522**
Education	0.522**
Income	0.302**
Contact with extension Agent	0.148

Number of independent variables = 6; number of respondents = 180. Source: Field survey, 2010.

ignorance and cost.

Problems of LMTs adoption

Results in Table 4 revealed that about 50% of the respondents were of the view that high cost of LMTs (especially soil testing) restricts to a large extent, the adoption of LMTs. About 47% felt incessant bush burning and uncontrolled forest fires had seriously impeded the adoption of LMTs. Whereas, 41% were of the opinion that extension agents are technically inadequate on the dissemination of LMTs and only about 16% of population viewed land tenure arrangement as a constraint.

Benefits derived from adoption of LMTs

Results in Table 5 showed the distribution of respondents by the benefits derived from LMTs adoption. Detailed analysis indicated that most (72.0%) respondents believed that LMTs allowed for correct land use. Others were of the opinion that its use serves as security against crop failure (50%) and that its use has increased revenue appreciably.

Correlation analysis showing linear relationship between personal characteristics of farmers and adoption of land management technologies

The result in Table 6 showed that four personal characteristics of farmers had positive and significant relationship. Two variables had two negative relationships with the LMTs at both ≤ 0.01 and p ≤ 0.05. The values of the identified variables were: age of the respondents (r = 0.19), farm size (r = 0.07) and contact with extension agent (r = 0.148). The positive correlation of age, farm size, years of farming experience and contact with extension agents was an indication that the more the magnitude of variation in these variable higher the number of LMTs that farmers would adopt in farming

practices. It could then be inferred that: Age and experience of the farmer, as indicated by the number of years that the farmer had been farming in the study area, is likely to have a range of influences on adoption of LMTs. The larger the farm size, the more the number of LMTs to be used as a result of the large coverage and there would be tendency of differences in variation of land to be used. As per contact with extension agents; the more farmers had contact with extension agents, the more they will be willing to adopt agricultural innovations.

CONCLUSION AND RECOMMENDATION

The findings of the study revealed that majority of the farmers in the studied area were aware of LMTs, with extension being the major source of awareness. The LMTS mostly adopted and utilized in the area were found to be planting leguminous cover crops, erosion control using (contour bunds and planting of vertiver grass), application of synthetic fertilizer, and the major constraint to LMTs adoption was high cost of LMTs (especially soil testing) and inadequate technical Know-how about LMTS by extension agents. In addition, age, farm size and years of farming experience had significant relationship with LMTs.

Among the recommendations that emanated from the study is that the government should provide technical incentives to extension agents to enable them have a deep knowledge about most of the LMTs, especially soil testing. The land management resource agencies should work in collaboration with extension agencies for effective dissemination of new technologies. Also, there is much need to intensify the promotional and popularization campaigns of adoption of land management technologies not adopted so as to arouse the interest of end-users towards adopting those technologies in order to enhance sustainable agricultural development.

REFERENCES

CIAT, TSBF and ICRAF (2002). Soil fertility degradation in sub-Saharan Africa: Leveraging lasting solutions to a long-term problem. Conclusions from a workshop held at the Rockefeller Foundation Bellagio study and conference centre, March pp. 4-8.

Ekong EE (2003). Rural Sociology: An introduction and analysis of rural Nigeria, Uyo: Dove publishers, P. 37.

Griliches Z (1957). Hybrid corn: An exploration in the economics of technological change. Econometrical pp. 25:501-523.

IFAD (2002). Stategy for rural poverty reduction in western and central Africa. Accessed online: http//www.ifad.org/operations/regional.

Kolawole OD (2008). Soil Science and the politics of knowledge: situating small holders farmers' knowledge and practices within global debates on soil fertility management in sub-saharan Africa. Unpublished MA dissertation university of Sussex, Birghton the united kingdom P. 1.

Marsh SP, panel DJ, Linder RK (1995). The adoption of lumpins in western Australia: Did extension make a difference? Paper presented at 39th annual conference of the Australian agricultural economics society, parth Western Australia, February pp. 14-16.

Rogers EM (1995). Diffusion of innovations. Free press, New York. P. 105.

Sanchez PA (2000). Soil fertility and hunger in Africa science. P. 295.

Schiller BR (1980). The Economy today. Random house, business division, New York. P. 428.

Vanlauwe B, Ramisch JJ, Saanginga N (2006). Integrated Soil Fertility Management in Africa. From Knowledge to Implementation, in Upheff, N. Ball, A.S., FErnamdes, E., Herren, H., Husson, O., Laing, M., Palm C., Pretty, J. (eds) Biological Approaches to Sustainable soil Systems, New York, Taylor and Francis groups.