Level of Adoption of Soil Conservation Technologies by Small Scale Farmers in Ebonyi State, Nigeria

Egwu, W.E

Department of Agricultural Economics, Management and Extension, Ebonyi State University, Abakaliki

ABSTRACT

The overall purpose of this study was to determined the level of adoption and use of improved farm practices by small scale farmers in Ebonyi State. A structured interview schedule administered to 300 small scale ADP contact and non contact farmers in 12 randomly selected autonomous communities in the three agricultural zone in the State was the major instrument used for data collection. A three stage sampling plan was employed with an agricultural zone constituting plan was employed with an agricultural zone constituting primary stage, the communities second stage and the respondents third stage. Descriptive statistics were used to analyze quantitative data while T-test statistics was used to verify differential adoption rates of the recommended soil conservation technologies between the two categories of farmers. The result showed among other things that adoption of recommend soil conservation practices are useful when farmers are provided enough knowledge about the practices and materials to implement the necessary action, using extension delivery systems that are in consonance with their socio-economic and agronomic circumstance.

Keynote Farm practices, Small scale, Contact, Non-Contact and ADP

INTRODUCTION

To keep pace with demand for increased food production while retaining the quality of land and ecological balance of production systems is a current challenge to agricultural research and policy in Nigeria. Increased food production in the country has been pursued by means of either or both of the two major processes: intensified and expanded cultivation. Whereas the intensification processes involves intensifying cultivation on already cultivated lands, the expansion process involves extending or expanding cultivation into hitherto uncultivated lands or new areas. In view of the fact that cultivated land in Ebonyi State is fixed in supply (In absolute terms) expanding the areas of cultivated lands cannot proceed ad-infinitum(Alao, J.A.,1971). In Ebonyi State presently, increasing population densities growing food and market demands, urbanization, growing incomes, proximity to major roads infrastructure and soil conditions have resulted to decreasing arable land(ADP,2000). These changes have resulted to deferential access to farmland and intensification of cultivation with farm reaching consequences for land use management practices and sustainability of the small scale farming systems in the state (Aina and Salan 2002).

Unfortunately, severe soil fertility depletion and productivity decline, shrinking crop yields and ecological damages including erosions losses, leaching, reduced water retention, increased water run-off, flood and gullies are some of the adverse effects of the uncontrolled land-use and agricultural intensification in the state (Ofomata, 2011). These problems might worsen in future due to the fragile, heavily weathered and leached nature of the soils of this area upon attendant uncontrolled population pressures.

To address the agricultural intensification problems and ensure sustained productivity and land quality in the state, the State, Federal Government and some donor agencies have introduced policies, programmes and projects aimed at accelerating farmer's adoption of improved soil conservation practices(FAO,2005). These practices are embodied in tree planting and use of manure/plant crop residue, mulching, terracing, contour cultivation and grass strips. Use of coner crops, alley copping, use of fertilizer and similar practices. These measures aimed at improving or maintaining the present state of soil resources for future continuity of yields are what is referred to in this study as improved soil conservation technology(Onu, 2011).

*Address for correspondence:

egwuwe@yahoo.com

Sampling Design

The study covered a total sample of 300 small scale ADP contact and non-contact farmers. Farmers were categorized into 'active' and 'non active'. Active farmers implies those who are using new farm practices or interested in agricultural innovation (ADP contact farmers). The 'non active' farmers are those farmers who show no interest in farm innovations (ADP non-contact farmers). Selection was based on cultural origin, familiarity with area of assignment and experience. Each enumerator was deployed in the agricultural zone where his community is located. Personal interview was used in data collection. One hundred farmers were interviewed in each of the agricultural zones of Ebonyi State.

Analytical Method

Data that was qualitative in content like land ownership pattern and tennurial were analyzed through descriptive statistics such as means and percentages while frequencies were used to analyze quantitative data. T-test statistics were used to verify differential adoption rates of the recommended soil conservation technologies between the two categories of farmers.

T-test is mathematically presented as:

$$t = \sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}$$

Where

The determinant of farmers' adoption of recommended soil conservation technique, their independent and combined effects was examined using stepwise multiple regression technique.

The objective of the analyses was to determine the individual contribution of each independent variable conjunctively yielded the 'best' linear equation.

The models are explicitly specified as follows:

$TECH = A + B_1 + B_2 LE_2 + B_3 FS_3 + B_4 SS_4 + B_5 NLLL_5 + B_6 AFL_6 B_7 LUF_7 + B_8 LF_8 + U$

Where:

TECH = Index measured and weighted on a five point scale as mean score of farmer's knowledge in terms of awareness, interest, evaluation, trial and the number of conservation practices in use by the individual respondent.

A	=	Contact
A_1	=	Age of respondent (in yrs)
LE	=	Level of formal Education
FS	=	Firms size
SS	=	Social status
NLLL	=	Nature and length of land lease
AFL	=	Access to farm land
LUF	=	Land use factor
LF	=	Length of fallow
U	=	Error term

RESULT & DISCUSSION

Consistent with the study objectives, the findings as presented focused on different improved soil conservation technologies available for adoption, rate of adoption of improved soil conservation technologies by the two categories of farmers and the effect of social, economic, agronomic and technology-related factors on adoption behaviour of the farmers.

In this study three hundred (300) respondents were categorized into:

I.   One hundred and seventy eight (178) ADP contact farmers (active)

II.   One hundred and twenty two (122) ADP non-contact farmers (Not active)

'Active" implies farmers who are active in using the new farm practices or showing different interest in agricultural matters (Ebonyi State ADP contact farmers). The "not active" groups were farmers who showed no particular interest in agriculture (Ebonyi State ADP non-contact farmers).

For the purposes of this study, the rate of adoption of these two categories of farmers were compared to determine their level of adoption of the recommended improved soil conservation technologies in the study area.

Table1 *Percentage Distribution of Respondents contact and non-contact farmers over the Improved and Recommended Soil Conservation Practices Technologies.*

Conservation Practices	ADP contact farmer "Active"	Non ADP contact farmers "Not Active"
	%	%
Manure/plant residue application	23	15
Mulching	25	4
Terracing	18	7
Contour cultivation and grass strips	8	5
Use of cover crop	13	7
Alley cropping	8	3
Use of fertilizer	15	5

Multiply Responses were recorded

Source: Field survey, 2012

Table 1 shows that all the recommended soil conservation practices in the study area were used by both the "active" and "not active" respondents. The use of manure/plant residue was the most conservation method used by the two categories of farmers.

With respect to the specific technologies, 23% and 15% respondents of the two categories respectively adopted the use of manure/plant residue.

The table equally indicates that ADP contact farmers (active) were more in adopting the recommended seven soil conservation practices than the ADP non contact (not active) farmers.

Table2 *Difference in Mean Adoption Rates of Improved soil Conservation Technologies between ADP Contact and Non ADP Contact Farmers.*

Group	Number	Mean	Standard deviation	Standard error	df	t
ADP contact farmers	178	2.44	1.05	0.04		
ADP non-contact farmers	122	2.95	1.056	0.07	291	3.072**

** Significant at both 0.05

This states that there is no significant Relationship between farmers' personal and farm enterprise characteristics and their rates of adoption of improved and recommended soil conservation practices.

This hypothesis was tested by the use of stepwise multiple regression technique. Farmers personal and farm enterprise characteristic investigated were: age, education, farm size, social status, land use factor, farm land unit, access to farmland, nature and length of land lease and length of fallow period.

CONCLUSION

The soil conservation extension agencies and programmes can be successful in bringing about mass adoption of recommended soil conservation innovations when farmers are educated and provided enough knowledge about the practices and the materials and skills to implement the necessary action using the extension delivery channels that are readily available, and stimulate farmers interest for frequent use. This is because most of the non-adopter were illiterates and lack the necessary information and assistance needed to evaluate the economic and agronomic dimensions of the recommended practice. If the soil conservation extension agencies make farmers aware of the need for the conservation innovation, make available to them valid agronomic and economic information necessary to evaluate the potential consequences of the technology adoption and receive technical assistance in adapting them to their unique soil, managerial and social conditions, they will adopt the recommended technologies and subsequently increases their productivity.

The most important conclusion to be drawn from the findings of this study is that soil conservation research and extension programmes in Ebonyi State can be useful in bringing about mass adoption of the recommended soil conservation practices, consequently productivity increase and sustainability of the production systems when farmers are provided enough knowledge about the practices and the materials to implement the necessary actions, using extension delivery systems that are in consonance with their socio-economic and agronomic circumstance.

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