International Journal of Research in Agriculture and Forestry
Volume 2, Issue 3, March 2015, PP 20-25
ISSN 2394-5907 (Print) & ISSN 2394-5915 (Online)

Socio - Economic Factors Influencing Arable Crop Farmers' Adoption of Environmental Conservation Measures in South Eastern Nigeria

Nwaiwu J.C

Department of Agricultural Economics, Extension and Rural Development,Imo State University Owerri.

ABSTRACT

Environmental degradation has remained one of the most devastating problem in South east Nigeria. This study analyzed socio-economic factors influencing arable crop farmer's adoption of Environmental conservation measures in south eastern Nigeria. Data were collected using semi structured and validated questionnaire from 342 randomly selected arable crop farmers. Data analysis was carried out using both descriptive and inferential statistical tool such as mean scores, tables, percentages and log it multiple regressions. Results show that the majority (70.50%) of the arable crop farmers were females, married (81.29%) had up to secondary education (49.42%) and of average age of 56.80 years. The mean household size was 5.40, while the mean number of years spent in formal school was 9.79 years. Over three-quarter of the people (80.70%) were members of different social organizations, with farming as their major occupation, (62.00%). The logit multiple regressions shows that the value of the R^2 was 0.824 which implies that about 82% of the variation in the adoption of environmental degradation measures was accounted for by the socio-economic variables investigated.

Keywords: Socio-Economic, Farmers, Adoption, Conservation Measures.

INTRODUCTION

Environment is the surrounding or conditions in which a person, animal or plant lives or operates and the settings or conditions in which a particular activity is carried out (Nigerian Environmental Study Action Team (NEST) 2003). Environmental degradation is the deterioration of the environment through depletion of resources such as air, water and soil (Uchegbu, 2002). Environmental degradation is a term used to describe a situation in which part of the natural environment is damaged. Environmental degradation is not a new thing, it has been happening all over the world for centuries. The problem is that it is now happening at a much faster rate, therefore not leaving enough time for the environment to recover and regenerate (Osabuomen and Okoedo-Okojie, 2011). Environmental degradation is a serious threat to the lives of the people, animal and plants.

From creation, the earth was designed with the capacity to sustain man without losing its original qualities. Oditte (1993) opined that the soil naturally replenishes itself when used "properly". Man's activities in his quest to conquer the earth have caused vital damages to this natural balance. There is increasing concerns about "worn out soils" resulting from continuous cropping to feed the over increasing world population. Today, a growing understanding of the ecological damage inflicted by poor land management practices is generating new interests in a sustainable agriculture in which soil nutrient's cycling plays a central role (Foster, 2000).

The socio-economic consequences of soil degradation are enormous. Igbozuruike (1990) attempted itemizing it to include: damage to farm land and farm structures, damage to crops and cultural vegetation, destruction of residential and non residential buildings, damage to electricity and water supply system, damage to recreational centers and transportation structures such as roads, railways, bridges, canals and river ports and markets. It also leads to the death of livestock and humans especially children. Other effects include what he termed "vitation of psychic values" and which manifests in the form of increased uncertainty, fear and general stress among the people.

Soil degradation has further deepened the devastating effect of poverty that is ravaging most rural areas in Imo State. It has also increased the cost and time spent in moving farm produces to nearby

Address for correspondence

juanhyginus04@yahoo.com

markets and consequently contributed in making agriculture unattractive especially to young people. Efforts to network rural communities in south eastern Nigeria and connect them to both urban and rural markets for easy transportation of agricultural produce and inputs are being seriously undermined by soil degradation as most roads have been cut off completely.

Soil degradation seriously affects land resources in many tropical, subtropical and dry land regions of the world, with severe impacts on much of the world population whose livelihood depends on agriculture and land as well as on urban and rural food security. The magnitude of these trends is inducing changes in the global systems and cycles that underpin the functioning of ecosystems and represents major environmental threats. Such changes include lagging and land degradation and extensive use of chemicals. Johnson and Lewi (2007) opined that the process of land degradation include soil and water erosion, soil compaction, decline in soil biodiversity, organic matter and fertility, salinity and other physical and chemical alterations due to poor drainage and misuse of soils.

The government and the Agricultural Development Programmes (ADPs) in collaboration with the research institutes came up with measures that can conserve the environment and create awareness to farmers through the extension agents. Some of the conservation measures include: Construction of pipe drop along water ways to slow down the force of water, use of vertiver grass, zero tillage, conservation fallow, forage growing method, crop rotation and mulching and grassing water ways in situation of gully erosion.

Despite the above measures, the negative effects of environmental degradation seem to increase due to poor or non adoption of measures. Such practices such as continuous cropping, monocropping, over grazing of farm land, bush burning, use of heavy machines and tools to till the land, use of inorganic fertilizer and chemical pesticides and herbicides, etc are still in practice. There is doubt whether farmers are aware of environmental degradation effects of these farming practices employed or perhaps the farmer's socio-economic factors are constraint to adoption of these measures.

MATERIALS AND METHODS

South east agro-ecological ^{o} zone was the study area. This zone lies between latitude $4^{o}20'$ and $7^{o}51'$N and longitude $50^{o}25'$ and $80^{o}51'$E covering a land area of about 109, 524, 59 sq.km (Monanu 1975). It has a population of about 18.92 million or 21.48% of the total population of Nigeria (NPC 2006). It is one of the most thickly populated agricultural zones in Nigeria (Iloka and Anuebunwa, 1995). About 60-70% of the inhabitants are engaged in agriculture, mainly arable crop farming except the Riverine areas such as the Ijaws are mainly fishermen (Unamma *et al*, 1985).

A purposive sampling technique was adopted to select three states (Abia, Anambra and Imo) in the zone. These are arable crop producing states with its large expanse of land prone to soil erosion. One hundred and twenty (120) arable crop farmers were randomly selected from each state giving a sample size of 360 but only 342 questionnaires were properly filled and retrieved. Primary data was collected through the use of structured questionnaire administered to the respondents. Data were analysed using percentages and means. Socio-economic variables influencing farmers' adoption was determined using logit regression. This is implicitly stated as:

$Y= f(x_{1,}x_{2,}x_{3,}x_{4},x_{5},x_{6},x_{7},x_{8},x_{9},x_{10}\, e)$

Where

Y= Index of perceived use of the adopted conservation measures

X_1= Age (years)

X_2= Household size (number of persons under one roof and feeding from the same pot)

X_3= Educational level (years spent in school)

X_4= Major occupation (Dummy, farmer = 1, non-farming = 0)

X_5= Membership of cooperative

X_6= Farming experience (years)

X_7= Farm size (hectares)

X_8= Extension contact (number of monthly visits)

X_9= Gender (Dummy, male = 1, female = 0)

X_{10}= Marital status (Dummy, married = 1, single = 0)

e= error term

RESULTS AND DISCUSSION

Sex, Age, Marital Status and Household Size of Respondents

Results in Table 1 contain the sex, age, marital status and household size of the respondents. It shows that 241 (70.5%) out of the 342 respondents were females while 101 (29.5%) were male. The dominance of female in this study could stem from the fact that arable crops are mostly produced by women who also carry out most of the farm activities like bush cutting, cultivation, planting and weeding. This is in line with the finding of other researchers on socio-economic characteristics in the study area Nwaru (2004) and Iweke (1987) who opined that women are responsible for most of the arable crop production in their study areas.

The table also reveals that the majority of the respondents (35.38%) were within the age range of 53-62 years while the minority (9.94%) was within the age range of 73-82 years. The minimum age was 33 years; the maximum age was 82 years, while the mean age was 56.80 years. This shows that the respondents comprised mainly of the elderly farmers in the sampled communities and therefore should adopt innovations.

Over three-quarter (81.29%) of the respondents are married while 1.75%, 11.40% and 5.56% were single, widowed and divorced respectively.

The mean house hold size of the respondents was 5 persons. This indicates that households in the south eastern Nigeria maintained a moderate household size. The result is slightly higher than the National Bureau of Statistics (NBS) (2010), which puts average household size of southern Nigeria at 4 persons. However, the implication of maintaining a moderate household size in the study area is that it is likely to help in reducing pressure and the already overstressed land of the area, since population pressure is one of the driving forces of environmental degradation.

Table1. *Distribution of respondents according to sex, age, marital status and household size*

	Characteristics	**Frequency**	**Percentage**
Sex:	Female	241	70.5
	Male	101	29.5
	Total	**342**	**100.00**
Age:	33 – 42	37	10.52
	43 – 52	84	24.56
	53 – 62	121	35.38
	63 – 72	66	19.30
	73 – 82	34	9.94
	Total	**342**	**100.00**
Marital Status:	Married	278	81.29
	Single	6	1.75
	Widowed	39	11.40
	Divorced	19	5.56
	Total	**342**	**100.00**
Household Size:	2 – 5	196	57.31
	6 – 9	135	39.47
	10 – 13	11	3.22
	Total	**342**	**100.00**

Mean Household Size (X) = 5.40

Source: *Field Survey, 2014.*

Educational Level, Major Occupation and Membership of Social Organization of Respondents

Table 2 shows the result of the educational level, major occupation and membership of social organization of the respondent farmers.

The educational levels of the respondents were determined using the number of years spent in formal school. The result shows that 39 (11.40%) of the respondents had no formal education while 79

(23.10%) and 169 (49.42%) spent between 1 – 6 years and 7 – 12 years in the school respectively. The table also shows that 55 (16.08%) of the respondents spent 13 years and above in school. The mean number of years spent in school by the respondents was 9.79 years. It therefore means that an average arable crop farmer in South Eastern Nigeria is literate.

This implies that the respondents were likely to adopt innovations in degradation measures, all things being equal, considering that education is an important factor influencing adoption of innovation (Abalu and Igwe, 2005, Asiabaka, 2002 and Ike, 2008).

Table 2 also shows that more than half (62.00%) of the respondents had farming as their major occupation, while 38.00 percent were involved in diverse non farming activities as their major occupation in addition to farming. However, the number of respondents engaged in non farming as their major occupation is quite high indicating a shift from all farming (agrarian) occupation as in the past. Bryceson (2000) reported that most countries in Africa are undergoing a process of "deagrarianisation" which he defined as long term process of occupational adjustment, income earning reorientation, social identification and spatial relocation of rural dwellers away from strictly agricultural based modes of livelihood. It could also be inferred that some of the people in the area resorted to non-farm occupation in addition to farming due to the devastating effect of environmental degradations in their farm lands.

As regards belonging to social organizations, the table shows that over three-quarter (80.70%) of respondents belonged to social organizations while less than one-fifth (19.30%) did not belong to any social organization. The result shows that the majority of the respondents were members of social organizations. The implication is that information regarding environmental degradation and its management can easily be diffused to the people using the various organizations existing in the communities.

Table2. *Distribution of respondents according to educational level, major occupation and membership of social organizations (N= 342)*

Characteristics	Frequency	Percentage	Mean ($\bar{x}$)
Years spent in school			
0	39	11.40	
1-6	79	23.10	
7-12	169	49.42	9.79
13 and above	55	16.08	
Major occupation			
Farming	212	62.00	
Non farming	130	38.00	
Membership of social organization			
Member	276	80.70	
Non member	66	19.30	

Source: *Field survey; 2014*

Farming Experience, Farm Size and Number of Extension Contacts of the Respondent Farmers

Results in Table 3 contain the farming experience, farm size and number of extension contact of the respondent farmers.

On the average, the respondents had 22 years of farming experience. This indicates that majority of the respondents had long time farming experience and could have over the year experience the change in the farm productivity as a result of devastating effects of environmental degradation. Based on that, they must have acquired wealth of knowledge and effective adaptation measures for cushioning the effects of environmental degradation as well as identified obstacles militating against effective adaptation measures.

The table also shows that majority of the respondents have a farm size of less than 1 hectare while 22.5% had between 1-2 hectares, 1.4% had 3-4 hectares and 1.2% had above 4 hectares. The implication of higher percentage of respondents having access to less than one hectare of land for farming shows the increasing pressure on land as a result of urbanization as more people depend on fewer portion of land for farming. It was also observed that land in the study area was being used for other activities like building of commercial residential houses, markets, etc. The pressure on land use

could add to deforestation which is one of the types of environmental degradation, and thus encourage adoption of degradation control measures.

Based on number of extension contact as indicated by the table: On the average, extension agents visited the farmers two times in a month. The two times visit in a month certified the condition for a farmer to adopt innovations.

According to Ike (2005) and Abalu and Igwe (2005), an extension farmer should visit the farmer regularly or forth nightly to know his problems on the innovations transferred and other farm activities so as to help him find solution to them.

Table3. *Distribution of respondents based on farming experience, farm size and number of monthly contact with extension agent (N= 342)*

Characteristics	Frequency	Percentage (%)	Mean(x) $\bar{}$
Farming Experience:(yrs)			
1-10	18	5.3	
11-20	169	49.4	
21-30	123	35.9	22yrs
Farm size: (hectares)			
< 1	256	74.9	
1-2	77	22.5	
3-4	5	1.4	
5-6	4	1.2	
Extension Contact			
0	30	8.8	
1	187	54.7	
2	120	35.1	(2) twice
3	5	1.4	

Source: *Field Survey, 2014*

Estimated Logit Regression Model Relating Socio-Economic Variables to Adoption of Degradation Reduction Measures

The Result in table 4 shows that the logit regression analysis provided the best fit in terms of conformity with a priori expectations. The value of R^2 was 0.824 which implies that about 82% of the variation in adoption of environmental degradation measures was accounted for by the joint action of socio-economic variables (independent variables) investigated in the study. Seven explanatory variables, age (0.047), household size (2.116), level of education (0.038), farming experience (2.00), farm size (4.297), extension contact (0.215) and marital status (0.444) were positively related to adoption of conservation measures implying that these variables were important factors influencing the farmers' adoption of environmental conservation measures.

Table4. *Estimated Logit Regression Model Relating Some Socio-Economic Variables to Adoption of Degradation Reduction Measures*

Variable	Coefficient	S.E	Wald	Antilog
Constant	-1.497	1.141	1.720	
Age (x_1)	0.047	0.013	12.818**	1.048
Household size (x_2)	2.116	0.058	4.076**	8.29
Education (x_3)	0.038	0.031	1.501	1.038
Major Occupation(x_4)	-0.872	0.293	8.860**	1.0378
Membership of Cooperative (x_5)	-1.456	0.592	6.045**	4.28
Farming Experience (x_6)	2.00	0.020	2.801**	7.38
Farm size (x_7)	4.297	0.286	5.079**	73.47
Extension Contact (x_8)	0.215	0.207	1.080	1.25
Gender (x_9)	-0.194	0.128	2.301*	1.21
Marital status (x_{10})	0.444	0.436	1.038	1.55
Cox & Snell (R_2)	0.824			
LR	88.53**			

Source: Computed from Field Survey data, 2014

The Cox and Snell R^2 was 0.84 indicating that up to 82% variation in adoption were jointly explained by the set of explanatory variables of the model. The likelihood ratio (LR) was significant at 1% showing the overall significance of the model. Age, household size, major occupation, membership of cooperative, farm size and gender were statistically significant showing their major influence.

The interpretation makes more meaning if it is done in terms of odds which are obtained by taking antilog of the various slope coefficients. For example, an increase in household size tends to increase the tendency to adopt the conservation measures more than 8 times, while change in membership of cooperative may reduce adoption tendency by more than 4 times. Increase in farm size shows higher intent to adopt the conservation measures as it was increased.

CONCLUSION AND RECOMMENDATIONS

Socio-economic factors of the farmers contributed immensely to the adoption of soil conservation measures. The coefficient of educational level is 0.038 implying that each additional year of schooling increased the number of dependents and motivate them to adopt conservation measures.

Conclusively, age, household size, major occupation, membership of cooperative, farm size and gender were statistically significant showing their major in influence.

The study recommends that education of arable crop farmers should be encouraged as education enhances access to a number of economic activities and enables the farmers to understand and adopt conservation measures and also extension agents should intensify their visits to farmers

REFERENCES

[1] Abalu, G.O and B.A Igwe (2005) "*Improved Agricultural Technologies of the Small Scale Nigerian Farmers"* proceedings of the National Farming Systems Research Workshop held in Jos, Plateau Nigeria, May 10th-13th. A publication of the Nigerian National Farming System Research.

[2] Asiabaka,C.C (2002).*Determinant of Adoptive Behaviours in Rural Farmers in Nigeria*.A proceeding of the 18th Annual Conference AIAEE, Durban, South Africa.

[3] Bryceson, D (2000) *Rural Africa at the Cross roads, Livelihood practices and policies,Natural Resources Perspective*, Overseas Development Institute (ODI), No 52, AprilIke,P.C (2008),''Agricultural Technology Adoption and Environmental Degradation Among Rural Small Scale Farmers in Enugu State Nigeria". In: E.A Aiyedun, P.O. Idisi and J.N. Nmadu. *Agricultural Technology and Nigeria's Economic Development Proceedings of the 10th Annual National Conference of the National Association of Agricultural Economist.* University of Abuja, 7th-10th October 2008, pp 83-93

[4] Illoka A.W and F.O Anuebunwa (1995). Appraisal study of the Agricultural Extension System of Nigeria, South East Agro-ecological Zone of Nigeria Unpublished Manuscript.

[5] Johnson D.L and Lewis (2007). Land Degradation: Creation and Destruction, 2nd Edition, Rowman and Little Field, Lanham Boulder Newyork Toronto Oxford.

[6] Monanu P.C (1975). "Geographical Boundaries of Nigeria". University of Ife Press. Vol 1, No.2, P..3.

[7] National Bureau of Statistics (NBS) (2007). Provisional of States and Local Government Totals of the 2006 Population Census of the Federal Republic of Nigeria. *www.nigerianstat.gov.ng*

[8] National Population Commission (NPC) (2006). Provisional Census Figures, Abuja, Nigeria.

[9] Nigerian Environmental Study Action Team (2003). Nigeria Threatened Environment, A Next Publication, Ibadan.

[10] Odiette, W.O (1993). "Environmental Impact Assessment for Sustainable Development" Environmental News Oct-Dec.

[11] Osabueme, J.I and D.U Okogie (2011). Analysis of the Effect of Arable Crop Production Practices among Farmers on Environmental Degradation in Edo State Nigeria. Archives of Applied Science Research 3(2)353-360.

[12] Uchegbu S.N (2002). Environmental Management and Protection. Precision Printers and Publishers, Nigeria.

[13] Unamma R.P.A, S.O. Odurukwe, H.E Okere and O.O Okoli, (1985). *Farming Systems in Nigeria.* Report of Benchmark Survey of the Farming Systems of South East Agricultural Zone of Nigeria.