NIGERIAN AGRICULTURAL JOURNAL
ISSN: 0300-368X
Volume 54 Number 1, April 2023 Pg. 315-322
Available online at: http://www.ajol.info/index.php/naj
https://www.naj.asn.org.ng

Training Needs of Farmers in Soil Erosion Control in Anambra South Senatorial Zone, Nigeria

Enwelu, I. A. and Okeke, H. C.

Department of Agricultural Economics and Extension,
Nnamdi Azikiwe University, Awka, Anambra State, Nigeria
*Corresponding Author's email: ia.enwelu@unizik.edu.ng

Abstract
The study examined the training needs of farmers in soil erosion control in the Anambra South Senatorial zone. The study used a structured interview schedule to collect data from a cross-section of 100 respondents. Data were analyzed using a combination of analytical tools such as descriptive and inferential statistics. The findings of the study revealed that the majority (51.0%) of the farmers were males and married (64.0%). Only 32.0% of the farmers attended secondary school. The farmers had an average of 3 extension contacts annually and their mean monthly income from all sources was ₦40,349.79. The study revealed major existing methods of erosion control such as channeling/drainage($\bar{x}$ = 3.08) and mulching ($\bar{x}$ = 3.00). Seventy-six per cent of the farmers had not been trained in erosion control while 52.0% of those trained were through seminars. The farmers desired to be trained in terracing (75%) and cover cropping (72%). The perceived effects of soil erosion on agricultural production were a reduction in land for agricultural activities ($\bar{x}$ = 3.06), removal of topsoil ($\bar{x}$ = 2.96) and reduction in farmer's income ($\bar{x}$ = 2.71). The constraints to farmers in soil erosion control were: poor educational background ($\bar{x}$ = 3.07), neglect of extension methods ($\bar{x}$ = 3.01) and poor information system ($\bar{x}$ = 2.99). The study recommended that extension agents should be recruited, and trained to educate the farmers on ways of soil erosion control.

Keywords: training needs, farmers, soil erosion, control

Introduction

Soil is essential for all living things as it provides nutrients for the growth of crops that most animals directly or indirectly depend on for existence (International Year of Soils, 2015). Soil is the natural body of loose unconsolidated materials which constitute a layer several meters deep on the earth's surface (Onu and Mohammed, 2014). For soil to continue meeting the demand of crops for nutrient availability, it has to be protected and conserved from such menace as erosion (Onu and Mohammed, 2014). Soil erosion is the wearing away of the land surface by water, wind, ice or other geological agents. It is a natural or anthropogenic process by which rock and soil are broken loose from the earth's surface at one location and moved to another (Osinem, 2015). It is observed in the tropics as the washing away of the rich topsoil by such agents as wind or water so that the sub-soil which cannot productively support plant growth is exposed (Osinem, 2015). According to Soludo (2022), soil erosion remains one of the greatest threats to the survival of the good people of Anambra State. A lot of capital has been invested in the control of the menace; the use of engineering method remains one of the main methods in erosion control in Anambra State but it has not completely taken care of the issue of erosion in the state. The occurrence of soil erosion is rampant in the farming lands with limited efforts being exhibited by the farmers to curtail the menace. This implies that farmers need improvement in existing skills or practices to ensure better performance.

According to Okoroafor, Akinbile and Adeyamo (2017), soil erosion is influenced by certain factors such as the amount, distribution and intensity of rainfall, topography of the land, the face of the prevailing wind, soil physical condition and characteristics with respect to texture and structure, type of crop grown and other bio-social activities. However, these factors can be controlled. Soil erosion control is the act of restraining the various forms of wind, water and mining from having a threatening effect on cultivated soil (Obi and Okekeogbu, 2017). Some identified mechanical field practices to help control erosion include contour bonds, terracing and construction of channels and tunnels because these practices control the movement of water and wind over the soil surface (Nwobodo *et al*., 2018). On the other hand, cultural measures such as mulching, cover cropping, strip cropping and contour farming are

less expensive and deal directly with reducing raindrop impact, increasing infiltration, reducing runoff volume and decreasing wind and water velocity can easily fit such practices into the existing farming system (Morgan 2005). Also, at competent levels, the farmers can ensure effective utilization of these practices for soil erosion prevention and control on their farm and their environment. According to Olaitan, Asogwa and Abu (2011), being competent means that the individual has acquired the knowledge and skills necessary to perform successfully at a specific proficiency level in the given task. One way to acquire this knowledge is through training.

The importance of identifying training needs lies in the fact that it is considered fundamental on which the rest of the stages of the training process stand. But it is difficult to designate the persons to be covered by training objectives, programme content and the relevant method without precise and objective training needs (Kessy, 2014). The exact training needs are crucial for the level of expected results since they are largely controlling other subsequent events. More so, it is counter-productive to offer training to individuals who do not need it or to offer the wrong kind of training (HR Guide, 2012). According to Iwuchukwu, Udoye and Onwubuya (2013), successful training needs analysis identifies those who need training and what kind of training is needed thereby putting training resources to good use and enhancing productivity.

Considering the menace of erosion in the Anambra South senatorial zone, the study examined the training needs of farmers in soil erosion control in the Anambra South senatorial zone. Specifically, the study ascertained the presence of soil erosion and if the sample farmers were really affected by it

Hypotheses of the Study

H_{0i}: There is no significant relationship between the socioeconomic characteristics of farmers and their training needs for soil erosion control

H_{0ii}: There is no significant relationship between the socioeconomic characteristics of farmers and existing methods of soil erosion control in the study area

Methodology

This study was carried out in the Anambra South senatorial zone of Anambra State, Nigeria. Anambra South senatorial zone comprises Nnewi North, Nnewi South, Ekwusigo, Ihiala, Orumba North, Orumba South and Aguata Local Government Areas. The major occupation of the populace in the study area is farming. They are engaged in crop production such as rice, cassava, vegetables, maize, oil palm etc as well as animal production like poultry farming. Other occupations include trading, civil service and artisan/ craftsmanship. The population of the study was all farmers affected by soil erosion control in the communities. A multistage sampling procedure was employed in selecting respondents for the study in each of the selected communities within the senatorial zone. In stage 1, two LGAs were purposively selected from Anambra South senatorial zone and they included Orumba North LGA and Aguata LGA. They were selected based on their perceived effects of soil erosion. Two town communities were randomly selected from the list of towns in each selected LGA in stage 2 to give a total of four town communities. In stage 3, a list of 40 farmers was compiled in each town community (made up of villages/clans) and from the list, 25 farmers were randomly selected to give a total of 100 respondents. Data for the study was collected from both primary sources and also secondary sources (such as books, journals, maps and reports, magazines, bulletins and internet). Primary data were collected with the aid of a structured interview schedule. The instrument and tools for data collection were systematically designed in a way that would enable an adequate understanding of the purpose and objective of the study. The researcher did all necessary corrections and modifications. Also, copies of questionnaire were sent to external bodies for more scrutiny and approval. Socio-economic characteristics of respondents such as sex (male or female), marital status (single, married, divorced, and widowed), education status (formal education, primary education, secondary education and tertiary) household size (number of persons living in their household and eating from the same pot), farming experience (number of years) and monthly income (Naira or Dollar) were measured accordingly. In cooperative membership, respondents were asked to indicate if they were members of any cooperative society or not while in extension contact the respondents were asked to indicate how often they have been visited by an extension agent per annum. Also, a list of possible existing methods of erosion control was highlighted and farmers were asked to tick the effectiveness of these methods. It was measured on a four-point Likert type scale of Highly effective (4), Effective (3), Moderately effective (2), and Not effective (1). The values were summed up to 10 and divided by 4 to give a mean score of 2.5. Variables with mean scores of 2.5 and above were regarded as effective while variables below 2.5 were regarded as not effective. The training need of farmers was ascertained by asking respondents to identify the ones they were familiar with and those they needed more training on from the list provided. Perceived effects of erosion on agricultural production were achieved by listing the possible effects of erosion on agricultural production and respondents were asked to tick these effects on a four-point Likert scale of Very high effect (4), High effect (3), Moderate effect (2), Low effect (1). Constraints to respondents engaged in erosion control were achieved by highlighting some possible constraints to erosion control and asking them to rate the extent of these constraints on a four-point Likert type scale of: very great extent (4), great extent (3), an extent (2), and little extent (1).

Logit Model

The logit equation (Greene, 2003) is written thus:

$$P_r(Y = 1) = \frac{e^{\beta x}}{1+e^{\beta x}} \ldots\ldots.(1)$$

With the cumulative distribution function given by

$$F(\beta x) = \frac{1}{1+e^{\beta x}} \ldots\ldots (2)$$

Where β represents the vector of parameters associated with the factor x.

Assuming the probability that farmer n will opt for need training (TN)) or not (NTN) is equal to the proportion of farmers using that technology in controlling erosion, then the individual empirical models to be estimated may be specified as:

$$TN = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots\ldots \beta_n X_n + \varepsilon_i \ldots\ldots (3)$$
$$NTN = \gamma_0 + \gamma_1 X_1 + \gamma_2 X_2 + \ldots\ldots\ldots\ldots \gamma_n X_n + \varepsilon_i \ldots\ldots (4)$$

Where;

TN = need training, NTN = need no training, β and y are vectors of respective parameters to be estimated,

X_i = vectors of explanatory variables,

e = error term

Explanatory Variables include**:**

X_1 = Sex (dummy variable; female=0, male=1)

X_2 = Marital status (dummy variable; single=1, married=0)

X_3 = Level of education (years)

X_4 = Household size of farmer

X_5 = Farming experience (years)

X_6 = Income (N)

Multinomial Regression

The multinomial logistic regression adopted from EL-Habil (2012) is defined as:

$$Log\left[\frac{\pi_j(X_i)}{\pi_i(X_i)}\right] = \alpha_{oi} + \beta_{1j}X_{1i} + \beta_{2j}X_{2i} + \cdots \beta_{pj}X_{pi} \ldots\ldots (5)$$

Where $j = 1, 2, \ldots (k-1)$, i = 1, 2, …, n

Where all the $\pi's$ adds to unity, then the reduced model is:

$$Log(\pi_j(X_i) = \frac{exp^{\alpha_{oi}+\beta_{1j}X_{1i}+\beta_{2j}X_{2i}+\cdots\beta_{pj}X_{pi}}}{\sum_{j=1}^{k-1} exp^{\alpha_{oi}+\beta_{1j}X_{1i}+\beta_{2j}X_{2i}+\cdots\beta_{pj}X_{pi}}} \ldots\ldots (6)$$

Where π is the response categories or existing methods of soil erosion control, $X_i$are the vector(s) of explanatory variables (gender, marital status, level of education, household size, experience and income), β_j is the parameter to be estimated which uses the maximum likelihood estimate method (Chatterjee and Hadi (2006). Multinomial logistic regression uses a baseline category and the predicted probability of estimate is defined as:

$$\pi_j = \frac{e^{\alpha_j+\beta_j Y}}{\sum_h e^{\alpha_h+\beta_h Y}} \ldots\ldots (7)$$

The first or last endogenous products are often used as the baseline sample, and the probability of each socioeconomic and demographic characteristic are predicted from the:

$$\widehat{\pi_1} = \frac{exp(y_i)}{1+\sum exp(y_i)} \ldots\ldots (8)$$

Where y_i is the predicted response from the multinomial coefficient. The multinomial logistic regression model is simply defined as:

$$Log(\pi_i(X_i)) = \alpha_{oi} + \alpha_{1j}X_{1i} + \alpha_{2j}X_{2i} + \cdots \alpha_{pj}X_{pi} \ldots\ldots (9)$$

Where: π is the response categories or level of mitigation strategies adopted by broiler farmers

α_i = parameter to be estimated

X_i = vectors of socioeconomics characteristics

The explanatory variables are as specified earlier

Results and Discussion

Socioeconomic characteristics of farmers

The results in Table 1 show that the majority (51.0%) of the farmers interviewed were males while the remaining 49.0% were females. This implies that male farmers dominated the study. This is in line with the findings of Abegunde *et al*. (2006) which revealed that most (89.25%) of the compound heads in the area were males. The majority (64.0%) of the farmers were married while others were widowed(er) (19.0%), single (10.0%) and divorced/separated (7.0%). This implies that married farmers dominated the study. A greater proportion (32.0%) of the farmers attended secondary school while other farmers had adult education (28.0%), primary education (21.0%), informal education (16.0%) and tertiary education (3.0%). The respondents were fairly literate to understand some basic erosion control practices that will be disseminated to them. The average household size for the respondents was 6 people. This household size is large enough to supply cheap family labour for soil erosion control. Majority (60.0%) of the farmers were involved in petty trading while others were involved in artisanship (30.9%) and transportation (9.1%). The need for the farmers to diversify to other economic activities cannot be overemphasized in this economic hardship. In Table 1, 47% of the farmers belonged to cooperative societies. Belonging to a formidable cooperative society helps to strengthen the farmers' knowledge of soil erosion control practices. On average, the mean experience was 11 years. The implication is that they had enough experience to master erosion control measures in the area. The average monthly income from all sources for the farmers was ₦40, 0349.79. The monthly income of the respondents was above the ₦30,000 minimum wage recommended in Nigeria. Fifty % of the farmers had less than 2 contacts with the extension workers in one year, 44.0% had 2 – 5 contacts and 3.0% had 6 – 10 contacts. The average number of contact was 3 times per annum which means that extension contact was not adequate considering the seriousness of soil erosion in the study area.

Effectiveness of existing methods of soil erosion control by farmers

Results in Table 2 reveal effective existing methods of soil erosion control by farmers namely: Channelling\ drainage ($\bar{x}$ = 3.08); Mulching ($\bar{x}$ = 3.00) and Contour making ($\bar{x}$ = 2.57). This finding is similar to the findings of Nwobodo *et al*. (2018) that channelling and mulching were effective in erosion control. On the other hand, farmers perceived the following existing methods of erosion control as not effective: mixed cropping ($\bar{x}$ =

1.86); Terracing ($\bar{x}$ = 1.87) and Cover cropping ($\bar{x}$ = 2.29). On average ($\bar{x}$ = 2.45), farmers perceived the existing methods as not effective. The implication is that the existing methods of erosion control by farmers in the Anambra South senatorial zone were not effective enough to tackle the erosion menace in the zone. Therefore, farmers need improvement in their existing methods and new knowledge on soil erosion control. This is in line with the study of Onu and Mohammed (2014) which alludes that farmers needed improvement in some cultural practices namely mulching, cover cropping, strip cropping, contour farming, terracing and channelling for success in soil erosion prevention and control. The standard deviation of farmers on cluster mean was 1.00. The standard deviations for these variables were high (above 0.5) enough to show variability in the respondents' decision-making process.

Training needs of farmers

Results in Table 3 show that 76% of farmers had not been trained on any erosion control methods while only 24% had been trained. These findings imply that most farmers may not be aware of the various methods of soil erosion control in the area and also may not know how to use the available ones. Furthermore, 52% of farmers trained received the training through seminars while 35% received theirs through workshops. Among the farmers, the major areas of training needs identified were: terracing (75%), cover cropping (72%), water catchment (68%), following (58%) and mixed farming (50%). Fewer proportion of farmers identified the following areas of training needs: mixed cropping (47%), tree planting (40%), crop rotation (34%), cultural practices (30%), channelling (20%), contour making (20%) and mulching (14%). The major areas of training needs in which the farmers show much concern may be those they are unfamiliar with and therefore need to be trained on these practices to be able to tackle soil erosion menace in the area. On the other hand, areas they show less concern may be those they are already familiar with and yet lack a better understanding or are even ignorant of. Therefore, farmers are required to be trained on major areas of their training needs and other areas they may be familiar with but still requires improvement to get the required results. This concurs with the study of Khan *et al*. (2011) which alludes that differences in skills and knowledge necessitate training needs for erosion control. Saleh *et al*. (2015) equally support that training will help to equip them to carry out the task ahead arising from a change in the environment.

Perceived Effects of soil erosion on agricultural production

Entries in Table 4 show that farmers perceived high effects of erosion on agricultural production in the following areas: reduction in land mass for agricultural activities ($\bar{x}$ = 3.06), removal of topsoil ($\bar{x}$ = 2.96), reduction of farmers' income ($\bar{x}$ = .51). The implication of this is that soil erosion is severe in all communities and has affected the farmers to a great extent. Therefore, preventive measures need to be put in place to enable farmers to adapt to the situation. The standard deviation on cluster mean is 0.88, enough to show variability in the respondent's decision-making process.

Constraints to farmers engaged in soil erosion control activities

Data in Table 5 show constraints that had affected farmers engaged in soil erosion control activities to a great extent as follows: Poor educational background ($\bar{x}$ = 3.07), Neglect of extension methods in erosion control ($\bar{x}$ = 3.01), Poor information system ($\bar{x}$ = 2.99) and Poor extension agent – farmers ratio ($\bar{x}$ = 2.52). It is interesting to note that farmers did not see inadequate funding of extension services and lack of incentives as constraints in erosion control; this may be a result of observed efforts made by governments in combating the menace. On the other hand, they may not know what the extension workers require to carry out their duties. However, the cluster mean ($\bar{x}$ = 2.67) indicates that farmers are constrained to a great extent. The standard deviation (0.91) on the cluster mean is enough to show variability in the respondents' decision-making process.

Logit regression estimates of the effect of selected socio-economic factors on training needs for soil erosion control among farmers in the study area

Logit regression analysis was used to model the effect of socio-economic relationship of the farmers on their training needs as presented in Table 6. The likelihood ratio chi-square of -99.42 with a p-value of 0.000 reveals that the model as a whole is statistically significant. Results in Table 6 reveal that the coefficient of the level of education was positive and significant at a 10% level of significance. This implies that with a 10% increase in the level of education of farmers, there is a likelihood of an increase in hunger for training in erosion control by 4.7 %. On the other hand, the coefficient of household size (-0.301) was negatively significant at a 1% level of significance which implies that with a marginal increase in the number of household members there is likelihood that there will reduce farmers' training needs by 30.1%. Sex (-0.3840) was negatively significant at a 1% level of significance which implies that being male has the likelihood that there will reduce farmers' training needs by 38.4%, likewise being married has the likelihood that there will be reducing farmers' training needs by 4.6%. Income was positive and significant at a 5% level of significance. This implies that with a 5% increase in the farmer's income there is the likelihood of an increase in the hunger for training needs in erosion control by 9.6%.

***Multinomial logit (MNL) regression analysis of farmers' socioeconomic characteristics and* existing methods of soil erosion control**

Multinomial logit regression analysis was used to examine the significant relationship between the socioeconomic characteristics of the farmers and existing methods of erosion control as presented in Table 7. MNL was estimated by normalizing one category (base category). The parameter estimates gave the direction of the effect of the independent variables on the dependent variables. Thus, the marginal effects of the MNL, which measure the expected change to a unit

change in an independent variable, are reported. The diagnostic statistics showed the Likelihood ratio =25.55, LRChi2 = 164.82 and the Probability >Chi=0.0000 this implies that the model as a whole significantly and jointly predicted the significant relationship between the socioeconomic characteristics of the farmers and existing methods of erosion control. The results in the table show Sex was significant at a 10% level of significance while marital status (0.722) was significant at a 1% level of significance. This implies that a 1% increase in the number of married farmers will increase the marginal effect of existing erosion control methods by 72.2%. This complies with LETA and MEGERSA, (2021). On the other hand, the coefficient of sex (-0.819) was negative and significant at a 10% level of significance which implies that an increase in the number of female farmers will reduce the marginal effect of existing erosion control methods by 81.9%. This may be because information may be coming to the male promptly. The level of education (0.352) was significant at a 5% level of significance, implying that an increase in farmers' level of education will increase the marginal effect of existing erosion control methods by 35.2%.

Conclusion

The study revealed effective existing methods of erosion control by farmers e.g. channelling/drainage and mulching and non-effective ones such as mixed cropping and terracing. The training needs identified included terracing and cover cropping. Seminars and workshops were the main methods used in training the farmers. Farmers perceived high effects of soil erosion on agricultural production in terms of reduction in land mass for agricultural activities as well as removal of topsoil and reduction in farmers' income. Major constraints to farmers engaged in soil erosion control were poor education background and neglect of existing traditional methods in soil erosion control. The study also found that level of education, farming experience and income were socio-economic characteristics that had a positive relationship with the training needs of farmers for erosion control. It also revealed that extension contacts were not adequate in the study area. The study made the following recommendations: proactive involvement of extension agency in soil erosion control in Anambra State; identified training needs for erosion control by farmers should be followed up with robust training programme; and existing traditional methods of soil erosion control should not be neglected.

References

Abegunde, A. A., Samson, A., Adeyinka, P., Olawuni , O. and Olufunmilayo, A. O. (2006). An assessment of the socio-economic impacts of soil erosion in south-eastern Nigeria. *Shaping the Change* XXIII FIG Congress Munich, Germany, October 8-13.

Chatterjee, S. and Hadi, A. (2006). Regression Analysis by Example. John Wiley & Sons.

EL-Habil, A. (2012). An Application on Multinomial Logistic Regression Model. *Pak. J. Stat. Oper. Res.,* 8(2); 271-291.

Greene, W. H. (2003). *Econometric Analysis*, 5th ed. New Jersey: Prentice Hall.

HR-Guide (2012). Needs Analysis: how to determine training needs. Copyright 2012, LLC. http://www.southbound. Com. my/accessed 9/3/08.

International Year of Soils (2015). Food and Agriculture Organization of the United Nations. Viale delle Terme di Caracalla 00153, Rome, Italy (soils.2015@fao.org)

Iwuchukwu, J. C., Udoye, C. E. and Onwubuya, E. A (2013). Training needs of pineapple farmers in Enugu State, Nigeria. *Journal of Agricultural Extension,* 17(1):89-99.

Kessy, J.F. (2014). Analysis of staffing and training needs for effective delivery of extension services in suitable land management in Kilimanjaro rejoin*; Tanzania open J. Soil Sci.,* 4:459-468

Khan, M. Z. Z. U., Haq, N.U., Khan, U. P. and Khan, M.A. (2011). Training needs for agricultural extension agents in Khyber. Pakhutunkwa, *Sarhad J. Agric,* 27(1):133-137.

Leta, A. and Megersa, T. (2021). Influencing Soil Erosion Management Practices in Ejersa Lafo District, West Showa Zone, Oromia, Regional State, *Ethiopia J. Appl. Sci. Environ.,* 25 (1): 79-85.

Morgan, R. P. C. (2005) Soil erosion and Conservation. Longman Scientific and Technical *Quarterly Journal of Engineering Geology and Hydrogeology*, 38(4): 402. http://doi.org/10.1144/1470-9236/04-112

Nwobodo, C. E., Otunwa, S., Ohagwu, V.A. and Enibe, D. O. (2018). Farmers' use of erosion control measures in Anambra State. *Journal of Agricultural Extension,* 22:3.

Obi, N. I. and Okekeogbu C.J. (2017). Erosion problems and their impact in Anambra State of Nigeria (a case of Nanka Community). *International Journal of Environment and pollution Research*, 5(1):24-37.

Okoroafor, O. O., Akinbile, C. O. and Adeyomo, A. O. N. (2017) . Soil erosion in southeastern Nigeria, Scientific Research *Journal of Environmental Studies,* 5: 30-37.

Onu, F. M. and Mohammed (2014). Competence improvement needs for farmers in soil prevention and control for enhancing crop production. Case study of Kogi State, Nigeria. *Journal of Agricultural science,* 5(1):6.

Olaitan, S.O., Asogwa, V.C. and Abu, M. (2011). Technology Competency Training Modules Required by Secondary School Graduates in E-Waste Management in Agribusiness. A paper presented at the Institute of Education University of Nigeria, Nsukka. https//www.scirp.org/(s(351jmbntvnsjt1aadkposzje))/reference/Referencespapers.aspx.referenceID-1287170

Osinem E.C. (2015). Environmental education in agriculture. Cheston Agency LTD, Enugu.

American Journal of Industrial and Business Management, 5:9.

Saleh, J., Norsida, M., Ahmed, H.L. and Majeed, H. (2015). A Review: Training requirement of agriculture extension officers in the Iraq. *Asian Journal of Applied Sciences*, 9(2):34-40.

Soludo, C. C. (2022). The SUN Newspaper (Voice of the Nation) 2nd October. (sunonline.editor @gmail.com).

Table 1: Socioeconomic characteristics of the respondents

Socio-economic variable	Percentage (%)	Mean ($\bar{x}$)
Sex:		
Male	51.0	
Female	49.0	
Marital status:		
Single	10.0	
Married	64.0	
Divorced/separated	7.0	
Widowed (er)	19.0	
Level of education:		
Informal	16.0	
Adult	28.0	
Primary	21.0	
Secondary	32.0	
Tertiary	3.0	
Household size (Persons):		
< 4	28.0	
4-6	44.0	6
7-9	19.0	
Above 9	9.0	
Secondary occupation:		
Artisan	30.9	
Petty trading	60.0	
Transportation	9.0	
Cooperative membership	47.0	
Farming experience (years):		
< 6	17.0	
6-10	26.0	11
11-15	23.0	
>15	34.0	
Monthly income (₦):		
< 30,000	54.0	
30,000- 59,999	36.0	40,349.79
60,000-89,999	7.0	
90,000 and above	3.0	
Extension contact per annum:		
< 2 times	50	
2-5 times	44	3
6-10 times	3	

Table 2: Effectiveness of existing methods of soil erosion control by farmers

Erosion control methods	Mean($\bar{x}$)	Standard deviation
Channelling/drainage	3.08	0.83
Mulching	3.00	0.82
Contour making	2.57	1.12
Cover cropping	2.29	1.07
Terracing	1.87	1.07
Mixed cropping	1.86	0.79
Cluster means	2.40	1.00

Cut off mean = 2.5

Table 3: Training needs of farmers

Training needs of farmers	Frequency (f)	Percentage (%)
Farmers trained in soil erosion control	24	24
Farmers not trained in soil erosion control	76	76
Method of training received:		
Training and visit	5	5.0
Workshop	35	35.0
Seminar	52	52.0
Demonstrations	8	8.0
Areas of training need:		
Terracing	75	75.0
Cover cropping	72	72.0
Water catchment	68	68.0
Fallowing	58	58
Mixed farming	50	50
Mixed cropping	47	47
Tree planting	40	40
Crop rotation	34	34
Cultural practices	30	30
Channelling/drainage	20	20
Contour making	20	20
Mulching	14	14

Table 4: Perceived effects of soil erosion on agricultural production

Effects of soil erosion	Mean($\bar{x}$)	Standard deviation
Reduction in land mass for agricultural activities	3.06	0.86
Removal of topsoil	2.96	0.84
Reduction in farmers' income	2.71	1.16
Poor growth of crops	2.51	0.50
Loss of biodiversity	2.45	1.05
Cluster means	2.74	0.88

Cut-off mean= 2.5

Table 5: Constraints to farmers engaged in soil erosion control

Farmers constraints	Mean ($\bar{x}$)	Standard deviation
Poor educational background	3.07	0.82
Neglect of extension methods in erosion control	3.01	0.81
Poor information system	2.99	0.84
Poor extension agent – farmers ratio	2.52	1.08
Inadequate funding of extension services	2.44	1.15
Lack of incentives	1.97	0.78
Cluster means	2.67	0.91

Cut off mean = 2.5

Table 6: Logit regression analysis of farmers' socio-economic characteristics and their training needs for soil erosion control

	Logit Regression Result		Marginal effect	
Variables	**Coefficient**	**P>|z|**	**Coefficient**	**P>|z|**
Intercept	8.493	39.48		
Sex	-0.3840.	0.0006***	-0.3820.	0.0004***
Marital status	-0.046	-0.005**	-0.043	-0.003**
Level of education	0.047	0.031*	0.045	0.029*
Household size	-0.301	-0.0001***	-0.301	-0.0001***
Farming experience	0.001	0.003**	0.090	0.001**
Income	0.096	0.001**	0.094	0.001**
Log likelihood = -99.50 Prob> chi2 = 0.000		LR chi2(16) = 178.26 Pseudo R2 = 0.4725		
N		100		

****, **, and *** = Significant at 10%, 5% and 1% respectively***

Table 7: Multinomial regression analysis of farmers' socioeconomic characteristics and existing methods of soil erosion control

Variable	Coefficient	P>Z	Marginal effect
Sex	-0.819	-0.011*	-0.704*
Marital status	0.744	0.000 ***	0.722***
Level of education	0.410	0.005**	0.352**
Household size	-0.095	-0.37	0.062
Farming experience	-0.078	-0.40	0.050
Income	0.078	0.28	0.050
Constant	-0.007	-0.01	
Pseudo R^2	0.369		
Likelihood ratio	25.55***		
LRChi^{2}164.82			
Prob b>Chi 0.0000			

****, **, and *** = Significant at 10%, 5% and 1% respectively***