ISSN: 2349-2147

Modern Research Studies

An International Journal of Humanities and Social Sciences
An Indexed & Refereed e-Journal
www.modernresearch.in

Title: Knowledge and Practice of Erosion Control Strategies among Rural Farmers in Kwande Local Government Area of Benue State Nigeria

Author/s: ANUM ORNGU JACOB

Volume 3, Issue 3
September 2016

pp. 615–628

Email: editor@modernresearch.in
mrsejournal@gmail.com

ISSN: 2349-2147
Modern Research Studies:
An International Journal of Humanities and Social Sciences

Knowledge and Practice of Erosion Control Strategies among Rural Farmers in Kwande Local Government Area of Benue State Nigeria

ANUM ORNGU JACOB
Department of Sociology
Benue State University, Nigeria
E-mail: ornguj@yahoo.com

Abstract: This study examines the knowledge and practice of erosion control strategies among rural farmers in Kwande local government area of Benue state north central, Nigeria. The objectives of the study were to identify erosion control strategies adopted by the rural farmers and factors hindering the effective Implementation of erosion control strategies among rural farmers. The study was anchored on modernization theory. Twenty seven rural farmers were purposely selected at random from each of the eight council wards in the study area, making a total sample size of two hundred and sixteen (216). The instruments of data collection were structured questionnaire, oral interview, and focus group discussion. Findings show that majority of the rural farmers adopted different strategies of erosion control while others were completely unaware of the methods; some that were fully aware of the strategies were not adopting them due to some constraints. Further findings identified various factors affecting erosion control strategies in rural areas to include inadequate capital, lack of information on soil conservation, high level of illiteracy, inadequate credit facilities and cultural factors among others. The study recommends the need for soil conservation education, more awareness on some of the modern methods of erosion control and the need for farmers to adopt them, and the granting of various material and logistics aids to farmers.

Keywords: Control; Erosion; Farmers; Rural areas; Strategies

Introduction

In all human societies, land constitutes an important element in productive activities. Since the creation of man, land has been of considerable importance. Land is the function of all forms of production. Land offers the primary opportunity for agricultural development. It is a source of human wealth and the natural source of raw materials required by man for food, energy and fiber (Arnalds 2005). Despite this, land is destroyed through erosion.

Raven (2003) saw erosion as the process by which soil and rocks are removed from the earth's surface by natural processes such as wind or water flow, and then transported and deposited in other locations. While erosion is a natural process, human activities have dramatically increased (by 10–40 times) the rate at which erosion occurs globally. The first global assessment of soil erosion, according to Raven (2003) was released in 1992; it summarized a three year study of global soil erosion sponsored by United Nations Environmental program. It reported that 1.96 billion hectares (4.84 billion acres) of soil have been eroded since World War II. 11% percent of the earth's vegetated surface – an area the size of China and India combined – has been washed so badly that it will be very costly or in some cases impossible, to reclaim it.

Soil erosion is a widespread phenomenon in sub-Saharan Africa. The principal processes that lead to it include erosion by wind and water which resulted in loss of nutrients and soil organic matter depletion (Oldeman, Hakkeling, & Sombroek 1990 and Vagen, Lal, & Singh 2005). Out of numerous human activities that cause these processes, cultivation activities are considered as the most prominent. The total extent of severely eroded areas in sub-Saharan Africa is approximately 3.5 million km^2 or between 20 and 25 percent of the total area of sub-Saharan Africa, of which 1.1 km^2 is estimated to be severely eroded due to agricultural activities (Food and Agricultural Organization FAO 2001).

In Africa, soil erosion results in annual loss of as much as 35 billion metric tons (53 billion tons) of topsoil (Daba 2003). Recent research

information for many areas (Sterk 2003; Kerr and Pander 2005) indicate that soil erosion is still a major agent of land degradation and a very important problem affecting sustainable development in many parts of Africa. The effect of wind on soil erosion is vividly experienced over a wide region of central African states. Without irrigation, however, the frequent and prolonged drought experience in Northern Africa increased the likelihood of crop failures, which result in bare easily eroded soil.

Being a global problem, Nigeria is not left out; every five years the Natural Resources Conservation Services (NRCS), which was formally called the soil conservation services, measures the rate of soil erosion at thousands of site across Nigeria. It also used satellite data to estimate annual soil erosion. These measurements and estimates according to Harper (2013) indicated that erosion is a serious threat to cultivated soil in many regions throughout Nigeria, particularly the middle belt, northern parts and some areas in the southern parts.

Once an area of soil becomes degraded and eroded, it cannot be used as farmland, and for that reason more land has to be purchased. This comes at great monetary and labor cost, not to mention the environmental problems caused by the artificial fertilizers that have to be added to the soil to regenerate itself. The value of land also decreases. As a result, farmers harvest less or produce less stock and eventually end up poorer.

Soil erosion as a global environmental problem has been studied since the 1930s and the history of intervention to conserve it is almost the same. International policy making, particularly the desertification convention in the 1990s, has institutionalized soil conservation tendencies. For example, in recognizing soil erosion as a major environmental and socio-economic problem, the government of Ethiopia made several interventions. Large-scale conservation schemes were initiated particularly after the famines of the 1970s. Since then, huge areas have been covered with terraces, and millions of trees have been planted (Herweg 1993 and Yeraswork 2000).

In Nigeria and Benue State in particular, the ministry of water resources and environment has initiated the programs of afforestation where thousands of trees are planted every year under the supervision of the commissioner in the ministry. Project such as the construction of drainages across the state has been embarked upon to address the problems caused by erosion and to avert its impacts on agricultural lands.

Many research works such as stakeholder's perceptions of gully erosion issues and adoption of conservation measures in Dangara Area, Central Nigeria (2010), farmers' views of soil erosion problems and their conservation knowledge at Beressa Watershed, Central highlands of Ethiopia (2004) all cited in Ayua (2015) have found out that failures of soil conservation projects instituted by governments all over the world is as a result of insufficient funding and inappropriate management of available resources. The ecological fund project embarked upon by the Benue State Government has been abandoned and the already excavated site has contributed to erosional activities in the state. Most of these programs, if not all, are aimed at conserving urban soils while ignoring the cultivated lands in the rural areas thereby reducing food production and decline in the economy of Nigeria.

Having realized that the government is not doing enough to control erosion, farmers have resulted to mobilization of community members to actively participate in the control of erosion.

Statement of the Problem

Agriculture and the livelihoods of rural community have been affected by land degradation, the major driver of which is soil erosion. The contribution of agriculture to the national economy of Nigeria is significant. It accounts for about 45% of the GDP, 85% of exports, and 80% of total employment (Federal Capital Territory Administration 2011). However, the erosion of agricultural land poses a serious threat to agricultural activities in many parts of the world and it has been well recognized that the conservation of soil is centered in the urban areas while ignoring the rural areas. Soil erosion depletes soil fertility and reduces land productivity which in turn reduces the farm level income

of households. Reduction in fertility of soil results in poor water holding capacity of the soil and vegetative growth of crops are limited as a result particularly during decrease in the quantity of seasonal rainfall. Decrease in soil fertility leads to increase in farm level investment. It is never an exceptional case in Nigeria as it has resulted to low levels of commodity trade and the production of lower value commodities, reducing incentives to invest in soil. It has led to the over-exploitation of the land with which inadequate soil and water conservation practices give rise to poverty and land fragmentation.

The study area is located on hilly regions where the ecosystem is very fragile and hence soil erosion is severe. The soil type within the study area is dominated by sandy soil which is easily washed away through water erosion. Continuous cultivation with little protection measures exacerbated the level of soil erosion and hence land productivity has declined significantly. The problem have been affecting the rural communities for decades while government programs aimed at controlling erosion in the rural areas are almost ineffective. Investment in remedial actions such as construction of drainages and aforestation is hard to quantify, but appears an order of magnitude smaller than the scope of the problem while the impact is a drain on economic growth in rural areas and has an effect on national economic growth patterns of every country. As a result of the government ineffectiveness to control erosion at the local level, rural farmers resulted to adopt various strategies to control erosion. This study therefore seeks to evaluate rural farmers' strategies for erosion control in Kwande Local Government Area of Benue State, Nigeria.

Objectives of the Study

The study is hinged on the following objectives:

i. Examine erosion control strategies device/adopted by the rural farmers.
ii. Identify factors hindering effective implementation of erosion control strategies in the rural areas.

Research Questions

This study examines the case of Kwande Local Government Area and it explores the following research questions:

i. What strategies do rural farmers employ to control erosion in their rural areas?
ii. What are the factors hampering erosion control strategies in their rural areas?

Theoretical Framework

The researcher has considered the modernization theory to understand the development of third world countries.

Modernization Theory

Modernization theory is rooted in the works of Talcott Parsons (1902-1979), Walter Rostow (1960-1978) and the works of such scholars as W.A. Lewis and Daniel Lerner (Ayua 2015). Modernization theory assumes that the underdevelopment of rural areas in developing countries is because of primitive, unproductive change resistant values, institutions and technologies found in traditional societies. The theory believes that because of these traditional ways of doing things, African societies are characterized by inefficiency, low productivity, agricultural stagnation and no knowledge about environmental hazards. It therefore sees increasing poverty in Africa as an outcome of continued reliance on these traditional inefficient and crudes methods of technologies in combating environmental problems. The theory thus maintains that the problem of erosion in Africa cannot be solved with the continued survival of traditional primitive and low-productivity economic system whose essential features are outdated technology, land tenure systems, small-scale production and unproductive social values and institutions.

The theory therefore opines that for environmental hazards such as erosion in Africa to be solved, African countries must adopt modern technology production methods, institutions and values systems. The theory believes that the problem of erosion can be corrected if the

existing methods of combating erosion are improved upon. The common view it promotes is that the problem of erosion can be eliminated by increased production through better management of land resources.

Based on these arguments, Ayua (2015) and Brandt (2011) have argued that land fragmentation based on inheritance principles in Africa has continued to constrain agricultural development as it hinders the mechanization of agriculture, consequently leading to soil erosion. To avoid fragmentation, therefore, measures must be put in place to ensure land consolidation.

Olayide (2003) argued that the most serious problem of tropical agrarian structure is the excessive fragmentation of holding into small uneconomic parcels. To them, fragmentation hinders the introduction of modern rational methods of cultivation. To overcome the problem of fragmentation, therefore, measures must be put in place to consolidate holdings. But they have argued further that land consolidation measures can only be successful if they are linked with other development measures such as construction of roads, changes in land utilization, provision of extension services, and a change in the inheritance customs and laws in order to prevent renewed fragmentation of holdings already consolidated.

In Nigeria, some of these policy recommendations have influenced the formation of many land policies such as land development schemes and the enactment of the 1978 Land Use Act. The idea behind the formulation of these policies has been to bring about a reduction in the concentration of ownership of wealth, inequality in income distribution from the land, and a rise in productivity and rural per capita income and to solve the problem of erosion.

Materials and Methods

Study Area

Kwande local government area is geographically located in Benue State, North central Nigeria. Kwande local government area lies in the

transition belt between the tropical rain forest of the south and the open grassland and savannah vegetation of the North. The people of Kwande local government area speak common Tiv language and are predominantly peasant farmers with a rich cultural heritage. Farmers here are the greatest producer of cash crops such as rice, groundnuts, kola nut, cassava, potatoes, Ogbono tree (Ive) banana and pineapples.

The infrastructural development here is poor. Apart from the federal trunk "A" road that runs through Adikpo through Iyon to Obudu in Cross River State, the rest of the roads are seasonal feeder roads used mainly during the dry season. Kwande local government area is subsequently divided politically into two divisions which include Kwande East and Kwande West with a demographic strength of about 248,642 from the 2006 population census figures.

Sampling Procedure

Given the large population of farmers in Kwande Local Government Area as well as the rugged terrain of the environment, it was difficult to have access to every farmer so as to get their views on the subject matter and as such it became necessary to adopt a sampling technique to arrive at a population that was studied. Initially, therefore, a cluster sampling technique was employed to select 8 council wards from the study area. A purposive sampling method was used to select 27 respondents from each of the council wards, given a total of 216 respondents ranging from 30 years and above from both men and women.

Research Instruments

This study relied essentially on available data, research reports, and empirical data collected via questionnaire, interviews and focus group discussion (FGD). The questionnaire contained both open and close ended questions. The questionnaires were administered by the researcher in company of ten field assistants who were trained in the act of questionnaires administration. The validity, test and pretest of the instrument were done by lecturers in the Department of Sociology, Benue State University, Makurdi Nigeria. A reliability coefficient of

0.85 was achieved. Quantitative data from questionnaires was analyzed using descriptive statistics such as frequencies and percentages. SPSS data package version 15 was used to aid in data analysis.

Results and Discussions

Table 1 and 2 present the findings. The first part deals with the erosion control strategies, its awareness and adoption while the second part deals with the barriers militating against erosion control strategies.

Erosion Control Strategies

Awareness and Practice

Table 1: Distribution of Respondents on erosion control strategies, awareness and adoption

Erosion control strategies	No. of resp. and percentage adopting it		No. of resp. and percentage unaware		No. of resp. aware but not adopting it	
	No. of Resp.	%	No. of Resp.	%	No. of Resp.	%
Afforestation	26	12	26	12	164	76
Planting cover crops	18	8	32	15	166	77
Avoiding cultivating slope	182	84	19	9	15	7
Contour ploughing across slope	194	90	7	3	15	7
Grazing control	20	9	32	15	164	76
Bush burning control	7	3	177	82	32	15
Stopping land scarification	199	92	6	3	11	5
Stopping road construction	-	-	-	-	216	100
Strip cropping	19	9	167	77	30	14
Fallowing	7	3	198	92	11	5
Sand filling	-	-	6	3	210	97
Drainage diversion	112	52	-	-	104	48
Crop rotation	18	8	132	61	66	31
Terracing	-	-	205	95	11	5

A close look at Table 1 indicates that the main control measures that were largely adopted by the rural famers include avoiding cultivating steep slopes (84%), contour ploughing across slope (90%), stopping land scarification (92%) and drainage diversion (52%), afforestation (12%), grazing control (9%), avoiding cultivation of steep cropping (9%), planting of cover crops (8%), grazing control (9%), crop rotation (8%) and fallowing (3%). Those which the respondents were generally not aware of include crop rotation (61%), bush burning control (82%), fallowing (92%), strip cropping (77%) and terracing (95%). The respondents were aware of road construction (100%), grazing control (76%), afforestation (76%), planting cover crops (77%), sand filling (97%) and drainage diversion (48%) but were not adopting them because of their technical complexity, high capital inputs required to adopt them and because such measures were considered by the respondents as simply inappropriate to their setting or beyond their (the respondents') capacity to adopt them. It should be particularly noted here that only about 11 respondents representing 5% admitted being aware of the role of terracing in minimizing erosion problem.

Interviews with the respondents indicate that majority of the farmers lack adequate knowledge of many other erosion control methods. These categories of respondents believe that the sloppy nature of their environment is not conducive to accommodate erosion control measures mentioned.

Alfsen et al. (1996), Moore & McCarl (1987) and Swanson (2002) argue that effectiveness of erosion control strategies depend on the level within which farmers have been educated to adopt a specific strategy at a particular place based on the topography of the area e.g. farming across slopes is adopted on a sloppy environment.

It is pertinent to observe here that the majority of the respondents benefited from these erosion control measures as erosion could not destroy their farmlands completely.

Factors hindering the success of Erosion Control Strategies

Table 2: Factors hindering the success of Erosion Control Strategies

Responses	Frequency	Percentage (%)
Inadequate capital	88	41
Lack of information on soil conservation	66	31
High level of illiteracy	18	8
Cultural factors	44	20
Total	**216**	**100**

Judging from the respondents opinion on factors hindering the sources of erosion control strategies in the study area, 88 (41%) attributed it to inadequate capital, 66 31%) to lack of information on soil conservation, 18 (8%) to high level of illiteracy among farmers while 44 (20%) respondents linked it to cultural factors.

It is also noted that, some of the problems farmers encounter in erosion control in the study area are lack of credit facilities and inadequate information from environmental agents. One of the respondents summarized the problems of farmers here as: "*w*e have no access to environmental agents, we lack financial resources coupled with high poverty level, in fact we are suffering." All these problems are general problems facing farmers in rural Nigeria; but they have the greatest impact on the agricultural sector because majority of the population use land for cultivation, providing about 85% of employment for the rural dwellers.

It is observed in the study area that some of the erosion control strategies embarked upon by the farmers was left incomplete as a result of inadequate capital. Also land tenure system is identified as one of the cultural factors hindering soil conservation. Under customary tenure system, every household has the right to cultivate as much land as they can manage, graze livestock anywhere except on land that is actually under crops, take timber for building and firewood, use water resources of the land for various uses, use sand, stones and other unclassified

minerals from the communal land resources and choose a site to build a house. This type of ownership according to Brandt (2011) poses a challenge to the conservation of soil.

Conclusion

The study identified Soil erosion as a major environmental problem affecting the rural farmers. Many farmers have already made significant progress in dealing with soil erosion problems on their farms as decisions pertaining to soil conservation is largely determined by their knowledge of the problem and perceived benefits from conservation. It is confirmed that farmers in the rural areas recognized soil erosion problems, and were of the opinion that conservation was necessary. However, because of continued advances in soil management and crop production technology, others have not been aware of these innovations and methods. Thus, this could be attributed to inadequate capital, lack of information on soil conservation, high level of illiteracy among farmers and cultural barriers. In this direction, increased soil conservation awareness and incentives play a significant role in achieving behavioral change towards risky environmental behavior.

References:

Alfsen, K. H. M. De Franco, S. Glomsrod, and T. Johnsen. 1996. "The cost of soil erosion in Nicaragua." *Ecological Economics,* 16.2: 129-145.

Arnalds, A. 2005. "Approaches to landcare- a century of soil conservation in Iceland." *Land Degradation and Development,* 16.2: 113-125.

Ayua, T. 2015. "An evaluatory of farmers' erosion control strategies." Unpublished M.Sc. Dissertation. Nigeria: Benue State University.

Brandt, W. 2011. "North-South: A program for survival." Report of the independent commission on international development. Lagos: Pan books.

Daba, S. 2003. "An investigation of physical and socio-economic determinants of soil erosion in the Hararghe highlands, eastern Ethiopia." *Land Degradation and Development*, 14.1: 69-81.

Federal Capital Territory Administration (FCTA). 2011. "Ministerial Report on Gully Erosion Control Programme at Dangara." Abuja: FCTA.

Food and Agricultural Organization (FAO). 2001. *Production year book*. Rome: FAO.

Harper, K. 2013. "Money and land tenure systems as factors in farm-size differentiation in Nigeria." *Hanover*, 7: 243-279.

Herweg, K. 1993. "Problems of acceptance and adoption of soil conservation in Ethiopia." *Applied Resources Management*, 3: 391-411.

Kerr, J., and J. Pender 2005. "Farmer's perceptions of soil erosion and its consequences in India's Semi-arid tropics." *Land Degradation and Development*, 16.3: 257-271.

Moore, W. B., and B. A. McCarl. 1987. "Off-site costs of soil erosion: A case study in the Willamette Valley." *Western Journal of Agricultural Economics*, 12.1: 42-49.

Olayide, S.O. 2003. *Relationships between land tenure and agricultural innovations.* Ibadan: Irat-Iita.

Oldeman, L., R.T.A. Hakkeling, and W.G. Sombroek. 1990. *World map of the status of human-induced soil degradation: An explanatory note*. ISRC-UNEP Report, the Netherlands.

Raven, E.A. 2003. "Soil erosion in the drylands of Nigeria and the issue of soil life." Cambridge-Bayero University Agropastoral Research Project. Nigeria: Department of Geography, Bayero University.

Sterk, G. 2003. "Causes, consequences and control of wind erosion in Sahelian Africa: A review." *Land Degradation and Development*, 14.1: 95-108.

Swanson, E.R. 2002. *Economic evaluation of soil erosion: Productivity losses and off-site damages*. Colorado: Great plains resource.

Vagen,T.G., R. Lal, and B.R. Singh 2005. "Soil carbon sequestration in sub-Saharan Africa: A review." *Land Degradation and Development*, 16.3: 53-71.

Yeraswork, A. 2000. *Twenty years to nowhere: Property rights, land management and conservation in Ethiopia*. Lawrenceville, New Jersey: Red Sea Press.