Farmers' Perception and Reponses to Soil erosion in Zing Local Government Area of Taraba State, Nigeria

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doi: 10.4314/ejesm.v4i1.11

Abstract

Soil erosion by water has remained a serious threat especially in the mountainous regions and sloppy lands where agriculture is practice, causing loss of valuable soil resources and attendant loss of agricultural productivity as well as siltation of the various water bodies across the continent of Africa and other regions of the world. This study is an appraisal of farmers' perception and responses to soil erosion on their farmlands in Zing Local Government Area of Taraba state. This was in realization that farmers in the study area are farming on erosion prone areas such as hill slopes and flood plains, disregarding the flatlands provided by nature. To arrive at the results obtained, a total of 312 questionnaires were administered to solicit for responses of the farmers on their perception of soil erosion on their farmlands in the area. Descriptive statistics using frequencies converted to percentages was used in analyzing the data. The result shows that 87.2% of the respondents have their farmlands either located on the steep or gentle slopes, and 35.2% of the respondents which constitutes the majority cultivate the hill slopes because of historical reason. It was further established that more than 76 % of the respondents are aware of the consequences of soil erosion on farms located on slopes, but, they do not agree that erosion is an individual problem caused by them. And to some great extent, they farmers have knowledge on measures of controlling soil erosion on their farm lands especially terracing, inter-cropping and molding ridges along contours.

Key Words: *Perception, Erosion, farmers, Zing*

Introduction

Soil erosion can be described as the process by which rock fragments and soil are detached from their original sites, transported, and then eventually deposited at some new locality, (Ray, 1994; Adediji, 2000). Soil erosion causes tremendous damage to about one-third of world's cropland (Hudson, 1989). Although, many erosion control technologies are available that are well understood and effective, yet the world soil erosion by water persists at levels greatly in excess of soil formation rate in most agricultural regions of the world, (Biswas and Narayanasamy, 1996). It has assumed disastrous proportions in the mountainous regions due to increased intensification of various human-induced activities in the later years, especially in the developing countries where the typical farmer can hardly perceive the onset of soil erosion and cannot afford optimum replacement of lost soil qualities (Ogidiolu, 2000). In Nigeria, for example, over 80% of the cropland regions are ravaged by erosion (NEST, 1991). The mean annual loss of crop productive capacity through erosion is estimated to be 25million tones, (Adediji, 2000). This has led to low yield, reduced grazing land for livestock, famine, low standard of living, decrease in availability of fuel wood, food insecurity, poverty and migration of rural dwellers (Olatunji, 2003).

Despite the foregoing devastating effects of soil erosion, a good number of farmers hardly can perceive the onset or extent of erosion on their farmlands (Aune, 1995, Barr, 1985).A significant part of farmers' responses to soil erosion is based on their assessment of short term future benefit from investment in soil conservation. Hence, farmers perception and responses to the problems of soil erosion do not only vary across cultures through time, they also differ among various ethnic groups within communities, regions and cities, (Akamigiro, 1988). However, most studies conducted on soil erosion such as Lal. 1989, Ray 1994, Easiet 1995, Jaiyeoba,1996, Mohamoud and Canfiel, 1998, Iguisi, 2002,and Adebayo and Tukur, 2003 have focused on qualitative and quantitative assessment of the magnitude of soil erosion, without much emphasis on the perception of farmers to soil erosion. This study was therefore undertaken to appraise farmers' perception and responses to soil erosion with a view to reveal variations in the ability of the farmers to understand natural system and how human beings intervene in such system.

The Study Area

The study was conducted in Zing Local Government Area, of Taraba State, Nigeria. Zing lies between latitudes 8^{o} 45^{1} and 9^{o} 10^{1}N and longitudes 11^{o} 35^{1} and 11^{o} 50^{1} E. It is bounded to the East and North by Mayo-Belwa and Jada Local Government Areas of Adamawa State and to the west and South by

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Yorro Local Government Area. It has a total land area of 867km^2, and a population of 127,362 inhabitants with an annual growth rate of 3.0 percent, (NPC, 2006). The study Area (fig 1) consists of 6 districts with 75major villages, each village having approximately a range of between 255-783 farm families (TADP, 2005).

The climate of the area is typically a tropical climate marked by dry and rainy seasons. The mean annual rainfall of the area ranges from 819-1761 mm. It is spread, over seven months, April to October. The onset of the rains is April, with low amount but increases gradually reaching a maximum in August, the amount drops also gradually with cessation in October.

The study area is within the Savannah grassland belt, particularly in the Guinea Savannah sub-region, characterized by scattered, deciduous tall trees with broad leaves and tall grasses

The major soil types' are the hydromorphic and ferruginous tropical Soils. The soils are highly influenced by local variation in altitude and human interference. The soil type is a mixture of loams and sands, and on the hilly terrain we have deep loamy soils found in between rocks. Along the banks of streams and rivers are clay loam soils which support the growth of a variety of crops in the area. On relief configuration, the study area can be categorised into two zones, highland | mountain range and lowlands. The highlands occupy the southern region stretching from west to south in chains of mountain with elevation ranging from an average of 1,800-2,400 meters high forming the Atlantica, Shebshi and Adamawa massifs ranges. The lowland which occupies about 60 % of the region hosts most of the settlements in the region. Major food crops cultivated in the area include yam, sorghum, bambaranut, groundnut, millet, and rice.

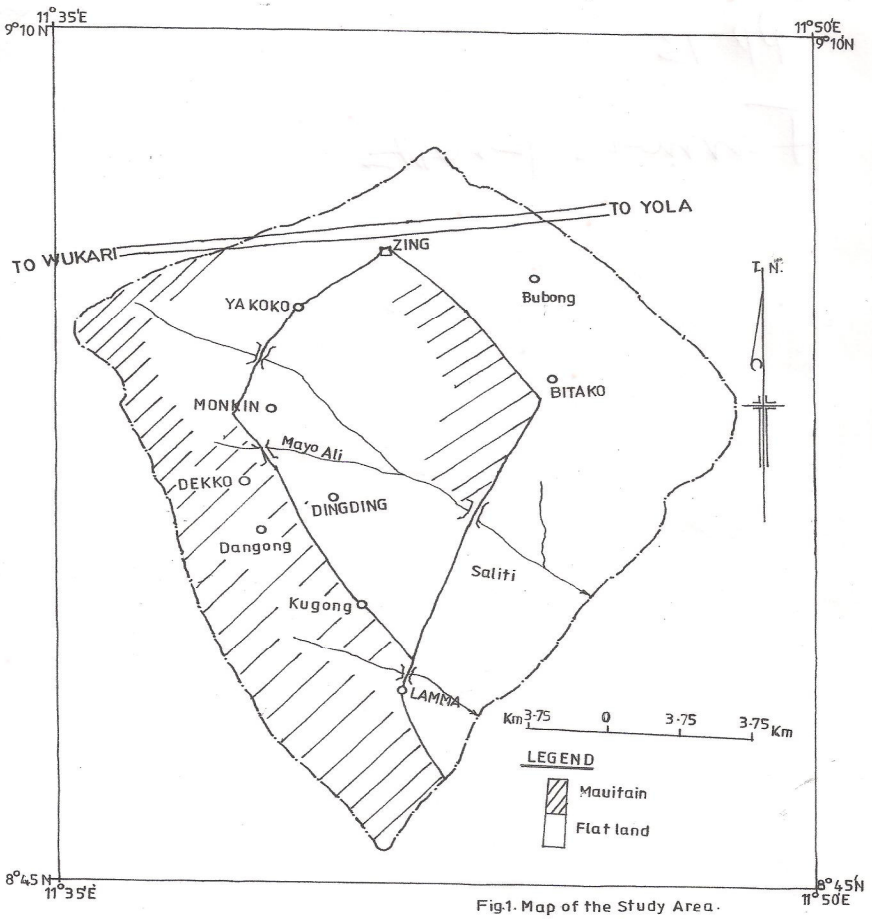

Fig.1. Map of the Study Area.
Source (Min of Land& Survey 2007) JL.

Methodology

Data used for this study were generated from both primary and secondary source. The primary data was sourced through the use of a structured questionnaire administered to the farmers during the 2007 farming season.

The study area has 6 districts which were used as clusters for samples collection. From this clusters a simple random sampling technique was then applied first, in selecting the villages and subsequently in picking the individual farmers or respondents. In selecting sample size, 30% of the villages in each district were purposively selected, bringing a total of 24 villages'. From the villages a total of 312 farmers were selected for the purpose of questionnaire administration. The proportion of these respondents 312 in each sample village was obtained using the Cochran 1977 proportional allocation technique formula. Thus $nh=Nh \times n / N$

Where:-

nh =the number of the individual sample villages

Nh=the number of farmers in the individual villages

n =the number of questionnaires to be distributed among the sampled villages

N =the total number of farmers in the sample villages

Descriptive statistics using frequency converted to percentages was employed in analyzing the data obtained.

Results and Discussion

Table 1 shows the distribution of respondents' farmlands on different gradients.

Findings indicated in table 1, revealed that almost all the respondents forming 87.2% have their farmlands either located on the steep or gentle slopes, a place where most soil erosion is taking place indicating a symptoms of lack of awareness of soil erosion in the area.

The results in table 2, shows that majority of the farmers (35.2%) cultivate on hill slopes because of Historical reasons, followed by those farmers who indicated that they prefer to farm on slopes because of weed invasion (31.4%). less crop destruction by animals 26.3%.Only a handful of respondents indicated that they farm on slope because of shortage in farmland (7,1%).This implies that the most important reason for cultivating the slopes is historical reason. this could probably be because, in the old days when there used to be frequent clashes between tribes, a number of inhabitants moved up hill, to live and therefore had to use the slopes as farmlands. Such people whose ancestors owned these types of farmlands, still use them today as they remain inherited property.

On whether they are aware of the consequences of soil erosion on farmlands located on slopes compared to farmlands on flat lands, the respondent's views are as indicated in Table 3

The result on table 3 shows that majority of the farmers forming 76.9% are aware of the consequence of soil erosion on farms located on slopes while only 23.1% exhibit ignorance. This implies that, farmers are aware of the consequence of soil erosion on farms located on slopes. This could probably be because of the added effort and cost of controlling soil erosion. Hence, this does not support Barr1985, findings that due to the insidious nature of the pervasive hazard of soil erosion, farmers misperceive either the existence or extend of erosion on their own farm.

Findings in Table 4, shows that majority of the respondents forming 64.7% agreed that crop yield is better on slopes than on flatland farmlands, while 9.6% disagreed. This could probably be attributed to the fact that hills or mountains are the sources of all minerals, and weathering processes is taking place almost continuously to release the TEB as they are leached out.. Hence, this could probably be one of the reasons why most farmers in the study area cultivate the hill slopes where as flatland areas exist.

Findings on table 5, shows that majority of the respondents (42.3 %) cited climatic factor as the major cause of soil erosion, while 23.1% opted for the nature of the topography and only 15.4% accepted poor farm management as the main cause of soil erosion in the study area. This means that majority of the farmers (84.6 %) do not agree that soil erosion can be caused by poor farm management. This supports the view of Ahmed (2002) that farmers see a relationship between erosion and crop yield, but are reluctant to accept that erosion is an individual problem on their own farms.

From table 6, it is evident that most farmers are aware that soil erosion in various forms is taking place on their farmlands, based on their perception and interpretation of

indicators that reveal certain conditions regarding soil erosion. About 1/3 of the farmers realize that soil erosion is taking place when trenches began to develop, while 26.9% of them, realize this when rills and gullies develop. This means that more than 90% of the sampled farmers in the study area look for physical signs on their farmlands as the major indicators of soil erosion, while only 13.8% notice that soil erosion are taking place when there is a decrease in crop yield.

This echoes Rickson and Stabbler (1985),findings that most farmers particularly the untrained ones decide on how to use their land in line with their own objectives and understanding about soil, and often disagree with the scientific evaluation of erosion condition by professional soil scientist and agricultural extension agents,

Results from table 7, reveals that more than 61.9% of the farmers indicated that their farmland sizes have been reduced by erosion, while about 25. 6% reported that their farmlands were reduced in size by being submerged. This shows that a greater proportion of the farmers perceive reduction of arable land as the main effect of soil erosion in the study area. Also, from the oral interviews conducted with the farmers in the study area, it revealed that not that the farmers are not aware of the effects of soil erosion on the hill slope sites, but that, they do not see it as a threat because the advantages they derive out weigh erosion problems. And that, to some great extent, they have knowledge on measures of controlling soil erosion on their farm lands especially terracing, inter-cropping and molding ridges along contours.

Hence, this could probably be the reasons why farmers in the study area cultivate hill slope areas where as flatland areas can conveniently contain farm lands.

Conclusion

The main focus of this study is to assess the perception and responses of farmers to soil erosion. The result shows that 87.2% of the respondents have their farmlands either located on the steep or gentle slopes, and 35.2% of the respondents which constitutes the majority cultivate the hill slopes because of historical reason. It was further established that more than 76 % of the respondents are aware of the consequences of soil erosion on farms located on slopes, but that, they do not see it as threat because the advantages the derive outweigh erosion problems. In addition, they do not agree that erosion is an individual problem caused by them on their farms .The chief contributing factor to the advancement of farming, have been the best practices used by the people (farmers) over generations to sustain agricultural problems in this area especially terracing, inter-cropping, molding ridges along the contours and mulching. And this is what is advocated for areas that are suffering erosion from hill slopes farmlands.

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Table 1 slope gradient of farmlands in the study area

Slope category/gradient	Frequency	Percentage
Flat land <4%	40	12.8
Gentle slope 4-8%	112	35.9
Steep slope 8-30%	168	51.3
Total	312	100

Source: Field survey, (2007

Table 2: Reasons why respondents use slopes

Reasons	Frequency	Percentage
Historical reasons	110	35.2
Less weed invasion	98	31.4
Less crop destruction by Animals	82	26.3
Shortage of farmland	22	7.1
Total	312	100

Source: Field survey, (2007)

Table 3; Awareness of the consequences of soil erosion on farmlands:

Perception	Frequency	Percentage
Not aware	72	23.1%
Aware	240	76.9%
Total	312	100

Source; Field Study, 2007

Table 4 farmer's perception of crop yield on slope as compare to flat lands

Crop yield better on slope than flat lands	Frequency	Percentage
Yes	202	64.7
No	39	9.6
Others	80	25.6
Total	312	100

Source: Field survey, (2007

Table 5: Causes of Soil Erosion on Individual Farmlands

Causes	Frequency	Percentage
Climatic factor	132	42.3
The nature of the topography	72	23.1
Poor farm management	48	15.2
Others	60	19.2
Total	312	100

Source: Field survey, (2007

Table 6 Farmers method of identifying soil erosion

Methods	Frequency of responses	percentage
when root of plats become exposed	61	19.6
When trenches began to develop	94	30.1
when of rills and gullies develop	84	26.9
Drop in yield	34	13.8
Change in soil colour	30	9.6
Total	312	100

Source: Field survey, (2007).

Table 7; The effect of soil erosion on farmlands, as indicated by respondents.

Effect	Frequency of responses	percentage
Reduction of arable land	193	61.9
Submerges of fertile arable land	80	25.6
Blockage in irrigation channels	31	9.9
Others	8	2.6
Total	312	100

Source: Field survey, (2007).