Full Length Research

Farmers' Perception on Soil Erosion Problems and Conservation Methods among Rural Farmers in Talensi-Nabdam Districts of Upper East Region of Ghana

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This study was carried out in Upper East Region of Ghana, Talensi-Nabdam districts,to assess how farmers perceive soil erosion problems and the causes that trigger soil erosion problems, identify the existing soil conservation practices adopted by farmers on their farms and examine the socio-economic and constraints influencing farmer's perceptions to implement different soil conservation methods. Five communities were purposively selected from that district namely Belungu, Kongo, Damolgo, Zalerigu and Nangodi. A total of 100 farmers were selected and the simple random technique was used to select 20 farmers from each community. These five communities were selected because of the severity of erosion in those areas. Data was analysed using frequency tables and percentages of descriptive statistics in SPSS. Male's form 79% of the respondents and 21% were females. The perceptions of farmers on the causes of erosion in the study area were: high intensity of rainfall, inadequate vegetative cover, deforestation and lack of proper conservation methods. The indicators of soil erosion problems in the study were presence of gullies (45%) making it impossible for profitable cultivation , 20% said removal of the top soil by water or wind, 20% reported that it makes the land infertile, 5% as exposure of the root of trees and finally change of soil color as 5%.The conservation methods adopted by the farmers include; stonebunds, earthbunds, vertiver grass, manure, local grass, tree planting, drainage trench, wood logs and ploughing across slope.

Keywords: Farmers, Perception, Soil erosion, Conservation methods, Ghana.

INTRODUCTION:

Soil erosion is a major threat to continued and sustained agricultural production in Ghana particularly in the Sudan Savanna zone (Folly, 1997). The effect of erosion may be on-site and/or off-site. The on-site damage, which affects the catchment where the erosion originates, includes soil structure degradation, increases erodibility, surface crusting and compaction (Adwubi et al., 2009).

The most severely affected areas are the three Northern Savanna Regions, particularly the Upper East Region, where large tracts of land have been destroyed by water erosion leading to soil depth reduction, soil fertility decline and siltation of rivers and reservoirs (Adwubi *et al.,* 2009).

Sustainable agricultural production also depends on productive soils, but the land resources of Ghana for that

matter Upper East Region, particularly the soils, are being degraded as a result of both natural and anthropogenic factors (Adama, 2003).

The loss of soil reduces depth, water and nutrient storage capacities of the soil. The reduction in moisture reduces the soil's potential to sustain plant growth, exposes the plant to frequent and severe water stress which ultimately results in reduced crop yields. Many of the soils have predominantly light-textured surface horizons and extensive areas of shallow concretionary and rocky soils with low water and nutrient holding capacities and limited capacity for agriculture (Quansah et al., 2000).

Evidence suggests that, adopting sustainable land management technologies can reduce soil erosion and enhance productivity. Since 1940's, a number of policy instruments have being used in an attempt to control or mitigate soil erosion in rural areas Stonehouse (1991).

This study was conducted in Talensi district (Northern part of Ghana). The district, as one part of Upper East Region, is affected by land degradation particularly soil erosion.

The objective of this study was to assess how farmers perceive soil erosion problems and the causes that trigger soil erosion problems, identify the existing soil conservation practices adopted by farmers on their farms and examine the socio-economic and constraints influencing farmers perceptions to implement different soil conservation methods.

MATERIALS AND METHODS

Data Type, Source and Sampling and analysis:

The study population comprised of all small holder farmers in the Talensi Nabdam District.Five communities were purposively selected from that district namely Belungu, Kongo, Damolgo, Zalerigu, Nangodi. A total of 100 farmers were selected and the simple random technique was used to select 20 farmers from each community. These five communities were selected because of the severity of erosion in those areas.

Data was analysed using frequency tables and percentages of descriptive statistics in SPSS.

RESULTS AND DISCUSSION:

Socio-economic characteristics of rural farmers

Male's form 79% of the respondents and 21% were females. This indicates that, majority of the rural farmers were males. A study done by Farida & Fariya, 2014 in the study area indicates that men had more access to financial capital than women in the community and also it

is a risky venture and women appeared not to be ready to take so much risk for fear of incurring debts. Majority of the farmers (44%) were between the ages of 31-40 years. 40% were more than forty years, 16% were between the ages of 21-30 years. Majority of the farmers in the study area owned their land (70%) and some also rented land (30%) from others for their production activities. The land rent is determined by the quality of land in respect of its suitability for the crop the farmer would be growing. Major land quality aspects considered are soil fertility and irrigation water availability. Hired labour was the major source of labour representing (41%) followed by family labour of (30%) and then those who were using both family and hired labor of 29% for their farming operations. Almost all the farmers used hired labour because their family members were engaged in other household or other business activities. Eighty nine percent (89%) of the respondents used their personal resources as seen in the Table 1 but 7% received some finance from financial institutions, 3% from relatives and friends and 1% from traditional money lenders. The reasons given by the farmers for using their own money for financing were due to non-availability and /or the high cost of credit. All are shown in the Table 1.

The Perception of Farmers' About the Causes and Indicators of Soil Erosion Problems in the District.

The perceptions of farmers on the causes of erosion in the study area are: high intensity of rainfall, inadequate vegetation cover, deforestation and lack of proper conservation methods.

Farmer's perception of soil erosion problems refers to the perception to relationship and processes of soil erosion and fertility of the soil (Belay, 2014). The indicators of soil erosion problems in the study area are shown in the diagram below: Majority of the farmers reported presence of gullies (45%) making it impossible for profitable cultivation. Similar study done elsewhere shows presence of gullies as the major indicator of soil erosion in Ethiopia (Belay, 2014), 20% said removal of the top soil by water or wind, 20% reported that it makes the land infertile, 5% as exposure of the root of trees and finally change of soil color as 5% as shown in Figure 1.
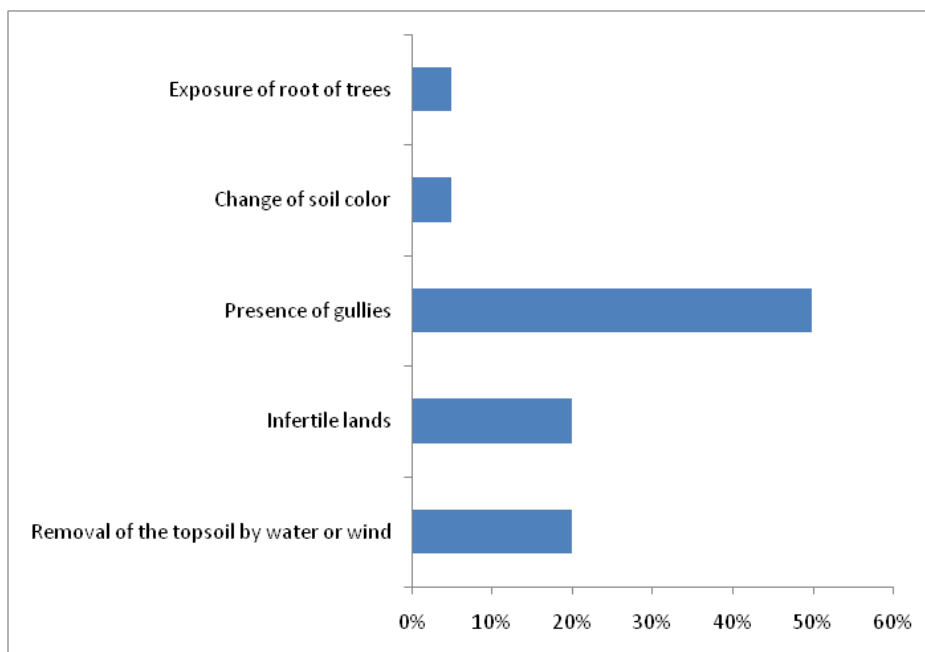
The various conservation methods adopted by farmers

During the survey, the farmers have a strong perception towards adoption of the conservation methods and also believe that the adoption of this conservation methods helps to control erosion, increase yield, increase land value, increase nutrient and retain moisture. The conservation methods adopted by the farmers include;

Table 1. Socio-economic characteristics of respondence

Variables	Frequency	Percentages (%)
Gender		
Male	79	79
Female	21	21
Total	100	100
Age(years)		
21-30	16	16
31-40	44	44
>40	40	40
Total	100	
Land ownership		
Own land	70	70
Rent	30	30
Total	100	100
Kind of labour		
Hired labour	41	41
Family labour	30	30
Both	29	29
Total	100	100
Source of finance		
Financial institution	7	7
Relatives or friends	3	3
Traditional money lenders	1	1
self	89	89
total	100	100

Source: Field survey, 2014

Source: field Survey: 2014.
Figure 1: Indicators of Soil Erosion Problem
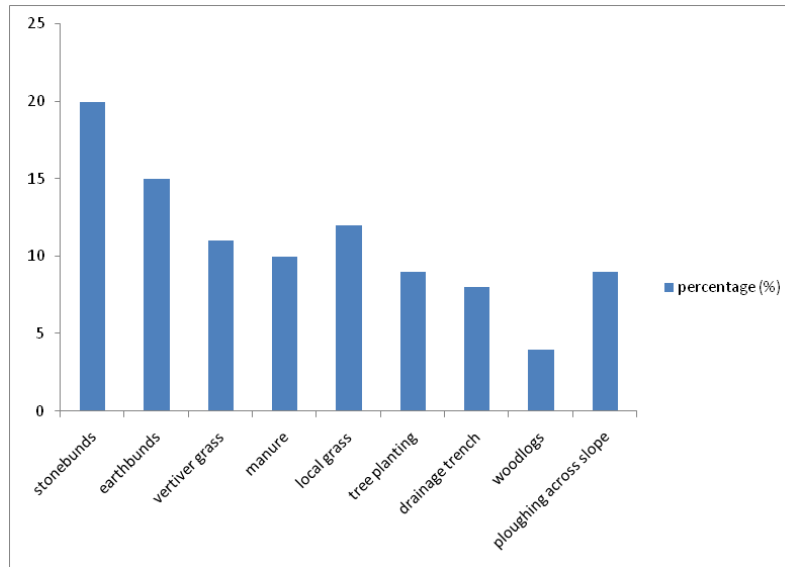
Source: field survey, 2014
Figure 2. Various conservation methods adopted by farmers

Figure 3: Photo 1. shows stonebunds, source: field survey, 2014.

stonebunds, earthbunds, vertiver grass, manure, local grass, tree planting, drainage trench, wood logs and ploughing across slope. Among the conservation methods adopted by the farmers, stonebunds has the highest percentage 20%, followed by earthbunds 15%, vertiver grass 12%, manure 10%, local grass 12%, tree planting 9%, drainage trench 8%, wood logs 4% and ploughing across slope 9% as shown in Figure 2.

Description of the various conservation methods

Stonebunds and Earthbunds

It is an embankment or ridge build across a slope along the contour. Earthbunds are made of soil or mud. On moderately sloping areas the farmers construct the soil and stonebunds for erosion control but most of the time the farmers in the study area use stonebunds instead of earthbunds structure as the is the availability of stones more than soil but if the is shortage of stones, the farmers use earthbunds to control erosion. The photo 1below shows the structure of a stonebunds being adopted among farmers in the study area. Figure 3

Vertiver grass

Vertiver grass has a deep root that binds the soil together and therefore prevents soil loss and water runoff. Apart

Figure 4: Photo 2. shows vertiver grass, source: field survey, 2014.

Table 2. Constraints in the adoption of soil conservation technologies

Constraints	Frequency	Percentage (%)
Insufficient credit	30	30
Prices of inputs being high	10	10
Insufficient information on possible practices	11	11
Insufficient practical help	9	9
Insufficient support from family/friends to help in adoption	12	12
Land tenure	8	8
Insufficient material	20	20
total	100	100

Source: field survey, 2014

from stonebunds adopted by farmers in the study area, the farmers also use vertiver grass as a means of controlling erosion since less labor is required in its planting than constructing stonebunds.The photo 2 below shows vertiver grass being grown among farmers in the study area. Figure 4

Manure

Manure is an organic material that is used to fertilize the land. Farmers in the study area usually use feces and urine of domestic livestock with or without accompanying litter such as straw, hay or burning to apply to their land.

Constraints in adoption of the conservation methods

From Table 2, insufficient credit recorded the highest percentage 30% which implies that it is the most serious problem faced by the farmers, prices of inputs being high and the other problems were also notified by the farmers

that hindered their of adoption of stonebunds, earthbunds, vertiver grass and manure, local grass, wood logs, drainage trench, tree planting and ploughing across slope. Followed by insufficient material (20%), insufficient support from family/friends to help in adoption (12%), insufficient information on possible practices (11%), prices of inputs being high (10%), insufficient practical help (9%) and land tenure (8%).

CONCLUSION

In the study, Male's form 79% of the respondents and 21% were females. Stonebunds, earthbunds, vertiver grass, manure, local grass, wood logs, drainage trench, and tree planting and ploughing across slopes were the various conservation methods adopted by the farmers. Among the conservation methods adopted by the farmers, stonebunds has the highest percentage 20%, followed by earthbunds 15%, vertiver grass 12%, manure 10%, local grass 12%, tree planting 9%, drainage trench 8%, wood logs 4% and ploughing across slope 9%.The

perceptions of farmers on the causes of erosion in the study area are: high intensity of rainfall, inadequate vegetation cover, deforestation and lack of proper conservation methods. The indicators of soil erosion problems in the study are farmers reported presence of gullies (45%) making it impossible for profitable cultivation, 20% said removal of the top soil by water or wind, 20% reported that it makes the land infertile, 5% as exposure of the root of trees and finally change of soil color as 5%. , insufficient credit has the highest percentage 30% which indicate that it is the most serious problem faced by the farmers, prices of inputs being high and the other constraints were also identified by the farmers as the most serious problem that affect their rate of adoption of stonebunds, earthbunds, vertiver grass and manure, local grass, wood logs, drainage trench, tree planting and ploughing across slope. Followed by insufficient material20%, insufficient support from family/friends to help in adoption 12%, insufficient information on possible practices (11%), prices of inputs being high (10%), insufficient practical help (9%) and land tenure (8%).

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