EFFECT OF SOIL EROSION ON AGRICULTURAL LAND

A CASE STUDY OF
WUSHISHI LOCAL GOVERNMENT AREA
OF NIGER STATE

BY

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CERTIFICATION.

This is to certify that this research work - effect of soil erosion on agricultureal land; A case study of Wushishi Local Government Area of Niger State, by Abubakar Ibrahim under the Supervision Dr. P. S. Akinyeye.

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epends on exchanges that take place within the soil. Plants, in
ırn serve as a vital part of the food Chain for living things, including
umans. Without soil there would be no vegetation-no crops for
od, no forest, flowers or grassland. To great extent, life on earth
epend on soil which takes a great deal of time to develop. As such,
is effectively a non renewable resource. Yet even now, in many
eas of the world, soil is under siege. Deforestation, over
velopment, and pollution from human made Chemicals are just a
w of the consequences of human activity and cave lesness. As the
ıman population grows its demand for food from crops increases,
aking soil conservation crucial.

Most soils resist short-term climatic change, but some may
ıder go irreversible change such as lateritic hardening and
nsification, podsolization, or large-scale erosion. Soil properties
ıd climatic variables such as mean annual rainfall and temperature
n be related by mathematical functions known as clime function.

The mineral component of soil is made up of an arrangement of
rticles that are less than 2.0mm (0.08 in) indiameter. Soil scientist
vide soil particles, also known as soil separates, into three main
e groups: sand, silt and clay. According to the classification scheme
ed by the united states Department of Agriculture (USDA), the
e designation are sand 0.05 to 2.00mm (0.002 to 0.08 in); silt
)02 to 0.05mm (0.00008 to 0.002 in); and day less than 0.002mm
00008 in). Depending upon the rock materials from which they
re derived, these assorted mineral particles ultimately release the
ıemical which plants depend for survival, such as potassium,
ım, magnesium, phosphorus, sulfure, Iron and manganese.

the soil can be delicate. An over aboundance of water will saturate the soil and fill pore spaces needed for the transport of oxygen. The resulting oxygen deficiency can kill plants. Fertile soils permite an exchange between plant and the atmosphere, as oxygen diffuses into the soil and is use by root for respiration. In turn, the resulting carbondioxide diffuses through spore spaces and returns to the atmosphere. This exchange is most efficient in soils with a high degree of porosity. For farmers, gardeners, land scappers, and others with professional interest in soil health, the processes of aeration - making holes in the soil surface to permite the exchange of air-is a crucial activity. The burrowing of earth worms and other soil inhabitants provides a natural and beneficial form of aeration.

Erosion can simply be defined as removal of rock and soil material by natural processes, principally running water, and wind *(Anyawun etal 1996).*

Soil erosion occur in several part of Nigeria under different geologic, climate and soil condition. But the degree of occurrence varies considerably from one part of the Country to the other: through erosion the surface of the earth is constantly being sculptured into new forms.

Soil can be eroded away by wind and water high winds can blow away loosen soils from that or little terrain. Water erosion generally occurs only on slopes, and its severity of the slope. In the Midwest much of the wind erosion occurs in winter when the ground frozen, but the upper most soil is dry and loose. Water erosion occurs during the spring with the thaning and melting action of the snow. Also duration, and intensity of rain fall played big role in water erosion.

2.3.1 *Rainfall*

The study are a experience wet and dry season. Rain fall in Wushishi Local Government is fairly reliable, it commence on early April and last for about seven (7) months. That is between late April and late October, but in some years up to early November (Anonymous 1996). The total rain fall is about 1250mm (Anonymous 1996).

2.3.2 *Temperature:*

Temperature of the study area varies from season to season (Wet and dry season) but in most cases lies within average temperature 32^{0}c (source) (Anonymous 1996)

2.4 *Drainage*

Most of the small narrow rivers floor from North to the South down to river Kaduna. River Nnamaye from the North, river Kacikota from South and river Babako from the east are all tributaries to river Kaduna.

Most of the major roads in the town have effective drainage systems for easy run off especially during raining season. These constructed drainage system empty most of the excess water into River Kaduna during the wet season.

Deforestation also lead to soil degradation on virgin land mantle of vegetation protect the soil. When rain falls on a surface of leaves of tree, some of the moisture evaporates before it can reaches the ground. Trees serves as under breaks and net work of roots helps to hold soil in place against action of both rain and wind. Agricultural and Lumbering as well as housing industrial development and high construction, however, partially or wholly destroy the protective canopy of vegetation and greatly speed up erosion of certain kinds of soil in agricultural land. As a result of large expense of bare soil. There is consent rase in the effective capacity (albedo) of the surface for solar radiation. This inturn lead to climate change. There is a considerably and often permanent loose of perennial plants, especially woody shrubs and trees. Soil erosion and impoverishment are wide of mineral and organic material and because of rapid oxidation of the remaining litter and soil carbon. Gully and sheet erosion soils by occasional heavy rainfalls tend to accumulate the erected materials on valley floors or in basin consequently agricultural land are lost, Loose of animals and human by death, inadequate water supply, lower of water table. *(Areola, 1992).*

Deforestation when natural forest are cleared without immediate replanting of new trees, the bare soil is exposed to rain and wind erosion, in condition of heavy rain the water is no longer intercepted by the leaves and branches, nor absorbed by the tree roots, and flow off the slopes as a sheet of water causing sheet erosion in agricultural lands. The fertile top soil is removed by usually deposited at the bottom of the slope. *(O.Areola 1992).*

Soil erosion can cause drought, desertification through the reduction of plant cover, sedimentation and allevation the degradation of soil structure, loose of water retention capacity, flood reduces soil profile thickness. These in turn result in a progressive decline of harvest, increase number of crop failure, wind damage to crops with uprooting or leaf damage, increase in surface runoff, reduced percolation, formation of erosion channels and gullies, reduction of surface water, crises in tree gemination. *(Areola, 1992).*

Row planting and clean weeding are generally recognised as good farming practice which improve crop production. These practice can, however, increase soil erosion if the slope of the land is over 2 percent especially with crops grown in underspaced pure stand, such as maize (Christiansso, 1981)

(Rowland 1993) it has long been recognized that leaving fields fallow helps to improve subsequent crop yield by allowing the soil to accumulate reserves of nutrients and organic matter and by decreasing the build-up of pest and diseases. When weeds are ploughed in the increased organic matter helps to improve infiltration and soil structure (Rowland, 1993) under traditional shifting cultivation system, the long fallows ensured that productivity was maintained and soil erosion minimized (Chritiansso 1981)

Intercropping often results in decreased soil erosion and conservation of soil moisture, because ground cover is greater than with monocropping. Natarja and Willey (1982) found that intercropping gave increased yield under condition of moisture stress, but not under non-stress conditions. Ikegoru (1987) concluded that

4.2 DATA ANALYSIS

The collected data were analyzed using existing statistical method. The statistical method used for this study is the percentage system. Tables were also needed for data analysis.

Table 2

	No. of Respondent	*Percentage*
Farmers	125	93.98
None Farmers	8	6.0
TOTAL	**133**	**100**

Table 2 shows the structure of occupation in the study area. The table reveals that 125 people out of the total of 133 are farmers. This represent about 94% of the total people interviewed were not farmers. This indicate that land were cultivated indiscriminately for farming. This pressure on various land can lead to soil erosion and degradation of the land as can be seen in table 2 above.

Table 3

	No. of Respondent	*Percentage*
Subsistence	130	97.6
Commercial	3	2.4
TOTAL	**133**	**100**

The result obtained from table 3 above shows that 130 people cultivate the land for purely subsistence farming. This represent about 97.6%. 3 of the respondents cultivate the land for extensive farming. This represent about 2.4%. This also indicat that, there is much pressure on land, and this inturn encourage soil erosion and land degradation.

The result obtained from the questionnaire shows that only 25 people (18.8%) of the respondents have increase in production every year. Whereas 108 people (81.2%) have decrease in production/ yield. This indicates that the land used for cultivation is fast loosing its fertility.

Table 4

	No. of Respondent	*Percentage*
Increase	25	18.8
Decrease	108	81.2
TOTAL	**133**	**100**

From the result obtained from table 5 below, majority of the respondents indicate that what lead to decrease in yield/production is as a result of poor fertility a total of 98 people (73.7%) attributed the decrease in yield to poor fertility of the soil. 18.8% however, blamed poor yield to poor seedlings. They claim that most of seedling we re already bad before planting/sowing take place. 75% however blamed poor yield on poor farming practice. This can be seen in Table 5 below.

Table 5

	No. of Respondent	*Percentage*
Poor fertility	98	73.7
Poor seed	25	18.8
Poor farming practice	10	7.5
TOTAL	**133**	**100**

Table 6 below indicates that 22.6% of the respondents use organic manure to increase the fertility of their farmers. 56.4% use inorganic fertilizer to increase the fertility of their agricultural land, 17.3% embark on other farming system such as crop rotation to increase their farm land fertility. While 3.8% do not hinge at all to increase the fertility of the farmland for the fact that they don't rear animals and they cannot afford to purchase inorganic fertilizer.

Table 6

	No. of Respondents	*Percentage*
Application of organic manure	30	22.6
Application of inorganic fertilizer	75	56.4
Changing farming system	23	17.3
Nothing at all	5	3.8
TOTAL	**133**	**100**

Source: compiled from field survey.

It is often very necessary to know if the farmers are adequately informed about new innovative and idea about farming system. This

is carried out by extension workers. Table 7 be below shows that extension workers have not been visiting the farmers. About 77.4% of the respondents were not visited by these workers. While only about 22.6% claimed they were visited by the workers. This indicates that farmers were not informed about new methods/techniques of combating soil erosion so as to avoid soil degradation.

Table 7

	No. of Respondent	*%*
NO	103	77.4
YES	30	22.6
TOTAL	**133**	**100**

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APPENDIX 1

FEDERAL UNIVERSITY OF TECHNOLOGY MINNA.

I am undertaking areserch work on " Effect of soil erosion on agricultural land".

Please assist me by answering those questions below, given to be the best of your knowledge. All information given shall be treated considentially.

SECTION A PERSONAL DATA.

1. Name of correspondant (optional)
2. Age
   (a) Lessthan 18 years (b) 19-32 years (c) 32-47 yrs
   (d) 48 years above.
3. Marital Status
   (a) Single (b) Married

SECTION B

1. Are you a famer
   (a) Yes (b) No
2. For how long have you been farming
   (a) lessthan 10 years (b) 11-20 years
   (c) 20 year above
3. What type of farming did you practise.
   (a) Subsistance farming (b) Commercial farming

4. Did you have increase in yield every year
   (a) Yes (b) No
5. If No what leads to decrease in production.
   (a) Poor fertility (b) Poor seed (c) Poor farming practise system.

6. How did you increase fertility of your agricultural land.
   (a) Application of organic manure
   (b) Application of inorganic fertilizer
   (c) Changing farming system
   (d) Notening is done at all

7. Did Agricultural Extension worker come to your farms.
   (a) Yes
   (b) No

8. What effect did erosion have in your farm land.
   (a) Carry away plant nutrient
   (b) Destroy crops
   (c) Cause drought
   (d) All of above.

9. What is your suggestion to ministry of agrculture on soil erosion.