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## EROSION PROBLEM IN IKA ENVIRONS: CAUSES AND FORMS

**Ogboi, E and Odeh, H**  
**Department of Agricultural Technology**  
**Delta State Polytechnic, Ozoro.**  
E-mail: [Ogboied@gmail.com](mailto:Ogboied@gmail.com).

### ABSTRACT

This work was carried out with the aim of identifying the causes of erosion problems and the forms of soil erosion existing in Ika environs. Data were collected through reconnaissance survey and questionnaires between 2009 and 2010. Man was identified to be majorly responsible for the erosion problem in Ika environs through his devices activities such as poor constructional works and bad farming practices that exposed the soil to agent of erosion. Twenty eight gully sites were identified and these ranged between 1-300 meters long, 1-20 meters deep and 1-5 meters wide and these were common on steep slopes and exposed area. Though sheet erosion sites were also identified but very normal in all the areas of study. It was therefore suggested that practices that will continually ensure proper protective cover of the soil should be adopted.

**Keywords: Erosion, Gully, Sites, Steep.**

### INTRODUCTION

Life on earth is threatened by rapid development and civilization (Myers, 1986). Civilization depends on man's ability and effectiveness to exploit the natural resources of the biosphere. Soil is one of the natural resources which may be exhausted or deteriorated as a result of continuous exploitation. The intensive exploitation of soil for agricultural production and capital construction in almost all branches of the national economy of most countries has gradually disturbed the natural soil cover and has exposed the soil surface to agents of erosion (Holy 1982 and Akamigbo, 1986). Soil erosion problem is widespread all over the world. All countries, rich or poor, arid or humid, cool or tropical suffer it (Wood 1995). Erosion problem is a threat to continue agricultural activities and food productions as well as environment sustainability. It has robbed the world of vast arable land. The rate at which erosion is operating has reached an extent that calls for universal concern. It was observed in 1980, that 25 million tonnes of topsoil are lost annually in Nigeria (Onyechoa, 1980). In 1993, Food and Agricultural Organization (FAO) reports that between 15 and 20 million hectares of land are lost annually to soil erosion. In 1996, the Federal Ministry of Agriculture reports that 35 million tonnes of topsoil are lost annually to erosion in Nigeria. In 2006, she reports that the rate of lost has increased from 35 million tones in 1996 to 87 million tonnes of topsoil in 2006. Myers (1986) observed that as a result of erosion, land is being lost from productive use at an alarming rate over the last 7000 years since man settled down and depend on sedentary agriculture. He estimated that, 430 million hectares of cropland and grazing land have been lost or severely degraded. Moreso, about 20 billion hectares of land world wide has been estimated to be lost to erosion in 2020 if nothing is done to conserve the environment.

Erosion has robbed the world good vast arable land. One may now ask some pertinent questions. Is the world running out of good arable land?, can the eroded and degraded lands be restored?, can the world feed its projected stable population of 10.5 billion?. Accelerated erosion is apparently a big factor in the equation pertaining to these issues. In Delta State, most areas especially in Northern geographical zone have been plagued by soil erosion. Ika environs are one of the major areas in Northern geographical zone of Delta State seriously suffering from erosion problem. It therefore becomes very important to investigate the major causes of erosion problem in Ika environs. Thus, the major objective of this work is to investigate the causes of erosion problem in Ika environs. Other are: to identify the forms of soil erosion and suggest on how erosion problem can be reduced.

## **MATERIALS AND METHODS**

This work was carried out in three different geographical zones of Ika environs (Northern, Central and Southern) represented by Boji, Boji Owa and Agbor, Ute-Okpu and Abavo respectively. Ika is located between latitudes  $5^{\circ} 43''N$  and  $6^{\circ}03''N$  of the Equator and longitudes  $6^{\circ}00''E$  and  $6^{\circ} 25''E$  of the Greenwich Meridian. It has an average annual rainfall ranging from 2300 to 2500mm and mean annual temperature range of 28-30°C (Nwajei, 1993). The vegetation was formerly rainforest but has been replaced by Derived Guinea Savannah Vegetation (Ofunne, 1993). Its altitudinal position is 250m above sea level. The major occupation of the people is farming. Reconnaissance survey of the study area was conducted and thereafter, various sites of forms of erosion identified were measured with measuring tape to know the length, width and depth of each erosion form site. Moreso, questionnaires on erosion problem were administered purposefully to 500 respondents in the areas of study. All data collected were analysed in percentages.

## **RESULTS**

Table 1 shows the bio-data of the respondents and it indicated that 60% of the respondents are female and 40% are male. The majority of the respondents (58%) are between 30-39 years and 70% are married. The educational attainment of the respondents shows that the least educational status stopped at primary school level. The majority of the respondents (50%) attained tertiary school. From the table, 30% of the respondents are farmers 25% civil servants and business men and women respectively while 10% each are students and applicants. Having the highest respondents (30%) as farmers and also being the major occupation of Ika environs, many pressures may be on the land as a result of farming, bush burning and reduction in fallow period. Table 2 shows the awareness of erosion problem and revealed that all the respondents (100%) are fully aware of the erosion problem. Majority of the respondents (45%) agreed that the problem manifests via: washing away of soil particles, de-silting of gutters/ water channel, destruction of roads and house. In addition, 40% of the respondents stated that this problem of erosion started 20 years ago. While 30% stated 10 years ago and 5% stated 2years ago. The table also revealed that erosion is noticed more in cultivated farm lands, exposed/bare compounds, on poorly constructed road's site and in place of concentrated buildings. Table 3 shows the causes of erosion problem. It revealed that majority of the respondents (85%) indicated that man is the major factor responsible for erosion problem, while 10% and 5% indicated nature

respectively. The respondents further stated that man contributes to erosion problem through poor construction works, massive deforestation, continuous farming/cultivation, destruction of vegetative cover, over cropping, farming down the slope, farming of marginal land, over cultivation and regular burning of bushes. The table further revealed as opined by 80% of the respondents that man is responsible for erosion because erosion problem is noticed more in areas of man's interferences. While little or no evidence of erosion is noticed in an undisturbed areas. However, this problem is more common during rainy season as observed by 70% of the respondents because erosion within the zone is mostly caused by water (rain) and most man's activities; especially farming is carried out during the rainy season. The forms of erosion identified in the study area as shown in table (4) are Gully and Sheet erosion. Number of gully sites identified were 28. Twenty (20) sites were identified within the northern zone, 6 sites were found within the central zone while 2 sites were identified within the southern zone. These gully sites were between 1 and 3000 meters long, 1-20 meters deep and 1-5 meters wide. They were found mostly on steep slope and road edges where conservation gutters were not build or constructed. Sheet erosion sites were observed in all the zones of study and were very common on most compounds and farm lands that lack vegetative cover and on gentle slope areas. Lack of vegetative cover in most of the areas was attributed to clear weeding of grasses, deforestation, clearing of bushes, continuous farming, and bush burning. However, the sheet erosion observed, is within the permissible limit as it is not disturbing the farming activities neither was the rate of soil particle transfer higher than the rate of replacement. It is very natural and gradual and can be referred to one of the major processes of soil formation in the areas of study (Akamigbo, 1986).

**TABLE 1: Bio- Data of the respondents**

S/N	Variables	Frequency(IES)	Percentages (%)
1.	<b>Sex</b>		
	(a) Male	200	40
	(b) Female	300	60
2.	<b>Age: (years)</b>		
	(a) Less than 20	10	2
	(b) Between 21-29	50	10
	(c) Between 30-39	250	50
	(d) Between 40-49	125	25
	(e) Between 50-59	50	10
	(f) Above 60	15	3
3.	<b>Education qualification:</b>		
	(a) Attained Primary School	100	20
	(b) Attained Secondary School	150	30
	(c) Attained Tertiary School		50
		250	

4.	Occupation of the respondents (a) Civil Servants (b) Farmer (c) Business (d) Applicant (e) Student	125 150 125 50 50	25 30 25 10 10
5.	Marital Status (a) Single (b) Married	150 350	30 70

**Table 2: Awareness of erosion problem**

S/N	Variables	Frequency (IES)	Percentage (%)
1.	Erosion problem awareness (a) Yes (b) No	500 -	100 -
2.	Manifestation of erosion problem: (a) Washing away of soil practices (b) De sitting of gutters/channels (c) Destruction of road (d) Destruction of building/houses (e) All of the above	75 50 75 75 225	15 10 15 15 45
3.	History of occurrence of erosion problem: (a) At about 10 years ago (b) Over 20 years ago (c) Just 5 years ago (d) Not more than 2 years ago	150 200 125 25	30 40 25 5
4.	Noticeable areas of erosion occurrence (a) In a cultivated farm land (b) In a exposed /bare compound (c) Under forested/vegetative cover (d) In a poorly constructed roads (e) In places of concentrated building (f) In all of the above except forested areas (g) In all of the above	125 75 5 50 50 150 45	25 15 1 10 10 30 9

**Table 3: Causes of erosion problem**

S/N	Variables	Frequency (IES)	Percentage (%)
1.	Factors responsible for erosion problem: (c) Man (d) Nature (e) Combination of both	425 50 25	85 10 5
2.	How man causes erosion problem: (f) Poor construction work (g) Massive deforestation (h) Continuous farming/ cultivation (i) Destruction of vegetative / ground cover over cropping (j) Farming down the slope (k) Farming on marginal land (l) Overgrazing (m) Over cultivation (n) Regular bush burning	50 50 50 50 50 50 50 50 50 50	10 10 10 10 10 10 10 10 10 10
3.	Why man is chosen: (a) Erosion problem is more noticed in areas of man interference (b) Little or no evidence of erosion in an undisturbed areas (c) Combination of both (A & B)	400 50 50	80 10 10
4.	Seasons of most occurrence (a) Rainy (b) Dry (c) Both	350 50 100	70 10 20
5.	Reasons for 70% in 4 above: (a) Rainfall / water is the agent of erosion in the area (b) Erosion is intensified by most farming activities carried out in the rainy season	250 250	50 50

Table 4: Forms of Erosion.

<b>Zones of Study</b>	<b>Forms of Erosion</b>	<b>Number</b>	<b>Length (M)</b>	<b>Depth (M)</b>	<b>Width (M)</b>	<b>Terrain</b>	<b>Soil Texture</b>	<b>Sites of Occurrence</b>
Northern Zone	Gully	20	10-3,000	4-20	2-5	Steep slope	Sandy loam	Open road edges
	Sheet	Many	N.D	N.D	N.D	Gentle slope / level	Sandy loam	Open farm land
Central zone	Gully	6	2-1,500	2-10	1-4	Steep slope	Sandy loam	Road sites
	Sheet	Many	N.D	N.D	N.D	Level ground / gentle slope	Sandy loam	Open farm land and compound
Southern zone	Gully	2	1-20	1-1.5	1-1.2	Gentle slope	Sandy loam	Road sires sites
	Sheet	Many	N.D	N.D	N.D	Gentle slope/level ground	Sandy loam	Open farm lands

N.D: Not determined.

M = Meters

**DISCUSSIONS**

The bio-data of the respondents indicated that 58% are between 30-39 years and 70% are married. This means that greater percentage of the respondents are in the climax of maturity and are active and hence most of the solutions to erosion problems will be easily accepted by this group. Moreso, 50% of the respondents attained tertiary school and hence the possibility of receiving and adopting improved practices of erosion control measures will be very high. Because literacy facilitates the use of communication channels. It was observed that all the respondents (100%) were fully aware of the erosion problem which manifest via: washing away of soil particles, de-silting of gutter/water channels. The observation conforms with Ofomata (1985) who stated that erosion problem usually manifest through detachment and washing away of soil particles, de-silting of gutters, water channels, destruction of roads and buildings, exposures of roots of plants, trees and foundations of buildings. The direct implication of the manifestation is unconducive environment for the people within the area of occurrence. It was also noted from the result that, there was variation on the inception of erosion problem within the area of study between the range of 2 and 20 years. This variation on the years of erosion problems inception may be attributed to variation in topography, road networking/ construction patterns, civilization and development projects within the areas of study. Most areas in Northern Ika having more problems of erosion had earlier civilization and development, more buildings and many road networks compared to other areas of study.

Thus, northern zone of Ika may have started experiencing erosion problem over 20 years ago than other areas that have many fallow grounds to be developed. It was observed that erosion problem is more common in cultivated farm land, exposed/bare compounds, on poorly constructed road site and in places of concentrated buildings. The areas plagued by soil erosion has the vegetative cover removed either by cultivation or construction works or bush burning. Man was identified by 85% of the respondents to be responsible for erosion problem in the area of study. This findings correlates with Akamigbo (1993). He observed that erosion occurs when man disturbs the vegetative cover and through improper positioning of houses against natural drains and concreting of most compounds with impermeable materials. Gully erosion was one of the major forms of erosion identified in the area of study. The respondents indicated that the gully erosion sites were very common on steep slopes and road edges without conservation gutters and protective cover. This finding agrees with Ofomata (1985) who observed that erosion problem is very common on steep slopes and areas exposed to adverse effect of rain drop. It was observed that most roads were constructed without due consideration of the physical factors or the possible consequences of such land scape modification. The removal of vegetation during road construction without replacement exposes the soil to agents of denudation. According to Onwuka (2005), gully erosion on road is due to flow concentration from civil engineering works. Gully erosion sites were more in number in the Northern zone of Ika (20 sites) compared to the other two zones Central and Southern zones with 6 and 2 sites respectively. This may be attributed to human settlement, massive floods and tiled concreted compounds.

## **SUGGESTION AND CONCLUSION**

Since erosion problem is initiated when the vegetative cover is disturbed, every available means to ensure that the vegetative cover of the soil is intact should be put in place. Hence, planting of grasses of different varieties such as Bahama grass (*Cynodon dactylon*), Carpet grass (*Aglonopus compressus*), Giant Star grass (*Cynodon plectoslachus*) in every exposed / bare compound and open area should be practiced. Moreso, tree crops like *Laucaena leucocephala*, *Treculia africana*, *Azairachta indica*, *Hyphaena theheica*; *Acacia albida* should be planted in areas already deforested and affected by erosion. Open / bare road edges should be protected with grasses capable of binding the soil particles together. Every road constructed especially on a sloppy terrain should have solid conservation gutters capable of withstanding the magnitude of the flood. To avoid furtherance of erosion menace to areas unplagued, Regional / City planning should be done by Regional/ City or Town planners so that buildings / construction works will be done in such a way that free flow of water in its natural flow channels will not be obstructed. Fragile / marginal areas should be set aside for conservation parks and gardens. Bad farming practices such as slope wise cultivation, over cropping, over grazing, continuous cultivation, indiscriminate bush burning and deforestation should be avoided. Compounds exposed to direct impact of rain drops should be planted with cover / carpet grass to prevent particle detachment and enhance proper water infiltration into the soil. Government both at Local, State and Federal levels should intensity efforts to arrest erosion menace by providing fund for erosion control. Moreso, laws forbidding activities by man that triggers erosion processes should be enacted before the whole place is literally washed away and floated in flood. Therefore, conservation task force comprising of soil scientists, engineers, conservationists, extensionists, sociologists and economists should be established to enforce the suggested measures of combating erosion problems. Erosion problem is prominent in Ika environs especially in Northern zone. Man as the prime factor responsible for erosion problem through his activities should have a re-think on his activities in order to ensure sustainability of Ika environs for the next generation.

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