PDF - EFFECT OF SOIL EROSION ON ARABLE AGRICULTURAL PRODUCTION IN ASABA AND IT'S ENVIRONS, DELTA STATE - researchcub.info**CHAPTER ONE**

BACKGROUND OF THE STUDY

1.1 INTRODUCTION

Erosion is defined as the washing away of the top soil due to excessive rainfall resulting to surface run off or as a result of denudation and weathering processes. Agriculture as defined by Robert (2015) is the growing of crops and rearing of animals for man's benefit. In view of the above definitions, it could be seen that agriculture depends on land for its sustenance. Carey and Oettli (2006) have observed that man through his anthropogenic activities has degraded the natural land resources which have in turn created erosional problems.

In recent times, studies have shown that erosion has become a worldwide environmental issue that has called for urgent attention and global redress (Edward, 2016). This shows that erosion has become a menace in the modern day society especially in the tropical regions. It has been observed that erosion has a direct effect on arable crop production and agricultural productivity (Carey and Oetti, 2006).

Soil carried off in rain or irrigation water can lead to sedimentation of rivers, lakes and coastal areas (Edward, 2016). The problem is exacerbated if there is no vegetation left along the banks of rivers and other watercourses to hold the soil. This soil carried away by erosional processes is mostly needed for arable agriculture. Sedimentation mainly caused by erosion has caused serious damage to freshwater and marine habitats, as well as the local communities that depend on these habitats. For example, people living in the river banks of River Niger often experience flooding of agricultural produce which results to pre-mature harvest during the rainy season. This trend is attributed to changes in the courses of waterways resulting from farming-related erosion and the silt deposition this causes (Gelder and Dros, 2006). They added that it's not just the eroded soil that is damaging: pesticides and fertilizers carried in rainwater and irrigation runoff can pollute waterways and harm wildlife.

Land degradation stretches to about 30 % of the total global land area (Carey and Oettli, 2006). The problem persists, with a reported loss rate of about 10 million hectares per year. In reality, the situation may be much more worrying. Over the last 5 decades, increases in agricultural productivity have made it possible to produce more crops on the same amount of land. But the problem is that because agricultural land is often degraded and almost useless, producers keep on moving to more productive land. Globally, the land used and abandoned in the last 50 years may be equal to the amount of land used today (Carey and Oettli, 2006).

Vegetation strongly affects soil characteristics including soil volume; chemistry and texture which feedback affects various vegetation characteristics including productivity and structure (Ndakara and Efe, 2010). Economic concerns will also emerge with rapid urban growth examples include accidental or intentionally started fires will increase, costing additional dollars and resources to suppress the flames that threatens homes, business and buildings. Threats to nature having information in cities impact to these endangered species and protected areas enables planners to shape the growth of cities before it is too late (Ndakara and Abotutu, 2010). However, the lack of funding especially in developing countries may prevent the implementation of smart-growing plans and expanded public transit system, paving the way for more vehicles and driven contributing more green house gases to the atmosphere a major cause of climate change (Efe and Ndakara, 2010).

Recent studies have shown that erosion caused by deforestation can also lead to increased flooding of farms and damage of agricultural produce (Nkonya, 2016). In plantations, for example, flooding occurs partly because of deforestation (soil is no longer there to absorb the water) and partly because of poorly constructed plantation drainage systems (Nkonya, 2016). This study is carried out to investigate the effect of soil erosion on arable agricultural production with special emphasis on the case of Asaba and it's environ.

1.2 STATEMENT OF RESEARCH PROBLEM

The major problems which this study seeks to address includes:

Loss of cropland: Erosion often causes loss of cropland and low agricultural productivity in most rural farms. Since humans worldwide obtain more than 99.7% of their food (calories) from the land and less than 0.3% from the oceans and aquatic ecosystems, preserving cropland and maintaining soil fertility should be of the highest importance to human welfare (David and Michael, 2013). This loss of cropland to the effects of soil erosion often results in the creation of new cropland out of forestland and pastureland and the need to enrich these new croplands with inputs of nitrogen and phosphate fertilizers (Pimentel, 2013).

Soil erosion is one of the most serious threats facing world food production. Each year about 10 million ha of cropland are lost due to soil erosion, thus reducing the cropland available for world food production (David and Michael, 2013). The loss of cropland is a serious problem because the World Health Organization and the Food and Agricultural Organization report that two-thirds of the world population is malnourished. Overall, soil is being lost from agricultural areas 10 to 40 times faster than the rate of soil formation imperiling humanity's food security (David and Michael, 2013).

Loss of farmlands: Erosion occurs after torrential down pour of rainfall with very high intensity leading to destruction of farmlands which affects agricultural productivity. It is mostly caused by the clearing away of the natural vegetation for agricultural activities (Nkonya, 2016). When natural vegetation is cleared and when farmland is ploughed, the exposed topsoil is often blown away by wind or washed away by rain or perhaps erosion thereby causing poor agricultural crop yield (FAO, 2006; Edward, 2016). This leads to reduced soil fertility and degraded land. Other major crops mostly affected by soil erosion include coffee, cassava, cotton, corn, palm oil, rice, sorghum, tea, tobacco, and wheat (Carey and Oettli, 2006).

Loss of natural ecosystem: Another serious problem affecting the sustainability of the rainforest vegetation and the natural ecosystem is soil erosion. Soil erosion remains the world's biggest environmental problems affecting the rainforest vegetation as well as threatening the sustainability of systems, and thereby the security of their major components (Ndakara and Efe, 2010).

Soil infertility: The loss of soil from land surfaces by erosion is widespread and reduces the productivity of all natural ecosystems as well as agricultural, forest, and pasture ecosystems (Troeh, *et al.,* 2004; Lal, *et al.,* 2010; Pimentel, *et al,* 2015). Concurrently with the growing human population, soil erosion, water availability, climate change due to fossil fuel consumption, eutrophication of inland and coastal marine bodies of water, and loss of biodiversity rank as the prime environmental problems throughout the world.

Loss of soil nutrient: Currently nearly 66% of the world population is malnourished (WHO, 2013; Pimentel and Satkiewicz, 2013), the largest number of malnourished people ever (malnutrition: faulty nutrition due to inadequate or unbalanced intake of nutrients or their impaired assimilation or utilization) (Gove, 2011). With the world population now over seven billion and expected to reach 9.3 billion by 2050, more food will be needed (UN, 2011). Consider at present that more than 99.7% of human food (calories) comes from the land (FOA, 2004), while less than 0.3% comes from the marine and aquatic ecosystems. Maintaining and

augmenting the world food-supply basically depends on the productivity and quality of all agricultural soils.

Damage to arable agricultural land: Human induced soil erosion and associated damage to all agricultural land over many years have resulted in the loss of valuable agricultural land due to abandonment and reduced productivity of the remaining land which is partly made up for by the addition of nitrogen and phosphate fertilizers (Pimentel, *et al.,* 2015; Young, 2008; Lal, 2006; Pimentel, 2006). In addition, soil erosion reduces the valuable diversity of plants, animals, and soil microorganisms.

Soil erosion is a disastrous environmental problem throughout the world. Erosion is a slow insidious problem that is continuous. Indeed, 1 mm of soil, easily lost in one rain or wind storm, is so minute that its loss goes unnoticed by the farmer and others. Yet this loss of soil over a hectare of cropland amounts to about 15 t/ha. Replenishing this amount of soil under agricultural conditions requires approximately 20 years, meanwhile the lost soil is not available to support crops. Along with the loss of soil is the loss of water, nutrients, soil organic matter, and soil biota. The soil system is severely harmed when soil erosion is allowed to occur.

Food insecurity: Future food security is threatened where cropland degradation is allowed to occur because of significantly reduced crop productivity. Shortages of cropland are already having negative impacts on world food production (Pimentel, *et al.,* 2009). For example, the Food and Agricultural Organization (FAO) of the United Nations reports that the per capita grain production has been declining for more than two decades, based on the availability of grains. Although grain yields per hectare in both developed and developing nations are still increasing, these increases are slowing.

Worldwide, soil erosion continues unabated while the human population continues to increase rapidly and 66% of the world population is now malnourished (WHO, 2013). If soil conservation is ignored and population control is ignored, more malnourished people and more deaths will occur. It is against this background that this study is therefore carried out to address the aforementioned problems and proffer lasting solution and management techniques.

1.3 AIM AND OBECTIVES

The aim of this study is to examine the effect of soil erosion on arable agricultural production. Therefore, the specific objectives are to:

identify the prevailing types of soil erosion;

ascertain the causes of soil erosion in the study area;

examine the practice of arable agricultural production;

examine the soil characteristics in the arable farm areas and control areas;

Suggest possible ecological approaches to manage the degraded farm-land areas.

1.4 RESEARCH HYPOTHESES

In this study, the following hypotheses was drawn to act as guide to the researcher.

There is no significant difference in soil bulk density degraded and control sites soils at the 0.05 level of confidence.

There is no significance difference in soil exchangeable potassium between degraded and control sites at the 0.05 level of confidence.

1.5 SIGNIFICANCE OF THE STUDY

This study will cover the whole of Asaba and will critically evaluate the effect of soil erosion on arable agricultural production in the study area. It would offer suggestion (s) on the causes and effects of soil erosion.

Therefore, the study will help to unfold the deteriorating effect of soil erosion and major farmland areas in the study area mostly affected by soil erosion. The study will also take a deeper view on the causes of soil erosion in Asaba, and also to look at or proffer solution (s) to combat the enormous problems of soil erosion on the urban landscapes as well as rural landscapes in the study area.

1.6 SCOPE AND LIMITATION OF THE STUDY

The scope of this study was strictly based on effect of soil erosion on arable agricultural production in Asaba; and to offer suggestion on the causes and effects of soil erosion arable farmlands as well as both the urban and rural landscape.

The scope of this study will cover farmlands and agricultural sites. The scope of the study was initially deigned to cover all the quarters in Asaba which includes; Ibusa, Inebisi, Ezenei, Okpanam, Okwe, Okoh, Ogbe-Ogonogo, and Anwai. However, because of time and financial constraints, the scope was scaled down. In this regard only selected major quarters were covered in this study. The time frame was inadequate to properly carry out extensive field work.

These limitations notwithstanding, the data gathered from this study and research finding will be of invaluable assistance of the study of urban sprawl and urban compaction.

1.7 STUDY AREA

1.7.1 Location, Size and Boundary

Geographically, Asaba is located in the North-West region of Delta State and falls under the Delta-North Senatorial District. Asaba is located in the South-South Geopolitical zone of Nigeria and in the Niger Delta Region. Asaba covers a total land area of approximately 189km^2 (73mile^2) (Opone, 2005). It lies between the geographical coordinate of latitudes 06^0 05^1N to 06^0 25^1N and longitudes 06^0 05^1E to 06^0 30^1E of the Greenwich meridian.

Asaba shares boundary in the North by Oshimili North Local Government Area, in the West by Aniocha South Local Government Area, in the East by Onitsha South Local Government Area of Anambra State and in the South by Ndokwa East Local Government Area of Delta State. Asaba shares boundary linguistically in the West with Aniocha language speakers, in the East with the Igbo Speaking group, in the North with the Oshimili Speakers and in the South with the Ukwani speakers. The dialect which belongs to the Igbo group is among one of the major ethnic groups in Delta State and Nigeria at large.

Asaba is one of the biggest cities in Delta State which developed into a metropolis. It is found in Oshimili South Local Government Area of Delta State. Neighborhoods in Asaba include; Okwe Community, Onitsha, Igodo, Ogwashi-Uku, Anwai, Illah, Onicha-Olona, Onicha-Ugbo, Ubulu-Uku, and a host of others.

Asaba as an urban area has experienced a rapid increase in size over the years, due to the presence of various administrative offices and governmental functions it performs both as the administrative headquarters of Oshimili Local Government Area of Delta State where the Council Secretariat is situated along Asaba-Onitsha expressway; and as the capital of Delta State. This is also as a result of the presence of the international airport in the area. This attracts people from surrounding area, to itself, because of its employment opportunities thus resulting in over-crowding, increased demand for land basically meant for agricultural purpose leading to shortage of land for farm practices.

The implication of these increase in size, is that it has led to population explosion in urban areas of Asaba which has in turn resulted in the development of its surrounding rural areas both in expansion and infrastructural development due to urban expansion. This has in turn had an adverse effect on the

inhabitants of Asaba and its environs especially on their agricultural system.

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