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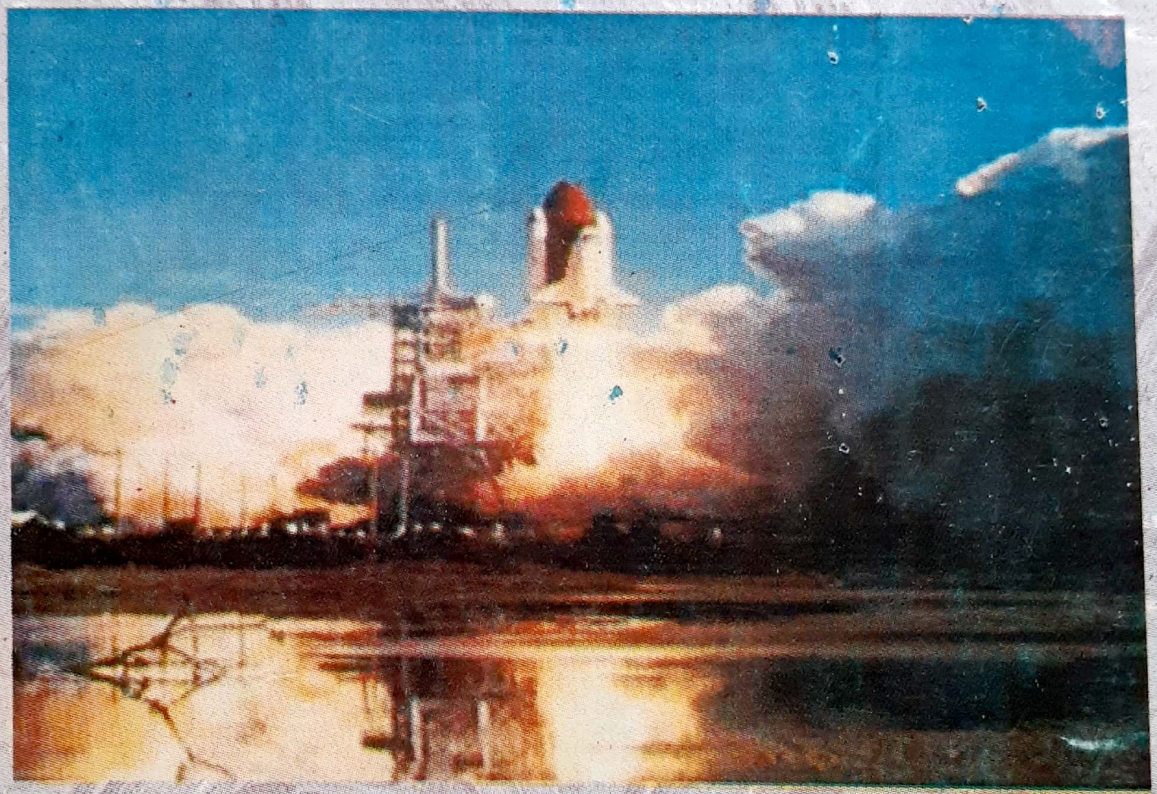

BOOK OF READINGS

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Environmental Effects Of The Federal University Of Technology, Minna Drainage System On The Location Downstream

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Abstract

No construction project on the earth can be posible without changing the patterns of sequence of the ecosystem around the area. Terrestrial photographs were used both of dry and wet season during the field observation to give first hand information of the study area. The discharge velocity were calculated for the stream flow. The need to study the river chanel and other related natural activities of features that associated with them such as flooding, degradation and erosion in the downstream location are not supposed to given a second thought because this will assist in the monitoring of such river channel. Direct methods were employed to measure the speed of the running channel during the field surveys.

Introduction

After rainfall, water flows down the sloppy ground areas into near by streams. The runoff drains into some major Rivers and finally empties into lakes oceans and into the ground and becomes underground water and may find it's way out through a sparing and into a river. This is the way the entire land point of the earth surface drained. In Nigeria, rivers are fed by flood and springs and this depends on the amount of rainfall.

The volume of a river varies with the quality of the supply of rainwater annually. In the wet season, they increase in valume while in the dry season, their volume decreases, exposing pebbles and bare rocks on their beds and some may dryup completely especially in Northern Nigeria. Under this condition, Navigation on the rivers is obviously impossible because boats cannot sail comfortably on fast flowing and shallow rivers. . Because of high temperature and humidity. The rock weather easily and flood water then seeps into the weathered materials down into the rivers that is why the rivers become turbid but relatively clean and almost sparking in the dry season.

Some rivers receive more flood water and have more tributaries, thus flow faster and more powerful than others many of the tributaries cut into valley of the weaker rivers and may "behead" them in a process called river capture. Some of the rivers flow smothly because th surface rocks over which they flow uniform.

Most of the river course are interrupted by gorges, rapids and waterfalls (Iloeje, 1980) Economically, some of the rivers offer possible production of hydroelectric power and Irrigation purpose in dry areas of the regions. Also they provide basic water for domestic and industrial uses and as well as a sources of freahwater fish used for food and as a trading commodity. These rivers form the nuclei for the intergrated development activities of the River basin development authorities in Nigeria.

Hydrologically, the natural run-off of the earths water such as a stream and rivers form an area of origin under the influence of gravity is reffered to as " Drainage". Also, it can be said to be a system of water courses. Drainage is the area of land used drains water, sediment and dissolved material to a common outlet at some point along a stream channel.

The term is synonymous with watershed in American usage and useage with catchments in most of the countries

Aim and Objectives

The aim of the study is to assess the environmental impact of federal university of technology Minna drainage system on the down stream location.

The specific objectives includes;

i. Analysis of stream velocity at the drainage and downstream location.
ii. Analysis of stream bank erosion at the downstream location.
iii. Vegetal cover assessment downstream location.

Description of River Bosso

River Bosso is located north of Minna municipal area. The river Originated from Gbako Hill and Joins river Hannun locito, which is a tributary of river Tagwai. It runs from thus confluence through the Bosso campus of Federal University of Technology, Minna into the southwestern part of Minna, Bosso river joined river Suka behind Federal University of Technology in Bosso minna (campus) and two rivers drains into river gbako, Niger State water Sanitation board, Minna.

The part of the river which runs through the Federal University of Technology, Minna is on the plat form constructed to ease the drainage in the area.

Description of The Study Area

The study area is Bosso drainage system downstream location of Federal University of Technology, Minna which is located in Bosso, Bosso local government area of Niger State. Niger State is located between latitude $4^{0}00$ and latitude $7^{0}00$ with longitude $8^{0}00$ – $11^{0}00$, Niger State lies within the middles belt of Nigeria. Bosso local government area is located on latitude $9^{0}30 - 10^{0}00$' and longitude $6^{0}00$-$6^{0}30$ respectively.

The hydrology of the study area include other rivers such as Malendo, Kontagora, Eku, Kaduna, Chanchaga Gurara, Dinga and Arunza river systems. They all drains into Niger at different points. Must of the rivers are perannial and the volume of their water is controlled by the season and climatic conditions.

The amount of water or rainwater that infiltrates into the ground will depend on the topography., the vegetation cover and human activities like building and constructions also the opening fractures in the weathered rocks allows water to seep into the rocks.

The climate of the study area is discussed based on rainfall and temperature. The annaul rainfall amount has been estimate to be between 1,120mm to 1.300mm. (Adefolalu, 1991) . long hours of sunshine combined with high radiative power across the study aea resulting in high power across entire area. The study area is cold/cool to cool/warn zone with cooler sector in the north half of the study area.

The vegetation type of the area is mainly the guinea savannah type. These are marked differences which occurs at close intervals both the floristic camposition and the open character of the vegetation, which is often caused by variations in soil types topography. The grasses are between 1.5 to 3.5m high. The trees are short, bold, broad leaf trees of up to 16.5m in height.

The soil type of the study area is primarily the result of the interaction between climate, flora and fauna, parent materials and geomorphic factors over varying period of time. The surface soils are loamy sand or sandy loam. Most of these soils are gravely except the soils formed on colloidal materials.

Data Sampling And Analysis Techniques

The method used in the study are discussed base on the results obtained is based on the method of analysis described below.

Data Source

The discharge data for Bosso river was estimated at three different points of the river channel and the average was computed. The terrestial photographs were taken for wet and dry season months. The photographs showed different human activities along the channel, the vegetation and the channel character was also highlighter to show the downstream effect of the drainage.

field observation was embarked upon to give firsthand information about the study area downstream location of Federal university of technology, Minna drainage system. The obsevation was base on the aim and objective of the research work.

Discharge Stream Flow Of The Channel.

Discharge can be defined as the product of cross-sctional area of flowing watr and it's velocity. The discharge measurement was done through direct measurement of discharge. That is passing through a cross section per unit time. In the S.I unit system which is expressed in unit of cubic matres per seconds.

Velocity area method is used to calculate the discharge of the river Bosso. Discharge is then calculated as

Discharge = Cross – sectional area x velovity.

$$Q = VA$$

Where Q = discharge $M^q/3$

V = area velocity M/S

A = Cross – sectional area f the water M2

These procesdure is given by united state Geological survey, USGS (corbelt, 1962) and world meteorological organisation (WMO) (1980).

velocity measurement may be made by observing the rate of travel of a float or dye which is given by the simple equation as:-

$$\text{Velocity} = \frac{\text{Distance}}{\text{Time.}}$$

The four cardinal point Approach to vegetal cover survey. This was an approach adorted in the assessment of vegetal cover of the study area. The four cardinal approach involved the selection of points within the study area and subsequent division of such points into four cardinal point each cardinal points was survey serially and the contents were classified in terms of the constituent of the vegetal cover and area of bare ground the result was tabulated for analysis.

Total number of Ten sampling survey were carried out.each of 10 point was taken as sampling point view all the environment as a complete circle it is divided into four cardinal

points. Each sector was assumed to be composed of five types of vegetation namely shrubs, grassland, bare land, trees, and farmland.
The result was tabulated as given below

Vegetation	percentage.
Shrubs	44.65%
Grassland	4.14%
Bareland	19.9%
Farmland	27.5%

Analysis of Stream Flow

The velocity of the river channel was taken at three different point A, B. and C into distance of 10m each .

In point A We have 7, 6, 7 and 8 x = 7.2 secs
Point B. We have 5, 4.5, 5, 6 and 4 x = 4.9secs
Point C. We have 11, 10, 9, 11 and 12, x = 10.6 secs

$$\text{Velocity} = \frac{\text{Distance}}{\text{Time}}$$

For point A $= \frac{10m}{7.2\,s}$ =13m/se.

For point B $= \frac{10m}{4.9s}$ = 0.49m/sec

For point B $= \frac{10m}{10.6s}$ = 0. 94m/sec

Total Mean = 27m/sec velocity about a point
Cwss – sectional area of the river channel.

Length of the river channel,

Point A	B	C	
At mm = 4.7m	mm=6.0m	mm = 14.6m	=25.3m dry
			= 8.43m dry
Max = 12.0m	max = 27m	max = 26.6m	=65.7m
			21.9m wet

Breadth of the channel

Point A	point B	Point C	
Min = 0.25 m	min = 0 .8m	min = 1.10m	= 1.41m dry
Max = 0.20m	max = 1.4m	max = 2.3m	= 3.9m wet

DISCHANGE FOR DRY SEASON

Min = dry sason = (LX B) x velocity
= 8.43 x 1.41
= 11 .8863 x 2.7
= 32.09m^3/3

Dischange for wet season

Max = wet season = (L x B) x velocity
= 21.9 x 3.9
= 85 .41 x 2.7
= 230.607 m^3/3

Between the dry and wet season there is a different of 198. 517 $m^3/3$ which shows during wet season there is a high dischanrge which makles activities impossible in the channel, because of high flow.

Also due to the high dischare the downstream location may be liable to flood, as a result of degradation of the soil it also caurse erosion in the down strea location.

Discussion of Results

Analysis of chemical charateristics and morphology.

The drainage system of Federal University of Technology, Minna has been channelized concretized and protected at the bank along it construction., the channel had also been narrowed to accommodate flood events. The bends of the chennel upstream had been systematically restructures and cut to reduce deposits along the stream. There is difference between the structures of the stream. The downstream has meandering so much to indicate the activity of stream flow. It also indicated to be a middle course stream that moves slowy more expecially at the beginning of the dry season. And erosion doesn't take place within the channal of Federal University of Technology, Minna, deposition does not occur because of the flood flow of the stream during the rainy season.

Since the floodplain channel bed is smooth and staighter, particules from upstream are tranported to the downstrem. This is ended by the meandering nature of the downstream where alluvial deposit is evidents. The down stream is not concretizers, bank erosion transportation, and deposition takes place more them the channel in upstream.

Stream Activities and Flow Characteristics.

The stream flow has been regulated and thus has the actions of the runing water. The stream of Federal University of Technology, Minna, has been graded to eliminate erosion and deposition of alluvial material, while the down stream suffers the consequences of the increased in deposition and erosion in the face of low or slow tranportation.s

Most of the load carried through the upstream channel are deposited along the downstream channel which hampered by low discharge of velocity corrosion and channel vegetation.

The upstream was channelized and protected, the ecological in balance created the concretizer channel has not been considered in the downstream, because of th e shift in human activities from upstream to downstream, the ecology of the area has also been tempered with, which make the pressure on the stream downward has been increased.

Because the stream had been narrowed at Federal University of Technology, Minna, drainage channel it's flow had increased to carry most particles downstream. The edge at where the concretized channel meets with the unconcretised has been eroded as a mark in shift of the stream activities it has also been depened by erosion while the edge is collapsing and cascading

Human Activites

The river channel was regulated concretizer and protected upstream which make human activities imposible in the channel flow. The channel and the bank connot be use for any form of activities, like farming, send excavation, fishing and shallow well digging.

These activities have shift to downstream of the channel, which create a lot of pressure on both the bank and the flood downstream location. Also during the dry season

farmers use the advantage of the fertile alluvial flood plain of the channel to plant vegetables, the deposit at the downstream also led to excavation or evacuation of gravel sand from the river chennel downstream for building activites.

Since the downstream is not protected most of the people living by the stream as a result of population explosive created by the unniversity, empty their refuse into these stream chennel to be flow and transported during the wet season, this activities are concentrated in downstream channel because the upstream cood not be –used for the same purpose.

Conclusions

it is obvious from the reserch to see the impact of channelization of Federal University of Technology, Minna, drainage system on the downstream location, which is facing great problems of treasure, that lead to erosion and deposition at the downstream chennel.

It coold be concluded that most of the stream flow activities, human activities and stream morphologies are concentrated at downstream as a result of their shift of human achunhes from the upstream.

Recommendation

Following the result of the resaerch one would want to make the following recommendation.

1. That the downstream should be protected against human activities endengering the course of the river and ecological species
2. That refuse dumping along the river channel should be discourage against the occurrence of flood which could be felt much in the downstream than upstream
3. That the rate of deposit and erosion of the area should be study, while intensive studies should be carried out on the channel of the river course.

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