

Description of the Natural Properties, Geomorphologic Aspects and Human Activity in Matammah Area – Northern Sudan (Application of GIS)

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Abstract – The Matammah area is located in north central Sudan on the western bank of the river Nile. The locality covers the south western part of river Nile state. The study area covers about 1855Km². The hydrogeological boundary of the study area are: khor wedi in the north, river Nile in the east, Sabaloka basements complex from the south, central Africa shear zone from the west. The land surface in general is largely a plain of low relief, Individual inselbergs (or jebels) occur sporadically. Drainage pattern in the study area is the Dendritic pattern while the area is covered by sandy soil, which classified into two main groups including residual and transported soils .

Keywords –Matammah, GIS, LAND SAT.

I. INTRODUCTION

The study area is linked by paved (asphaltic) road to Khartoum; the area is characterized by tropical climate; In Matammah the mean maximum monthly temperatures range between 41 C° to 43C° in summer. The highest maximum temperature ever recorded was 45C° in May and June; the minimum temperature is 19 °C in January in winter. The rainy season extends from August to September with less than 100 mm per year rain fall, the general direction of winds in Matammah area varies according to the season during the year, and the land surface in general is largely a plain of low relief; Individual inselbergs occur sporadically. Sandy soils are common in most areas, except in the south, where clayey soils predominate. Wadis are mostly running ephemerally only during the rainy season. The Wadis mostly flow from N-NW to S-SE towards the river Nile. Sandy soil has been encountered which was classified into two main groups including residual and transported soils. Vegetations cover is very poor and sparse, bushes and small trees cover interspersed by variable thorny acacia. The population is concentrated mainly in settlement centers in towns and villages along the river Nile Banks and they depend on their economy on agro-pastoral for long times and on ground water in their water needs.

II. MATERIALS AND METHODS

Various data have been combined together to complete this work; Sudan National census of 2008 data is used to figure out the number of population and distribution of villages throughout the study area. Meteorological data of the area was used in order to get weather condition throughout the year, rainfall and wind movement. Digital Elevation Model (DEM) is used to illustrate the topographic features and to generate drainage pattern.

Satellite images were used to describe soil types and classified the vegetation cover. Global mapper, ENVI and ArcMap softwares were used to complete this study.

III. RESULTS AND DISCUSSION

1. Climate:

The area is characterized by tropical climate (dominated by semi desert conditions), In Matammah the mean maximum monthly temperatures range between 41 C° to 43C° in summer. The highest maximum temperature ever recorded was 45C° in May and June; the minimum temperature is 19 °C in January in winter. The rainy season extends from August to September with less than 100 mm per year rain fall, Khartoum meteorological authority (1960-1999). Generally the wind in the study area is dry and carrying sand and dust which move away and shift dunes (sand sheets). The general direction of winds in Matammah area varies according to the season during the year. In winter wind moves from north east direction, while in the summer from south directions, the south east winds cause precipitation in the area of study. Setana, A. (2000).

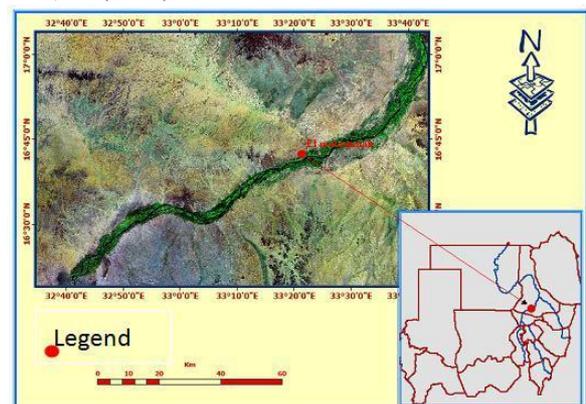


Fig.1. Location map of the study area.

2. Geomorphology aspects:

2.1 Topography:

The land surface in general is largely a plain of low relief. Individual inselbergs (or jebels) occur sporadically. Sandy soils are common in most areas, except in the south, where clayey soils predominate. Wadis are mostly running ephemerally only during the rainy season. The Wadis mostly flow from N-NW to S-SE towards the river Nile.

The Study area is generally Qoz terrain with plain topographic relief Setana, A. (2000). (fig. 2), ranging in elevation from 350 m, above mean sea-level in the east, and about 450 meters to the west.

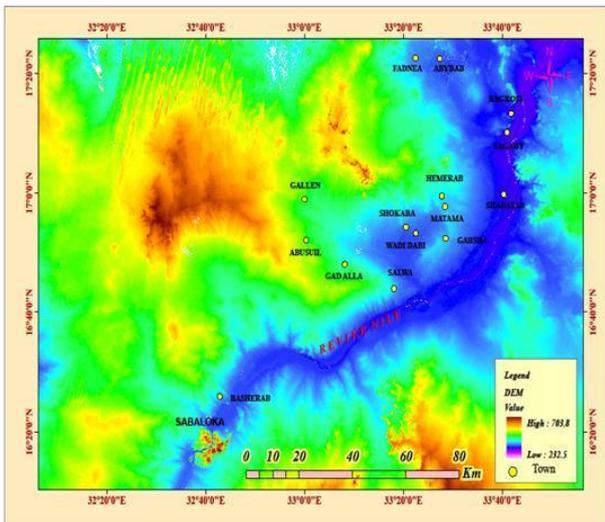


Fig.2. Topographic Map of the Study Area.

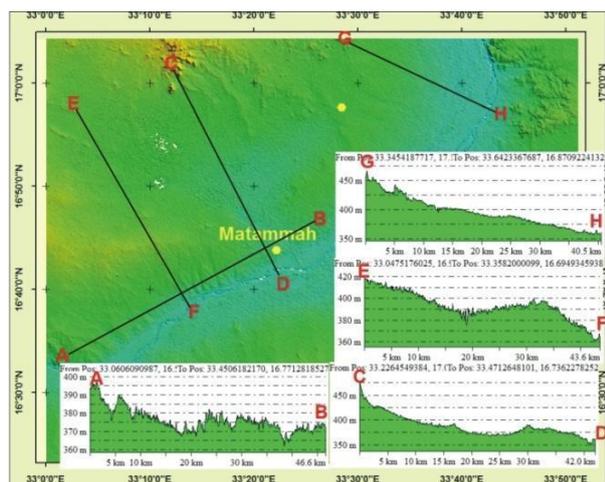


Fig.3. Topographic cross sections

2.2 Soil:

The study area is covered by sandy soil, which was classified into two main groups including residual and transported soils Setana, A. (2000). They are the result of weathering processes of the Basement rocks Complex. They are mainly made of pebbly materials, sand, clay and clayey sand. These types of soil are mostly found surrounding the basement hills. The thickness and extension of the soil cover depend on the slope, shape and the rock type of the hills.



Plate. 1. Soil cover

2.3 Drainage patterns

The River Nile is the important physiographic feature of the study area. Other drainage pattern in the study area is the Dendritic pattern which covers largely the area. Some other relatively big wadies flow towards the south direction to join Nile River, Sudan survey department (1940). The main drainage in the study area is: river Nile, wadi (ELNugoa), wadi Hamra, Husra (Fig. 3).

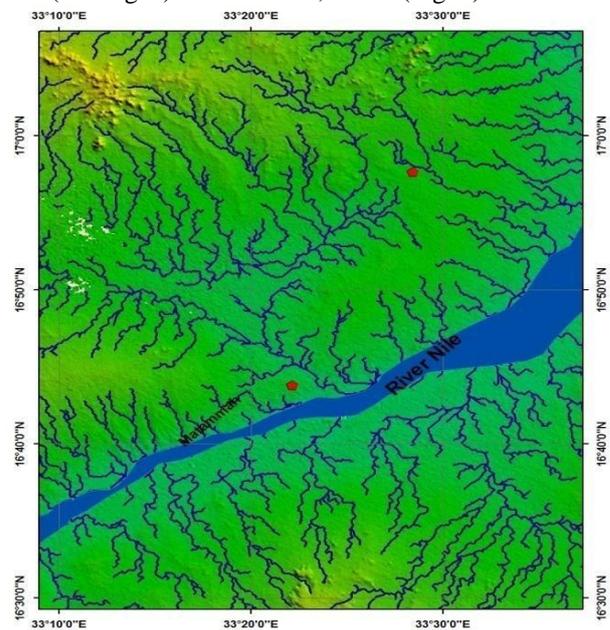


Fig.4. Main Drainage pattern in the study area.

3. Vegetation

Vegetations cover is very poor and sparse, bushes and small trees cover interspersed by variable thorny acacia, National Corporation for the forest (2003). Like Seha (*Belfaris cilianis*) and Tmam (*Panicum turgidum*) and Tepas {Nall} (*Cymbopogen nerratus*) senamka (*Cassia senna*) and Osher (*Calotropis procena*) this is a seasonal grass. This includes Acacia trees like Seyal (*Acacia Seyal*) Talh (*Acacia Spirocarpa*), Salam (*Acacia ehrenbergiana*), Sareh (*Mearua crassifolia*) Saumor (*Acacia tortilis*) and Tundub (*Capparis deciduas*) There are some trees located far from the main course of the River Nile, There are seder

(*Zizphus abyssinica*) duom (*Hyphaena thebiaca*) Haraz (*Acacia albida*) trees along the River Nile, and some other crops in the terraces of the River Nile.



Plate. 2. Vegetation cover

4. Population

In the study area, the population is concentrated mainly in settlement centers in towns and villages along the river Nile Banks. The total population of the Matammah area reaches 107.461 persons according to the census in (2008). The main tribe is Gaaliyin constituting approximately 95% of the total population. Other tribes are Shaigiya, Ababda, Fadniya, Hawaweer, Hassaniya, and other small tribes, Hammad, Y.M.A. (1999).

4.1 Activities of the population

The economy in the area has been agro-pastoral for long times. Onion, beans, vegetables etc. are cultivated along the Nile for local consumption and also as cash crops, using lift-irrigation on the river Nile banks and on the islands. The Sheep, Goats, Cattle, Camels and donkeys are kept and routinely used for loading water from wells or Hafirs and for transport purposes.

5. Water needs and water supply

The principal use of ground water in Matammah locality is for domestic, stock and maintains supplies. A small quantity is used for irrigation. In the northern and control quarters ground water use generally exceeds that of surface supply. Only the town resident were receiving piped water, while the rest of the population were depending on raw water from open well, dams, seasonal rivers and ponds. The towns have public water systems supplied by well. The water is generally of good quality and the supply is commonly adequate except at times of mechanical break. Now access to safe drinking water through the functional up wells and water yards drilled and installed, an additional to construct dam. In the study area Water Distribution at home: by net distribution inside the houses - by nets of water distribution to the water pumping centers." Which is free in the same region, also some time sold by the localities? And Water pumping from the local wells.

REFERENCES

- [1] Khartoum meteorological authority (1960-1999).
- [2] Setana, A. (2000): Environmental effect for the mobile sand dune in the Kali and Alsyal Agriculture scheme. M.Sc. thesis, Khartoum Univ.
- [3] Sudan survey department (1940). Final report and data survey.
- [4] National Corporation for the forest (2003).
- [5] Sudan National census in (2008)
- [6] Hammad, Y.M.A. (1999): the migration from Matammah and Demographic, Economic and Social effects. M.Sc. thesis, Khartoum. Univ.