

Chapter One

Introduction

1.1 Introduction

Agriculture on the banks of the Nile had been known by Sudan's population since the dawn of history. The first generation in Sudan laid customary rules governing the means and methods of ownership of land and distributed among the owners and how to grow and invest it.

Meandering is a natural geomorphic feature in rivers which results in gradual migration of the river's course and erosion of banks, most rivers in the world are subject to meandering due to natural and human activities (Ahmed and Fawzi, 2011). Flood and river bank erosion are almost regular phenomena throughout the world. Between these two types of disaster, the loss due to flood is temporary, but the loss of land due to river bank erosion is permanent and has a long term impact on the economy.

River bank erosion is one of the natural disasters that cause displacement of inhabitants who previously lived near river banks. Many of those erosion distressed people loose not only their homes, means of livelihood and assets but also their previous identity, and they, therefore, often try hard for recognition of an identity (Das et al., 2014). The Nile is the longest river (6650 km) in the world and passes from south to north through Eleven countries in Africa, namely Ethiopia, Eritrea, Sudan, Uganda, Tanzania, Kenya, Rwanda, Burundi, Egypt, Democratic Republic of the Congo and South Sudan. The Nile meanders through a watershed that is to more than 30 percent arid (Wong et al., 2007). The Nile flows from south to north and is formed by three major tributaries: the White Nile, The Blue Nile and the Atbara. The river just flows downhill, from the high mountains in the middle of Africa to the Nile delta, where it enters the Mediterranean Sea. Human activities along the river include urbanization, Settlement, agriculture, and tourism. These activities create great stress on river stability. In turn, meandering could lead to environmental problems on human activities represented by migration of river's

course and erosion of its bank and islands (Ahmed and Fawzi, 2011). The complexities and variations of the position of title boundaries abutting or adjacent to water courses are topics that often cause vexation to property owners, surveyors, solicitors and Crown land administrators (John R. Parker, 1996).

Continuous erosion of bank and islands of the River Nile results in social problems among settlers of land adjacent to the bank. A firm understanding of channel migration and associated processes of erosion and deposition will allow for management of river behavior and decision making process (Ahmed and Fawzi, 2011). The most important examples of meandering are found in Mississippi River of North America, Yangtze and Ganges rivers of East Asia, Amazon River of South America, and River Nile of Sudan.

River Nile meandering results in change of the river's morphology and islands (Ahmed et al. 2005; Aldesoky 1992, 2002; Alhosaini 1988, 1991; Ashour 1993; Altorkmany 1997). Considering the loss of agricultural lands is a very dangerous situation for the future of the country. In this thesis it will be touched the most important of these organization norms for land use rights and duties and conflict resolution around peacefully and in accordance with the norms and laws.

The objective of this study is to understand the gravity of the river bank erosion problem through studying the effect of erosion and sedimentation processes on Nile Basin and monitor the changes that occurred during the 30 years in the study area and evaluate and suggest solutions to reduce the effects of these natural phenomena. It was been monitoring changes in the Nile basin using satellite images for 30 years, using GIS techniques. This research also aims to study the river basin in the selected area and assess the effects of erosion and deposition on agricultural land and using geographic information systems in the production of multi-layered maps program and displayed spatially and conducts a thorough analysis to support maker's decision to curb these problems as much as possible.

1.2 Statement of the Problem

Uncontrolled of erosion and deposition in the river basin and its impact on the Ownerships. Also Weak positioning cadastral maps (local coordinate system) for farmlands on the Nile Basin and its islands. The most prominent problem here lies in the disappearance of the land and its appearance in other places, or the migration of the islands with the time, therefore, the owners gradually change, which in turn leads to disputes over property, and even the lands newly created by sedimentation. The continuous processes of erosion and sedimentation lead to change the Mirin continuously, therefore, whenever the Mirin change, the boundaries were changed, thus creating continuous disputes. The complexities and variations of the position of title boundaries abutting or adjacent to water courses are topics that often cause vexation to property owners, surveyors, solicitors and Crown land administrators.

1.3 Research objectives

The loss of land due to river bank erosion is permanent and has a long term impact on the economy and to present measurements of the erosion and meandering in the river course. So the research objectives are:

- Monitoring erosion and deposition processes in the river course, its implications, provide measurements and to clarify the impacts specifically on the ownerships.
- knowing the amount of sediment in the River Nile and The size of the erosion that occurs to land on the bank of the river and the islands annually
- Know how to dealing with problems resulting, make some proposals to reduce the impact of erosion and meandering and reduction of conflicts arising. So that the conflict between river dynamics and human settlement could be minimized.
- Answer the question: If the new island emerged and there is owners to each of the two shores, left and right located in front of them all, how is this division? How to reduce disputes?

1.4 Thesis layout:

Chapter one: Is introduction about the importance of Nile agricultural lands in Sudan, The nature of erosion and sedimentation processes, the study area, the study period, materials, data and software used for the completion of search, in addition to problem of the study, the goals that the Thesis is seeking to achieve, and Thesis layout. Chapter two: Illustrates the Land Law in Sudan: The Unregistered Land Act, 1970, Different forms of Ownership of Land and Limitations on it, also explain the Modes of Acquisition of ownership of Land in the Sudan, in addition to General Principles of Customary Prescriptive Possession, most importantly is Hag el Gusad, and The "Mirin" System. Chapter three: reviews the River Bank Erosion in the World, Impact of erosion on human life, and Human vulnerability across the world, finally the Impact of River Bank Erosion. Chapter four: highlighting the geographic information system (GIS), Definition, Components of GIS, Functionalities of GIS and Satellite Image in GIS. Also elucidate the remote sensing (RS), Definitions, Principles, Stages, sensors and remote sensing satellite. Chapter five: shown the study area, its Climate and Vegetation, how Data Collection, and methodology steps were done to accomplish the thesis. Chapter six: Results, Data analysis and Discussion: Showing results and an analysis of changes in Perimeter, surface area of the river's course. Also analysis of Phenomena resulting. Discussion the Erosion and deposition in Islands and river's course. Chapter seven: Conclusion, Recommendations and References.