

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND TO THE STUDY

In response to the drought of the early 1970's, the government of Kano State at that time searched for ways to improve the management of water resources in the state. In 1969, the state government under Alhaji Audu Bako commissioned the Dutch Engineering Firm NEDECO to carry out feasibility study on irrigation on the Kano River, from which the Tiga Dam and the Kano River Project developed. The Kano River Project phase I began in 1969 is yet to be completed. Similarly, the KRIP phase II (extension to 40,000 ha) is also yet to be completed. Also the phase I of the Hadejia Valley Project (12,500 ha) designed to receive water by gravity from a pond on the River Hadejia above the floodplain, using water released from Tiga has faced several problems (Adams and Hills, 1987). The Tiga Dam was commissioned in March, 1975 by the former Head of State, General Yakubu Gowon. The Dam is 4.72m high and 7.24km long, has a reservoir with a capacity of 1514 million litres of Water. The water is to be used to irrigate 180,000 hectares (phase I and II) of land in the Kano River Basin under the KRIP. The Kano River is a lifeline for a region of about 10 million people based on 2006 national head count. It conveys water over a distance of 50sq kilometer. The Kano River Irrigation Project has provided vast opportunities for multi-crop agriculture, raising new crops, intensive livestock production, flood control, development of fisheries, site for tourist attraction. The main objective of the project is to bring a rapid increase in hectarage under cultivation and raise output per hectar

After almost thirty three years of operation of the Kano River Irrigation Project, it is useful to try and identify some of the effects (positive and negative) on the environment. For the inhabitants, water

availability is the most important criterion. They previously suffered from chronic water shortages. Farmers now specialized in irrigation based production of more crops. At present, the rate of utilization of irrigation system (facilities) is very high. However, evaporation and evapo -transpiration could be high due to the fact that the open water in reservoirs and channels is subjected to intense heat characteristics of the weather condition for most of the year. Similarly, evapo-transpiration is further aggravated by the widespread aquatic plants in these ecosystems. Most importantly, the inability to limit or constrain further expansion of *Typha* invasive weed has become an obstacle to water circulation and has some negative effects on farming activities as well as fishing. Others include siltation of reservoir, distribution canals, and channels; clogging of irrigation canals and drainage; flood damage to farmlands and roads.

These impacts are socio-economic and environmental. The economic and environmental losses due to these weeds could be high. Indeed, the breadth of the impact means that it is almost difficult to estimate. Traditionally, the people control *Typha* aquatic weeds by mechanical means. However, these weeds have remarkable growth capacity. Thus, mechanical control is really not effective in the control of infestation which is large and widespread as evident in the Kano river irrigation area. This issue clearly highlights a fundamental water management problem. The risk of adverse side effects for users of the water must always be given priority. Accordingly, aquatic weed management must be developed which is socially and environmentally sustainable.

1.2 STATEMENT OF THE PROBLEM

Irrigation activities in the Kano river irrigation project area is seriously affected by the unwanted growth of *Typha sp.* aquatic weed. The dense growth of this plant in canals, drainage ditches, water

reservoirs and farm ponds impedes the flow of water, allows silt to settle down and became deposited on the bed of the dam as well as the numerous distribution channels. Overabundance of these weeds in the area is a direct response to the changes created by irrigation structures and human activities. Over time the weed has become very difficult to control by farmers and the water management authority (HJRBDA). With increasing demand for water propelled by economic growth of the population, the sustainability of irrigation activities in the Kano River Irrigation Project areas could be hampered in the nearest future. The consequences of the collapse of irrigation in the area would be enormous. Khoff and Pietese (2003) reported the effect of dense growth of aquatic weeds in the Diana dam on the Senegal River. Similarly, Varis and Fraboulet-Juttala (2002) also reported that extensive *Typha* sp. in the lower Senegal River Basin provided sanctuary for huge population of grainivorous birds which caused serious damage to crops of which 50% of the rice grown were destroyed by the birds.

1.3 AIM AND OBJECTIVES OF THE STUDY

The main aim of this study is to establish the current status of *Typha* species aquatic weed, its nature, ecology and effects on the surrounding land use, formulate a water management approach that enhances sustainable operation of the irrigation scheme in view of the *Typha* invasion. Specific objectives to achieve this aim are:

- i) To identify the particular species or specie of *Typha* found in the area, its nature, spread, and habitats.
- ii) To determine the type specific physico-chemical indicators predicators of this weed; and thus to obtain useful information about its phenology and ecology that can be employed in its control and management.

- iii) To investigate the effects of these weeds on farming and other water related activities by the people
- iv) And use data obtained in the study to produce a conceptual water management approach linking aquatic weeds, water and human activities.

1.4 JUSTIFICATION FOR THE STUDY

The cause of the vulnerability of the Kano River Irrigation Project Area to *Typha* species weeds is not adequately understood and has not been thoroughly investigated. Landscapes of intensive agricultural row crop production are subjected to high levels of nutrient enrichment from surface runoff and sub-surface drainage, particularly enrichment by nitrate.

It is believed that this condition enhances the susceptibility of a habitat to invasion (Burke and Grime 1996; Galatowich *,et.al*; 1999; and Systad 2000). It is therefore necessary to learn more about the growth, habitat conditions, and the attempts at controlling the weed so as to avoid a situation in which the plant species will constrain the ability of the people (farmers) in the area to derive maximum benefit from the water project particularly in this difficult economic situation in the country.

1.5 THE STUDY AREA

The Kano river project irrigation zone is a large area approximately phase I is 22000ha (figure 1). It was established after the creation of the Tiga dam in 1974. The irrigation system extends about 30 km on the Kano-Zaria road, from “Karfi” to “Chiromawa”. The dam distributes water by gravity through an 18km long main canal, which splits into eastern and western branches. The branches further split

into lateral distribution and field canals to deliver water to farmlands or plots. In addition, eight storage reservoirs were also created with an elaborate drainage system which drains the project area of excess irrigation flow and rain water. Several smaller ponds, and burrow pits created as a result of earth excavation for soils, gravels or clay have become permanent and conspicuous features of the irrigation environment. These smaller depressions retain water throughout the year. Two cropping systems are practiced each year in the irrigation area. In the rainy season rice, maize and some millet/sorghum are raised while in the dry season, maize, wheat, tomatoes, onions, sugar cane, as well as cucumber and watermelon are produced in commercial quantity. For over two decades, both the canals, drainages, reservoirs and the different types of ponds in the area have been overgrown by an emergent aquatic weed belonging to the *Typhacae* family. It is common practice for the locals, farmers and fishermen in the Kano River areas to clear canals, drainage and channels by cutting and removing these plants since it is absolutely necessary to do this in order to meet their water needs. However, in the face of multiple use scenario of the environment, promoting economic development which takes into consideration traditional livelihoods and ecology is of primary importance.