

**THE SOCIO-ECONOMIC IMPACT OF ZOBE DAM ON IT'S
NEIGHBOURING ENVIRONMENT**

BY

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CERTIFICATION

“This is to certify that this research work was carried out by Sagir Sani and it is hereby submitted for assessment for the award of a B.Sc. Degree in the Department of Geography, Usmanu Danfodiyo University, Sokoto”.

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DATE

DEDICATION

I have dedicated this work to Almighty Allah and his Prophet Mohammad (S.A.W),
and the entire people of Safana town.

ACKNOWLEDGEMENT

With highly regards and respect, I sincerely express my profound gratitude to my beloved father Alh. Sani A. Suleiman Safana (MAGAJI SAFANA) who gave me the opportunity to become what I am today, I really don't know how much to express my thanks to him, thank you very much father.

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ABSTRACT

This research work examines the socio-economic impact of Zobe Dam on its neighboring environment. Specific objectives includes how the construction of the dam has brought about changes in farming techniques, their standard of living and its potential contribution to the overall development of the area. The problem hinges on how the construction of dam has triggered changes in farming techniques in the area. The proposed hypothesis (Ho) that: there is no relationship between Zobe Dam and socio-economic activities taken place around the dam site, (Hi) that: there is relationship between Zobe Dam and socio-economic activities taking place around the dam site before and after the Zobe Dam construction in Dutsin-ma Local Government Area, were tested.

The result of the hypothesis testing is that; there is a relationship between Zobe Dam and socio-economic activities around the dam site. Therefore, it was concluded that the socio-economic activities of people around the study area are strongly influenced by the dam.

LIST OF TABLE

Tables	Page
Table 2.0: Quantity of water in the Earth System	13
Table 2.1: Some Major Dams in Nigeria and Their Uses	19
Table 3.1.0: Crops Cultivated Before and After the Dam Construction	22
Table 3.1.1: Farm Holding and Sizes Before and After the Dam Construction	23
Table 3.1.2: Occupational Characteristics Before and After the Construction of the Dam	25
Table 3.1.3: The Major Uses of the Dam	26
Table 3.1.4: Potentials of the Dam to the Socio-Economic Development of the Area	29
Table 3.1.5: Changes in the Farming Inputs	30
Table 3.1.6: Problem Arising Due To Establishment of Dam	31
Table 3.2.1: Changes in the Farming Inputs	34
Table 3.2.2: Chi-square for the Hypothesis	35

LIST OF FIGURE

Figures	Pages
Figure 1.7.1.0: Map of Nigeria Showing the Katsina State	6
Figure 1.7.1.1: Map of Katsina State Showing Dutsin-ma Local Government Area	7
Figure 1.7.1.2: Map of Dutsin-ma Local Government Area Showing the Study Area	8
Figure 2.0: Percentage of Water Quantity in the Earth System	13
Figure 3.1.0: Farm Holding and Size of Pre and Post Dam Construction	24
Figure 3.1.1: Occupational Characteristics of Pre and Post Dam Construction	25
Figure 3.1.2: Percentage Uses of Zobe Dam	27
Figure 3.1.3: Potentials of the Dam to the Socio-Economic Development	29
Figure 3.1.4: Changes in the Farming Inputs	30
Figure 3.1.5: Percentage Problems Arising Due to Establishment of Dam	32

TABLE OF CONTENTS

Title of Page	i
Certification	ii
Dedication	iii
Acknowledgement	iv
Abstract	v
List of Table	vi
List of Figure	vii
Table of Contents	viii

CHAPTER ONE

1.0: Introduction	1
1.1: Statement of the Research Problems	2
1.2: Aim and Objectives of the Study	3
1.3: Significance of the Study	4
1.4: Research Questions	4
1.5: Research Hypothesis	4
1.6: Scope of the Study	5

1.7.0: The Study Area	5
1.7.1: Location of Physical Background	5
1.7.2: Climate	9
1.7.3: Vegetation	9
1.7.4: Geology and Soil	9
1.7.5: Economic Activities	10
1.8: Research Methodology	10
1.8.0: Sample and Sampling Frame	11
1.8.1: Sampling Techniques	11
1.8.2: Method of Data Collection	11
1.8.3: Method of Data Analysis and Presentation	12
CHAPTER TWO: LITERATURE REVIEW	
2.0: Introduction	13
2.1: Nature of Surface Water	14
2.2: Forms of Surface Water	15
2.3: Uses of Surface Water	16
2.4: Dams Construction in Nigeria	16

2.5: Problems of Surface Water	20
--------------------------------	----

CHAPTER THREE

3.0: Data Presentation and Analysis	22
-------------------------------------	----

3.1: Introduction	22
-------------------	----

3.2: Resolving Hypothesis	33
---------------------------	----

CHAPTER FOUR

4.0: Summary, Conclusion and Recommendation	37
---	----

4.1: Summary	37
--------------	----

4.2: Conclusion	38
-----------------	----

4.3: Recommendations	39
----------------------	----

Bibliography	42
--------------	----

Appendix A (Questionnaire)	44
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CHAPTER ONE

1.0 Introduction

In every society whether rural or urban there is dominant economic activity engaged by large number of population of that society. This research focus on Zobe Dam and its socio-economic impact on the people living around the dam site. A dam is a barrier that impounds water or underground streams to confine and utilize the flow of water for human purposes (Monk house et al, 1973). According to Lawson (1972) resources behind dams are man-made water bodies which are important for water resources development programmes.

Dams are built for single or multiple uses. Single use dams are constructed for single purpose like hydroelectric power generation. Multiple or multipurpose dams are built to supply water for diverse uses such as water supply for municipal and industrial uses, livestock and fishing production etc. (Norman 1976).

Dam project or construction of dams dates to many centuries ago. Starting in the Nile and Tigris in the present day Egypt and Iraq respectively. In Nigeria most of our dams are multipurpose dams, such as Kainji dam which was built in 1968, Tiga dam in Kano, Bakalori dam in Zamfara, Goronyo dam Sokoto, and Zobe Dam in Katsina state (Norman 1976).

Dams have been used by man long before the Christian era. The concept of ancient river valley civilization has been widely accepted for many years and five valley societies of importance are well known as; Egypt in Nile valley, Indian civilization in the Indus valley, china in the yellow river valley (Oliver, 1976).

According to Oliver (1971), the costs of dam construction are expensive. Apart from flood control, they can also be utilize to hydropower, improve navigation, provide irrigation waters and established recreational facilities. Large dams have other negative features in addition to cost. The reservoir that forms behind the dam may in updates thousands of acres of fertile agricultural land. Another disadvantage of dam is that; it has adverse effect on the human health as the water facilitate the breeding of malaria transmitting mosquitoes and tiny black flies that acts as host for worms that can be barrowed into human blood stream and cause river blindness(Oliver, 1971).

Some irrigation, perhaps on the tributaries of big river system and areas surrounding big dams is plausible. In the past the development of methods of capture, control, distribution and use of dams or water has been the predominant issue but this has been submitted with building dams, combine with generating and transmitting electricity and the likes. Today the relevance of dams to human societies is well articulated in literature despite all those negative implementation of dam construction. Against the background, this study seeks to assess the impacts of Zobe Dam on socio-economic activities of people living around the dam site.

1.1 Statement of the Research Problems

The construction of dams is considered as one of the most effective means of solving human problems of water shortage in sub-humid and arid areas. Olofin (1982) assert that in Nigeria, dams' construction is seen as the only solution to the problem of water scarcity in savannah areas. Ologe (1973), state that dams bring social and economic changes to the regions where they are found. Also Warren and Robbin (1968), show that the creation of large reservoirs inevitably brings a host of changes such as

agricultural innovation in form of irrigation, improved fishing, infrastructure facilities, electricity and pipe borne water. It also brings about some negative socio-economic consequences, like inundation of farms by water, reduction in fishing activities increased health hazard especially those associated resettlement or displacement and relocation of the affected population. However, despite those problems, Zobe Dam like all other dams constructed both within and outside Nigeria have contributed to the improvement of living conditions of people living around dam side. Therefore this study seeks to find out:

1. What are the forms of human activities taking place around the dam site.
2. What are the positive impacts of these activities on human life around dam site.
3. What are the environmental problems faced by people living along Zobe Dam site.

1.2 Aim and Objectives of the Study

The aim of this research is to assess the effect of Zobe Dam on socio-economic activities of people living around dam site. To achieve this aim the following objectives will be persuade.

1. To identify some forms of human activities around dam site (e.g. fishing, irrigation, transportation etc).
2. To identify the significance of these activities on the teaming population living along the dam site.

3. To identify some environmental problems (e.g. flooding, soil erosion, pollution etc) around Zobe Dam site.

1.3 Significance of the Study

1. This study will provide up to date information about the impact of Zobe Dam on its surrounding environments
2. The findings of this study will serve as a reference point that can guide future policy on Zobe Dam management.
3. It will reveal the socio-economic benefits derived by people around dam site.
4. It will reveal the environmental problems faced by people around the dam site.

1.4 Research Questions

1. What are the forms of human activities taking place around the dam site?
2. What are the impacts of these activities on human life around the dam site?
3. What are the environmental problems faced by people living along Zobe Dam site?

1.5 Research Hypothesis

The research hypotheses formulated for this study are:-

- (1) Ho: there is no relationship between Zobe Dam and socio-economic activities taken place around the dam site.
- (2) Hi: there is relationship between Zobe Dam and socio-economic activities taking place around the dam site.

1.6 Scope of the Study

This study covers the socio-economic impact of Zobe Dam on its neighboring environment. About three (3) communities were studied; Garhi, Takatsaba and Makera.

1.7.0 Study Area

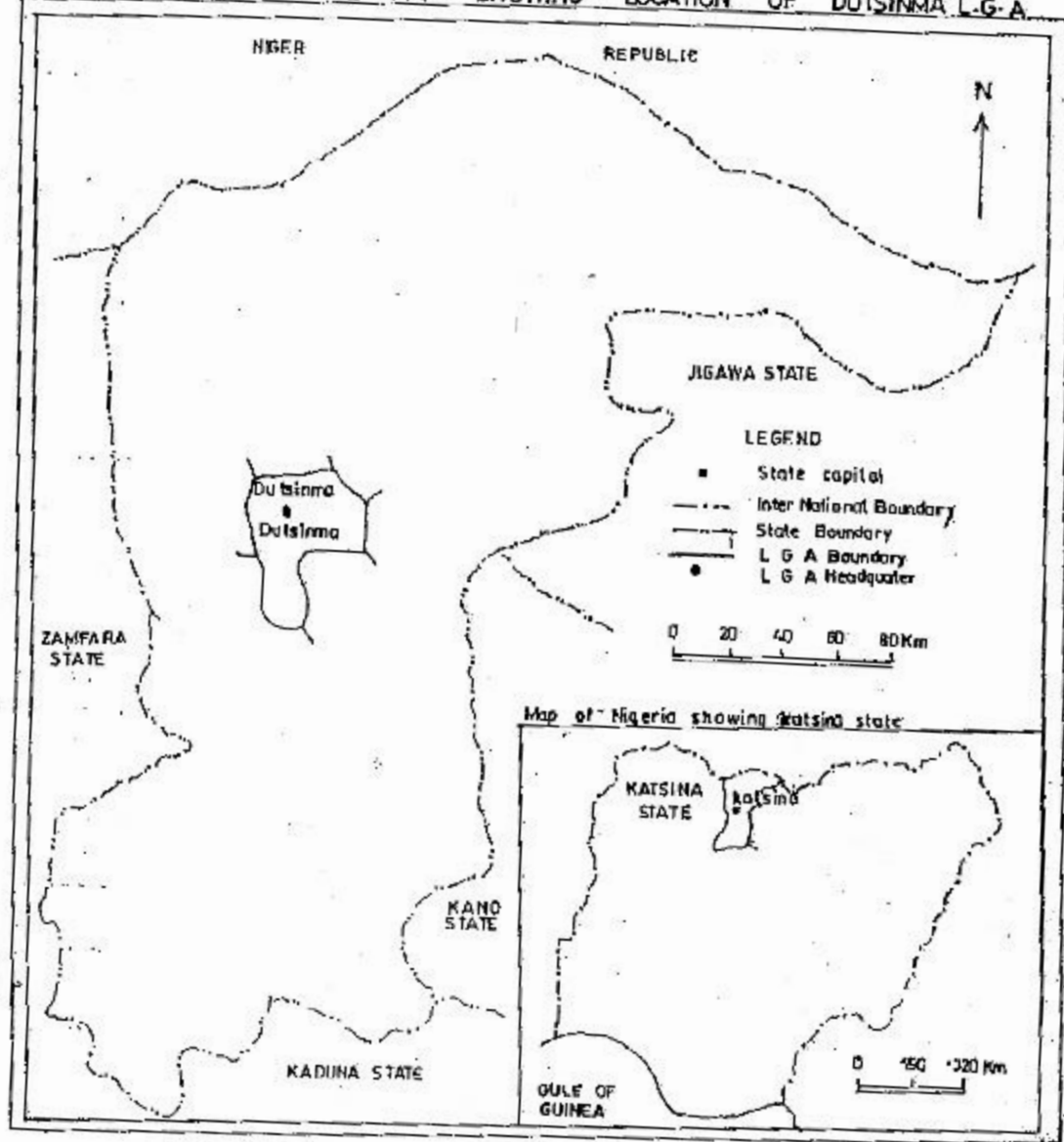
1.7.1 Location of Physical Background

Zobe Dam falls in Dutsinma local government area of Katsina state it is situated between latitude $12^{\circ} 23' 18''$ N to $12^{\circ} 38' 33''$ N and longitude $7^{\circ} 28' 29''$ E to $7^{\circ} 47' 47''$ E. Zobe Dam was constructed in 1972 and commissioned 1983. It has a height of 48m and length of about 360m.

There are about 32 villages along the reservoir in west. The dam boundaries extends from Hau-Kanzama and Garhi, in the East, by the Tuga in the South, and by Makera, Ardawa, Siya-siya, and to be North by Tangaluk and Katsali. The dam has only two at tributaries; these include river Karaduwa which is flanked by Gada River to the north and Gagare River to the South.

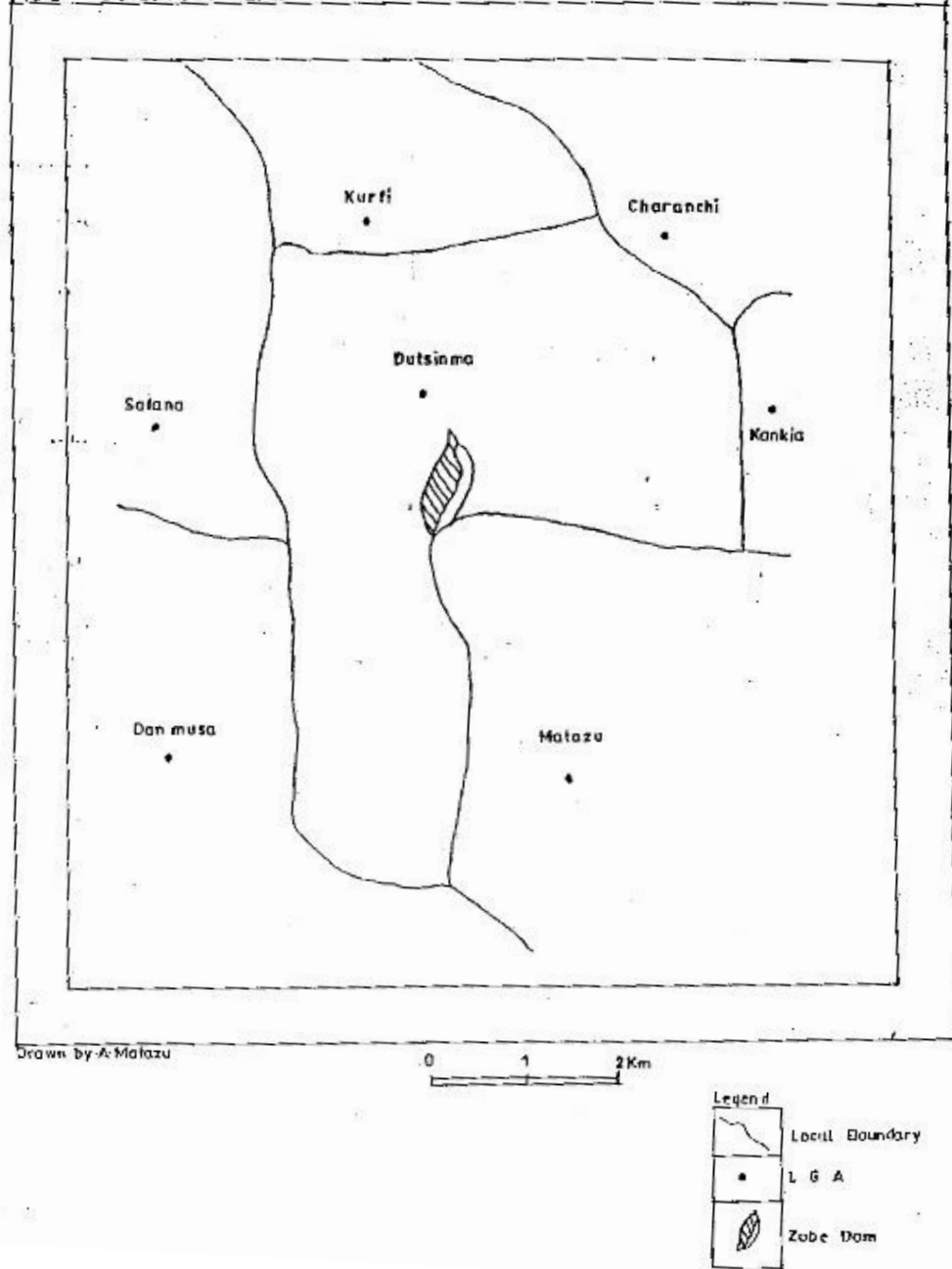
The villages initially within and near the dam are Makera, Garkin dankari, Goberawa, Tangalawa, Takazaba, Tuga, Marmara, Paddawa kunci, Keba and Salihawa. Most of the villages were completely submerge by the dam. For the purpose of this study three bigger villages around the dam site selected and they are Garhi, Makera, and Takatsaba.

FIG 1 KATSINA STATE MAP SHOWING LOCATION OF DUTSINMA L.G.A



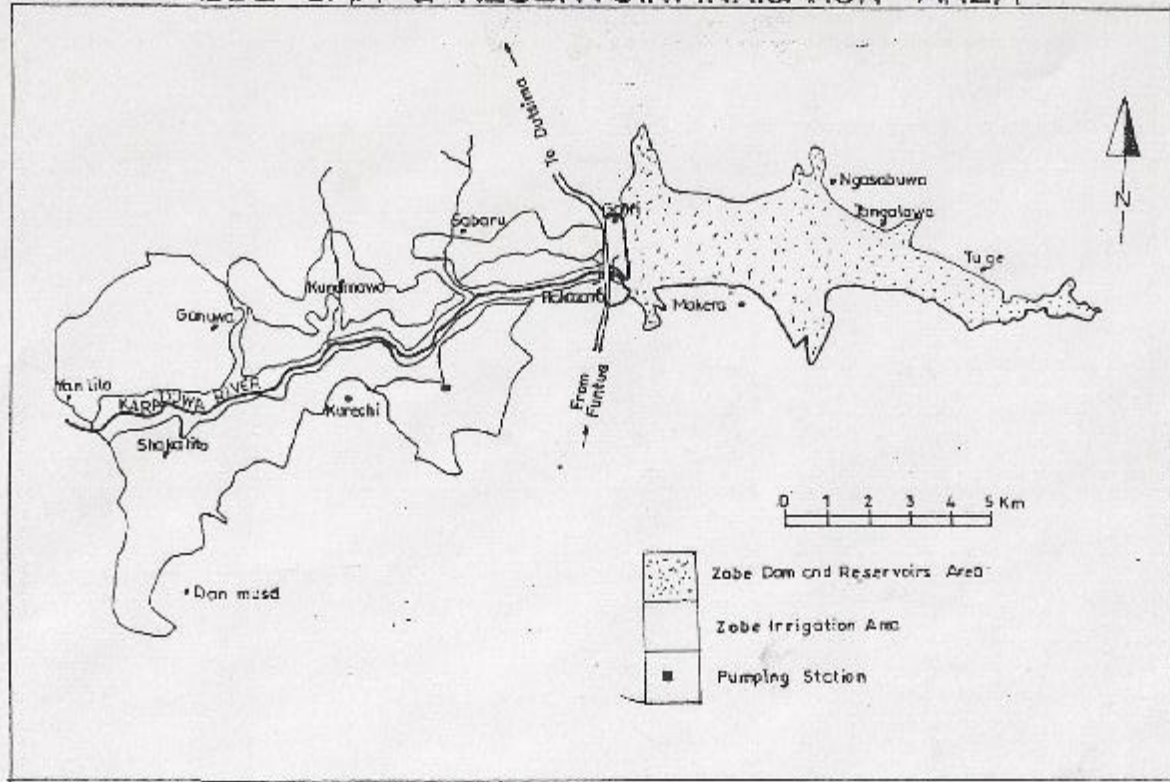
Source: S.R.R.B.D.A Dutsinma Area Office, 2008.

FIG 2 DUTSIN MA LOCAL GOVT SHOWING LOCATION OF STUDY AREA



Source: KTARDA Report on Zobe Dam, 2008.

FIG3 ZOBE DAM & RESERVOIR/IRRIGATION AREA



Source: KTARDA Report on Zobe Dam, 2008.

1.7.2 Climate

The climate is hot and dry for most part of rainy season from mid-may to beginning of October and the dry season from November to March. In April and early weeks of May the weather is warm and muggy with low precipitation (Buchman, 1974:144). During the dry season descending tropical continental air masses from the desert extends to south of the catchment area of the region. The region experience relative cool weather from November to March with daily maximum temperature of about 24^{0c} - 38^{0c} and minimum temperature of about 16^{0c} -24^{0c} . (udoh 1970). As rain season approaches tropical maritime air masses move inland from the Gulf of Guinea and there is heavy precipitation in the area, especially in the months of July and August. The annual total ranges are between 500mm to 800mm (udoh 1970).

1.7.3 Vegetation

The vegetation of the area combines characteristic features of Guinea and Sudan savannah vegetation zone of the northern Nigeria. The natural vegetation has been divested and this is due to human activities such as bush burning and clearing land for crop production, wood cutting for domestic fuel, animal gathering and bush fire. The natural vegetation is mainly grasses interspaces with trees, relating the influence of rainfall on the vegetation (Areola 1982).

1.7.4 Geology and Soil

The geology of Zobe Dam area is characterized by geological succession of the Pre-Cambrian rock which referred to as the “Basement complex” the nature of parent materials and topography has combined to produce different soil, and rocks. Drifts

these render the area very porous and susceptible to erosion on the inter flares and upper slope of the undulating areas while in the rainy season flooded valleys and the side of soil drift the area more coarse and tend to be shallow, less water retention capacity and are of low or medium fertility, which couple with their fire constituent make them ideal for the growth of such crops including: millet, beans, and guinea corn over large area (Oguntioyinba 1983).

1.7.5 Economic Activities

In term of economy, agriculture is the most important occupation around the Zobe Dam area. Thus it has the characteristics of most rural areas in the country, where by 90% of the population are farmers who practice farming at subsistence and commercial level. Also the level of economic activities in the area are expected to improve with the increase irrigation which is now guaranteeing and provide a lot of income to the people in the study area. Crops grown include cereals and vegetables. Another important occupation in Zobe Dam area is the fishing as well as livestock rearing. About 82% of the famers in the area practice mixed farming wood carving, poultry, tailoring, local craft butchering and marketing, business are also practiced in the area. (Suleiman Ahmed Misau 29 Dec.2005)

1.8 Research Methodology

First a reconnaissance survey will be carried out so as to get researcher to familiarize himself with study area. Then, latter, both direct field measurements and observations as well as Questionnaire administration will be carried out.

1.8.0 Sample and Sampling Frame

Since the total number of the household in Zobe Dam area is about 2,056 therefore, the questionnaires covered 2.5% of the households around of Zobe Dam will be studied.

1.8.1 Sampling Techniques

Systematic random sampling was used in choosing the households to be interviewed as 2.5% amount to 101 household. This was made possible by the use of systematic random sampling which include the selection of household to be interviewed at regular interval of selecting every 10th household since 1014 household were chosen at random which is 2.5% of the total household. Purposive sampling was used to interview two key officials from whom information needed was procured. The two officials were interviewed from the following department:-

1. Irrigation monitoring department; and
2. Dam engineering and maintenance department.

1.8.2 Method of Data Collection

One hundred (100) questionnaires were distributed to the communities around the dam site each questionnaire contains twelve (12) questions. The question were use to generate information about the socio-economic impact of Zobe Dam on its neighboring environment. Therefore, the data generated from the administration of questionnaire is presented in chapter three.

1.8.3 Method of Data Analysis and Presentation

The data collected will be presented by the use of tables, graphs, charts, and simple percentages. This will enable the researcher to organize and summarize information.

However, inferential statistics will also be employed. The inferential statistics tool that will be used for this study is Chi-square.

CHAPTER TWO
LITERATURE REVIEW

2.0 Introduction

The quantity of water in the earth-system can be classified into various categories as presented into the following table.

Table 2.0 Quantity of water in the earth system

Classes of storage system	Percentage%
Oceans	97.61%
Polar ice, Glacier	2.08%
Ground water	0.29%
Lakes	0.017%
Soil and subsoil moisture	0.005%
Rivers	0.00009%
Atmospheric water vapor	0.0009%

Source: Norman 1976.

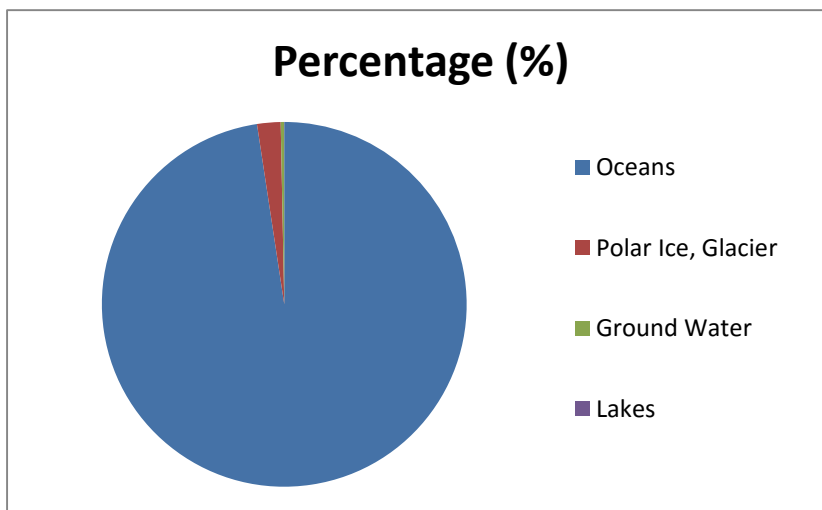


Figure 2.0: Percentage of Quantity of Water in the Earth System
Source: Field survey 2015.

Table 2.0 and figure 2.0 show, that the oceans which cover 70 percent of the earth's surface with salt water up to 7miles deeps. The oceans contain 97.61 percent of the world total water supply as expressed by Oliver (1971) and over 317 million cubic mites: if the earth were a perfectly smooth sphere, the ocean water would be sufficient to submerge the entire globe to a depth of 800 feet (Oliver, 1971).

Evidently, the water resources which mankind has been appropriating for several thousands of years are but a ting faction of the planet total reserves. The interesting question as asserted by smith (1976) for the feature is whether or not methods can be worked out which enable regions deficient in water resources to tap the fresh water reserve of glaciers and polar ice caps and convert sea water.

2.1 Nature of Surface Water

Today, we know that water moves from ocean to air to land and to ocean again in pattern known as the hydrological cycle (Oliver, 1971). He later added that because of the cyclical nature of water movement, a given water molecule may be used over and over again through the centuries. Although, he suggested that fluctuation in rate of water movement may occur in certain segments of the cycles. Oliver, further notes that, the cycle is powered by solar energy and gravity, the daily energy input being greater than all the energy utilized by man since the dawn of civilization, He is also of the view that in actuality, not all form of water is continuously moving, it crust on the earth's surface or in the atmosphere. That at any instant only 0.005% percent of the total water supply is moving through the cycle. Familiarity with the hydrological cycle

is basis to an appreciation of the nature and complexity of the serious water conservation problems confronting the world today.

2.2 Forms of Surface Water

The rainfall in the world contributes to the formation of numerous pond, lakes, streams, and rivers from which it inexorable flows toward the ocean, or else percolates as ground water downward into the pores and channels of the earth's crust (Oliver, 1971). It is this component of the precipitation that is of direct concern to the conversations, for it is only this supply that yield to human control and manipulation and may be used for domestic, industrial and agricultural purposes (Oliver, 1971).

He later also point out that even though river channels hold only 0.0001% of the world's water supply, stream flow is the most obvious method by which water returns to ocean. Even during the ancient times people had a fairly good understanding of river-ocean relationship.

It has been estimated that, water flows in 3.35 million miles of river channels in Nigeria which amount to an average 1,200 billion gallons a day. It may be represented by a tiny mountain stream or a great river such as the Niger, which drains over a million squares mile and flows 1,200 miles approximately across the face of the mid-Nigeria to the Gulf (Olafin, 1992).

Surface water according to Oliver (1971) in the form of streams, ponds and lakes satisfies 80 percent of man's water requirements. This run off can be either destructive (Flows erosion) or beneficial. Water soluble nutrient (Potassium, nitrates, and Calcium) may be transported from upstream areas and deported downstream. The

extremely high productivity of low lying marshes and estimates derives from this fact (Adams A.E, 1977).

2.3 Uses of Surface Water

Norman (1976) noted that, the remarkable contribution of hydrogen and oxygen is serving as an indispensable component of our ecosystem. He added that we use water in our day-to-day activities such as washing and everything from a 10 ton truck to a baby's ear. We use it to extinguish fires and clean city streets to flush sewage and to power industries. It is the basic raw materials for number less product emerging from out factories. Water is the indispensable medium for irrigation everything from a backyard for garden to a desert wilderness. We take water into our bodies in a thousand disguises, from buttermilk to beef stew. Water contributes 75 percent of the human body and without it no organism can survive on the surface of the earth. Water is the bedrock on which man's sustainability in life and everything that have life is built on.

2.4 Dam Construction in Nigeria

Literature is abundant on the impact of dams on the surrounding environments. This is because of their socio-economic and even physical importance. Even though quite a number people are very much aware of Zobe Dam, yet only few scholars have given serious attention.

Edington (1979) have highlighted the physical and socio-economic effects of dam construction upon environment. The most important point they raised are based on the physical and socio-economic aspects. They drew a number of examples from

different parts of the Africa to support their view. However, most of their studies were carried out on large dams like Aswan.

The impact of dams is relatively little understood. Dams impact in particular communities dependent on agriculture and fishing in channels, floodplains and delta/inshore marine environments. In these areas, ecological, economic and social impacts tend to be closely linked (Mehta and seinivasan, 1999).

Olefin (1980), has observed that dams have had adverse effects on the flood plain vegetation in the downstream areas, because the regulated flow has deposited less nutrient rich silt. And the same author contends that, major dams and reservoirs construction on the seasonal streams, in savannah environment will generate change in the component of the process responses in the downstream reaches. He concludes his work on dam by identifying certain parameters, that induce the construction of dams and all land projects general and these are provision of food crops for the local population, provision for rights of displaced persons to land.

Wolman (1967), on his part attempt to measure the importance of dam construction of the downstream river morphology and made concerted effort to assess the biological and social changes induced by manmade lakes in Africa. He concludes that these changes are few between and that most of what may be environmentally important is assessing the desirability of water resources development projects, using our techniques of feasibility analysis in siting such projects.

Goddess (1986) writes regarding the effect of dam construction and puts forward the view that dam construction especially of the little Bakalori dam, has some

peculiar features or characteristics for instance, the dam disorganized the farming life and systems of well established farmers of Talata mafara and a number of houses were submerged.

Melta and Serinivasan (1999) the impact of dam construction includes quantifiable economic impacts, in the form of changed flow of economic cost and benefits resultant of the construction of the dam. These can be measured quantitatively they would include reduced or enhanced streams of existing benefits from the river or economic systems. Supported by the river's water (for example losses from agriculture in the flood plain, or gains in terms of reduced flood damage downstream). However, the impact of dam also includes intangible socio-cultural impacts. These includes culture; political identify, freedom, mobility, the impact of modernity, and knowledge etc.

Abdulkadir (1988), also identifies a number of environmental issues regarding dam construction in Kano state. He report that bad positioning of spill ways in Bagauda resulted in dam breakage which consequently affected lives and agricultural land use in the downstream of the areas.

In fact, water resources development schemes have that ability to transform region where they are constructed. The lower Volta in Ghana had their socio-economic activities changed greatly within period of only 14years. Lawson (1972) has shown that the rural economy was moved from static traditional type into transitory phase of economic growth in which earlier constraints we broken down to make way for a more sensitive response to economic opportunity that been grounded.

Lawson (1972) also explains the factors behind the socio-economic changes. But what is more important according to him is that the long-term effect of the dam's construction will depend on a number of factors. Two of which are very important are the response of various communities to economic changes and the decision of the government about investments, in new inputs, especially in social over leads, infrastructure and agricultural improvements. In the short period to date however, they have benefited from the construction of the dam, especially owing to the emergence of a valuable activity such as fishery.

Table 2.1 Some Major Dams in Nigeria and Their Uses

Basin	Location	Purpose
Sokoto-Rima	Bakalori	Irrigation, flood content
	Goronyo	Flood control, irrigation
	Zobe	Irrigation
	Kafin zaki	Irrigation, flood control
Hadejia-jama'are	Chalawa Gorge	Flood control, irrigation
	Tiga	Flood control, irrigation
	Kainji	Power generation,, flood control.
Niger	Jebba	Power generation
	Shiroro	Power generation
	Kontagora	Irrigation
	Swashi	Irrigation
	shemanker	Irrigation
Upper Benue	Dep	Irrigation
	Mada	Power generation, irrigation, flood control.

Source: NEST, 1991

2.5 Problems of Surface Water

Not only is man plagued by water scarcity he also is beset with the equally serious problems of too much water from rainstorms and floods. Floods effects inundate large sections of land, washed away a very large area of land and drowned away. Very large areas of land and drowned so many people whom may be rendered homeless and may perhaps took the lives of some people.

Another problem caused by water is drought a period of severe atmosphere dryness and lack of rainfall of sufficient duration to cause wide spread of damage to environment such as crops, extraction of livestock and other economic hardships. These drought caused by water is known as hydrological drought Oliver (1971). However, according to Dr. Iferbeyi (2010) drought always involves financial setback both to the individuals and to the nation.

According to U.S weather bureau, droughts occur or exist whenever of twenty-one days or longer 30 percent of the average for the time and peace. This severe drought is as a result of diminution of stream flow and reduction in ground water levels this characterized the drought of 1972-1973 in the northern region which promoted on an exodus of people down southern part. Drought leads to extensive destruction of farm crops malnourished, diseases-susceptible livestock extreme discomfiture for man and soaring food prices.

The most probable season for drought is summer period when water requirement of both wild and cultivated vegetation are great because of the high rates of photosynthesis and transpiration Mamman Kabir (2000).

However, it is on this note that most of the dams in the northern region were constructed to salvage the life of the inhabitants through construction of large dams has lead to severe social problems when many people had to be resettled Reijinjes (1992).

While, all these observations may be quite true because there are alert of generalizations in the studies of dams by most scholars. It is the intention of this research work to precisely measure and report some of the socio-economic impacts of dams with particular reference to Zobe Dam in Dutsinma local government area Katsina State.

CHAPTER THREE

3.0 DATA PRESENTATION AND ANALYSIS

3.1 Introduction

The data presented in this chapter is a reflection of the feelings of the respondents.

Table 3.1.0: Types of Crops Cultivated Before and After the Dam Construction

Crops cultivated	Before dam (%)	After the dam (%)	(%) change
Rice	5		
Wheat	-		
Millet	100	63	-35
Fodder crops	-	5	+5
Maize	75	60	-15
Guinea corn	100	60	-40
Vegetables	30	50	+40
Groundnuts	60	55	-5
Beans	40	30	-10

Source: Field survey, 2015.

Table 3.1.0 shows the type of crops cultivated in the area before and after the dam construction which have changes overtime. While there has been some decrease in the cultivation of crops such as Maize, Millet, Guinea corn, Groundnuts and Beans as depicted above on the table 3.1.0.

However, as some have depreciated some have increased in yields and production such as vegetables i.e. tomatoes, and pepper in particular, wheat and rice respectively. This is as a result of the use of irrigation farming system, which has improved the production of vegetables in the area.

Table 3.1.1: Farm Holding and Sizes before and After the Dam Construction

Farm size (ha)	Before the dam		After the dam	
	Frequency	Percentage	Frequency	Percentage
0-0.9	3	7.5	5	13.0
1-1.9	5	12.5	10	25.0
2-2.9	8	20.0	15	37.0
3-3.9	3	7.5	6	15.0
4-4.9	12	30.5	3	7.5
5 and above	9	22.5	1	2.5
Total	40	100	40	100

Source: Field survey, 2015.

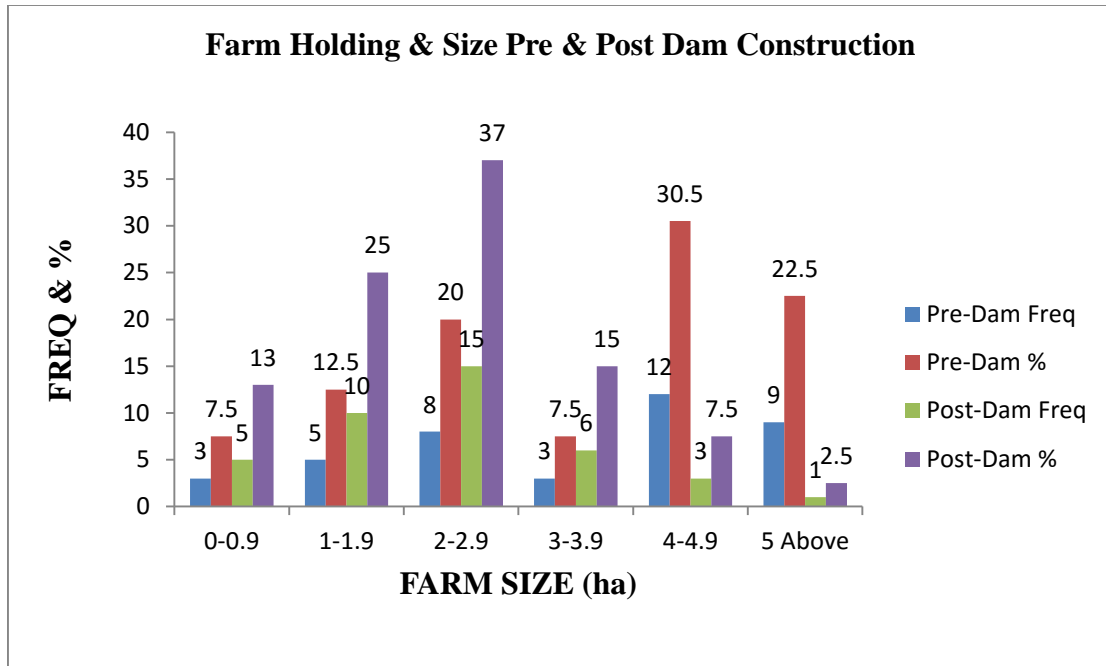


Figure 3.1.0: Farm Holding & Size of Pre & Post Dam Construction

Source: Field survey, 2015.

From size is defined as the total hectare cultivated by a farmer of a particular portion of the land for agricultural purpose (George, 1987). Due to the large number of farmers before the dam construction it has been observed that many hectares of farm land where cultivated the maximum farm size id about 5 hectares and the minimum size ranges 0.5 to 0.9 hectare in the study area. But with the construction of the dam, the sizes of the farm have changes as illustrated on the table 3.1.1 above.

Table 3.1.2: Occupational characteristics before and after the constructions of the dam

Occupation	Before the dam		After the dam	
	Frequency	Percentage	Frequency	Percentage
Farming	18	45	17	42.5
Tailoring	4	9.5	4	9.5
Butchering	13	32.5	13	32.5
Black smiting	2	5.5	3	7.5
Bicycle repairing	1	2.5	1	2.5
Cake making	1	2.5	1	2.5
Middle men	1	2.5	1	2.5
Total	40	100	40	100

Source: Field survey, 2015.

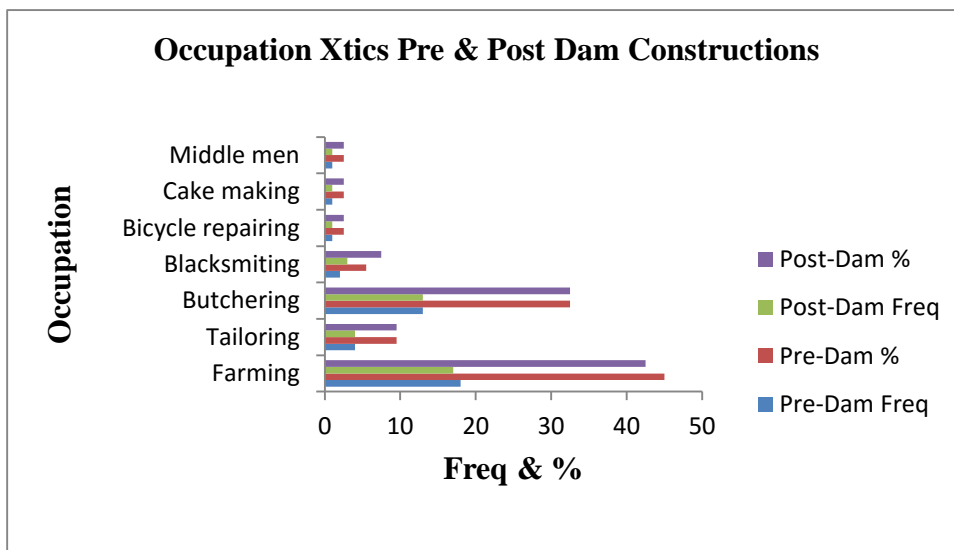


Figure 3.1.1: Occupational characteristics of Pre & Post Dam Constructions

Source: Field Survey, 2015.

It is expected that whenever a meaningful project is introduced into an area the income of the people living around the dam site should also change either in positive or negative form.

This is true with the construction of Zobe Dam. Before the construction of the dam, people are engaged into activities such as trading, tailoring and mart making and the likes. But with the construction of the dam substantial number of the population now depend solely on agricultural practices to earn their living and the income has increased too.

Research conducted has shown that a farmer earned about (937.00) per farm input before construction of the dam. However, since the construction of the dam, the average annual incomes of the farmers have risen by about 25%. The table 3.1.2 above explains the occupational changes before and after the establishment of the project.

Table 3.1.3: The Major Uses of the Dam

Types of uses	No of respondents	Percentage
Irrigation farming	40	40%
Fishing	25	25%
Tourism	5	5%
Recreational center	10	10%
Live stock production	20	20%
Total	100	100%

Source: field survey, 2015.

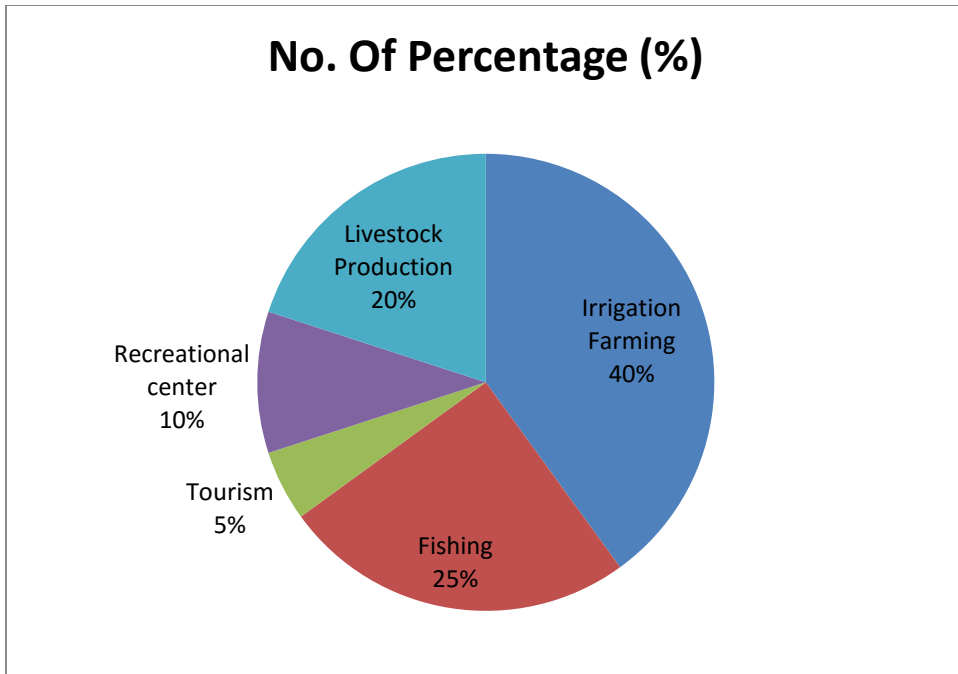


Figure: 3.1.2: Percentage Uses of Zobe Dam

Source: Field survey, 2015.

The irrigation farming as observed in the field shows that irrigation is by both gravity and pumping, the reservoirs being the source of water for both systems. The above table depicted that substantial numbers of the population engage in irrigation farming. Farmers that are benefiting from the reservoir make use of pumping machines to supply water to their farm this has transformed both the farming system and cropping patterns of the area.

This is evident by the practice of new system of modern irrigation, adaptation of new techniques and inputs like chemical fertilizers, irrigation pumps, sophisticated machines like tractors and new varieties of seed are now available.

The Table 3.1.3 shows that 25% of the population practice fishing. Although are important component of the Zobe Dam project is fisheries development. The water surface at dead storage level was planned to be 50 hectares, which was expected to support about 2 tonnes of fish harvest per reservoir per annum, giving a total of 1,000 tonnes of fish annually. Even if this target has not been realized changes have occurred in the system of fishing production. From the discussions held some of the fishermen, fishing in the reservoir is now their secondary occupation after farming. The number of people who take fishing as a full time has increased after the dam construction. Fishermen population as at 2010 in the area was over 1000 (KTARDA, 2010), but now they have increased in number due to the development of fishing in the areas.

The Zobe Dam reservoirs provided very important fish species which are marketed and consumed beyond the state in places such as Kaduna, Kano, and even Niger Republic and this has transformed the socio-economic of the area.

The table 3.1.3 above has also shown that both tourism and recreational activities take place around Zobe Dam site. Though some people do swimming in the reservoir whereas during festivals for example Sallah celebration and weeding ceremony some people around Dutsinma, Safana and Matazu use to visit the dam for their picnics.

Table 3.1.4: Potentials of the Dam to the Socio-Economic Development of the Area

Farm size (ha)	Pre-dam unit		Post-dam unit	
	Per (ha)	Total (₦)	Per (ha)	Total (₦)
4	937	3,748	1,479	5,915
5	637	3,170	1,065	5,325
6	634	3,170	1,001	5,005
6	547	3,282	853	5,118

Source: KTARDA Report on Zobe Dam, 2010.

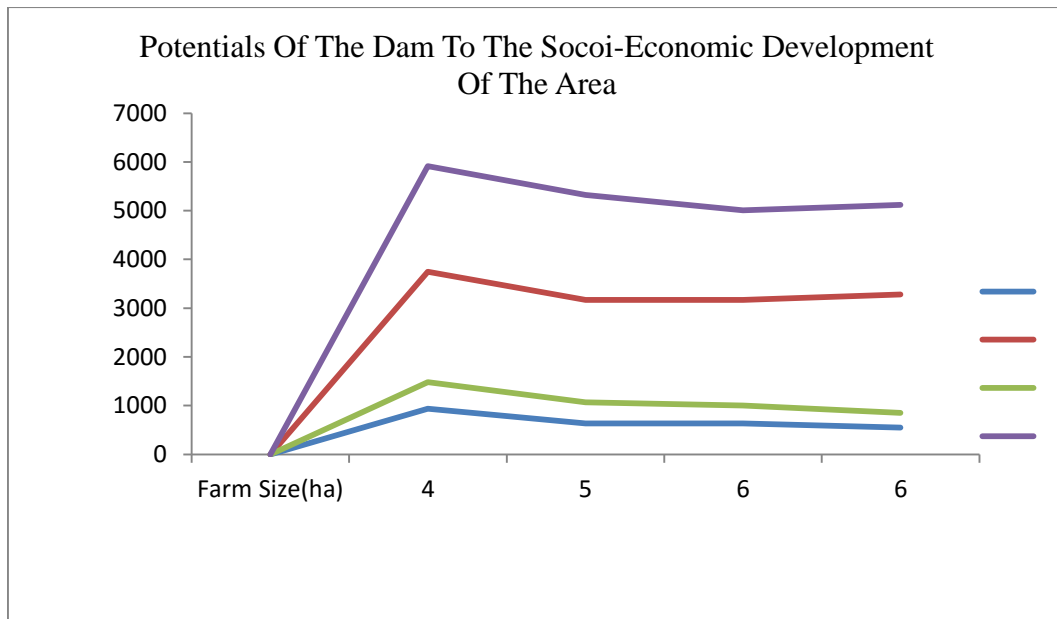


Figure 3.1.3: Potentials of the Dam to the Socio-Economic Development

Source: Field Survey, 2015.

From the table above 3.1.4 one can deduced that since the construction of the dame the average annual income of the farmers has risen by 25% and this has reflected in their standard of living das farmers are able to save some part of their income that accrue to them from farming activities.

Table 3.1.5 Changes in the Farming Inputs

Input	Pre-Dam	Post-Dam
Animal manure	200 sacks	46 sacks
Chemical fertilizer	2,300 sack	25,334 sacks
Irrigation pumps	0	500
Cattle plough	30	5
Improved seed	0	609. 23 tonnes

Source: KTARDA Report on Zobe Dam, 2010.

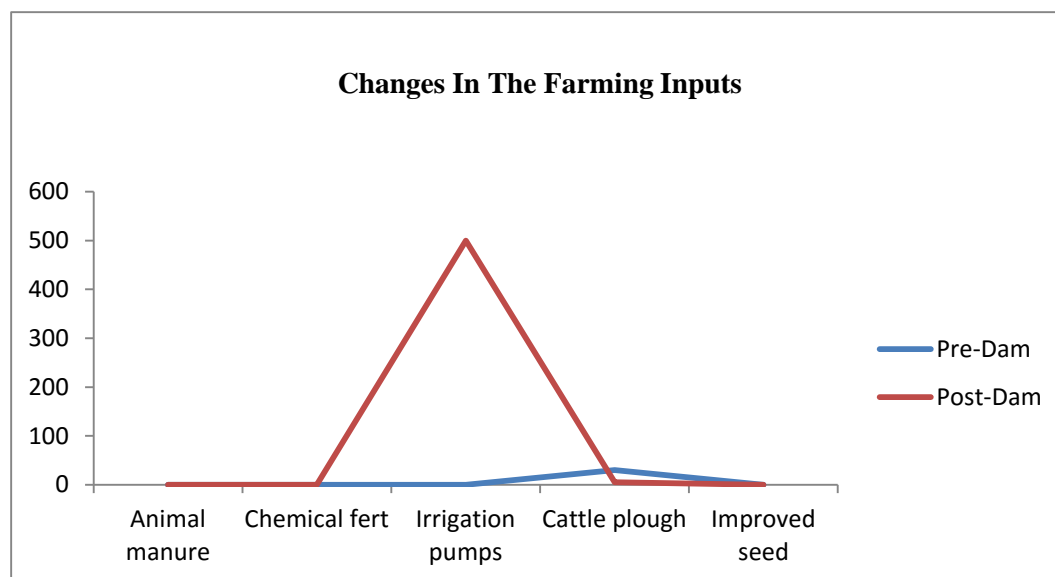


Figure 3.1.4: Changes in the Farming Inputs

Source: Field survey, 2015.

Table 3.1.5 and figure 3.1.4 shows that, the level of agricultural production depends mainly on the farm inputs. The use of various farm inputs has increased tremendously, these inputs include chemical fertilizers, cattle plough, insecticides, irrigation, pump etc. before the construction of the dam, people living around the dam site depends on local farm inputs as local seeds varieties use of old farming techniques and animal manure. However, with the construction of the dam the use of these local farm inputs some of these changes are illustrated the table above.

In Garhi, Makera and Takatsaba areas these is increase in the use of chemical fertilizers instead of local manures. Also, cattle ploughs have given way to the use of more agricultural machinery like tractors, irrigation pump what responsible for the new turn in farm is attributed to increase income of individual farmers. It also came as a result of the realization of higher output the need to feed growing population and higher market price. In early stage of the project, wheat seed of about 25 tonnes were provided to the farmers price and onion seeds were also sold at low prices KTARDA, 2010.

Table 3.1.6: Problem Arising Due To Establishment of Dam

Type of problem	Not of respondent	Percentage
Erosion	20	20%
Flooding	40	40%
Diseases outbreak	40	40%
Total	100	100%

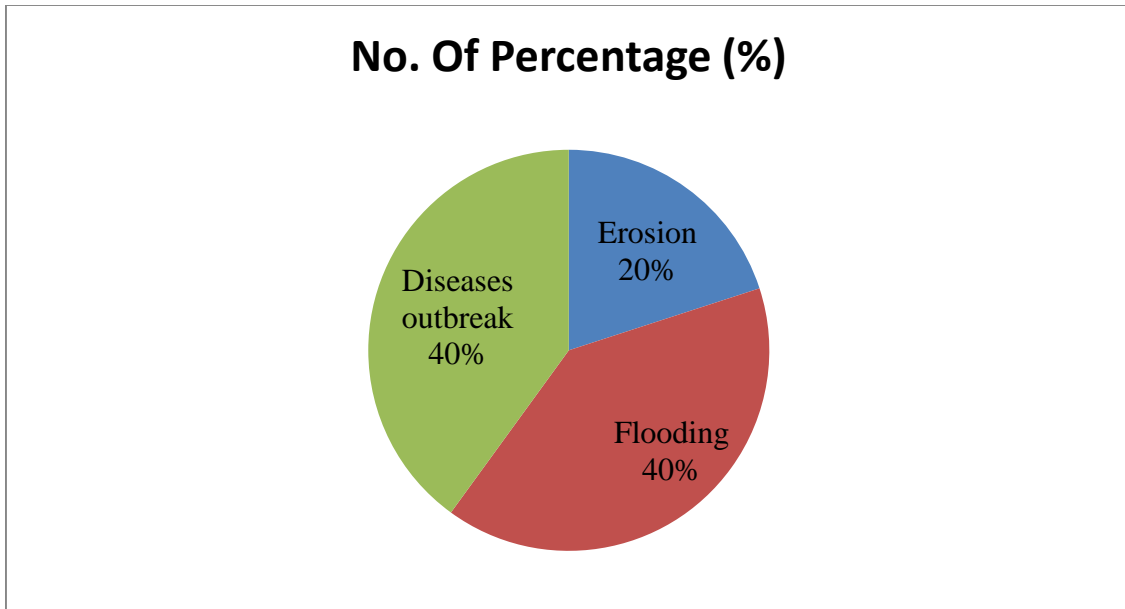


Figure 3.1.5: Percentage of Problems Arising due to Establishment of Dam

Source: Field survey, 2015.

The construction of the dam has posed some serious adversities on the people around the dam site. These effects include the increased erosion and soil degradation. After the dam some farmers experienced flooding over their farms as well as gully erosion. Another negative impact felt by the people of these areas is the water-borne diseases outbreak. These disease include river blindness, guinea worm infestation, cholera, malaria etc, these diseases where not known in the area prior to the dam construction and people around the dam site find it very difficult to curve such diseases.

3.2 Resolving Hypothesis

The research hypotheses formulated for this study are:

Ho: The proposed hypothesis (Ho) is that there is no relationship between Zobe Dam and socio-economic activities taken place around the dam site.

H₁: There is relationship between Zobe Dam and socio-economic activities taking place around the dam site.

It is tested research to draw general conclusion and make predictions about the subjects matter. The chi-square is used to compare differences between observed frequencies and expected (theoretical) frequencies. The observed frequencies are those that obtained after an observation experiment has been concluded.

The expected frequencies are merely based on speculation. The chi-square can be expressed mathematically as follows:

$$X^2 = \sum \frac{(Of - Ef)^2}{Ef}$$

Where: \sum = Summation

Of = Observed frequency

Ef = Expected frequency

Level of significant = 0.05

The degree of freedom = (r-1) (c-1)

Where: r = Number of row

c = Number of column

I = Constant variables

Decision Rule

H₀: If the chi-square calculated is less than the chi-square tabulated them, the hypothesis is rejected.

H₁: If the chi-square calculated is greater than the chi-square tabulated then, the hypothesis accepted.

Source: (Asika, 2001).

Table 3.2.1: Changes in the Farming Inputs

Inputs	Pre-dam	Post-dam
Animal manure	200 sack	46 Sacks
Chemical fertilizers	2,300 sacks	25,334 Sacks
Irrigation pumps	0	500
Cattle plough	30	5
Improved seeds	0	609.23 tonnes

Source: KTARDA Report on Zobe Dam, 2010.

The hypotheses shall be tested using table above which was derived from analysis on the changes in the farming input.

Table 3.2.2: Chi-square for the Hypothesis

O	E	O-E	(O-E) ²	$\frac{(O-E)^2}{E}$
200	8.3	191.7	36748	4427
2300	-0.05	2300.05	5290230	-105804600
30	8.7	21.3	453.7	52
46	-0.8	46.8	2190.24	-2737.8
25334	0.00002	25334	641811556	3209057715
500	0.11	499.89	24,9890	2271727
5	-0.84	5.84	34.11	-40.61
609.23	0.11	609.12	371027.2	3372974.5
Total				3108899518

Source: Author Computation, 2015.

Table 3.2.2 above shows that

Chi-square calculated = 3108899518

$$\begin{aligned}
 \text{Degree of freedom} &= (r-1) (c-1) \\
 &= (5-1) (2-1) \\
 &= 4 \times 1 \\
 &= 4
 \end{aligned}$$

Where level of significance = 0.05

4 under 0.05 (from the table of chi-square) = 9.488

Chi-square calculated = 3108899518

Chi-square tabulated = 9.488

Discussion

Since chi-square calculated is greater than the chi-square tabulated therefore the hypothesis is accepted. That is there is no significant relationship between Zobe Dam and socio-economic activities taken place around the dam site. This is evident in table 3.1.5 and tractor is completely absent in the table, which is known to be one of the important sophisticated implements used for agricultural practices. This is as a result of the fact that many famers cannot afford the use of tractors.

CHAPTER FOUR

4.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

4.1 Summary

The chapter one of this research work introduced the subject matter that is dam and the important of dam which are built to control erosion and floods. The research problem revealed how construction of the dam brought about changes in the standard of living, the level of development and how it brought about positive changes. The hypothesis was based on the research problems and the set up objectives.

Chapter two which review the ideas of the past research on dam construction and their impact. It also explains exhaustively the nature of the surface water which can only be achieved through hydrological process, the forms of surface. Water which include lakes, rivers, ponds, and stream. The uses to which all these forms of water can be put. Since most of the regions in Nigeria have water problem and there is high demand for the supply of more water for domestic, agricultural and individual purposes. Therefore the effort of the government to address this situation is to embark on river basin development schemes and constructions of dams for portable drinking water supply. And it also entails the research methodology and background of the study area. The method used in collecting data include primary data source of data such as observation, oral interview and administration of questionnaire, which was supplemented by secondary data like journal, textbooks and the likes,. Moreover, the study area encompasses the location climate, geology and soil, vegetation population, economic activity of the area.

However, chapter three has also exhaustively analyzed the nature, uses, forms and socio-economic impact of the Zobe Dam to the people of Katsina state. Though with the perpetual efforts of the government to harness water for both domestic uses, industrial uses and agricultural uses problems have partly arisen because the cost of maintaining the infrastructure sanitation and sedimentation, falling water tables and other ecological problems is too high and as such construction of big dams has led to severe social problems when many people had to be resettled.

In addition, from the finding, the project is to develop water supply scheme involving installation of water treatment plant to world health organization standards at the rate of 3,400 3/hr together with the necessary pumping stations, ground reservoirs pipelines and power generation using Zobe Dam reservoirs as the source.

Chapter four which include the research project summarized the where project work from which a conclusion was drawn what revealed some of the findings of the research and a recommendation were produced to some of the findings of the research and a recommendation were produced to some of immediate problems militating the people living around the reservoir of the dam.

4.2 Conclusion

Zobe Dam was constructed to boost food production and water supply. The dam has also changed the regime of the Karaduwa River by regulating its flow downstream. The change has affected the agricultural practices and productivity. These effects can be seen and the farm sizes, farming system or cropping patterns, farming inputs and fishing activities as described above.

However, from the findings, it can be deduced that dam construction have both negative and positive impacts, such positive contribution include the development of access roads and improved fishing and farming. Yet negative social and economic changes have also taken place. There has been decline in agricultural land for farming and also epidemic of diseases without corresponding establishment of health facilities. For example, guinea worm, malaria, river blindness and the likes are most economic in the area around.

Generally, one can conclude that the construction of Zobe Dam if of benefit not only to the people living around but to the whole people in katsina state at large, especially when the Zobe water supply project is completed.

4.3 Recommendation

These negative effects stand as an impediment to reflect the positive effects on these problems have super ceded the known advantages of the Zobe Dam. Some of which could been avoided certain steps had been taken for example in the case of diseases such as malaria, guinea worm and river blindness, supply of portable water to the areas of less advantage can alleviate the perpetual occurrence of these problems.

In addition, proper maintenance of the dam and the area that are susceptible to water logging should be supply with chemicals in order to prevent the major diseases vectors such as mosquitoes from breeding. However, since the harm has already being done, more curative drugs should be administered to those that fall victims.

In order to solve the problem of low land productivity and the reduced production of staple food crops, there is need to encourage the use of fertilizer

supplied at a subsidized rate together with organic manure. Also the problems of pests and diseases could be reduced or solved by providing insecticides, herbicides and pesticides at subsidized rates, rural credit and loan facilities should also be provided in the area as this will help in boosting agricultural activities. Adequate storage facilities and improved hybrid seed will al-so help in improving the magnitude of yields.

However, to fully tap the fishing potentialities of the area, present fishing method most be modified. In this correction more attention should be directed to the introduction of the introduction of more sophisticated fishing techniques and methods such as fishing boats, nets, fish smoking as well as ways and means assisting and organizing fishermen to creates awareness of the advantages that can be enhanced for adopting the new techniques or innovation. Also, technical assistance should provide to the fishermen though the concerted efforts of agricultural extension workers and fishing technologists to train fishermen the modern fishing techniques.

To overcome the problem of erosion and soil degradation, the rate of releasing water should be regulated throughout the season, as this minimize the rate of destruction made by the water during the wet season, erosion can also be checkmate through afforestations.

There is need to provide some recreational facilities in the reservoir area in order to boost recreational and tourism activities in the area, as this will go long way to generate revenue to the government.

The provision of adequate portable water supply and sanitation is a necessary pre-requisite to the improvement in public health. Therefore, government should intensify its effort to make the Zobe water supply project a reality.

The government should also improve the maintenance of the irrigation schemes as to be rest assure of food security in the area.

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APPENDIX A

QUESTIONNAIRE

DEPARTMENT OF GEOGRAPHY, FACULTY OF SOCIAL SCIENCE

USMANU DANFODIYO UNIVERSITY, SOKOTO

Dear Respondent,

This research work is to carefully examine the socio-economic impact of Zobe Dam to the people living around the Dam site. It is purposely designed for academic purposes and all information supplied shall be treated with highly confidential.

SECTION A: BIO DATA

1. Location of respondent.....
2. Sex: (a) Male [] (b) Female []
3. Age: 5-20 [] 21-45 [] 46-above []
4. Educational Attainment
 - (a) Primary School [] (b) Secondary School []
 - (c) Qur'anic School [] (d) Others Specify.....
5. Marital Status
 - (a) Married [] (b) Single []
 - (c) Widow []

SECTION B: IMPACT OF DAM CONSTRUCTION ON SOCIO-ECONOMIC DEVELOPMENT

6. Do you practice irrigation farming?
 - (a) Yes [] (b) No []

7. What are the types of crops you cultivated before and after Dam Construction?
- (a) Rice [] (b) Wheat [] (c) Millet []
- (d) Fodder Crops [] (e) Maize [] (f) Guinea Corn []
- (g) Vegetables []
- (h) Groundnut [] (i) Beans []
8. Has the Construction of the dam yield positive impact in your practice?
- (a) Strongly agree [] (b) Not agree []
9. What is the size of your farm before and after the dam construction?
- (a) 1-1.9 [] (b) 2-2.9 [] (c) 3-3.9 [] (d) 4-4.9 [] (e) 5-5.9 []
- (f) 6-above []
10. Which one do you practice among the following economic activities?
- (a) Farming [] (b) Tailoring [] (c) Butchering []
- (d) Blacksmithing [] (e) Bicycle repairing []
- (f) Cake Making [] (g) Middle Men []
11. Do you benefit from the dam constructed?
- (a) Strongly agree [] (b) Not agree []
12. If you agree with the above question what other use do you put the dam to?
- (a) Irrigation Farming [] (b) Recreational Centre []
- (c) Fishing [] (d) Livestock Production [] (e) Tourism []