
ECONOMIC IMPACT OF DAM CONSTRUCTION, THE CHALLENGE AND SOLUTION TO AGRICULTURAL PRODUCTIVITY IN NIGERIA: A CASE STUDY OF TURA DAM IN MASHIGI VILLAGE, KANKARA L.G.A., KATSINA STATE

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ABSTRACT

The aim of Tura Dam was to provide domestic water supply to Malumfashi and Kankara Towns. The effect of the Dam has brought some laudable environmental challenges and economic gains to the population of Mashigi village. This paper examines those activities during the two periods; before and after the Dam construction. The variables measured therein are information obtained from a checklist method, personal observations, information from official records and informal discussions with the dwellers of Mashigi village. 50 questionnaires were administered to the respondents. The results obtained showed that the construction of Tura Dam has brought losses of farmlands, particularly Fadama holdings, and at the same time expanded fishing production. Farmers' income has risen. Although construction of Dam has both negative and positive effects, the gains are greater than losses, hence could be a challenge and solution to agricultural productivity in Nigeria.

Keywords: Dam, Pre-Dam period, Post-Dam period.

INTRODUCTION

A Dam is a structure built across a stream, river or estuary to retain water. The earliest recorded Dam is believed to have been on Nile River at Kosheish, where a 15 metres high Masonry structure was built about 2900BC to supply water to king Mene's Capital at Memphor. Evidence exists of a Masonry- faced earth Dam built about 2700BC at Sadel-kafara, about 30kilometers south of Cairo in Egypt.

Dams are built for single purpose or for multipurpose. The single purpose Dams constructed for single purpose include hydro-electric power generation at the Shiroro Dam in Niger State, Nigeria. Multipurpose Dams are put to diverse uses such as water supply for municipal and industrial use; livestock and fish production; flood control; electricity generation, irrigation and tourism among others. Tura Dam in Kankara L.G.A, Katsina State is an example of single purpose Dam built along River Tura in 1983 to supply domestic water to Malumfashi and Kankara Towns and their neighbouring villages.

It is no doubt; Dams have contributed to the economic growth of many nations. The over 45,000 Dams built round the world have played important role in helping communities and economies harness water resources for several uses. An estimated 30-40% of irrigated land worldwide now relies on Dams and that Dams generate 19% of world electricity (World commission on Dams, 2000). Warren N and Robin N (1968), show that creation of large reservoir inevitably brings a lot of changes in its wake, such as agricultural innovations in the form of modern large irrigation, improved fishing infrastructural facilities like health, roads, modern housing, electricity and water supply.

Altinbilek (2002), made one remark about Dam construction, which is very important to this study. His assertion was that "significant change may occur in rural areas; this notwithstanding the benefits are greater than losses, there is the need to continue with Dam construction for overall development but greater studies and planning are required".

Although Dam construction brings positive gains to the affected people, at the same time it brings some laudable environmental challenges to the society. For instance, ecological problems such as changes in water quality, channel morphology, aquatic flora and fauna, growth of aquatic weeds, spread of water-borne diseases and resettlement of people in river basins are rampant and have been documented (Ogbeibu, 2002). Also more than 250 communities annually lost their home and farmlands to the annual de-flooding of hydroelectricity Dams in Niger, Kwara, Kogi and Kebbi States (The Newswatch, Lagos, (2001)

It could be seen that by so many Authors that Dams bring changes to the surrounding population. These changes have been investigated by so many Authors at different places in Nigeria but, were not investigated at Tura Dam in Mashigi village. As such there was no empirical study presently showing economic impact of Tura Dam to the surrounding population. This is a gap in knowledge which is supposed to be investigated. The contending issues now are: What are the economic gains and losses as a result of Tura Dam construction to the dwellers of Mashigi village? This paper is out to answer this question

AIM AND OBJECTIVES

The aim of this study is to investigate some economics impact of Tura Dam to the surrounding dwellers of Mashigi village. This aim will be achieved by the following objectives:

1. To determine the effects of the Dam on the occupations of the people;
2. To Identify effect on fishing if any;
3. To determine how these activities have affected the income of the farmers.

METHODOLOGY

The method of obtaining information came from two sources. This involves primary and secondary sources of data collection. Primary sources of data include fieldwork, personal observations, informal discussion and questionnaire survey. Secondary source of data collection came from official documents, textbooks among others. In those days, the entire population of the dwellers of Mashigi village was small, but today the population has increased, because it was observed, over one thousand (1000) people engaged in various economic activities in the area. As such questionnaire method was used in order to obtain relevant information. Fifty (50) questionnaires were administered to the farmers, fishermen, and cattle rearers, most of them were the village's dwellers. Items addressed in the questionnaire survey include: occupations of the respondents; land uses and type; farmland sizes; household income and main sources of income of the respondents. Simple random sampling was used to select respondents. Some people were interviewed orally so as to make the data obtained more relevant. Observations were made on the sizes of the farmlands, fishing activities in the reservoir of the Dam and the type of crops cultivated on irrigation basis. Tabulated frequencies tables and bar chart were used to analyse data

obtained on the field. Simple percentage was also used to compare between gains and losses in economic term due to the Dam construction.

RESULTS AND DISCUSSION

THE STUDY AREA

Katsina State locates in Northern Nigeria. It is located between lat $11^{\circ}02'$ and $13^{\circ}03'$, long $6^{\circ}05'$ and $9^{\circ}02'$. Katsina State borders with Kaduna State to the south, Niger Republic to the North, Zamfara State to the West, Kano and Jigawa States to the East. It covers an area of about 23,983sq kilometres. Kankara L.G.A locates at the southern part of Katsina State. It is situated between lat $12^{\circ}11'$ and $12^{\circ}26'$, long $7^{\circ}27'$ and $7^{\circ}35'$. It borders with Malumfashi L.G.A to the East, Zamfara State to the West, Danmusa and Musawa L.G.As to the North, Bakori and Faskari L.G.As to the south. Mashigi village and Tura Dam were located at Kankara L.G.A. The Dam was constructed along River Turami, an important tributary of River Gagere drainage basin. Figure 2.1 shows the Drainage of Kankara/Malumfashi, Mashigi village and Tura Dam, the study area.

OCCUPATIONS OF THE RESPONDENTS

Farming is the main occupation of the respondents. Farmers practiced rainfed and dry season farming even before the Dam was constructed. However, before the Dam, dry season farming is raised on minor basis. After the Dam dry season farming expanded and became the main occupation of the farmers of the area. Fishing is also practiced in minor basis along rivers and streams before the Dam. As the Dam was constructed fishing activity expanded. Table 2.1 below illustrates further the distribution of the main occupations of the respondents

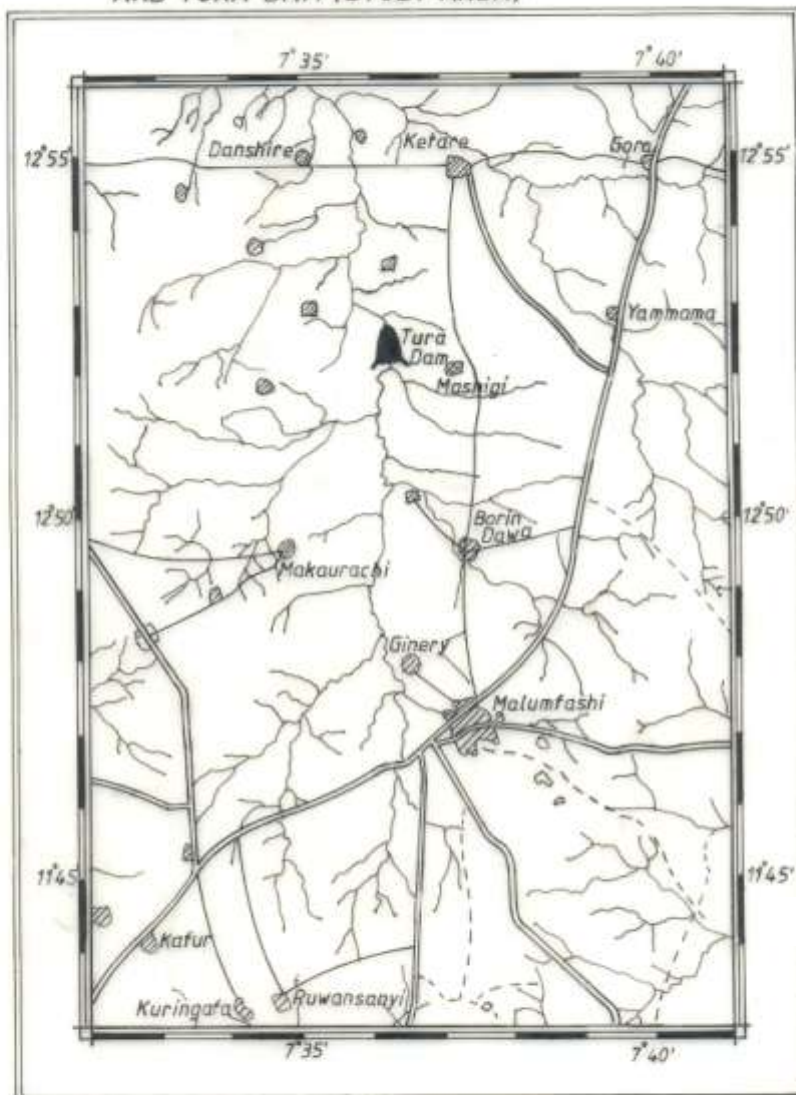
Table 2.1: Distributions of Main Occupations of the Respondents.

Category of occupations	Number of Respondents(Pre-Dam period)	Percentage (%) pre-Dam	Number of Respondents(Post-Dam)	Percentage (%)post-Dam
Rainfed Farming	10	20	5	10
Rainfed/Irrigation	4	8	6	12
Fishing	3	6	5	10
Rearing	2	4	5	10
Main/ Subsidiary Occupation	1	2	9	18
Total	20	40	30	60

Source: Field Work, 2008

**DRAINAGE SYSTEM OF KANKARA/MALUMFASHI,
LOCATION OF MASHIGI VILLAGE AND TURA DAM**

FIG 2.1 TOPOGRAPHY AND LOCATION OF MASHIGI VILLAGE AND TURA DAM (STUDY AREA)



Source: Drawn & Reproduce
By Cartographer Dept of
Geography Katsina
State University



LEGEND

Tura Dam (Study Area)	
River	
Main Town / Village	
Major Road	
Minor Road	
Path	
Mashigi Village (Study Area)	



According to Table 2.1 farming took the largest share than the other occupations. 10 Farmers engaged in rainfed farming before the dam representing 20% of the total respondents. After the dam, the respondents were 5 representing 10%. This shows most of the farmers practiced rainfed farming before the dam was constructed. After the dam their numbers were reduced due to the emergence of new occupations such as tailoring, trading among others. Rainfed and irrigation have 4 respondents before the dam which represent 8%. After the dam, the number increased to 6 representing 12%. In this farmers do not engage in rainfed/irrigation much before the dam compared after the construction of the dam. The reason for this according to a farmer interviewed was, during summer season the dam floods farmers' farm plots which prevent them to cultivate. During dry season the flooded farms provide more Fadama for irrigation. Fishing is also among the main occupation of the farmers before and after the dam. From Table 2.1, three (3) respondents engaged in fishing before the dam, is represented by 6%. This shows there is an increase in fishing activity after the construction of the dam, due to the availability of water for fishing all the year round in the reservoir of the dam. In rearing, the respondents are 2 practiced livestock rearing before the dam. This number has increased to 5 respondents after the dam. Subsidiary occupations also increased after construction of the dam due to improvement of income level of the farmers. Crops grown especially those under irrigation gave farmers a lot of income. Table 2.2 illustrates the distribution of main and minor occupations of the respondents.

Table 2.2: Occupational Distribution of the Respondents, Main/Minor Occupation.

OCCUPATION	RESPONDENTS (PRE-DAM)	PERCENTAGE (%) Pre-Dam	RESPONDENTS (Post-Dam)	PERCENTAGE (%) Post-Dam
Farming/Blacksmithing	5	10	-	-
Farming/Trading	-	-	15	30
Farming/Motor Driving	-	-	15	30
Farming/Carpentering	-	-	15	30
Total	5	10	45	90

Source: Field Work, 2008.

According to Table 2.2 farmers have less time to combine main and subsidiary occupations before the dam. Only 10% of the total respondents combined main and subsidiary occupation. And they practiced farming and blacksmithing before the dam. After the construction of the dam 30% engaged in farming and trading, 30% in farming and motor driving and 30% in farming and carpentering. As such construction of the dam has led farmers to engage in more occupations as seen from the table 2.2 above. Besides these economic activities people now settled at home to engage in irrigation scheme. These economic activities have led to the increase in the ownership of Lorries and Buses, consequently, led to the increase of motor drivers.

LAND USES AND TYPE

A Land use refers to the use into which land is being put. The type of land uses in the study area is divided into two:

- a. Agricultural Land uses
- b. Non-Agricultural Land uses.

Agricultural land uses is also divided into Arable Fadama and upland Arable (Mortimore and Wilson, 1989). In this area, Arable Fadama farming is practiced during the dry season around the reservoir of the dam. Different crops are raised. This includes Tomatoes, Onions, Carrots, Lettuce, Amaranths, and Maize among others. Upland Arable farming is practiced during rainy season. Crops grown include Guinea Corn, Millet, Maize, Groundnuts and Cassava among others. The land uses under non agricultural practises in the study area include settlement areas, footpath and barrowing pits among others.

FARMLAND SIZES

Asmal, K (200) observed that “the Pakistans second five years plan drown a particular attention to the small and uneconomic size of land holdings and the excessive fragmentation of holdings as being among the causes of low crop yield”. In this area the construction of the Dam has led to the reduction of farmers’ annual crop yields whose most of their farmlands were flooded. This led to variation in the size and number of plot between farmers (Table 2.3).

Table 2.3: Sizes of Farmers’ Farmlands

NO. Of HECT.	NO. Of RESPONDENTS (PRE-DAM)	PERCENTAGE (%), PRE-DAM	NO. Of RESPONDENTS (POST-DAM)	PERCENTAGE (%), POST-DAM
0.5-5ha	8	16	10	20
6-10ha	10	20	8	16
10ha	10	20	4	8
TOTAL	28	56%	22	44%

Source: Field work, 2008

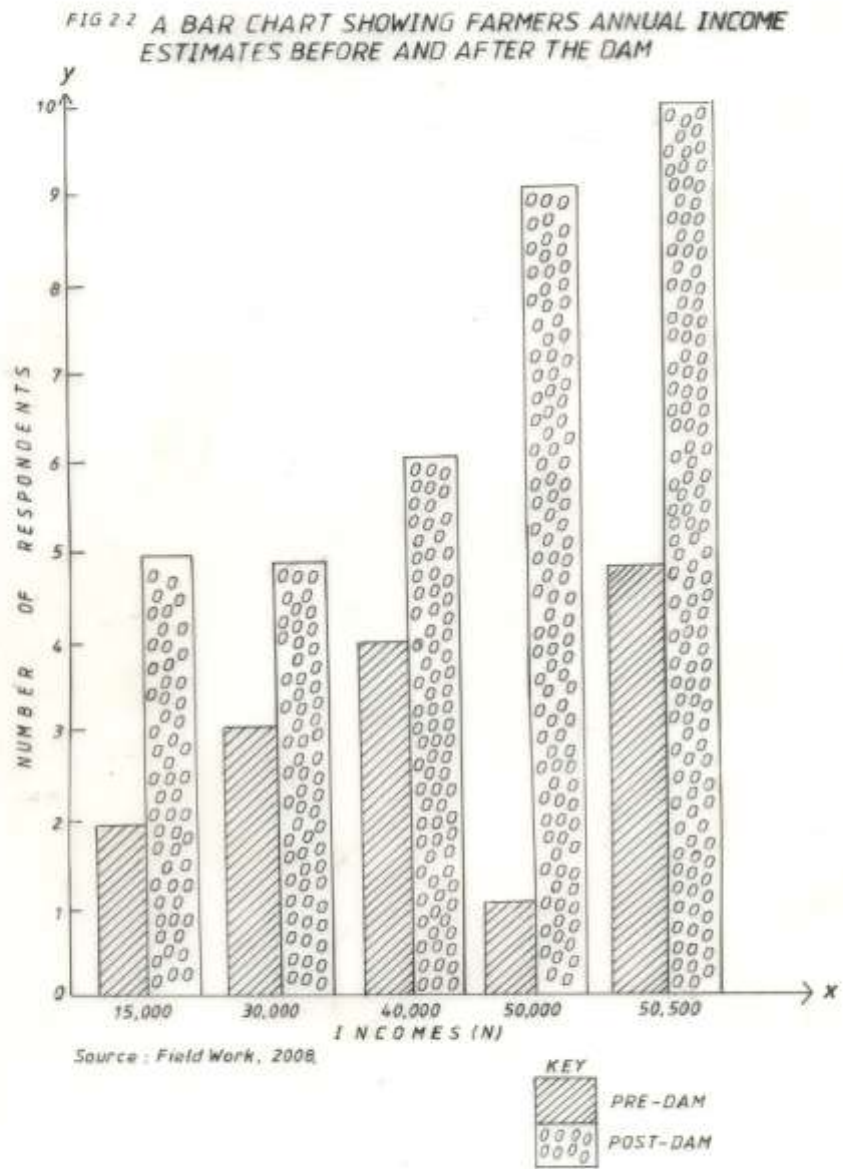
Farmers who had large portions of land before the Dam managed to get small portions after the Dam construction or vice versa. Most of the farms that were affected in the construction of the Dam were owned by the inhabitants of the Mashigi Village. From the Table 2.3 above, 16% of the farmers who owned 0.5-5 hectares of land before the Dam now increased to 20%. Also farmers who had owned 6-10hectares were 20% before the Dam, and this reduced to 16% after the Dam.

HOUSEHOLD INCOME

Estimating the wealth and income of farmers is difficult. This is because farmers in the study area have no measures of their farmlands. Information on income is therefore, not to be taken as precise. The method followed in getting the information was through informal interview with the farmers by asking them the number of bags of Guinea Corn, Millet, Tomatoes and Onion among others they harvested and multiply them with the value of the market price. The number of a quantity or yield is also estimated using the sizes of the farms of the respondents.

Shu’aibu M. (1992), expressed that “comparisons of farmers annual income estimate as indicated by the farmers, show that there is a remarkable increase in their annual

estimates as compared to the period before the project was established". According to most of the farmers interviewed, in spite the reduction of farmland sizes, generally the construction of Tura dam has led to increase the income level of the farmers. Below is a bar chart illustrating farmers' annual income estimate in the study area.



PRE-DAM PERIOD
 POST-DAM PERIOD

In general, the respondents have higher income now than the pre-dam period. And this is as a result of the activities they do in the post-dam period. People engaged much in rainfed-agriculture without paying any attention to subsidiary occupation in dry season in pre-Dam period. Majority of the youth now stay at home and irrigate their crops during dry season. Also the construction of the Dam attracts more fishermen to the area. Income realised from subsidiary occupation is invested in agriculture by purchasing more fertilizers, herbicides and insecticides.

MAIN SOURCES OF INCOME

The main sources of income of the respondents are from the various economic activities they practiced. As already seen the people of the study area engaged in many economies activities before and after the construction of the Dam. The main sources of income are shown in the table below:-

Table 2.4: Main Sources of Income before and after the Dam Construction

SOURCES OF INCOME	RESPONDENT S (PRE-DAM)	PERCENTAG E (%) PRE-DAM	RESPONDENT S (POST-DAM)	PERRCENTAG E (%) POST-DAM
Rainfed Farming	10	20	5	10
Rainfed/Irrigation	4	8	6	12
Fishing	3	6	5	10
Rearing	2	4	5	10
Fishing/Blacksmithin g	1	2	-	-
Farming/Trading	-	-	3	6
Farming/Motor Driving	-	-	3	6
Farming/Carpenteri ng	-	-	3	6
Total	20	40	30	60

Sources: Field Works 2008

In pre-dam people who practiced rainfed agriculture were many. It is their main sources of income. After the dam farmers who practiced rainfed agriculture reduced. So, sources of income from rainfed agriculture decreased after the dam. This is because some farmers turned to other new occupations. Those who engaged in rainfed/Irrigation increased from 8% in the pre-dam period to 12% in post dam period. So their main sources of income also increased after the dam. For instance, in irrigation only those farmers who were near the rivers before the dam have access to irrigate. But now due to the expansion of Fadama brought by the dam, Irrigation increased and became main source of income to the farmers. Also fishing provides many farmers source of income after the construction of the dam than before the dam. This is similar with rearing. Income raised from fishing/blacksmithing is very little and was obtained in pre-dam period. Farming/trading, Farming/motor driving and Farming/carpentering do not give income to the farmer in pre-dam period. After the Dam, farming/trading gave 6% of the respondent source of income, farming/motor driving 6% and farming/carpentering 6%.

CONCLUSION

At Tura dam, there can be no doubt that significant positive economic changes have occurred to the surrounding population of Mashigi village. A notable example is the sharp rise in irrigation farming and fishing. Besides rainfed farming which was the main occupation of the dwellers of Mashigi village during pre-dam times, new occupations such as dry season farming, trading, motor driving, among others have now emerged after construction of the Dam. Average annual income of households; increased; increased in livestock population; improved living conditions and diets. Yet, negative economic changes have also taken place. There has been a decline in farmlands as some areas have been flooded by the Dam.

RECOMMENDATIONS

We observed very few dams were constructed in Katsina State. The few ones constructed were for single purpose to supply domestic water to major urban centres across the State. Some of these dams include Mairuwa dam in Funtua L.G.A, Ajiwa dam in Batagarawa L.G.A and Tura dam in Kankara L.G.A among others. In rural areas across the State hardly found even earth dams. So, the greatest challenge to the Government is construction of dams in both rural and urban areas where there is none. With regards to farming especially dry season farming, farmers up to now were using simple tools and traditional method of irrigation. Effort should be made by the Government to assist farmers by providing them with pumping machines on hire basis. Fishermen should be organised into cooperative while loans and technical assistance should be made available to them.

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