

THE DOMA DAM AND ITS SOCIO-ECONOMIC IMPLICATION IN DOMA LOCAL GOVERNMENT AREA OF NASARAWA STATE

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ABSTRACT

The study examined the Doma Dam and its socio economic implication in Doma local government area of Nasarawa State, six villages were selected which include Doma town, Alagye, Dogon Kurmi, Yelwa, Agbabor and Ohinna because of their proximity to the Dam. Data was obtained by the use of questionnaire accompanied by oral and written interview schedules, a handbook on Doma dam was also obtained from the Dam's authority. The result obtained from the field were presented and tabulated using simple descriptive statistics. The result of the analysis confirmed that Doma Dam has resulted to improvement of socio-economic condition of the people through provision of potable water for drinking and other uses which tremendously reduce the problem of water supply in the study area, creation of employment opportunities through fishing activities and the boost in economic activities through farming. However, the disadvantage is health hazard, particularly the prevalence of schistosomiasis which record the highest percentage in the study area.

KEYWORDS: Schistosomiasis, Domestic and Irrigation Water, Drilling for Irrigation

INTRODUCTION

The construction of dam is among other ways in which water is conserved globally. It is a finite and scarce resource due to increased demand for a growing population, world industrialization and other agricultural development.

A dam is one of the artificial methods through which man modifies river and other fluvial processes. It also represents one of the methods of developing water resources by man and the best strategy for averting the effects of perennial drought in the dry lands of the world (Maigari, 2002).

Dams have been constructed in order to prevent floods to supply drinking and domestic water to generate energy and for irrigation purposes since the old times.

They have a great deal of positive and negative implication on the environment beside their benefits like controlling stream regimes consequently preventing floods obtaining domestic and irrigation water from the stored water and generating energy.

In Nigeria, the first attempt at dam construction was made in 1918, it was in form of dykes placed across a river in the Sokoto Basin and the second attempt was in 1925 in the same basin, they were all washed away by flood in 1922 and 1940 respectively.

The first real dam in Nigeria was built in 1954; it was constructed at Erinle on river Osun. However, by 1960 about 67 town where supply with water from reservoirs behind similar dams mostly in the south western part of the country (Faniran and Ayoade 1978).

In the late 1960s dam construction in the Sudano – Sahelian zone and Northern guinea zone, returned in full capacity. The first major and so far the largest dam in Nigeria to date is the multipurpose Kainji dam commissioned in 1968. In recent decades and following the Sahelian drought of 1968 – 73, the Sudano – Sahelian area of Africa (that of Nigeria inclusive) has come heaving under construction and borehole drilling for irrigation and other purpose (Martin and Olofin, 1992).

Dams hold possibilities of considerable harm for living things in addition to their advantages such as meeting basic requirements of the society and increasing living standards.

They have been associated with the incidence of new pests and pathogens and the proliferation of existing ones. The availability of stagnant or slow moving water in dams, irrigation canals and irrigated field provide ideal environment for harmful organisms such as water borne diseases parasites, responsible for the prevalence of schistosomiasis.

Undoubtedly, dams have helped to improve our water supplies and account for a significant proportion of the electric power in our national grid, while irrigation has resulted in the production of some highly favored selected crops. But at what cost? There is firm evidence that they bring with them undesirable and far reaching environmental and social problems.

Negative effects of dams on the environment include decrease fishing downstream, dam failure, with loss of lives and property salinity and water logging problems and the elimination of silt supply to flood plains.

RESEARCH PROBLEM

A Canadian consulting firm from 1973 – 1974 designed the Doma dam and the construction of the dam started in 1980 and was completed in 1986. The Federal Government through the Federal Ministry of Agriculture and water resources financed the construction of Doma dam. The dam was commissioned by General Ibrahim Babangida in March, 1986. Doma Dam is an earth filled dam, constructed across the famous Ohina River. It has a foundation at 105m above sea level and the crest height is 132m above sea level. To be precise, the dam is 28m high and 520m long. The width at the foundation is 160m and at the crest is 18m (Bawala, 2003).

The executing agency of Doma Dam is the Lower Benue River Basin Development Authority (LBRBDA) which is a parastatal under the Federal Ministry of Agriculture and Water resources. However, the construction of Doma Dam and its reservoirs for the purpose of irrigating 2000 acres of farmland represents a major water resources development in the area. Without any doubt, Doma Dam like any other dam will have significant environmental and socio-economic consequences on the people. Barrow (1983), while reviewing the major environmental consequences in the tropics identified various environmental changes that are brought about by damming of rivers and the creation of artificial lakes. He further stated that some of these may be desirable while others are not. Some studies have been carried out on socio-economic consequence of dam construction. Including the displacement resettlement, loss of fertile farmland and grazing land. For example, in Nigeria more than 44,000 people were displaced by lake Kainji. These people were resettled at the great cost of N32.1 million (Mabogunje, 1973).

Rufai (2008) have also highlighted the major environmental consequence of Doma Dam on the people in the locality. Most important among the point he raised are the environmental implication or consequences of the Dam such as problem of diseases, decreasing fishing activities in the downstream, increase in gully erosion at the downstream, nutrient load and turbidity. Rimi (2008) examined the effect of Doma Dam on the dry season agriculture. Most significant among the issues raised is the effect of the dam on dry season farming. He further stated that farmers do not use water from the

dam to irrigate the field, though he revealed that stream and ponds are the major sources of water for dry season farming in the area and this in turn decrease the yield of the crops. From above it is evident that emphasis has not been laid on the socioeconomic implication of the Dam by previous researchers which is the focus of this study. The aim of the study is to examine the socioeconomic implication of Doma Dam in Doma Local Government Area of Nasarawa State.

STUDY AREA

Doma local government is located at latitude 8^o24’N and 8^o5’N and longitude 6^oE and 6^o30’E of the Greenwich meridian. It is located in the North of the state capital Lafia, approximately 22km away and shares common boundary with Obi local government in the North East, Keana local government in the east, Kokona local government in the Northwest, Nasarawa local government in the west and Makurdi local government area of Benue State in the south. Doma dam is located some eight (8km) kilometers south of Doma town and about 30 kilometers away from Lafia the state capital (Figure 1a and 1b). The dam is structured into three arms with each arm measuring more than 2km in length and 300m in width: they are the three (3) branch of the dam meant for farming and fishing activities in the downstream.

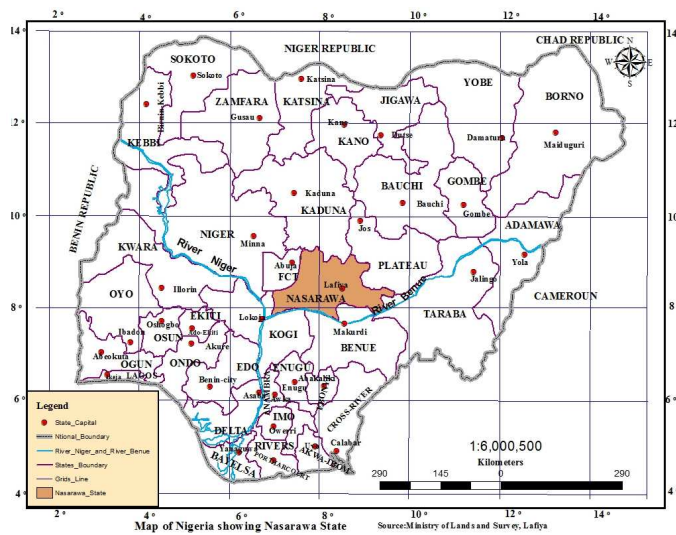


Figure 1a: Nigeria Showing Nasarawa State Source: Ministry of Lands, Survey Town Planning, Lafia

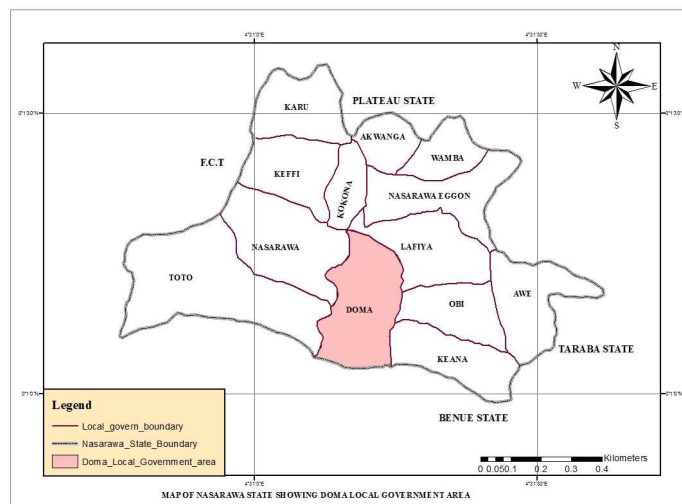


Figure 1b: Nasarawa State Showing Doma Local Government Survey Department Area Source: Lands Doma L.G.A

The location of the study area observed on the geological map of Nigeria clearly shows that the entire local government is a zone of cretaceous sediments (sedimentary Basin) that had been deposited during the marine transgression in about 130 million years ago. The commonest mineral found within the study area are galena, limestone clay, chloride spheneterite, sodium and barite (Lyam, 2000). The fact that the relief of a particular environment influence its drainage pattern means that there is a correlation between the relief and drainage system. The entire local government is generally characterized by low land area about 100-200 meters above sea level although there exist a kind of spatial variation in the surface area. This kind of relief form greatly influence the drainage pattern of the study area which is characterized by streams and rivers. These rivers and streams dry off their water during the dry season while in the wet season; they swell off their water or increase their volume of water content. This in turn has a negative impact on the economic base of the people in the study area such as farming and fishing (Rimi, 2008).

The population distribution in Doma local government area exhibits a kind of variation between the rural and urban areas (i.e. the less or sparse population is found in areas of agricultural practice, while the dense or greater accumulation of the population is found in towns, in administration and commercial activities). From the result obtained in the 2006 census, it shows that there are about 70,545 males and 69,062 females and the overall total is 139,607. The estimated population for 2013 is 165,505 based on a growth rate of 2.8% (NPC, 2009).

Doma local government area is predominantly an agricultural area, with arable farming as the main occupation of the inhabitants.

METHODOLOGY

Information was derived directly from field or physical observation, use of questionnaire administration, oral/verbal and written interviews. The questionnaire was in sections concerned about the socio-economic profile of the respondents, socio-economic implication of the dam in the study area and the problem encountered by respondents as a result of Doma dam construction.

In order to select respondents for the questionnaire survey a sample of six (6) villages were selected because they are the immediate villages around the dam out of twenty (20) to form a representative sample, and served with the questionnaire. The questionnaire was distributed based on the estimated population from 1991 – 2013 based on a growth rate of 2.8% as shown in the table below.

Table 1

Six Selected Village	1991 Population	2013 Estimated Population	Copies of Questionnaire
Doma town	34,846	63,974	306
Agbabor	2,594	4,762	22
Alagye	2,594	4,762	22
Yelwa	1,739	3,193	16
Dogo Kurmi	848	1,557	8
Ohinna	838	1,557	8
Total	43,469	79,805	382

In all, three hundred and eighty two (382) copies of the questionnaire were used based on Krejcie and Morgan (1970) method of determining sample sizes. Purposive sampling technique was used. Descriptive statistical analysis was used in the analysis of the data. Descriptive statistics is a measure of central tendency such as the mean, median, mode, standard deviation, frequency, bar chart, pie chart, histogram and percentages. It helps to summarize the socio-economic and demographic variables of the respondents. It will be used in analyzing the objectives.

RESULTS AND DISCUSSIONS

Age Distribution of the Respondents

The sex and age distribution of any population has many significant and important implications. Some of the fundamental implications are that these variables set limits to society’s reproductive potential, determine manpower supply and influence school requirements and attendance. Because of its significant demographic, economic and social implications, the dynamics of a country’s age and sex structure are a very central subject in any meaningful demographic analysis (Laah, 2008).

Table 2: Age Distribution of Respondents in the Study Area

Age	No of Respondents	Percentage
20 – 25	34	8.90
26 – 30	50	13.09
31 – 35	49	12.83
36 – 40	132	34.55
Above 41	117	30.63
Total	382	100

Source: Field Work, 2013

The data from table 2 above shows that 8.90% of respondents fall between the ages of 20 – 25 and they form the least of all the age range while about 34.6% and 30.63% of respondents between the ages of 35 – 40 and above 41 are the active population that fully engage in farming and contribute to high fertility rate.

Gender Group of Respondents

Figure 2 below reveals the gender group of respondent in the study area.

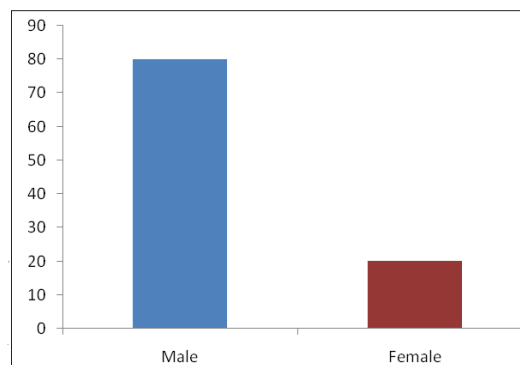


Figure 2: Bar Graph Showing the Sex of Respondents

From the graph above 79.6% of the respondents are males while 20.40% are females. Margaret (2009) found out that 71% of respondents in her study area (Zaria) are males and only 29% of respondents are female. This implies that more males participate in farming activities than females.

The reason for higher number of male respondents is because of the cultural and religious belief of the people in the study area where it is mostly males that are more exposed to this kind of activities than females.

Occupation of People in the Study Area

Occupation is seen as the solution to the problem of unemployment in any locality.

Table 3: Occupation of People in the Study Area

Occupation	No of Respondents	Percentage
Farming	223	58
Fishing	90	24
Trading	16	4
Civil servant	42	11
Other	11	3
Total	382	100

Source: Field Work, 2013

According to the oral interview most of the people in the study area are engaged in both farming and fishing, but analysis from the table above indicate that the main occupation of people in the study area is farming which has the highest percentage of respondents (i.e 58%).

It is evident that few people engage in other activities beside fishing and farming. This finding is not different from that of Margaret (2009) where most of the population in her study area (i.e Zaria) are farmers with 53% of respondents.

This implies that farming is one of the major economic activities that people in the study are engaged in. Shehu (2010) attributed that farming is among the determinant or major occupation that determines the eligibility for benefits of farm input and output in an area.

Farm Sizes before the Dam Construction

The table below revealed the various sizes of farmland of respondents in the study area before the construction of the dam.

Table 4a: Farm Sizes before the Dam Construction

Size of Farm Acres	No of Respondents	Percentage
0 – 5	214	56
6 – 10	100	26
11 – 15	50	13
16 – 20	18	5
21 – 25	-	-
Total	382	100

Source: Field Work, 2013

Farm Sizes after the Dam Construction

The table below reveals the various sizes of farm owned by respondents in the study area after the dam's construction.

Table 4b: Farm Sizes after the Dam Construction

Sizes of Farm Acres	No of Respondents	Percentage
0 – 5	103	26.90
6 – 10	202	52.10
11 – 15	40	10.50
16 – 20	10	7.07
21 – 25	10	2.43
Total	382	100

Source: Field Work, 2013

Farm size as seen is an important element in determining economic output of farm produce in the study area. There is significant improvement in farm produce after the dam construction because the people in the study area farm throughout the season. Indeed before the dam construction 56% of the respondents had 0 – 5 areas while after the dam construction 26% had 0 – 5 acres, likewise, 26% of the respondents had 6 – 10 acres before the dam construction while 52% of respondents had 6 – 10 acres after the dam construction and 2.43% of respondents had 21 – 25 acres after the dam construction.

This implies that there is significant increase in farm size after the dam construction.

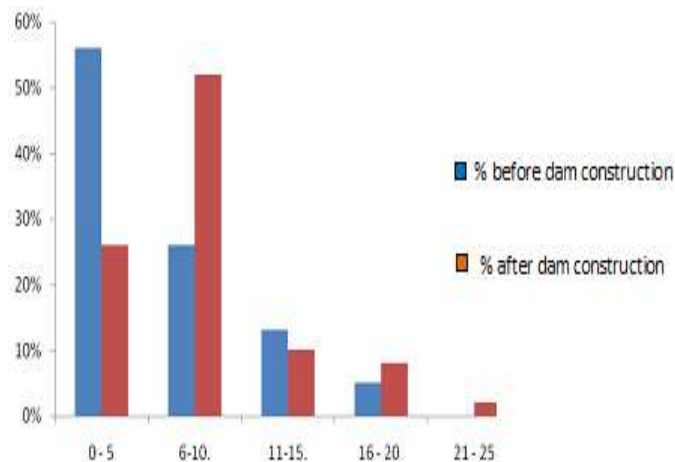


Figure 3: Histogram Showing Farm Sizes before and after the Dam Construction

Ownership of Farm

Farmers in any community acquire piece of land through transfer from one person to another within the families while some pay rent and others acquire their lands through purchasing

Table 5: Reveal the Ownership of Farm

	No of Respondents	Percentage
Yes	225	59
No	157	41
Total	382	100

Source: Field Work, 2013

The table 5 above shows that 59% of the respondents acquired their land by either inheritance or purchase while 41% of the respondents hire (i.e they pay rent) their farm lands. From the oral and written interview, ₦2000 is charged for each acre of farmland by LBRBDA in Doma local government of Nasarawa State. In a related development Shehu (2010) identified that ₦1500 is charged for each acre of farm land in Funtua by Sokoto State River Basin Development Authority. This is almost similar with that of Doma local government.

This implies that majority of farmers in the study area acquire their land through transferring from one person to another within the families because they are mostly indigene of the study area while the remaining pay a token for the use of the land.

Types of Crop Grown in the Study Area

Crops are the main type of farm product that determine the income of the farmers either for consumption or for export and they serve as the raw material for industries. The table below reveals the types of crops grown in the study area.

Table 6: Types of Crop Grown in the Study Area

Types of Crop	No of Respondents	Percentage
Maize	208	54
Cassava	118	31
Vegetable	9	2
Total	382	100

Source: Field Work, 2013

The data analysis from the table above showed that maize is the major crop grown in the study area. Although there was increase in its production when the dam was constructed maize has the highest percentage with about 54% of respondents while about 2% form the least of all the other types of crops grown in the study area.

Margaret (2009) analyse that the most productive crops in her study on the impact of dam on downstream agriculture in Zaria is maize with 27% of respondent. This implies that maize is the most dominant type of crop grown in the study area in particular and northern Nigeria in general.

Participation in Irrigation

Irrigation farming is a major agricultural activity during the dry season along flood plains river courses and dam environment water moisture for plant growth. Adams (2003) noted that irrigation farming increased rapidly due to pressure of survival and need for additional food supplies to ever increasing population.

Table 7: Level of Participation in Irrigation Activity

	No of Respondents	Percentage
Yes	76	20
No	306	80
Total	382	100

From the table it shows that about 80% of respondents engage in rain fed cultivation while only 20% of the respondents engage in dry season farming (i.e irrigation) and majority of them use stream and pond for irrigation. It means that the dam is not effectively utilized for dry season farming. This is because the 2000 hectares of farmland that the dam was constructed to irrigate is fully utilized during rain fed cultivation but it is not under irrigation.

From oral and written interview it shows that irrigation activities in the study area have suffered serious setback. This is because a considerable number of pipes and their accessories were stolen each year when people discovered that they are good resources for aluminum pot making. Another problem of irrigation in the study area arises from high cost of diesel. Recently an effort has been put in place by LBRBDA through construction of new cannals and the supply of new tractors to the farmers in order to bring the irrigation to an appreciable level.

Fishing Activity in the Study Area

Fishing is one of the major sources of income in the study area, most of the farmers also engage in fishing. Those involved in fishing made up to 60% of the respondents where the fish are caught for sale while few are consumed by the fishermen and they earn a profit of at least not less than 10% per month. About 40% do not involve themselves in fishing activities in the study area. As things stand now, aquatic life may not be highly favoured simply because the normal passing way of territorial animals are hindered since the dam works as barrier. Meantime the upstream fish movement aiming ovulation and feeding is prevented and thus brought about many complaints from the respondents that the availability of fish in the reservoir is low which lead to their low income. From the oral interview, fishing activities within the dam is charged as low as N200 per fisherman per month.

However, the dam has a lot of fishing potentials if frequent maintenance is sustained.

Source of Domestic Water Supply in the Study Area

Dam construction is among other ways in which water is conserved globally. It is a finite and scarce resource due to increased demand for a growing population, world industrialization and agricultural development. This imperative natural phenomenon is needed every day for drinking, bathing and several other domestic uses. The table below reveal the various sources of water supply before and after dam construction.

Table 8: Source of Domestic Water Supply

Category	Source of Water	No of Respondents	Percentage
Before dam construction	Borehole	25	6.54
	Tap	-	-
	Well	340	89.01
	Rain water	12	3.14
	Water vendor	5	1.31
Total		382	100
After dam construction	Borehole	60	15.71
	Tap	306	80.71
	Well	16	4.19
	Rain water	-	-
	Water vendor	-	-
Total		382	100

Source: Field Work, 2013

From the table above, before the dam construction, the main source of domestic water supply by respondents is well with about 89% but after the dam construction it shows that the main source of water supply is tap with about 80% of respondents.

This implies that water is the basis of life and therefore the development of water resources is an important component of any area. Economic development of necessity involves the development of water resources for the multifarious purposes to which they can be put. Against this background is the continued increase in many part of the world in demand for water for various uses notably domestic, industrial water supply and irrigation agriculture.

However, LBRBDA do not restrict water board from using dam water for treatment and supply to Doma area. The water board was established to supply treated water to the populace of Doma local government area. Although the water supplied by the board is still not enough, this effort has tremendously reduced the problem of domestic water supply in the study area.

Increase in Level of Income

Income which is another important socio-economic characteristics is the amount of money received by an individual for work done, goods or services or a reward for capita over a period of time. Nigeria per capital income is estimated at about one dollar per day which is equivalent to about 160 naira.

The income is also a reflection of standard of living. The study revealed that 98% agree that with the construction of Doma dam, their income has increased while only 2% believe that their income is not increasing since the dam was constructed. Since majority have experienced increase in level of income it is pertinent to assess the extent of increase. The bar graph below reveals the average increase in level of income of the respondents in the study area.

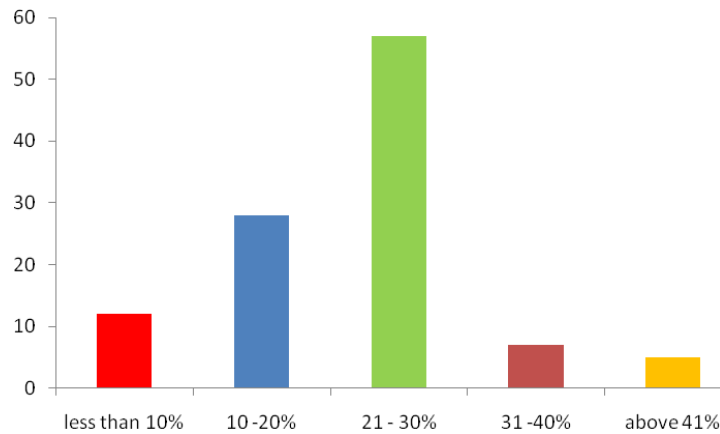


Figure 4: Graph Showing the Increase of Income in the Study Area

56% of respondents experienced an increase in income of 21 – 30%, 2% between 31 – 4% while 1% form the least of the average increase in income.

This implies that most respondents earn income and increase in level of income is a tribute to the bumper harvest. This is because farmers use the income (i.e money) to purchase farm input which lead to bumper harvest.

Problem of Water Borne Diseases

Dams hold possibilities of considerable harm, it results to increase health hazard such as the prevalence of schistosomiasis, malaria, cholera etc. Table 9 below reveals the responses on the problem of water borne disease encountered by respondents as a result of dam construction.

Table 9: Problem of Water Borne Diseases

	No of Respondents	Percentage
Yes	123	32
No	259	68
Total	382	100

Source: Field Work, 2013

From the table above, 32% of respondents have problem of water borne diseases while according to them the most common one is the schistosomiasis (i.e Bilharzias) when they drink water directly from the dam without treatment by water board they experience this diseases. This is because the water board does not supply water constantly throughout and this inturn make people in the study area to drink water directly from the dam. The study revealed that schistomiasis is not experienced before the dam construction. While 68% which form the majority of respondents do not have problem of water borne diseases.

Resettlement Case

The resettlement issues surrounding dam projects are inherently more difficult than those of non-dam projects. Construction of dams and their related reservoirs usually requires the acquisition of large consolidated piece of land. Withdrawing this land from production eliminates the main means of livelihood for its owners.

Table 10: Resettlement Case

	No of Respondents	Percentage
Yes	-	-
No	382	100
Total	382	100

Source: Field Work, 2013

The table above clearly shows that there is no any case of resettlement in the study area. This inturn implies that not all dams construction involve resettlement as in the case of Doma dam.

CONCLUSIONS AND RECOMMENDATIONS

It can thus be concluded from the above manifestations that dam construction has advantage and disadvantage on Doma LGA and its environs. The advantages that resulted to important improvement of socio-economic condition of the people are provision of potable water for drinking and other uses which tremendously reduce the problem of water supply in the study area, creation of employment opportunities through fishing activities and the boost in economic activities through farming.

However, the disadvantages include health hazard, particularly the prevalence of schistosomiasis which record the highest percentage in the study area and it also resulted in increased hazard of pests and diseases that attack the crops leading to low crop yield.

Generally one can conclude that the construction of Doma dam is of benefit not only in Doma LGA but to Nasarawa State as well as to Nigeria as a whole.

Based on the research findings, the following recommendations are offered.

- There is need to enact laws and regulations governing farming and fishing activity around the dam. This could help to discourage farmers around the dam from polluting the water through the use of herbicides, insecticide etc.
- There should be improvement in irrigation practice in order to boost production by ensuring sufficient water supply in dry seasons in the area. Farmers need to be enlightened and encouraged in this regard.
- Mobilization and enlightening the farmers in the area toward adoption of modern farming techniques is important because modern production techniques will increase productivity.
- Government extension services and credit schemes should be extended to individuals that deserve to invest in agriculture.

These recommendations, if carefully adhered to, will reduce if not completely eliminate some problems associated with development of water resources in Doma LGA, Nasarawa State and Nigeria at large.

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