

SOCIO ECONOMIC IMPACT OF JEBBA HYDRO POWER DAM ON SOME DOWNSTREAM COMMUNITIES IN NIGER STATE, NIGERIA

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ABSTRACT

Ever since the construction of Jebba dam, the downstream communities have been subjected to several hardships as a result of flood occurrences and other devastations caused by the dam. Many people lost their houses and other properties worth millions of naira. Therefore the aim of this paper is to assess the socio-economic impacts of Jebba hydro power dam on some downstream communities in Niger State, Nigeria. The primary data were collected directly from the field survey, personal interview and questionnaire. The secondary data are those data that have been used by previous researchers as well Niger State Emergency Management Agency documents on environmental hazard associated to the study areas. Other secondary sources include Google Earth map of 2016, journals, textbooks, newspapers, unpublished and published theses. Data collected using questionnaire and oral interview was analysed statistically through frequency percentage and 3-point likert type scale in the study area. As revealed in the result, some downstream communities were less vulnerable and some were highly vulnerable to flood. The less vulnerable include Funti, Ogundu and Kpatsuwa. Highly vulnerable downstream communities of Jebba dam include Jebba Gungu, Muwo and Tatabu. As revealed in the study, loss of farm produce ranked the highest with 137 respondents, loss of human lives and shelter ranked second with 111 respondents, loss livestock ranked third with 35 respondents and loss of fishing equipment ranked the least with 28 respondents. This implies that the major socio-economic activity impacted was farm produce and the least was fishing equipment. The inhabitants of the study area were predominantly farmers and fishermen and so any impact on these occupations will translate to less socio-economic development. It's therefore recommended that flood control structures or buffer zone should be created in areas of high and moderate vulnerability. Multi-sectoral approach to flood mitigation as opposed to single sector should be promoted as there are inter-linkages in terms of flood effect on various aspects of society.

Keywords: Jebba dam, Socio-economic, Flood, Downstream communities.

Introduction

Water supports life. It remains one of the most valuable natural resources vital to the existence of any form of life. All human's production activities could only be carried out with water (Babagana *et al.*, 2015). As important as water is, it is a limited

resource. The total amount of all kinds of water is about 1.39billion km³ the world fresh water is only about 36million km³ representing less than 3% of worlds total water amount. There are over 50,000 large dams in the world today. These dams provide a range of benefits: electricity generation, irrigation water for agriculture, urban water supply, flood control, and tourism opportunities (Altinbilek *et al.*, 2012). Large dams supply 20 percent of global electricity and provide irrigation water for 15 percent of global food production (Tran, 2017). Despite this, large dams also present a series of complex challenges and negative impacts. However, the environmental and social impacts of dams in the tropics did not go unnoticed and received attention in the 1970s. Examples included siltation decrease in the Nile River Delta due to the construction of the Aswan Dam in Egypt, and a host of social and human health problems, including water-borne diseases and displacement of large numbers of people due to the Volta Dam in Ghana, Kariba Dam in Zambia and Zimbabwe (Tran, 2017).

Dams can undermine the social and ecological integrity of communities resources, displace and destabilize communities (International Rivers, 2013), and fracture relationships and social systems that form the foundation for effective governance arrangements (Bennett *et al.*, 2012; Peter, 2013). Dams can create social costs such as the 40-80 million people displaced by hydro dams worldwide (UNDP, 2011). Dams have led to the resettlement of communities, and deprived people of access to resources and assets such as farmlands, sacred groves, roads, health centres, and schools (Ferraro *et al.*, 2011; International Rivers, 2013).

Ever since the construction of Jebba dam, the surrounding communities have been subjected to several hardships as a result of flood occurrences and other devastations caused by the dam. Many people lost their houses and other properties worth millions of naira. The dam project resulted in the displacement and relocation of about 6,000 people who inhabited 42 villages and thus were resettled into 21 amalgamated but planned settlements. Although the floods did not directly cause any death at the time of the failure numerous casualties were reported due to the resulting poor conditions. Residents now suffer from housing shortages, resulting in overcrowded living environment, in one instance, more than 30 people. Many communities members lost their local business due to the catastrophe and were left without a means of livelihood. The dam communities are neglected because they are not active stakeholders in major developments as a result of the dam constructions (Ya'u, 2012). Fishing, which is one of the major Economic activities in the dam and serves a major source of income for the inhabitants is stalled (Andam *et al.*, 2010). The impact of the devastation caused as a result of the construction of Jebba dam on peoples livelihood, health, social system and culture are not easily quantified and hence often not ignored when analyzing the cost and benefits of Jebba. The direct benefits they provide to people are typically reduced to monetary figures for economic quantification and are not

recorded in human terms. Therefore the aim of this study is to assess the socio-economic impacts of Jebba hydro power dam on some downstream communities in Niger State, Nigeria.

Jebba dam is located between longitude 4° 20' E to 4° 50' E and latitude 9°51' N to 10° 57' N between Niger and Kwara State in the northern Nigeria. Jebba dam is earth and rockfill and is coupled with several auxiliary dams and infrastructure. The main dam is located to the south and its imperviousness is secured by an upstream blanket. Jebba Dam comprises the civil dam structures, the bottom gated spillway, the hydroelectric powerhouse with turbines, generators, and a navigation lock, with monitoring and control systems. The Jebba Dam stores and safely releases water to generate hydroelectric power, provide flood protection and, originally, support navigation.

The length of the reservoir is about 130km and its maximum width is 24km. The reservoir is highest depth is about 465 feet and the lowest depth is approximately 435 feet under normal conditions (9.3 m difference) (See Figure 1.1).

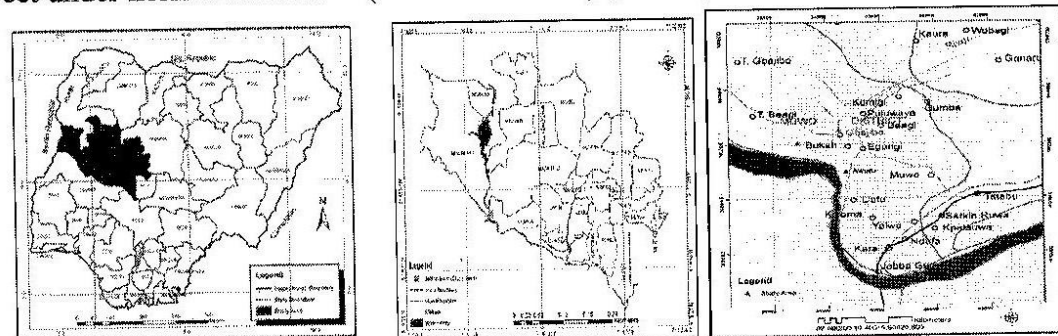


Figure 1: The Study Area

Materials and Methods

The primary data were collected directly from the field survey, personal interview and questionnaire. This was used to achieve the stated objectives. The secondary data are those data that have been used by previous researchers as well Niger State Emergency Management Agency documents on environmental hazard associated to the study areas. Other secondary sources include Google Earth map of 2016, journals, textbooks, newspapers, unpublished and published theses, and the internet.

Wide range of data is necessary and essential for effective examination of the problem peculiar to Jebba dam. Based on this, both primary and secondary data sources were employed. A designed questionnaire was used as the major source of the data collection. Responses from respondents bothering on downstream human activities of Jebba Dam in Niger State, Nigeria were collected through the questionnaires and personal interview. Data collected using questionnaire and oral interview was

analysed statistically through frequency percentage and 3-point likert type scale in the study area.

Results and Discussions

Mapping the Downstream Communities

As revealed in Figure 2, the distance of downstream communities was 263.1km² (Jebba dam to confluence of Lokoja) and most of these downstream communities were vulnerable to flood.

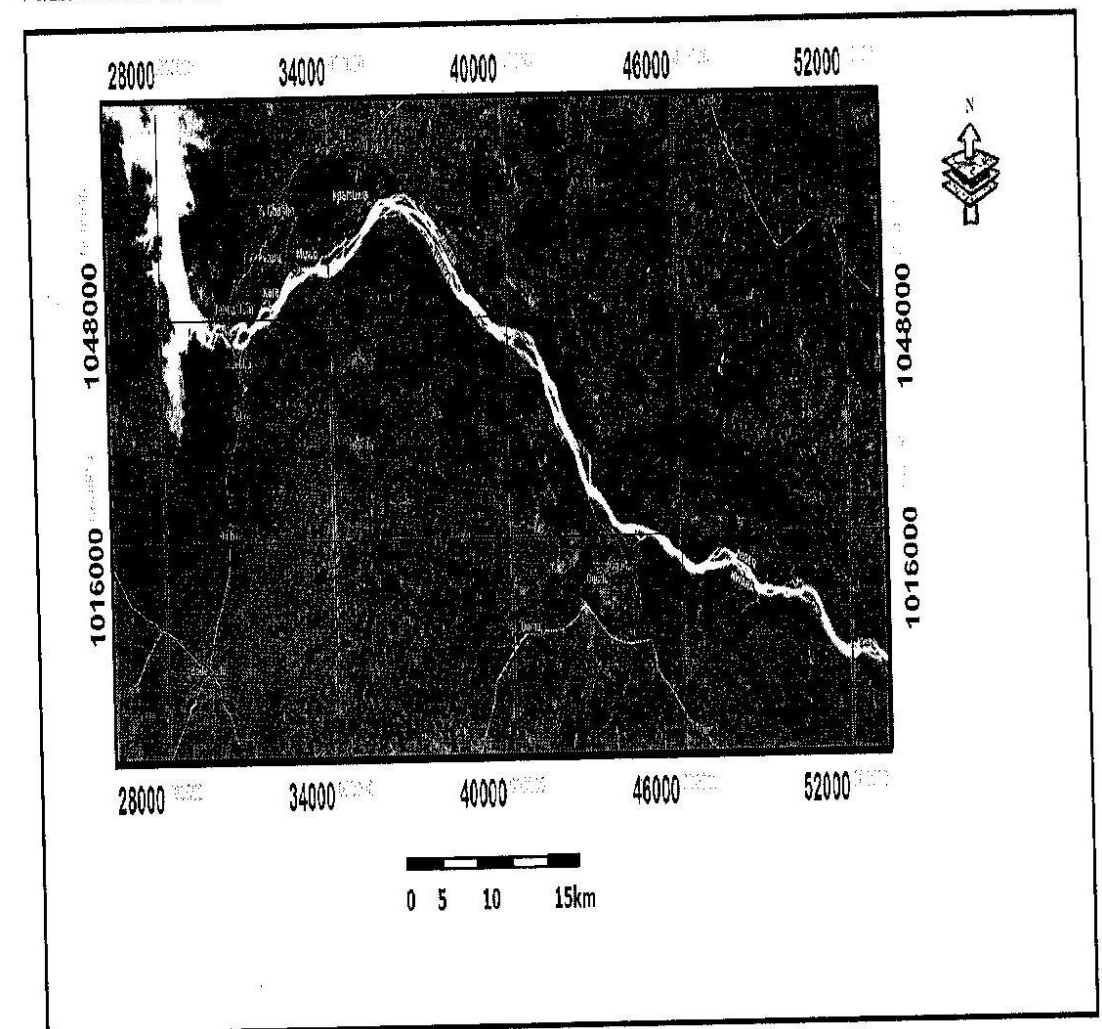


Figure 2: Downstream Communities of Jebba Dam

Some of the downstream communities include Jebba Gungu, Kpatsuwa, Tatabu, Muwo, Awuru, Yalwa and Kara.

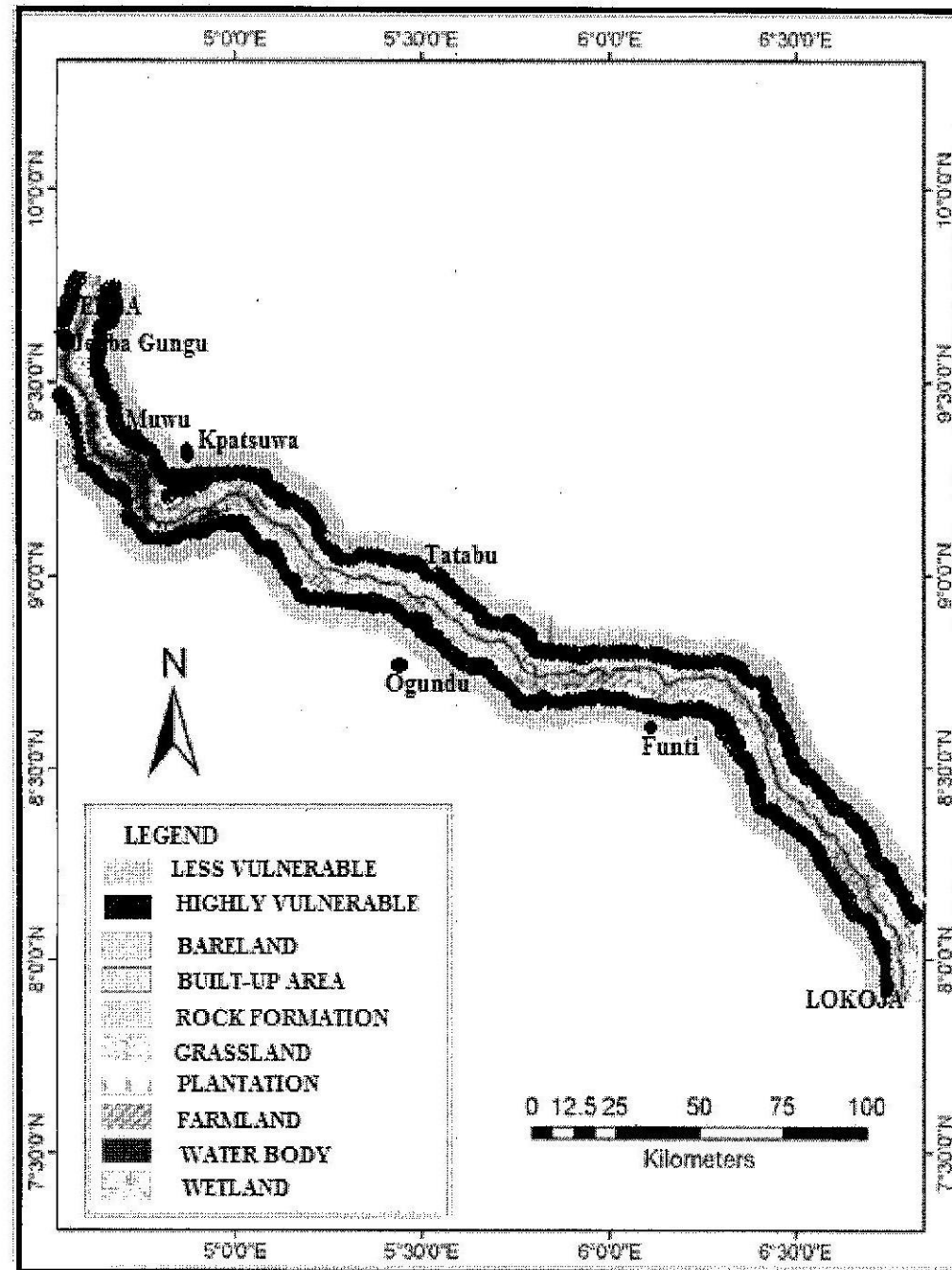
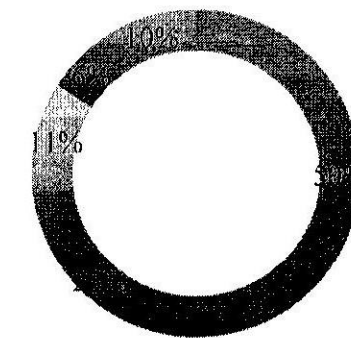


Figure 3: Vulnerability of Downstream Communities of Jebba Dam

As revealed in Figure 3, some downstream communities were less vulnerable and some were highly vulnerable to flood. The less vulnerable include Funti, Ogundu and Kpatsuwa. Highly vulnerable downstream communities of Jebba dam include Jebba Gungu, Muwo and Tatabu.

The major occupations of the respondents in the study area include crop production, trading, fishing, charcoal burning and wage labour (civil servant) as revealed in Figure 4 of the study.

Major Occupation of Respondents



■ Crop Production ■ Trading ■ Fishing ■ Charcoal Burning ■ Wage Labour

Figure 4: Occupations of Respondents

The result presented in Figure 4 revealed that crop production is the major means of livelihood, it recorded about 50%, followed by trading with 23%, 11% are into fish farming, 10% of the respondents are into wage labour, while 6% are into charcoal burning. Discussions with downstream communities established that the main source of income for most households was crop production followed by trading. These main sources of livelihood were found to be subsistence farming. Also, the environmental hazard had a devastating impact on food stocks where many households lost their food. Consequently, this affected the households' food security level.

As revealed in Table 1, loss of farm produce ranked the highest with 137 respondents, loss of human lives and shelter ranked second with 111 respondents, loss livestock ranked third with 35 respondents and loss of fishing equipment ranked the least with 28 respondents. This implies that the major socio-economic activity impacted was farm produce and the least was fishing equipment. The inhabitants of the study area were predominantly farmers and fishermen and so any impact on these occupations will translate to less socio-economic development. Plate I and II revealed the damaged fishing net, loss of farm produce and damaged shelter in the study area.

Table 1: Impact of Jebba Dam on Socio-Economic Activities of the Respondents

Impact	Highly Impactful	Impactful	Barely Impactful	Not Impactful	Total
Loss of farm produce	81	45	11	0	137
Loss of fishing equipment	23	4	0	1	28
Loss livestock	18	15	2	0	35
Loss human lives & shelter	67	25	13	6	111

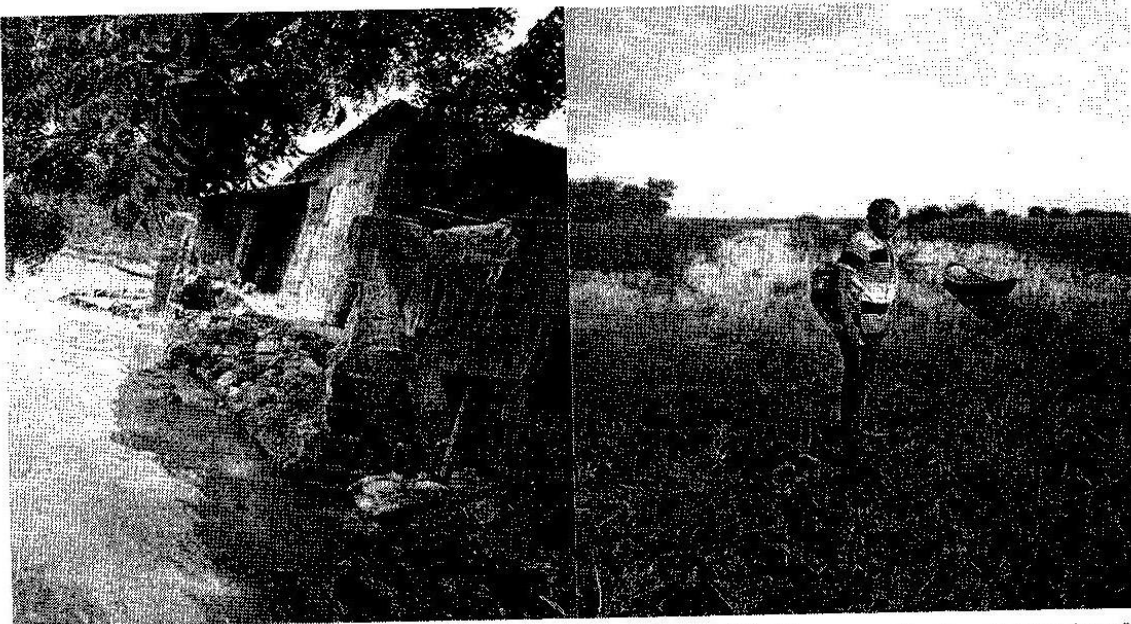


Plate I: Damaged shelter in the study area Plate II: Damaged rice farm in the study area

Flood hazard coping strategies for the study area include Engineering Scheme, Flood Abatement Schemes, Flood-Protection Scheme, Public Relief Funds, Flood Insurance, Flood Forecasting and Warning Schemes and Floodplain Zoning as revealed in Table 2.

Table 2: Effective Flood Coping Strategies Adopted by the Communities

S/No	Coping Strategies	VG	G	NG	Total
a	Engineering Scheme	10	1	0	11
b	Flood Abatement Schemes	4	3	0	7
c	Flood-Protection Scheme	69	7	0	76
d	Public Relief Funds	108	20	0	128
e	Flood Insurance	0	0	0	0
f	Flood Forecasting and Warning Schemes	69	12	0	69
g	Floodplain Zoning	9	11	0	20
	Total	257	54	0	311

Source: Field Survey (2019)

As indicated in Table 2, public relief funds ranked the highest with 128 respondents, protection scheme ranked second with 76 respondents flood forecasting and warning schemes ranked third with 69 respondents, floodplain zoning ranked fourth with 20 respondents and flood insurance ranked the least with no response. The implication

of this finding is that public relief fund either from government or private donor is the major flood coping strategy in the study area. Engineering Scheme include river training, works designed to prevent local bank erosion, flood embankments, channels enlargement, flood-relief channels and flood storage reservoirs; Flood Abatement Schemes include afforestation and reducing the land-to-channel runoff; Flood-Protection Scheme: stocking of suitable shields to be placed in position at doors and windows prior to a flood, raising of building above the flood level and inclusion of pumping facilities in basement and Floodplain Zoning include Prohibitive Zone, Restrictive Zone (All buildings should be flood proofed and establishment of Game reserve) and Warning Zone.

Conclusion

From the study, it was clear that households cope differently when affected by floods in downstream communities of Jebba dam. The current coping strategies being employed by most respondents were not very effective. The finding revealed that the flood coping strategies were not sustainable because they had been using them and yet the situation did not seem to improve. The downstream communities coping capacities should not be underestimated but rather built upon. The focus must be on improving livelihood conditions of the people.

The downstream communities should be encouraged to build their shelters using durable materials and away from the flood prone area as a way of coping with the floods. Clearly, there is need to develop better and appropriate measures (as discussed under the implications and recommendations sections) to prepare and mitigate the socio-economic impact of Jebba dam on downstream communities. Above all, the aim must be to involve all the players to enhance downstream communities' resilience to floods due to location of Jebba dam. This is because as they put it, their livelihood revolves around the water: farming, fishing, transport and ancestral history. It's therefore recommended that flood monitoring and management in downstream communities of Jebba dam should be encouraged and funded by both NEMA and Niger State Emergency Management Agency. Flood control structures or buffer zone should be created in areas of high and moderate vulnerability. Multi-sectoral approach to flood mitigation as opposed to single sector should be promoted as there are inter-linkages in terms of flood effect on various aspects of society.

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