

Assessment of Fishing Activity in Tiga Dam and its Significance to Kano, Nigeria

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Abstract

This study examines fishing activities at Tiga Dam in southern Kano State and its supply capacity to Kano Metropolis. The research focuses on the relationship between dam based fishers and urban dwellers, as well as the challenges faced by those engaged in fishing. Primary data were collected through an interview schedule administered to 172 randomly selected respondents, the interview was complemented by key informant interviews with the *Sarakin Ruwa* and secondary data from documented sources. Descriptive statistical techniques, including mapping, percentage calculation, frequency counts, and tabulation, were used for data analysis. Findings reveal that 94% of the catch fish is sold to agents who transport it largely to nearby communities. Nevertheless the fish populations within the dam is decline, which was said to be a contributing factor to its supply to Kano city. More than 80% of the catch fish were consumed within the dam neighbouring communities. Key challenges identified include inadequate capital, limited government intervention, insufficient modern fishing gear, and poor electricity supply. The study recommends the promotion of sustainable fishing practices; investment in modern infrastructure, livelihood diversification, stronger regulatory frameworks, and targeted empowerment programs for youths and women in the dam's surrounding communities.

Keywords: Fishing Activity, Kano Metropolis, Nigeria, Significance, Tiga Dam

1. Introduction

Fish is one of the main aquatic food sources that the human body can get enough nourishment from it. The annual growth in fish production supports a sustainable economy since they are a substantial source of food and revenue (Noreen, et al, 2025). For centuries fishing provide a means of livelihood for local inhabitants. Small scale, fisheries are defined by “a diverse and dynamic set of activities that include various low-technology, low-capital fishing methods, as well as fish processing and marketing, boat building and net making (Tembo, 2025). The production is characterize by labor-intensive activities that are coupled with relatively low productivity. FAO (2015) define small-scale fisheries as a type of fishing which include use of small boats, either unpowered or powered by small outboard engines with limited off-shore range, use of passive, non-towed, traditional capture gear such as hooks and gillnets, and small crews of only several people. Over 90% of the roughly 120 million people who work in capture fisheries worldwide are supported by small-scale fisheries, which are an essential part of global marine capture fisheries (Hossain, et al 2025).

Fish play a crucial role in food security and sustainable nutrition, especially in coastal and low-income regions (Ahmed, et al. 2022). However, despite the essential nutrients that fishes provide, the production of natural fish especially in dams of Southern Kano is decreasing Bello (2025). Severe declines in fish abundance over time effect the already existed relationship with urban areas that makes people to develop strategies of urban small-scale fisheries at home, and that fails to close the nutritional gap and other choices from the variety of fish types raised in dams. Inland (non-marine) small-scale fishing is a livelihood through which urban households may be able to access nutritious and favoured foods and support their food security (Rivero, et al. 2022). Small-scale

fisheries provide livelihoods for millions of rural and urban people and make important, broader contributions to food and nutrition security (Loring, et al. 2019). Thus, the aim of this study is to assess the nature of fishing activities in Tiga Dam, examine their contribution to the supply of fish to urban Kano, and identify the challenges affecting fishing practices in the area.

2. Methods

2.1 Study Area

The Tiga Dam, is constructed on the Kano River and was commissioned in 1974, a significant hydraulic structure in northern Nigeria (Umar, et al, 2024), situated in between Rano, Tudun Wada and Bebeji Local Governments all in Kano State, geographically positioned between latitudes 11°15' to 11°29' N and longitudes 8°17' to 8°37' E (Figure 1). This substantial earth dam spans approximately 40.40 km in length and 24.40 km in width and reaches a depth of 40.00 m. With a surface area of 178.00 km², it forms a reservoir capable of storing about 1978.49 × 106 m³ of water, making it a critical water resource for the region (Mohammed, Muhammad, Abdullahi and Adeogun, 2021). The water available in the dam allows sufficient opportunities for harvesting fresh water fish of different species. The study area's climate is classified as humid tropical, characterized by a distinct bimodal seasonal pattern: rainy and dry seasons. This climatic regime is typical of many West African regions, where rainfall distribution is governed mainly by the Inter-tropical Convergence Zone (ITCZ) movement.

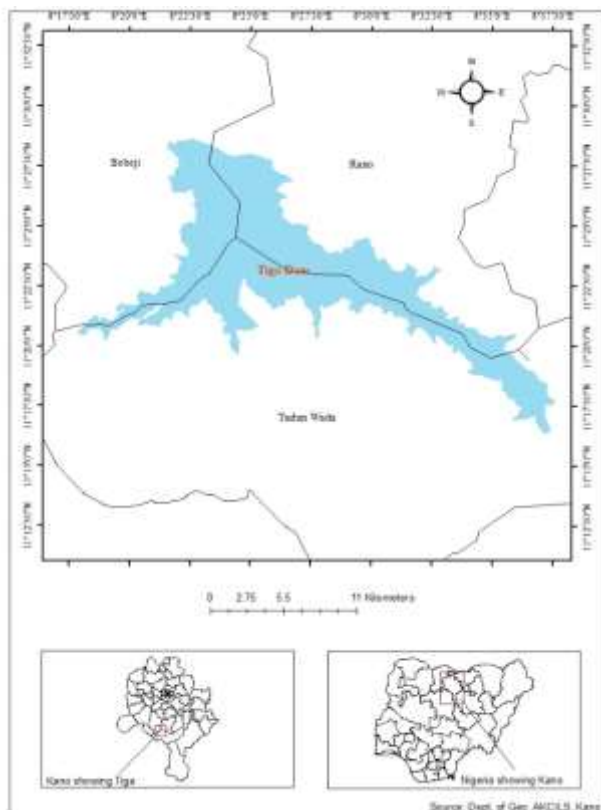


Figure 1: Study area

2.2 Sources of Data

The study utilized both primary and secondary sources of data. Primary data were obtained directly from the field to capture firsthand information on fishing activities at Tiga Dam. This involved the use of face-to-face interviews with fisher men, which provided detailed insights into their daily fishing practices, techniques, challenges, and perceptions regarding the supply of fish to urban Kano. In addition, key informant interviews were conducted with the *Sarakan Ruwa* (the traditional head of fishermen), who offered valuable information on the historical development, management practices, and socio-cultural dimensions of fishing in the area. These interviews ensured the collection of rich qualitative data, enabling a deeper understanding of the dynamics of fishing in Tiga Dam. Secondary data, on the other hand, were sourced from published and unpublished materials such as journals, textbooks, government reports, and previous research works related to fisheries, livelihoods, and rural-urban supply chains. These sources were used to complement and validate the information gathered from the field, providing a broader context for analyzing the state of fishing activities in Tiga Dam and their contribution to urban fish supply.

2.3 Population and Sample

The population of this study comprised individuals directly engaged in fishing activities within Tiga Dam. This included small-scale subsistence fishers those involved in commercial fishing and depend on the dam as their primary source of livelihood. Since the focus of the research was to understand the nature, challenges, and contributions of fishing in the area, fishers were considered the most relevant population group. A purposive sampling technique

was employed to identify and select respondents who possessed adequate knowledge and experience of fishing practices in Tiga Dam. This method was deemed appropriate because not all individuals residing around the dam are engaged in fishing, and the study specifically required participants with firsthand experience in fishing activities. In addition to the fishers, key informants such as the *Sarakan Ruwa* (the traditional leader of fishermen) were included to provide deeper insights into the management, cultural practices, and historical trends of fishing in the dam. Thus, the population of the study was carefully defined to ensure that only those directly involved in fishing activities and decision-making processes related to the fisheries sector of Tiga Dam were represented. The target population comprises all active fishers operating on Tiga Dam. Based on the records and briefings by *Sarkin Ruwan Tigat* his population is estimated at 300 fishers, from which the sample size was determined using the Yamane's simplified formula. However, the sample of 172 were selected from the population.

$$n = \frac{N}{1 + Ne2}$$

2.4 Method of data collection

Data for this study were collected using interview methods targeted at active fishers and key informants. Primary data collection comprised two complementary approaches: semi structured face-to-face interviews with fishers operating at Tiga Dam, and in-depth key informant interviews with the *Sarakan Ruwa* (the traditional leader of fishermen). For the fisher interviews, a semi-structured questionnaire was administered in person at landing sites and common gathering points. Key informant interviews were conducted with the *Sarakan Ruwa* to gain contextual and historical perspectives on fishing activity, regulation, community organization, challenges and the dam's role in urban fish supply. These interviews were more open-ended and exploratory.

2.5 Analytical Techniques

To assess the nature of fishing and its supply to urban Kano, the data generated was analyzed using, descriptive statistics. This involves use of frequency distribution, percentage, map, charts, and graphs. Flow chat map is used to demonstrate the volume or quantity of fishes that were supplied from the dam to other places.

2.6 Ethical Considerations

The ethical considerations underpinning the data collection process in this study primarily relate to the protection of participants' privacy, confidentiality, and autonomy. Informed consent was obtained from all participants. Confidentiality was maintained by anonymizing responses.

2.7 Limitations of the study

This study relies on fisher perceptions especially in terms of declining of fishing quantity; therefore, future research should obtain landing site records. The study is also limited to Tiga dam and is the one of the cleanest water among all other dams in the state. It traverses the Falgore Game Reserve which makes water to have less human

imprint and fishing activity is also extensively carried out in this area than any other dam in the state (Bello, 2025).

3. Results and Discussion

3.1 Socio-economic Characteristics of the Fishers

The study revealed that the majority of the fishers were middle-aged, with 45% between 25–44 years and 35% between 45–64 years, indicating that most respondents were within the active and productive fishing age. All respondents were male, reflecting the cultural setting of the area, although studies in other locations have shown female participation in fishing activities. Most respondents (85%) were married, suggesting strong family responsibilities and dependence on fishing as a means of household support. Fishing was identified as the major occupation of the respondents (56%), followed by farming (24%), while a few engaged in trading, transportation, livestock production, and fish processing, and civil service as supplementary livelihood activities. In terms of education, most respondents had secondary education (41%) or Qur'anic education (34%), indicating that many fishers possessed basic literacy that could influence adoption of innovations, although low educational attainment may limit access to credit and extension services. The findings further showed that larger household sizes were common, providing family labour for fishing activities and increasing productivity, although high household consumption could reduce overall income. Regarding fishing experience, most respondents had many years of involvement in fishing, particularly between 21–30 years, demonstrating a high level of expertise and dependence on fisheries for livelihood. Overall, the socioeconomic characteristics indicate that fishing is a family-oriented and experience-driven occupation that plays an important role in sustaining rural livelihoods and fishery development in the study area.

3.2 Nature of Fishing Activity

3.2.1 Availability of Fishes in the Dams

The discussion with Sarkin Ruwa reveals that, the fish population keeps decreasing, and this concur with fisher men responses on the same issue. The responses reveals that majority of the respondents with 95% responded to the decrease in the fish population within the dams over some years. While minority of the respondents with 2% believed there is increase in fish population within the dams of the study area. Some respondents with 3% thinks there is no change in the abundance of fish population in the dams. The result shows that there was a decrease in the abundance of fishes over some years within the dams in the study area. This happened as a result of some factors which includes; damming some rivers along the way, insufficient fingerlings within the dams, poor fishing techniques, continues de-silting of channels by government, frequents change in the water volume which may cause over flow of the dams. This finding aligns with FAO (2020) reporting declining in fish populations in inland water bodies especially in Sub-Saharan Africa face mounting pressures from population growth, habitat degradation, and weak governance, leading to reduced stock availability.

3.2.2 Types of Fish Commonly Found in the Dam

Both from interview and key informant interview, present twelve different types of fish species commonly found in Tiga dam of the study area. They includes Silver Catfish (Ragon ruwa), Baby Whale (Lamsa), African Catfish (Mari), Nile/Niger Perch (Giwan ruwa/Barya), Silver Side (Kawara/Jarwutsiya), Armored Catfish (Buro), Heterotis Fish (Bargi), Tiger Fish (Tsage), Electric Fish (Minjirya), Mango Tilapia (Gargaza), Butter fish (Rampai/Balo) and Wahrindi (Karaya). It was stated that the availability of species depend on the factors which includes; size of the dam, volume of water, flooding, seasonality of the rivers, siltation etc. Although, there is fear of extinction of Mango Tilapia (Gargaza). Fish population is another factor attracting fishers to carry out fishing activities in the study area. The higher the fish population in the water, the more people attracted to the dam and the more fishing activities taking place which in return affect the fish quantity. This findings correspond with the finding of Ita, (1999) and Dankishiya et al., (2012) whose stated that seven species families were common throughout the study period, which perhaps could be due to the relatively abundance of these species in Northern Nigeria.

3.2.3 Fishing Techniques

The result shows that almost all the respondents respond to the use of the fishing techniques like net, hooks and line, trap, among others. The fishing method should be active or passive, passive gears are those which are left in place for a period before retrieval. While the active techniques are using bait to attracts fish. Most of the fishers used hooks, pots and net for their fishing, while others use traps, gill net and tackle boxes for fishing and only few uses both fishing gears for fishing. The result shows that the highest proportion of the respondents with 59% uses hook, pot and nets for fishing, 31% are using trap, gill net and tackle boxes. The lowest with 10% are using both for fishing.

3.2.4 Average Catch of Fish per Day

The average catch of fish per day, determine the quantity of fish to be found in the study area. This also determines and affects the fishing activities around the dams and study area in general. The result shows that Majority of the respondents i.e. 53 responded to 13 and above kilograms catch per day with 31%. 45 respondents responded to 1-4kg average catch per day with 26%. 41 and 33 respondents responded to 5-8kg and 9-12kg respectively with 24% and 19% in order of the higher to the lower. The result findings show that level of experience in fishing attributed to have high catch of fish per day. More especially bigger and heavy fishes in the dams like, *Nile/Niger perch (Giwan Ruwa/ Barya)*, *Baby Whale (Lamsa)* and *African catfish (Mari)*. While respondents with low experience are likely have little or low catch per day in the study area. Because the respondents with high experience of fishing activities for their age or inheritance as masters or guardians of the water in the dams that is *Sarkin ruwa* are likely to have big catches per day. The result finding matched with the finding of Danbatta, (2015) who stated that the low level of fishing experience could

have negative influence of catch per unit effort of the fishermen.

3.2.5 Challenges in Fishing

There are a lot of challenges in dam-based fishing, some were identified and shown in figure 3 as it was presented by the respondents. The major challenge face by the fishers is related to economic problem. Majority of the respondents with 82% responded to economic recession and lack of support as a major challenge facing fishermen of the study area. 12 % responded to over fishing as a major challenge, while 4% think reduction in fish population due to the reduction of the volume of the water in the study area as a challenge. Only 2% of the responded believed that use of local fishing technique is a major challenge faced by fishermen to sustain their livelihood in the study area. The result show that; the major challenge affecting fishing around the dams of the study area is related to the economic problem more especially capital to run the activities effectively without any hindrance.

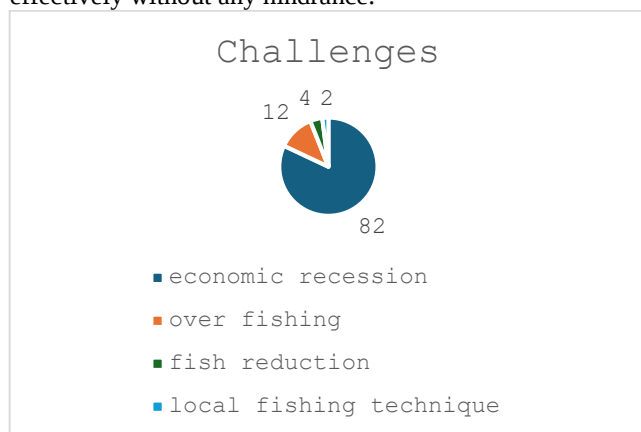


Figure. 2

Source: Field survey, 2025

3.2.6 Methods Fish Preservation

Preservation of fishes after fishing is found to be a major challenge and very important in fishing activities, because it reduces lost to the fishers. Figure 4 shows processes of preserving fish stocks after fishing. Majority of the respondents with 66% responded to the freezing as their process of preserving fishes after fishing around the dams of the study area. Respondents choose smoking of the fishes after fishing as the process of preserving fish after fishing had 33%. Only 1% chooses other processes like salting and drying as their process of preserving fishes after fishing in the study area. The results show that majority of the respondents used ice to preserved fishes after fishing in the dams of the study area. Even the agents “Yan-Bankwai” use to buy a lot of ice in order to preserve fishes before conveying it to the respective places of sell. This finding corresponded with the findings of Kumar et al. (2018) in India which found that post-harvest losses in the fishing industry can be reduced by up to 50% through improved handling and storage practice

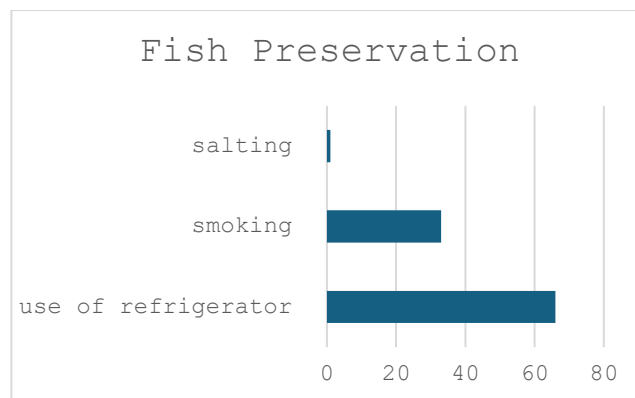


Figure. 3

Source: Field survey, 2025

3.2.7 Fish Supply to Urban and Nearby Communities

The fish is sold after fishing in the study area by different processes. Majority of the respondents (162) sell their fishes after fishing to the individuals' agents called “Danbankwai”, with 94% responded to it. 9 respondents sell their catches to the nearby markets with 5%. Only 1% sells their catches to the people within the community around the dams. The result shows that almost each and every fisher has his own agent. Each agent has his own group of fishers to buy fish from. The finding corresponded with the findings of Kumar et al. (2017) found that improving supply chain efficiency can help reduce post-harvest losses and increase the income of fishermen.

3.2.8 Fish Distribution to other Communities

According to interview result, the number of fishes in the dam is declining, which has an impact on supplies, particularly in urban areas where demand is high. When speaking with Sarkin Ruwa, four distinct locations where fish are disseminated were identified. The cities of Yaryasa, Tiga, Rurum and Kano are the communities in question. The last community is the longest and receives a negligible amount in comparison to the first three, which are all fairly close to the fishing source. The average monthly volume of fish dispersed across the aforementioned localities is shown in the flow map in Figure 4. This was also demonstrated by the main modes of transportation, with motorcycles being the most popular since they can get to nearby locations unlike far places like Kano City. It was said that 1200kg goes to Rurum community every month, 200kg to Tiga, Kano Metropolis is 500kg and Yaryasa 900kg. This clearly shows that significant portion of catch fish remains within the rural community. Since the total average monthly catch is 2800kg only 500kg (17.85%) was sold out to Kano city and 82.15% remains within the rural community.

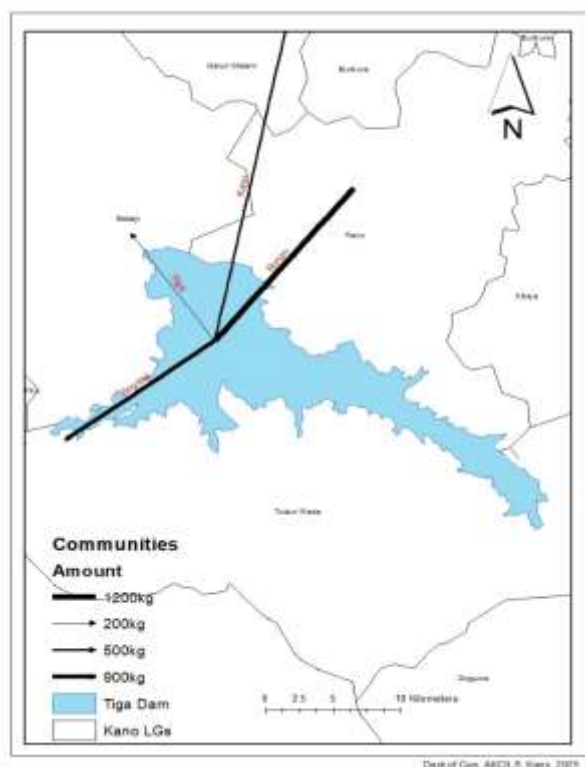


Figure 4: Average monthly fish distribution to communities.

4. Conclusion and Recommendations

The study concluded that, fishing activity is important in the livelihood of fishermen and the people especially around the dam. But, the relationship between source and far destination (Kano Metropolis) is very low in terms of quantity of fish supply to urban area, since majority of catch fished remains within the nearby community. Lack of capital to boost fishing activity was identified to be a major problem that hinders the expansion of fishing business. The respondents recommends the promotion of sustainable fishing practices through training, technical support, and incentives. They also urge government to bring back fishing festivals around the area of study and improvement of infrastructure, including roads, storage, processing facilities, and electricity, to strengthen the fish value chain. It further emphasizes the need for stronger regulatory frameworks to curb overfishing and pollution, empowerment of youth and women through capacity building and entrepreneurship opportunities, and recruitment of more extension officers to provide services that enhance fishing practices across dams. Lastly, it calls on the state government to give greater consideration to rural areas.

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