



The Challenges of Sustainable Fish Farming Culture in North-East of Nigeria

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Abstract

The study was conducted in North East Zone of Nigeria where fishing has been the occupation of the inhabitants. The study focused on the challenges of sustainable fish farming culture in the study area. Data for the study was obtained from both primary and secondary sources through a public participation and stakeholders' interview with the application of focus group discussion. The data collection for the research work was carried out within the period of 1st to 31st March 2023. Primarily, conservative qualitative method with snow-ball technique was applied and information was elicited from the respondents on challenges of sustainable fish farming culture. The study revealed the challenges associated in sustaining fish farming culture involves conflict associated with fisheries management system, the use of crude implements, the system is self-subsistence, over-exploitative, degradable, limitation of cultural adaptation and lack of support system. Recommendations were made for formulation of policy framework that will transformed and sustained the fish farming culture.

Keywords: Challenges; Culture; Fish Farming; Sustainable

Abbreviations: GMT: Greenwich Mean Time; FDF: Federal Department of Fisheries; EIA: Environmental Impact Assessment.

Introduction

Small-scale fishing communities across the globe are sustained by fishing livelihoods, which requires community members sustained access to fisheries capital. In this regards, the important type of fisheries capital includes; natural capital involves the marine ecosystems and the living species they support, physical capital includes fishing vessels, gear, landing sites, processing and marketing facilities, financial capital for sustaining operations, provisioning various items of physical capital, supporting other social and economic activities and sometimes for sustaining or enhancing natural capital as well and human social and cultural capital which

includes human skills and information utilized in fisheries activities, as well as broader accumulated knowledge containing guidance for how to go about living in general [1].

Africa accounts for 25 percent of the global inland captures, where they represent an important source of food security, particularly in the case of landlocked and low-income countries. Nigeria account for 3 percent, Uganda 4, Tanzania 3, Chad 1, Kenya 1, Mozambique 1, Mali 1, Ghana 1, Malawi 2 among others. In developing countries, more than 60 million people rely on freshwater fisheries for their livelihood. Seventy – one low income countries currently produce nearly seven million tonnes of fish a year, representing 80 percent of global inland fisheries capture. Limited research has been focused on the reservoir fisheries in Western Africa. Fish catch and fish supply in the region from inland waters is being used for consumption within

region which is a clear indication of the importance of capture fisheries to the livelihoods of dry lands communities of Sub – Saharan African [2].

Contribution of Small-scale Fisheries to Sustainable Development Goals (SDGS) in Nigeria are critically important to the nation food security and nutrition. The sub – sector accounted for 58 percent total catch from marine fisheries and 42 percent catch from inland freshwater fisheries. Northern Nigerian States produce less fish than Southern States, up to 30 percent of small-scale fisheries harvest may be lost given the seasonality of the catch. On the average day, children consume fish less frequently in Northern States by 13 percent and more frequently in Southern States by 35 percent, Zamfara and Borno State are fish production States but children consume little thus Zamfara and Borno are targeted States by the government to benefit from the program to increase children fish consumption. Overall, an estimated animal food sources of person per day in the Country Nigeria estimated as 24 grams of fish, 21 grams of meat and 8.2 grams of eggs. Increasing the serving sizes of fish in Nigeria may help address micronutrient deficiencies for vulnerable populations [3].

Artisanal fisheries production in major communities in the Lake Chad Basin Area of Borno State takes their source from the major inflow in to the lake (about 95%) comes from the Logne Khari system from Chad and the Cameroon. The contribution from the Elbaid River is estimated at 2.5% with another 2.5% entering the lake from the Nigerian Rivers Komodugu Yobe, Yedseram, Ngadda and other smaller rivers and streams [4]. The traditional management system in the Lake Chad basin Borno State, locally adopted seems to provide an appropriate institutional framework to ensure future sustainability, unless emergent factors of change threaten to upset this relationship. For the future, it appears that two factors will determine the sustainability of the fisheries; whether traditional management system can cope with and adapt to the nature and rate of change and the role of government policy in managing change [5]. The cultural environment of any production activities is equally an important factor that is to be taken in to consideration. Cultural consideration goes a long way in determining the success or otherwise the production activity, there exist a relationship between the culture of a people and their politics, consumer preference, resource allocation and the influence of traditional authority on the people [6].

Problem Setting and Research Objectives

Obviously, Fish farmers in Mile 3 fishing community of Lake Chad Basin, Kukawa Local Government Area of Borno State, North eastern zone of Nigeria frequently experience

economic reversal due to natural factors beyond their control and the use of unsustainable crude method of cultural fish farming considered detrimental thus certain fish species are not available when or where they usually are, the species in the lake have undergone wide fluctuation in their stock level and these factors makes the availability of the species very difficult for the farmers to think of onward advancement in their fish farming culture. The members of Mile 3 fishing community are predominantly artisanal fish farmers, they continuously rely on fish farming culture as their primary means of livelihood as a source of food and raw-material without corresponding good conservative measures with attendant problem of high-demand as a result of the depletion fish population, coupled with state of insecurity in the area. Many research works were carried out on fish production and other fisheries related development studies in the fishing communities of the Lake Chad Basin, Kukawa Local Government Area of Borno State such as; Nwamaka OO, et al. [7], Oluwatuyi SO, et al. [8], Sarch MT [9] and Bryan K, et al. [10] and others revealed that their studies were carried out on environmental management, problems and prospects, cultural challenges, sustainability of the Lake Chad Basin Area but research work that integrates sustainability and fish farming culture is limited in the study area. Hence the need to close the literature gap. To attained sustainable fish farming culture in Mile 3 fishing community requires sustainable utilization of the existing fish farming culture and learn how to sustainably utilize new fishing method and know-how. Therefore, this study was undertaken with the main aim of determining the challenges of sustainable fish farming culture with the specific objective of assessing the factors that inhibits fish farming culture in order to remedy the grey areas identified for sustainable fish farming culture in the study area.

The output of this research work may provide a basis for cultural approach to ensure optimal utilization of fisheries resources endowment of the country, Nigeria and the world at large. The information derived from the cultural fish farming may encourage new entry in to cultural fish farming and to improve the state fish farming culture in the study area.

Data collection for the research work was carried out within the period of 1st to 31st March, 2023, there was high demand for fish as a result of religious events such as “Month of Ramadan Fasting, Good Friday, Holy Saturday, Easter Sunday, and Easter Monday” people from all over the world make preparation for these events. Thus, majority of the fish farmers embarked on harvest as pre-planned for intensive fish marketing. Data collection was carried out in a facilitated manner as a result of the easy accessed to the fish farmers and the required information was obtained adequately.

Methodology and Data

Kukawa local government area is domicile in Borno State, North-east geographical zone of Nigeria. Kukawa Local Government Area is part of the prestigious Borno Emirate and consist of several towns and villages such as Alagarno, Yoyo, Kekeno, Kauwa, Baga Kauwa, Mile 3, Doron Baga among others. The kanuri language is widely spoken in the Local Government Area, while the religions of Islam and Christianity are practiced in the Local Government Area. Kukawa Local Government Area is situated on the shores of the Lake Chad and has an average temperature of 32 degrees centigrade. The area experiences two major seasons which are the dry and the rainy seasons. The average wind speed in the area is put at 11 kilometres per hour [11]. The study area is Mile three (03) Baga fishing community of Lake Chad Basin, Kukawa Local Government Area of Borno State, North-East, Nigeria. It is in the semi- arid plain between latitude 12o 18' – 13o 48' N and longitude 13o 18' – 14o 48' East of the Greenwich Mean Time (G.M.T) [12]. During the "Normal Chad" (stabilization of the Lake at normal size as a result of the influence of rainfall and volume of water flow in the major rivers that feed the basin), the composition of Lake Chad Basin comprised of Chad 11,000km² (50%), Nigeria 5,500km² (25%), Niger 3900km² (17%), and Cameroon 1800km² (8%), during the "Little Chad" the open water is shared only between Chad 1200km² (60%) and Cameroon 800km² (40%), the Nigerian and Niger portion are liable to complete drying, e.g. Sahelian drought of 1968 [13]. The study area has a population of about two hundred and three thousand, three hundred and forty-three (203,343) inhabitants with a land area covering about 4,901km², National Population Commission of Nigeria [14]. Fishing is an important economic activity in Kukawa Local Government Area as the residents of the area take advantage of the enormous sea food found in the area's water bodies. Trade also flourishes in Kukawa Local Government Area. The fisheries of the Lake Chad employ about 10,000 fishers including about 150,000 persons associated with the fisheries business [15]. The major tribes from Nigeria include the Agatu, Hausa, Jukun, Kanuri, Ijaw, Shuwa, Urhobo, Nupe, Ilaje and Ijebu and foreigners like Malian, Kotoko, Masaca, Buduma, Kanumbu. The Hausa constitutes the majority (19%) fishermen on the Nigerians part followed closely by the Jukun (16%), Agatu (11%), Malians constitute majority of the foreign fishers on the Lake. Fishing is their major occupation consisting of fisheries activities including processing, preservation, transportation and marketing. Other economic activities are farming, Cattle herding and trading, Federal Department of Fisheries (FDF) [16].

Out of the study area total population of 203,343 inhabitants. The study targeted population of approximately 6000 to 7000 FGD, FCFPT, Mile 3, Baga [17] fishers and

persons associated with the fisheries activities from the study area and other relevant individuals and groups that were considered important in the study area for the purpose of this research work were used for the study.

Data for the study was obtained from primary and secondary sources. Both the primary and the secondary data were obtained through a public participation and stakeholders' interview with the application of focus group discussion with minimum of seven respondents and maximum of nine constituting representative of each relevant group. Primarily conservative qualitative method relied on focus group discussion was applied with snow ball technique to elicit information from the respondents on the challenges of sustainable fish farming culture of fish farmers in Mile 3, Fishing Community of Baga, Kukawa Local Government Area, Borno State, North-East of Nigeria.

Multi stage sampling technique was employed for selecting the respondents. In the first stage Mile 3 Fishing Community of Baga town Kukawa Local Government Area predominantly fishing community was purposively selected. Secondly, stakeholders and other relevant public individuals members of the community were selected and thirdly, Snowball method was used in the selection of other respondents with sea and fisheries related cultural activities in the fishing community, people from ministries, state and local government agencies, stakeholders and other local interest groups that are directly linked with the fishing community were also selected. Interviews were analysed with conventional qualitative content analysis that disclosed result relevant to cultural sustainability in the context of fisheries of local cultural community which has provided insights in to the assessment of the factors that inhibit fish farming culture with the aim of determining the challenges of sustainable fish farming culture in the study area.

Results and Discussions

Challenges of Sustainable Fish Farming Culture in Borno State, North-East Zone of Nigeria

There has been conflict associated with cultural fish farmers in Mile 3 cultural fishing community over fishing zone, fishing space and on sea theft or theft in the fishing process and the problem of traditional method of land administration. Sabotage among cultural fish farmers with the application of charms to drives away fish in a particular fishing space or zone of a fish farmer that seems to misbehave or disrespect or by the way of disobeying the cultural doctrine of the community was another source of conflict that brought about subdivision and disunity among cultural fish farmers in Mile 3 fishing community.

This result is in line with the findings of Andrews Evans J, et al. [18] the collapse of a fish stock that has long been the mainstay of a small-scale fishing community's subsistence may have had great symbolic importance in the community traditions, methodology, religion and cultural identity, with its collapse leaving the components severely impoverished and not capable of being quickly revitalized. Other far reaching repercussions, includes affecting community members self-esteem, patterns of household composition, modes of kinship reckoning, beliefs regarding appropriate gender roles and preferences regarding other social relations.

The traditional fisheries management system which is a metaphor of cultural fisheries management system is more culturally inclined but with the emergence of other regulatory authorities after due resistance of the traditional fisheries management system it was over powered by the other interfered regulatory bodies although in the Nigerian context of governance, the government agencies from the state and the federal government are more powerful constitutional than the cultural system of fisheries management, the traditional authorities are also subsumed of the local, state and the federal government respectively.

This result shows consistency with the findings of Oluwatuyi SO, et al. [8] generally, the management systems of law in Africa is rickety and this can be seen in the way systems are being managed; there are no sustainable water laws or the metrics to detect are too challenging to quantify, leaving many people as violators of law, people still cut down trees and leaves the area bare, they still hunt for fish without any need for a license, and those monitoring most water deliveries and taxes just do it with no accountability, which makes them look no accountability, which makes them look somewhat like a threat to the citizens.

With the application of both the traditional management system and that of the other governmental agencies the traditional management system was weakened by the unfair treatment of the cultural fish farmers by the constituted regulatory bodies that extorts money from the cultural fish farmers in form of revenue consequently led to a failure in the laid down principles of fisheries resource management of the cultural and traditional management system of the Mile 3 cultural fishing community which was absolutely not in the interest of the cultural fish farmers. Gradually, with the weakening of the cultural and traditional management system gave room to the cultural fish farmers violation of cultural and traditional edicts of community fisheries resource management as the traditional managers too resorted for acceptance of returns from harvest both in cash and kind. The management system was not left in the hand of the cultural fish farmers neither to the traditional

rulers nor the governmental authorities manage the system accordingly as required with fairness, justice and equity for sustainable fisheries in the Mile 3 cultural fishing community these enabled the wealthy individuals of the community to overcome the less privileged farmers in the machinery of production.

This result shows consistency with the findings of Nwamaka OO, et al. [7] the most important bottom-up transformation proposal is the reform of the management structure of the Lake Chad by replacing the Lake Chad Commission with the Federal College of Freshwater Fisheries Technology, Baga, Borno State of Nigeria. Fishers expressed a strong preference for a completely new system of fisheries governance headed by the Federal College.

The overexploitation and environmental degradation method of operations of the cultural fish farming of Mile 3 fishing community has been another major problem of sustaining the culture of fishing in the community as a result of the violation of the regulatory management framework of both the cultural community, the traditional management system as well as the modern system of governance under the authority of the local, state, federal and other agencies of the government. The application of herbicides, pesticides and fungicides on the adjoining farmlands had degradable effect on the environment and on fish species coupled with the subsistence and small-scale nature of operation as evident by the used of crude implements. Lack of adequate capital to expand operational base and lack of farmers zeal to seek for capital for expansion to overcome the problem of inaccessibility to external funding and other intervention schemes proved to be the problem of cultural adaptation among others also limits the cultural fish farmers of the community for advancement generally.

This result confirmed that of Aderounmu AA [19] even though traditional system of fisheries contributes immensely towards increased domestic fish production, its annual growth rate is said to be at average of 3%. The current record of overall fish landings from small-scale fisheries is almost, if not in excess of presently estimated potential resources for the fisheries. This poses a major problem because fishing efforts should be based on optimum sustainable yield to ensure rational exploitation and good fisheries management.

The Mile 3 community cultural fish farmers hardly coped with the modern system of operation in term of land legislations, environmental regulation and other regulatory policies of the government such as the local, state and federal government edicts on the operational system of the fisheries. Thus, the farmers were faced with the implication of operation out of the regulatory framework formulated such as fishing

without permit and or certificate of occupancy and at the individual farmer or community level, the fishers embarked on fishing without environmental impact assessment (EIA).

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Contravening control measures of the regulatory authorities as a result of lake recessed regime by the members of the community was a devastating effect of cultural farming method of Mile 3 fishing community on the environment. "Taru" is a popularly known method of cultural fishing considered advantageous to the fish farmers as it permits large volume big fish catch in an easily manner, but the method was confirmed not sustainably friendly as it makes some fish species to disappear in the long run.

This result shows consistency with the findings of Bryam K, et al. [10] most rural communities are more intentional about practicing agriculture that puts a portions of food on their table or garners them a substantial profit than engaging in sustainable practices for the soil and the ecosystem, and this is the case in the Lake Chad region.

The cultural fish farmers of Mile 3 fishing community practice common property regime under this system there has been the problem of cultural believed of ownership; that pools in a locality belongs to all members of the community even if there was an individual ownership there must be equity in the system of operation and any attempt by the traditional rulers (Bulama) Ward head to empower an individual fish farmer in the community or groups of members of the community over the pool resulted to a conflict. Under common property regime the powers of the traditional rulers over harvest return from individual fish farmers in the community was less and the persiodic payment in form of revenue and operation license was not inexistence as a result of the cultural believes of the fishing community over common property right. With the emergence of traditional management system partly with or without modern management system problems experienced by the members of the community under this system has been the revoking of agreement among members of the community over a contracted or hired fishing zone and or fishing space

as a result of expectation of bopper harvest in most cases ended up in conflict.

This result confirmed that of Sarch MT [9] conflicts in the region has resulted in widespread poverty, child malnutrition and lack of means of survival for those who have lost their farms while facing the problem and battle created the conflicts. Forest encroachment is also considered a norm in this region, with people breaking the forest regulations.

High illiteracy level of the members of Mile 3 cultural fishing community the fish farmers could not understand simple explanation by fisheries personnel regarding modern fisheries management system and as result of the cultural orientation, the fish farmers were not attentive of any attempt from fisheries personnel to incorporate the community in to modern fisheries developmental programs. The fish farmers lacked modern technical know how on fisheries management only 3 members of the community that have undergone modern fisheries management training. The community members lacked initiation for setting up standard cooperative society that would broaden their developmental chances accord the community equity in all their dealings.

This result shows consistency with the findings of Zanna B, et al. [20] Boko Haram insurgency has been a major challenge to the development of education in Baga, Mile 3 Fishing Community of the Lake Chad Basin Area Borno State of Nigeria. It has been evidently shown that without bringing an end to the menace of Boko Haram Insurgency the development of education cannot be achieved in the study area.

The community experienced inadequate water supply, medical facilities, electricity supply, good road network, marketing facilities, storage and preservation facilities, inadequate security personnel and educational facilities. In addition to the problem of cultural adaptation, government commitment in inculcating the idea of modern fisheries management system to the members of the community constituted another major constraint.

This result shows inconsistency with the finding of EUTF [21] Fish production initiative was launched in Borno state on April 2019, under a comprehensive response programme to restore agriculture-based livelihoods in the state, designed to build technical capacity of fish actors on safe and sustainable aquaculture. The initiative has boosted fish availability in the state especially around the benefitting communities such as Zabarmari, Gongulong, Dusman, Alau and Gamboru in Jere, Konduga and Maiduguri Metro-Politian Council local government areas of the state. This have improved food

security and malnutrition considered major challenges, especially for millions of women and children affected by insurgency in the state and have promoted sustainable water management for income generation in the state.

There has been the constraint of gender inequality in Mile 3 cultural fishing community as prevails in the cultural tradition and religious belief of the community which states that hard work in an open place is main for the males and more so females are restricted to interact with male unless under the provision of the religion and other cultural traditions as practice in the community or otherwise under inevitable condition as ordained by the community edict. Therefore, female in Mile 3 cultural fishing community engages in fishing activities such as buying and selling of fish, fish processing and other contributory fisheries activities whereas the male engages in all fishery's productive activities.

This result shows consistency with the findings Fakoya K, et al. [22] about 8 million people are employed by the Small – scale Fisheries in Nigeria for livelihood and income generation, provides social and cultural value and women plays dominance role in the post-harvest sector thus Nigerian Small-scale Fisheries industry is a safety net from poverty, although it contributes to deforestation and the impact fall disproportionately on women. Improvement in governance and stewardship of Small-scale Fisheries, access to services, credit and social protection are important to deepen the contributions of Nigeria's Sustainable Development Goals.

The problem of continues increased in the number of cultural fish farmers of Mile 3 community without corresponding genuine supportive ideas and facilities culturally and otherwise. Coupled with the shrinkage of the Lake Chad which serves as an indicator that the total number of fishes in the Lake Chad has been on decline resulted in degradation of the aquatic environment and problems of agricultural pest cumulatively, resulted in low fishing yields and crops. There was no any initiative by the government of Nigeria to support the community for the sustainability of the community fish farming culture neither at the cultural community level. Although, the members of cultural community were as well not conversant or unaware of the environmental degradation not to talk of the long run implications as a result of the cultural adaptation to their ancestral cultural system of fish production with the believed that the higher the population the higher will be the quantity of fish that will be produced without taking in to cognizance the law of diminishing marginal return and the long run effect of the irrational pressures on the land resources.

This result shows inconsistency with the findings

of Nwamaka OO, et al. [7] the surface water receding in its strength and capacity pushed more fishermen and fisherwomen in to other occupations and various regional crisis compounded the problem as more people embraced aquaculture as a form of sustenance.

There has been no meaningful development in the cultural system of fish farming of Mile 3 fishing community as a result of lack of enlightenment campaign by the government towards sensitizing the rural cultural fish farmers to accept change by embracing modern method of fisheries management system by inculcating the principles of sustainable development with reference to culture and sustainable development in fisheries of the rural folks.

This result confirmed that of Opeyemi O [23] in the last decade 90th the fish industry provided direct and indirect employment for residents in Borno state; fishers, fish processors, marketers, retailers, and many other actors earned their living from fish production and its value chains. Income from the industry contributed significantly to the market performance of other goods and services like food items, household needs, school fees etc. The adverse effects of the conflict in present Borno has further affected the fish industry consequently substantial loss of rural livelihoods. Fishing activities in the state were disrupted. Supply of fish gradually became irregular that at some point fish sellers rarely had fish to sell.

The age long culturally inherited method of Mile 3 community fish farming has been disarrayed by gradual penetration of traditional fisheries management system and the incorporation of modern fisheries management system which have not yet yielded positive result rather than the collapsed of the cultural machineries already in place. The situation should have been worsened if not because of the cultural adaptation of the community. The needed transformation of the cultural fish farming system for sustainable fisheries development have not yet achieved rather than perforation of the system.

This result shows inconsistency with the finding Sodagar B [24] to achieve true sustainability the need to balance economic, social and environmental sustainability factors in equal harmony, then the community is said to have achieved true sustainability and a true circular economy. Therefore, fish farming culture of Mile 3 fishing community may achieve true sustainability only if it operates in a true circular economy; the economic, social, and environmental pillars of sustainability of the fish farming culture of the community has equate each other.

Some Cultural Inland Fishing Implements (Gears) (Figure 1)

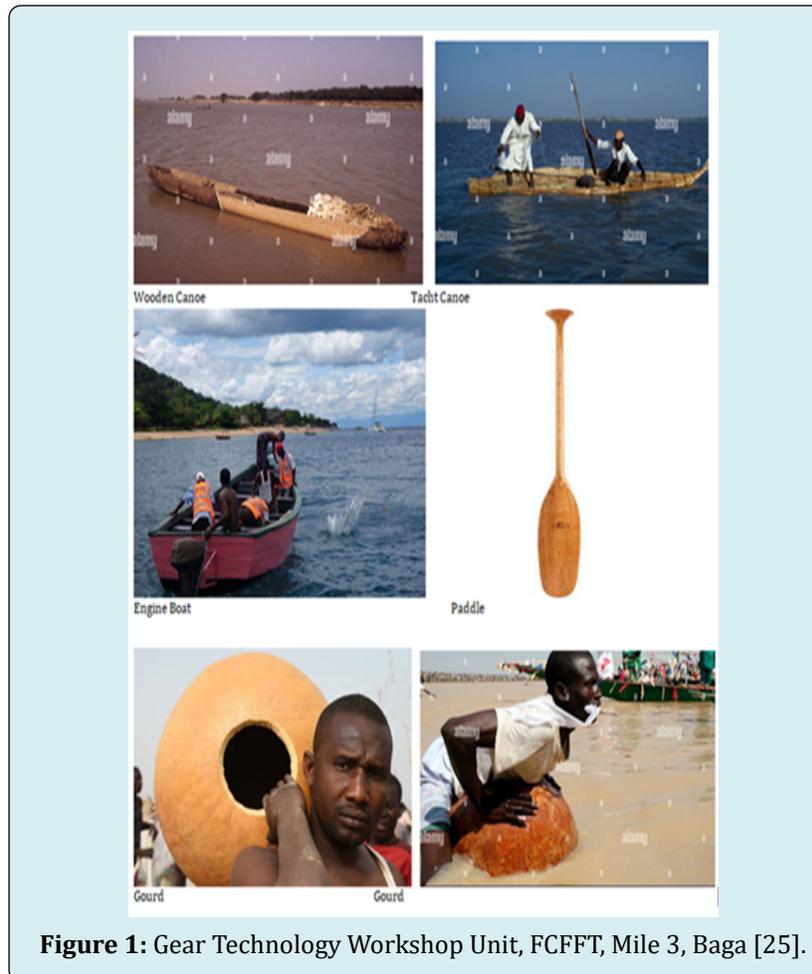


Figure 1: Gear Technology Workshop Unit, FCFFT, Mile 3, Baga [25].

Summary and Conclusion

The study concerned with the challenges of sustainable fish farming culture in Mile 3, Baga, fishing community, Borno State, North-East Zone of Nigeria. The findings of the study revealed that challenges of sustainable fish farming culture in the study area were conflict associated with the modern fisheries management system, the use of crude implements in the fish farming culture, the system has been self-subsistence, over exploitative and degradable, population increase without corresponding support system, lack of technical know-how, gender inequality and limitation of cultural adaptation. Given the analysis presented and taking in to account the performance of fish farming culture in the context of sustainability. The current phase of cultural fish farming should be transformed to inculcate the attributes of modern system of fish production for the sustainability of the culture of fish production in the study area [26]. The study recommends that the government and non-governmental agencies with community level participation should jointly formulate a robust policy framework that will transform the

cultural fish farming through objective fisheries management system to address the challenges of sustainable fish farming culture in the study area and the country at large.

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Contributions; Conceptualization: Babagana Zanna, writing original draft preparation: Babagana Zanna, Writing – review and editing; Mohammed Musa and Babagana Zanna, Supervision: Mohammed Musa. The authors have read the manuscript and agreed for onward vetting, corrections, guidance for further consideration and approval and subsequent publishing of the final version of the manuscript accordingly. The research work was carried out by Babagana Zanna without any financial support from any agency or individual and finally the research work has no any conflict of interest.

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