

AN EXAMINATION OF TECHNIQUE OF CULTURAL FISH FARMING IN LAKE CHAD BASIN AREA OF NIGERIA

BABAGANA ZANNA* 

Department of Administration, Federal College of Freshwater Fisheries Technology, Maiduguri, Borno State, Nigeria.

Email: zannab116@gmail.com/zannafisheries@gmail.com

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ABSTRACT

Objective: Examine and incorporate the required changes in the technique of cultural fish farming to guarantee economic, social, and environmental sustainability in the fishing culture communities of the Lake Chad Basin Area of Nigeria and to close the literature gap.

Methods: 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. Primarily, a conservative qualitative method with the snowball technique was applied and information was elicited from the respondents on the technique of cultural fish farming.

Results: The study revealed technique of cultural fish farming in the study area involves the use of culturally believed norms of unsustainable age-long intrinsic practice of fish farming and shows consistency in high proportion with the results of other similar studies reviewed in the study.

Conclusion: The need for the transformation of the technique of cultural fish farming thus recommendation were made for the formulation of a policy framework in connection to the technique of fish farming for the transformation and sustainability of cultural fish farming in the study area.

Keywords: Cultural technique, Examination, Fish farming.

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INTRODUCTION

Many fisheries worldwide continue to operate under open access and unmanaged conditions, it is recognized that certain African inland fisheries still retain traditional management systems which prevent over-exploitation. Therefore, the traditional management system in African inland fisheries can offer some protection to fishing communities from poverty. For African inland fisheries, such questions as; do traditional management system have a future role in poverty alleviation for fishing communities? especially, when such systems are known to be vulnerable to the impact of change and also given the fact that many governments would prefer to manage fisheries on a more centralized basis through their own agencies [1]. The cultural adaptations of small-scale fishing communities to the ecosystems they exploit are also often evident in other components of their cultures, including components that are more distant from fisheries technologies and fisheries activities such as important religious beliefs, values, symbols, community's reliance on marine ecosystems. Therefore, even where most of a fishing community's religious beliefs and practices derive from the larger culture of which it is a part, it may still have unique beliefs and practices that derive from its exploitation of marine ecosystems and marine species [2].

In 1964, when the Lake Chad Basin Commission was established for conservation and management of the lake and for sharing its resources among the riparian countries, the lake's stretched over 26,000 square kilometers or 22 times the size of Delhi and covered eight percent of Africa's land mass. The lake then sustained the livelihoods of people in eight countries; Chad, Nigeria, Cameroon, Niger, Algeria, Libya, Central African Republic and Sudan. However, in the past 50 years, it has shrunk by over 90%. What remains today is not more than a patchwork of ponds and puddles, spanning 1500 square kilometers addressed as "ecological catastrophe," and predicts that the lake could disappear by the end of the century [3].

All Chad Basin countries are affected to varying degrees by the degradation of its productive ecosystems caused by the lake's natural variability, climate change, and human actions. Close to 50 million people now live in precarious and increasingly vulnerable conditions in the region. As fisherfolk migrate with their families towards the lake in search of arable land and livelihood, it results in disputes and culminates in social conflicts [4].

Artisanal Fisheries production in major communities in the Lake Chad Basin area takes their source from the major inflow into the lake (about 95%) comes from the Logne/Chari system from Chad and the Cameroon. The contribution from the Elbied 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. The Lake Chad shows a decline date back 1972/73 over eighty fish species were identified in 1967 but as a result of the 1972/73 drought year, there has been a considerable reduction in the number of species [5]. Thus, the repercussion effect indicates reduction in catches from inland fisheries due to deteriorating quality of the aquatic environment and poor management. Obviously, it has been indicated that the Lake Chad fishery as an integral part of the World's inland fisheries has estimated to be on their maximum level of exploitation which automatically reflects continual reduction in the yielding capacity of the lake [6]. Many research works were carried out on fish production and other fisheries-related development studies in the fishing communities of the Lake Chad Basin area of Nigeria but studies that centered on the technique of cultural fish farming in the study area is limited, the need to close the literature gap. Fish farmers of Lake Chad Basin Area of Nigeria frequently experience economic reversal due to factors beyond their control. 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, uneven distribution of fish species in the lake is also another problem and these factors make the availability of the species very difficult for the cultural fish farmer. In addition to

natural factor, these problems are not unconnected to the practice of cultural technique of fish farming in the study area. The fish farmers in the fishing community are predominantly artisanal fish farmers, they continuously rely on cultural fish farming as their primary means of livelihood as a source of food and raw material without corresponding good conservative measures with the attendant problem of high demand as a result of the depletion fish population. In the last decade 90th unlike nowadays cultural fish farming has provided a means of livelihood in different forms to fishing communities in the Lake Chad Basin Area such as fishing, fish processing, fish marketing, fish transporting, and many other fishing economic activities. Income from the fishing activities contributed significantly to the market performance of other goods and services such as food items, household needs, and school fees. To attained a sustainable fish farming culture in the Lake Chad Basin area fishing community requires sustainable utilization of the existing cultural technique of fish farming or learn how to sustainably utilize new fishing technique. The introduction of new technique requires changes in the organization of the fishing effort which entails changes in the community's social organization and patterns of interpersonal relations. It is important to note that the prevailing norms of social organization, social relations, and social behavior of fish farming culture communities are influenced by the norms of larger society in which the fishing community formed a part and incorporate adaptive responses to the requirements of cultural fish farming activities. On the other hand, what is known concerning how to incorporate and apply fish farming cultural knowledge into modern fisheries management remains mostly theoretical and still in the experimentation stage. This is because the knowledge of fish farming culture in the fishing community is transmitted orally and rarely written down, making it difficult to transfer in a systematic manner to modern fish farming for possible incorporation into formal fisheries-management practices and policies. Therefore, there is the problem of bringing changes in the fish farming culture management of the adapted regime of the fishing community; without having full knowledge of the adaptive experience, without appreciating and accepting the experience for the change, and without acquainting with the contemplated possible consequences that may erupt in an attempt to incorporate changes into the fish farming culture of the community social norms. To avoid aggravating to a very serious undue social, economic, and environmental problems, the need to examine and incorporate the required changes in the technique of cultural fish farming in the study area for sustainable fish farming culture in such a way that will guarantee economic, social and environmental sustainability in the fishing communities of the Lake Basin Area of Nigeria; this requires an examination of the cultural technique of fish farming in the study area which was the main objective for undertaking the study.

The output of this research work may provide a basis for a cultural approach to ensure optimal utilization of fisheries resources endowment of the Lake Chad Basin Area, Nigeria, and world at large. The information derived from the cultural technique of fish farming may serve as a basis for the incorporation of modern techniques of fish farming and to remedy the grey areas identified for sustaining fish farming culture in the study area.

Data collection for the research work was carried out within the period of 1st–March 31st, 2023, within the period there was a 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, the 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.

METHODS

Kukawa local government area is domicile in Lake Chad Basin Area, Borno State of Nigeria. Kukawa Local Government Area is part of the

prestigious Borno Emirate and consists 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 Lake Chad and has an average temperature of 32° centigrade. The area experiences two major seasons which are the dry and the rainy seasons. The average wind speed in the area is 11 km/h [7]. The study area is Mile three Baga fishing community of Lake Chad Basin, Kukawa Local Government Area of Borno State, Nigeria. It is in the semi-arid plain between latitude 12° 18'–13° 48' N and longitude 13° 18'–14° 48' East of the Greenwich Mean Time [8]. 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 11,000 km² (50%), Nigeria 5500 km² (25%), Niger 3900 km² (17%), and Cameroon 1800 km² (8%), during the “Little Chad” the open water is shared only between Chad 1200 km² (60%) and Cameroon 800 km² (40%), the Nigerian and Niger portion are liable to complete drying, for example, Sahelian drought of 1968 [9]. 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 4,901 km², National Population Commission of Nigeria [10]. 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 Lake Chad employ about 10,000 fishers including about 150,000 persons associated with the fisheries business [11]. The major tribes from Nigeria include the Agatu, Hausa, Jukun, Kanuri, Ijaw, Shuwa, Urhobo, Nupe, Ilaje, and Ijebu and foreigners such as Malian, Kotoko, Masaca, Buduma, Kanumbu. The Hausa constitute the majority (19%) of fishermen on the Nigerian's part followed closely by the Jukun (16%), Agatu (11%), and 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, [12].

Out of the study area total population of 203,343 inhabitants the study targeted population of approximately 6000–7000 [13] 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 were 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 constituted representative of each relevant group. The primarily conservative qualitative method relied on focus group discussion was applied with snow ball technique to elicit information from the respondents on the technique of fish farming culture of fish farmers in the Fishing Community of the Lake Chad Basin Area, 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, Borno State, Lake Chad Basin Area, Nigeria, predominantly fishing community was purposively selected. Second, 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 analyzed with conventional qualitative content analysis that disclosed result relevant to sustainability of fish farming in the context of fisheries of local cultural community which

has provided insights in to the examination of the cultural technique of fish farming with the aim of sustaining the technique of cultural fish farming by incorporating the required changes in an economically, socially and environmentally sustainable way in the study area.

RESULTS AND DISCUSSION

Technique of cultural fish farming in lake Chad Basin area, Nigeria

Culturally in Mile 3 fishing community male are considered potentially valuable than women in fishing activities thus the community fishing activities are carried out by adolescent and adult males considering their ability to withstand the difficulties involves in seafaring and fishing work rather than the women fishers in the community. On the other hand, women in Mile 3 community play many roles such as in the upkeep of the households and the children, women involve in fish processing, marketing and distribution and in other economic-related activities.

This result shows inconsistency with the finding of [14] the production relations and organization of fishing activities of small-scale fishers living in very different cultures may be very similar, even though they are members of very distinct cultures. There are noteworthy exceptions to this, of course, which are seen in regions where the larger cultural traditions overwhelm this cross-cultural uniformity (Fig. 1). For



Fig. 1: Cultural techniques of fish farming (irreducible risk)
Source: Library, Information and Documentation Unit, FCFFT, Mile 3, Baga, 2023



Fig. 2: Cultural techniques of fish farming (Seafaring and fishing work by adolescent and adult males)
Source: Library, Information and Documentation Unit, FCFFT, Mile 3, Baga, 2023

example, women make decisive contributions to fish processing and distribution in most small-scale fishing communities but in certain cultures they are not permitted to work in the fisheries.

There is no cultural technique employed as biological control technique by Mile 3 cultural fish farmers. Cultural fisheries management strategy for sustaining the fish farming culture of Mile 3 fishing community turned to be other side of the coin, as stock of catch are not permitted to escape. In general, the levels of catches are not regulated among others includes: Enforcement of catch limits are not applied, no limitation impose on total number of traps and nets that can be applied, gears are applied without any regulations, fry and smaller catches are not return to the water; excess catches are misused instead of reservation in enclosures for future use. The Mile 3 fishing community are not experiencing serious decline in catches and there is less competition experience by fishers of mile 3 fishing community except fluctuation on natural ground which assumed to be the major caused of the lack (Fig. 2) of biological control although majority of the fish farmers believed to be the cultural orientation and background of the techniques of the fish farming in the Mile 3 community as the major cause of the lack biological control measures.

This result shows consistency with the finding of [15] small-scale fishers develop intimate, detailed, and functionally oriented knowledge of the marine ecosystems they exploit and the main species they target. When this knowledge has accumulated over long time spans it is often referred to among social scientists as “traditional ecological knowledge,” or TEK. But whether acquired through long-term experience or instead acquired relatively recently, all fishers quickly amass knowledge that will help them to exploit marine ecosystems.

Special considerations is accorded in the form of differential treatment to some individual fish farmers in Mile 3 Fishing community either by the way of fishing permit before other members will be permitted to fish or a fishing zone/fishing space will be carved out for such special farmers or a special fishing days will be allotted, accorded with community voluntary fishing support in the form of team work. These individuals are culturally considered different either as a result of their mysterious achievement in the community, their contribution to community development, emergence as victorious in a community race, festivals, demonstration of highly exceptional qualities that earns the individual prestigious dignity in the community.

This result confirmed that of Palsson [16] as a strategy for management in small-scale fishing communities, respect systems work best in culturally homogeneous small-scale fishing communities. Communities whose members share a common ethnicity and cultural background and whose approaches to fishing and individual wealth levels are uniform. Otherwise, respect systems tend to break down when dissimilar and unrelated groups of fishers enter a fishery.

In Mile 3 fishing community, the ownership style of the fishing zone and or fishing space is under the common property right and or traditional management system as the fish farmers fish in open water. With the development of community, government, public and or legally established management system, the cultural ownership style of fishing zone and or space gradually over-time became illegal cultural practice of ownership. The culturally inclined open-access fisheries of Mile 3 fishing community which encourages common property right and or traditional management system may erupt to a problem of conflict. Although with the improvement in the traditional management system of Mile 3 fishing community under the headship of Ward Head (Bulama) with the application of cultural traditional ruling system such conflict has been deterred. Majority of the cultural fish farmers in Mile 3 community have joint fisheries cooperative societies and fisheries associations at the local government, state government and even national level in recent time in an effort to agitate for equal treatment to individual community right by the way of explicit legal system in case of any problem in the future.

This result shows consistency with the findings of Stoffle *et al.* [17] small-scale fishing community members who are involved in fishing, develop a proprietary interest in the marine ecosystems they exploit, asserting that they have certain prior rights to access to these. Such assertions often extend as well to the localized marketing systems through which their catches are distributed. They usually assert these claims regardless of whether they are formally recognized by higher authority and often despite laws or regulations explicitly denying them.

The technique of cultural fish farming practice by fish farmers in Mile 3 fishing community is unique and may endanger their life. The fish farmers adopted fishing practices from their ancestors in form of cultural heritage thus they partake in fishing practices even under a dangerous situation because of the cultural adaptation. This technique of fishing reduces the risks and uncertainties associated with fishing also sustained the culture of fishing although the risks associated with such practices remains as no any counter cultural adaptations in the community can help fish farmers to avoid these risks. The risks of fishing overnight, settlement in island, individual enormity, communal and territorial conflicts, wild animals both aquatic and in aquatic and many other unforeseen natural and unnatural risks.

This result shows consistency with the finding of Malinowski [18] small-scale fishers in developing countries are seldom equipped with modern lifesaving gear such as life jacket or survival suits and many do not have access to timely weather advisories or effective communications, nor can they count on rescue services should they run in to danger while at sea. Serious boldly injuries are common place in both large-scale and small-scale approaches to ocean fishing. Small-scale fishers do not have access to adequate medical care should they become injured while fishing.

The highly experienced cultural fish farmers in Mile 3 community that possesses high skill culturally and otherwise may deliberately withhold information that are considered crucial in enabling fishers in the community to record high catch. Such information as the appropriate time and period of fishing, required weather condition for fishing as it applies to fishing zone and space, the special technique required for fishing various fish species, cultural believes that may hinder individual farmer high catch. Thereby overcoming their colleagues' cultural fishers in the community tactfully.

This result confirmed that of Gatewood [19] small-scale fishers have striven to reduce competition in the fisheries they depend on by managing information and maintaining skill differences. This usually entails maintaining secrecy about productive fishing spots, including withholding information about when fish may be available, deliberately misinforming potentials competitors about the forgoing and a reluctance to share knowledge concerning skills and fishing methods that confer success in fishing effort.

Under cultural community-based fisheries management practice of Mile 3 fishing community, there is cultural technique of regulating the volume of fishing in a particular fishing zone or space in disguise as to control fishing effort but in actual sense it is a deliberate act of avoiding or reducing intensive fishing or competition within a household or at a community level. This is done under the cultural assertion of household property right or territorial property right at the communal level.

This result confirmed that of Thorlindsson [20] certain community-based traditions, customs, religious practices, ritual behaviours, and taboos may also influence fishing effort and fishing mortality in small-scale fishing communities. Religious imperatives that prohibit working on certain days may compel a cessation of fishing effort and a correspondingly significant reduction of fishing mortality.

There exists cultural technique of prohibition of fishing activities in Mile 3 fishing community. Violation of this Practice will result to a negative consequences experience at the individual violator level or be fallen

on the community in general depending on magnitude of the violation as subjected to in accordance to the norms and traditions of Mile 3 fishing community. The prohibition of the consumption of certain fish species, fishing on Fridays within stipulated time, Pregnant women should not go to fishing zones. It has been tabooed by the culture of Mile 3 community that any violation of this cultural believe will be catastrophic as this will lead to the disappearance of fish species in the lake as well the individual violator too will face some consequences at his own individualistic level.

This result shows consistency with the finding of Le-Sann [14] some small-scale fishers have community-based management strategies which includes; ceasing to fish when stocks are unduly pressured, not fishing when important stocks are spawning, permitting some of stock to escape, not taking away all of a stock that could be captured, imposing total catch limits, limiting the number of traps or nets that can be deployed, refusing to adopt certain fishing gear, returning fry and smaller specimens to the water, holding excess catches in an enclosures until needed, discouraging undue zeal on the part of fellow fishers and undertaking projects to enhance marine ecosystems.

When the need arises the cultural technique of engaging labor in Mile 3 fishing community for team work is in form of fishing crew or other fisheries activities. The recruitment is in most cases based on social tie but not based on know-how, cost of labor and or fishers experience. The members of the community under such circumstances give priority to the members of the house-hold and then from the strata of the fishing community system of kinship and other social relations. This type of cultural technique tightened good and harmonious relationship among fish farmers in the community both personally and in their fishing trade. The expenditure incurred in form wages as cost of labor will at the same time represent income within the same setting of Mile 3 fishing community.

This result agreed with the finding of Davis [21] fishing requires certain human adaptations and behaviors. These adaptations and behaviors are rooted in the requirements of exploiting marine ecosystems with whatever technologies people have at a time and then are ramified through the cultures of their fishing communities. Therefore, it is important to underscore that a fishing community's approaches to fishing, the fishing gear it utilizes, and its organization of other fisheries activities is usually the result of considerable experimentation over a long period of time.

SUMMARY AND CONCLUSION

The study concerned with the examination of the technique of cultural fish farming in Mile 3, Baga Fishing Community, Lake Chad Basin Area of Nigeria. The findings of the study revealed that the cultural technique of fish farming in the study area is unethical to the principal of sustainable development. Given the analysis presented and taking in to account the performance of the technique the current phase of cultural technique of 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. 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 technique of fish farming through objective fisheries management system to ensure economically, socially and environmentally sustainable technique of cultural fish farming in the study area.

CONFLICTS OF INTERESTS, AUTHORS CONTRIBUTION AND AUTHORS FUNDING

Contributions; Conceptualization: Babagana Zanna, writing original draft preparation: Babagana Zanna, Writing, review and editing: Babagana Zanna. The author has read the manuscript and agreed for onward vetting, corrections, guidance for further consideration and approval and subsequent publishing of the final version of the

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