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Status of Women in Artisanal Fishery Enterprises and Aquaculture Development for Food Security and Sustainable Fisheries in Lake Chad Basin Area, Borno State, Nigeria

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Obetta, N.C.
Extension Unit, Department of Fisheries Technology,
Federal College of Freshwater Fisheries Technology Baga, Borno State, Nigeria
Corresponding Author's Email: nathobettac@gmail.com
Babagana Zanna
Department of Economics,
University of Maiduguri, Nigeria
Mohammed Musa
Department of Economics,
University of Maiduguri, Nigeria

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ABSTRACT
The study assessed the level of women's involvement in inland and aquaculture development for food security and sustainable fisheries in Lake Chad Basin Area, Borno State. The objectives were to determine their Monthly income, the fisheries activities women were involved in, and their challenges. The study population was the women fishers in Doro and Baga fishing communities. Multistage sampling technique was used to select two hundred and sixty-five members. Data were collected using interview schedule and questionnaire. Results were presented using descriptive statistics, frequency, percentage and mean. Majority (82.27%) earned between eighteen thousand naira and above forty thousand naira per Month. Almost all the respondents (93.2%) were involved in fish marketing, 90.19% in making and sales of twine (ropes), 86.4% in Net making. The Total percentage contribution of roles performed was 965.28% while the mean percentage contribution of role performed was 68.95%. The constraints faced by the women fishers were rank ordered, 86.8% for high cost of fishing technology, 75.5% fear and anxiety due to insurgency and 74% inadequate credit. The following recommendations were made; Close relationship between the government and various women stakeholders in the community for frequent interaction, Initial capital for startup should be made readily available in form of bank loan or any other women empowerments schemes, Extension agents should be adequate and within the reach of women fishers, Government programs and projects should be introduced with consistent monitoring and evaluation, Improved women agricultural policies and programs should be consistent, Improved quality fish seed and cost effective fish feed should be made available to women fishers in rural communities and Factors such as environmental, economic, social, religious etc. should be taken into consideration on crucial grounds.

Keywords: Status of women, Artisanal fishery, Aquaculture, Lake Chad Basin Area

INTRODUCTION

Aquaculture is referred to as the farming of aquatic organisms in inland and coastal areas, involving intervention in the rearing process to enhance production and the individual or corporate ownership of the stock being cultivated. In rural areas of most developing countries, agronomy, water management, aquaculture and wild aquatic resource harvesting are often physically and functionally integrated. Thus, aquaculture is an integral and indivisible part of the management of aquatic resources (Haylor and Blands, 2001). Aquaculture development in Nigeria which started over 50 years ago was believed to bridge the gap between fish demand and supply. Aquaculture has been pointed out to be catalytic to food security, hunger reduction, and poverty alleviation through economic growth and employment generation particularly at this period of serious decline in fish production from capture fisheries as a result of exploitation strategies and land use practices that are antithetical to the principles of sustainable development coupled with the state of insecurity in the Lake Chad Basin Area.

The harnessing, development and proper use of water resources have often served as yardsticks for evaluating sustainable development in riverine communities. The aquatic ecosystem is bound to respond to the exploitation strategies and practices. If the practices are deleterious, the impacts are bound to be negative. At the Lake Chad Basin, most exploitation strategies and land use practices are antithetical to the principle of sustainable development such as obnoxious fishing practices e.g. dumba fishing, inappropriate agricultural practices, indiscriminate grazing of grassland vegetation, reckless fuel – wood cutting, creation of borrow pits associated with bad mining practices and brick making, water pollution(Raji and Omoyemi, 2005). What are evident at the Lake Shores in the last eight (8) years were population pressure and the continuous exploitation of marginal lands especially deforestation have continued to aggravate the process of drought and desertification in the area. With the emergence of Boko Haram Insurgent fish supply from the study area has drastically fallen. To meet the challenges of sustainable fisheries development in the study area, it is necessary to embark on aquaculture fish farming.

The development of aquaculture in rural communities in Nigeria, like most other African countries, has been very slow for several reasons; lack of feeds and high seeds (fingerlings), inadequate access to credit, environmental degradation, conflict with other sectors, poor experience of past attempts at developing aquaculture, inadequate and inappropriate research on the aspects of aquaculture and lack of economic viability studies (Okoye and Ayanda, 2004).

Aquaculture for Food Security and Sustainable Fisheries

Food Security has been defined as a condition when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. This concerns not only food production and distribution but also has social, economic and institutional dimensions (FAO, 2007). Nutritionally, fish is one of the cheapest and direct sources of protein and micro - nutrients for millions of people in Africa. With steady decline in capture fisheries, aquaculture is a readily, veritable tool in the provision of fish eaten all over the continent unlike some other animal products, fish is widely acceptable, its acceptability cut across social, cultural and religious backgrounds (Gabriel, Akinrotimi, Bekibele, Onunkwo and Anyan, 2007).

Participation of women in aquaculture in Nigeria is increasing daily and this has contributed to household food security in the followings:

1. Increased availability of fish market.
2. Help to provide food of high nutritional value, especially for vulnerable groups such as pregnant and lactating women, infants and pre-school children.
3. Provides employment.
4. Provides highly digestible proteins that are rich sources of fat and water – soluble vitamins, minerals and fatty acids.
5. Provides a focal point for agricultural diversifications and increased sustainability by providing a source of water.
6. Increase farm sustainability through construction of ponds, which also serve as small – scale, on farm reservoirs.
7. Reduces some social, cultural and economic constraints women are going through in performing their household roles (Olufalaye, 2012).

Sustainable development means the management and conservation of the natural resource base and the orientation of technological and institutional change to ensure continued supply of human needs for present and future generations. Sustainable fisheries development is defined as fisheries development that integrates bio-ecological, economic and social dimensions to sustainably improve the well-being of all the people engaged directly or indirectly in the fisheries sector as well as natural productive system (Serge, 1998). Aquaculture as a tool for sustainable fisheries is ensured when self-sufficiency in fish production, optimum resource utilization and conservation is attained through aquaculture practice.

The current low supply trends with ever increasing population combined with the state of in-security in the study area, the per capita consumption of fish in Borno state is stagnating and supply to other parts of the country has drastically fallen. To arrest this deplorable condition to boost fish production, aquaculture remains the only feasible option that can sustain adequate fish supply.

Women in aquaculture in contrast with capture fisheries, little has been done to improve the scope of women's participation in aquaculture or to bring women in to mainstream of aquaculture development effort in the study area for sustainable fisheries. Aquaculture development in other part of the country e.g. Ijebu Ode fish farm in Ogun State and New Bussa fish farms in Niger State, has impacted on social-economic objectives such as nutrition improvement in rural areas, income generation, diversification of farm activities (integrated farming) and creation of employment especially in rural communities where opportunities for aquaculture and its economic activities are limited. This approach over the years has resulted in sustained aquaculture growth in some part of Nigeria e.g. Kokori fish farm in Delta State and Eriwe fish farm in Ogun State (Stella, 2000). Yet there is still room for enhancing aquaculture production in such areas through improved production systems (cost effective and high quality fish feed), genetics and general farm management principles to achieve the desired and expected growth of aquaculture to meet the ever increasing demand for fish and satisfy its socio-economic functions.

The purpose of the study was to undertake an assessment on the level of women involvement in inland fisheries and aquaculture fish farming, income generation and their

challenges in Doro and Baga, Lake Chad Basin Area Borno State, Nigeria. The paper also highlighted the identification of relevant policy strategies that would suit the peculiar problems of empowering women in aquaculture fish farming in the fishing communities in such a way that the agreed goal of each policy met the adequate condition required for the development of women in aquaculture for the realization of food security and sustainable fisheries for actual improvement in the standard of living of the area and the nation at large.

METHODOLOGY

The study was carried out in Doro and Baga fishing communities of Lake Chad Basin Area of Borno State. It is located in the semi- arid plain between latitude 12° 18' – 13° 48' N and longitude 13° 18' – 14° 48' East of the Greenwich Mean Time (G.M.T) (Abelege and Ipinjolu, 2001). The fisheries of the Lake Chad employs about 10,000 fishers including about 150,000 persons associated with the fisheries business (Sule, Ovie and Ladu, 2001). 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%), the 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, 1998).

Sampling method

The population of this study involved all artisanal women fishers in two fish markets in Doro and Baga. In this study, multi stage sampling technique was employed for selecting the respondents. In the first stage, two fish markets (Doro International fish Market and Baga fish Market) the predominantly large fish markets was purposively selected. The second stage involved random selection of the women involved in the fishery activities in the two markets. The list of the registered women fishers groups was obtained from the records of Federal College of Freshwater Fisheries Technology (FCFFT), Baga in the institute's office Maiduguri, Office of the Nigerian Union of Fisheries and SeaFood Dealers (NUFAS), Maiduguri and Borno State Ministry of Animal and Fisheries Resource Development, Maiduguri. The list of the registered women fisher groups forms the sampling frame and a random selection of 100 respondents from Baga fish market while 165 respondents from Doro International fish market because of the higher fishing activities of the international market. This gave a total sample size of 265 respondents for the study. The primary data was obtained through the use of a structured interview schedule questionnaire designed to elicit information from the respondents on their Monthly income, contributions in role performance in fisheries and aquaculture activities and challenges.

Data analysis

Descriptive statistics was employed in the analysis and presentation of the data collected using frequency count, percentages and mean.

The mean role performance index (Y) for each respondent was obtained by dividing the total number of artisanal fishing roles performed and total number of roles under consideration, multiplied by 100.

Mathematically,

$$Y = d/xy\ 100 \quad (1)$$

Where,
Y= Mean role performed, index d= Number of roles performed by respondent, y= Total number of roles expected to be performed by the respondent.

RESULTS AND DISCUSSION

Monthly Income

Monthly income analysis of the fisher women as indicated in Table1 depended on their volume of fishing activities. The result shows that 17.74% of the fisher women earned less than ₦ 18,000 per month, the meaning is that as much as (82.27%) of the fisher women earned income which was equal to ₦ 18,000 and above per month that meant that they earned more than the national minimum wage of ₦ 18,000 earned by the civil servants in the country. According to Central Bank of Nigeria, (CBN, 2017) 1 US Dollars exchange rate was ₦305.08 as at 20th July, 2017 when the questionnaires were administered. That meant the fisher women earned $1.97 per day and $59.00 monthly. This result was an indication that the fisher women lived above the global poverty level which is 1 US Dollars per day. This shows that the role of women in artisanal fisheries is economically rewarding and could be useful in tackling poverty in the study area. The result confirmed that of Raji and Omoyemi (2006) measuring poverty based on the Income Poverty Index (IPI) reveals that the fishers of the fishing communities cannot be regarded as poor. The fishers with the least income earned amounting to ₦ 28,000 - ₦ 44,000 per month. At the other extreme monthly earning could be as high as ₦ 228,000 - ₦ 244,000 per month. With these earnings, the fishers have been placed above the 1 US Dollars per day.

Table 1: Percentage Distribution of Respondents According to their Monthly income (n=265)

Characteristics: Income (Naira per month)	**Percentage**
Less than ₦18,000.00	17.74
₦18,000.00 – ₦28,000.00	40.38
₦29,000.00 – ₦39,000.00	32.83
₦40,000.00 and above	9.06
Total	**100.00**

Source: Field survey, 2017

Table 2 shows that marketing was the major contribution of women fishers in role performance with 93.21%, followed by making and sales of twine (ropes) with 90.19%, net making with 86.42%, transportation 82.26%, preservation and processing of fish with 81.89%, sorting with 80.00% and sales of fishing gear with 78.11%. The contributions of women fishers in role performance in other activities recorded in the study area were all below 60% except that of packaging and unpack aging of fish which accounted for 61.51%. The lease contribution was made under loading and off-loading activity with 43.77%. This result shows that mean contribution in role performed by an average woman in artisanal fisheries in the study area was high indicated as 68.95%. This result shows consistency with the findings of FAO (2006) the post-harvest subsector has provided women with many jobs, played an essential role in economic and social development. In Congo, between 80% and 90% of the fish traders are women.

Table 2: Percentage Distribution of Women Fishers Contributions in Role Performance in Fisheries (n=265)

	Activities	Percentage (%)
1.	Net making	86.42
2.	Boat building(kadai)	52.83
3.	Fishing (artisanal)	49.43
4.	Sorting	80.00
5.	Transportation	82.26
6.	Loading and off-loading	43.77
7.	Processing and preservation of fish	81.89
8.	Marketing	(93.21)
9.	Production and sales of fishing cards for fish drying	50.94
10.	Mending of fishing gears	56.98
11.	Sales of fishing gears	78.11
12.	Hiring canoes	57.74
13.	Making and sales of twine (ropes)	90.19
14.	Packaging and un packaging of fish	61.51
	Total percentage contribution of role performed	***965.28***
	Mean percentage contribution of role performed	***68.95***

Source: Field Survey, 2017. multiples responses were recorded.

The role performed by women fisher in artisanal fisheries has immensely impacted on the household well-being, particularly the health and education of children.

Constraints Faced by the Respondents

From Table 3, the constraints faced by the fisherwomen in a ranked order of severity were as follows: the high cost of fishing input (86.6%); fear and anxiety due to insurgency (75.5%), Inadequate credit facilities (74%); lack of electricity (64.5%); lack of preservation equipment (44.5%); poor access roads (24.9%); menace on fishing gears (21.9%) and poor media exposure (18.9%). The result is consistent with the earlier study by Odogbo (2001) who reported lack of appropriate fishing technologies, lack of social amenities such as schools, health clinics, electricity, good toilets, lack of storage facilities and security and their operations are adversely affected by poor infrastructure and communication.

Table 3: Rank Order of Constraints Faced by the Respondents (n=265)

Constraints	*Percentage	Rank
High cost of technologies	86.8	1st
Fear and anxiety due to insurgency	75.5	2nd
Inadequate credit facility	74	3rd
Lack of electricity in the villages	64.5	4th
Lack of preservative technologies	44.5	5th
Poor access road	24.9	6th
Menace on fishing gears	21.9	7th
Poor media exposure	18.9	8th

Source; Field survey Data, 2017. *Multiple responses exist

CONCLUSION

The study revealed that the women fishers make a reasonable amount of money per month which can sustain their household. From the results obtained, women have enough economically viable activities which they are directly involved in fishing. The result revealed again that high cost of technologies, fear and anxiety due to insurgency and

inadequate credit facility are top constraints facing them. None of the respondents engaged in aquaculture practices.

RECOMMENDATIONS

Vincent-Akpu (2013) affirmed that sustainable fisheries development can be achieved through regulated fishing, which encompasses fishing management objectives that address the status of the resource, the health of the environment, post-harvest technology and trade, as well as other economic concerns, social benefits, legal and administrative support. In consonance to (Vincent-Akpu, 2013) affirmation the following recommendations were made for the development of aquaculture for sustainable fisheries in the study area:

1. Close relationship between the government and various women stakeholders in the community for frequent interaction.
2. Initial capital for startup and other financial resources to meet up with other requirement should be made readily available in form of bank loan or any other women empowerment schemes.
3. Extension agents and other technical advisory team should be adequate and within easy reach of the women fishers.
4. Government programs and projects on women in aquaculture towards sustainable fisheries should be introduced with consistent monitoring and evaluation of the programs and projects.
5. Improved women agricultural policies and programs, in the area of implementation and consistency.
6. Improved quality fish seed and cost-effective fish feed should be within easy reach of women fishers in rural communities.
7. Factors such as environmental, economic, social, religious etc should be taken in to consideration on crucial ground e.g. environmental impact consideration, good market structure etc

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