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PERFORMANCE OF FISHERY COOPERATIVE SOCIETIES IN RIVERS STATE NIGERIA

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ABSTRACT: *In Nigeria fishery sub-sector accounts for about 40% of animal protein in the diet and contribute 4.4% of the agricultural share of the nation's GDP in 2003. Nigeria is blessed with a vest expense of inland, fresh water, marine and brackish ecosystem which is richly bless with aquatic life. However Nigeria fish production volume of 0.5 tones cannot meet the annual demand of 1.3 million tonnes. Average annual fish consumption in the country has therefore stagnated a 9.2kg per capita, a situation that resulted in a huge supply and consumption gap. The study, therefore had its trust as appraising the performance of fishery cooperative societies in Rivers State. Data were obtained from 360 cooperative fishermen, from 12 purposively selected Local Government Area of Rivers State. Data obtained were analyzed with both descriptive and inferential statistics. The findings revealed that, the respondents were of low educational qualification as such affected their initiative to improve the technique in the fish production as well as management of the fishing experience, had significant influence on the fishermen return as fishermen who went for more catch. Also, the findings from the study gave evidence that; there are three major sources used in the fishing exploit deep sea approach, the riverside and the creek. It was observed that more fishermen prefer the creek as fish tend to hide at the creek followed by the riverside approach with few exploiting the deep sea. The findings revealed that fishermen are faced with various degrees of challenges which range from pollution, climate change/bad weather, financial challenge; storage and processing facility; as well as high cost of fishing tools. The Researcher, therefore recommended among others that formal cooperative system of fish producers should be put in place to improve fish production in the areas.*

KEYWORDS: Fishery, Cooperative Societies, Rivers State, Nigeria

INTRODUCTION

Background of the Study

Fish availability in Nigeria is either by capture fish, artisanal fish farming or by import. Capture fisheries involve the harvesting of naturally existing tocks of wild fish. This can be done either by small-scale/artisan fishers or by industrial/commercial travelers. In artisanal fisheries, production is achieved by individual or by small groups by the use of labour intensiveness. Characteristically artisanal fishers operate from dug out, wooden canoes that are more often than not un-motorized. At present, fish production by artisanal fishers dominate fish production in Nigeria (Anene, Ezeh & Opute, 2010). Statistics indicate that Nigeria is one of the largest

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African fish producers, with production output of about 817,516 tons in 2010 (616,981 tons from capture and 200,535 tons from aquaculture) (FAO, 2011).

In 1980, Federal Government of Nigeria decide to boost fish production in Nigeria through fishermen cooperative as effective machinery for improvement of economic and social welfare of small-scale farmers throughout the federation. Adeyemo, cited in Olaeye (2013). The fisheries cooperative exists in Rivers State as an offshoot of cooperative food marketing (Ayanda, cited in Olaoye, 2013). The department was responsible for promotion and development of agricultural cooperatives implementation and monitoring of cooperatives projects. Field officers were mobilized out s a means of involving all fish farmers group at the grass root level in the decision making process and organization of fish supplies at competitive prices to the consumers (Bako and Ahmend 204). Other side benefits of the societies are the increased and effective employment of labour at the different stages of fisheries activities. The availability of increased fish output as a result of these activities contributed immensely to improvement of the socio-economic life of fish farmers. An additional role given to fishermen's cooperative society is the implementation of fisheries development programme under different successive plans by the Rivers state government. Today, however, fisheries cooperatives in the state are doormat, poorly organized, managed and financed and various fishing communities are not feeling their impact. Fisheries constitute an important sector in Nigerian agriculture, providing valuable food and employment to millions and also serving as source of livelihood mainly for rural dwellers in coastal communities. Nigerian has a coastline of 3,122km (Earth trends, 2003) shared by 8 states (Lagos, Ogun, Ondo, Delta, Bayelsa, Rivers, Akwa-Ibom and Cross River) out of a total of 36 state in the country, and this coastal fisheries are important and contribute at least 40 percent of fish production from all sources in Nigeria between 1995 and 2008 (FAO, 2010). According to the fisheries society of Nigeria (2013), small scale fisheries provide more than 82 percent of the domestic fish supply, giving livelihood to one million fishermen and up to 5.8million jobs in the secondary sector comprising processing, preservation, marketing and distribution. The total contribution of fisheries to Nigeria's gross domestic product is estimated at $USI billion (CBN, 2013). According to the estimates, Nigeria requires about 2.1milion metric tones (mmt) of fish/year but produces only 0.65mmt and imports over 900mmst/year at a value of US4800 in order to meet this shortfall Ajiboso, (2009). Considering Nigeria's enormous water resources, human capital and other natural endowments, the Federal Department of Fisheries (FDF) estimate fish production of over 1.7mmt comprising 201,300mt from inshore (brackish and coastal fisheries), 33,900mt (offshore fisheries), 288.200 (inland fisheries) and 1180215mt (aquaculture). Constraints to increased fish production in Nigeria include, poor infrastructures, high level of rural poverty (over 80% of rural poor live below the poverty line), environmental problems (e.g. pollution in coastal areas arising from gas flaring, oil spills and industrial wastes), civil unrest in the Niger Delta, climate change effects (sea level rise, coastal erosion and flooding, increased environmental temperatures and wind storms) and degradation of coastal areas through human action (e.g. sand filling that destroys breeding grounds). Investigations into fisheries in Nigeria, including those of wetlands, come under the mandate of the National Institute for Freshwater Fisheries Research (NIFFR), formally Kainji Lake Research Project. During the project phase (1968-1975) research concentrated on fish populations of the new Kainji Reservior on Niger River. With the phasing out of the Kainji project, a multi-displinary Research Institute was created with research disciplines similar to those of the project (i.e. fisheries limnology, wildlife and range ecology, agriculture, public health and socio-economic studies) but with an expanded mandate for fisheries, covering major lakes and rivers in Nigeria.

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The importance of fish production cannot be over emphasizes, fishing is making an important contribution to world protein intakle as it serves as supplement for animal protein especially affording cost of animal seems to be beyond the reach of an average income earner (Samson, 1997). As such the demand for fish globally and Nigeria in particular has been on the increase with supply not meeting demand (FAO, 2004). This had created great opportunity, such fish farming is a fast growing animal base, food production sector particularly in the developing countries mainly from China and other Asian countries (Green facts 2004). Consequently provides employment opportunity such as production, processing, transportation and marketing. According to Olatunde, (1998), fish intake is about 40% of protein intake of average Nigeria. However combination of various factors seems to have triggered the increase in fish production and consumption. In Africa the fish sector provide income for over 10 million people engage in fish production, processing and trade new partnership for Africa Development, (2005). Fish has become a leading export for Africa with an annual export value of 2.7 billion US dollar. Yet this benefit is at risk as the exploitation of natural fish stock is reaching its limit Mutune, (2002). The supply of fish in Africa has been declining for a number of reasons while the demand is increasing due to the rise in population with decrease in livestock, desertification and disease Olaoye et al, (2007). This is attributed to the discovery of crude oil that led to increase in oil spilage and consequent to this, this natural habitat of fish is destroyed. Fish is an aquatic animal, caught by man since the early times for food value. According to Spore, (1986) fish is the most popular diet in the world that is termed the 'poor man's protein'. Fish which had made significant contribution to the survival and health of a world population had been affected by industrial activities. Often it is referred to as rich food for the poor people as it provides essential nourishment especially quality protein fats (macro nutrient), vitamin and minerals (micro nutrient).

Statement of the Problem

The search for adequate food supply in view of the soaring population in most part of Nigeria has been a serious concern for the government and many international agricultural agencies. According to Okunola, Oludarnwere (2011), the issue of malnutrition and inadequate food supply is a critical problem and the energy intake by Nigerians averaged 225 kilocalories a day against internationally estimated minimum of 2500 and 2800 kilocalories daily. About 13-18 million people (mostly children) also die yearly from sickness related to fish protein deficiency, united Nation (2012). This was as a result of the fact that, over 70% of Nigerians lived within the ambit of poverty and they are poor to obtain food required for healthy growth of children Okumadewa (2006).

It is important to note that the global food equation recognizes two major protein components namely, food crop components and animal protein component. Animal protein sources include meal from cattle, sheep and goat, poultry, eggs, milk and milk products, wild life and fish Okunlola, Oludare; and Akinwalere (2011). Among all these sources of protein, fish is the only source of protein that is affordable for every household that are poor. As a result of the bottlenecks in the production of fish, there has been the problem of meeting the percentage protein consumption required by the average Nigerian. As such, this will result to malnutrition, and other related diseases and sickness. According to FAO (2004, the capital protein intake as recommended by FAO is 55gm out of which 10.6gm should be from animal origin. The Nigerian food balance sheet showed that only 4.82kg of animal protein is consumed which is only about 10% of the recommended total protein intake (Ajayi, cited in Adekoya, 2004).

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In view of the situation above, there is the need to identify the performance fishery cooperative societies on the quantum of fish production…. Over the years, fish shortage coupled with high price in Nigeria have indicated that domestic output has not been able to provide most Nigerians fish as affordable prices, coupled with the increase petroleum exploration; the natural habitat of fish is becoming un conducive for fish to survive. This had made the cast of fish capture very expensive. River state is endowed with inland and marine waters for fish capture. The availability of fish in the water due to population has been of great concern. This had affected both fishermen ability to catch fish and maintain facility for fishing. (consequently it affected their income from fishing. The incessant movement of vessels makes thing worst fro capture, as it poses great danger for both the life of fishermen and their equipment.

It is against this back the researcher seeks to evaluate the contribution of fishery cooperatives toward the quantum of fish production Rivers State. It is absolutely necessary to conduct this study, so as to determine if the contemporary fishing cooperative ethnology has improved the livelihood of their members through the quantum of fish produce annually by the fishermen, and as to weather the cooperative are still living up to the above expectations.

Objectives of the Study

The broad objective of this study is to evaluate the performance of fishery cooperative societies in Rivers State. The specific objectives are to:

i. examine the socioeconomic characteristic of members of fishery cooperative societies;

ii. assess the performance of fishery cooperatives based on quantum of fish production;

iii. determine the extent to which membership of fishery cooperatives have enhanced the income of fishermen;

iv. determine the effect of socioeconomic characteristics on the quantum of fish production;

v. identify the constraints militating against optimal performance fishery cooperatives and make recommendations that will strengthen fish production and ameliorating of the identified constraints based on the findings from the study.

Hypotheses of the Study

Ho_1: Fishermen socioeconomic characteristics have no significant influence on the quantum of fish production.

Ho_2: The fishery cooperative societies have not performed optimally in boosting the quantum of the fish production.

Fish Production in Nigeria

Nigerians are large consumers f fish and it remains one of the main products consumed in terms of animal protein. Investors have the opportunity to establish fish farming businesses in several locations across the country. Only around 50% of demand for fish is currently being met by local supply. The fishery sector is estimated to contribute 3.5% of Nigeria's GDP and provides direct and indirect employment to over six million people (Adeola 2006). Nigeria has many rivers and water bodies which would serve as good locations to set-up fish farms. Opportunities

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exist in various areas of the fishing sub-sector, these include; production of stable fish, construction of fish farms, storage, processing and preservation of captured fish, fish seed multiplication, transport, financing. It was stated that early fish farmers in Nigeria raised their fish in burrow pits abandoned minefields and in earthen ponds on extensive production system Oresegun et al (2007). The introduction of concrete tanks allows for manageable pond size and modification of the environment through a water flow through system and supplementary feeding thus allowing for higher fish yield. The advent of the indoor water re-circulatory system (WRS) has ushered in a new prospect for aquaculture. The introduction of WRS has created a turning point in the production of fish in Nigeria especially catfish.

A re-circulatory system (RAS) is an intensive fish farming system that incorporates the treatment and reuse of water with less than 10% of total volume of water replaced per day. As a result, less water is needed for the aquaculture operation system. There is also complete environmental control of the system and al year availability of controlled harvested fish. The basic concept of RAS is to reuse a volume of water through continual treatment and delivery to the organisms being cultured. Although the re-circulatory system requires high initial investment, high risk and compels technical skill it offers a number of potential advantages for aquaculture. Production of fish in locations where limited water is available, Bio-security, ability to locate the operation close to markets to reduce product, transport, time, and costs, improved feed conversion, and year round production. Ponds are essential components of most fish and aquaculture farms. Lowlands or valley less suited to other agricultural development are usually selected as sites for these ponds and this is often the decisive consideration in selecting the site the site for the entire project. The ponds are normally shallow, cover relatively large areas and are surrounded or impounded in the majority of cases by low earth dikes or dams. The ponds are usually filled and drained through open canals; other methods, such as filling through a pipeline, being exceptional.

Prospects of Fishing Culture

The story of aquaculture in Nigeria is essentially the story of catfish culture and the hope of fish supply in Nigerian hangs son its development and culture. Recent trends all over the world, point to a decline in landing from capture fisheries, indicator that fish stocks have approached or even exceeded the point of maximum sustainable yield. Aquaculture therefore remains the only viable alternative for increasing fish production in order to meet the protein need of the people. The vast Nigerian aquatic medium of numerous water bodies like rivers, streams, lake reservoirs, flood plains, irrigation canals, coastal swamps offer great potentials for aquaculture production, if optimally utilized. Constraints to modernization of aquaculture in Nigeria among other factors are:

- A serious shortage of trained manpower
- Lack of knowledge on profitability of aquaculture as an industry
- Limited availability of fund (or capita)
- Inadequate data base on the biology and ecological requirements of endemic fish species with aquaculture potentials.
- Insufficient data on production and management techniques, and
- Lack of rational aquaculture development planning.

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The food and agricultural organization of the united nations (2006) stated that Nigeria is a protein deficient country. The protein deficiency in the diet can be primarily remedied through the consumption of either protein-rich plant or animal food stuffs. The steadily growing importance of fish farming has compelled improvements in the technologies necessary for securing the initial and basic requirements for productive aquaculture; namely, the production of fish seed for stocking. Fish culture today is hardly possible without the artificial propagation of fish seeds of preferred cultural fish species (Pillay, 1976). The need for the production of quality fish seed for stocking the fish ponds and natural water bodies has increased steadily. Artificial propagation methods constitute the major practicable means or providing enough quality seed for rearing in confined fish enclosure waters such as fish ponds. Reservoirs and lakes (Charo and Oirere, 2000). Apart from being able to obtain quality seed, artificial propagation technique can also be used to develop strains superior to their ancestors by the method of selective breeding and hybridization. Depending on the perfection of the system, at least 65% of the eggs produced can be raised to viable fingerlings against less than 1% survival rate in natural spawing. The most popular fish species that have proved desirable for culture in Nigeria are he Cllariid fishes; C. garipinus, Heteroclarias sp. And heterobranchus species (Adekoya et al, 2006). The African catfish (C. garieinus)as an important food fish in Nigeria has remained an important candidate for research. In Ogun State, the importance of C. gariepinus has been no less than elsewhere in Nigeria based mainly on the farmers' and consum,ers' preferences (Adekoya et al, 2006).

Fishery Sector

Fishery sector can be categorized into the following:

Artisanal Fishery

Typically involves using small boat and canoes, it accounts for more than 25% of the world catch. It is the source of more than 40% of the fish used for human consumption (FAO, 1991). This sector provides the bulk of the fish consumed in Africa. This fishery involves marine (coastal) areas and land water bodies. In Nigeria, the artisanal sector both (coastal and inland) supplies the highest volume of fish with an average 356.2mt yearly (CBN 2000). There are about 264, 601 people on the average that are fully employed in the artisanal fishery (FDF, 1996). Also there has been a steady increase in the number of full and part time artisanal fishermen from 1985 – 1994. In Nigeria, artisanal fishery represents the lowest level of fishing organization, but it employs millions of people at all levels from capture, landings, processing to marketing, and support services (FAO 1991).

Aquaculture

This embraces a wide range of activities from extensive "sea ranching" and management activities sin large, bodies of water to intensive culture with fertilization arid feeding of fish in small man made ponds. Aquaculture has the potential to expand its annual output from the 12% of the total world fish production by weight to more than 20% by the turn of the century (FAO, 1991). It provides a wide range of benefits, not only for human health and nutrition, but also through foreigh exchange earnings in the world markets and employment on a full time and supplemental basis.

This is especially important in economically depressed regions. Nigeria has high potentials for aquaculture development, despite these potentials, fish production from aquaculture in Nigeria

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is still very low and it is estimated a below 25,607 metric tones in 1989 from total water surface area of about 5500 hectares (Ita, 1993). FDF (1996) gves an average of 16,618 metric tons of fish production through aquaculture from 1985-1994 in Nigeria. According to Miller (2004) an inventory of fish farms has been completed in all the 36 states and federal capital territory (FCT) with a total of 2,293 fish farms in the country.

This inventory is presently under verification and evaluation and will be complied into a date base for shared use with all effort made to use existing database to avoid duplication and facilitate compliments. Ten mostly southern states have 1,774 fish farms or 77% of total. This shows that pond fish farming is practiced in Nigeria where physical conditions (clay soils, water availability) and social economic environment are suitable.

Table 1: top ten states having the most private fish farms output of the 2,293 total in the country.

STATES	**NO OF FISH FARMS**
Delta	420
Osun	300
Benue	198
Ogun	173
Lagos	153
Edo	136
Kwara	121
Akwa-ibom	98
River	89
Beyelsa	86
Total; and % of total	**1,774.77%**

Source: Miller (2004)

From compiled available information (Ayemi, 1995: Anadu, 1996), there are four categories of fish farming in Nigeria; homestead concrete tank/ponds, subsistence fish farming, small-to-medium fish farming, large scale fish farming.

Integrated Agriculture and Aquaculture

Rice-cum fish culture is often cited as a promising method of producing a carbohydrate and protein crop simultaneously din the same field, with resultant increase in economic benefits. Experimental trials in Thailand have indicate that it is possible to produce, in addition to rice, a fish crop averaging 220kg/ha without supplementary feeding and up to 400kg/ha with feeding (Swingle 1972). Experimental fish culture trails conducted in irrigated paddy fields at one of the agricultural demonstration farms in the Mekong yielded a fish crop of about 100kg/ha without supplementary feeding. Construction of homestead fish ponds for fish culture and other purposes is a common practice in the Mekong basin. In a study conducted in North East Thailand, woke and patrols (1975) cited instances of some farmers constructing homestead ponds for culturing fish as an integral part of an agricultural system. They concluded that for a comparable area, farmers receive 21 times more net income than from irrigated rice farming. In Nigeria, rice cum fish culture trials were carried out at NCRI, Badeggi, rice experimental station, a total fish yield of 34.58kg was realized in the plot as well as a view yield of 18.70

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after 85 days cultured period. This can be projected to fish yield of 1870kg/ha after one cropping. This gives a high fish and rice yield that should be tried in other ecological zones for verification (Okoye et al 2001). Aquaculture activities are generally divided into the following categories: Aquaculture without feeding. Aquaculture with feeding. Culture based fisheries. One major aspect of the poverty status in Nigeria is the high rate of unemployment with the attendant economic in capability, which in turn is responsible for the persistant problem of malnutrition over the decades. Women play an important role in the poverty alleviation and women can be empowered for better productivity in fish culture enterprises, seeing that women have been active in different aspects of agricultural production. The fact that women play major roles in the sustencance and development of a nation cannot be over emphasized. Many publications have indicated that women form two thirds of the agricultural labor force in most African countries like Nigeria. On the average, women work longer hours than men by as much as 13 hour each week in Asia and Africa (SPORE 1996). In Nigeria women produce the bulk of the food for local family consumption.

There have been a lot of efforts in recent times geared towards the empowerment of women in the agricultural sector. There has been some structural adjustment and associated drive towards increased cash crop productivity and exports such that more than half of the agricultural sector in developing countries of African are sustained by women (Wuraola 2001). There is a need however to also consider increasing efforts in encouraging women to get involved in fish culture enterprises.

Aquaculture Potentials in Nigeria

Nigeria has high potentials for aquaculture development and thus potentials can be realized substantially through services. Despite this potentials, fish production from aquaculture in Nigeria is still very low and it is estimated as below 25.607 metric tones in 1989 from total water surface area of about 5500 hectares (Ita. 1993). It has also been suggested that if Nigeria is to be self sufficient in fish production through aquaculture a total of about 900, 000 metric tones of fish a year (i.e. estimating at a minimum production of 1 metric tones per hectares per year. (Ita.1993). The activities of the artisanal and industrial fishery remain the backbone of fish production in Nigeria and a means of generating foreign exchange. The potentials of aquaculture for fish production is also very high if adequately utilized. Over the years the demand for fish has been on the increase with the supply never up to the projected fish demand for the country. The projected average fish demand between the year 1986 and 1996 is 1, 370, 818, 78 tones. However, data on domestic fish in the country shows that an average supply of 445, 252.45 tones is obtainable, which is about 32.5% projected demand between 1986 and 1996. Hence, the need for increase production to bridge this gap has been a major concern. It is evident that the resources suitable for fish production in Nigeria are grossly unexploited, yet all through the years the levels of fish production has been far lower than demand. Nigeria can be self sufficient in fish production if her fishery resources are developed , managed and conserved to provide production levels that are economically sustainable. In 1994, a projected. Nigeria human population of 120, 669 million, projected fish demand of 1, 560, 000 metric toes PEA, only a total of 283, 193 metric tones were produced domestically. On the average the annual fish production is about 23% of the average demand from 1985 – 1994. Contribution from aqua culture is comparatively small 17,n 109 tones per annum amounting to 5.36% of the total fish production, despite the availability in Nigeria of 1, 010, 00hg of fresh water swamps and 741, 509hg of brackish water suitable for aquaculture purpose (Ajayi and Talabi 1984). The table below gives the fish supply by sector on yearly basis (1990 – 2000). From the data

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in the table it could be ascertained that the artisanal sector both (Coastal & Inland) supply the highest volume of fish with an average of 161, 54mt. while 356.2mt is the average yearly accuring from the fishery sectors combined. Aquaculture has the lowest turnover per volume with an average of 24/9mt, which translates to mean that aquaculture subsector is the most underdeveloped, as such; a lot still needs to be done so as to bridge the supply gap from aquaculture. This recommendation cultivable surface area could be easily met from total of 12 million hectares of surface areas of water including lakes, reservoirs, streams, rivers that could be harnessed for aquaculture development. To utilize the total area, the role of extension services in aquaculture technology transfer has to be put in place in rural development.

Empirical Review

All farms operate at less than profit maximizing scale and most operate at less than minimum efficient scale. Also, El – Naggar, Nasr – Ala, and Kareem (2008) examined the economics of fish farming in Behera Governorate of Egypt. They found out that, high prices f fish feed; declining fish prices and lack of finance were the top ranking serious constraints facing fish farmers in that area. Feed costs per kg of fish were LE 3.87, representing 58.9% of the production costs. The break – even analysis showed that average production costs of LE 6.57 per kilogram of fish while the sales price is LE 7.5/kg. the findings also reveal that quantity of fish seeds is a notable and significant factor contributing to the fish arming enterprise in the study area

Kassli, Baruwa ans Mariama (2011) analyzed the economics of inland fishing, aquaculture and fish marketing in Niamey and Tillabery areas of Niger Republic. The study showed that both the aquaculture and inland fish production were profitable with a rate of return of 61% and 320% respectively while two types of fish marketing channels were identified.

Yesuf et al. (2002) assessed the economics of fish farming in Ibadan Metropolis, Nigeria. The study revealed that ,most farmers with secondary education and above operate at small scale level with an average of three (3) ponds. Fish farming practiced polyculture fish farming. Clariasspp is the most raised fish species followed by Heteroclariasspp. The gross margin analysis revealed that medium scale farmers derived the highest return of N1.55 for every one naira expended. This is followed by large scale farmers at N1.55 for every 1 Naira compared with only N1.34 for every 1 Naira spent by small scale farmers.

Ajao (2006), found that 80% of fish farmers in Oyo State, Nigeria, operated less than two (2) which could not capture economy of size. More than 90% of the respondents distributed their fish at the site while 60% had little access to extension agents. Meanwhile fish farming was found to be profitable.

Kudi, Bakio and Atala (22008) examined the resources, cost and returns and other factors affecting fish production in Kaduna State, Nigeria. The study revealed tat land, water, labour and capital were the man resources employed in fish production. Then costs and returns analysis indicated that variable cost constituted 97.63% of the total cost of fish production in the study area, while the fixed cost constituted 2.37%. amongst the variable inputs, fingerlings/juveniles (42.82%) and feed (34.70%) constituted the highest (77.52) to cost of production, while hire labour constitutes 16.91%. the cost of production was N571, 231.79, the total revenue of N5, 853, 625.64 and the net income was N5, 282, 93.85 indicating that fish production was highly profitable.

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Nandu; Gunn; Adegbiye and Mongalaku (2014) conducted a study on the assessment of fish farmers' livelihood and poverty status in Delta State. Their findings of this study suggest that the livelihood status of the famers has improved in terms of socio-economic condition, quality of food consumed, housing condition and savings among others, yet, the farmers are relatively poor. The positive social and environmental attributes of agriculture makes it an attractive entry point to improve the livelihoods and determinate poverty among the poor rural fishing households. Adequate fishing can ease under-nutrition, improve income status and serve as a means of agricultural diversification to alleviate poverty and ameliorate standard of living. Even though, the study found that improvement in the livelihood status f fishing households was recorded, their livelihood status is still below the annual minimum income of an average Nigerian, with a high poverty gap.

METHODOLOGY

Area of Study

The area of te study in river State. River State is one of the 36 states of Nigeria. According to census data released on 2006, trhe state has a population of 5,185,400, making it the sixth-most populous state in the country. Its capital, Port Harcourt is the largest city and in economically significant as the centre of Nigeria's oil industry. River State is bounded on the South by the Atlantic Ocean, to the North by Imo, Abia and Anambra State, to the East by Akwa Ibom State and to the west by Bayesian and Delta States. It is home to many indigenous ethic groups: Ikwerre, Ibani, Opobo, okirika, Etche, Ogba, Ogboni, Engenni and others. The inland part of River State consists of tropical rainforest, towards the coast the typical Niger Delta environment features many mangrove swamps.

River State, was named afeter the many rivers that border its territory, was part of the oil Rivers Protectorate from 1885 till 1893. When it became part of the Niger Company to form the colony of region was merged with the chartered territories of the Royal Niger Company to form the colony of Southern Nigeria. The State was formed in 1967 wih split of ten Eastern Region of Nigeria. Until 1996 the state contained the area which is now in Bayelsa State.

River s State is currently consisted of 23 Local Government Areas, all of which handle local administration, under an elected Chairman.

River State has maintained its importance as a leading supplier of weath to the nation fr centuries. In 2007, the state ranked 2nd nationwide with a Gross Domestic product (GDP) of $21.07 billion and a per capital income of $3,965.

Population of the Study

The population of the study consist of all fishery cooperative societies in the River State. Based on the information obtained from the ministry of agriculture; there are 23 LGs which cut across for Agricultural zones with 197 registered fishery cooperative societies in River States and these cooperatives have membership base of 24,401. Thus, this is study population.

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Table 2: Sample size determination and sampling procedure

Selected LGAs & their Agric zone	No of selected fishery cooperative in LAGs	No of fishery in the selected fishry cooperatives	No of selected fishermen (6 fishermen in each coop).
Port Harcourt Zone (A)			
Ogu/bolo	5	748	30
Okirika	5	806	30
Port Harcout	5	1,862	30
Degema zone (B)			
Bonny	5	358	30
Asari-Toru	5	320	30
Khana	5	656	30
Ahoada zone (C)			
Ahoada East	5	747	30
Ahoada west	5	484	30
Emohua	5	901	30
Ikwerre zone (D)			
Opodo/Nkoro	5	454	30
Adami	5	366	30
Ikwerre	5	951	30
Total = 12 LGAs	**60 Fishery Coops**	**8,653 fishermen**	**360**

Source: Fields survey, 2015

Production and socioeconomic profile of the fishermen. The fishermen's socioeconomic characteristics are indicator which can significantly influenced the fish production.

The influence of socioeconomic characteristics on fish production ere considered using sex, age, marital status, number of household, fish timing, distance to fish point and scale of production, years of experience and level educational attainment.

Hypothesis 1 was tested using the regression coefficient, hypothesis 2 was tested using T-test while hypothesis 3 was measured using Analysis of variance (ANOVA).

Model Specification

Multiple regressions was using to ascertain the effect of socioeconomic attribute of the fish producers on fish production. The dependent variable (fish production) was explained by the regression line.

$Y = f(x_1\ x_2 \ldots x_n)$

$Y = a + b_1 x_1 + b_2 x_2 + b_3 x_3 \ldots\ldots\ldots ei$

Equally multiple regression analysis is a statistical tool for evaluating the relationship abetment one ore independent variable x_1 $x_2 \ldots\ldots\ldots\ldots x$

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y is most often used when ndependent variable are not controlled as when collected in a simple survey or ther observational study (Gollerger, 1964).

As such, the empirical model (semi Log) fro this is stated as

$Y=a+b_1 \log x_1 + b_2 \log x_2 + b_3 \log x_3 + b_4 \log x_4\ b_5 \log x_5 + b_6 \log x_6$ ……$b_n\, x_n$ x ei

Double log

$\text{Log } y = a+b_1 \log x_1 + b_2 \log x_2 + b_3 \log x_3 + b_4 \log x_4 + b_5 \log x_5 + b_6 \log x_6$……$b_n x_n$

Data Presentation and Analysis

Socioeconomic Characteristics of the Fishermen

Table 3: Distribution of Responses Based on the Socioeconomic Profile of the Fishermen

Socioeconomic	**Frequency (n=360)**	**Percentage %**
Sex:		
Male	269	74.7
Female	91	25.3
Age:		
Less than 20 years	79	21.9
21 – 50 years	162	45
51 – 70 years	107	29.7
70 above	12	3.4
Education: (years of formal education):		
Zero year of formal education	54	15
FSLC	189	52.5
SSCE	94	26.1
OND/NCE	12	3.3
BSc/HND	11	3.1
Marital Status		
Single	73	20.3
Married	243	67.5
Widow/widower	44	12.2
Household size		
1 – 2 persons	86	23.9
3 – 5 persons	251	69.7
6 – 10 persons	77	21.4
11 – 20 persons	-	-
Above 20 persons	-	-
Nature of Fishing		
Full time of fishing (1)	295	81.9
Part time fishing (0)	65	18.1
Fishing Experience (Years)		

ISSN 2057-2611(Print), ISSN 2057-262X(Online)

Less than 1 year	65	18.1
1 – 5 years	102	28.3
6 10 years	182	50.6
11 – 20 years	11	3.0
Scale of fish Production		
Small (0)	242	67.2
Large (1)	118	32.8
Fish Production timing		
Full tide movement	86	23.9
Low tide movement	71	19.7
No moon light	99	27.5
Full moon light 104	28.9	
Income Generated from fish Production Annually (in Naira)		
Less than 100,000	48	13.3
100,000 – 200,000	92	25.6
200,001 – 500,000	105	29.1
500,001 – 1000,000	95	26.4
Above 1,000,000	20	5.6
Distance/Area Covered During Fishing		
1 – 5Sq mile	86	23.9
6 – 10 Sq mile	125	34.7
11 – 20 Sq mile	89	24.7
21 Sq mile and above	60	16.7

Source: Filed Survey may, 2015

Table 3 was a distribution the socioeconomic profile of the respondents which revealed that more males 74.8% were into fish production tan females (25.3%) and these fishermen were middle aged. On the average, the majority of the fishermen were well educated god number of them spent years in school to obtain first school leaving certificate (FSCL). Most of the respondents were married with family size 3 – 5 members. From the result on the table. It was discovered that, the respondents were full time (81.9%) fishermen and were adequately experienced. The table also showed that the respondents produced fish in small scale production (67.2%). Different fish production timings were explored by the respondents and they earned varying income ranging from 100,000 to 1,000,000 naira per anunum and they cover relatively wide range of fishing areas.

ISSN 2057-2611(Print), ISSN 2057-262X(Online)

Performance of fishery cooperative relative to the quantum of fish production

Table 4: Distribution of respondents on the performance of fishery cooperative relative to the quantum of fish production

S/N	Contributions of Fishery Cooperative	Std. Deviation	Mean (x)	Decision
1.	Supply of fishing materials e.g net, hook, trap, balt, etc.	.9881635	3.98	Agree
2.	Hiring services on fishing equipment e.g boat engine, etc.	1.007841	3.61	Agree
3.	Provision of credit facilities	.0889762	3.28	Agree
4.	Provision of storage facility	.632492	4.68	Agree
5.	Processing of fish	1.447528	2.66	Disagree
6.	Renders extension services on modern method of fishing	.7853436	4.07	Agree
7.	Collective marketing of members fish	.4752284	3.85	Agree
8.	Educational service e.g adult education	1.008436	3.08	Agree
9.	Renders advisory services on fishing safety.	.8804644	4.37	Agree
10.	Enlighten fishermen on the benefits of personal hygiene and family health	.9326661		
11.	Provide fishing regulations that regulates the fishing activities of the fishermen	1.006440	2.86	Disagree
			3.72	**Agree**

Source: Field survey May, 2015.

Table 4 reveals that the respondents agree that fishery cooperatives have performed well in quantum of fish production in different areas except in the processing of fish and provision of fishing regulations that regulates the fishing activities of the fishermen.

In all other areas, the fishery cooperatives have performed greatly relative to the quantum of fish produced. The areas where they performed outstandingly are provision of storage facilities, rendering of extension services on modern methods of fishing, rendering advisory service on fishing safety and enlightenment of fishermen on the benefits of personal hygiene and family health.

Test of Hypothesis (Ho_2)

H_{02}: The fishery cooperative societies have not performed optimally in boosting the quantum of the fish production.

To test this hypothesis statement, parametric statistics paired T-test was used, and the summary was presented in the table below;

ISSN 2057-2611(Print), ISSN 2057-262X(Online)

Table 5: Paired T-test and CI Summary Table

	Mean	St. Dev.	SE Mean
Strongly involved	201.6	39.0	13.8
Not involved (week)	85.4	39.0	13.8
Difference	116.3	77.9	27.5

95% lower bound for mean difference = 64.1

T-test of mean different = 0

T-value = 0.002

Decision

Since the P-value (0.002) is significant at 5% level of significance. That is, the P-value is less than 0.05.

Thus, the null hypothesis were rejected while the alternate was affirmed. Therefore the fishery cooperative societies have performed optimally in boosting the quantum of the fish production; this further strengthened the result of descriptive statistics table.

Effect of membership of fishery cooperative on the income of fishermen

Table 6: Annual income of farmers before and after joining fishery cooperative

	Frequency N = 30	Percentage	Frequency N= 360	Percentage
1. Less than 100,000	78	21.7	32	8.9
2. 101,000 – 200,000	245	68.1	64	17.8
3. 201,000 – 500,000	30	8.3	107	29.7
4. 501,000- 1,000,000	7	1.9	123	34.2
5. 1,000,001 – 2 million	-	-	32	8.9
6. 2.1million – 5milllion	-	-	2	0.5
7. Above 5 million	-	-	-	-

Source: Field survey may 2015

Table 6 above reveals that he maximum range of income earned by the respondents per annum before joining cooperative is 501,000 to 1,000,000 naira while the annual income of the respondent increased when they joined cooperative to the extent that 2 persons earn between 2.1 million to 5 million.

Test of Hypothesis (H_{o2})

H_{o3}: Membership of fishery cooperative has not significantly enhanced the income of the fishermen.

ISSN 2057-2611(Print), ISSN 2057-262X(Online)

Table 7: Analysis of Variance (ANOVA)

	Sum of Squares	Df	Mean Square	F	Sig.
Between Group	9.511	2	4.256	12.161	.000
Within group	54.9000	147	.380		
TOTAL	**64.411**	**149**			

Source: Field survey May, 2015.

The analysis of variance in table 7 revealed an F value of 12.161 which is greater than the tabular value (3.00) and significant at 0.05 (5%) level of significance. Therefore the null hypothesis was rejected and the alternate hypothesis was accepted which states that being a member of a fishery cooperative has significantly enhance the income of the fishermen.

Effects of fishermen socioeconomic characteristics on the quantum of fish production

Table 8: quantum of output of fish by cooperative members

	Quantum of fish production in tons annually by frequency		
s/n	**Members**	**N = 360**	**Percentage (%)**
1.	Less than 10 tons	23	6.4
2.	11 tons – 20 tons	30	8.3
3.	21 tons – 50 tons	22	6.1
4.	51 tons – 100 tons	23	6.4
5.	101 tons – 200 tons	41	11.4
6.	201 tons – 500 tons	201	55.8
7.	Above 500 tons	20	5.6

Source: Field survey May 2015.

Table 8 reflects the quantity of fish produced annually by cooperative members. It is apparent from the table that majority of the members produce between 201 tons to 500 tons per annum.

Test of Hypothesis One (H_{01})

$H_0$1: Fishermen socioeconomic characteristics have no significant influence on the pattern of fish production. In order to affirm or reject the above hypothesis statement the socioeconomic characteristics independent (variable) X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11}, X_{12}, versus production quantum dependent (variable) were subjected to multiple regression analysis test and the result is presented in the table 7 below.

ISSN 2057-2611(Print), ISSN 2057-262X(Online)

Table 9: Result of regression analysis

Predictor	Coefficient	Std. error	t-value	p-value
Constant	0.82541	0.09925	8.32	0.00**
X_1 Sex	0.10885	0.05118	2.13	0.04**
X_2 Age	0.013858	0.001681	8.24	0.000**
X_3 Yrs. Edu.	0.10151	0.04590	2.21	0.028**
X_4 Marital	0.03461	0.005195	6.66	0.300*
X_5 House size	-0.00000	0.06287	-0.00	0.000**
X_6 Alt. Job	0.000000	0.0000001	2.09	0.037**
X_7 Fishing exp.	-0.011448	0.004769	-2.40	0.017**
X_8 Scale of pro.	0.00590	0.5345	0.11	0.002**
X_9 Fishing tim.	-0.084537	0.003474	-24.33	0.000**
X_{10} Income gen.	0.0130936	0.004281	624	0.000**
X_{11} Distance cov.	0.004824	0.05385	4.26	0.000**

** significant

* Not significant

R – square = 83.9

Adjusted R – square = 83.4

Table 10: Analysis of variance

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	48	24,1904	2,6878	.181.34	0.000**
Residual	312	4,6393	0.0148		
TOTAL	**360**	**28,8297**			

Source: Field survey May, 2015.

P – value < 0.05

DECISION

The result analysis showed that R^2 = 83.9 which indicated that the extend which the dependent variable is explained by the independent variables. That is, 84% of variation is fish production (dependent variable) are caused (explained) by the independent variables sex; age; marital status; years of education; income; household size and fishing experience (years). Also the adjusted R^2 was also 8.4 which show 83% of the fish production was explained by changes in their age; marital status; scale of production; fish production timing; years of formal education; income generated by fishermen; household size and years of experience and distance covered.

An examination of coefficient also revealed that it is only marital status that is not a significant factor. Therefore, all other variables are significant at 5% of level of significance and the p-value is less than 0.05. As such, the research rejects the null hypothesis and concludes that the fishermen socioeconomic characteristics have significant influence on the pattern of fish production.

ISSN 2057-2611(Print), ISSN 2057-262X(Online)

Challenges faced by fishermen in fish production

Table 11: Distribution of responses based on the challenges faced by the fishermen.

S/N	Constraints	Std. Deviation	Mean (X)	Decision
	River related problems			
i.	Pollution	.88862	4.63	Agree
ii.	Non availability of fish	1.0298	3.27	Agree
iii.	Non availability of fishing area	.06322	3.33	Agree
iv.	Fish related diseases	2.0315	2.48	Agree
v.	Climate change and bad weather condition	.6488	4.63	Agree
	Financial constraints			
vi.	Lack of fund	.0946	4.08	Agree
vii.	Lack of collateral for loan	1.0843	3.74	Agree
viii.	Ignorance of loan facility	1.066	3.58	Agree
ix.	Unfavourable government policies	.8733	4.14	Agree
	Problem associated with fishing			
x.	Poor extension service	1.0061	3.59	Agree
xi.	Non availability of labour support	.8441	4.42	Agree
xii.	Long distance of fishing	.6825	3.37	Agree
xiii.	Strength of fish surviving	1.0441	3.66	Agree
xiv.	Fish preservation problem	.6601	3.92	Agree
xv.	Tsetse fly challenge	1.043	3.04	Agree Agree
xvi.	High cost of fishing tools materials	.8801	4.37	Agree
xvii.	Poor storage facility	.6244	3.4	Agree
xviii.	Lack processing facility	.5721	3.04	Agree
xix.	Poor distribution and market channel	69.03	3.84	Agree
	Grand Mean		**3.7152**	**Agree**

Source: Field Survey 2015

The result of the above table 9 revealed a from 5 points scale analysis with the weighted mean of .0 as criteria for agree or disagree. Meanwhile the grand mean (x = 3,7152) implied that fishermen are been faced with different degrees of constraints that range from pollution (4.63), climate change/bad weather (4.63), lack of storage facilities (3.46), high cost fishing materials (4.37).

Summary of Findings

The study appraised the performance of fisheries cooperative societies in rivers state. The findings from the study revealed that, the respondents are of low education qualification as such affected their initiative to improve the technique in the fish production as well as management of the fishing business. It was also revealed that, the distance cover, in t fishing exploit, fishing experience, had significant influence on the fishermen return as fishermen who went for made more catch.

On the average, t majority of the fishermen were well educated as good number of them spent 12 years in school to obtain SSCE. Majority of the respondents are married with family size of

ISSN 2057-2611(Print), ISSN 2057-262X(Online)

3 -5 members. The respondents are full time fishermen and are adequately experienced. The respondents produced fish in small scale. Different fish production timings are explored by t respondents and earn varying income, ranging from 100,000 to 1,000,000 naira per annum and they cover relatively wide range of fishing areas.

Fishery cooperative societies have performed optimally in boosting the quantum of fish production. The findings also revealed that the income earned from fishing by the respondents before joining cooperatives was lower compared to after they joined cooperatives.

The study revealed that the significant factors that influence fish farming are sex, age educational level, house size, alternate job, fishing experience, scale of production, fishing timing, income generated through fishing and distance covered.

Finally the findings revealed that fishermen are faced with various degrees of challenges which range from pollution, climate change/bad weather, financial challenge, storage and processing facility; as well as high cost of fishing tools.

CONCLUSION

Although fishing is very important in stimulating growth and development of national economy, it was observed that government is not concerned about the plight of the fishermen as their policies are not directed to support them. Thus level of government intervention in form of levels and other payments to a great extent affect the ability of the independent variable in stimulating the gross margin as such value creation was limited as the capacity to sustain it is not allowed to manifest especially as they do not allow the market mechanism to determine price. This was observed to cause instability in the market mechanism and fishermen became skeptical. Membership of a fisher cooperative has significantly enhanced the income of the fishermen, so cooperative membership is seen as a major advantage in fish production.

RECOMMENDATIONS

From the study the researcher recommends the following:

1. Fishermen in Rivers State should endeavour to engage in group fish farming through the formation of cooperative societies as the study revealed that the income generated by members of such cooperative was higher compared to when they hadn't joined cooperatives.

2. Fishermen should be encouraged to use modern facilities to improve their catch. With the introduction of modern equipment, it will enhance fishermen productivity and improve their income.

3. The government should provide basic education for these fishermen and their household. This will enable them manage their fishing business effectively and facilitate the adoption of modern technologies in fish production.

ISSN 2057-2611(Print), ISSN 2057-262X(Online)

4. Government should provide social infrastructure that will enhance fish storage such as electricity to help reduce some of the challenges the fishermen encounter in fish production. Ways of involving women in fish production should also be sought.

5. Financial institution should be encouraged to provide credit facilities to the fishermen. This will enable the fishermen to acquire the necessary fishing equipment that are capable of boosting fish production and result to more income.

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