Research Paper

Productivity and Constraints of Artisanal Fisher folks in Some Local Government of Rivers State, Nigeria

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ABSTRACT: *Productivity and constraints of artisanal fisher folks in some local government of Rivers State was carried out. Prepared questionnaires were used to sourced vital information from a total of one hundred and fifty respondents (150) in three communities (Bugunma, Harristown and Obonnoma) in Kalabari Kingdom of Rivers State. The data generated from the study were analyzed, using descriptive statistics, budgetary analysis and regression analysis (ANOVA). The results revealed that 54.6% has their major source of capital from personal saving. The budgetary analysis showed that the gross margin of N3 The ANOVA showed that household size, highest educational qualification and fishing experience has significant impact on the output level of the fishers.0,093 were obtained by fisherman/day. The common catch species of fish are shiny nose (Polynaemidae) 82.3%, Tilapia 80.85%, and Cat fish 80.1%. While the common types of fishing gear used were hook and line 95.0%, Cast net and Scoop net (86.5%), Fishing basket 85.1% and Fishing trap 84.4%. The weighted constraints to artisanal fishery were found to be inaccessibility to credit, high cost of equipment, scarcity and high cost of net and inadequate technology.*
KEYWORDS: *Productivity, Constraints, Fisheries management, Fishing gears*

I. INTRODUCTION

The Artisanal fish production in Nigeria is bedeviled by numerous problems which includes: over fishing, decreasing yield, obnoxious fishing methods, multispecies and labour intensive nature (Mascia *et al.,* 2017).Fish resources are susceptible to environmental and man induced stresses and can deteriorate very fast, most a time when environment and man act concurrently to limit production. Tobor (1992) expressed a reduction in mean sizes that is mean length and weight in fish species and changes in species composition owing to both recruitment and ecosystem overfishing. However, Ladipo (2016) included the difficulty involved in evacuation and distribution of fish products from hardly accessible fishing units scattered in hinterlands, these features bring significant percentage of fish spoilage and wastage and poor returns on investment by fishermen. In spite of this, Lawal, (2002) stated that the potentials for large scale fish production in Nigeria is reduced because of water weeds, outrageous cost of fishing implements, poor regulations and insecurity in our water ways. Other factors listed as a challenge to Artisanal fishing in Nigeria include non-rendering of proper fish production and marketing records. Moreover, Imande, (2018) remarked that managing fisheries may require considerable technical changes to the gear and fishing areas and seasons so as to increase selecting and minimize impacts on other species. This awareness has not been put in place by fisheries policy makers.

In fisheries production, the physical inputs involve land, water, labour and money/capital are arranged into a fish enterprise whose ultimate target is the maximization of profit, minimization of cost, maximization of satisfaction or a combination of some or all of these objectives (Ruttam, 2017). Furthermore, Okeowo (2014) stated production as a stage whereby goods and services known as inputs are changed into other products and services known as outputs or products for the reason of increasing profits and welfare. However, Berdgue (2016), described resources as allocation of farm resources such as land, labour, capital and management in different dimensions among competing alternatives. The index point is row to achieve maximum profit, food

calories or nation income from already existing or acquired resources that are generally source and limit the output level of the fisheries sector. The resources use or resources allocation is one of basic function of any economic system.

Fisheries Production factor are overviewed as the function of fishing efforts and stocks abundance (Olajide and Heady, 2002). In principle, fishing effort involve all the physical inputs used in fish cropping (Oukosi and Erhabor, 1987). As an experimental work, it is specifically indicated as a function of certain easily measurable production variables. The product of fishing activity is given in terms of total fishing catch earned by the cropping while access to the means of production for instance ownership of nets, boats etc determine the process by which small scale households undertake fishing (Anderson, 2006). Access is included to production and capable resources such as renting of fishing canoe as a variable influencing the productivity of fishing and thus used as one of fishing inputs. They are measured capital input as a summation of the value of fishing canoes and rental cost also to production inputs, fishing gears were also used. (Ewuola and Williams, 2005).

The cardinal objective of the management of water resources is to achieve sustainable maximum yield and the conservation of aquatic resources, to avoid extinction of these organisms in their aquatic environment (Barldam, 2001). Moreover, Ofuoka *et al.* (2008) in his contribution stated that main objective of fisheries resource management is targeted at sustainable development is to optimize the current utilization of resources without reducing the maximum benefit to future generation. There are many management strategies and approaches taken, to arrive at the accomplishment of these objectives. The popular approaches are regulation of fishing gears, closed areas, complete ban on heavy equipment's, restriction of mesh size, monetary measures such as fees, taxes and licensing. The National, State and Local Government formally enforce the regulations officially and therefore both guidelines and sanctions are closely laid down (Olatunji, 2015). Assessment of productivity of fisher folks in particular locality is necessary for sustainable fisheries development. Hence, this study evaluates the productivity and constraints' confronting the fisher folks in some local government area of Rivers State, Nigeria.

II. METHODOLOGY
Study Area
The study was carried out in Buguma, Obuama and Abonnemma communities respectively in Asari Toru, Degema and Akuku Toru Local Government Areas of RiversState, Nigeria.These areas are surrounded by large water bodies and the natural vegetation in this area varies from the mangrove to the freshwater swamp forests. The prevailing climate hydrographic conditions thus favour a thriving fishery, artisanal and aquacultural activities.

Data Collection
One hundred and fifty set of structured questionnaires were used to collect the primary data on, types of fishing gears and crafts, membership of fishing association, cost of gears and crafts cost of other inputs, availability of market facilities, availability of storage facilities, output per season, rent on fishing site, amount and interest on credit, problems and solutions to these problems facing fishermen in the study area.

Data Analysis
Descriptive Statistical technique such as mean, frequency distribution and percentage were used to obtain the objectives of the study. Cost and return analysis were carried out using OLS regression analysis.
Analytical Framework
Cost and Returns Analysis
The benefits from artisanal fishing were determined by minimizing the household average production costs from the household's average proceeds/revenue generated from sales. This model was used to determine the value of cost and returns so as to determine the profitability on the enterprise. The model specification to achieve cost and return analysis is specified as follows:

$$NFI = GI - TC$$
$$\text{Where} \quad NFI = \text{Net farm income}$$
$$GI = \text{Gross Income}$$
$$TC = \text{Total Cost}$$

Fixed cost items included annual depreciation of gears/crafts, interest on borrowed capital and rent on fishing sites. Total variable cost included cost of labour, cost of twines, fish baits, cost of processing (scaling, evisceration, sorting and smoking). Profit to production Gross Farm Income (GI), were obtained as the total value of fish output measured in Naira at current average local market price of N500 per kilogram.

III. RESULTS

Respondents' Sources of Capital
The sources of capital for the respondents in the study area are presented in Table 1. The results revealed that majority (54.61%) of the respondent sourced their capital from personal savings, 19.03% from friends/relatives, 17.73% from Agric loan and 7.00% from money lenders.

Profitability Analysis
The cost structure and profitability of the respondents in the study area are presented in Table 2. The total variable cost (TVC) were =N=5,007, 850, Average variable cost (AVC) =N=35,517 and Average variable cost per day =N=8,879. The Revenue structure were, gross income (GI) =N=21,980,292, Average income (AI) =N=155,889, Average income per day (AVI/D) =N=38,972. The gross margin (GI-TC) =N=16,972,442, gross margin per fisher (GM/F) =N=120,372 and gross margin per day (GM/D) =N=30,093.

Constraints of artisanal fisher folks in the exploitation of fishery resources
The constraints confronting the fisher folks in the study area are presented in Table 3. The results obtained indicated that inaccessibility to credit facilities pose the highest (3.21) challenge, while distance to market for inputs pose the lowest (2.10) to fishing activities.

Dominant Fish Species at Landing Site
The predominant species in the landings of the fishers in the study area were shiny nose (82.27%), Tilapia, (80.85%) silver catfish (80.14%), Mullets, (77.30%) Prawns, (74.47%) Shrimps/Crayfish (73.05%), andCroakers (72.37%). While the species such as Bloody cockle (63.12%), and Tongue sole (60.99%) recorded the lowest (Table 4).

Types of Fishing Gear used
The commonly used fishing gears in the area of study are presented in Table 5. The results revealed that the most common gear is hook and line (ranked 1st). Cast net and scoop net is ranked 2nd while fishing basket is ranked 3rd. While 2 finger by 10 net (25.4mm), and 4 finger by 20mm net ranked last.

Table 1: Respondents' Sources of Capital

	Capital Source				
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Personal Saving	77	54.6	54.6	54.6
	Friends/Relatives	28	19.9	19.9	74.5
	Agric. Bank	25	17.7	17.7	92.2
	Money lenders	11	7.8	7.8	100.0
	Total	141	100.0	100.0	

Table 4.2: Cost Structure and Profitability of Artisanal Fishing

Cost Structure	Amount
Fixed Cost	
Hiring of gear(s)	1,011,300
Hiring of canoe(s)	1,394,400
Basket(s)	364,900
Total	2,770,600
Variable Cost	
Light (touch, batteries, kerosene, rechargeable lamb etc)	132,450
Mending	371,700
Setting & Lifting	649,800
Paddling	1,083,300
Total	**2,237,250**
Total Cost (TC)	**5,007,850**
Average Cost (AC)	**35,517**
Average Cost (AC/day)	**8,879**
Revenue Structure	
Gross Income (GI)	21,980,292
Average Income (AI)	155,889
Average Income (AI/day)	38,972
Gross Margin (GI - TC)	16,972,442
Gross Margin/fisherman	120,372
Gross Margin/fisherman/day	30,093

Source: Field survey, (2019)

Table 4.3: Mean Scores showing the Constraints of Artisanal Fisher Folks in the Exploitation ofFishery Resources (n=141)

S/n	Constraints	Weighted Score	Mean	Remark
i.	Inaccessibility to credit	452	3.21	1st
ii.	Scarcity & high cost of net	411	2.91	3rd
iii.	High cost of equipment	420	2.98	2nd
iv.	Poor boat maintenance	400	2.84	5th
v.	Poor gear design	361	2.56	6th
vi.	Climatic conditions	359	2.55	7th
vii.	Infestation by water plants (eg. water hyacinth	310	2.20	10th
viii.	Unavailability of space part	320	2.27	9th
ix.	Difficulties of access	347	2.46	8th
x.	Inadequate technology	403	2.86	4th
xi.	Distance to market for inputs	296	2.10	11th

Source: Field Survey, (2019)

mon Species of Fish Catch

S/No	Common Name	Scientific (Family) Name	Freq	Percentage	Rank
i.	Baracuda	*Syhyraenidae*	91	64.54	12th
ii.	Croaker	*Sciaenidae*	102	72.34	7.5th
iii.	Mullets	*Mugilspp*	109	77.30	4th
iv.	Shiny Nose	*Polynaemidae*	116	82.27	1st
v.	Tilapia	*Tilapia guineensis*	114	80.85	2nd
vi.	Tongue Sole	*Cynoglossidae*	86	60.99	14th
vii.	Shrimps	*P.notialis*	103	73.05	6th
viii.	Grouper	*Serranidae*	93	65.96	11th
ix.	Prawn	*P. momondon*	105	74.47	5th
x.	Crab	*Callinectesaminicola*	102	72.34	7.5th
xi.	Sardine	Clupaidae	94	66.67	10th
xii.	Bonga Fish	*Ethimalosa*Spp	96	68.09	9th
xiii.	Catfish	*Chrysicthysspp*	113	80.14	3rd
xiv.	Blood Cockle	*Seniliasenilis*	89	63.12	13th
xv.	Others		81	57.45	15th

Source: Field Survey,(2019)

Table 4.5: Types of Fishing Gear used

S/No	Types of fishing gear used	Yes	Percentage	Rank
I	Gillnet	107	75.89	9th
Ii	Cast net and scoop net	122	86.52	2nd
Iii	Hook and line	134	95.04	1st
V	Fishing basket	120	85.11	3th
Vi	Fishing Trap	119	84.40	4th
Vii	Scoop net and gill net	108	76.60	8th
Viii	Fishing pot	**110**	78.01	7th

Ix	4 finger by 16(mm)	103	73.05	10.5th
X	2 finger by 10 (25.4mm)	112	79.43	5th
Xi	4 finger by 10 (101mm)	103	73.05	10.5th
Xii	2 finger by 14 (mm)	102	72.34	12th
Xiii	4 finger by 20 (mm)	111	78.72	6th

Source: Field Survey, (2019)

IV. DISCUSSION

In analysis of sources of capital for their fishing business, personal saving as a source of capital dominated the artisanal fisher's capital base in the study area. The findings is in agreement with study of Yesufu*et al.* (2013). These authors reported that fishers in developing countries including Nigeria finance their fishing business from personal savings, which is meager and not able to sustain their business on long term basis. The cost structure and profitability in the area sampled, revealed that artisanal fisheries in the study area is a profitable trade. The study is line with the previous works of Anyanwu *et al*. (2009) which observed the same trend from fishers along River Niger at Onitsha and Bayelsa axis. They observed that that fish business is profitable according to the level of investment and variable cost minimization by the fishers on daily basis.

The artisanal fishers in the area under investigation had some major challenges in their fishing operations. These were inaccessibility to credit,, inadequate technology , poor boat maintenance , poor gear design and climatic conditions . These observations agreed with the studies of Okeowo *et al* (2015), who reported similar trend in Lagoon Waters of Epe and Badagry Areas of Lagos State, Nigeria. Inadequate access to credit pose barrier to fisheries investment and aggravated by high cost of equipment. While high cost of equipment may impact on the catch a serious problem to profitability of the fishers, climatic conditions may trigger fish spoilage due to inadequate technology. Also, non-availability of a credit schedule is a peculiar problem of artisanal or small scale fisheries which influence capital –intensive expansion.

Furthermore, on constraints of fisher folks, low income from poor catch was another major problem because artisanal fisher folks in the study area had been experiencing decline in fish output over the past few years as a result of pollution as fallout of illegal refineries that is prevalent in the area. Other constraints identified were high costs of fishing gears, inadequate processing and storage facilities, poor transport (bad roads), and marketing problems. These constraints are in line with the studies of Onemolease and Oriakhi (2011) in selected coastal areas of Delta State, Nigeria. Moreover, overfishing, oil spillage and waste from domestic and industrial sources have equally been identified as threats to a successful fishery business in the study area. Moses (1990) reported that overfishing, obnoxious / illegal fishing methods, siltation, and oil pollution as the major factors threaten fisheries resources in Nigee Delta region of Nigeria.

Compilations of 14 species of fishes were observed in the sampled areas. Family names and common names were used to identify these species in line with the work of Ele (2008). Fishers focused on commercially important fishes to maximize their gross margin and minimize expenditure based on the dominant species during fishing season. Shiny nose were the most targeted species which attracted majority (82.27%) of the respondents. Shiny nose identified by fishers to have high rate of spoilage due to biological features, is large, oily and tasty. The expectation would be that tilapia fish, bonga fish and croaker could have been the most catch, but the fishers dismissed the conception, because they are experienced, know where to go and season to catch their targeted specie. This work is agreement with Olopade *et al*. (2017) who opined that Shiny nose (polynemus), Grunter (*Pomadasys*) and Red Snapper (*Lutjanusspp*) and *Elasmobranchs* are 68% important contributors to the variety and weight of fish landed in Bonny/ new Calabar River Estuary.

The type of fishing gears used by the respondents was investigated for an insight of good resource management and policy. Majority of the fishers used hook and line, cast net and scoop According to Adewuyi *et al*. (2017), hook and line is a major local commercial gear, landing a good number of species ranging from shiny nose to other larger fishes. The respondent reported that they sometime combine these gears depending on fishing season and species of fish. The auxiliary gears like hand/scoop net and small seine were used for quick capture of prawns and crabs. The high percentage of respondents using hook and lines is not unpredicted, studies by Unongo (2010); Sasabo and Tol (2005) and Olopade *et al*. (2017) proved they are the predominate gears used within the Niger Delta region.

The artisanal fisherman sampled in this study settle along the coastline, they rely predominantly on the use of small fishing gears, large dugout canoes and motorized canoes for fishing. From the study the gear used by the fisher folks is directly proportional to their inputs from various means which include personal savings friends, family, cooperatives, market and government. This implies that most of the respondents prefer to be rightful owner of their fishing gears which include canoe, nets hooks, line and other fishing gears. Those that rely on other sources like the government, cooperative are those that make use of sophisticated gears like

motorized speed boat and engines. From the information gathered from the fisher folks, some of them borrow these gears for certain amount of money or in exchange for what they catch.

V. CONCLUSION

The study revealed that artisanal fisheries are profitable in the area of the study from the result of budgetary analysis. The results obtained in this study have provided scientific information and detailed knowledge of the constraints limiting the growth and expansion of artisanal fisheries in the study area and probable solutions to these limitations. The dominant fish species at landing site based on season and commercial importance were shiny nose (82.27%), marine tilapia (80.85%), catfish(80.14%), mullets (77.30%) and prawns (74.47%). The result indicated that the predominant fishing gears were hook and line (95.04%), cast net and scoop net (86.52%), fishing basket (85.11%), fishing trap (84.40%) and 2 finger by 10 (25.4mm).The majority constraints of the respondents were inaccessibility to credit (mean =3.21), high cost of equipment (mean =2.98), scarcity and high cost of nets (mean =2.91), inadequate technology (mean=2.86), climatic condition (mean=2.55) ,while infestation by water plant (mean=2.20),unavailability of space (mean=2.27), difficulties of access (2.46%) and distance to market for inputs (mean=2.10) were strongly disagreed and less than accepted mean (mean = 2.5), using Five pointer Likert scale.

VI. RECOMMENDATIONS

Based on the results obtained from this study, the following points were therefore recommended
1. More infrastructural facilities such as roads, hospitals, schools and recreational facilities should be addressed to enhance performance in the fishing business.
2. To reduce lost suffered from processing and preservation of fish, it is advisable for the fishers to form viable co-operative societies in the acquisition of good storage facilities and to eliminate the activities of middle men.
3. To achieve the economies of scale, the fisher folks should join group or co-operative societies to be able to gain its benefits. This has become necessary to enhance the use of more improved technological equipment which could impact meaningfully on output level of the fisheries.
4. Efforts should be made to provide the fishers with motorized fishing boat, it will help to boost quantity of fish caught.
5. Fisheries extension services should be intensified with adequate programmes that will encourage improved fishing practices with reduced losses.
6 Awareness should be created to the fishers, stakeholders and the government on the dangers of wanton destruction of the water environment by oil operations. Good management and policies laid locally and national.

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