Structure and Profitability Differentials among Fishermen in Kwara State, Nigeria

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ABSTRACT

The study has three overriding objectives; to assess the structure and profitability differentials among motorised and non-motorised fishing enterprise in Kwara State, Nigeria; to examine the factors influencing net fishing income in artisan fishery and to identify the constraints to artisan fishing in the State. Data were collected through a structured questionnaire administered at random to 306 artisan fishermen in eight fishing settlements in Kwara State. Data analysis was carried out using descriptive statistics, net margin and ordinary linear regression. The results show artisan fishery enterprises to be profitable, but finds out that fishermen who imbibed motorized gears make more profitable when compared to non-motorised one. Depreciation of fixed assets, cost of labour, fishing hours, experience and household size were factors that influenced variability in net fishing income in the study area. Access to credit stood as the most important constraint in artisan fishermen's operations. It is therefore concluded that artisan fishermen should adopt improve fishing techniques and motorised gears to increase their income which will ultimately improve their well being and reduce the level of poverty in the study area.

Keywords: *Structure, Artisan fishermen, motorised and non-motorised fishing*

INTRODUCTION

The Nigeria fishery industries consist of three broad sub sectors: the artisan or small scale fisheries; the industrial (or large scale fisheries) and the aquaculture. Of these, the artisan fisheries constitute the most significant sub sector in terms of number of people employed and contribution to total fish output in the country (Oladimeji, Abdulsalam and Damisa, 2013). Available records from the Federal Department of Fisheries (2005). Food and Agricultural Organization (2007) reveals that Nigerian self sufficiency in fish production was as high as 98.8% in 1983 but dwindled between 29.4% and 40% in 2005 with an annual average of 49.6% and standard deviation of 19. The rapid increase in population of Nigeria has resulted in a huge increase in the demand for animal protein which is essentially higher in quality than plant protein, contains all essential amino acids for body growth (Awoyemi and Ajiboye, 2011). The average protein intake in Nigeria which is about 19.38g per caput consumption per day is low and far below FAO requirement of 75g/caput consumption/day. The contribution of 7g from animal source is below recommended minimum of 35g/caput consumption/day expected from animal products (Oladimeji, 1999;

Oladimeji, Abdulsalam and Damisa, 2013). Further study revealed that average rural households in Kwara State consumed an average of 17g of animal protein per caput per day (Oladimeji, 1999). However, per caput consumption per day of fish is higher than that of any other livestock products in Nigeria. It was estimated that the nation per caput consumption of fish per day which was 29.1g, yielded 2.6g of animal protein and represent 35.0% of the per caput consumption of livestock products and 30.8% of ingested animal protein (Oladimeji, 1999; Awoyemi and Ajiboye, 2011). This has increased at an average rate of 3.5% per annum from 6.970kg in 1975 to 9.096kg in 1985 (Oladimeji, 1999) but a downward trend to total per caput consumption of about 7.52kg in 2011 (Awoyemi and Ajiboye, 2011).

Apart from fishes, other sources of animal protein are ruminants (cattle, sheep and goats), poultry (chicken, turkey and duck) and piggery. However, fish production remained a better option of animal protein among Nigeria's populace since rapid increase can be achieved within a short time coupled with diverse sources from both cultured and wild sources. In addition, the craving for fish is on the increase in Nigeria given its implication for individual and national health. Fish contains Omega III fatty acids that are known to reduce cardiovascular diseases, hypertension and arteriosclerosis, thus becoming a preferred source of animal protein for those about 50 years of age and above (FDF, 2005). Omega III fatty acids are also known to enhance good brain cell development in developing foetus, (thus a vital diet for pregnant women and Intelligent Quotient (IQ) in developing children (FDF, 2005). This is in addition to the fact that other sources of animal protein such as ruminants, poultry and piggery are bedevilled with one problem or another. For example, piggery has a religious connotation and ruminants such as cattle, sheep and goats are poor candidates for rapid short increases in numbers due to low fecundity, long gestation and long generational interval (Rahji, Aiyelari, Ilemobayo And Nasiru, 2011).

Poultry production suffers lack of inputs and technical know-how as well as adequate finance and basic human needs such as proper housing, good/hygienic drinking water and sanitation which decimate the species within a very short time. Therefore, the combination of low domestic production of poultry and beef as well as their relative high prices, coupled with religious stigma attached to piggery consumption and more importantly the driving force to meet animal protein requirements from domestic sources demand intensification of production of fish. Awoyemi and Ajiboye (2011) opine that the nutritional requirement is particularly crucial in a developing country such as Nigeria where malnutrition and starvation are the major problems facing millions of rural dwellers. Therefore, artisan fishery (both coastal and inland) occupies a significant position in the Nigerian economy; provides employment for over 6 million (about 4.3%) of Nigerian population and supplies yearly average of about 88.1% of the total domestic fish production (FAO, 2007). It is against this backdrop that the study was undertaken to assess the structure and profitability differentials among motorised and non-motorised artisan fishing in Kwara State, Nigeria.

METHOD

The data for this study were drawn from a field survey conducted in 2012/2013 among

artisan fishermen in four major fishing Local Government Areas (Asa, Edu, Moro and Patigi) of Kwara State. The State has a land mass covering about 32,500 square kilometres, a total land size of 3,682,500 hectares and 247,975 farm families with majority living in rural areas. It has a population of about 2,365,353 people according to the National Population Census (NPC, 2006). The State's population and farm families are projected in 2014 to be about 3,043,222 and 306,584 respectively representing 3.2% annual growth rate and an average density of about ninety four persons per square kilometre. The annual rainfall ranges from 800mm to 1500mm and between 50.8mm during the driest months to 241.3mm in the wettest months. It is bounded in the North by Niger State, in the South by Oyo, Osun and Ekiti States, in the East by Kogi State and in the West by Benin Republic. Artisan fisheries production is much favoured in the North Eastern part of the State as a result of numerous tentacles of water and streams as well as flood plains of the River Niger that stretches from Jebba/Bacita (Moro LGA) through Shonga in Edu LGA to Gakpon in Patigi LGA of the State.

Artisan fishing and farming are the major occupation of the people in study area. These fishing activities are usually carried out by the traditional fishing methods (such as canoes with paddles, fishing nets, hooks, gear, trap etc.) and more recently few motorized boat have been introduced in the study area. Majority of the farming households in Edu, Moro and Patigi are predominantly artisan fishery households while a sizeable proportion of farmers in Asa also engage in capture fishery (Oladimeji, Abdulsalam and Damisa, 2013). Primary data were collected through interview and a structured questionnaire which was subjected to a pre-survey. The entire rural artisan fishery households in Kwara State made up the target population for the study. A multi-stage random sampling technique which consists of probability and non-probability sampling was employed for selecting the representative of rural artisan fishery households. The first stage involved the purposive selection of the entire four fishing Local Government Areas in Kwara State. With the assistance of ADP/Fishery Department Staff, the list of fishing settlements in each of the four fishing LGA was drawn from which two fishing settlements each was randomly selected. These settlements include Osin and Laduba (Asa LGA); Chewuru and Lipata (Edu LGA); Kungu and Ipata (Moro LGA), and Gbaradogi and Rogun (Patigi LGA). Then, the list of artisan fishery households in each selected fishing settlement was compiled from cooperative societies for random selection. The stage involved a random selection of 40% artisan fishery households in each of the fishing settlements. In all, three hundred and six respondents were sampled. The budgetary technique which involves the cost and return analysis was used to determine the profitability of artisan fishery enterprise in the study area. The model specification is given as:

$$GM = TR - TVC \quad (1)$$

$$\Pi = TR - TC \quad (2)$$

$$TR = PQ \quad (3)$$

Where:

Π = Total profit/net returns (N);

TR = Total revenue (N);

P = Unit price of output (N);

Q = Total quantity of output
TC = Total variable cost.

The following estimates were carried out to determine the profitability (indices) of fishing enterprise in the study area, these are:

RPN = GM/TVC (4)
BCR = TR/TC (5)
ESR = TFC/TVC (6)
ROR = NR/TC (7)
GR = TFE/GI (8)

Where:
RPN = Return per N outlay;
BCR = Benefit cost ratio;
ESR = Expenditure structure ratio;
ROR = Rate of return and
GR = Gross ratio.
GM = Gross margin (N);
TVC = Total variable cost (N);
TC = Total cost (N);
NR = Net return (N);
TFE = Total farm expenses
GI = Gross income (N)

The Net Return per Fisherman (NPF) was estimated using equation 9 below:

(9)

Where:

ANR = Average net return; i.e. net return per fisherman,
TR = Total sales revenue accruing to the *ith* fisherman in the *jth* LGA (N);
TC_{ij} = Total cost incurred by the *ith* fisherman in the *jth* LGA (N); and
M_j = Total number of fishermen in the *jth* LGA.

Differential Estimation of the Factors influencing Net Fishing Income

Estimation of the factors influencing net fishing income of motorised and non-motorised fishermen involves the use of ordinary least square regression techniques and specified by equation 10:

$$\text{Log } NEY_{ij} = \beta_0 + {}_1\text{Log}DEP_{1ij} + {}_2\text{Log}CHL_{2ij} + {}_3\text{Log}FL_{3i} \quad {}_4\text{Log}FHS_{4ij} + {}_5\text{Log}FEX_{5ij} \quad {}_6\text{Log}HOS_{6ij} + \mu_i \qquad (10)$$

Where:

NEY_{ij} = Net fishing income of the *ith* fisherman in the *jth* LGA (N);
DEP_{1ij} (X_1) = Depreciation of fixed inputs used *ith* fisherman in the *jth* LGA (N);
CHL_{2ij} (X_2) = Cost of hired labour employed by the *ith* fisherman in the *jth* LGA
FL_{3ij} (X_3) = Cost of family labour by the *ith* fisherman in the *jth* LGA (N) ;
FHS_{4ij} (X_4) = Fishing hours per season spent by *ith* fisherman in the *jth* LGA;
Hos_{4ij} (X_5) = Number of fishing trips made by the *ith* fisherman in the *jth* LGA;

FEX_{5ij} (X_6) = Fishing experience of the *ith* fisherman in the *jth* LGA (years);

μ_i = error term associated with data collection from the *ith* fisherman in the *jth* LGA which was assumed to be normally distributed with zero mean and constant variance.

$_0$ = constant

$_1$- $_6$ = regression parameters that were estimated.

RESULTS AND DISCUSSION

Types of fishing gears used: Table 1 presents the results of the distribution of types of fishing gears used by artisan fishery households. The pattern of non- motorized canoe ownership was as follows: 33.1% were owned by fishermen from Moro fishing settlements follow by 27.2% from Edu fishing settlements; while 24.8% and 15.1% were owned by Patigi and Asa fishermen respectively. On the other hand, the bulk of motorized canoes (98%) were largely concentrated in Nupe area situated along the Northern part of the State with River Niger flowing along most of their boundaries and these comprise Edu, Patigi and partly Moro Local Government Areas (LGAs). Therefore, artisan fisheries in the study area rely heavily on the use of non-motorized canoes as presented on table 1. For instance, about 88% canoes out of the total of 338 canoes used by artisan fishermen in the Study area were non-motorised. Ownership and types of canoes and fishing nets determine to a large extent the amount of fish catch.

β Furthermore, the result of the analysis showed that a majority of the canoe ownership 93.2% was by men while women owned only 6.8% of the canoes which are all non-motorized. This has implication on fishing since some women may be willing to engage in fishing but do not have means which made them depend solely on their husband. The few women fisher folks may be attributed to the tradition and custom of the people in the study area where women are mostly restricted from actual fishing but preferred to engage in processing and marketing of fish, and performed other non-farm activities as well as forefront in home economics. This result was in line with Sulaiman (2007), Adewumi *et al* (2012) and Oladimeji *et al* (2013) who observed the dominance of men in actual fishing and the dominance of women in fish processing which shows differentiation of roles and functions based on gender.

Relative Sizes of Different Vessels: The distribution of the sizes of different vessels being used in the study area is presented on table 2. The table shows that 43.8% of the respondents used 5.1-6.0 m^2 length canoe, followed by 4.0-5.0 m^2 length with 41.1% and about 4.1% used canoes with length greater than 7. The mean size of canoes and their standard deviation is 5.9 m^2 and 1.32 m^2 respectively. The results of the mean size of canoe couple with few motorised canoes give a clear testimony of subsistence nature of the artisan fishery practices in the study area. The implication of this is that the bulk of these fishermen who used non-motorised canoes spent more time of their operations in canoe paddling and may not be able to travel to far distance. Invariably, the quantity of fish caught is less.

Distribution of fish catch: The daily fish catch rates per canoe ranged from 5kg to 45kg with a State average of 13.7kg. Although Oladimeji, (1999) recorded average daily catch ranged of 12.5kg to 45.50kg with a State average of 16.50kg and Sagua (1975) obtained average daily catch rates per boat of 11.49kg in Kwara State while Inoni and Oyaide (2007) recorded 12.36kg in Delta State. The dwindling average of 13.75kg was attributed partly to increase in number of fishery households which has increased from an estimated 1200 fishery households in 1975 to over 10, 000 in 2010 (KWADP, 2008). This is coupled with an improvement in the level of fishing technology such as acquisition of improved fishing nets, gears, canoes both paddled and motorized. However, Abiodun and Oshungade (2009) recorded an average daily catch as low as 3.1kg/canoe in Jebba lake around Kwara and Niger State border, which suggest that the southern part has been heavily fished and the fish stock in the area were extremely skewed towards smaller immature fishes.

Net Return per Fisherman: The net margin per fisherman is the gross returns less total cost of production (TC). It is income the fisherman receives after all costs have been deducted from the gross revenue from artisan fishing operations. The results of net margin analysis are presented on table 3. The Average Variable Cost and Average Fixed Cost per fisherman/month had a state average of N41,744.62 and N8,146.00 respectively. The gross margin was computed using production values in Kilogram and prices in Naira for the fish sold and equivalent amount for the one consumed and gave away. The average gross revenue for the State was N60,492.60 compare with that of motorised unit (N133,482.10) and non-motorised unit which was N53,701.10 as shown on table 3. Net margin per fishermen per month were N19,079.9 and N8,350.10 among motorised and non-motorised units respectively, and N10,601.98 per fisherman per month in the entire study area. The net margin analysis has shown that artisan fishing operations in Kwara State are profitable. However, from the result obtained, operations in motorised appear to be more profitable and lucrative. In fact, average net margin was about 70% higher among the motorised units than the non-motorised ones.

Indices of Profitability: In order to determine the level of profitability in artisan fishing in the study area, a number of indices of profitability and efficiency such as total cost/kg, net margin/kg, and net margin to cost ratio, return on sales as well as gross ratio amongst others were computed, and presented in Table 4. Net margin per kg was 35.53/kg and 29.30/kg respectively for operators in the motorised and non-motorised segments of the artisan fishing sub sector; but with an average value of 25.7/kg for the entire study area. The revenue accrued to fishermen was not only dependent on the kilogram of fish caught and price per kilogram, but also dependent on the variable costs. Therefore, the combined effects of low yield and high cost of production, particularly of variable costs components, are implicated for the rather low net margin per kilogramme. The implications of the obtained net margin/kg however, are that for every kilogramme of fish caught, the fisherman earns a profit of N35.53 for motorised operators and N29.30 for non-motorised with State average of N25.70. The results are at disparity to the average net margin/kg of N80.26/kg reported by Inoni and Oyaide (2007) among fishermen in south agro ecological

zone of Delta State. Although the net margin per kilogramme revealed the level of profitability, it is not a very critical measure because it does not take into consideration the total cost incurred by the fishermen to earn that margin. Therefore, the relative profitability of artisan fishing operations in the different locations, as well as between the two segments of the small scale fisheries cannot be compared. The net margin to cost ratio indicates the relative profitability of artisan fishing in the segments, because it relates the net margin realised to the total cost of production. The ratio was 18.3% and 18.4% respectively in the motorised and non-motorised segments of the artisan fisheries sub-sector but, with a value of 21.3% for the entire area as seen in Table 4. The result implies that investments in the small scale fisheries sector earned about 18% return on capital, as was the case among both motorised and non-motorised segment. However, Inoni and Oyaide (2007) obtained a relatively high value of 37% among fishermen in Delta State and Njifonjou (1998) and Oladimeji (1999) obtained net margin to cost ratio of 25.7% and 29.5% among artisan fishing units in the Limbe region of Cameroon and Jebba North in Niger State respectively.

Table 4 also shows the return on sales, which indicates the magnitude of operating margin the fishermen have on their fish sale, is another measure of probability in artisan fisheries applied in this study. This was determined by dividing the net margin by the gross revenue. The lower the return on sales, the lower the operating margin thus, the greater the revenue that must be made in order to make an adequate return on investment (Gittinger, 1982 in Inoni and Oyaide, 2007). Return on sales in the study area ranged from 14.30 to 15.55 with a mean value of 17.5% for the entire area studied. The results showed very low operating margin in artisan fishery production in the study area. Inoni and Oyaide, 2007 attributed a condition of this nature to a very high cost of production. The results further imply that profit was only 15.5% of gross revenue on the average.

Thus, while the average net margin in the motorised segment was better, the non-motorised units were more profitable because they had a higher return on investment as well as a higher operating margin, than their motorised counterparts. The operating ratio is a measure of efficiency in the use of financial resources, and it was obtained by dividing total production cost by gross revenue. The operating ratio is an indicator of the ability of fishermen to control cost of operation. A rising ratio shows that variable costs are increasing or that revenue is declining due to falling fish prices. The operating ratio in artisan fish production in the study area was 82.47%; though the ratio was 78.21% and 84.64% respectively for motorised and non-motorised fishing units. According to Gittinger (1982) in Inoni and Oyaide (2007), enterprises with very high operating ratios in the neighbourhood of 90% have difficulty in making adequate returns on investment, due to triple effects of high operating expenses, dwindling fish catches, and falling prices; while an abysmally low ratio, say 50%, implied that some costs may have been omitted or grossly underestimated. Based on the findings on both tables 3 and 4, as well as indicators computed, it can be concluded that artisan fishermen in the study area should adopt improve fishing techniques and motorised gears to increase their income which will ultimately improve their well being and reduce the level of poverty in the study area. The implication of this finding therefore is that fishermen who earned higher net returns from their fishing enterprises were most likely to have a reduced poverty status than non-motorised fishermen.

Differential Estimated Factors Affecting Net Income of Fishermen: The result of analysis of the multiple regression models (double log functions) for the Differential determinants of households' net income among motorised and non-motorised, and the State average is cumulated on table 5. The result for motorised segment shows that depreciation of assets, cost of hired labour and fishing hours were statistically significant at 1% level of probability, cost of family labour, fishing experience and household size were not statistically significant. All the variables in motorised unit were in line with a priori expectation and postulate of economic theory except cost of family labour (positive) and household size which was negative.

However, in non-motorised segment, depreciation of fixed assets and cost of hired labour were not statistically significant but bears expected negative sign. Suffice to note that fishing hours per season, years of experience of fishermen and household size were both in line with a priori expectation and statistically significant at 1% level of probability. In addition, cost of family labour was significant at 5% level of probability. The hypothesized independent variables explained 75.02% and 76.2% in the variability of the net income of motorised and non-motorised units respectively while the F-test indicated that the model was significant at the 1.0% level. The result of the double log functions of State fishermen's net income is also presented in 5. From the table, it could be observed that all the independent variables were statistically significant and followed a priori expectation and postulated economic theory expect cost of hired labour and household size. Depreciation of capital input (X_1) exerted negative impact on fish returns was statistically significant for motorised and State function at 1% and 5% respectively.

The cost of labour hired labour were negative in both segments as well as State average while family labour (X_3) were positive in both motorised and State average and was statistically significant at 5% except in motorised, indicating that it's another very critical input in artisan fishery production. Although, the cost of small-scale fishing is very labour intensive and every activity in the business, from going to sea, mending of gears and crafts, unloading the catch, grading, processing to marketing of fish require an adequate amount of human effort. In fact, it could be said that labour input is the factor around which small scale fishing revolves, because without adequate number of men ready to undertake a fishing trip both hired or family labour, there will be no catch. The excessive use of labour resources in rural areas tends to be a common occurrence due to rather low opportunity cost for the input (Ladipo *et al,* 1992 in Oladimeji *et al,* 2013). Family labour cannot sensibly be 'laid off'. For instance, in agricultural activities even when it is making a negative contribution because it still has to be catered for whether it is employed or not. Besides, the existence of disguised unemployment and under-employment of labour in rural areas of the country necessarily promote excess labour in agriculture and fishing enterprises. Fishing hours (X_4) exert positive impact on coefficients of both units and State functions, suffice it to note that the positive sign on the coefficient of LN fishing hours indicates that an increase in these variables would result in higher net income for the fishermen in both units and State function, all other factors remaining unchanged. Furthermore, fishing experience (X_5) was statistically significant at 1% level of probability in non- motorised unit and State

average but exert positive impact in all the segments under considerations. Finally, household size (X_6) had a negative influence on net income of fishermen in all the segments but statistically significant at 1% for State and non-motorised units. This implies that the larger the size of the family that participate in fishing expedition, the lower the net income of fishermen. The negative influence of household size may be due to the desire of fishermen to meet financial obligations of their families since virtually most of the fishermen had no viable alternative income generating activities outside fishing. Furthermore, household members may constitute a significant proportion of the labour force in fishing. Although the fishermen's household may not be involved directly in fishing activities, family members actively engage in fish retailing, processing, fish distribution and marketing. However, the variable was not statistically significant in motorised unit.

Test of Hypothesis on Profit Earned by Fishermen's Households: The data on Table 6 elucidate the result of t-test on returns and costs of artisan fishermen in Kwara State. The results show that z-calculated is greater than the tabulated z-value at 1% level of probability. Since the results of the z-calculated was greater than the critical value for returns and costs variables at all the level of significance, therefore, the null hypothesis was rejected which suggests that the artisan fishery enterprise is profitable in the study area. This was supported by the net margin per fishermen per month calculated to be ¦ 19,079.9 among motorised units, ¦ 8,350.10 for the non-motorised artisan, and ¦ 10,601.98 per fishermen per month in the entire study area. Therefore, either way, the net margin analysis has shown that artisan fishing operations in Kwara State are profitable.

The Major Constraints Affecting Fishery Households in the Study Area: Table 7 depicts the constraints faced by fishermen in the study area ranked in order of severity. The study showed that inaccessibility of credit ranked the most important bottleneck in all the sectors with the highest rating 25% for motorised unit; 13% for non-motorised unit and 15.5% for state average. This was closely followed by the lack of extension visits in both state average and non-motorised unit, and high cost of hired labour in motorised followed by extension contact. It suffices to note that non-availability of credit and lack of extension contact identified as two most important constraints sum up to over one quarter of the problems of artisan fishery in the study area. It may be concluded that if these two constraints are look into and their fishery cooperatives are rejuvenate, other impediments such as 3rd, 4th, 7th, 15th, 10th, 5th, and 8th constraints may ceased to exist or bare to minimum in the study area.

Table 1: Differential distribution of types of fishing gears used

Fishing settlements(LGAS)	No. of non- motorized Canoes	No. of motorized Canoes/boats
Moro	98(33.1%)	13(32.5%)
Edu	81(27.2%)	14(35.0%)
Patigi	74(24.8%)	11(27.5%)
Asa	45(15.1%)	2(5%)
Total	298(100)	40(100.0)

Figures in brackets are as percentages of total number of non-motorized and motorised canoes

Source: Field Survey, 2013

Table 2: Distribution of the Sizes of Different Vessels

Size of canoe ($m^{2)}$	Frequency	Percentage
4.0-5.0	139	41.1
5.1-6.0	148	43.8
6.1-7.0	37	11.0
>7.0		
Total	14338	4.1100
Mean	5.9	
Stdev	1.32	

Source: Field Survey, 2013

Table 3: Relative Estimated Costs and Returns in Artisanal Fishing

Parameters	Motorised unit	Non-motorised unit	Entire Study Area
Average Gross Revenue from fish (N)	133482.10	53701.10	60492.60
Less variable Costs			
Labour	31600.90	29870.80	31181.21
Fuel and Lubricants	37600.00	-	8058.1
Others	29700.50	7630.00	2505.3
Total Variable Costs (TVC)(N)	98901.4	37500.8	41744.62
Average Gross Margin (N)	**34580.70**	**16200.3**	**18747.98**
Less Fixed Costs			
Depreciation of fixed assets	15500.80	7850.20	8146.00
Net Margin/ fishermen/month (N)	**19079.9**	**8350.1**	**10601.98**

Note *International discount rate: US$1 = N160 during survey.

Source: Field survey, 2013

Table 4: Differentials Efficiency and Profitability Ratios in Artisan Fishing

Parameters	Motorised unit	Non-motorised unit	Entire Study Area
Average Output (kg)	537	285	411
Gross Revenue (N)	133482.10	53701.10	60492.60
Total Cost (N)	104402.2	45451.00	49890.62
Net Margin (N)	19079.9	8350.1	10601.98
Benefit/Cost (BCR)	1.28	1.18	1.21
Expense Structure Ratio (ESR)	0.16	0.21	0.20
Rate of Return (ROR)	0.18	0.18	0.21
Gross Ratio (GR)	0.74	0.83	0.84
Total cost/kg	194.41	159.48	121.39
Net margin/kg	35.53	29.30	25.7
Net margin to cost ratio (%)	18.30	18.37	21.25
Return on Sales (%)	14.30	15.55	17.53
Operating ratio (%)	78.21	84.64	82.47

Source: Field survey, 2013.

Table 5: Differentials Estimated factors affecting net income of fishermen

	Motorised unit		Non-motorised unit		State average	
Variables		**t-ratio**		**t-ratio**		**t-ratio**
Ln Dep (X_1)	-0.167	11.61^{***}	-0.131	-0.936^{NS}	-0.027	2.25^{**}
Ln Chl (X_2)	-0.075	9.18^{***}	-0.131	0.829^{NS}	-0.830	0.982^{NS}
Ln Fl (X_3)	0.54	1.54^{NS}	-0.923	-2.08^{**}	0.116	2.37^{**}
Ln Fhs (X_4)	0.165	3.83^{***}	0.081	20.3^{***}	0.336	7.15^{***}
Ln Fex (X_5)	0.057	1.52^{NS}	0.419	5.74^{***}	0.181	4.76^{***}
Ln Hos (X_6)	-0.895e	-0.86^{NS}	-0.2e-	-3.2^{***}	-0.4e-05	-5.93^{***}
R^{-2}	0.7502		0.7620		0.6852	
F-statistics	16.70		23.50		19.70	

Note* 1% ** 5% *10% level of significant & Ns: not significant**

Source: Field survey, 2013.

Table 6: Test of significance of profitability

Estimated Variables	Mean Costs	Mean Revenue	Mean Profit	t-value	sig.
Maximum	135369.2	184750.0	70000	307.777	000
Minimum	22858.3	29891.7	900		
Mean	57295.2	67897.2	10601.98		
Std Dev	19309.1	27686.1	10540.89		

Source: Field survey, 2013.

Table 7: Differential Constraints Faced by Fishing Households in 2013

	Motorised unit			Non-motorised unit			Entire study area		
Constraints	**F**	**%**	**Rank**	**F**	**%**	**Rank**	**F**	**%**	**Rank**
Inaccessibility of credit	20	25.0	1st	69	13.0	1st	89	15.5	1st
Distance of market	1	1.2	9th	44	8.3	6th	45	7.4	6th
High Cost of Equipments	10	12.5	4th	58	10.9	3rd	68	11.1	3rd
Climatic Variability	-	-		8	1.5	14th	8	1.3	14th
High Cost of Hired Labour	12	15.0	2nd	12	2.3	12th	24	3.9	11th
Inadequate Storage Facilities	9	11.2	5th	51	9.6	4th	60	9.8	4th
Scarcity of Gears and Nets	11	13.8	3rd	32	6.0	8th	43	7.0	7th
Accessibility to Fuel	8	10.0	6th	12	2.3	12th	20	3.3	13th
Infestation by hyacinth	-	-		31	5.8	9th	31	5.1	9th
Poor Gear Design	3	3.8	8th	3	0.6	15th	7	1.14	15th
Accessibility to River	-	-		30	5.7	10th	30	4.9	10th
Tax and Charges	-	-		50	9.4	5th	50	8.2	5th
Menace of Water lords	-	-		42	7.9	7th	42	6.9	8th
Extension contacts	6	7.5	7th	65	12.2	2nd	71	11.6	2nd
Others	-	-		24	4.5	11th	24	3.9	11th
Total	80	100		532	100		612	100	

Note: *the first two major constraints per fisherman were analysed

Source: Field survey, 2013

CONCLUSION

It can be concluded that artisan fishermen in the study area should adopt improve fishing techniques and motorised gears to increase their income which will ultimately improve their well being and reduce the level of poverty in the study area. Therefore, if modern fishing gears and nets can be acquired, then the output will be much higher and the fishermen will be more efficient. Finally, the fishery cooperative should rejuvenate and bring alive their associations to access credit and to enable them feel government impact at all level and to assess most of the new innovations and inputs necessary to increase their output and improve their standard of living. Suffice to note that a functional and active umbrella organization of fishermen is required to handle issues of capacity building of fishermen, linkage with input and output dealers, negotiation with credit institutions and various tiers of government and interested non-governmental organization. Effort should be made towards inducing potential fishermen to go into fishing while those already fishing are encouraged to increase their fishing efforts because there was a reasonable level of financial return to artisan fishing enterprise in the State. By so doing, the demand-supply gap of fish needs in the country will be reduced or vanished completely and this may give rise to export. That the net margin analysis has shown that artisan fishing operations in Kwara State are profitable, although, estimated profit margins are relatively small in non-motorised segment while operations in motorised unit appear to be more profitable and lucrative.

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