

ECONOMIC ANALYSIS OF CRAYFISH HARVESTING AND MARKETING IN BADAGRY LOCAL GOVERNMENT AREA OF LAGOS STATE, NIGERIA

Nwali, Collins .S.¹, Ikuejawa, Igbekele .I.¹, Adepoju, Oladoyin A.¹ and Obasi, Friday .A²

Department of Agricultural Extension and Management,

Federal College of Agriculture Moor plantation, Ibadan, Oyo state, Nigeria¹

Institute of Agricultural Research and Training, Ibadan, Oyo state, Nigeria²

Corresponding author's Email: sunccollins@yahoo.com

ABSTRACT

The research is designed to examine the economic analysis of crayfish harvesting and Marketing in Badagry Local Government Area of Lagos state, Nigeria. Specifically, the study: examined the socio-economic characteristics of crayfish harvesters in the study area, identified the crayfish harvesting methods used in the study area, analyzed the Cost and Returns of crayfish marketing among harvesters in the study area and identified constraints of crayfish harvesting in the study area. The data for the study were collected through questionnaires and one hundred and twenty (120) respondents were used for the study. Data gathered from questionnaires were analyzed using descriptive and inferential statistics. Results revealed that majority of the respondents were male (74.2%) with average age of 51 years, 84.2% married, 84.1% have crayfish harvesting experience of above ten years, 51.7% had primary education, 70.2% were into crayfish fishing as their primary occupation and 81.6% had household size of 2-6. Also, majority (67%) of the respondents use drag net as fishing method in their harvesting. The result on Cost and Returns showed that ₦599,155 as their average gross margin with the Net Income (NI) of ₦96,705 and the Net Return on Investment as 0.15. Lack of storage facilities which has the highest mean (86.4) and ranked first is the major constraints of crayfish harvesters in the study area followed by insufficient capital to expand which ranked second and inadequate processing facilities that ranked third. The chi-square result shows that age, fishing experience and household size have significant relationship with the profitability of the crayfish Harvesters in the study area. The study therefore among others recommends that Fishers should form a cooperative society and create a larger group to acquire better storage and processing facilities so as to promote the harvesting and marketing of crayfish in the study area and in turn make more profit from their fishing activities in the study area.

Key Words: crayfish, economic analysis, profitability, harvesting

1.0 INTRODUCTION

Fish consumption is gaining wide prominence particularly in developing countries where 40% or more of their protein comes from fish (Amaefula *et al.*, 2010). This is because fish is more affordable, palatable and readily available than other sources of animal protein, less tough, more digestible and its acceptability cut across religion, ethnics and cultural boundaries (Ekeocha *et al.*, 2010). Crayfish is an important crustacean consumed all over the world and they are usually prepared for consumption by smoking, and occasionally preserved by sun-drying. It is also a common delicacy in the diet among the people of the Southern Western Nigeria (Babatunde, 2010). Crayfish is one of the aquatic animals and a dominant decapods in many freshwater and even terrestrial habitats playing important community roles through their mobility, behaviour and omnivory. Their main habitats are cool or warm high quality streams and lakes, warm lower quality wetlands, semi-terrestrial swamps and temporary wetlands (burrowers), and cave ecosystems (Reynolds *et al.*, 2013).

Crayfish may also be available at all the seasons, relatively cheap, affordable and suitable to supply adequate nutrients to cater for infants estimated daily nutrient requirements to eradicate protein energy malnutrition (PEM), in the developing countries (Joseph, 2011). It is a clean and very low carbohydrate food (Grace, 2010) and has a super healthy combination of nutrients from its almost pure form of protein to its healthy amount of omega-3 fatty acids which we now know are among the most beneficial fats we can eat (FAO, 2009). Meals containing crayfish play a great role in the development of humans in the world especially in the lives of people in the developing countries where other protein sources are grossly inadequate and comparatively costly. Experimentally, protein derived from crayfish and fish based diet is as good as that obtained from meat ((Bassey *et al.*, 2013). Consumption of crayfish together with products of plants origin which are poor in some amino acids such as lysine and thiamine enables not only a complete utilization of plant protein, but also improves the content of the diet (Ele, 2014).

According to the study carried out by Babatunde (2010), in Ago – egun, Ikorodu and along the Lagos lagoon beach, the market price of shrimps and prawn are high compared to meat or fish in the markets in the study area. During the study, while a kilogram of prawn was sold between ₦410 and ₦450, meat price averaged (₦300 - ₦350) and fish prices stood at ₦250 - ₦300 per kilogram. Thus weight of the prawn fetched more money (>30% greater i.e. ₦390.00) than fish. These high prices encourage regular and active macro-brachium crayfish fishing in Lagos lagoon.

Unfortunately, crayfish farmers in rural areas still adopt old ways of crayfish processing which are unhygienic and affect the quality of the crayfish through microbial contamination (Nieland, 2004). Also, some farmers lack experience in the modern and proper way/method of processing (Teitze, 2014). Those living in rural areas normally use the same facilities that were used before in processing because of lack of fund to afford a new one. Farmers most times lack the proper storage facilities to store their processed crayfish which may lead to spoilage of the product (Njie, 2002), deterioration of crayfish during processing, heavy loss and poor yield (Teitze, 2014). Aquaculture has been described as the fastest growing animal food-producing sector and to outpace population growth in the world (FAO, 2012). Unfortunately, crayfish are neglected compared to other aquatic animals because it is believed to yield low profit in terms of sales and it is usually called a poor man's business (Flake, 2007). The fishery sector (crayfish inclusive) is still characterized low output, high post-harvest losses and the marketing methods used by traditional/local farmers that involves spreading of crayfish on the floor using raffia bags is un-hygienic and leads to spoilage of crayfish (Basse et al., 2013).

Furthermore, based on the above fact, the broad objective of this study was to evaluate the Economic analysis of crayfish harvesting and marketing in badagry local government area of Lagos State, Nigeria. Specifically, the study: i. examined the socio-economic characteristics of crayfish harvesters in the study area; ii. identified the crayfish harvesting methods used in the study area; iii. analyzed the Cost and Returns of crayfish marketing among harvesters in the study area; iv. Identified constraints of crayfish harvesting in the study area

Ho=the null hypothesis of the study is that there is no significant relationship between crayfish harvesters' socio-economic characteristics and their profitability in the study area.

2.0 METHODOLOGY

2.1 Study Area

The study was conducted in Badagry Local Government Area of Lagos State. Badagry Area in Lagos Nigeria is endowed with lagoon system, delta distributaries, floodplains and mangrove swamps. It

lies within longitude 2°42'E and 3°42'E and stretches between Latitude 6°22'N and 6°42'N, sharing boundary with Republic of Benin. It directly connects with Nigeria's 960 km² of coastline bordering the Atlantic Ocean in the Gulf of Guinea, a maritime area of 46,500 km² with depth of up to 50m and an Exclusive Economic Zone of 210,900 km² (World Resources, 1990).

It is important for both artisanal and commercial fisheries, and as well as transportation, recreation and domestic purposes. It serves as a means of livelihood for many villagers, and fishers. The creek separates the mainland sedimentary basin of South-west Nigeria from the Atlantic coastline. The creek exhibits relatively high species richness, which might possibly be due to succession of species temporarily using the environment for feeding, spawning and shelter.

2.2 Data Collection

Primary data only were used for the study. Data were collected for the study using structured questionnaire that captures objectives of the study coupled with oral interview guide.

2.3 Sampling Procedure and Sample Size

The study used two-stage sampling procedure. In first stage, ten (10) villages namely :(Marina, Topo, Akarakumo, Ajido, Dado, Genme, Iworo, Moba, Agovi, Ropoju) were purposively selected out of the fifteen (15) villages due to the predominance number of crayfish harvesters in these villages in the Local Government Area. Similarly, in the second stage lists of registered crayfish harvesters were obtained from the village heads and from this list, 5% of the crayfish harvesters population of each village were randomly selected with Marina having 10 respondents, Topo having 10 respondents, Akarakumo having 15 respondents, Ajido having 10 respondents, Dado having 15 respondents, Genme having 10 respondents, Iworo having 15 respondents, Moba having 10 respondents, Agovi having 15 respondents and Ropoju having 10 respondents which make a total of 120 respondents that were used for the study.

2.4 Methods of Data Analysis

Descriptive statistics such as frequency counts, means, tables and percentage count were used to achieve objective I, ii and iii, while objective iv was achieved with gross margin analysis. Hypothesis was tested using Chi-square analysis to test the relationship between socio-economic characteristics and profitability of crayfish harvesting in the study area.

Gross Margin Analysis was used to find the profitability level of crayfish harvesting and marketing in the study area.

$GM = TR - TVC$

Where; $GM =$ Gross margin, $TR =$ Total Revenue, $TVC =$ Total Variable Cost

3.0 RESULTS AND DISCUSSIONS

3.1 Socio-economic Characteristics of the Respondent

Results in Table 1, shows that majority (80.8%) of the respondents were between the age ranges of 41 and 60 years with the average active age of 51 years. This implies that youths are are not much involved in the crayfish harvesting and marketing in the study area The result equally shows that majority (74.2%) of the respondent were male while 25.8% of the respondents were female. This implies that the crayfish harvesting and marketing in the area is male dominated. The result also shows that majority (84.2%) of the respondents are married and with majority married there may be family support in their crayfish fishing in the area. The result on education

shows that 19.2% of the respondents had no formal education, 51.7% had primary education while 29.2% of the respondents had secondary education. This signifies high level of illiteracy among the crayfish harvesters and marketers in the area. The result equally shows that both Christianity and Islam are 45.0% which implies that religion is not a barrier to the crayfish fishing in the area. The result also shows that majority (84.1%) have being in this harvesting and marketing of crayfish for 10 years and this implies that the crayfish harvesters in the study area are experienced. The result on primary occupation shows that majority (70.2%) of the respondents engage in crayfish harvesting and marketing as their main primary occupation

Table 1: Socio-economic characteristics of the respondents

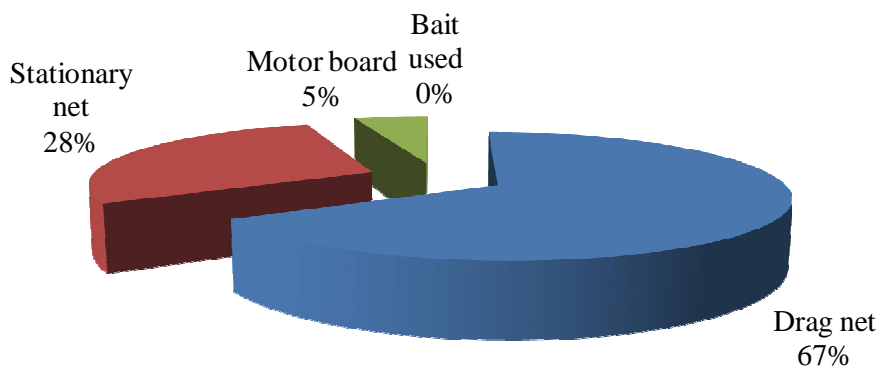
Variables	Frequency	%	mean
Age			
<20yrs	1	0.8	
21-40yrs	17	14.2	
41-60yrs	96	80	51
61 yrs and above	6	5.0	
Sex			
Male	89	74.2	
female	31	25.8	
Marital Status			
Married	101	84.2	
Single	3	2.5	
widowed	16	13.3	
Level of Education			
No formal	23	19.2	
Primary	62	51.7	8
Secondary	35	29.2	
Religion			
Christianity	54	45.0	
Islam	54	45.0	
Traditional	12	10.0	
Fishing experience			
<5yrs	3	2.5	
5-10yrs	16	13.4	7.5
>10yrs	101	84.1	
Primary occupation			
Crayfish Fishing	85	70.2	
Trading	33	27.5	
Civil servant	1	0.8	
Other Farming	1	0.8	
Household size			
2-6	98	81.6	4
7-11	22	19.0	

Source: Field survey, 2018.

3.2 Crayfish Harvesting Methods in the Study Area

Result in Figure 1, shows that majority (67%) of the respondents use drag net as fishing method, 28% use stationary net, while the least (5%) of the

respondents use motor board fishing method. 100% of the respondents do not use bait. This result implies that drag net is the dominant crayfish harvesting method in the study area.



3.3 Cost and Returns in Crayfish harvesting and marketing (Profitability)

Result in Table 2, shows the average total variable cost made up of the average cost of feeding, cost of labor, cost of fueling, cost of accessories, cost of

₦246,000. The revenue of the business is calculated from the quantity harvested and the price of crayfish sold which was at ₦702,900. ₦599,155 was their average gross margin with the Net Income (NI) of ₦96,705. The Net Return on Investment was 0.15,

Figure 1: percentage Distribution of Crayfish Harvesting Methods in the Study area (Author's design from the data extracted from field survey, 2018)

repairs and maintenance at ₦121,745. The average total fixed cost made up of the cost of boat, cost of net, cost of outboard motor engine was at ₦124,255. The grand total cost which is the addition of the total variable cost and the total fixed cost was at

which further establish the fact that crayfish fishing in the area is profitable. This agrees with Iwuchukwu *et al.*, (2017) that marketing of crayfish is a profitable venture.

Table 2: Average Cost and Returns in Crayfish Harvesting and Marketing

Cost Type	Average Cost (Naira)
Fuelling	33,170
Labour	12,580
Feeding	12,150
Accessories	42,695
Repairs and Maintenance	21,150
Total Variable Cost (TVC)	121,745
Boat	502,450
Net	163,000
Engine	93,450
Total Fixed Cost	124,255
Grand Total Cost (TVC + TFC)	246,000
Revenue	720,900
GM= TR - TVC	599,155
Net Income	96,705
NI = GM - TFC	
Net Return on Investment	0.15
NI/TC	

Source: field survey, 2018.

3.4 Constraints of Crayfish Harvesting and Marketing

Results in Table 3, showed that lack of storage facilities which has the highest mean (86.4) and ranked first is the major constraints of crayfish harvesters in the study area followed by insufficient capital to expand which ranked second and inadequate processing facilities that ranked third, while water/oil pollution which has the least mean

and ranked 10th is their lowest constraints. This result implies that adequate storage facilities and insufficient storage facilities to maintain or improve the quality of the product when they cannot be sold easily or immediately after harvest due to glut in the market or other reasons. Consequently, the harvester may find it difficult to market the good and where possible at reduced price probably lower than the cost price.

Table 3: Constraints to Crayfish Harvesting and Marketing

Variables	Very severe	Severe	Not severe	Mean	Rank
Theft	66(55.0)	24(20.0)	30(25.0)	78.0	4th
Inadequate Processing facilities	67(55.8)	28(23.3)	25(20.8)	78.1	3rd
Insufficient capital to expand	81(67.5)	22(18.3)	17(14.2)	82.3	2nd
Water weed	72(60)	21(17.5)	27(22.5)	61.0	8th
High cost of fishing gears	71(59.2)	27(22.5)	22(18.3)	62.1	7th
Lack/ insufficient storage facilities	48(40)	45(37.5)	26(21.7)	86.4	1st
Fluctuation in price of crayfish	27(22.5)	71(59.2)	22(18.3)	67.3	5th
Sea pirates	26(21.7)	88(73.3)	6(5.0)	53.6	9th
Weather fluctuations	83(69.2)	35(29.2)	2(1.7)	66.0	6th
Water/oil pollution	8(6.7)	31(25.8)	81(67.5)	52.3	10th

Source: Study field, 2018.

3.6 Relationship between the socio-economic characteristics and profitability level of crayfish harvesting

The result in Table 4 shows that there are significant relationship between age, harvesting experience and household size with profitability level of the crayfish harvesters in the study area.

Table 4: Chi-square on the relationship between the socio-economic characteristics and profitability level

Variables	Chi-Square	df	p-value	remarks
Age	0.002	6	0.041	S
harvesting experience	0.781	6	0.030	S
Household size	0.114	3	0.010	S

Source: Study field, 2018

S – Significant at 5% (P < 0.05)

4.0 Conclusion/Recommendations

The study concluded that crayfish harvesting and marketing is profitable venture in the study area with reference to the gross margin and other profitability indicators in this study. Also, the harvesters lack sufficient storage and processing facilities.

However, based on the findings of the study, the following recommendations were made:

1. Fishers should join to form a cooperative society and create a larger group to acquire better storage and processing facilities so as to promote the

harvesting and marketing of crayfish in the study area and in turn make more profit from their fishing activities in the study area.

2. Lack of capital to expand is one of the major constraints to the crayfish fisher as such, Financial institutions and government should make financial support available to the crayfish harvesters. This will encourage them to go on a large scale crayfish fishing in the study area.

3. Government and Nongovernmental organizations should introduce training on post-harvest and provide

the required post-harvest equipment and other related equipment to reduce the problems of Lack of storage facilities and Inadequate Processing facilities identified by the crayfish harvesters as one of their major constraints. Comments: There is no summary of this work. There is no conclusion done by the researcher.

REFERENCES

- Amaefula A Onyenwaku, C.E. and Asumugha G.N. (2010): Economic Efficiency of Fish production in Delta State, Nigeria. *The Nigerian Agricultural Journal* 41 (2): 39 - 42).
- Babatunde .E.E, (2010): First observation on Shrimp Fishery using Brackish water fern *Acrostichum aurem* traps in a Tropical Lagoon, South – Western Nigeria. Report and opinion 2010; 2(3): 111 – 115.ISSN: 1553 – 9873.
- Bassey, N.E, Aniekan, J . A, Ikpe, I. K, Udo, U. J. (2013). Analysis of the determinants of capital structure: evidence from unlisted Agro-based firms in Nigeria 2005-2010. *Agric. Sci.* 1(4):36-47.
- Ekeocha, C.A. Aghahiaka, L.A, Okereke, F.O and Nwankwo C.F. (2010): Status and Prospect of Fish Farming in Umuahia North Local Government Area, Abia State. Proceeding of 44th Annual Conference of Agricultural Society of Nigeria held at Ladoke Akintola University of Technology Ogbomosho, Oyo state pp488
- Ele, I.E and Nkang, M.O. (2014). Structure and efficiency of crayfish marketing in major markets in Calabar, Cross River State, Nigeria. *IOSR J. Bus. Manage.* 16:26-32. <http://iosrjournals.org/iosr-jbm/papers/Vol16-issue4/Version-4/D016442632.pdf>.
- Eyo, A.A (2001): *Fish Processing Technology in the Tropics*. Ilorin University Press. 403pp.
- FAO (2009): *FAO STAT Data Base: Agriculture Data for Food Balance Sheets*. <http://apps.Fao.Org./Page I>.
- Flake J (2007). Department of fisheries (Western Australia) State of Fisheries Report 2006/07: *Aquac. Reg. Res. Dev. Overview* pp. 244-247.
- Food and Agriculture Organization (FAO) (2012). *State of world aquaculture 2012*. FAO Fisheries Technical Paper No. 500, FAO, Rome, Italy pp. 1-134.
- Grace, N. (2010). *Crayfish Health Benefits: Health, knowledge, Natural food matters in Nigeria*. pp. 48-68. <http://www.gracengofoundation.org.ng/2015/09/crayfish-health-benefits.html>
- Iwuchukwu, J. C, Eke, J. N. and Udoye, C. E. (2017) *Practices of farmers in processing and marketing of crayfish in Akwa-Ibom State, Nigeria*. *African Journal of Agricultural research*, Vol.12 (44), pp.3169-3180, 2 November, 2017.
- Nieland AE (2004). *Poverty and small-scale fisheries in West Africa*. Kluwer Academic Publishers. P 66.
- Njie M (2002). *Fish distribution and constraints to the domestic fish trade in the Gambia*, Fisheries Department, Banjul, the Gambia. Paper presented at the National Workshop on links between artisanal fisheries and world markets – Banjul, The Gambia.
- Reynolds J, Souty-Grosset C, Richardson A (2013). *Ecological Roles of Crayfish in Freshwater and Terrestrial Habitats*. *Freshwater Crayfish* 19(2):197-218.
- Teitze U (2014). *Economic performance and fishing efficiency of marine capture fisheries*. FAO Fish. Tech. Pap. No. 482. FAO, Rome. P 68.
- World Resources Institute (1990) *World Resources (1990-1991)*, retrieved from <https://en.m.wikipedia.org> on 10th March, 2018.