



Profitability Analysis of Crayfish Marketing in South-South, Nigeria

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Abstract

This study analyzed the profitability of crayfish marketing in the South-South states of Nigeria. The specific objectives of the study include to: estimate the profitability of crayfish marketing; examine the factors influencing gross margin in crayfish marketing; and describing the constraints to crayfish marketing in the study area. A well-structured questionnaire was used to collect data from (120) respondents through multi-stage sampling techniques. Data were analyzed using gross margin formulae, an ordinary least square model and a four-point likert type rating scale. The result showed that the total gross margin realized by crayfish marketers was N2,748,650 in the study area. The major factors influencing the gross margin of crayfish marketers were age, marketing experience, market levy, labour cost and shop rent. The marketers adjudged unstable prices, high cost of crayfish, too many middlemen, scarcity of fish, transportation and inadequate storage facilities as major constraints to crayfish marketing in the study area. Young people should be encouraged to go into crayfish marketing as this will reduce unemployment in the country while the involvement of too many middlemen in the crayfish marketing chain should be discouraged so as to increase the profitability of crayfish marketers in the study area.

Keywords: Profitability, Crayfish, Marketing, Constraints

Introduction

Crayfish are an important component of the stream ecosystem. They are significant links in the complex aquatic and terrestrial food webs in the ecosystem and by their feeding, burrowing and foraging activities, they help to maintain a high level of water quality in our streams which has great benefit to human lives (Reynolds, Souty-Grosset & Richardson, 2013). Most crayfish produced are sold to the food industry, and although some are sold for recreational fish bait, a small portion is marketed to the aquarium trade and to educators, who use it as study specimens (Ogbonna, 2013). Although in most parts of the world, crayfish are sold alive and eaten fresh/boiled but in Nigeria, they are usually smoked and occasionally sun-dried to form an indispensable food item in the diet of the entire Southern States in particular and Nigeria as a whole. It is noteworthy that all animals that are fully aquatic and can live only in water and not out of the water are all lawful and permissible to consume without cultural, traditional or religious barriers. This includes fish, sea crab, lobster, crayfish, shrimp, sharks squids etc. (Mufti, 2016). Since animal protein sources such as beef, chicken, snails, and mutton are presently beyond the reach of the average Nigerian household, many people now settle for

seafood products such as fish and crayfish as cheap sources of animal protein (Esheya, 2021a).

Crayfish is known to have a super combination of nutrients such as vitamin B6 and B12, fat soluble vitamins (vitamins A,D,E& K), phosphorus, zinc, iron, calcium, magnesium, sodium and other macro-nutrients (Udoh, 1997). Sodium and Potassium which are vital nutrients in crayfish play the role of maintaining and balancing the body's fluid, helping the blood vessels to relax and maintain normal pressure. It is a good source of easily digestible protein with low fat. It is a high-quality protein source because it contains all nine essential amino acids and also contains fatty acids (omega-3 and omega-12). The presence of omega-3 in crayfish aid in promoting cognitive function and helps in promoting eyesight by decreasing the risks of loss of vision and developing the overall body system. Crayfish is more easily digested than any other type of meat due to its short muscle fibre (Teitz, 2014). Crayfish, just like fishes are eaten worldwide (Adamu and Esheya, 2022). It has no toxic residue as it is sensitive to polluted water. Crayfish contains a good amount of iodine. We cannot list the benefits of crayfish without mentioning iodine; the seafood is rich in iodine and plays a major role in the

proper functioning of the thyroid gland. Excess intake of iodine-rich food can cause the thyroid to inflame and might even lead to cancer while its deficiency leads to goiter. The iodine present in crayfish helps in increasing the level of energy in the body and also of a great help in maintaining the body's immune system (Adamu, Esheya, & Tanko, 2021).

Agricultural marketing covers the services involved in moving an agricultural product from the farm to the consumer. It involves all stages of operations which aid the movement of products from the farms to the consumers (Esheya, 2021b). The stages include assembling of goods, storages, transportation, processing, grading, packaging and financing these activities (Amusa, & Esheya, 2022). Crayfish trading in the South-South states of Nigeria has provided business and economic activities for the fishermen of the coastal region where crayfish is found and also crayfish dealers as well as consumers of crayfish (Agwumba, 2009). Most people in the country today, including fishermen from South-South states of Nigeria engage in the production and marketing of crayfish and related ventures owing to its high profitability and as a common means of livelihood (Esheya, Okoye & Nweze, 2022).

Since crayfish aquaculture is not common and crayfish are harvested from aquatic environment, it is available in areas close to the coast, therefore leading to scarcity and high price in areas further away from the coast. Thus, there is need to strike a balance between production, marketing and consumption of crayfish (Akenbor & Esheya, 2022). However, majority of the crayfish marketers might not be aware of the profitability in crayfish marketing and factors that influence the profitability of crayfish marketing in the South-South states of Nigeria. Thus, this study was undertaken to bridge this information gap. The general objective of this research is to analyse the profitability of crayfish marketing in the South-South zone of Nigeria. The specific objectives were to: estimate the profitability of crayfish marketing; examine the factors influencing the profitability of crayfish marketers; and describe the constraints faced by crayfish marketers in the study area.

Research Methodology

Study Area

This study was carried out in the South-South Zone of Nigeria comprising Akwa Ibom, Bayelsa, Cross River, Delta, Edo and Rivers States. South-south Nigeria is located between latitude 6.2059° N¹ and longitude 6.6959° E. This zone is located in the rainforest belt and has 2 distinct seasons namely –the long rainy and short dry seasons. The annual precipitation ranges between 2000 –3000 mm per annum. This rainfall regime received in most parts of the zone support farming all year round (Ubokudom, Esheya, & Udioko, 2021).

Sampling Techniques

Specifically, four States (Akwa Ibom, Cross River, Delta and Rivers) from the zone were purposively

selected for this study because of high concentration of crayfish production and marketing activities among the majority of the people in the areas. Three major crayfish markets were selected from Akwa Ibom, Cross River, Delta and Rivers states respectively. This gave a total of twelve (12) major crayfish markets in the study area. Multi-stage random sampling technique was used in selecting the respondents. Ten (10) major crayfish marketers were randomly selected from each market to obtain a sample size of one hundred and twenty (120) respondents for this study.

Data Analyses and Model Specification

Both descriptive and inferential statistical tools were used for data analysis and interpretation. Objective (i) was analysed using gross margin formulae given:

$$GM = TR - TVC$$

Where TR is Total Revenue and TVC is Total Variable Cost.

The ordinary Least Square Model was used to examine the factors influencing the profitability of crayfish marketing as stated in objective (ii). The implicit form of the model is presented thus:

$$Y = f(x_1, \dots, x_n, e)$$

Where

Y = Profit margin

(X₁, X_n) = Explanatory variables

e = Error term

The above was utilized explicitly through experimentation with linear functional form:

$$\text{Linear function: } Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + e$$

Where

Y = Profit margin

X₁ = Age of respondents (years)

X₂ = Household Size (number)

X₃ = Marketing Experience (years)

X₄ = Educational Level (years)

X₅ = Access to Credit (Dummy, 1=Yes, 0=No)

X₆ = Market Levy (Naira)

X₇ = Labour Cost (Naira)

X₈ = Shop Rent (Naira)

e = Error term

Four-point Likert scale was employed to describe the constraints faced by crayfish marketers in the study area as stated in objective (iii).

Results and Discussion

Gross Margin Analysis of Crayfish Marketing

The estimated gross margin of crayfish marketing is presented in Table 1. The Table revealed the gross margin of crayfish marketers in the study area. The crayfish marketers in Akwa Ibom markets realized a gross margin of N658,450, crayfish marketers in Cross River markets realized a gross margin of ₦820,000, crayfish marketers in Delta markets realized a gross margin of ₦657,300 while crayfish marketers in Rivers market realized a gross margin of ₦612,900. The result

indicates the crayfish marketers were making a reasonable profit on sales while keeping overhead costs in control. The result also shows that crayfish marketers in Cross River markets were making more gross profit margin due to the fact that some crayfish marketers pay little or no rent as most of them acquire what they can sell in a day and buy another the next day. It also implied that the marketers in Cross River who invested more money in crayfish marketing were likely to realize more profits due to the scale of their marketing business, they tend to get discounts on the market levies charged on their goods. Crayfish marketers in Cross River markets also incurred low expenses in terms of loading and off-loading of goods which boosted their gross profit margin.

Factors Influencing Gross Margin of Crayfish Marketers in the Study Area

The multiple regression analysis was used to predict the effects of socioeconomic factors on gross margin realized by crayfish marketers in the study area. The independent variables were age, household size, marketing experience, educational level, access to credit, market levy, labour cost and shop rent. The data on gross margin and socioeconomic factors were fitted to the linear functional form. The R-square tests for the OLS estimation showed that about 94.4% of the variation in the gross margin of crayfish marketers was attributed to the specified explanatory variables. Hence, the remaining (5.6%) was due to random disturbance. The F – statistic was significant at a 5% probability level, denoting that the estimated R– square was significant and by implication, the estimated equation had the goodness of fit. The result as shown in Table 2 shows that out of the eight predictors included in the model, five (age, marketing experience, market levy, labour cost and shop rent) had significant influences on gross margin, while others household size, educational level and access to credit were not significant. The coefficient of age was significant at (1%) level and negatively related to gross margin. This result is in line with *a priori* expectation, that older marketers were not likely to realize higher gross margin. This could be a result of the tedious marketing activities involved in the business which includes going to the water banks, transporting the crayfish and its marketing processes. It otherwise meant that young marketers were likely to earn more gross margin in crayfish marketing. The result disagrees with the findings of Kotler (2000) in the study “Comparative analysis of crayfish marketing in selected markets of Akwa Ibom and Abia States, Nigeria”, who reported that crayfish marketers increase marketing efficiency and profitability as their age increases due to the ease to adjust to a change in the marketing system. The coefficient of marketing experience was positive and statistically significant at (10%) level. This implied that the higher the marketing experience gained by the marketers, the higher their gross margin. This result is in line with *a priori* expectation of a positive relationship between gross margin and marketing experience. Crayfish marketers with ample experience would know the best marketing strategies to improve sales while

minimizing costs during operations in order to make more gross profit margin. The result is in line with the findings of Kainga (2013); and Olukosi and Isitor (2005) who separately reported that years of experience of fruit vegetable marketers was positively related to the net incomes of the marketers. The coefficient of the market levy was positive and statistically significant at (5%) level. This implied that the higher the market levy incurred by the marketers, the higher their gross margin. This result is contrary to *a priori* expectation of a negative relationship between gross margin and market levy. However, it also implied that the marketers who were charged more money as market levy in the crayfish marketing link were likely to realize less profits because of the greater expenses they have incurred through the payment of the exorbitant market levy. The result corresponds with the findings of Okeke and Nwankwo (2020) in a study that reported that the higher the marketing cost (market levy) incurred by the marketers, the lower their net marketing income. The coefficient of labour cost was significant at (1%) level and negatively related to gross margin. This result is in line with *a priori* expectation, which as labour cost incurred during marketing operations increases, the gross margin of the marketer's decreases. Due to the high cost of labour, crayfish marketers would not be able to make a high gross margin from sales. The result is contrary to the findings of Ele, and Nkang, (2014) on a study that reported that an increase in the cost of labour hired will increase the revenue. The coefficient of shop rent was significant at (10%) level and negatively related to gross margin. This result is in line with *a priori* expectation, that as more expenses are incurred on shop rents by marketers, it tends to reduce the volume of gross margin to be realized from the business. Shop rent is a marketing cost, the findings correspond with the result of Ugwumba and Okoh (2010) study which reported a negative and significant relationship between marketing cost and catfish marketing income.

Constraints Faced by Crayfish Marketers in the Study Area

Table 3 showed the constraints to the marketing of crayfish in the study area. Out of the several constraints identified, seasonality of the product (94.4%), marketing charges (92.2%) and too many middlemen (91%) ranked 1st, 2nd and 3rd respectively. Four marketing channels were identified (crayfish farmers or harvesters, wholesalers, retailers and consumers). This agrees with Esheya (2022) where the marketing constraint like high marketing charges was a peculiar constraint among marketers of agricultural products. This could be connected to the fact that the marketers travel long distances and rural areas to purchase the commodity coupled with the bad road networks. Seasonality of the product, presence of too many middlemen, high cost of crayfish, scarcity of crayfish, high transportation cost and inadequate storage facilities were common constraints to both the wholesalers and retailers.

Conclusion

Crayfish marketing in the study area proved a profitable

enterprise given the positive values of the gross profit margin. Age, labour cost and shop rent had a negative significant impact on gross margin while market levy and marketing experience had a positive significant impact on gross margin of crayfish marketers in the study area. The major challenges faced by the crayfish marketers were unstable prices, high cost of crayfish, too many middlemen, scarcity of fish, high transportation cost, and inadequate storage facilities. Thus, young people should be encouraged to go into crayfish marketing as this will reduce unemployment in the country. Based on the findings of the study, age had a negative impact on gross margin, hence, the youth should be encouraged to invest in crayfish marketing as they would have the energy to carry out activities involved in the business at ease thereby making more profits. Government should improve rural road construction in the study area in order to reduce the high cost of transportation which has a negative effect on the profitability of crayfish marketing. The marketers through their unions should reduce the number of middlemen which would give the marketers a better chance of making more gross profit margin, this could be done by ensuring that anyone who participates in crayfish marketing belongs to the union.

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Table 1: Estimated Margins of Crayfish Marketers in the Study Area

Variables	Pooled Data	Akwabom Markets	CrossRiver Markets	Delta Markets	Rivers Markets
Total Revenue (₦)	9,899,000	3,280,000	2,746,000	2,010,000	1,863,000
Variable Cost (₦)					
Cost of crayfish	5,759,750	2,117,250	1,625,000	1,027,500	990,000
Transport cost	257,600	106,500	51,000	52,700	47,400
Cost of packaging	317,100	92,100	74,500	89,300	61,200
Storage/Security levy	13,000	11,000	1,000	-	1,000
Feeding cost on business	53,700	13,000	3,000	11,500	26,200
Market levy	74,000	33,000	14,500	11,200	15,300
Shop rent	136,500	38,000	18,000	35,500	45,000
Labour cost	219,700	98,200	35,000	57,500	29,000
Cost of loading and offloading	227,400	114,500	10,400	67,500	35,000
Gift	3000	3000	-	-	-
TVC	7,150,250	2,621,550	1,926,000	1,352,700	1,250,000
Gross Margin (₦) (GM = TR - TVC)	2,748,650	658,450	820,000	657,300	612,900

Source: Computed from field survey data, 2022.\

Table 2: Estimated Determinants of Gross Margin Realized by Crayfish Marketers

	Coefficient	Std. Error	t-ratio	p-value
Const	443323	58623.5	7.562	0.0016***
Age	-7919.39	1316.31	-6.016	0.0038***
Household Size	-1064.92	3899.91	-0.2731	0.7983
Marketing Experience	3072.90	1246.91	2.464	0.0694*
Educational level	1289.87	1683.20	0.7663	0.4862
Access to credit	-16887.3	17284.9	-0.9770	0.3839
Market levy	21.5724	7.09731	3.040	0.0384**
Labour cost	-33.2325	6.25752	-5.311	0.0060***
Shop rent	-14.2459	6.20448	-2.296	0.0833*
Diagnostic Statistics				
R-squared	0.944871	Adjusted R-squared	0.834613	
F(8, 4)	8.569641	P-value(F)	0.027178	

Source: Field survey, 2022

Table 3: Constraints militating against Marketing of Nsukka Yellow Pepper

Constraints	Responses		Rank
	*Freq.	%	
Too many middlemen	82	91	3 rd
Seasonality of the product	85	94.4	1 st
High transportation cost	72	80	6 th
Marketing Charges	83	92.2	2 nd
Unstable prices	68	75.5	7 th
Inadequate storage facilities	66	73.2	8 th
High cost of crayfish	78	86.6	4 th
Scarcity of crayfish	74	82.2	5 th

*Multiple responses

Source: Field Survey, 2021