COMPARATIVE ANALYSIS OF CRAYFISH MARKETING IN SELECTED MARKETS OF AKWA IBOM AND ABIA STATES, NIGERIA

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ABSTRACT
The study was on comparative analysis of crayfish marketing in some selected markets of Akwa Ibom and Abia states of Nigeria. It specifically looked at market integration, costs and return, marketing margin, marketing efficiency and factors influencing marketing efficiency in both states. Data were collected from 60 respondents (30 from each state). Data analyses were carried out with the use of such statistical tools like bivirate analysis, efficiency ratio, marketing margin and regression analysis. The results show that selling and purchasing prices had weak correlation between the markets in Akwa Ibom and Abia states, implying low level of market integration. Costs and return analysis showed a net return of N 16, 816.42 and N 35, 734, 50 for Akwa Ibom and Abia states respectively. This implies that crayfish marketing is more profitable in Abia state. Marketing margin in Akwa Ibom and Abia state was 9.58 and 15.01 respectively, while the marketing efficiency was 8.29 and 13.31 respectively in the states. The results call for policies aimed at provision of infrastructural facilities to reduce transportation cost and marketers encouraged to increase the level of crayfish marketing because it is lucrative, thereby meeting up with the increasing demand for protein.

Keywords: Comparative Analysis, Crayfish, Marketing, Market Integration

INTRODUCTION
Recently, the price of animal protein has been on the increase, causing people with average income to settle for cheap sources of protein like crayfish and fish and this has caused a high demand for crayfish among the populace. Crayfish also known as crawfish or crawdad are freshwater crustaceans resembling small lobsters. Taxonomically, they are members of the supper families Astacoideae and parastacoideae. Crayfish is known to have super combination of nutrients; it is a good source of easily digestible protein with low fat. It is a high quality protein source because it contains all the nine essential amino acids and also contains essential fatty acid (omega – 3 and omega – 6), boiled crayfish contain many essential minerals and vitamins. Crayfish meat is easily digested than other types of meat due to its short muscle fibre (Trapper, 2001). Crayfish are eaten worldwide; it has no toxic residue as it is sensitive to polluted water;

Most crayfish produced are sold to the food industry, although some are sold for recreational fish bait, a small portion is marketed to the aquarium trade and to educators, who use it as a study specimen (Nsetip, 1995). Although in most parts of the world, crayfish are sold alive and eaten fresh boiled, in Nigeria, they are usually smoked and occasionally sundried to form an indispensable food item in the diet of the people of the entire Southern States in particular and Nigeria as a whole. Since animal protein sources such as beef, mutton and chicken are presently beyond the reach of an average Nigerian, many people now settle for sea food products such as fish and crayfish as cheap sources of animal protein.

The demand for crayfish globally and particularly in Nigeria has been on the increase with the supply not meeting up with the demand (FAO, 2004). It is estimated that about 12,000 metric tonnes of crayfish is produced annually in Nigeria and although the artificial rearing and production of crayfish in Nigeria is not common compare to the production of fish, processing and marketing of crayfish is gaining ground because of the seasonality of supply with the peak harvest occurring

from March through June (Robert et al. 2005). Thus, there is need to strike a balance between production and consumption of crayfish. One of the ways of doing this is by improving the marketing system, since production and marketing work together. (Mendoza and Rosegrant, 1995).

Agricultural marketing plays great role in the economy. It is the performance of all business activities that transfer the flow or direct flow of goods from producers to consumers with the mind of accomplishing producer's objectives (Olukosi and Isitor, 2005, Gabre, 2001). Production is not complete until the finished goods get to the hands of the final consumer [Robert and Brewer, 2003]. Marketing of crayfish passes through various market participant and exchange of crayfish point before they reach the final consumers [Ali et al, 2008]. The longer the chain of people involve in a marketing process, the more the costs incurred.

The concept of comparative analysis mean the item-by-item comparison of two or more comparable alternative, processes, product, qualification, set of data, system or the like. It is the side by side examination of two or more alternative, processes, products, qualification sets of data, system, etc to determine if they have enough common ground, equivalence or similarities (Business dictionary, 2013). Modern day social science considers comparative analysis essential to most types of research (Robert and Brewer, 2003). In marketing, it is the analysis of the value of goods and services by taking only a very few market indicators such as price per unit kg of goods and then extra piloting to the goods under analysis. This does not constitute appraisal, but may give prospective sellers as basis for setting a sales price for listing purposes, guides to create better marketing channel and efficiency and also guides marketers on areas which the marketing of crayfish is more profitable and viable. Marketing margin and profit range accruable to the market participants gives an indication of market performance (Robert and Brewer, *ibid*).

However, despite the fact that crayfish product is one of the major food condiments in Nigerian cooking, fluctuation in price occasioned by seasonality nature of crayfish production coupled with lack of processing/storage facilities have continued to make the price of crayfish to be high during off-seasons and lower price in the season of high supply with its attendant effect on poor market performance (Ali et al., 2008). Since crayfish aquaculture is not common and production of crayfish is mainly by nature, crayfish is only available in areas close to the coast, thus, causing scarcity and high price in areas further away from the coast. The objective of the study is to analyze and compare crayfish marketing in some selected markets of Akwa Ibom and Abia States of Nigeria

METHODOLOGY

The study was carried out in Akwa Ibom and Abia States of Nigeria. Akwa Ibom State is located in the coastal Southern part of the Country. The State lies between latitude 4^0321' and 5^0331' north and longitude 7^0251 and 8^0251' east. The State is bounded on the south by Atlantic Ocean. The State covers the total land area of $8{,}421_{sq}$.km and a shoreline of 129km long, with a population of 3.9million. Abia State lies within latitude 4^040' and 6^014' north and longitude 7^010' and 8^0 east. The State covers a total land of $5{,}243.7_{sq}$km and has a total population of 2.8million. Based on the tropical location of Abia State, the climate is generally humid with abundant rainfall, good sunshine. Crayfish is a core of Nigerian cooking. Akwa Ibom and Abia States are two Niger delta states with the supply of crayfish from Akwa Ibom which is closer to the coast. Multi-stage sampling technique was adopted in selection of three markets each from the two states followed by selection of sixty crayfish marketers comprising thirty respondents from each state. Data was collected from primary source using a well-structured questionnaire. The questionnaire was administered on the crayfish marketers in order to elicit information that touches every aspect of crayfish marketing.

In testing pricing efficiency, the bivariate correlation coefficients between prices for crayfish in the spatially separated markets were computed following the pattern of Trotter (1992). Mendoza and

Rosegrant (1995) and Diakosavvas (1995). Bivariate correlation still remains a useful starting point for testing integration of spatially integrated markets and remains the most commonly used approach in agricultural marketing (Dahlgran and Blank, 1992).

This model is specified generally as:

Pij, Pik	…	…	…	Pim
P2j, $P2_K$	…	…	…	P2m
Pnj, Pnk	…	…	…	Pnm …… (1)

where

Pi = average price in period i

J = 1… m = location of the market

A more simplified form of the above equation can be re-written as:

$$Pij = bo + bi\ Pik + e \quad \ldots\ldots (2)$$

where

Pij = price series of market j;

Pik = price series of market k;

bo.bi =coefficients, e = error term

This equation is estimated for crayfish markets. The closer is bi to unity, the more spatially integrated the crayfish market. The size of this coefficient and its significance shows the level of the inter-market dependence.

Testing hypothesized pricing behavior

Based on the equation, behavioral pricing relationships were tested:

Hypothesis 1: Market independence

$H_0 : {}_{Bo} = 0$

Hypothesis II: Perfect and Cooperative Pricing

$H_0: B_o = +0.99$

In the first hypothesis, pricing in market j do not affect prices in market k, accepting this hypothesis suggests that crayfish traders exercises a form of spatial price discrimination. The alternative hypothesis is that some negative or positive correlation exists. Hypothesis II indicates an organized, collusive pricing arrangement between crayfish marketing strategy in maintaining secured share in the market (Mendoza and Rosegrant, 1995). It is customary, following other studies, to use a level of greater than +0.9 as evidence of strong association and by implication the region of acceptance of spatial integration.

Marketing efficiency

Marketing efficiency is the movement of goods from producers to consumers at the lowest cost relative to the provision of services that consumers are willing and able to pay for (Olukosi and Isitor, 2005). In agriculture, market efficiency is used to examine market performance. It is of great important, since marketing function crate utility. The output of marketing is consumer's satisfaction while the inputs of marketing are all the components incurred during the process. It can also be defined as the maximization of the ratio of output to input. Index by Olukosi and Isitor, (2005) was used and is given as:

$$\text{Marketing efficiency (M.E)} \frac{\text{value added by marketing}}{\text{Total cost of marketing services}} X \frac{100}{1} \quad \ldots\ldots (3)$$

Or

$$M.E = \frac{TRM - TCM}{TCM} X \frac{100}{1} \quad \ldots\ldots (4)$$

Where
Value added by marketing is the net revenue = total revenue from marketing (TR) – total cost of marketing (TCM) i.e cost of marketing services is the total cost incurred during marketing.

Marketing margin [mm] is given as:

$$Mm = \frac{\text{selling price – supplying price}}{\text{Selling price}} \times \frac{100}{1} \quad \text{..... (5)}$$

The factors influencing marketing efficiency of crayfish was analyzed using regression analysis.
The regression model is written as follows:

$$Y = [x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, U] \text{ ---------- (6)}$$

Where Y = marketing efficiency [in Percentage]
X_1 = Age of marketers [in Years]
X_2 = Marital status
X_3 = Household size
X_4 = level of education [in Years]
X_5 = years of experience in crayfish marketing [in years]
X_6 = quantity bought per trip [in bags]
X_7 = Transportation costs [in Naira]
X_8 = Purchase price [in Naira]
X_9 = Selling price [Naira]
U = error term

RESULTS AND DISCUSSION

Pricing Efficiency of Crayfish Markets in Abia and Akwa-Ibom States

The results in Table 1 show a matrix of correlation coefficients for crayfish prices in Abia and AkwaIbom. The essence is to determine how well information on prices in markets is communicated between these states and how freely the traders move between the markets (Asumugha, 1999 and Asumugha et al, 2007). The results show that selling and purchasing prices had weak correlation between the markets, implying low level of market integration.

Table 1: Bivariate Correlation coefficients for Prices of crayfish between markets in Abia and AkwaIbom States, Nigeria

	Purchasing Price(AkwaIbom)	**Selling Price (AkwaIbom)**	**Purchasing Price (Abia)**	**Selling Price (Abia)**
Purchasing Price(AkwaIbom)	1.0000			
Selling Price (AkwaIbom)	0.9442	1.0000		
Purchasing Price (Abia)	**0.0408**	-0.0563	1.0000	
Selling Price (Abia)	0.0452	**-0.0371**	0.9853	1.0000

r > 0.8 = strong correlation
r 0.6-0.8 = moderate correlation
r < 0.6 = weak correlation

Costs and Return, Marketing margin and Marketing Efficiency of crayfish marketing

The results in Table 2 show the result of costs and return, marketing margin, marketing efficiency and net return from crayfish marketing. As indicated in the table, crayfish marketing in both states are profitable and efficient, although in Abia state it is more profitable and more efficient than in Akwa Ibom. This could be as a result of value addition in form of place utility which tends to attract higher price differential when compared to the point of production where there is excess supply**.**

Although, marketing margin in Abia state (15.01) is higher than that of Akwa Ibom state (9.58), both are acceptable because they are both between 5% and 10% which is the standard for storage and perishable goods (Olukosi and Isitor, 2005).

Table 3: Costs and Return, Marketing Margin and Efficiency of Crayfish Marketing in Akwa Ibom and Abia State

Items	**Akwa Ibom Value**	**Abia Value**
Quantity (bag)	8	10
Purchasing Price/bag	25,066.67	26,450.00
Total Purchasing Price	200,533.33	264,500.00
Transportation Cost	562.67	1,697.50
Loading	781.67	1,078.00
Storage	1,058	1,195.00
Total Costs	2,402.34	3,970.50
Selling Price	27,469.01	30,420.50
Total Selling Price	219,752.08	304,205.00
Marketing Margin	**9.58**	**15.01**
Marketing Efficiency	**8.29**	**13.31**
Net Return	**16,816.42**	**35,734.50**

Source: Field Survey, 2014

Factors Influencing Marketing Efficiency of Crayfish Marketing in the study areas

Table 3 shows the multiple regression estimates of factors influencing marketing efficiency of crayfish marketing. It was obvious from the Table that the semi-log functional forms gave the best fit for Akwa Ibom and linear for Abia State with R^2 values of 0.99 and 0.92 respectively showing strong relationship between the endogenous variables and the exogenous variables. The F-value in table 3 was 853.18 and 26.71 respectively. These values were significant at 1% indicating that the model gave a best fit to the data.

Table 3: Regression Estimates of Factors Influencing Marketing Efficiency of Crayfish Marketing in the Study Areas

Variable	Akwa-Ibom (Semi-log+)	Abia (Linear)
Constant	14.07 (-5.12)***	7.12 (2.82)**
Age(X_1)	0.5 (2.46)*	-0.09 (-0.08)
Marital Status (X_2)	-0.01(-0.68)	0.10 (1.25)
Educational Level (X_3)	-0.01(0.91)	0.13 (1.88)*
Household Size (X_4)	-0.01(-0.05)	0.08 (0.89)
Experience (X_5)	-0.02 (-1.93)*	-0.01(-0.04)
Quantity Bought (X_6)	-0.03 (-1.98))*	0.11(1.94)*
Transportation (X_7)	-0.22 (-12.52)***	-0.43(-6.23)***
Purchase Price (X_8)	-8.36 (-58.51)***	-3.86 (8.74)***
Selling Price (X_9)	7.85 (55.80)***	3.47 (7.95)***
R^2	0.99	0.92
R^{-2}	0.97	0.88
F-Ratio	853***	26.71***

Source: Field Survey, 2014

The results of the table 3 shows that six exogenous variables out of nine tested were significant. The variables are age, years of experience, quantity bought transport, purchase price, selling price for Akwa Ibom marketers and educational level, quantity bought, transportation, purchase and selling price for Abia State. Years of experience and quantity bought were significant at 10% level and negatively related to marketing efficiency. The negative coefficient of experience (-1.93) and

quantity bought (-1.98) implies that change in years of experience is inversely proportional to the change in marketing efficiency. This implies that the more experience a crayfish marketers have, the less efficient the marketing of crayfish will be. This could be because the more experience the marketers have, the more knowledge they would have where the produce could be purchased at a better price. This knowledge will help attract a higher margin to them. The follows Oyekale and Jaiyebo (2003). Also, the quantity of crayfish bought is negatively related to marketing efficiency of Akwa Ibom crayfish marketers but positive at 10% level of probability for Abia.

The coefficient of age was positively related and significant at 10% for Akwa Ibom marketers. This implies that as age increases, the marketing efficiency of the crayfish marketers will also increase. This implies that there is available physical energy and, ease to adjust to change in the marketing system. According to (Mabawonku et al, 1984), the age of marketers could influence his/her marketing decisions or performance. Transportation cost, purchase and selling price were statistically significant at 1% level. Transport cost for Akwa Ibom and Abia State were inversely related to the marketing efficiency. This implies that an increase in transport cost will lead to a decrease in marketing efficiency. This could be influenced by the distance between the source of supply and the market, extortion of drivers by police at check points and produce inspectors and the poor road network.

Purchase price was negatively related to the marketing efficiency. This implies also that as the price of crayfish increases, the marketing efficiency of the crayfish marketers decreases. The coefficient of selling price is directly related to the marketing efficiency at 1% level of significant. This implies that as selling price of crayfish increases, the marketing efficiency of the crayfish marketers also increases and vice versa. When farmers are selling more products at a higher price, they are better off (Evan, 2004). When the quantity of a commodity supplied increases and the price increase, production become more efficient (Asumugha et al, 2007).

The Level of education was significant at 10% and positively significant to marketing efficiency with respect to crayfish marketers in Abia State. This implies that an increase in level of education will lead to an increase in marketing efficiency of crayfish marketing. According to Asumugha et al (2007), the educated marketers are in position for better investment and rational for increased income compared to uneducated ones.

CONCLUSION

The study did a comparative analysis of crayfish marketing in some selected markets of Akwa Ibom and Abia States of Nigeria. It specifically looked at the pricing systems in the areas to ascertain how integrated the markets are, estimated marketing margin, marketing efficiency and factors influencing marketing efficiency of crayfish marketers in Akwa Ibom and Abia States. Selling and purchasing prices had weak correlation between the markets, implying low level of market integration; crayfish marketing is inefficient; although better in Abia than Akwa Ibom. However, crayfish marketing in both states is viable since the net returns are positive. The marketing margins are normal and acceptable. Age, years of experience, quantity bought, transport, purchase price and selling price were significant factors influencing marketing efficiency of crayfish in Akwa Ibom state. While level of education, quantity bought, transport, and purchase price and selling price are factors influencing marketing efficiency of crayfish in Abia state. The results call for provision of institutional and infrastructural facilities for increased access to the market at reduced transaction costs.

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