



DETERMINANTS OF CRAYFISH MARKETING PROFITABILITY BETWEEN DOWNSTREAM AND UPSTREAM MARKETS IN AKWA IBOM STATE, NIGERIA

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ABSTRACT

The study comparatively analyzed crayfish marketing across selected markets in Akwa Ibom State. The objectives of the study were to: estimate the factors influencing gross margin of crayfish marketing and identify constraints militating against crayfish marketing in the study area. Multistage sampling was employed to select one hundred respondents for the study. Data elicited using a well-structured questionnaire were analyzed using ordinary least square (OLS) regression, Gross Margin Analysis and means score. The regression results showed that upstream profitability is primarily determined by storage cost (1% level of probability), rents (10% level of probability), experience (10% level of probability), sex (5% level of probability), marital status (5% level of probability), and access to credit (5% level of probability) while downstream profitability is driven by scale (Stocks at 1% level of probability) and logistical efficiency (Transportation Cost at 1% level of probability). Based on constraints militating against crayfish marketing, the result showed that high cost of crayfish ($\bar{x}=3.12$) ranked 1st, high cost of transportation ($\bar{x}=2.84$) ranked 2nd, supply chain instability ($\bar{x}=2.80$) ranked 3rd, and poor market infrastructure ($\bar{x}=2.78$) ranked 4th were the severe constraints for upstream marketers. On the other hand, high cost of transportation ($\bar{x}=2.88$) ranked 1st, high cost of crayfish ($\bar{x}=2.74$) ranked 2nd, price fluctuation ($\bar{x}=2.64$) ranked 3rd were the severe constraints for downstream marketers. Crayfish marketing in Akwa Ibom State, Nigeria dominated by female gender proved a more profitable enterprise at the upstream market given the positive values of the gross margin on investment. The upstream marketers gained more profit than the downstream marketers in the business. The study recommends that; credit and subsidies should be directed toward improving post-harvest handling and storage facilities at the primary landing sites.

Keywords: Marketing, Profitability, Upstream, Downstream and Market

INTRODUCTION

Crayfish which are freshwater lobsters found in a range of freshwater are famous for their adaptability, ecological importance, and complex behavior (Mazza & Tricarico, 2022). Benzer & Benzer, (2024) reported that they are subject of interest because of their physiology, anatomy, nervous system and regenerative capabilities. Their sensitivity to pollution which reflects the health status of aquatic environments has made them important biological indicators and an essential species (Esheya, 2023). This blend of ecological worth, economic potential, and scientific curiosity makes crayfish an increasingly attractive article of trade at all levels. The value and economic importance of this aquacultural product across international markets cannot be overestimated. The global crayfish food market was valued at USD 19.59 billion in 2024, \$1.8 billion in 2025 and is projected to grow to \$2.9 billion by 2034, representing a compound annual growth rate (CAGR) of 6.2% during the forecast period. This is driven by the rising consumer demand for sustainable seafood, combined with improvements in environmentally friendly aquaculture practices and greater conservation efforts that both make crayfish available and support ethical production for global markets (Market Reports World, 2026).

The quest to meet rising global and local consumption demands, propelled by their culinary request, seasonal availability and export prospective particularly from non-producing countries, has put them as a money-spinning area within inland fisheries (FAO, 2022). Demand from foreign Nations

specifically China (Benzer & Benzer, 2024), Europe and North America (Cilbiz, *et al.*, 2020) have contributed to its rising status in specialty food sectors. These diverse market interests suggest significant potential for expanding crayfish production and distribution on a global scale. Consequently, its conservation, preservation and sustainability has the notch of most International Organisations. Notably, the Food and Agriculture Organization (FAO, 2022) has risen to its preservation by providing guidelines for its conservation with universal sustainable fishing practices. Equally, its place has caused some African regions to explore its farming potentials as a means of enhancing food security and livelihoods (Esheya, 2023) and Nigeria is not an exception. Technological advancements in crayfish farming, such as automatic feeding systems, better breeding techniques, and enhanced water quality management, have led to improved efficiency and higher yields. These developments have helped increase production capacity while reducing environmental impacts, offering opportunities for industry players to grow their operations, thereby augmenting the growth of the crayfish market. Its farming and marketing in Nigeria is significant, contributing to both local food security and economic growth. As one of the most important ingredients in Nigerians' culinary, crayfish has an important place in the Nigerian food industry, especially in local markets, catering, and traditional dishes. Current data from FAO corroborate Nigeria's potential to become a global leader in crayfish production, owing to its favorable climatic conditions and expanding aquaculture practices (FAO, 2022). Despite these opportunities and potentials, the crayfish market in Nigeria is not without challenges. Amongst them, as enumerated by Esheya (2023), includes inefficient supply chains, lack of adequate processing and preservation infrastructures.

The Conceptual Framework is illustrated on the thematic understanding shown below:

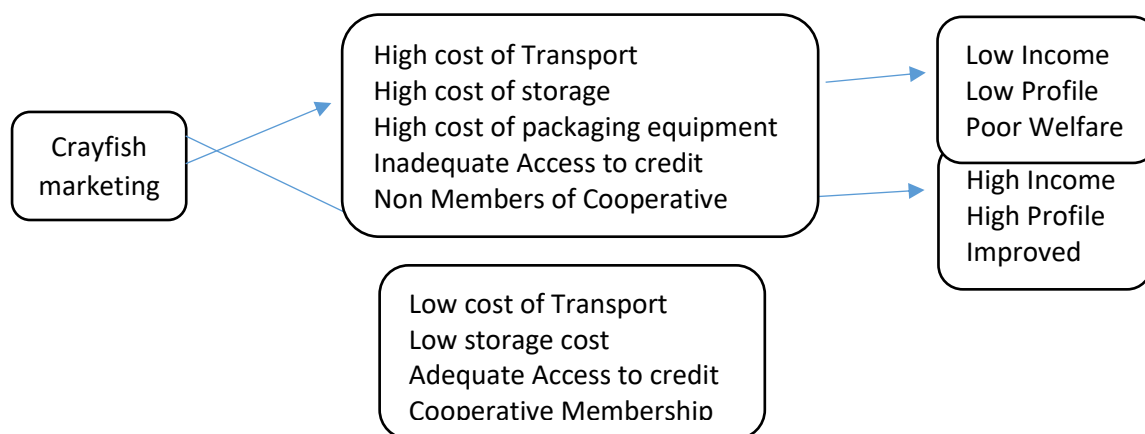


Figure 1: Conceptual Framework of Factors Affecting Crayfish Marketing

Source: Researchers Model, 2025

The figure illustrates how different conditions in crayfish marketing lead to varying outcomes for marketers. High transport, storage, and packaging costs, along with poor credit access and lack of cooperative membership, result in low income, low profile, and poor welfare. Conversely, low costs, adequate credit access, and cooperative membership lead to high income, high profile, and improved welfare (Esheya, 2023). Overall, the model emphasizes that better support and reduced costs significantly enhance the wellbeing of crayfish marketers.

Understanding these dynamics is crucial for enhancing the marketing strategies and sustainability of crayfish in the dominant Maritime States and the country in general. Crayfish marketing holds significant importance both locally and globally due to its economic, ecological, and nutritional contributions. Crayfish marketing has expanded globally with the *Procambarus clarkii* and *Pontastacus leptodactylus* species ferrying across continents. In Turkey, its production and marketing contributes significantly to the Country's GDP, presenting the sector's leveraged for foreign exchange earnings (Cilbiz *et al.* 2020). Equally, Guohui *et al.* (2021) underscored its growth and interest due to their nutritional value and bio-accumulation proficiencies as well as their health and environmental



market sentience. Apart from its economic and ecological magnitudes, its marketing contributes to regional food cultures and carnivals, promoting cultural identity and tourism. Baiduwiki (2025) noted that crayfish festival held by China's Jiangsu Province enhance economies, boosting broader socio-cultural and recreational significance of them.

In Nigeria, many households are involved in harvesting, processing and distribution of this aquatic product and it serves as a vital source of income, livelihood and rural development by integrating informal trade networks and supporting food security in surrounding communities (Ba *et al.* 2021 and Esheya, 2023). Crayfish also play a vital role in indicating ecosystem health, thus linking their trade to sustainable environmental practices. This ecological linkage has become increasingly relevant in regions such as the Mediterranean, where environmental standards are closely tied to export viability (Benzer and Benzer 2024). They concluded that, for rural markets of Nigeria linkage to international food and aquaculture industries, crayfish trade plays a critical role in sustaining livelihoods, promoting environmental sustainability, and connecting communities through shared culinary and commercial interests.

Akwa Ibom State is a marine State with abundance of aquatic resources except some few oceanic voracious species found within the shelf. This has made the State a hub for various aquatic resources including crayfish. Though there is no official outstanding stock harvest volume of crayfish in the State, individual output production mainly from the wild (95%) was estimated at 12.5 bags (19kg per bag) with the primary hub at Oron, Eket and Ibeno. Consequently, the State is dotted with both upstream and downstream markets for crayfish marketing. Crayfish fishing in this region benefits from the rich aquatic resources of the State, positioning it as a key player in Nigeria's aquaculture sector as opined by FAO, 2022. According to Okeke and Nwankwo (2020), crayfish is not only an important source of income for rural communities but it also contributes to local food security. Sequel to this factor, crayfish marketing in Akwa Ibom State has gathered increasing attention due to its economic potential and its vital role in the livelihoods of local fishermen and traders. Crayfish marketing is influenced by various factors including market demand, transportation logistics and pricing structures (Esheya, 2023). This factor has adverse effect on the marketing of not only crayfish but other aquatic products. This is contrary to the role of effective and efficient supply chains, in the global and local markets as highlighted by Ba, (Mazza & Tricarico, 2022). All their analysis underscore the need for technological and infrastructural improvements in the sector for a better mark-up as explained by Transaction Cost Economics.

Coase in 1937 propounded the Transaction Cost Economics theory which was later expanded by Williamson in the 1970s. The theory opines that transactions in markets are not costless; rather, every exchange involves some costs related to information search, negotiating contracts, enforcing agreements and managing risks. The theory helps in understanding how crayfish traders navigate the complexities of buying and selling in markets where high transaction costs—such as fluctuating prices, supply uncertainties, and information asymmetries—are prevalent. Its strength lies in its ability to explain the organizational structures and decisions made by crayfish traders in the marketplace.

Crayfish marketing in Akwa Ibom State is within two typical tiers of markets (downstream and upstream). The two are differentiated by where they occur relative to the raw material source and how close they are to the consumers. The closest to the raw material source is the upstream and the closest to consumers are the downstream markets. Each market has its own challenges which makes it difficult for crayfish to reach distant markets timely with its freshness or first processed limit intact. Amongst them are: poor infrastructures, including dilapidated and or non-motorable roads, storage facilities and limited access to formalized marketing channels (Frank and Umoh (2018). Reports on the financial returns (Frank *et al.*, 2017) and catch levels (Frank *et al.*, 2017) of artisanal fishermen substantiate various challenges at each level of the market. These often result in losses of product quality, reduced market value and income particularly during hot seasons. These issues impact negatively on primary producers as these open them to exploitation by middlemen and subsequently lead not only to poor income but increase processing cost. The middle men equally incur extra cost in transportation, preservation and other value addition and the retailers same; all for the sake of quality assurance, income



and taste sustainability. The marketers from both markets are mercantile with the ultimate goal of profit making even at the face of all these several challenges.

Though, Esheya studied profitability Analysis of Crayfish Marketing in South-South, Nigeria; BA et al. (2021) studied economic analysis of crayfish processing in Akwa Ibom State, Nigeria; none of these studies out-rightly compared the upstream and downstream markets. This research therefore, aim to bridge this gap by examining these dynamics, challenges, and opportunities in crayfish marketing across these markets. The significance of this study lies in its ability to provide a deeper understanding of the profitability of crayfish marketing within both downstream and upstream markets in Akwa Ibom State. By comparing these two market systems, the study highlights variations in pricing, supply sources, and marketing practices. This is crucial in identifying the factors that influence market performance, profitability, and competitiveness for crayfish marketers operating in different ecological and geographical zones of the state. This analysis provided valuable data for understanding the economic impact of crayfish trade and the effectiveness of market strategies in Akwa Ibom State.

It is against this backdrop that this study was carried out to compare the profitability of crayfish marketing across these selected markets in Akwa Ibom State. The research questions asked were:

- What are the factors influencing profitability of crayfish marketing among selected markets?
- What is constraints militating against crayfish marketing in the study.

The main objective of the study was to carry out a comparative analysis of factors influencing profitability of crayfish marketing across selected downstream and upstream markets in Akwa Ibom State. The specific objectives of the study were to

1. estimate the factors influencing gross margin of crayfish marketing using chow's test
2. identify constraints militating against crayfish marketing in the study.

MATERIALS AND METHODS

The Study Area

The study focused on Akwa Ibom State, located in the South-South geopolitical zone of Nigeria. Created in 1987 from Cross River State. Akwa Ibom shares boundaries with Cross River to the east, Rivers and Abia States to the west and northwest, and the Atlantic Ocean to the south. The state, named after the Qua Iboe River, comprises 31 Local Government Areas with Uyo as its capital and lies within the rainforest belt, experiencing two main seasons—rainy and dry—with an annual rainfall of 2000–3000mm (Akpan & Inyang, 2021). It spans latitude of 4°32'N and 5°33'N and longitudes 7°25'E and 8°25'E. The people are primarily involved in farming, fishing, trading/marketing, etc. Markets in the study area includes Abak Main Market, Abo Market, Affiong Market, Eket Main Market, Ibeno Market Eket Ikot Ekpene Main Market, Itam Market, Offiong Etok Market, Obong Anang Market, Udua Akpan Ndem, Udua Fionetok, Oron Market, Ura Bom Market Urua Oto Market, Uyo Main Market. Specifically, the study will focus on Udua Akpan Ndem, Udua Fionetok, and Oron Market. These markets are significant for crayfish trade in the region.

The target population of this study comprises all the crayfish marketers in the selected markets of Akwa Ibom State. Two-stage sampling techniques was adopted in selecting respondents for the study. In stage one, two markets each were purposively selected for upstream (Oron and Ibeno) and downstream (Akpan Andem and Itam) markets. This was based on the volume of crayfish marketed from these two markets as found out by the researcher. In stage two, twenty-five (25) marketers were randomly selected to obtain one hundred (100) respondents for the study. Primary data was used for collection of data from the crayfish marketers. Data were collected on specific objectives of the study. A questionnaire consisting of sub-sections to reflect the specific objectives of the study was used to collect the data.

The following analytical techniques were used to achieve the study's objectives:

Objective 1: To estimate and compare the gross margin of crayfish marketing between downstream and upstream markets. Gross Margin Analysis (GMA) was used to estimate the profitability of crayfish marketing.

Formula: $GM = TR - TVC$



Where: GM=?

TR = Price x Quantity Sold

TVC = Labour Cost + Transportation Cost + Market Levy + Storage + Packaging Cost ----

-----Equation 1

Objective 2: To estimate the factors influencing gross margin of crayfish marketing

Chow's Test was used to estimate the factors influencing gross margin of crayfish marketing.

Formula:

$$F = \frac{\frac{(RSS_1 + RSS_2)}{K}}{\frac{RSS_1 + RSS_2}{(n_1 + n_2)2k}} \text{-----Equation 2}$$

Where: RSS = Residual Sum of Squares

k = Number of parameters

n₁ and n₂ = Sample sizes

X₁ = Stocks (number of bags of crayfish)

X₂ = Labour (₦)

X₃ = Market levy (₦)

X₄ = Storage cost (₦)

X₅ = Transportation cost (₦)

X₆ = Rent (₦)

X₇ = Education (Number of years)

X₈ = Experience (Number of years)

X₉ = Age (Number of years)

X₁₀ = Sex (dummy, 1= male, 0=female)

X₁₁ = Marital Status (1= single, 2 = married, 3 = divorced)

X₁₂ = Household size (Number of persons)

X₁₃ = Access to credit (dummy, 1= yes, 0=no)

X₁₄ = Monthly income (₦)

Objective 2: To identify constraints militating against crayfish marketing in the study

A four (4) point Likert scale was used to assess the severity of each constraint and .

means score was used to achieve the objective:

$$\text{Mean score} = \frac{\sum fx}{\sum f} \text{-----Equation 3}$$

Constraints with mean scores ≥ 2.5 were considered significant.

RESULTS AND DISCUSSION

Determinants of Profitability in the Upstream Markets

The regression result presented in Table 2; indicates that the model has a reasonably good fit, with an R-squared of 0.5878 and an Adjusted R-squared of 0.4229. This means that approximately 58.78% of the variation in the profitability of upstream crayfish marketers is explained by the included variables. The overall model is statistically significant, as shown by the F-statistic ($F(14, 35) = 3.565017$) and a highly significant P-value (0.001128), suggesting the model as a whole is useful for prediction. The analysis reveals several socio-economic and cost-related factors that significantly influence the profitability of upstream crayfish marketers. Storage cost, rents, experience, sex, marital status and access to credit were significant amongst all the variables included in the regression.

Storage Cost: Storage Cost was found to be negative but statistically significant at 1% probability level, this could imply that, a one-naira increase in storage cost leads to a sharp decrease in gross margin by approximately ₦40.42, holding other factors constant. This is logical for upstream markets, where crayfish is often processed and stored near the production source using rudimentary or traditional methods (e.g., smoking, sun-drying) with limited commercial cold storage. High storage costs directly erode the captured gross margin (Olakiumide, 2021).

Rents: Rents exhibit a positive significant relationship at the 10% level, suggesting that paying rent (perhaps for better-located or more stable stalls/sheds) might be associated with higher profitability.



This implies that better market positioning leads to increased sales volume or higher prices that outweigh the cost of rent. This result is in contrary 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 is in contrary with the result of Esheya (2023) which reported a negative and significant relationship between marketing cost and catfish marketing income.

Experience: Experience has a positive significant relationship, indicating that more experienced marketers (as seen in the mean experience of 5 years) are better able to navigate market fluctuations, manage risk, and foster business relationships, which translates to higher margins. The positive influence of experience aligns with human capital theory, where cumulative knowledge and skills directly enhance efficiency (Frank *et al.*, 2019) and financial outcomes (Frank *et al.*, 2019).

Sex: Sex was found to be negative but statistically significant at 5% level of probability. The results could imply that female marketers are significantly more profitable than their male counterparts, by an average of about ₦26,702. This finding supports the descriptive results and the general observation that women dominate and often excel in the local trade of fishery products. This aligns with findings by dos Santos and Alves (2024), who argue that women's specialization in marketing, superior negotiation skills at the retail level, and better cost management (often relying on unpaid family labor) contribute to higher profitability in small-scale agribusiness compared to men who might be involved in more capital-intensive or wholesale activities.

Marital Status: Marital status was negative and significantly influenced gross margin by 5% level of probability. The result could imply that, married marketers, who often have larger household sizes and more dependents, face greater demands on their business income, effectively reducing the net profitability retained for reinvestment compared to single counterparts.

Access to Credit: Access to credit has a positive and significant relationship with profitability. Marketers who have access to credit (formal or informal) are likely to earn more in gross margin. This is highly important in the upstream market where capital constraints are common. Credit allows marketers to purchase larger volumes of stock immediately after the catch when prices are lowest (Okeke & Nwankwo, 2020), thereby exploiting economies of scale and realizing higher profit margins upon sale.

Table 1: Determinants of Profitability in the Upstream Markets

	Coefficient	Std. Error	t-ratio	p-value
Constant	136977	84606.8	1.619	0.1144
Stocks	0.0943380	0.0817759	1.154	0.2565
Labour	-0.910124	0.821627	-1.108	0.2755
Market Levy	-12.1736	11.4796	-1.060	0.2962
Storage Cost	-40.4187	9.30591	-4.343	0.0001***
Transportation cost	3.09957	2.57663	1.203	0.2371
Rents	8.31449	4.51859	1.840	0.0743*
Education	2326.20	1420.21	1.638	0.1104
Experience	8288.77	4748.51	1.746	0.0897*
Age	-792.910	544.183	-1.457	0.1540
Sex	-26702.2	9934.30	-2.688	0.0109**
Marital Status	-18281.1	7832.08	-2.334	0.0255**
Household Size	7365.52	5292.00	1.392	0.1728
Access to Credit	20719.5	8549.88	2.423	0.0207**
Income	-0.0954366	0.118397	-0.8061	0.4256

Diagnostic Statistics

R-squared = 0.587800	F(14, 35) = 3.565017	P-value(F) = 0.001128
Adjusted R-squared = 0.422920	Log-likelihood = -564.0053	
Sum squared resid = 1.84e+10	S.E. of regression = 22914.03	

Source: Field Survey Data, 2025. Computed using Gretl.

***, **, * means 1%, 5% and 10% probability level of significance, respectively.

Determinants of Profitability in the Downstream Markets

The analysis of profitability determinants in the downstream crayfish markets presented in Table 4.5 reveals a distinct set of factors influencing financial performance compared to the upstream markets. The downstream model has a lower explanatory power, with an R-squared of 0.4231 (Adjusted R² of 0.2752), meaning approximately 42.31% of the variation in profitability is explained by the variables. However, the model remains statistically significant overall (P-value (F) = 0.009027).

Stocks: Unlike the upstream model, the downstream profitability is primarily driven by the scale of operation and external costs. Stocks had a positive coefficient and was statistically significant at 1% level of probability. This suggests that for downstream marketers, scale matters most. Marketers who invest more in acquiring a larger volume of crayfish stock are significantly more profitable (Esheya, 2023). This is typical of urban/downstream markets where the demand is high and consistent, meaning increased turnover via larger volumes leads directly to higher gross margins. This finding directly contrasts with the upstream market, where the stock variable was not a significant determinant of profit.

Transportation: Transportation cost shows a negative and statistically significant influence on profitability at the 10% level. Transportation cost which was non-significant in the upstream market, becomes critical downstream. Downstream marketers are responsible for the final legs of transport and distribution to urban centers or retailers, meaning higher transportation costs significantly erode their margins. This highlights the inefficiency and high cost of logistics in the downstream segment. This aligns with literature on urban food marketing, where high logistic and infrastructural costs are often cited as major constraints that reduce the final profit realized by the distributor (Oteri *et al.*, 2023).

Table 2: Determinants of Profitability in the Downstream Markets

	Coefficient	Std. Error	t-ratio	p-value
Constant	10793.4	33066.4	0.3264	0.7459
Stocks	0.178969	0.0488685	3.662	0.0007***
Labour	-0.447422	0.443604	-1.009	0.3194
Transportation	-2.55901	1.31112	-1.952	0.0582*
Experience	811.239	2595.42	0.3126	0.7563
Age	569.533	427.727	1.332	0.1907
Sex	10118.8	6736.15	1.502	0.1411
Marital status	-1240.11	9212.37	-0.1346	0.8936
Household size	-2280.56	2805.06	-0.8130	0.4211
Access to credit	-6894.10	5506.41	-1.252	0.2180
Income	-0.0847052	0.0818229	-1.035	0.3069
Diagnostic Statistics				
R-squared = 0.423148	Adjusted R-squared = 0.275238			
F (10, 39) = 2.860838	P-value(F) = 0.009027			
Sum squared resid = 8.99e+09	Log-likelihood = -546.1274			

Source: Field Survey Data, 2025. Computed using Gretl.

***, * means 1%, 5% and 10% probability level of significance, respectively.

Structural Comparison Using Chow's Test

The Chow's Test was employed to formally determine if the two profitability models (upstream and downstream) are structurally different, meaning the determinants of profitability and their magnitude of influence differ significantly between the two market locations. The result of the test is highly significant as shown in Table 3 The F-Calculated (10.54) is substantially greater than the F-



Critical (2.70), this implies that there is no structural break. This decisive result confirms that the crayfish marketing system in Akwa Ibom State operates under two fundamentally different economic structures. The factors determining profitability in the upstream (source) market are statistically distinct from those in the downstream (final distribution) market. Upstream profitability is primarily determined by cost control (Storage Cost), social structure (Sex, Marital Status), and access to capital (Credit) while Downstream profitability is driven by scale (Stocks) and logistical efficiency (Transportation Cost). Downstream marketers succeed by maximizing turnover despite higher transactional costs.

This structural break supports the initial finding from the gross margin analysis that profitability is captured differently in the two segments. This implies that policy interventions aimed at improving the crayfish value chain must be location-specific; for instance, upstream interventions should focus on improving storage technology and providing targeted micro-credit, while downstream interventions should focus on reducing transport bottlenecks and improving market infrastructure to better handle high volumes.

Table 3: Chow Test Results

Statistics	Values	Decision
F-Calculated	10.54	reject the null hypothesis of no structural break
F-Critical	$\alpha=0.05$ with $DF(3, 94) = 2.70$	

Source: Field Survey Data, 2025.

Constraints Militating against Crayfish Marketing in Upstream Market

The marketing of crayfish was constrained by a number of factors in the upstream market as presented in Table 4.7. The findings showed that out of seven (7) constraints listed, only four (4) were severe in the study area. These four includes; high cost of crayfish ($x=3.12$) ranked 1st, high cost of transportation ($x=2.84$) ranked 2nd, supply chain instability ($x=2.80$) ranked 3rd, and poor marker infrastructure ($x=2.78$) ranked 4th. For upstream marketers, the "cost of crayfish" is the price they pay directly to the fishermen or local processors. The high ranking suggests that these producers command significant leverage or that the primary production process itself is inherently expensive (e.g., fuel, equipment, labor). This pressure on acquisition cost limits the volume of trade and capital accumulation for marketers. While the transportation cost variable was not a significant determinant of profitability in the upstream regression (suggesting a similar cost burden across marketers), its high rank as a constraint indicates that the absolute cost still restricts business expansion.

Upstream markets are often located in remote, riverine, or coastal areas with poor road networks. Moving the purchased crayfish from the source to assembly points, or even to nearby consuming markets, requires costly logistics, often involving multiple modes of transport.

Supply instability is often linked to the seasonal nature of fishing, unpredictable weather, and resource depletion. This lack of reliability forces marketers to maintain higher inventory risks and limits their ability to secure long-term downstream contracts. It creates uncertainty, preventing planned bulk purchasing that would lead to economies of scale. Poor market infrastructure leads to inefficiency, increased manual labor for handling, and higher vulnerability to theft or damage. While marketers might not pay high rents (Rents was a significant positive determinant of profit, suggesting better sites are profitable), the general condition of the market is detrimental. The findings are similar to those of Esheya (2023), Okeke and Nwankwo (2020), and Obikeze (2020) who reported that high cost of crayfish and high transportation cost were major constraints faced by crayfish marketers.

Table 4: Constraints Militating against Crayfish Marketing in Upstream Market

Constraints	SD	D	A	SA	Mean	Ranks
Supply chain instability	5	10	25	10	2.80*	3 rd
Poor market infrastructure	10	11	9	20	2.78*	4 th
Lack of cooperatives	21	18	5	6	1.92	7 th
Poor storage facilities	24	10	9	7	1.98	6 th
High cost of transportation	6	10	20	14	2.84*	2 nd
High cost of crayfish	4	7	18	21	3.12*	1 st
Price fluctuation	12	18	10	10	2.36	5 th

Source: Field Survey Data, 2025.

Note: SD – Strongly Disagree, D – Disagree, A – Agree, SA – Strongly Agree

* - Severe constraints

Constraints Militating against Crayfish Marketing in Downstream Market

Analysis of constraints in the downstream markets reveals a distinct hierarchy of challenges compared to the upstream segment, reflecting the commercial and logistical realities of urban distribution. The marketing of crayfish was constrained by a number of factors in the downstream market as presented in Table 5. The findings showed that out of seven (7) constraints listed, only three (3) were severe in the study area. These three includes; high cost of transportation ($x=2.88$) ranked 1st, high cost of crayfish ($x=2.74$) ranked 2nd, price fluctuation ($x=2.64$) ranked 3rd. High cost of transportation was ranked the first severe constraints, this result corroborates the regression analysis, where transportation cost was found to be a significant negative determinant of profitability in the downstream model. Downstream marketers are typically responsible for transporting bulk volumes from regional collection points or upstream markets to urban commercial centers and finally distributing them to various retailers or consumers. For downstream marketers, the "cost of crayfish" includes the price paid to the upstream middlemen, which already has the upstream marketer's margin and initial transport costs embedded. Downstream marketers must acquire the product at a high price, limiting their ability to maintain large stock volumes despite the pressure to scale up (as identified by the Stocks variable in the regression). While this ranked 1st upstream ($x=3.12$), it is still critical downstream, showing that the high input cost is pervasive throughout the entire value chain, but the downstream marketer has the added pressure of severe transportation costs. Price fluctuation ranks third, downstream marketers operate closer to the final consumer market, which is more sensitive to supply shocks, competitor pricing, and demand changes (e.g., shifts to cheaper alternatives). The findings are similar to those of Esheya (2023), Okeke and Nwankwo (2020), and Obikeze (2020) who reported that high cost of crayfish and high transportation cost were major constraints faced by crayfish marketers.

Table 5: Constraints Militating against Crayfish Marketing in Downstream Market

Constraints	SD	D	A	SA	Mean	Ranks
Supply chain instability	13	16	11	10	2.36	4 th
Poor market infrastructure	23	17	5	5	1.84	7 th
Lack of cooperatives	14	18	11	7	2.22	5 th
Poor storage facilities	21	15	13	1	1.88	6 th
High cost of transportation	4	11	22	13	2.88*	1 st
High cost of crayfish	7	13	16	14	2.74*	2 nd
Price fluctuation	2	22	18	8	2.64*	3 rd

Source: Field Survey Data, 2025.

Note: SD – Strongly Disagree, D – Disagree, A – Agree, SA – Strongly Agree

* - Severe constraints.

CONCLUSION AND RECOMMENDATION

Crayfish marketing in Akwa Ibom State, Nigeria dominated by female gender proved a more profitable enterprise at the upstream market given the positive values of the gross margin on investment.



The upstream marketers gained more profit than the downstream marketers in the business. The key determinants of upstream profitability were storage cost, sex, marital status and access to credit while downstream profitability is driven by stocks and transportation cost.

The following recommendation are suggested based on the findings of the study;

1. In the Upstream market, credit and subsidies should be directed toward improving post-harvest handling and storage facilities at the primary landing sites. Since Storage Cost significantly erodes upstream profitability, investing in modern, low-cost preservation methods (e.g., solar drying racks, improved smoking kilns) will reduce spoilage, lower operating costs, and increase the quantity of marketable stock, boosting the high upstream gross margin.
2. In the downstream market, credit should be larger in volume and aimed at increasing Stocks (the key positive determinant downstream) to enable marketers to exploit economies of scale and meet high urban demand.
3. Government and local authorities must prioritize the rehabilitation and maintenance of feeder roads and waterways linking the primary upstream markets to the major downstream distribution centers.
4. Encourage the formation of formal Crayfish Marketers' Associations and Cooperatives, particularly among the dominant female marketers.

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