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Structure, efficiency, and cost-benefit analysis of crayfish marketing in major markets in Calabar, Cross River State, Nigeria

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Abstract

This study examines the cost-benefit analysis and marketing efficiency of crayfish trade in three major markets in Calabar, Cross River State. Using a quantitative approach, the study analyzes marketing margins, gross margins, profitability, and efficiency metrics, particularly employing the Shepherd Futrel method to evaluate trade effectiveness across these markets. The study utilizes primary data collected from crayfish traders and market unions, incorporating cost structures, sales volumes, and price variations over a three-month period (January–March 2024). A comparative analysis of wholesale and retail margins is conducted to assess variations in profitability and efficiency. Results reveal significant disparities in purchase costs, variable expenses, and profit margins among the three markets: Nsidung Beach Market: Purchase cost ₦145,000, total revenue ₦800,000, gross margin ₦740,000, profit ₦630,000, and marketing efficiency of 94.11%, making it the most efficient market. Watt Market: Purchase cost ₦162,000, total revenue ₦850,000, gross margin ₦768,000, profit ₦638,000, and marketing efficiency of 80.19%, moderately efficient but impacted by higher transaction costs. Ika-Ika Oqua Market: Purchase cost ₦163,000, total revenue ₦875,000, gross margin ₦781,500, profit ₦641,500, and marketing efficiency of 74.95%, lower efficiency due to increased costs but generating the highest revenue. This research uniquely integrates cost-benefit analysis with marketing efficiency metrics, distinguishing between wholesale and retail margins to provide deeper insights into crayfish trade dynamics. Unlike prior studies that focus only on profitability, this study quantifies efficiency in multiple market structures, shedding light on pricing strategies, cost optimization, and economic viability of crayfish marketing. Findings suggest the need for market infrastructure upgrades, reduced transaction costs, and price regulation frameworks to enhance profitability and efficiency. Policymakers should invest in cold storage facilities, streamline union regulations, and support digital trade platforms to reduce overhead expenses and expand market access. This study underscores the economic potential and efficiency variations in crayfish trade, providing a data-driven foundation for improving trade sustainability in developing economies. Future research should explore international export opportunities, digital marketplace integration, and seasonal trade dynamics to further optimize the seafood supply chain.

Keywords: Cost-benefit analysis, Crayfish, Marketing efficiency, Market Structure, Nigeria

Introduction

Marketing refers to the execution of business activities that facilitate the

movement of goods and services from producers to consumers. It is also described as the managerial process responsible for

identifying, anticipating, and fulfilling consumer needs in a profitable manner. Similarly, agricultural marketing encompasses all activities involved in transferring agricultural goods and services from the initial production stage to the final consumer, ensuring efficient distribution and market accessibility (Srivastava, 2020).

Agricultural marketing encompasses all stages of operations that facilitate the movement of products from farms to consumers. These stages include the assembling of goods, storage, transportation, processing, grading, packaging, and financing of these activities. Key features of marketing involve pricing, the execution of various institutional functions, and the influence of supply and demand forces (Eyo, 2018). Crayfish is defined as a smoked dried product composed of a mixture of shrimps, post-larval stages of pink shrimps, and other crustaceans, harvested from estuaries and sediment-rich coastal waters. It serves as a valuable source of animal protein, containing essential nutrients such as lysine, sulfur amino acids, thiamine, riboflavin, vitamin D, vitamin A, phosphorus, calcium, and iron (Ele & Nkang, 2014).

Crayfish serves as a valuable source of animal protein, offering the potential to mitigate protein deficiency in diets. It contains essential nutrients, excluding carbohydrates, making it a well-rounded dietary component. Crayfish is particularly rich in lysine, sulfur, and amino acids, making it an excellent complement to high-carbohydrate diets. Additionally, it provides vital vitamins and minerals, including thiamine, riboflavin, vitamin D, vitamin A, phosphorus, calcium, and iron (Paxton, 1995). Its high content of polyunsaturated fatty acids plays a crucial role in reducing blood cholesterol levels, thereby promoting cardiovascular health. Furthermore, regular consumption of crayfish has been associated

with medicinal benefits, such as reducing the risk of heart-related conditions and thyroid disorders like goiter (Health guide, 2024).

Crayfish-based meals play a significant role in human development, particularly in developing countries where alternative protein sources are often scarce and expensive (Ukoha, 1998). As an affordable and nutrient-rich option, crayfish helps bridge the gap in protein deficiency, ensuring better dietary balance. Studies have shown that protein derived from crayfish and fish-based diets is comparable in quality to that obtained from meat, making it a viable substitute for populations with limited access to traditional protein sources (Ibironke et al., 2014).

The consumption of fish, combined with plant-based products that may lack essential amino acids such as lysine and thiamine, enhances the overall nutritional value of the diet. This combination not only ensures the complete utilization of plant proteins but also improves dietary composition. Studies indicate that crayfish consists of approximately 54.37% protein, making it a highly nutritious food source (Asukpa, 1999). Crayfish naturally inhabit aquatic environments and reproduce for various purposes, including food production, economic activities, ecological balance, and laboratory research. In Cross River State, Nigeria, crayfish fisheries have significantly contributed to business and economic activities, providing livelihoods for fishermen, traders, and consumers. Due to its high profitability, many individuals engage in the production and marketing of crayfish as a primary source of income. The chemical composition of crayfish includes moisture (4.6%), ash (2.9%), protein (54.37%), lipids (2.38%), energy (2.14 KJ/g), and vitamin B6, making it a valuable dietary component (El-Sherif et al., 2021).

Marketing margin represents the difference between the price paid by consumers and the price received by producers, often reflecting the cost of marketing services. Its magnitude is influenced by factors such as market structure, transaction volume, and the number of intermediaries involved. While some argue that a high marketing margin indicates inefficiencies due to excessive middlemen, others contend that it compensates for essential marketing functions (Asibong, 1992). Market structure, which defines the competitive landscape, influences firm behavior and includes characteristics such as the number and size of buyers and sellers, knowledge distribution, product differentiation, and barriers to entry. The four primary market models, monopoly, oligopoly, monopolistic competition, and perfect competition, each exhibit distinct features that shape pricing and market efficiency (Douglas, 1986).

Efficient markets ensure that information is quickly incorporated into prices, minimizing transaction costs for buyers and sellers. However, some researchers argue that perfect informational efficiency is unattainable, as it would eliminate the incentive to trade and potentially destabilize market operations. Studies on crayfish marketing reveal that varying levels of competition influence pricing behavior, with market margins differing across wholesale and retail segments (Ele & Nkang, 2014).

Nsidung Beach Market serves as the primary landing site for crayfish in Cross River State, with major landing days occurring on Thursdays and Sundays. Although the market is officially owned by the Henshaw Town indigenes, it is predominantly utilized by people from Nsidung, Efiat, Oron, and Creek Town, with Creek Town fishermen forming the largest

group of users. Watt Market, also known as Calabar Central Market, is the oldest market in Cross River State and remains a key hub for major transactions, surpassing other markets in terms of purchasing and selling activities. Additionally, Ika-Ika Oqua Market, commonly referred to as Marian Market, is located in Calabar Municipality and plays a significant role in the crayfish trade. Traders in these markets purchase crayfish in bulk from Nsidung Beach Market for resale to consumers within and beyond Calabar Metropolis (John, 1994).

Today, Calabar is recognized as one of Nigeria's notable seaports, particularly for its supply of seafood, including crayfish, fresh fish, smoked fish, dried fish, periwinkles, crabs, snails, and other marine products. The crayfish trade has provided substantial economic opportunities for fishermen, traders, and consumers, contributing to the livelihoods of many individuals in the region (Ele & Nkang, 2014). This study aims to economically analyze the structure, efficiency, and cost-benefit of crayfish marketing in major markets in Calabar, Cross River State, Nigeria. Specifically, the study sets out to:

- assess the organizational structure of the three (3) selected markets.
- evaluate and compare the crayfish retail marketing margin with the wholesale marketing margin in the three markets.
- estimate the cost-benefit structure and efficiency of crayfish marketing in the three (3) markets.

Methodology

Study area

The study focuses on three major markets in Calabar, Cross River State: Nsidung Beach Market, Watt Market, and Ika-Ika Oqua Market. These markets play a crucial role in the trade and distribution of

crayfish and other seafood products. Calabar is situated in southeastern Nigeria, with coordinates latitude 4.9517°N and longitude 8.3220°E (NearWeather, 2025). The city is known for its proximity to the Atlantic Ocean, which influences its climate and economic activities. It experiences a tropical monsoon climate, characterized by high temperatures and significant rainfall throughout the year. The climate is influenced by its coastal location and surrounding rainforest. The average annual temperature is 27°C, with the hottest months between January and March, reaching 30°C. The coolest months, July to September, have average temperatures around 24°C. The city receives approximately 3,500 mm (138 inches) of rainfall annually, with the wet season lasting from March to October. The heaviest rainfall occurs between May and September, exceeding 400 mm (15.7 inches) per month (Weather Atlas, 2025).

Calabar has high humidity levels, ranging from 70% to 90%, contributing to its warm and moist climate.

These climatic conditions significantly impact the fishing and crayfish trade, as weather patterns influence harvesting, transportation, and market activities (Effiong et al, 2024).

Sample procedure and sample size: A two-stage sampling procedure was adopted in the study.

Stage 1 - Random sampling of three (3) markets out of the six (6) major markets in Calabar.

Stage 2 - Random sampling of the crayfish sellers to be used as respondents.

The sampling frame at the wholesale level comprised all the registered members of the different crayfish associations in the selected markets. This was obtained from the presidents of the different crayfish associations. At the retail level, listings were

done to create a comprehensive sampling frame for sampling with the crayfish association leaders. Using simple random techniques, wholesalers and retailers were selected. A total of fifty (50) respondents, stratified as 25 wholesalers and 25 retailers, were selected. Within each stratum, the respondents were further classified into males and females, respectively. With all selected levels, questionnaires were used to obtain information in terms of buying and selling strategies, financing, profit, entry and exit barriers, and trade relationships.

Data collection: The data used for the study were obtained from both primary sources. Primary data was obtained through personal interviews, direct observations, and validated structured questionnaires whose content comprised open-ended questions. The wholesale prices at Nsidung beach market were obtained from the selected crayfish dealers who habitually travel to Efiat, Bakassi, and Oron (major crayfish landing areas) by engine boats to buy crayfish in bags and on return sell to wholesalers on Thursdays and Sundays (landing days when prices of crayfish are low). Secondly, questionnaires were distributed to fifty (50) respondents, to enable them to record their monthly sales/purchases quantities and prices, as well as other information on marketing. This record-keeping was done for twelve (12) weeks. The information obtained was used to assess market performance in the three (3) markets.

Data analysis: Objective 1 was analyzed descriptively using tables, frequencies, and percentage distribution as presented:

$$\text{Mean} = \sum \frac{x}{N}$$

Where,

N = Number of observations

$\sum X$ = Summation of the observations

$$\text{Standard deviation}(\delta) = \sqrt{\sum \frac{X - \bar{X}}{N-1}^2}$$

Where,

δ = Standard deviation

X = Observations

$\bar{X}$ = Mean of X

N = Number of observations

$$\text{Coefficient of Variability (CV)} = \frac{\delta}{\bar{X}} \times \frac{100}{1}$$

Where δ and X are as already defined

Objectives 2 and 3 were analyzed using budgetary analysis and Shepherd's Futrell method. Parameters estimated were net income, gross margin, profit, and marketing efficiency. The Net income from crayfish marketing is stated as: $NI = GM - FC$, where,

NI = Net income from crayfish marketing activities

GM = Gross margin

FC = Fixed Cost

Gross margin (GM) = $TR - TVC$

Profit $TR - TC$

Where,

TR = Total revenue

TVC = Total variable cost

TC = Total cost

$$\text{Marketing efficiency} = \frac{\text{Marketing output}}{\text{Marketing input}} \times \frac{100}{1}$$

Marketing efficiency using Shepherd's Futrell method = $\frac{\text{Revenue}}{\text{Cost}} \times \frac{100}{1}$

Total marketing cost 1

$$\approx \frac{\text{Value of goods sold}}{\text{Cost}} \times \frac{100}{1}$$

Retail margin (₦) = Retail price/bag - wholesale price /bag

$$\text{Retail margin (\%)} = \frac{\text{Retail price/bag} - \text{wholesale price /bag}}{\text{Wholesale price per bag}} \times \frac{100}{1}$$

Wholesale margin (₦) for Watt/Ika-Ika Oqua market

= Wholesale price at Watt/Ika-Ika Oqua - wholesale price at Nsidung beach

Wholesale margin (%) for Watt/Ika-Ika Oqua market

$$= \frac{\text{Wholesale price at Watt/Ika-Ika Oqua} - \text{Wholesale price at Nsidung beach}}{\text{Wholesale price at Nsidung beach}}$$

Wholesale price at Nsidung beach

Results and Discussion

Organization and structure in the three (3) markets

Nsidung Beach Market

This market serves as the primary landing site for crayfish, crabs, and other seafood products, with major landing days on Thursdays and Sundays. It is officially owned by the Henshaw Town indigenes but is predominantly used by fishermen from Creek Town, Nsidung, Efiat, and Oron. It operates within a structured framework that ensures efficient trade and market regulation. In terms of organization and structure, the market is officially owned by the Henshaw Town indigenes, but it is primarily utilized by fishermen and traders from Creek Town, Nsidung, Efiat, and Oron. Creek Town fishermen dominate the market in terms of numbers. Major landing days for crayfish are Thursdays and Sundays, when fishermen bring in fresh supplies, but wholesale and retail transactions occur throughout the week, with peak trading on landing days. Both retailers and wholesalers operate within organized unions that regulate market activities. Membership in the retailers' union requires: ₦5000 registration fee and Five (5) crates of soft drinks. Membership in the wholesalers' union requires: ₦8000 registration fee, Five (5) crates of soft drinks, three cartons of Star beer, and three cartons of small stout, Two bottles of hot drinks, Commitment to financial contributions for fellow members, Regular attendance at meetings and payment of dues and

Acquisition of a permanent shade at ₦1000 monthly.

However, when considering the structure and competition of Nsidung beach market, the market exhibits characteristics of a perfectly competitive market with oligopolistic tendencies, including entry into the market is restricted by union regulations, allowing only financial members to trade freely, and many buyers and sellers, ensuring that no single participant significantly influences market prices. Economically, the market plays a vital role in the economic activities of Calabar, providing livelihoods for fishermen, traders, and consumers, and contributes to the seafood supply chain, distributing crayfish, fresh fish, smoked fish, dried fish, periwinkles, crabs, snails, and other marine products. These findings are consistent with Ele and Nkang (2014), who in their study on the Structure and Efficiency of Crayfish Marketing, reported that an oligopolistic market structure for the Nsidung beach market

Ika-Ika Oqua Market (Marian Market)

Ika Ika Oqua Market, commonly known as Marian Market, is one of the largest and most dynamic markets in Calabar, Cross River State, playing a crucial role in the crayfish trade. As a major commercial hub, it facilitates the exchange of foodstuffs, household goods, seafood, and other essential commodities, making it a vital center for both traders and consumers. In terms of organization and structure, the market is well-structured, with designated sections for different types of goods, including fresh produce, seafood, clothing, and household items. Crayfish traders operate within a systematic stall arrangement, ensuring easy navigation for buyers and sellers. The market is governed by traders' unions, which regulate activities, enforce price controls, and resolve disputes.

Membership in the union requires formal registration, including payment of fees and contributions, which helps maintain order and efficiency in crayfish transactions.

Economically, the market serves as a key economic driver, providing employment opportunities for crayfish traders, transporters, and wholesalers. Many traders source crayfish from Nsidung Beach Market, a major landing site, and distribute it to retailers and consumers within and beyond Calabar. The market supports wholesale and retail trade, ensuring a steady supply of crayfish to meet demand. Additionally, crayfish marketing in the market is influenced by seasonal fluctuations, affecting pricing and availability. The Calabar Municipal Council has recently introduced an automated revenue system at the market to enhance transparency and ease of doing business. Efforts have also been made to reduce market tolls, making it more affordable for crayfish traders. These developments contribute to the efficiency and sustainability of crayfish marketing, ensuring that traders can operate in a more structured and profitable environment. The market remains a central hub for crayfish marketing, fostering economic growth and community engagement. Its structured layout, union governance, and technological advancements enhance the efficiency of the crayfish trade, making it a vital component of the seafood industry in Calabar. These findings align with related studies by Okon (2019) and Eyo (2018).

Watt Market (Calabar Central Market)

Watt Market, also known as Calabar Central Market, is the oldest and largest marketplace in Cross River State, serving as a major hub for crayfish marketing alongside other wholesale and retail transactions. Established in 1901, it has evolved into a multipurpose market, offering a wide range

of goods, including food, clothing, electronics, and household items. In terms of organization and structure, the market is well-structured, with designated sections for different types of goods, including seafood, which plays a significant role in the local economy. Crayfish traders operate within a systematic stall arrangement, ensuring easy navigation for buyers and sellers. The market is strategically located in Calabar's central business district, making it easily accessible to traders and consumers. It operates daily, with peak trading hours in the morning and late afternoon, when crayfish transactions are most active. The market is managed by traders' unions, which regulate activities, oversee pricing, dispute resolution, and market security, and ensure smooth operations. Membership in the unions requires formal registration and adherence to market regulations. These unions play a crucial role in crayfish marketing, ensuring fair pricing and preventing market disruptions. Economically, the market serves as a key economic driver, providing employment opportunities for crayfish traders, transporters, and wholesalers. Many traders source crayfish from Nsidung Beach Market, a major landing site, and distribute it to retailers and consumers within and beyond Calabar. The market supports wholesale and retail trade, ensuring a steady supply of crayfish to meet demand. Additionally, crayfish marketing in the market is influenced by seasonal fluctuations, affecting pricing and availability. The Calabar Municipal Government has initiated projects to improve market efficiency and organization, including efforts to modernize infrastructure and enhance trade conditions for crayfish sellers. These developments contribute to the efficiency and sustainability of crayfish marketing, ensuring that traders can operate in a more structured and profitable environment. In essence, the

market remains a central hub for crayfish marketing, fostering economic growth and community engagement. Its structured layout, union governance, and modernization efforts enhance the efficiency of the crayfish trade, making it a vital component of the seafood industry in Calabar. These findings align with Uya (2003).

Comparison of crayfish retail margin with the wholesale marketing margin in the three (3) markets of Calabar.

In Nsidung Beach Market, the retail margins fluctuate between 5.92% and 7.60%, averaging 15.74% overall. The highest retail margin occurred in January (7.60%), indicating a more favorable pricing environment at the start of the year. The lowest retail margin is observed in February (5.92%), reflecting tighter pricing adjustments or increased competition. The wholesale margins ranged from 5.07% to 6.45%, averaging 5.66% while the lowest wholesale margin (5.07%) occurs in March, indicating lower markups and the highest (6.45% in January) suggests stronger wholesale pricing dynamics. In essence, Nsidung Beach Market has the lowest wholesale margins, suggesting a more competitive pricing strategy at the point of initial crayfish landing.

Similarly, in Watt market, the retail margins ranged from 6.25% to 14.28%, with a mean of 28.24%. The highest retail margin is 14.28% in January, indicating strong market activity, while the lowest retail margin in March (6.25%) suggests a period of lower price variability or stabilized pricing. The wholesale margins were significantly higher, ranging from 11.72% to 15.15%, averaging 13.89%, with the highest wholesale margin observed in January (15.15%), suggesting peak trade efficiency while the lowest wholesale margin (11.72% in March), indicated stabilized pricing. Watt

Market consistently has the highest retail and wholesale margins, showing its role as a key trade hub with stronger pricing power.

Lastly, in Ika Ika Oqua Market, the retail margins varied between 9.38% and 11.88%, with an overall mean of 25.71%. The highest retail margin occurs in February (11.88%), indicating stronger pricing power while the lowest retail margin is 9.38% in March, reflecting a more competitive market structure. Wholesale margins vary between 12.41% and 16.29%, with an overall average of 14.87%. February records the highest margin (16.29%), showing stronger wholesale leverage and the lowest margin (12.41% in March), reflecting potential market saturation. However, Ika Ika Oqua Market maintains moderate retail and wholesale margins, balancing its position between the highly competitive Nsidung and the dominant Watt Market.

As presented in Table 2, retail margins are significantly higher than wholesale margins across all three markets, emphasizing the markup dynamics from the wholesale to retail stages with seasonal variations impact price margins were higher profit margins (particularly in January) was seen across both retail and wholesale segments, likely due to post-holiday demand.

Cost-benefit analysis of crayfish marketing in the three (3) major markets of Calabar

This analysis (Table 3) compares the cost structure, profitability, and efficiency of crayfish marketing in Nsidung Beach Market, Watt Market, and Ika-Ika Oqua Market in Calabar. As presented in Table 3, crayfish procurement costs are lowest at Nsidung Beach (₦145,000) compared to Watt (₦162,000) and Ika-Ika Oqua (₦163,000). This suggests that Nsidung

Beach serves as the primary landing site, where prices are lower due to fewer intermediaries. In terms of their variable cost of production, transportation, loading, security, maintenance, and association dues increase as crayfish moves further from the landing site. Ika-Ika Oqua incurs the highest variable cost (₦93,500), followed by Watt (₦82,000), with Nsidung Beach having the lowest (₦60,000), implying that crayfish distribution becomes more costly in urban markets due to logistics and operational expenses. Fixed cost comprising the cost of renting storage facilities was highest at Ika-Ika Oqua (₦130,000), followed by Watt (₦120,000) and Nsidung Beach (₦100,000).

It was also found that the total revenue in Ika-Ika Oqua Market records the highest revenue (₦875,000), followed by Watt (₦850,000), with Nsidung Beach at ₦800,000 which reflects higher selling prices in urban markets due to added value and customer accessibility. Similarly, Ika-Ika Oqua remained the most profitable (₦641,500), followed by Watt (₦638,000) and Nsidung Beach (₦630,000) which explains that despite higher marketing expenses in urban areas, the final retail pricing sustains high profitability. Ika-Ika Oqua also had the highest gross margin (₦781,500), followed by Watt (₦768,000), with Nsidung Beach slightly lower (₦740,000), which explains that despite higher costs, urban markets generate greater gross margins due to increased selling prices. Lastly, Nsidung Beach has the highest efficiency (94.11%), followed by Watt (80.19%) and Ika-Ika Oqua (74.95%), which suggests that direct sourcing from Nsidung Beach is the most cost-effective, while retail markets incur additional expenses that reduce efficiency.

Table 1: Estimated wholesale and retail marketing margins and average

Months	Fishermen from Ineh wholesale price/bag (₦)	Nsidung beach retail price/bag (₦)	Watt Av. Retail price/bag (₦)	Ikalka Oqua retail price/ba (₦)	Nsidung retail margin (₦)	Watt retail margin (₦)	Ikalka Oqua retail margin (₦)	Nsidung retail margin (%)	Watt retail margin (%)	Ikalka Oqua retail margin (%)
Jan. 24	130000	140000	160000	155000	10000	20000	15000	7.60	14.28	10.71
Feb. 24	135000	143000	160000	160000	8000	17000	17000	5.92	11.88	11.88
Mar. 24	150000	160000	170000	175000	10000	10000	15000	6.67	6.25	9.38
Total Mean	415000 138333.33	443000 336333.33	490000 376666.66	490000 373333.33	28000 21333.33	47000 40333.33	47000 37000	20.19 15.74	32.41 28.24	31.97 25.71

Percentage Margins

Months	Fishermen from Ineh wholesale price/bag (₦)	Nsidung beach wholesale price/bag (₦)	Watt wholesale price/bag (₦)	Ika-Ika Oqua wholesale price/bag (₦)	Nsidung wholesale margin (₦)	Watt wholesale margin (₦)	Ika-Ika Oqua wholesale margin (₦)	Nsidung wholesale margin (%)	Watt wholesale margin (%)	Ikalka Oqua wholesale margin (%)
Jan. 24	124000	132000	152000	153000	8000	20000	21000	6.45	15.15	15.91
Feb. 24	128000	135000	155000	157000	7000	20000	22000	5.46	14.81	16.29
Mar. 24	138000	145000	162000	163000	7000	17000	18000	5.07	11.72	12.41
Total Mean	390000 130000	412000 137333.33	469000 156333.33	473000 157666.66	22000 7333.33	57000 19000	61000 20333.33	16.98 5.66	41.68 13.89	44.61 14.87

Source: *Computed from field survey, 2024*

In essence, Nsidung Beach Market offers the best marketing efficiency, with low costs and high margins, making it ideal for bulk purchasing. Urban markets (Watt & Ika-Ika Oqua) generate higher revenue and profits, but marketing efficiency is lower due to increased costs. Higher costs in urban areas were balanced by increased selling prices, sustaining profitability despite higher operational expenses. This suggests the need for crayfish traders in Calabar to optimize their sourcing and distribution strategies, balancing costs and profit margins depending on their market choice. These findings are similar to Ukam (2020).

Conclusion and Recommendations

This study provides a comprehensive cost-benefit and marketing efficiency analysis of crayfish trade in Nsidung Beach Market, Watt Market, and Ika-Ika Oqua Market in Calabar. By evaluating cost

structures, profit margins, and marketing efficiency, the research highlights the profitability and sustainability of crayfish marketing across different market structures. The justification for this study lies in its contribution to understanding the economic viability of crayfish trading, particularly in urban and landing markets. Despite the significance of crayfish as a nutritional and economic commodity, limited research has focused on the market dynamics and efficiency variations among major markets in Calabar. This study addresses this gap by providing empirical insights into pricing structures, operational costs, and trade efficiency, assisting policymakers, traders, and investors in optimizing market strategies. This research presents a novel approach by integrating cost-benefit analysis with marketing efficiency metrics, specifically utilizing the Shepherd Futrel Method to evaluate efficiency across

markets. Unlike previous studies that only examine profitability, this study offers a comparative perspective on wholesale and retail margins, demonstrating how market location and operational costs influence efficiency. Additionally, the findings reveal the structural disparities in trade operations, showing how union regulations, logistics, and market accessibility shape crayfish marketing performance. The study establishes the impact of market type on

marketing efficiency, highlighting that Nsidung Beach Market is the most efficient due to lower operational costs, while urban markets (Watt and Ika-Ika Oqua) generate higher revenues but lower efficiency due to additional expenses. Findings reinforce the economic potential of crayfish marketing, offering recommendations for cost optimization and investment strategies, which can enhance market sustainability.

Table 2: Cost-benefit analysis of crayfish marketing in the three (3) major markets of Calabar

	Variables	Nsidung beach (₦)	Watt (₦)	Ika-Ika Oqua (₦)
(A)	Purchase	145000	162000	163000
(B)	Variable Cost			
-	Transportation Cost	20000	30000	35000
-	Loading (per bag)	5000	8000	9000
-	Off-loading (per bag)	5000	9000	10000
-	Security	5000	8000	8500
-	Association dues	5000	5000	6000
-	Maintenance cost	20000	22000	25000
	Total variable cost	60000	82000	93500
(C)	Fixed cost			
-	Rent for stores	100000	120000	130000
-	Local govt. rate	10000	10000	10000
	Total fixed cost	110000	130000	140000
	Total cost (TFC+TVC)	170000	212000	233500
(D)	Total revenue (Price×qty(5bags))	800000	850000	875000
(E)	Selling price	160000	170000	175000
(F)	Marketing margin (Selling price-Purchase price)	15000	8000	12000
(G)	Gross margin (TR-TVC)	740000	768000	781500
(H)	Profit (TR-TC)	630000	638000	641500
(I)	Marketing efficiency Sepherd futrel method	94.11%	80.19%	74.95%

Source: *Computed from field survey, 2024.*

This research underscores the significance of market structure in crayfish trade, emphasizing the importance of cost management and efficiency optimization to

maximize profitability. Future studies may build on this work by exploring seasonal price variations, international export

potential, and the role of digital platforms in enhancing crayfish trade dynamics

The study proffered the following recommendations:

➤ **Market Infrastructure Improvement**

The Calabar Municipal government should invest in modernized market infrastructure at Nsidung Beach, Watt, and Ika-Ika Oqua Markets. Enhancing storage facilities, transportation logistics, and security measures will help reduce operational costs and improve overall efficiency.

➤ **Optimized Pricing Strategies**

Market unions and policymakers should implement structured pricing models that balance wholesale and retail margins. Establishing price monitoring mechanisms can help stabilize crayfish trade prices, ensuring fair returns for fishermen, wholesalers, and retailers.

➤ **Reduced Transaction Cost**

High variable costs such as transportation, security, and market dues negatively impact efficiency, especially in Watt and Ika-Ika Oqua Markets. Traders should explore collaborative transportation models and union-driven security arrangements to reduce overhead expenses while maintaining trade quality.

➤ **Market Accessibility and Trade Expansion**

Encouraging regional and international trade links could boost profitability for crayfish marketers. Government policies should support export opportunities, digital trade platforms, and cooperative trade alliances to expand market access and maximize revenue.

➤ **Policy and Union Regulation Reforms**

Market unions should revise entry requirements and membership fees to encourage wider participation while

maintaining order. A policy framework ensuring regulated competition will improve crayfish supply chain efficiency, minimize monopolistic tendencies, and enhance sustainability.

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