# Factors Affecting Fish Marketing and Consumption in Sawakin - Red Sea - Sudan

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**المستخلص :**

هدفت الدراسة للتعرف على الخدمات التسويقية وتكاليفها واثرها على الكمية المستهلكه من الوسطاء. البيانات الأولية جمعت بإستخدام إستبيان (لعشرة) من الوسطاء و (خمسين) من المستهلكين، بينما البيانات الثانوية تم الحصول عليها من الدراسات السابقة ، البحوث، المراجع، والاوراق العلميه، والشبكة العنكبوتية وتقارير من مصادر مختلفة ذات صلة بالدراسة. اتبعت الدراسة المنهج الوصفي ومنهج دراسة الحالة. الحزمة الإحصائية للعلوم الإجتماعية أستخدمت لتحليل البيانات، كما تم تطبيق التحليل الوصفى ( التكرارات والنسبة المئوية والإرتباط الخطى البسيط) لتحليل البيانات. أظهرت الدراسة أن%20.0 من الوسطاء يقدمون كل الخدمات التسويقية، والعوامل التى تؤثر على العرض والطلب هى زيادة الطلب مع نقصان العرض تمثلت فى %40.0 من الوسطاء. كما وجدت الدراسة أن %50.0 من المستهلكين مستوى دخلهم ( 1000 جنيه واقل ) وهذا يعنى ان نصف المستهلكين من الفقراء. أظهرت الدراسة وجود علاقة موجبة متوسطة بين الخدمات التسويقية وتكاليفها ( بمعامل إرتباط 590.) وهذا يعنى ان زيادة الخدمات تؤدى الى زيادة التكاليف. كذلك يعانى المستهلكين في المنطقة من عدم توفر المياه الصالحه للشرب والكهرباء. دعت الدراسة الحكومة لحل مشكلة المياه والكهرباء لانها ، وإدخال طرق تصنيع جديدة تعمل على زيادة فترة صلاحية الاسماك

**ABSTRACT:**

The study aimed to identify marketing services and their cost effect on quantity consumed from intermediaries. The primary data were collected using a questionnaire for ten (10) intermediaries and fifty (50) of consumers, while the secondary data were obtained from previous studies, research, references, scientific papers, web sites articles, and reports from various sources related to the study. The study adopted the descriptive and the case study methods; in addition, the Statistical Package for Social Sciences  program (SPSS) was used for data analysis. Descriptive statistics including frequencies, percentages, and linear correlation coefficient were applied to the data. The study showed that all marketing services were offered by 20.0% of intermediaries, while 40.0% of intermediaries believed that the factors, which affected marketing demand and supply of fish, are the increase of fish demand coupled with decrease in its supply. The study found that 50.0% of consumers their income level is (1000 SDG and less), that means half of the consumers are poor. The study indicated the existence of a positive medium relationship between marketing services and their costs with a correlation coefficient of 0.590, which means the increase of services leads to an

increase in their costs. Moreover, consumers in the study area suffer from unavailability of drinking water and electricity services. The study calls for the government to solve the problems related to provision of electricity and water services, besides introducing new processing methods to extend the expiry date of fish.

**Keywords: -** Consumption, Services, Services Costs, Intermediaries, Consumers.

**Introduction**:

Animal production has an important role in agricultural economic activities; it represents the major products utilized for human nurture, which considered as a main source of animal protein. It has nurture value, which represents about 80% of fish weight, about 65% of poultry, and about 54% of the livestock (Yahuh, 2014).

Catches of fish fluctuate widely between years, locations, and seasons according to movements of fish, which depend on weather patterns and sea conditions, climate change, with estimated sea surface temperature; fishermen think fish will be the scarcer due to climate change (Moenieba, 2013).

Market force losses are due to inadequacy between demand and supply leading to changes in price of fish. If the price of fish falls because of oversupply, the seller may incur a market force loss. Market force loss is difficult to measure accurately, because it usually sets the ground for quality and physical losses (Idanie and Meseret, 2015) (FAO, 2014).

Fish prices are influenced by demand and supply factors, including the costs of production and transportation. The lowest prices are received in summer due to peak supply at that season while the highest prices are received in winter and autumn (Somia, 2009).

Fish marketing is an important agricultural domain. Seafood is one of the most extensively traded commodities in the world and export of fish produced from developing countries, comprises 20% of agriculture and food processing exports and is likely to increase as demand for fish produced continues to increase (Ismail, 2014). Fish marketing and distribution is an integral aspect of fish production because it is only when the fish gets to the final consumers in this point production can be complete.

Marketing has been defined as all processes involved from the production of a commodity until it gets to the final consumer. These processes ascertain that the right product is available at the right place, at the right price and at the right time to fully satisfy the consumer.

Fish being highly perishable after harvest requires proper preservation and storage to increase the shelf life. Major methods of fish preservation and processing have been identified as freezing, wood, smoking and drying. Fish is sold to consumers as frozen or ice fish, cured (smoked), sundried fish and as fresh fish, either from a cultured pond or from the wild. (A, A, Nwabueze1 and E, O, Nwabueze2, 2010).

The per capita of fish consumption in Sudan is about 1.3 kg/year, which is considered as a very low rate when compared to the international level, which is about 13 kg/year according to FAO statistics. In the Sudan the national average was close to 1 kg/year. In urban areas consumption was estimated to be as > 2 kg/year; while in rural areas, it was < 0.5 kg/year".

Fisheries resources in Sudan, are not fully exploited, therefore, there are considerable resources which could contribute significantly to rectifying the low per capita consumption (Somia, 2009). Proper and quick handling is needed for fresh fish as it is a very perishable commodity especially under Sudan hot climatic conditions, but the existing fish marketing is practiced in traditional ways. The storage function is primarily concerned with making commodities available at the desired time. (FAO, 2012). To make fish available to consumers at a right time and in a right place requires an effective marketing system.

Entering into the market is difficult for fisherman for many reasons, mainly because of non–cooperation and resistance from retailers. Thus, it is obvious why fishing commodities' remain poor or are getting poor over the years, although they trade an important, necessary and every-day commodity (Dominic, 2010).

The buying and selling of fish commodities in their various forms as fresh or preserved fish had been affected by various factors, urbanization and growth of urban population had led to changes in the pattern of demand for fish products, while the development of informal markets are responsible for the increase in consumer demand for higher quality fish products. Other socio-economic problems such as transportation and distance to the point of sale to the final consumers have affected the quality and cost of fish products.( A,A, Nwabueze[1] and E,O ,Nwabueze[2,]2010).

There are several factors that affect fish marketing, which may include fish quality, location, weather condition, price and demand, and water pollution. The quality of fish greatly affects the market price of fish, since most of the consumers preferred to purchase high quality and fresh fish for health and safety reasons (Alapan, et al, 2016).

Fish consumption, frequency, and preferences are affected by consumers' geographic, social, and cultural characteristics. It is known that food preferences are also affected by a number of sensory (taste, smell, texture) and non-sensory factors (behavior, beliefs, personal characteristics, risk perception) (Mehmet, et al, 2016).

Marketing problems are related to infrastructural facilities; high perish ability of the commodity, lack of storage facility, lack of processing unit, and high bargaining power of the consumers, huge competition, price fluctuation, irregular supply of fish, and lack of government support (Rahaman and Bara, 2013). Also pre -harvesting methods of fishery products, unavailability of adequate transportation (roads, vehicles, and rails), ineffective of distribution system to transport goods from one point to another are considered as constraints for fish marketing (Nwabunike, 2015).

Price is the main constraint of fish marketing in the low income sector of the population, while lack of capital also constitutes a problem in the marketing process. Alternatively, the ineffective of distribution system of fish increases the marketing margins as transporters and wholesalers recover the high cost of vehicle maintenance from consumer price (Nwabunike, 2015).

**Statements and Justification of Study:**

The Red Sea State is the only state in Sudan bordering the sea with a coastline of 750 km and an exclusive economic zone of $91,600km^2$. The most important zone in Red Sea is the Southern zone, which includes Sawakin; it contributes about 40% of the total capture, while the Northern zone and the Central zone contribute about 25%, and 35 % of the total capture respectively.

Although, it represents high percentage of fish capture compared with other zones, intermediaries and consumers in Sawakin area still suffer from problems affected fish marketing and consumption. These problems were related to marketing services provided to fish and methods of preservation, as well as lack of fish and methods of preservation.

**Objectives of the Study:**

This study is mainly conducted to identify the factors, which affect fish marketing in Sawakin area. The specific objectives of the study is to explain the relationship between marketing services and cost and their effect on quantity consumed from intermediary, to determine the relationship between income rate and amount of fish consumed per month.

**Hypotheses of the Study:**

The study hypotheses are based on the objectives of the study, whereas the following hypotheses will be tested: finance, transportation, preservation, and grading affect fish marketing and marketing services, and hence their cost affect the quantity consumed by fishermen and intermediary.

**Materials and Methods of the Study:**

The study was conducted in Sawakin area which located at west Sudanese Costal; it located at latitude 19, n), longitude at (37'E) and altitude 66m. Sawakin was originally built on a flat oval-shaped island, about 750 m. long and less than 500 m. wide, for much of the second millennium Sawakin was one of the most important port cities in the upper Red Sea region (Sawakin Dilemma, 2016).

Coral buildings of Sawakin developed a distinctive art and architectural style, which was applied throughout the coastal, it shares specific culture and social values which are embedded in their everyday system of social organization, and had its influence on their architecture as well (Olakanbi and Osama , 2016).



Map data 2017 Google

**Data Collection**

Data was collected through a survey which was conducted during the period of May, 2017, while the samples were obtained by using simple random sampling technique. There were two types of respondents from whom primary data was collected, that include 50 consumers and 10 intermediaries (10 intermediaries represent all population in study area). The questionnaire used composed of close-ended and open-ended questions, which were designed to provide

essential information about marketing services and their cost in Sudanese Pound (SDG) per ton.

In addition to primary data, the study used secondary data, which was collected from relevant sources including reports and studies relevant to the field; various Ministries reports, research centers, text (books), and related sources on internet (website).

In order to achieve the objective of the study, the data collected was subjected to descriptive analysis procedures; including descriptive statistics (frequencies, percentage), while linear correlation coefficient was used to show the relationship between some variables. The data analysis has been conducted through using the Statistical Package of Social Sciences Program (SPSS).

**Results:**

Table **(1)** explains the marketing services and their cost in SDG per ton**).** It also, shows that the cost of service varies according to number of services provided for commodities.

Table (1) :Marketing service and costs

| Marketing service and costs | Frequency | Percentage % |
|---|---|---|
| Cooling | 2 | 20.0% |
| All services | 2 | 20.0% |
| Collection / cooling /transport and /distribution | 1 | 10.0% |
| Collection  / cooling and distribution | 1 | 10.0% |
| Collection/ transport/ storage and distribution | 1 | 10.0% |
| Cleaning/ transport | 1 | 10.0% |
| Cleaning frying pan | 1 | 10.0% |
| All except  cleaning | 1 | 10.0% |
| **Marketing service** | 10 | 100.0% |
| 180 - 400 | 2 | 20.0% |
| 400 - 620 | 2 | 20.0% |
| 620 -  840 | 4 | 40.0% |
| 840 - 1060 | 0 | 0.0% |
| 1060 – 1280 | 1 | 10.0% |
| **Cost of marketing services  in SDs  per ton** | 9 | 90.0 % |

Source: survey data, 2017

Table (2) displays different factors that affect marketing in the study area, which include marketing demand and supply of fish, price, transportation problems, preservation methods, as well as other factors such as the lack of contact between fishermen and trader in case of emergency, high price of production input, and high cost of spare parts and their unavailability in the local market.

Table (2):Factors Affecting Marketing in the Study Area.

| | Frequency | Percentage % |
|---|---|---|
| Increase of demand with decrease supply | 4 | 40.0% |
| Increase of supply with decrease demand | 4 | 40.0% |
| No problem | 2 | 20.0% |
| marketing demand and supply of fish | 10 | 100.0% |
| price | | |
| Fluctuation price | 10 | 100.0 % |
| Un abundance site of production far from consumer position | 4 | 40.0% |
| Unsafe | 2 | 10.0 % |
| High cost and traditional | 3 | 30.0 % |
| No problem | 1 | 10.0 % |
| transportation problems | 10 | 100.0 % |
| High price and un abundance of ice special in summer | 5 | 50.0% |

| | | |
|---|---|---|
| Traditional mean of production | 2 | 20.0 % |
| High price and traditional methods | 3 | 30.0 % |
| preservation methods | 10 | 100.0 % |
| No contact between fisherman and trader incase emergency | 1 | 10.0 |
| High price of production input and | 3 | 30.0% |
| High cost of spares and unavailability in local market | | |
| Other factors affected fish marketing | 4 | 4.0% |

Source: survey data, 2017

Table (3) shows that 70.0% of intermediaries believe that the best season to achieve high profit is winter, alternatively, 30.0% of them believe summer is the best season to achieve profit. Table (3) also, indicates that 60.0% of intermediaries believe that high price is the main reason to achieve profit, while 30.0% believe that rise in the demand of fish is the main reason, and10.0% of respondents believe that the main reason to achieve profit is the abundance of fish.

Table (3): Best Seasons and Causes of High Profits

| | Frequency | Percentage % |
|---|---|---|
| Winter | 7 | 70.0 % |
| summer | 3 | 30.0 % |
| Season to achieve high profits | 10 | 100.0 % |
| High price | 6 | 60.0 % |
| Increase demand of fish | 3 | 30.0 % |
| Abundance of fish in big amount | 1 | 10.0 % |
| Reason to achieve high profits | 10 | 100.0 % |

Source: survey data, 2017

Table (4) shows the factors affecting fish consumption, which include income rate, family size of consumers, number of fish meal per month, amount of fish consumed in kg/ month, effect of income increase on quantity demanded, and other factor affecting fish consumption such as high perishable rate, and high price of fish in the study area.

Table (4) : factors affecting fish consumption

| | Frequency | Percent % |
|---|---|---|
| 1000  and less | 25 | 50.0 % |
| 1000 - 2000 | 16 | 32.0 % |
| 2000 - 3000 | 6 | 12.0 % |
| 3000 and more | 3 | 6.0 % |
| Income Rate | 50 | 100.0 % |
| 5and less | 33 | 66.0 % |
| 6  - 10 | 16 | 32.0 % |
| 11 -15 | 1 | 2.0 % |
| 15 and more | 0 | 0.0% |
| Family size | 50 | 100.0 % |
| 1 - 3 | 12 | 24.0 % |
| 3 – 5 | 22 | 44.0 % |
| 5 and more | 16 | 32.0 % |
| Number of fish meals  in month | 50 | 100.0 % |
| Less than 3 | 11 | 22.0 % |
| 3- 5 | 34 | 68.0 % |
| 5 and more | 5 | 10.0% |
| Amount of fish consumed in kg/ month | 50 | 100.0 % |
| Increase | 44 | 88.0 % |

| Decrease | 6 | 12.0 % |
|---|---|---|
| Effect of income increase on quantity demanded | 50 | 100.0 % |
| Un abundance | 17 | 34.0 % |
| High price | 26 | 52.0 % |
| High perishables | 2 | 4.0 % |
| No factors | 5 | 10.0 % |
| Other factors affecting fish consumption | 50 | 100.0 % |
| Unavailable of potable water and electricity | 50 | 100.0 % |
| Other problems | 50 | 100.0 % |

## Analysis of Data
### The Relationship between Income Rate and Amount of Fish Consumed per month

The analysis of data (table 5) indicates the existence of a significant positive relationship between income rate and amount of fish consumed per month with a correlation coefficient of 0.417. Accordingly, that means income rate has an effect on amount of fish consumed per month.

Table (5):- The Relationship between Income Rate and Amount of Fish Consumed per month

| Correlations | | rate income | amount of fish consumed per month |
|---|---|---|---|
| rate income | Pearson Correlation | 1 | .417[**] |
| | Sig. (2-tailed) | | .003 |
| | N | 50 | 50 |
| amount of fish consumed per month | Pearson Correlation | .417[**] | 1 |
| | Sig. (2-tailed) | .003 | |
| | N | 50 | 50 |

**.Correlation is significant at the 0.01 level (2-tailed).

### The Relationship between Services and Costs of Services

The study finds a medium and a positive relationship between services and their costs with the coefficient of correlation amount to 0.590, which means the increase of services lead to the increase of their costs.

Table (6):- The Relationship between Services and Costs of Services

| Correlations | | service | Costs |
|---|---|---|---|
| Service | Pearson Correlation | 1 | .590 |
| | Sig. (2-tailed) | | .073 |
| | N | 10 | 10 |
| costs | Pearson Correlation | .590 | 1 |

| | | |
|---|---|---|
| Sig. (2-tailed) | .073 | |
| N | 10 | 10 |

## Discussion:

There were many factors that affecting fish marketing in Sawakin area, the most important ones include storage, which is an important job for fishermen, intermediaries and consumers because fish is a very perishable commodity and needs adequate storage, also, preservation, which stems its importance from the fluctuation of ice price and its unavailability, especially in summer season. Moreover, the means which used to carry fish are traditional, since the fishing trip takes many days in sea ranging from 7 -15 days, thus, the fishermen need a large amount of ice to save the fish from spoilage when marketed at Sawakin or Port Sudan market, (Somia, 2009). This result emphasizes the hypothesis, which assumed that storage, transportation, preservation, and grading affect fish marketing.

Fluctuation in the price of fish took place due to change in the amount of fish catches per journey, as a result of change in weather patterns, sea conditions, and temperature, also, when there is no fish sale or the fish sale is low, the fish price reduced and change from time to time. As argued by (Moenieba, 2013) "catches of fish fluctuate widely between years, locations, and seasons, whereas movements of fish can be highly variable depending on weather patterns, sea conditions, and climate change". Also, (Idanie and Meseret, 2015) found that market forces losses are due to inadequacy between demand and supply leading to changes in price of fish. If the price of fish falls because of oversupply, the seller may incur a market force loss. However, market forces losses is difficult to measure accurately, because it usually sets the ground for quality and physical losses. This proves that fish prices are influenced by demand and supply factors, including the costs of production and transportation, (FAO, 2014).

The results showed the best season to achieve high profits is winter due to high price and increase demand of fish, and decrease of supply because most of fishermen do not practice fishing because of unsettled weather. As mentioned by (Somia, 2009) "the lowest prices are received in summer due to peak supply at that season, while the highest prices are received in winter and autumn". In addition, fishermen sell the majority of their production in Port Sudan that make fish price high for consumers in the study area.

We should also mention that although Sawakin hosts the second largest port in the country after Port Sudan, however, it still suffers from inadequate electricity and water services. These problems affect fish consumption through fish preservation, which become difficult, and hence does not enable consumers to buy big amount of fish.

## Conclusions:

The main factors affecting fish marketing include the price instability due to changes in the amount of fish catches per journey, high cost of transportation because of the traditional and unsafe means of transportation used, preservation factors especially in the summer due to un availability of preservation means and their cost, high perish ability of fish commodity that means the consumers suffer from the lack of preservation facility to preserve fish due to poverty, while the main factors affect fish consumption include lack of adequate electricity and water services.

## Recommendations:

The study calls for the government to solve the shortages of electricity and water services, improve the condition of marketing infrastructure in the study area to ease the provision of services, find out methods that can make fish available for the consumers, introduces new processing methods to save fish for a long time (increase shelf life) by making extension training programs for consumers.

## References:

1. A. A Nwabueze1 and E.O. Nwabueze2 (2010). An investigation into the problems of fresh fish marketing in Oshimili South Local Government Area of Delta State, Nigeria. Agricultural and Biology Journal of North America ISSN Print: 2151-7517

2. Alapan ,M,P, Arpilleda ,E,L. Altizo, K,J. and et al(December 17, 2016). Factors Affecting the Market Price of Fish in the Northern Part of Surigao Del Sur, Philippines. Journal of Environment and Ecology. ISSN 2157 - 6092 .Vol. 7, No.2w. www macrothink.org/jee

3. Dominic Joseph Bill Ayiek, (2010).Effect of Variable &Fixed Costs on Fish Marketing in Sudan, MSc Thesis, Sudan University of Science and technology.

4. FAO, (2014). The State of World Fisheries and Aquaculture 2014, opportunities and challenges

5. FAO Report (November 2012), Marketing of Major Fish Species in Bangladesh, A Value Chain Analysis, A report submitted to Food and Agriculture Organization for the project entitled "A Value-chain Analysis of International Fish Trade and Food Security with an Impact Assessment of the Small-scale Sector", By Ferdous Alam, Idris A, M.

6. IdanieMisganaw and MeseretBazezew.(2015). Post-harvest and Major Related Problems of fish production, Fisheries and Aquaculture Journal.

7. Ismail ABDLatif , Tijani.( 2014). Analysis of Marketing Channel and Market Structure of Dried Fish in Maiduguri Metropolis of Borno State, Nigeria, European Journal of Business and Management www.iiste.org, ISSN 2222-1905 (Paper) ISSN 2222-2839 (Online).

8. Mehmet, F, C. Aytekin, G. Hayriye, Y, C. (Jun. 2015). Fish consumption preferences and factors influencing it. Food Sci. Techno, Campinas, I:Dhttp://dx.doi.org/10.1590/1678-457X.6624 - 35(2): 339-346, DI:Dhttp://dx.doi.org/10.1590/1678-457X.6624

9. Moenieba Isaacs ,(M, 2013).Small-scale fisheries governance and understanding the snoek (Thyrsitesatun), supply chain in the Ocean View fishing community, Published under license by the Resilience Alliance Isaacs, Western Cape, South Africa. Ecology and Society 18(4): 17.

10. Nwabunike M., (2015). (Received: 21-12-2014, Accepted: 12-01-2015,) Constraints of Fish Marketing in Abakaliki Metropolis, International Journal of Fisheries and Aquatic Studies.

11. OlakanbiBolajiAbdulRaheem and Osama AbdulwahabRayis, (2016). (IJA) Volume 2, Issue 1, January-June 2016, pp. 01–15), International Journal of Architecture, Article

12. Omer Abu- Alhassan Omer Aidam, (May 2011). Comparative Study on Nutritive Value and Microbial Load Count Wet, Salted Fish Product (Tarkin) in Sudan, MSc Thesis, Sudan University of Science &Technology.

13. Rahaman, B. K. BERA, (2013). A study on problems and constraints in production and marketing of fish in West Bengal, Journal of Crop and Weed.

14.   Sawakin Dilemma, (10 Jan 2016). Conservation and Heritage Management in Eastern Sudan, Pages 109-121 | published online.

15.   Somia Abu Elgasim Mohamed Ahmed (April, 2009). The Economic of Fish Production &Marketing in White Nile State – Sudan, MSc Thesis, University of Khartoum, Sudan.

16.   Yahuh Mohammed Metuli Khalil (2014) .Economics of fish production and consumption in Egypt, National Research Center.