

Economics of Fish Production and Marketing: A Case Study of Khartoum State, Sudan

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Abstract: The study aims at highlighting on economics of fish production and marketing in Khartoum State, Sudan; during 2008/09 season. Studying the socioeconomic characteristics of fishermen, calculating production cost and identifying the different production factors of production represent secondary objectives. Primary data was collected by using questionnaire. 75 fishermen were interviewed using random sampling. The secondary data was collected from different sources related to the area of the study. Descriptive statistics and quantitative analysis techniques were used. Also, Coefficient of Private Profitability (CPP) measure was used beside return per Sudanese pound invested. The results revealed that about 52% of the fishermen education ranges between primary and secondary school. About 46.7% of them have working experiences more than 9 years. Also, return per Sudanese pound invested showed that the business of fisheries was viable. CPP was more than unity which indicated that the production of fish was profitable at producing and/or the present price level. The study recommended that developing and modernizing the means of production and packaging and encouraging investment in this profitable and viable business.

Key words:

INTRODUCTION

The natural fisheries of Sudan are divided into two main sectors; the inland fisheries (fresh water fisheries) and the marine fisheries of the Red Sea. The inland fisheries are composed of the main Nile and its tributaries which are 6500 km long. And specially the reservoirs formed by the dams on the rivers; Jebel Aulia reservoir on the White Nile, Rosaries and Sennar reservoirs on Blue Nile, Khashm Algerba reservoir on Atbara River and Nuba Lake, which is the Sudan portion on Nasir reservoir. It lies in the northern part of Sudan, and it was formed by the construction of the Egyptian high dam south of Aswan. It is the richest source of fish in the Main Nile inside the Sudan, in addition to the Sud region at Upper White Nile^[2].

On the other hand, the marine fisheries are at the Sudanese coast line on the Red Sea, which extends to 720 km, and a continental shelf of about 98,000 km², which is unsuitable for trawling due to its irregular coral beds^[10]. This area is endowed with fine fishes, shelf fishes, 'crap' and crustacean 'shrimp and lobster'^[9], the total sustainable fish stock of Sudan is about 110,000 tons^[6].

Khartoum State covers an area of 21000km² and the fish storage in it is estimated around 15,000 tons. But the amount exploited is not more than one thousand tons. The fish production is found in the fisheries inside Khartoum State in Jabal Awlia, Kalakla, Fetiah Al-Agaleen, Al-Murada, the island of Al-Fitihab, Al-Sagai, Al-Sabalwaga and Al-Jeriaf area on the Blue Nile ⁽¹⁾. The process of handling and distribution of fish is carried by fishermen, traders and this confirmed with the case of Ethiopia^[4]. The population of the Khartoum State is about five millions. This great number of people made Khartoum a big consuming market for animal and vegetable production.

The fish section in Khartoum State is characterized by being traditional in general and the ways and equipment of fishing did not find their chance to be modernized effectively. Add to that there are not enough means of storing, refrigeration and suitable transportation. On the other hand, the fish marketing activity is concentrated on only two markets out of the three fruit and vegetable central markets that exist in the state. Even in those two markets, there are very simple ways of preserving, showing and circulating the

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fish. In the state there are two stations for fish services which are regarded as a centre for the teams of the statistics. What is observed in these two centers is that there an infrequency in the studies and researches that are concerned with the development of the fish section in the state^[7]. So, the main aim of this study is to shed light on the economics of producing and marketing fish in the state. While the secondary objectives are to study the economics and social characteristics of the fishermen, counting the production cost, counting the net profit, gross margin and studying the ways of how to deal with the abundance. These are besides, studying the ways adopted in packing, transporting and identifying the criteria's of grading fishes.

MATERIALS AND METHOD

Data Collection Methods: This study was carried out during the year 2009 in Khartoum State. It relied on the primary data gathered from a questionnaire among 75 fishermen using the random sample. The study also relied on the secondary data collected from different sources related to the topic of the study.

Data Analysis Method: The data collected were analyzed using descriptive statistics. It also used quantitative analysis tools such as net returns, gross margin, benefit cost ratio and return per S. G invested.

Quantitative analyses Techniques:^[3]

Net Returns: This was determined by the following equation:

$$\text{Net returns} = \text{TR} - \text{TC}$$

Where;

TR = Total Revenue

TC = Total Cost

Gross Margin Analysis: Gross margin is the difference between total revenue and total variable cost and was determined using:

$$\text{GM} = \text{TR} - \text{TVC}$$

Where;

GM = Gross Margin

TR = Total Revenue

TVC = Total variable cost

TVC = TC - TFC

TFC = Total fix cost (cost of boat)

Returns per Sudanese Pound Invested: Returns per Sudanese pound invested:

$$\text{Returns / Sudanese pound invested} = \text{GM} / \text{TVC}$$

Coefficient of Private Profitability: (CPP) is used to measure of profitability of the farm

$$\text{CPP} = \text{TR} / \text{TC} \text{ (S.G/Kg)}$$

CPP: Coefficient of Private Profitability

If CPP is less than unity then it is unprofitable to produce that product at the present productions level and /or the present price level.

RESULTS AND DISCUSSION

The following section contains socioeconomic characteristics of fishermen and fish marketing.

Socioeconomic Characteristics of Fishermen Age:

Table (1) showed that the majority of the fishermen (65.3%) were more than 31 year. While (28%) of them were between 20-30 years and (6.7%) were below 20 years old.

The Education Level: Table (2) indicated the level of education for the fishermen. It was observed that the level of education for most of them (69.3%) ranged between primary and secondary school level, while 14.7% stands for those who attended Quranic schools (Khalwa) and 16% refereed to those who were illiterate.

Fishermen Working Experience: It was found that about 66.7% of the fishermen have working experience more than six years in the field of fishing.

The Existence of Fishermen in Fisheries: Table (4) showed that 81.3% of the fishermen lived permanently in the city, while (18.6%) of them lived in villages and come to the area of production.

Fish Marketing:

Transportation: Referring to table (5) we observed that only 29.3% of the fishermen transported their fish to the markets and 70.7% of them did not.

Means of Transportation: Table (6) showed the fishermen and the means of transportation that they used to transport their fish product. It was seen that 22.5% of the fishermen used bicycles and 50% of them used normal car, while 22.5% used refrigerated cars.

Distribution: Table (7) denoted that 34.7% of the fishermen sold their fish to all categories of merchants (wholesalers, retailer and local merchants). 34.7% of them sold their fish to retailers, 13.3% to the local merchants and 6.7% sold their fish to wholesalers.

Packing: Table (8) showed the percentage of the containers that fishermen used in packing their fish. It was noticed that about 80% of the fishermen used baskets for packing, while about 20% of them used buckets.

Grading: Table (9) explained that 100% of the fishermen classified their fish according to its kinds.

The Ways of Dealing with the Abundance: Table (10) clarified that 100% of the fishermen deal with the abundance by processing it. This was confirmed in a previous study which showed that about 63% of the fish production was mainly marketed inside and consumed freshly and 28.7% of it was consumed as dried fish and 9% was consumed as salted fish^[8]. That means post-harvest losses in fishers did not find in the study. This result was un-agreed with previous study in Ethiopia^[11]. Tigaba declared that the post-harvest losses reflecting to some of the following; fishing methods, inadequate handling facilities and delay between catch collection and distribution.

Fish Production: In fish production section Quantitative Analysis and Coefficient of Private Profitability results were presented.

Quantitative Analysis Results: ^[1] Calculating production costs

The production costs were calculated in table (11) as follows:

[a] Calculating the net costs (S.G/kg)

The cost of the net in a day = the cost of the net in a month (S.G)/30.

$$\frac{82.5}{30}$$

$$30 = 2.75 \text{ kg/day}$$

$$\text{The net cost (S.G/kg)} = \frac{\text{net cost in a day (S.G/day)}}{\text{Productivity (kg/day)}}$$

$$2.75/6.5 = 0.4 \text{ S.G/kg}$$

[b] Counting the boat costs (S.G/kg)

The cost of the boat per day in (S.D/kg)

$$\frac{\text{the price of the boat}}{\text{the age of the boat} \times 12 \times 30 \times \text{the daily production}}$$

$$\frac{23400}{5 \times 12 \times 30 \times 6.5} = 2 \text{ S.G per kg.}$$

Form table (11), the highest cost of production was the laborers which represented 68.8% of the production costs, followed by the net costs (14%) and the boat cost which was 8.2%.

2- Calculating the Net Returns: Net returns = price (S.G/kg) - production cost (S.G/kg) = 6.5 - 3 = 3.5 S.G/kg

Net returns equal 3-5 S.G/kg which indicated that the profitability was high and this was supported by the study of ⁽⁵⁾. Hibro stated that the profitability of capture fishery was high in the lake in Ethiopia

3-Gross Margin Equals: GM = TR - TVC
TVC = TC - TFC

Where;

$$\text{TFC} = \text{Total fix cost (cost of boat} = 0.2 \text{ S.D/Kg)}$$

$$= 6.5 - 2.8 = 3.7 \text{ S.G/kg}$$

This result indicated that this business was profitable.

4>Returns per Sudanese Pound Invested: Returns per Sudanese pound invested:

$$\text{Returns / Sudanese pound invested} = \text{GM / TVC}$$

$$= 3.7/ 2.8 = 1.32$$

The results revealed that investing on fisheries will generate returns.

Result of Coefficient of Private Profitability Measure (C_{pp}): According to the result in table (12) the fishers are profitable at producing level and/ or the present price level i.e. CPP greater than unity.

Recommendations: Developing and modernizing the f transportation mean and packing. Encouraging investment in this profitable business.

Table 1: Distribution of fishermen according to their age

Age range (years)	Frequency	Percentage
Less the 20	5	6.7
20 – 30	21	28.0
31 – 40	16	21.3
More	33	44.0
Total	75	100

Source: Collected and calculated data.

Table 2: Distribution of fishermen according to their education

Education level	Frequency	Percentage
Khalwa	12	16.0%
Primary	11	14.7%
Secondary	27	36.0%
University	25	33.3%
Total	75	100

Source: collected and calculated data

Table 3: Distribution of fishermen according to their working experience (years)

Working experience (years)	Frequency	Percentage
Less than one year	3	4.0%
1 – 3	9	12.0%
3 – 6	13	17.3%
6 – 9	15	20.0%
More than 9	35	46.7%
Total	75	100

Source: collected and calculated data

Table 4: Distribution of fishermen according to their existence in fishers

Existence fishers	Frequency	Percentage
Permently	61	81.3%
Temperedly	14	18.6%
Total	75	100.0%

Source: Collected and calculated data.

Table 5: Distribution of fishermen according to transport of fish

Item	Frequency	Percentage
Transport	22	29.3%
Not transport	53	70.7%
Total	75	100.0%

Source: Collected and calculated data.

Table 6: Distribution of fishermen according to means of transportation

Mean of transportation	Frequency	Percentage
Bicycles	5	22.5
Normal car	12	55.0
Refrigerated vans	5	22.5
Total	75	100.0%

Source: Collected and calculated data.

Table 7: Distribution of fishermen according to kind of trader

Kind of trader	Frequency	Percentage
Local trader	10	13.3
Wholesaler	5	6.7
Retailer	26	34.6
All traders	26	34.7
Consumer	8	10.7
Total	75	100.0%

Source: Collected and calculated data.

Table 8: Distribution of fishermen according to their containers

Type of container	Frequency	Percentage
Baskets	60	80%
Buckets	15	20%
Total	75	100%

Source: Collected and calculated data.

Table 9: Distribution of fishermen according to their grading of fishes

Grading of fish	Frequency	Percentage
Size	0	0.00
Kind	75	100.0%
Total	75	100.0%

Source: Collected and calculated data.

Table 10: Distribution of fishermen according to the ways of deal with abundance

Dealing with the abundance	Frequency	Percentage
Extermination	-	-
Processing	75	100.0%
Others	-	-
Total	75	100.0%

Source: collected and calculated data.

Table 11: Production cost of fish (S.G/kg)

Item	Production cost (S.G/kg)	Percent (%)
Nets	0. 4	14.8%
Labor	2. 2	68.8%
Boat	0.2	8.2%
Others	0.2	8.2%
Total	3.00	100%

Source: Collected and calculated data.

Table 12: Result of coefficient of private profitability measure (CPP)

Item	(S.G/kg)
Total return	6.5
Total cost	3
CPP	2.17

Source: Collected and calculated data

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