Value-chain analysis - An assessment approach to estimate Lake Nasser fisheries performance

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ABSTRACT

Although, the fishery in Lake Nasser has existed for more than 40 years, the economic and financial performance of its fisheries-based businesses not well understood. The current study aimed to improve understanding of fisheries value chain performance in Lake Nasser. Individual interviews and focus group discussions with fishers, traders, and processors were used to collect quantitative and qualitative information about financial performance, employment creation and critical factors impacting performance of each node throughout the chain. Tilapias account for 75%, while pebbly fish and tigerfish account for 13% of capture. Fish processing is an important subsector as some fish species (mainly tigerfish and pebbly fish) are only consumed after going through a salting process. Fishers obtained a relatively low percentage (49%) of the final consumer price. Average catch per fisher per day was 20 kg and average total cost in the three fishing harbours was EGP 5210/t. One hundred tons of fish caught and sold provides an average 29.99 Full-Time equivalent jobs (FTE). The current study suggests that the fishery is under pressure from overfishing. Critical factors facing the fisheries sector and impacting profitability are numerous. This value chain study improve our understanding of the performance of fisheries sector in Lake Nasser and identified limiting factors and action needed to support fisheries development in the Lake.

1. INTRODUCTION

Lake Nasser is an important source of fish for the Egyptian markets. Lake Nasser has a diverse fishery with 52 fish species belonging to 15 families [1]. During recent decades, the lake's ecosystem has undergone change and species diversity has declined [2, 3]. Tilapias, comprise 75% of the total catch by weight and are sold as fresh fish, while pebbly fish (*Alestes* spp.) and tigerfish (*Hydrocynus* spp.) are also important and are used as raw material to produce a traditional salted fish product. Other fish species in the catch are Nile perch, squeaker catfish, sharptooth catfish, Bagrus catfish and Nile carp. The statistics indicate that fish catches declined in the last 5 years mainly due to reduced tilapia and Nile perch catches [4]. Value chain analysis (VCA) has become increasingly prominent as a form of analysis in the fisheries and aquaculture sectors [5 - 7]. The particular aims of this study were to: Map the fisheries value chain and the flow of products through the chain; identify the various actors, their functions, and existing linkages across the chain; conduct a preliminary analysis of the input-output structure and the distribution of margins, return on investment and job creation along the chain; identify the problems and opportunities facing different actors in the fisheries value chain.

2. METHOD

The work for this study consisted of three main stages: planning, data collection and data entry. Three main target groups were identified in this study: fishers, traders (intermediaries, wholesalers, and retailers) and fish processors. Three questionnaires designed to be used in the study (one for fishers, one for processors, of both fresh and salted fish, and one for the postharvest subsector; i.e. intermediaries, wholesalers and retailers). The questionnaires tested and revised and simplified wording for the interviewees.

Fishers were selected on a stratified random basis in the three fish landing sites (Aswan, Garf Hussein and Abu Simbel). Fish processors are based in Aswan and the sample selected randomly from a list of fish processors. While, fish traders were selected to represent different trading activities (intermediaries, wholesalers, and retailers). The number of interviewees for each category considered in this study are as follows; fishers 162; processors 22 (fresh and salted processors); and traders 23 (intermediaries, wholesalers and retailers). A total of 207 respondents (fishers 162, processors 22, and traders 23) were interviewed. Data collected allowed the estimation of a number of key indicators for each link in the value chain.

The data collected allowed for the construction of costs and earnings models for each respondent across the chain. The data collected on employment was converted into Full-Time Equivalent (FTE) jobs. FTEs were estimated based on 1 FTE being the equivalent of 300 days per year in fishing and processing sub-sectors, and 330 days FTE in the trading sub-sector as described by Macfadyen et al. [6].
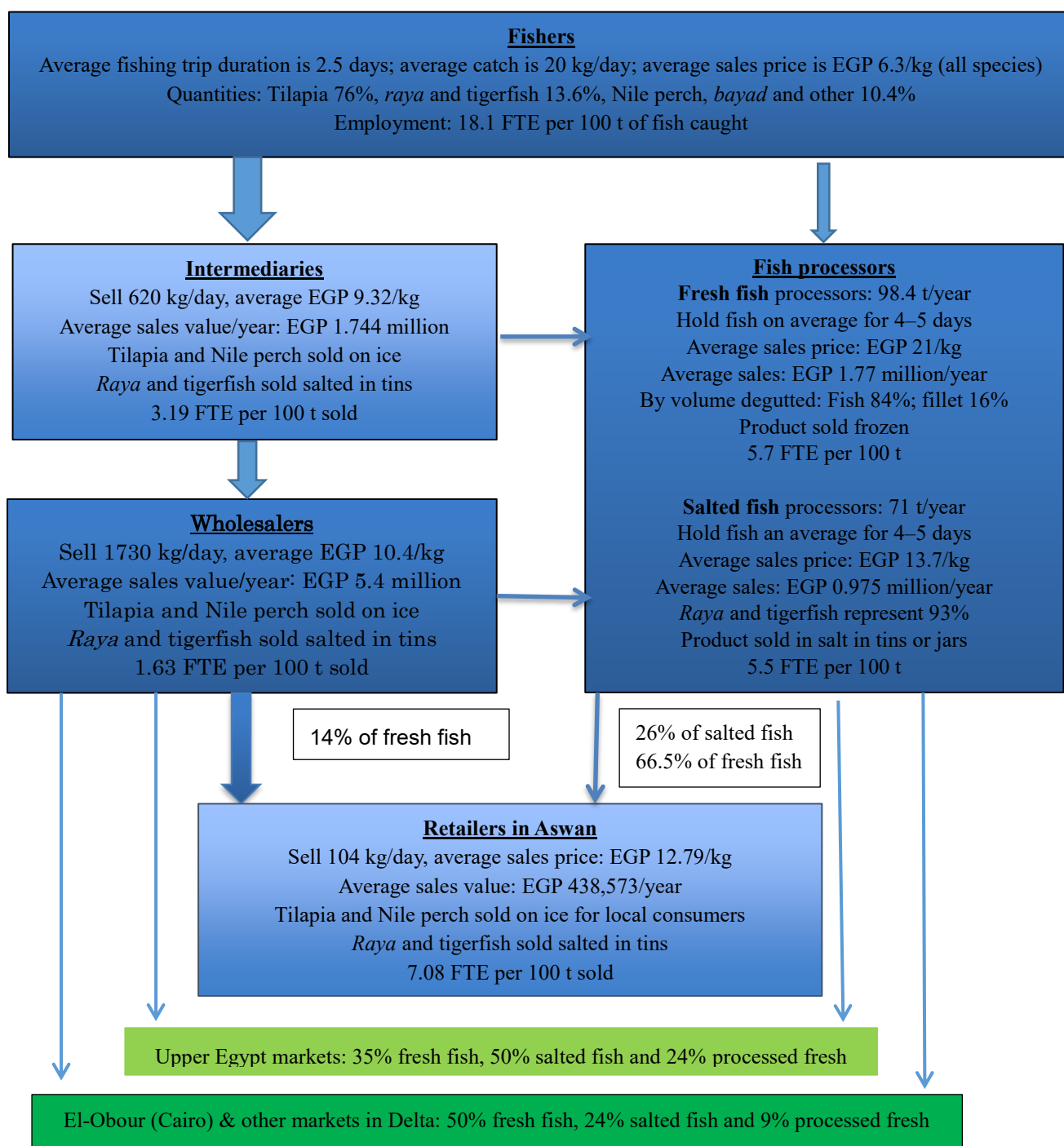
3. RESULTS AND DISCUSSION

4.1. Lake Nasser fisheries value chain mapping

Results of the value chain mapping and analysis revealed that the average catch per fisher per day was 20 kg and average sales price is EGP 6.3/kg, Fishers obtained a relatively low percentage (49%) of the final consumer price, due to the long supply chain compared to aquaculture value chain [6]. Tilapias represent 76% of catch and pebbly fish and tigerfish represent 13.6%. Intermediaries play an important role in collecting catches from fishers in their fishing camps and selling on to wholesalers at landing sites or in the market. Fish processing is an important subsector of the fisheries value chain in Lake Nasser. Fresh fish processing generates 5.7 FTE/100t processed, while salted fish processing generated 5.5 FTE/100t processed. Also, fresh fish processing led to higher value added (EGP 3652/t) than salted fish processing (EGP 2507/t). Salted fish (*muluha*) is a product that is unique to Upper Egypt and comes mainly from Lake Nasser. *Muluha* is made from tigerfish (*Hydrocynus* spp.), pebbly fish (*Alestes* spp.), Nile carp (*Labeo* spp.) and other species that cannot be sold as fresh fish.

Figure 1. Schematic chart for Lake Nasser fisheries value chain.

Fishers
Average fishing trip duration is 2.5 days; average catch is 20 kg/day; average sales price is EGP 6.3/kg (all species)
Quantities: Tilapia 76%, *raya* and tigerfish 13.6%, Nile perch, *bayad* and other 10.4%
Employment: 18.1 FTE per 100 t of fish caught

Intermediaries
Sell 620 kg/day, average EGP 9.32/kg
Average sales value/year: EGP 1.744 million
Tilapia and Nile perch sold on ice
Raya and tigerfish sold salted in tins
3.19 FTE per 100 t sold

Fish processors
Fresh fish processors: 98.4 t/year
Hold fish on average for 4–5 days
Average sales price: EGP 21/kg
Average sales: EGP 1.77 million/year
By volume degutted: Fish 84%; fillet 16%
Product sold frozen
5.7 FTE per 100 t

Salted fish processors: 71 t/year
Hold fish an average for 4–5 days
Average sales price: EGP 13.7/kg
Average sales: EGP 0.975 million/year
Raya and tigerfish represent 93%
Product sold in salt in tins or jars
5.5 FTE per 100 t

Wholesalers
Sell 1730 kg/day, average EGP 10.4/kg
Average sales value/year: EGP 5.4 million
Tilapia and Nile perch sold on ice
Raya and tigerfish sold salted in tins
1.63 FTE per 100 t sold

14% of fresh fish

26% of salted fish
66.5% of fresh fish

Retailers in Aswan
Sell 104 kg/day, average sales price: EGP 12.79/kg
Average sales value: EGP 438,573/year
Tilapia and Nile perch sold on ice for local consumers
Raya and tigerfish sold salted in tins
7.08 FTE per 100 t sold

Upper Egypt markets: 35% fresh fish, 50% salted fish and 24% processed fresh

El-Obour (Cairo) & other markets in Delta: 50% fresh fish, 24% salted fish and 9% processed fresh

4.5. Data summary

Changes in the average product price across the value chain indicate the average sales price for each link in the value chain (i.e. the basket price) (Table 1). The data indicates that fishers receive just below 50% of the final retail price.

Table 1 Gross output values (average prices) for the Lake Nasser fisheries value chain

Subsector	Price EGP/kg	% of Retail prices
Fishers	6.29	49
Intermediaries	9.32	73
Wholesalers	10.40	81
Retailers	12.79	100

4.6. Job creation in fisheries value chain

This study found that the fishing subsector resulted in total employment of 30 jobs (FTE) per 100 t of fish caught in Lake Nasser (Table 2). The highest employment level was in fishing followed by retailing, and intermediaries and wholesaling. More than 90% of fishers working in Lake Nasser are from Upper Egypt governorates. Meanwhile, 50% of wholesalers and 65% of retailers are also from outside Aswan. This indicates that the fisheries sector is an important source of job creation not just for Aswan but also for other governorates, including those of Upper Egypt. The current study found that most work was full time (>79%) indicating that fish businesses generate a good level of income across all subsectors. Furthermore, in fish retailing and wholesaling, almost all employment was full time (97% and 95% respectively). Youth (30 years old) represented 49–59% of total FTE indicating that working in the fisheries value chain is an acceptable option for young men.

Table 2 Employment creation in the Lake Nasser fisheries value chain

Employment	Fishers	Inter[1]	Ws[2]	Re[3]	Total
Jobs (FTE)/100 t sold	18.1	3.19	1.63	7.08	29.99
% across the chain	60	11	5	24	100
Full-time (% of FTE)	79	78	95	97	
Youth (% less than 30 years old)	57	53	59	49	
Source of labor					
Aswan %	9	47	50	35	
Other governorates %	91	53	50	65	

[1]Intermediators; [2]Wholesalers; [3]Retailers

4.7. Analysis of critical factors limiting fisheries development

Focus group discussions (FGD) resulted in identification of a series of challenges categorized into; livelihood challenges; inputs availability challenges; operation challenges include; post-harvest and marketing challenges.

4.8. Recommended actions to improve fisheries value chain performance

Suggested recommendations are based on the critical issues identified during the FGD and issues raised by fishers during interviewing.

• Establish new service organizations to provide inputs.

• Capacity building on recent fishing methods, improved handling and fish processing technologies.

• Facilitate affording operations inputs (food, fuel and ice).

• Ensure enforcement of security on and around the lake

• Adopt community-based fisheries management approach

• Improve living standards in the fishing camps in the lake and provide health service and social insurance service.

• Local authority should support establishing fish auctions in both Aswan and Abu Simbel to regulate fish prices.

4. CONCLUSION

The Lake Nasser fishery is an important source of food and job creation in Aswan and Upper Egypt. The fisheries sector contributes significantly to direct job creation, including for youth. No women were employed in the fishers or fish processing sectors in Aswan.

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