بنك المعرفة المصري

The Importance of Applying Value Chain of Fisheries in Mediterranean Sea in Egypt: A Systematic Review

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Abstract

The role of fisheries sector is obviously important for providing people with a vital animal protein source and reducing the unemployment rate in developing countries. From a management point of view, fisheries are among the most important productive food resources in the world, should be properly managed and sustained in order to secure food supply, since they are representing a safe and reasonable source of animal protein. The study of value chains in fisheries sector is a systematic approach to analyze main components of the production process particularly in small-scale fisheries, where the ways of improvements in quality and product design are identified. Moreover, data and information needed for management options and measures are important to be well provided in order to provide decision makers with the information needed to help manage and develop the fisheries sector.

Keywords: **Value chain; Fisheries management; Protein sources; small-scale fisheries**

Introduction

Fisheries and aquaculture sectors are obviously important for providing people with a vital animal protein source and reducing the unemployment rate in developing countries. That role is line with the strategic objectives of Food and Agriculture Organization of the United Nations in "eliminating hunger, food insecurity and malnutrition" **(FAO, 2019)**. From a management point of view, fisheries and aquaculture, which are among the most important productive food resources in the world, should be properly managed and sustained in order to secure food supply, since they are representing a safe and reasonable source of animal protein. Given the aquatic natural resources of Egypt, both fisheries and aquaculture sectors are well-represented and contributing the Egyptian economy with 12% of the agricultural national income **(GAFRD, 2019)**. Regarding natural fisheries, Egypt has various resources such as northern lakes; Burullus, Mariut, Edku and Manzala, coastal lagoons; Port Fouad, Bardawil, inland lakes; Al-Morrah, Temsah, Suez Canal, Qarun, Al-Raiyan, Nasser Lake, Toshka and Water bodies in New Valley, as well as the River Nile. Aquaculture sector is also strongly represented by governmental farms and private farms comprising different production systems such as semi intensive, intensive, cages and rice field systems **(GAFRD, 2019)**.

According to the statistical year book of the General Authority for Fish Resources Development (GAFRD) of 2019**,** the total aquatic production of Egypt is growing rapidly as it has increased from 1304794 tonnes in 2010 to 2038991 tonnes in 2019. The majority of the production came from private and governmental fish farms with a total percentage of 80% in 2019. On the other hand, the Egyptian Mediterranean was represented by 48.5% of the total marine production in 2019. Nevertheless, its production has dramatically declined over last decades; for example, it declined from ~ 77388 tons in 2010 to ~ 48018 tons 2019. Moreover, the total percentage of fisheries production decreased from 35% of the total aquatic production in 2010 to only 20 % in 2019. Hence, there is a crucial need to study, analyze and measure every step in the natural fisheries sector starting from the fishing process and ending with the final consumers in order to define the reasons that might stand against developing marine fisheries sector in Egypt, with emphasis on the Egyptian Mediterranean. Value chain analysis of fisheries industry globally identifying the different key parts of value chains is shown in (Table 1).

2. Value chain analysis in fisheries sector

The study of value chains in fisheries sector is a systematic approach to analyze main components of the production process particularly in small-scale fisheries, where the ways of improvements in quality and product design are identified. Moreover, data and information needed for management options and measures should be provided (**Rosales et al., 2017**), focusing on small-scale sector in order to provide decision makers with the information needed to help manage and develop that sector. The whole range of operations required to get a product or service from conception to end consumers is referred to as a value chain. Production, marketing, distribution, as well as support services are all included in this category in local, regional, and worldwide markets (**Kruijssen *et al.,* 2020**). It is also defined as a network of merchants, distributors, transporters, and suppliers involved in the manufacturing, transportation, and sale of a product to the consumer (**Harland, 1996**). Value chains of fisheries and aquaculture sectors comprise several key activities including production, processing, transportation and marketing at both (wholesale and retail levels).

2.1. Physical Disruption in Transport and Logistics

Logistics' primary goal is to protect the products from damage during packaging or transportation so that they can be correctly delivered to the consumer. The proper product, the appropriate quantity, the appropriate quality, the right place, the right time, the right consumer, the right cost, and the logistics for market transactions are the concepts that countries have developed. Beyond national boundaries, all fishermen who are equipped are likely to have access to improved postharvest methods, lowering losses as a result of improved road infrastructure (De Silva, 2011).

2.2. Product, Price, Place and Promotion

Product, Price, Place and Promotion, which are the 4Ps categories of marketing management decisions that represent the traditional marketing model, are not fully reflected in the growing service-based economy. Instead, present value chains focus more on services and they are composed of 7Ps; Product, Price, Place, Promotion, People, Process and Physical Evidence (**De Silva, 2011**). According to their findings (Figure 1), the processes of the 7Ps in fishing industry are:
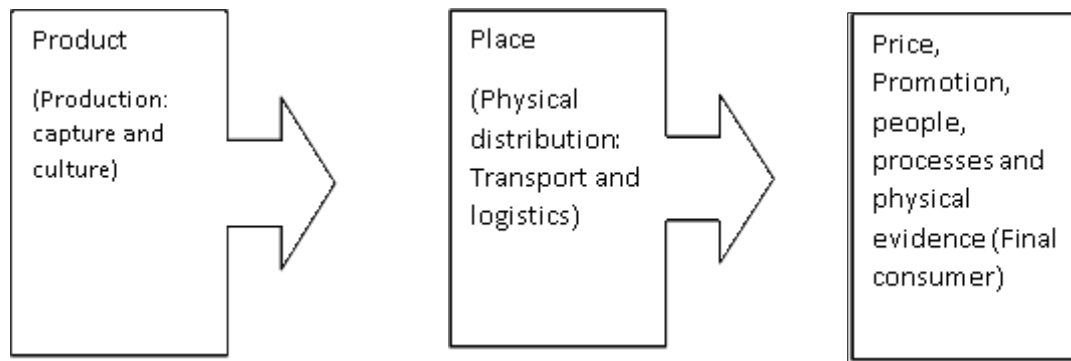
Figure 1. The processes of the 7Ps in fishing industry

In terms of employment, income, and the provision of protein sources to the diet, fishing industry provides a substantial contribution to the livelihoods of more than 50 million people. Furthermore, the fishing industry has consistently placed among the top contributors to the local and regional economies **(FAO, 2018)**. Fisheries industry's capacity to generate significant growth prospects and successfully contribute to the developing world's development goal of poverty eradication and wealth creation has been severely hampered because of overexploitation of resource bases, environmental deterioration, climate change, high resource pressures, and poor or restricted value addition, which have all put industry at threatening levels **(FAO, 2020)**.

The value chain viewpoint is significant because it provides insights that research focusing on individual economic agents or specific fisheries policy or management frameworks would not provide. A value chain analysis (VCA) can also reveal insights into the issues that the sector faces as a result of several drivers of change, such as inadequate governance and market access, as well as the competitiveness of small businesses and fishermen in changing markets.

2.3. The Obstacles Related to Transmission and Supply Lines in Fisheries Sector

Countries have been interested in revealing the reasons hindering the global development of fisheries, given that the fishing industry has consistently occupied a considerable position among the major contributors to local and regional economies (FAO, 2018). The value chain view was important because it provided insights that research focused on individual economic factors or specific fishing policies or management frameworks did not provide. Efforts were intensified to improve the infrastructure of the main roads to transport

these goods, such as railways and refrigeration Given that production, marketing, and distribution operations are among the most important factors for the success of the sustainable development of the fish farming sector, work was done on a network of traders and suppliers and the reclamation of the party through which goods are transported and infrastructure is strengthened **(L. Mayoux, 2008, pp. 97**).

Table 1. Value chain analysis of fisheries industry globally identifying the different key parts of value chains

Author	Area	Investigated Species	Value Chain Level	Key Findings
Dubay et al. (2010)	Sinaloa, Mexico	Shrimp	Fishers and type of fisheries	- 70% of the wild-caught shrimp is produced by a single producer, which has its own processing, exporting, branding, and marketing. - Between 4,000 and 5,000 artisanal fishers included in 140 local cooperatives, have a very small share of the market.
Shamsuddoha (2007)	Lake Victoria	Nile perch	Fishers	- Fishermen, intermediaries, and wholesalers were backward stakeholders in both the long and short supply chains. - Fish producers are divided into three categories: low-income or indebted producers, middleincome fishers, and private enterprises.
Ahmed (2007)	Bangladesh	Hilsa	Fishers	- Fishermen's key challenges at primary markets are a lack of bargaining strength and market knowledge.

Lindhal (2005)	Vietnam	Different Species	Processors	- Private local Chinese-based (LCB) businesses are underserved when it comes to upgrading their systems, and they are excluded from the HACCP standard certification procedure. - Ethnic markets play a critical role in the development of brand identities and enterprises in international markets. For instance, LCB process fish and fisheries goods for the Chinesedominated ethnic markets using traditional techniques, tastes, and flavors.
Dubay et al. (2010)	Sinaloa, Mexico	Shrimp	Processors	- Processors are typically third-party participants in the Mexican artisanal sector who are paid to process shrimp but are not directly involved in the sale of shrimp.

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				- Processing units and factories should meet and maintain the Mexican government's quality and safety standards.
Carrillo (2009)	Mexico	Different Species	Traders and Distributors	- The intermediaries purchase shrimp from small-scale fishers directly and sell them to processing factories or domestic operators. - Coyotes or intermediaries play a key role in getting shrimp from small-scale fishers to the main distribution channels, which is one obstacle to developing the local shrimp market.

Jiménez (2009)	North Carolina, USA	Different Species	Traders and Distributors	The only advantage of intermediaries is that they provide vital liquidity to the artisanal sector, allowing artisanal fishers to continue to operate. The disadvantage is that small-scale producers make less money selling to intermediaries than they would if they sold to the domestic market.
Ardjosoediro and Goetz (2007)	Indonesia	Different Species	Retailers	- In comparison to developed country markets, sales of domestic fish products in modern retail outlets, such as supermarkets, are limited in developing countries. - Fish producers may take advantage of the rising urban markets by upgrading their fish products through value-added procedures, cold chain connections, and links to retail segments.
Ahmed (2007)	Bangladesh	Hilsa	Retailers	- Bangladesh's Hilsa value chain reports the lowest marketing margins and profits in primary markets and the greatest in secondary markets, but not in retail marketplaces.
Josupeit (1991)	Europe	Different Species	Final Consumer	- End customers who purchase fish or shrimp from the "Retailers" section make up the "Consumer" category. - Fish consumption per capita in Europe has increased slowly but steadily since 1970, when it was 18 kg. - The United States, Canada, Australia, and New Zealand all record per capita fish consumption of around 20 kg, which is close to that of Western Europe. This is a significant rise above the level of 14 kg in both areas in the 1970s.

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3. Discussion

Fisheries are of great importance. Therefore, we need to pay attention, understand, and analyze the different value chains for several of the various methods followed and types of fish produced in the fishing sector in the Egyptian Mediterranean. In this regard, Derayah (Moin Musa Nimr Al-Musa, 2015) noted that the maritime environment is identical to every other type of habitat, for example, the desert, woods, and others. The maintenance of a balance between the actions of members and components of a certain ecosystem is what results in the continuation of that system as we know it, making balance the essential component in any healthy-ecosystem.

If the system's or its components' functions are disrupted, this imbalance triggers the appearance of unfavorable consequences and the deterioration of the environment.

A lack of understanding of the sector's social and economic dimensions is thought to be a barrier to any future development plans. According to a 2015 study, although humans only have a small direct impact on fishing wealth, this effect has highly significant outcomes. The first and most significant impact that people have on fisheries is the direct result of fishing activity, which has a negative impact on them. The act of fishing involves removing particular or nonspecific fish species from their natural habitat with the goal of profiting from them. Human activity can sometimes have an indirect negative impact on fishing as a whole. For example, many sources of pollution can harm fisheries as a whole. A decrease in the areas that these organisms can use as nurseries for their young or as breeding grounds for their adults results from additional activities, like reclamation of coastal areas and the destruction of mangrove areas, both of which have a significant impact on the various fish nursery areas.

Value chain analysis (VCA), which reveals the visions and issues faced by the sector as a result of many of the changing systems (e.g., governance), was viewed as providing insights into the fisheries industry that are not provided by research that focuses on individual economics or fisheries policy. When examining Egypt's natural water resources, we notice the economic significance of this industry (fisheries and aquaculture), which is primarily responsible for 12% of the country's agricultural income and is related to the natural fisheries that the Egyptian government owns, particularly the northern lakes (Burullus, Mariot, and

Manzala, which are coastal lakes; Port Fouad and Bardawil, which are inland lakes; and Al-Murra and Timsah).

Considering the value chain, the study concentrated on the formality of the procedures utilized by the state for production and service as well as the idea of reaching the final consumers. The local, regional, and international markets for this category included production, marketing, and distribution in addition to support services. Additionally, value chains are created for the accreditable fundamental activities in the fishing and aquaculture industries. The product, location, and manner of promotion are seen as crucial factors in boosting sales and the regional economy.

Generally, a value chain analysis is conducted to identify upgrading, that is, improvements in quality and product design that enable producers to gain enhanced value or through diversification in the product lines served. However, a range of data and information of use to managing small-scale fisheries, not just markets, can be also be produced. A value chain analysis provides a different perspective on the small-scale fishery than a traditional socio-economic or resource and ecological assessment. The conduct of a value chain analysis involves an examination of how the individual actors operate, what is going on between the actors in the chain, what keeps the actors together, what information is shared, what power relationships exist, and how the relationships evolve. Due to the high incidence of the poor in the small-scale fisheries sector, the value chain framework can also be used to draw conclusions on the participation of the poor and the potential impact of value chain development on poverty reduction.

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