

Supply Chain Management in Fisheries and Its Challenges

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Introduction

Supply Chain Management can be defined as the management of the flow of products and services from the source of origin to the point of consumption. It also includes the movement and storage of raw materials used in work in progress, inventory, and fully furnished goods. Supply chain management includes transporters, credit, and cash transfers, suppliers, distributors and banks, accounts payable, warehousing, order fulfilment, dividing information into demand forecasts, and production and inventory control activities (Heizer and Reinder, 2005). Multiple firms in a supply chain enter into a long-term agreement; developing mutual trust and commitment to the relationship; integrating of logistics events that include the sharing of demand and supply data; shipping (Londe and Masters, 1994).

Supply chain management is an umbrella process that creates and delivers the process to the consumer from a structural standpoint (Fig.1). A supply chain is an intricate network of relationships that connects an organisation with its business partners in order to obtain a source of production in order to deliver to consumers, with the goal of maximising the overall value generated (Chopra and Meindl, 2001)

Supply Chain Management is particularly concerned with the planning and fulfilment of customer demand because these dimensions and indicators contribute the most to shaping supply chain management; however, other dimensions should not be overlooked, particularly when it comes to improving supplier relationship management, including supplier selection, supplier evaluation, pricing, and order approval with suppliers because these dimensions and indicators contribute the least to shaping supply chain management.

Supply chain in fisheries

Despite the general trend among consumers to eat healthier foods with lower fat, higher fibre content, and more vitamins, overall demand for fish has been steadily increasing. Because of the relatively predictable demand and the unpredictability of raw material supply, fish supply chains are impossible to manage without inventories and buffers along the supply chain from sea to consumer. Although the product palette refined from the catch is large, we focus on fish-related dishes, whether frozen, salted, smoked, or dried, rather than the numerous by-products made from the raw material caught in the net (Hameri and Pálsson 2003). In summary, the following major steps are involved in getting the fish to the

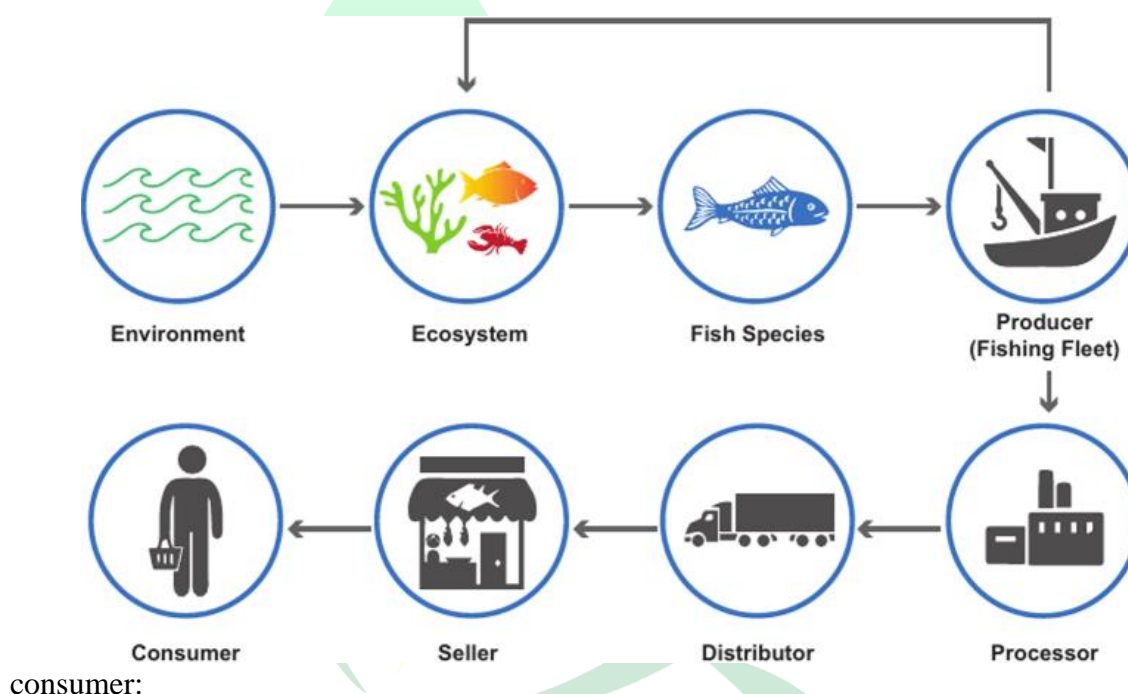


Fig.1 Supply chain in fisheries

- **Catch:** the decision is influenced by the fishing season, weather and news from other boats, experience, quota, and market conditions. All of this data has been compiled into a catch plan, which also takes available fleet capacity into account.
- **Raw material treatment:** trawl is unloaded; fishes are gutted, cleaned and sorted into ice-covered storage bins with identifiers for full traceability. This treatment takes place on board the vessel, and the catch is usually landed within 5 or 7 days of departure. Some catches, such as capelin bound to fish meal, are processed in large quantities using a tank processing system, and thus are not gutted or sorted.



- **Primary production:** the fish are weighted and measured, before headed, filleted and skinned. Primary production is completed when cleaned fish fillets are immersed in iced water for several hours before the individual quality freezing (IQF) or bulk freezing in blocks. Once frozen, the fillets could be transported further or stored for later use. This processing takes place 5 days of the fishing vessel's arrival.
- **Secondary production:** cleaned fish fillets are used in a variety of ways to create finished products for customers. To make the intended dish, the fish is cooked, grilled, fried, breaded, and marinated, and so on. This could happen near or far from the markets. The time frame for secondary production can vary significantly.
- **Distribution and sales:** the requirements for shipment and supply chain are determined by the product.

Many manufacturers do not sell products or services directly to consumers, instead relying on marketing intermediaries to carry out a variety of necessary functions in order to get the product to the final user. These intermediaries, such as wholesalers, retailers, agents, brokers, distribution partners, or financial institutions, typically enter into longer-term agreements with the producer and form the marketing channel. Manufacturers use raw materials to create finished goods, which are then delivered to retailers or, less frequently, consumers.

However, finished goods typically flow from the manufacturer to one or more wholesalers before reaching the retailer and, finally, the consumer. Normally, each party in the distribution chain acquires legal possession of goods during their physical transfer, but this is not always the case. For example, in consignment selling, the producer retains full legal ownership even if the goods are with a wholesaler or retailer that is until the merchandise reaches the final user or consumer.

Challenges in the fish supply chain

The most severe constraints in the fish distribution system are lack of hygienic fish landing centres, illiteracy, ignorance towards fishermen, lack of awareness, the poor economic condition of the fishermen, cold storage, transportation, and preservation facilities, etc. Problems are especially severe in areas with insufficient transportation and distribution facilities, a lack of insulated and refrigerated fish vans, electricity, ice waste, and open trucks as the primary fish carriers. Lack of proper knowledge of modern techniques for controlling



fish farms, ignorance or carelessness in managing workers, personal hygiene, isolation of fishermen from their wholesale market, and other factors are also regarded as constraints to fish distribution (Islam and Habib, 2013).

There are three major types of constraints to consider when developing a viable supply chain; Production Constraints, Flow Constraints, and Storage Constraints. To make sure an optimal and feasible supply plan these three types of constraints must be determined at each and every point along the extended supply chain. As a result, many constraints must be considered, including:

- **Supplier Constraints:** capacities and order minimums/maximums
- **Manufacturing Constraints:** multi-stage production limitations, min/max batch sizes, capacities, working days and hours, and availability of specific skills.
- **Storage Constraints:** facility and zone capacities, required safety stocks, and any dedicated or flexible storage capabilities.
- **Loading / Unloading Constraints:** at any facility including receiving and shipping capabilities.
- **Transportation Constraints:** vehicle/route limitations, vehicle/item limitations, transport calendars, load / route consolidation rules.
- **Demand Fulfillment Constraints:** backorder permissibility, order-splitting permissibility.
- **Time-Phased Constraints:** production, flow and storage constraints over a certain time-period.

Conclusion

Though fish distribution is overwhelmed with a number of unresolved issues, there have been a number of positive changes that are expected to improve fish distribution environment in the country, such as shift from subsistence to commercial fish farming and emergence of super-markets. For better fish distribution, the government should work with the private sector to provide physical facilities such as refrigerated storage, refrigerated vans, good market places with related facilities such as water, ice, cleanliness, electricity, drainage facilities, and other arrangements related to supply chain. To ensure fish quality, the government should implement a fish market inspection system. Similarly, it is the government's responsibility to ensure that consignments arrive at their destination without



incurring unnecessary tolls while maintaining quality. If there are proper landing centres with cold storage facilities, the perishability of fish can be checked, resulting in less post-harvest loss and a higher price for the fishermen.

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