

# Supply Chain Management in the Catfish Seed Market

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**Abstract**—This study examines the Supply Chain Management (SCM) of the catfish seed market in the Mustafa K Company in the South Kalimantan Province in Indonesia. Cultivation of catfish cannot be separated from seed availability arrangement. Excess inventory can lead to an increase in storage costs, while a shortage of inventory causes farmers to not carry out cultivation. Supply chain management can be applied to help plan and control seed stock at optimum level so that efficient management and delivery of seeds. This study uses primary and secondary data and the qualitative method to examine SCM coverage area and the Snowball Sampling method to examine the supply chain model. The results show that the company obtains seeds from a different source to ensure quality. The maintenance criteria for fish seeds consist of three sizes of 1, 1.5, and 2 inches to minimize mortality rate and focus on quality level before selling it to fish farmers. The distribution system considers the minimum quantity of seed orders, delivery distance, and time of delivery. The company's Supply Chain Model involves suppliers (Company Agent of Zahra Catfish seeds), Distributors (Individual Company Mustafa K), and Customers (fish farmers). Implementing SCM in the fishery sector will improve the quality and quantity of fishery products.

**Keywords**— Catfish, Mustafa K. Company, SCM coverage area, Supply Chain Model.

## 1. Introduction

Intense competition pushes businesses to change and innovate in the modern world. One such change is the development of a market efficiency system [1]. Market efficiency is beneficial for both producers and consumers [2]. Improving supply chain management is the most important aspect of creating an efficient market system [3]. Supply Chain Management (SCM) is a network of several companies that work together to deliver a product to the final consumer [4].

The SCM concept owes its emergence to the importance of producing cheap, good quality products quickly [5], [6]. SCM regulates the planning, coordination, control of raw materials, parts, and final products from suppliers to costumers [7].

SCM is a part of operational management [8]. SCM improves operational performance and reduces transaction costs, ensuring better product quality [9]. Ref. [10] discusses the positive influence of SCM implementation on product

quality and innovation. SCM covers various activities ranging from raw material procurement, production, marketing, and transportation [5], [6].

Implementing SCM in the fishery sector will improve the quality and quantity of fishery products. The quality of fish seeds has an important role in the fishery sector, as it affects the growth of fish [11]. Good quality fish seeds quality ensures rapid growth and vice versa, which has a direct effect on production [12].

People in South Kalimantan developed freshwater aquaculture. One area in South Kalimantan that cultivates fish is the Tanah Lauh Regency, with various fish species such as Catfish, Patin, Nila, and Mas. Table 1 shows freshwater aquaculture production from 2014 until 2016 as per the Performance Report of the Marine and Fisheries Office of Tanah Laut Regency, 2016.

**Table 1.** Fish Cultivation Data in Tanah Laut Regency 2014-2016

No .	Types of fish	Amount of production per year (ton)			Total production (ton)
		2014	2015	2016	
1	Catfish	2014	2015	2016	3.050
2	Nila	430	1.370	1.250	2.640
3	Mas	355	1.360	925	2.645
4	Patin	345	1.360	940	2.585

Table 1 shows that catfish are the most cultivated fish species in Tanah Laut Regency. The community likes this fish because it is relatively cheap and tastes good. Catfish cultivation depends on the availability of seeds, mostly from hatchery cultivation techniques, as natural seeds are very difficult to obtain [13]. The market for catfish seeds in Tanah Laut Regency depends on catfish consumption. High demand indicates a good seed market. The seed requirements also adjust to market needs of consumption, forming the seed market [14]. Mr. Mustafa. K owns a company that provides catfish seeds, among others, including information to fish farmers about fish seeds.

## 2. Literature Review

A central tenet of marketing is the importance of knowing customer needs, because without buyers,

products become useless. A market-oriented producer plans to meet a particular need or market opportunity [15]. The next important activity is marketing, which delivers goods from producers to consumers through several marketing chains [16]. The marketing chain is a relationship between the flow of goods, activities, and information from producers to consumers [17].

The supply chain is one part of the SCM system [18], which manages and delivers products efficiently through upstream to downstream activities [19]. SCM is a complete chain management cycle from raw materials to suppliers to operations and distribution to consumers [20]. Oliver & Weber first proposed SCM in 1982 [21]. [22] argues that SCM is an approach system for delivering products to final consumers, using information technology to coordinate all supply chain elements. According to [23], SCM is managing the entire flow of information, materials, and services from raw materials through factories and warehouses to final consumers. Ref. [24] defines SCM as a strategic coordination of the supply chain to integrate supply and demand management. SCM manages the flow of information, products, and services throughout the network [25]. Further, Table 2 shows the coverage of SCM.

**Table 2.** Coverage of SCM

Portion	Coverage of activities
Product Development	Conducting market research, designing new products, involving suppliers in the design of new products
Procurement	Selecting suppliers, evaluating supplier performance, purchasing raw materials and components, monitoring supply risk, fostering and maintaining relationships with suppliers
Planning & Control	Demand planning, demand forecasting, capacity planning, production planning, and inventory
Operation / Production	Production execution, quality control
Delivery / Distribution	Distribution network planning, shipping scheduling, maintaining relationships with shipping service companies, monitoring service levels at each distribution center

Source: [5]

SCM aims to synchronize demand and supply as effectively and efficiently as possible [24]. Companies must achieve strategic SCM goals to

survive competition, which requires SCM to provide cheap, good quality products on time [5].

### 3. Research Method

#### 3.1. Research Sites

The study uses the purposive sampling method to determine research locations in the Mustafa K. Company in Sarang Halang Village, Pelaihari Sub District, Tanah Laut district, South Kalimantan Province.

##### 3.1.1. Method and Research Data

A good method should be able to bring researchers towards achieving the research objectives perfectly [26], [27]. This study uses the case study method. As a descriptive approach, the case study method performs an intensive evaluation of a particular individual or company with a narrow area or subject [28]. Research subjects can be individuals, groups, institutions, or communities [29].

This research uses primary and secondary data. The source of primary data is the survey and interviews with respondents [30]. The study uses the interview guide technique [29]. Interview guides usually contain detailed questions to obtain information from context and interview situations [28]. Ref. [29] explains that it is possible to obtain secondary data from literature study and obtain supporting data from previous study results.

#### 3.2 Data Analysis

##### 3.2.1 SCM Coverage Area

The study uses a qualitative method to examine the SCM coverage area, which describes the actual situation using the data [31]. This method provides an overview of the research results and provides discussion material [32]. SCM coverage areas in this study include:

- a) Activities to obtain raw material / seeds
- b) Production activities
- c) Delivery activities

#### 3.3 Supply Chain Model

This study uses the Snowball Sampling technique for its supply chain model, which identifies, selects, and obtains samples in a network to show the relationship between respondents or between cases [28]. As samples, respondents represent the population, and not always easy to obtain in the field [33]. According to [34], the snowball sampling technique rolls from one

respondent to another, usually to explain the social patterns or communication of a particular community.

## 4. Results And Discussion

### 4.2 Respondent Characteristics

Mr. Mustafa. K's company was established in 1997 at Sarang Halang Village, Pelaihari Sub-District, Tanah Laut District, South Kalimantan Province. Its distribution of catfish seeds to fish farmers covers the Tanah Laut regency up to the Tanah Bumbu regency. This company buys catfish seeds from the Zahra Company Agent Fish Hatchery in the Cindai Alus Village, Martapura Sub-District, Banjar District, South Kalimantan Province.

Mustafa K's individual company is a legal institution because it has an SIUP (Surat Izin Usaha Perikanan) or Fishery Business License, which is a written permission from government agencies of meeting government requirements. The SIUP is compulsory for all in the fishery business.

The SIUP lists the obligations of each fishery company in (Article 1 Number 16 of Law Number 31 Year 2004 about Fisheries) and (Article 1 Number 16 of Law Number 31 year 2009 on Amendment to Law Number 31 Year 2004 concerning Fisheries).

#### 4.2.1 SCM Coverage Area

##### (a) Obtaining Catfish Seeds

Initially, Mr. Mustafa K's company purchased catfish seeds from Bogor, Sukabumi, and Blitar areas, using the Cargo Syamsudin Nor airport flight, with a minim delivery volume of 30.000 tail per trip. With more than 2000 catfish farmers, Mustafa K Company began to cooperate with Zahra Company Agent, managed by Mr. Reja in Cindai Alus, Banjarbaru.

The Mustafa K Company cooperates with the Zahra Company to take the advantage of managerial expertise and technical skills of bending, packing, and standard equipment. This ensures a low death rate and good quality of fish seeds.

After several years of working with Zahra Company, problems forced a change of ownership to Mr. Yayan. However, the Mustafa K individual company continues to work with the Zahra Company for several reasons, as follows:

- (1) Mr. Yayan has the same technical skills of bending and packing seeds, in addition to equipment of technical standard.
- (2) As they already know the purchase value, it is easy to set the purchase price, which benefits both companies.

#### 4.2.2 Maintenance of Catfish Seeds in Mustafa K Company before Sale

Catfish breeding criteria in this company consists of three sizes, which are 1 inch, 1.5 inch, and 2 inches to minimize mortality rates and focus on quality. Table 3 shows the maintenance of catfish seeds as per the company's annual records.

**Table 3.** Maintenance of Catfish Seeds in Mustafa K. Company, 2000–2016

No.	Year	Total Production (Per/fish size 1 inci)	Total production (Per/fish size 1.5 inci)	Total Production (Per/fish size 2 inci)
1	2000	50	65	35
2	2001	40	50	30
3	2002	80	75	23
4	2003	80	125	135
5	2004	35	175	10
6	2005	200	180	50
7	2006	221	170	12
8	2007	30	250	17
9	2008	20	150	30
10	2009	47	185	209
11	2010	236	160	53
12	2011	54	120	185
13	2012	172	140	45
14	2013	213	180	21
15	2014	40	245	30
16	2015	372	250	23
17	2016	36	200	174

Source: Mustafa K Company annual record

#### 4.2.3 Delivery of Catfish Seeds to Fish Farmers

The distribution of fish seeds covers Tanah Laut district to Tanah Bumbu district. Prior to transportation, catfish seeds undergo acclimatization through fasting, a day before distribution, to adapt them to water and the temperature during dissemination.

Four-wheeled vehicles deliver the seeds; therefore, special care is necessary to minimize losses, including

- (a) Minimum order quantity of seeds  
Minimum order at the Mustafa K individual company is 1.000 catfish seeds
- (b) Distance delivery

The cost of transport depends upon the delivery distance. There are two ways of delivery:

- The delivery area is limited to Tanah Laut regency. The company sends the catfish seeds to fish farmers without any transportation cost but adds it for areas

outside, for example Tanah Bumbu regency, depending on the distance.

- Fish farmers can purchase seeds directly from Mustafa K Company.

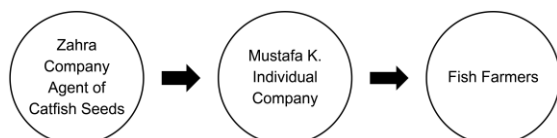
(c) Delivery time

To minimize losses, the company does not deliver the seeds directly if the order is only 1.000 seeds but initiates a waiting period of 1–2 days for other orders to facilitate one-time delivery.

#### 4.2.3 Supply Chain Model

Figure 1 shows the supply chain model based on data from research sites. Figure 1 shows that the marketing chain consists of one pattern, starting from the purchase of seeds from Zahra Company. This is because

- Their long association ensures no disadvantages to either company.
- Zahra Company has good seeds and expert labor resources.
- The Zahra Company has an efficient service system resulting in quick supply and packing of catfish seeds.



**Figure 1.** Supply Chain Patterns at Mustafa K. Individual Company

Institutions in the marketing chain of catfish seeds in Mustafa K. Company are as follows:

- Suppliers (Zahra Company Agent of Catfish Seeds)
- The network begins when the Zahra Company informs the Mustafa K Individual Company that the catfish seeds are ready in accordance with the minimum order volume.
- Distributor (Mustafa K Individual Company)
- Travel approximately 90 minutes to obtain catfish seeds from the Zahra Company. Furthermore, inform the fish farmer that the catfish seeds are ready for delivery.
- Customers (Fish Farmers)
- Fish Farmers obtain confirmation from Mustafa K. Individual Company about their orders. Fish farmers will immediately inform the Mustafa K. Individual Company or take the seeds to the company for the successful execution of transaction.

## 5. Conclusion and Recommendations

### 5.2 Conclusion

#### 5.2.1 SCM Coverage Area

(a) Activities to obtain catfish seeds

Mustafa K Company obtains seeds from the Zahra Company located at Cindai Alus Banjarbaru, as the latter possesses the technical skills of bending, packing, and standard equipment, which reduces the death rate and improves seed quality.

(b) Maintenance of catfish seeds in Mustafa K company before sale

Catfish breeding criteria consists of three sizes, which are 1 inch, 1.5 inch, and 2 inch to minimize mortality rates and focus on quality.

(c) Delivery of catfish seeds from Mustafa K. Company to fish farmers

The distribution covers Tanah Laut District to Tanah Bumbu Regency. The shipping method consists of bending / acclimatization. Transportation is via four-wheeled vehicles for a minimum number of seed reservations, delivery distance, and delivery time.

The supply chain at the Mustafa K Individual Company consists of only one pattern, which starts from the purchase of seeds from the Zahra Company and then sales to fish farmers. Institutions involved include Suppliers (Zahra Company), Distributors (Mustafa K Individual Company), and Customers (fish farmers).

### 5.3 Recommendations

Although the company is meeting the needs of fish farmers, it could innovate by developing fish seeds and optimizing services for fish farmers.

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