Chapter 1

# Agriculture Value Chain as an Alternative to Increase Better Income's Distribution: The Case of Indonesia

Adi Djoko Guritno

Additional information is available at the end of the chapter

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**Abstract**

Specific material handling and treatment for specific agriculture products is required. Enhancing the productivity, competitiveness and efficiency of agriculture value chain is a priority for Indonesia to achieve competitiveness. This chapter discusses the overview of agriculture value chain in Indonesia and provides case studies related to supply chain risk management and logistics cost. Then, the author may propose recommendations to optimize the agricultural value chain. Each agriculture commodity probably has different type of tier, type of supply chain risks, issues and activities which leads to the different proportion of logistics and distribution cost in each tier. The results showed differences in strategy either speculation or postponement for inventory management to improve the value of horticulture along supply chain, while in aquaculture research also shows the same differences. Moreover, the value chain analysis helps to identify the value created by each stakeholder. In the value chain of catchment fish, ship owner plays the dominant role in the whole income distribution, while in the aquaculture, spreader get the highest profit margin. Trader gives the highest value added during transportation but earns the lowest profit. The value chain analysis of fresh vegetables shows the highest portion of traders in the whole inventory cost.

**Keywords:** agriculture product, supply chain, risk, strategy, value chain analysis

## 1. Introduction

Globalization offers opportunities for the developing countries to expand their business in both domestic and international markets. Currently, agriculture continues to be a fundamental instrument for sustainable development and poverty reduction [1]. Therefore, the

producer needs to strictly compete with other producers and also builds competitive advantage by adding the value of the product. To achieve these goals, controlling activity along the supply chain of the agriculture commodity is required and necessary starting from the plantation farm to the retailer. Agriculture value chain manages the flow of products and information along the supply chain by capturing the value added in each stage. It also offers the opportunity to reduce the cost and risk along the supply chain. Furthermore, the perishability of agriculture commodity results in the special material handling and treatment to control the quality of material. Different types of agriculture commodity probably need different kinds of material handling and treatments. More recently, the issues of food safety and food security become global issues since people are more aware and concern about their health. These conditions encourage the producers to increase their awareness and assure the quality of product to the customer. Therefore, activities along the supply chain of agricultural product should be managed by each stakeholder in order to minimize the cost and risk and add the value that can be perceived by the customer.

Indonesia is one of the developing countries that have great potential in agriculture commodities. Its geographical conditions make Indonesia rich in natural resources especially in agriculture products including horticulture, fish and livestock. However, inability of Indonesia in managing the resources becomes the major constraint. Vegetables are one of the valuable horticultural commodities in Indonesia. According to Ref. [2], the vegetable production in Indonesia reached 11,005,954 tonnes/year for the last 5 years. The national vegetables production also increases every year, but this increase of production should be followed by good quality of vegetables.

Indonesian agro-industry needs to optimize the potential of natural resources by providing added value along the supply chain. Investigation on the current condition of several agriculture products value chain may facilitate the author to identify the obstacles and risks and determine the appropriate action to deal with these risks in the field. Managing and controlling the activity along the supply chain will enhance the efficiency of value chain and minimize the logistics cost. Nevertheless, inadequate infrastructure and lack of coordination within the supply chain lead to the increasing cost and inefficient flow of material and information. Collaboration between stakeholders in the supply chain, the strategies used and government support are necessary to optimize the application of agriculture value chain in Indonesia.

This article aims to provide an overview of the agriculture value chain in Indonesia for several agriculture commodities such as fish, aquaculture and horticulture commodity. Case studies related to supply chain risk management (SCRM) and logistics activity analysis are presented to evaluate and optimize the potential agriculture in Indonesia. SCRM helps to identify the potential risk in each tier and to provide the appropriate mitigation to reduce the exposure of each risk. Furthermore, the analysis of logistics activity in the supply chain by using activity-based costing is also needed as the supplement to evaluate and improve the agriculture value chain. Sampling method in these studies used convenience sampling, while the data collection was done through in-depth interview to each respondent along the supply chain. The number of respondents in each case study is varied.

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## 2. Theoretical background

According to Ref. [3], analysis of the value chain (value chain analysis—VCA) seeks to understand how a business creates value for customers by examining the contribution of different activities in the business against the value. A value chain is about linkages generating value for the consumer. The productivity, efficiency and depth of agricultural value chains are important elements driving commercial agriculture and agribusiness [4]. Important barriers for developing country producers in this respect are the lack of an enabling environment offering institutional and infrastructural support, availability of resources and efficient and effective coordination in value chains. In particular, small-scale producers are at a disadvantage because they have little capital to invest, use traditional techniques and depend on family labour and lack contact with (international) market players [5–7].

Two complementary approaches can be followed to support agro-enterprise development for competitiveness and participation. One is to improve the investment climate to induce the entry of private investors, particularly small- and medium-sized enterprises (SMEs). Surveys of the rural investment climate in Indonesia, Nicaragua, Sri Lanka and Tanzania indicate that the lack of rural finance, infrastructure, business and public services is particularly binding. The other approach targets bottlenecks in small- and medium-sized agro-enterprise development, particularly in value chains [4].

According to Ref. [8], factor conditions relate to the nation's endowment with resources such as physical, human, knowledge, technology and infrastructure. These factors enable or constrain value chain upgrading. Moreover, Ref. [9] revealed that three key elements for a balanced analysis of value chain are network structure, horizontal and (vertical) market channel relationships, value added and governance. Moreover, value chain actors may be motivated to improve their position in the chain by changing their production of value added, their relationships (governance) with other actors in the value chain and by choosing different market channels for their products.

SCRM is an attempt to control the risks in the supply chain of a commodity which provides recommendations for the stakeholders to optimize the supply chain activity. Each tier along the supply chain may handle different kinds of risks in which the activities to prevent the risks in each tier might be different as well [10]. The practice of SCRM consists of identifying the risk from the risk owner, analysing the probability and severity of the risk, monitoring the risk and continuously evaluating the risk.

In most value chains, each activity has a distinct cost structure determined by different cost drivers. Analysing cost requires disaggregating the value chain to identify the relative importance of each activity with respect to total cost, the cost drivers for each activity, how cost in one activity influence the others and which activities should be undertaken or outsourced [11].

Several main activities related to logistics are the design of supply chain, procurement or purchasing, transportation, receiving, warehousing, material handling, distribution, return,

replacement, disposal of waste and communications. The most important thing in an activity of logistics is how to make the whole stakeholder in the supply chain working together to obtain an efficient material flow [12].

Calculation of logistics costs in every activity can be used to determine which tier has a dominant proportion of cost against activity [13–15]. The logistics activity along the corn supply chain is divided into six activities including procurement, material handling, maintenance, transportation and communication. The logistics cost analysis shows the proportion of logistics cost and its component cost, the most influence activity on their respective logistics activities and what activities can be controlled at every tier [16, 17].

From Ref. [18], one underlying aspect to appreciate in terms of customer demand or usage requirements is the relationship between the customer order-to-fulfilment lead-time (CLT) and the sum of the supplier order-to-fulfilment lead-time (SLT), the firm's cycle time (CT) and the delivery-to-customer lead-time (DTC) as shown in **Figure 1**. CLT denotes the amount of time a customer is willing to wait, once an order has been placed, to be satisfied by the firm; SLT denotes the amount of time the firm is willing to wait for its own wishes to be met by its suppliers in producing what the customer wants once the customer order is received; CT denotes the amount of time it takes the firm to manufacture and process a customer order and finally, DTC denotes the amount of time it takes the firm to deliver a completed customer order to the customer, so that CLT = SLT + CT + DTC.

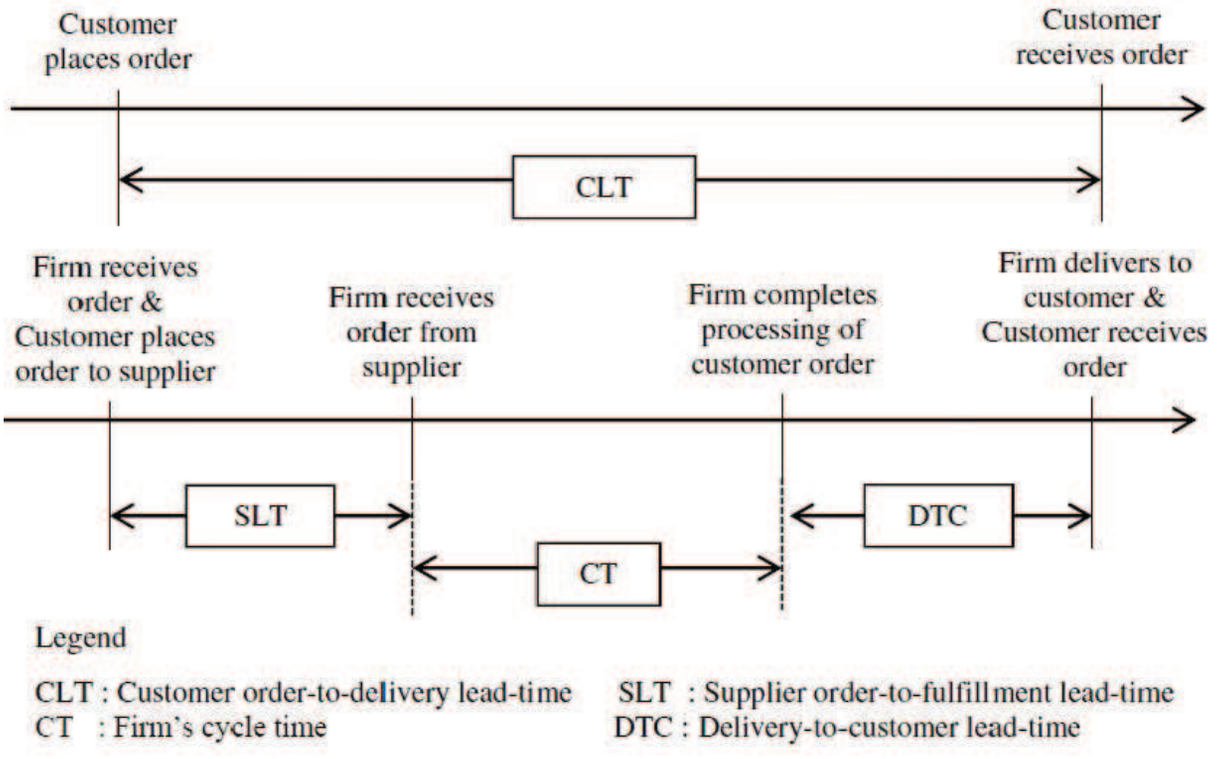


**Figure 1.** Lead time approach for inventory classification.

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## 3. Agriculture value chain in Indonesia

Agriculture sector in Indonesia has enormous potential for economic development since Indonesia's biodiversity becomes the strength and challenge for Indonesia to compete globally. Consumptive culture which is relatively high in Indonesia needs to be gradually transferred to the more productive sectors, so that Indonesia will have high competitiveness among other countries. Several countries in the world such as Japan, China and Thailand were already focused on the development of agriculture to enhance the country's competitive advantage. Moreover, one of the problems of agriculture in Indonesia is the inability to provide value added to the product before selling the product to others. In some cases, Indonesia exports the raw materials with a relatively cheap price. Then once it arrives at the destination country, they add value to the raw material by processing it into finished product which is then imported to Indonesia at a much higher price. It certainly gives a disadvantage for Indonesia. In the national scale, initial suppliers (farmers and fishermen) are one of the stakeholders who add the least value added to the product. It causes the decrease in the profit earned by them and repositions them as a price taker with low bargaining power. In addition, lack of supervision and assistance from the local government affects the income's distribution within a supply chain.

Currently, agro-industry in Indonesia is rapidly growing from small, medium to large scale. The existence of agro-industry in Indonesia is particularly important in providing added value to agricultural commodities through food processing. Agriculture value chain concept can be applied not only in the scale of production, but also can be implemented on a small scale for some commodities such as horticulture, rice, fisheries and many more. Making a living in agriculture involves not only selling the product but also various other things in the form of tourism, sales, processing, seedling, education and many more. By adding the value of the commodity, it can enhance the price of the product as well. Therefore, the stakeholders along the value chain can earn more profit.

## 4. Original case study

Related to agriculture value chain practice in Indonesia, the following are several case studies related to the application of value chain analysis for several agricultural commodities in Indonesia.

### 4.1. Case of fresh catchment sea-fish

Indonesia is one of the developing countries that have great potential in agriculture commodities. Its geographical conditions make Indonesia rich in natural resources especially in agriculture products including fish. In the fish commodity, Indonesia was able to produce 6,105,225 tonnes in which it consisted of 5,707,012 tonnes of fresh catchment sea-fish, hereinafter referred to as catchment fish, and 398,213 tonnes of aquaculture fish. Around 1,081,717 tonnes of catchment fish in Indonesia came from coastal area of Java Island [19]. Catchment

fish as perishable products requires special material handling during distribution and storage activity. Therefore, each stakeholder along the supply chain should control the quality of product through the temperature control. Based on **Figure 2**, the production of catchment fish significantly increases each year. In 2009, the production of catchment fish reached 4812 thousand tonnes, then it increased to 5039 thousand tonnes in 2010 and 5346 thousand tonnes in 2011. The increase of production did not significantly occurred in 2012 which only reached 1.6%, while the increase in 2013 reached 5%.

The increasing number of catchment fish indicates the potential of this commodity in the future. However, currently, the increase in the quantity of production is not followed by proper material handling processes in which it may lead to the decrease in the quality of product. This quality deterioration may impact on the selling price of the product and may lead to the losses. Practice of cold supply chain management is needed to reduce the risk of quality deterioration during distribution by maintaining the temperature of catchment fish to remain at a low temperature which is below 0°C, so that microbial growth in the product can be minimized.

Furthermore, there are six main tiers in the supply chain of catchment fish including fishermen, ship owner, fish auction facility (FAF), trader, fish processing units (FPUs) and end customer. Data from 64 respondents consisting of 22 fishermen, 22 ship owners, 8 FAFs, 9 traders and 11 fish processing units (FPUs) were collected from the coastal area of Java Island. Fishermen in this study are the fishermen who do not have their own ships so they rent a ship on vessel providers (ship owner) and make payment based on the share-fishing. Based on this condition, fishermen will be the stakeholder who gets the greatest loss if the selling price is cut down due to the quality deterioration. Furthermore, Ref. [20] revealed that fishermen have low bargaining power in term of price, so the government provides fish auction facility (FAF) as an infrastructure to enhance the productivity and improve the price of catchment

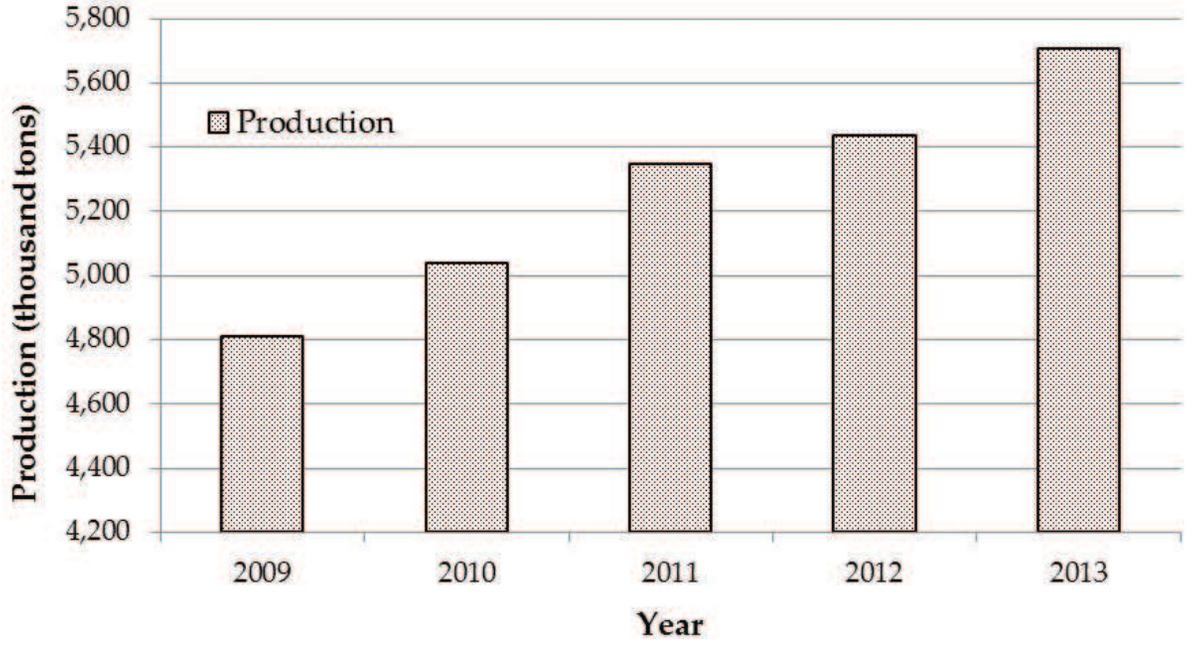


**Figure 2.** The production of fresh catchment sea-fish in Indonesia [19].

fish in the fishermen stage. FAF facilitates fishermen through ship owner and trader in terms of fish landing, auction, processing and marketing process. Both ship owner and trader must pay retribution with the amount of retribution varies for each FAF. However, it is around 5% of the total production of catchment fish.

The value added can be enhanced in each tier by optimizing every activity undertaken along the supply chain. Based on in-depth interview, the current practice of catchment fish supply chain is not optimal yet since inadequate infrastructure and inefficient activity are the main obstacles. In order to improve the value added along the supply chain, recognizing the most valuable activity is necessary to decide which activity could be improved to provide competitive advantage.

*4.1.1. Logistics cost of fresh catchment sea-fish*

In the practice of cold supply chain, every logistics activity in each tier needs particular cost to encourage the appropriate temperature for controlling the quality of product. However, in some cases, the large cost required becomes the constraint in the cold chain practice. The total cost along the cold supply chain in a whole cannot be separated by any logistics activity at each tier. In the integrated supply chain system, changing in costs of particular logistics activity in one tier may affect others and the whole supply chain. The analysis of the logistics cost along the supply chain of catchment fish thus should be taken to identify the proportion of logistics costs, determine the cost components of the most influential and valuable activity and define which activities can be controlled to minimize the overall logistics costs. In addition, the logistics cost analysis can be used as one of the considerations in determining the selling price and profit margin.

Moreover, fish that had completed the auction process was then placed in a container, such as Styrofoam or cold box, and ice cube was added to keep the product at the low temperature. Transportation used for distribution is differentiated based on the distribution distance where truck, container or car is used for long distance trip and motor cycle is used for short distance trip. In the peak season, the catchment fish which are not distributed yet will be stored in a particular period by trader. Wholesalers will keep them in the cold storage, while the small traders will keep in the cold box which is filled with ice. According to Ref. [21], temperature of cold storage which is around from −18 to −30°C may freeze the fish product by turning almost all the water content in the product into ice because the temperature is under the freezing point of water. Therefore, the use of cold storage tends to be more optimal to control the quality of fish.

The logistics activity in this case study encompasses procurement, material handling, inventory, transportation, maintenance and information. Calculation of logistics cost is only carried out on the *Euthynnus affinis* as the most dominant type of catchment fish in this study. In addition, **Figure 3** shows the proportion of logistics cost for non-freezer (using the ship with the cold storage and longer fishing trip) and freezer chains (using ice cube for storage during the trip and shorter fishing trip). Based on **Figure 2**, transportation cost accounts for the largest portion of the logistics cost with the slight difference between freezer (43.57%) and non-freezer chains (42.91%). It is because the freezer chain requires more fuel for longer trip and cold storage. For both chains, transportation cost of trader is dominant because traders deliver large quantity of product with limited capacity of vehicle which leads to the high

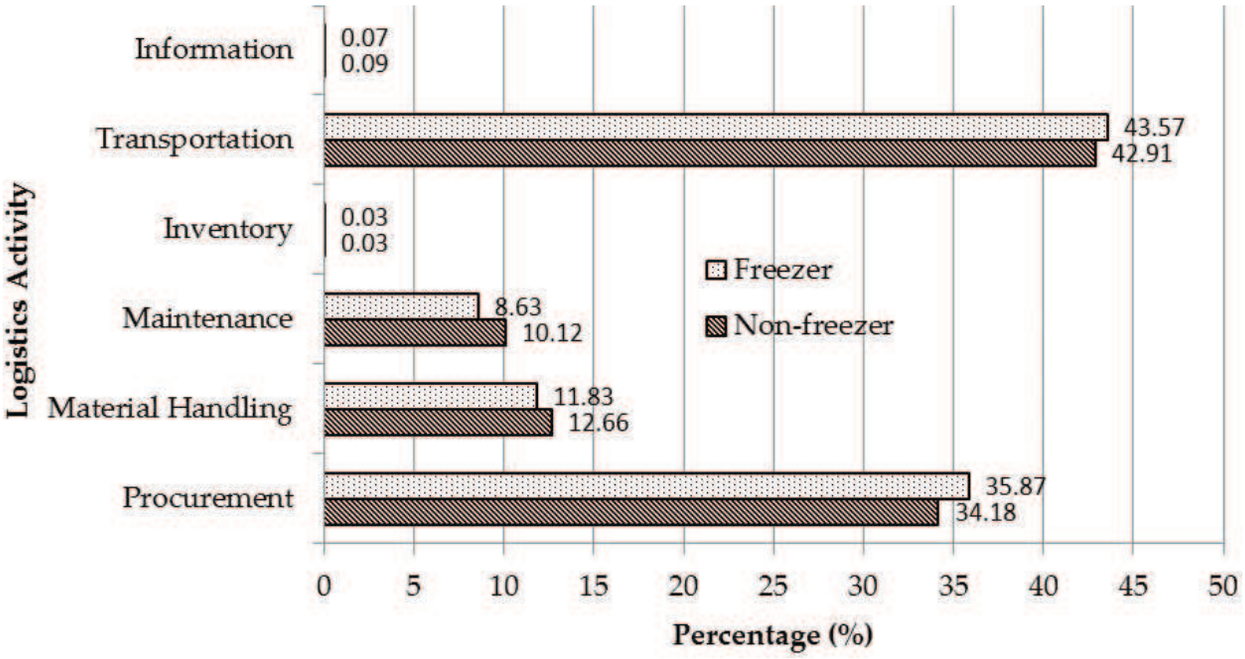


**Figure 3.** The proportion of logistics cost for each logistics activity.

intensity of delivery. On the other hand, procurement accounts for the second largest portion and it is only owned by the fishermen. Procurement cost includes needs for fishing and labour cost which is entirely covered by fishermen. The material handling, maintenance, information and inventory costs have little portion in the logistics cost in which total of those four accounts for less than 25%.

Furthermore, material handling cost is dominated by the ship owners and traders with the cost components including post-fishing cost, inspection cost, depreciation of tools and loss during handling. Post-fishing cost encompasses retribution cost during auction process in the FAF, which is under the responsibility of ship owner and trader as the participants. The maintenance cost of tool and vehicle is dominated by the cost from fishermen, while information cost comprising of communication bill is dominated by traders and ship owners. Inventory cost accounts for the smallest portion because catchment fish is fast moving product so that inventory is not the dominant activity among other logistics activities.

The selling price of catchment fish in the market fluctuates significantly, ranging from Rp 9000 to 14,000/kg in the fishermen stage and Rp 13,000 to 23,000/kg in the trader stage. Based on the current market price, the market price of catchment fish processed by trader is sold at average price Rp 17,125/kg, while catchment fish in the fishermen stage is sold at a price Rp 11,375/kg in average as shown in **Figure 4**. The large gap occurs in the ship owner stage because they get the fish from the share-fishing with the higher portion and spend less operational cost. It is very difficult for the fishermen to get profitable margin since they are responsible for all the operational cost during fishing and share the fishing result with the ship owner. The fishermen play a role as a price taker because they have low bargaining power, while the ship owners have higher bargaining power in the auction process. With the material

handling and information cost ranging from Rp 664 to 882/kg, the ship owners then sell the fish at a ranging price from Rp 11,125 to 12,625/kg. Total margins in the whole value chain are Rp 5750 (freezer) and 6625/kg (non-freezer) with the highest portion in the ship owner stage. Therefore, in terms of making profit, the highest profit margin ratio is gained by the ship owner among the value chain players. The high profit margin shows the good achievement for each stakeholder, but when looking at the whole value chain, unbalance profit margin leads to inefficiency value chain.

### *4.1.2. Developing strategies of supply chain*

Inefficient value chain of catchment fish can be minimized by balancing profit margin ratio on each tier. One of them is to replace the share-fishing system into a lease or rental system so that rental costs incurred depending on the length of rental time and the quantity of fish that fishermen obtained. Moreover, the increasing demand of catchment fish as the functional product is an opportunity and challenge for the stakeholders along the value chain. Nevertheless, the ability to provide appropriate quantity and good quality of products with profitable margins for every stakeholder is challenging. According to Ref. [22], the implementation of efficient strategy is the appropriate strategy for functional product where it focuses on the fulfilment of customer demand at the lowest prices by reducing the total cost of the activity with the largest cost. Since the ship owners have less expenditure, this case study focuses on the reducing cost in the fishermen and trader stages. Fishermen should reduce the procurement cost by using alternative equipment called 'rumpon' to reduce the use of diesel fuel and by joining association to be able to aggregate the needs of procurement cost. However, the government who plays an important role to enhance the efficiency of value chain should provide sustainable assistance and training to the fishermen, tighten supervision over the selling price so that every stakeholder can earn profitable margins, and develop infrastructure to support cold

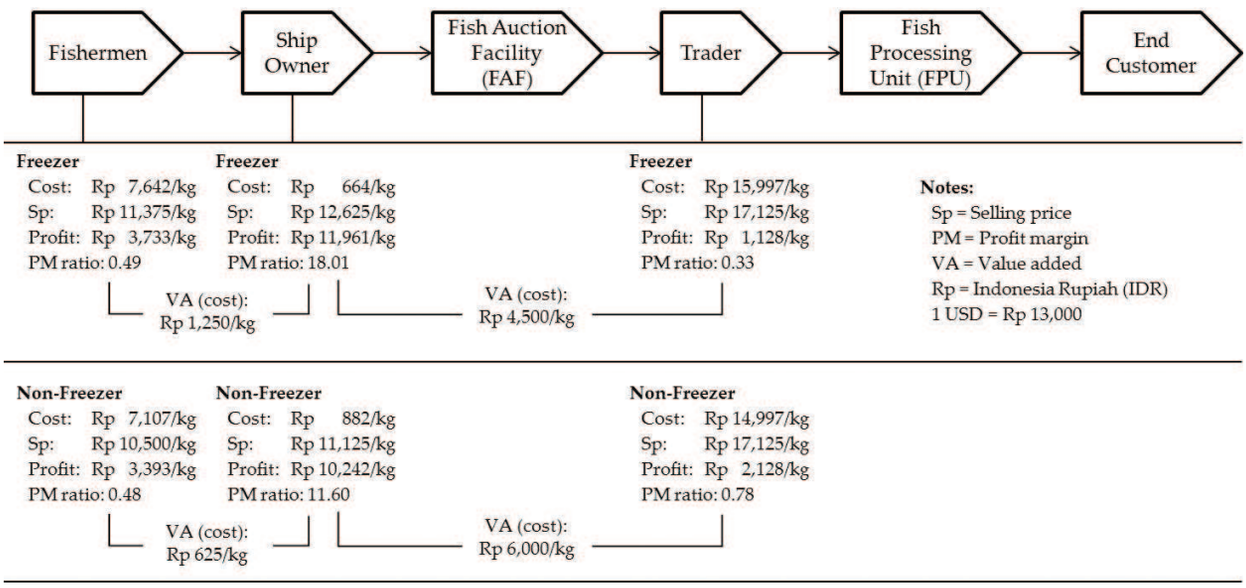


**Figure 4.** Value chain of fresh-sea fish.

chain system through the provision of cold storage that is affordable for fishermen. By using cold storage, fishermen can get higher quality of product and higher selling price. On the other hand, trader should consider the Full Truck Load to minimize the transportation cost per unit.

### 4.2. Case of fresh vegetables

Vegetables are one of the valuable horticultural commodities in Indonesia. The national vegetables production increases every year which should be followed by good quality of vegetables. Due to the perishable characteristics of vegetables, they need special handling throughout the supply chain. This research was conducted in the centre of vegetables in the highland area which is the Magelang region, Central Java and the Sleman region, Yogyakarta. Three main tiers involved in the distribution of fresh vegetables are shown in **Figure 5**.

As it is classified as fast moving product and having perishable characteristics, vegetables are not necessary to be kept in the long period of time and it leads to the low inventory cost along the supply chain. This research revealed that inventory cost of fresh vegetables accounted for 1.22% of total logistics cost which is equivalent to Rp 28.58/kg. Inventory cost comprises of holding cost, labour cost and losses during inventory. In addition, **Figure 5** shows the increasing portion of inventory cost along the supply chain. Farmer accounts for only 2.14% of the whole inventory cost, while trader has the largest portion of inventory cost in the whole supply chain. The holding cost such as electricity and space rental in trader is higher than in collector and farmer due to the larger number of products being handled by trader. The storage period also increases as the supply goes to customer since collector and trader collect fresh vegetables from more than one supplier before distribute to their customer.

In order to enhance this value chain, both trader and collector should control their inventory activity by strengthening the integration and communication in terms of quantity demand among the stakeholder. Therefore, the inventory can be efficiently managed.

In other cases, the study of lead time in the inventory management of fresh vegetables was conducted in the Yogyakarta region. The data were collected based on purposive sampling method, followed by in-depth interviews and group discussions to suppliers at each tier. The results from Ref. [15] show that several vegetable varieties have positive lead time

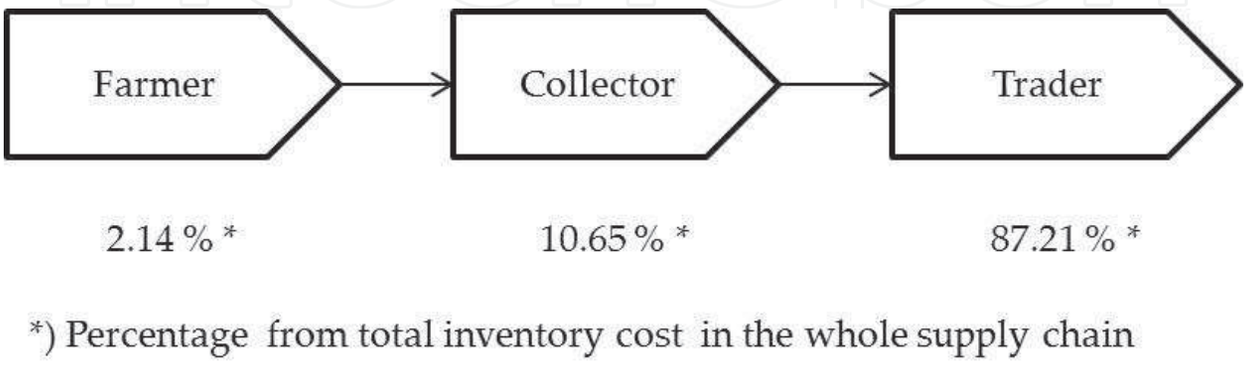


**Figure 5.** The supply chain of fresh vegetables and inventory cost percentage in each tier.

| | Vegetables | Lead-time (hours) | | | | Supply chain characteristics | Inventory management |
|---|---|---|---|---|---|---|---|
| | | CLT | CT | SLT | DLT | | |
| Non-unique vegetables | Cabbage | 16 | 4 | 3 | 6 | Predicted demand, fluctuative consumer's demand, reliable supply chain, predicted delivered products' quantity, strong bargaining power, many suppliers | Speculation |
| | Squash | 48 | 4 | 6 | 6 | | |
| | Scallions | 12 | 2 | 2 | 6 | | |
| | Pakcoy | 12 | 2 | 2 | 4 | | |
| | Chicory | 12 | 4 | 4 | 4 | | |
| | Tomato | 24 | 4 | 6 | 6 | | |
| | Small tomato | 24 | 4 | 6 | 6 | | |
| Unique vegetables | Broccoli | 12 | 6 | 6 | 6 | Unpredicted demand, stable consumers' demand, unreliable supply chain, unpredicted delivered products' quantity, weak bargaining power, few suppliers | Postponement |
| | Green lettuce | 8 | 4 | 4 | 4 | | |
| | Lettuce | 8 | 4 | 4 | 4 | | |
| | Beetroot | 12 | 8 | 6 | 6 | | |
| | Red spinach | 8 | 4 | 4 | 4 | | |
| | Kailan | 8 | 4 | 4 | 4 | | |

Notes: CLT: customer order-to-delivery lead-time; SLT: supplier order-to-fulfilment lead-time; CT: firm's cycle time; DLT: delivery-to-customer lead-time.

**Table 1.** Management inventory at supplier level.

(CLT > SLT + CT + DTC) as characterized by predictable demand and relatively the consumer preferences change rapidly as shown in **Table 1**. This type of supply chain is reliable and predictable in terms of delivery quantities. In this case, supplier has a strong bargaining power, because they have many suppliers (more than 50 farmers). Approximately 80% of the varieties are non-unique plant such as cabbage, squash, leeks, pack coy, chicory, tomatoes and small cherry tomatoes.

Meanwhile, 20% of the rest (other farmers) grows unique varieties, namely broccoli, lettuce, green lettuce, beetroot, red spinach and kaylan. These vegetables have negative lead time (CLT < SLT + CT + DTC) as indicated by demand level that is difficult to be predicted but relatively occupy stable consumer preferences. The lead time in this supply chain tends unreliable due to the fluctuation in the quantity of delivery. The bargaining power of suppliers is weak as it is only supplied by a limited number of farmers.

Based on this fact, the most proper inventory management for non-unique vegetables is inventory postponement, while the most proper inventory management for non-unique vegetables is inventory speculation.

### 4.3. Case of aquaculture business

During year 2010–2014, aquaculture production showed a positive trends with an increasing reach 23.74%/year on average The positive performance for the value of aquaculture

production also increases in the same period with an average increase of 16.12%/year. Meanwhile, demand from Java Island will continue to grow because per capita consumption of fish in Java Island is still below per capita consumption outside Java Island. This case study was conducted in the Sleman region and the Klaten region, while Tilapia (*Oreochromis niloticus*) and Catfish (*Siluriformes*) are in the focus of this case study.

The main stakeholders in supply chain of aquaculture consist of six tiers including fish larvae producer, spreader, enlarger, wholesaler (collectors), retailer and consumer. In a supply chain, the amount of value added provided by each tier could be different because of their different respective functions in the activities of the supply chain running. In the analysis of logistics cost, Ref. [22] revealed that procurement activity is accounted for the highest portion in the total logistics cost of Tilapia and Catfish in aquaculture business. Procurement activity as the initial activity in this aquaculture business is very important because it will determine the success of the rest of the activities in this business. Good initial activity leads to the good result and yield. In addition, the second highest cost is material handling.

Margin value is obtained from the difference between selling price and purchasing price. **Figure 6** shows that the highest margin occurs in the spreader stage, while the lowest one is in the enlarger stage. Spreader gives value added by producing Tilapia with the size equal to 50–60 pcs/kg. Different margins between the Sleman region and the Klaten region are influenced by differences in the production yield of Tilapia fish in each area which may affect the selling price of the fish. Moreover, distribution margin for Catfish between the Sleman and Klaten regions is not significantly different (**Figure 7**) due to the similarity of commodity price in both areas. Similar with Tilapia fish, the highest margin occurs in the spreader stage. On the other hand, the lowest margin in the value chain of Catfish is in the collector stage.

From the calculation of profit margin, different profit margins earned by each tier are occurred as shown in **Figures 6** and **7**. For aquaculture of Tilapia and Catfish, spreader earns for the highest profit margin among all tiers in both the Sleman and Klaten regions, while wholesaler or collector earns for the smallest. Moreover, profit margin obtained by Tilapia fish larvae producer in the Klaten region is smaller than the profit margin of Tilapia fish larvae producer

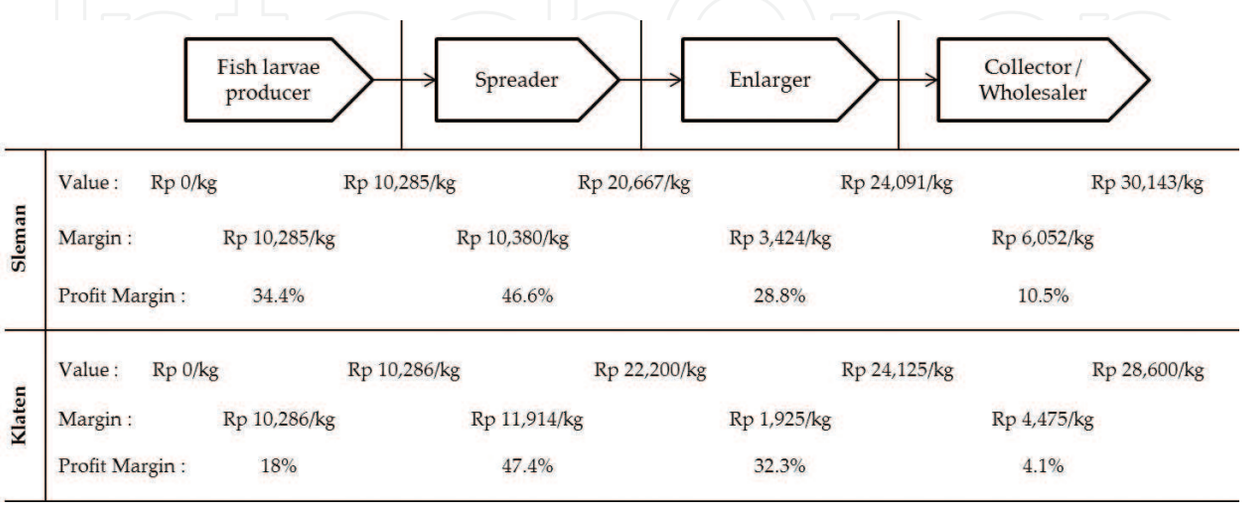


**Figure 6.** The value chain of Tilapia fish in the Sleman and Klaten regions.

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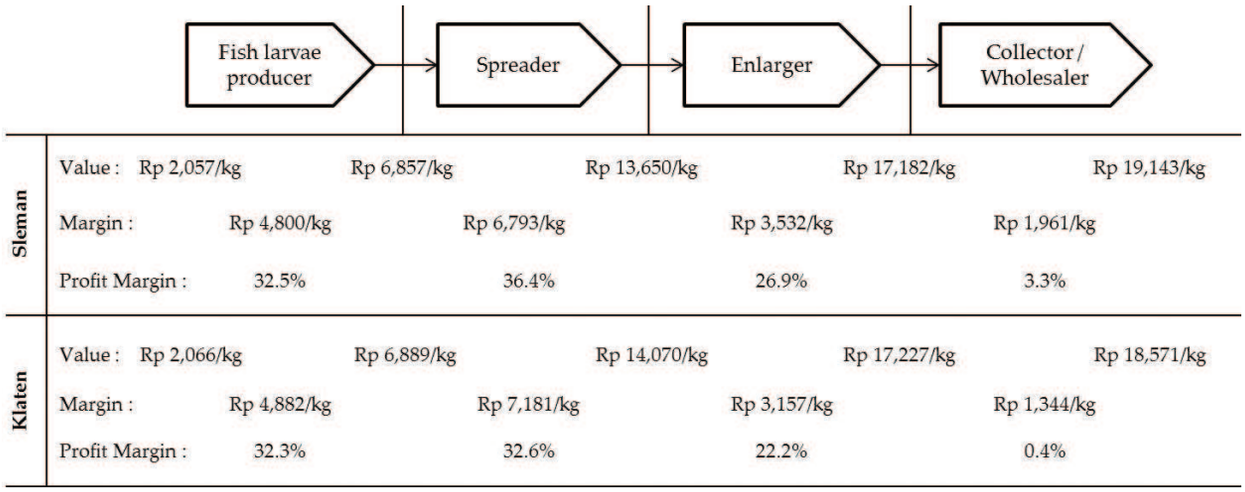


**Figure 7.** The value chain of Catfish in Sleman and Klaten region.

in the Sleman region. It is because the water temperature in the Klaten region is lower than the Sleman region, while the spawning process takes the warm water with the temperature around 25°C. This results in the higher use of resources in the Klaten region which leads to the higher cost to get the same quantity of yield (see **Figure 6**).

The increasing production of aquaculture followed by the demand of aquaculture is an opportunity for aquaculture business to rapidly grow. To enhance its profitability and sustainability supply, improvement should be taken into the stakeholder's consideration. Based on the value chain analysis aforementioned, the fish larvae producer should increase the quality of spawning process and encourage the use of feed alternative with the similar quality but with lower cost. As the second tier, spreader should enhance the ability to choose the good fish seed as well as choose the supplier who is able to provide good quality of fish seed. On the other hand, vertical integration with the fish larvae producer may also lead to the high availability of raw material. Next, enlarger should develop feed alternative as a side component of main feed with the lower cost and do the push-based strategy. They should also buy in the large quantity to the big organizations or suppliers in order to get lower price or discount. Employing pull-based strategy, finding many suppliers to maintain the inventory and enhancing sales volume are the strategies that should be conducted by the wholesalers [23].

## 5. Concluding remarks

In Indonesia, there are many long supply chains where the role of intermediaries becomes quite dominant. In many cases, the added value given to the product in each tier of supply chain is relatively minimal, so that the increase in prices is not followed by the value added of the product. This has led to a considerable gap between the selling prices received by the initial suppliers (farmer or fishermen) and purchasing price paid by the consumer. In addition, the integration between stakeholders has not been applied so that the profit is not optimal as a whole. Currently, creating added value can be achieved by understanding the regional resource, connecting them and disseminate the result.

In several aforementioned case studies, stakeholders who gain the highest profit are the intermediary parties with relatively low operational costs or logistics costs. Low bargaining power of initial supplier (farmer or fishermen) is still a fundamental obstacle why the profit earned is sometimes not worth the effort that has been nurtured. In addition, the additional charges given to the initial supplier are sometimes too big, causing the smaller profit earned. Inequalities in profit among stakeholders show the inefficiency of supply chain. Furthermore, value chain analysis can be performed to determine which activities classified into core and support activities. Analysis using the cost parameters enables the determination of level income distribution in a commodity. The analysis can be used to formulate an improvement strategy. In this case, the government also needs to play an active role in controlling and mentoring. Therefore, the distribution of profit and the income gap among the stakeholders in a particular commodity is not too significant.

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## Author details

Adi Djoko Guritno

Address all correspondence to: adidjoko@tip-ugm.org

Department of Agroindustrial Technology, Faculty of Agricultural Technology, Universitas Gadjah Mada, Indonesia

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