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## Characteristic of Cocoa Commodity Supply Chain in West Sulawesi

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### Abstract

West Sulawesi Province, especially Mamuju District is one of the cocoa bean producers whose farming community is still the main income from cocoa farming. However, the price of this commodity is dominantly determined by collecting traders, so the price has not been competitive compared to other commodities, such as rubber and oil palm. This is due to the supply chain from farmers to marketing logistics of cocoa beans have a considerable distance. The purpose of this research is to identify the pattern of supply chain of cocoa beans commodity from farmers as producers to village collector traders, sub-district collector traders, and wholesalers in Mamuju District, West Sulawesi Province. This research was conducted through survey by mapping the characteristics of the cocoa bean supply chain that became the object of research from farmers to collector traders. The results of this research show that the supply chain of cocoa beans has not been patterned or unstructured. The marketing chain of cocoa beans is still dominated by village collector traders because the volume of productivity and quality of cocoa beans produced by farmers is still low due to pest attack disease and low quality of varieties / seeds, so the farmers need government policies and research that support the increase of productivity. In addition, the farmers need capital from banking and mentoring from government, private, or NGOs for cacao plant maintenance, as well as price guarantee from traders or industries in the form of partnership.

**Keywords:** characteristic; supply chain; cocoa beans.

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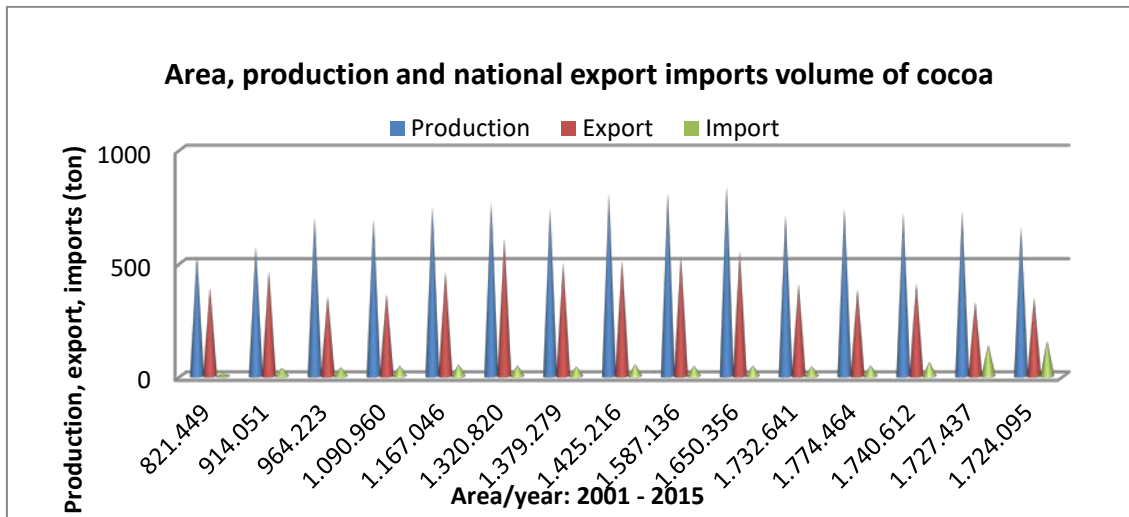
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**1. Introduction**

Supply chain is an sustainable and integrated process from raw materials to semi-finished or finished products to consumers which involved several companies [26]. The supply chain as a network consists of several companies working together directly or indirectly to meet customer demand [19, 27, 28]. The sustainable supply chains need to increase the engagement and interaction of several stakeholders [11] that can support the financial strength and performance of the supply chain [3, 9]. These companies perform the material procurement function and the process of transforming the material into semi-finished and finished products to distribution to the final consumer. The goal to be achieved from each supply chain is to maximize the value produced as a whole [5, 6]. The demand for security, make the standard aspect increasingly plays a fundamental role in supply chain organizations [4, 17] .

Cocoa is a leading commodity in the third plantation sector after palm and rubber in Indonesia. The commodity has the same target market as raw material for domestic and foreign industries. Cocoa is different from oil palm and rubber whose management area is mostly conducted by private companies and State Owned Enterprises (SOEs), 87.4% of cocoa is managed by people’s farm or individual farms, 6.0% of state plantations, and 6, 7% of private plantations [10]. The management of cocoa farmers owned by farmers faced many problems, including the limited capital cultivation and post-harvest handling.

The national problem of cocoa is the decline of production that occurred since 2010, from 837,918 tons in 2010 to 661,243 tons in 2015, whereas there is an increase of area of 1.6 million Ha in 2010 to 1.7 Ha in 2015 ( Figure 1). According to the Ministry of Agriculture, the decline in productivity of Indonesian cocoa garden is caused by pests / diseases, old crops, the average land tenure by farmers is small, lack of maximal garden care, and improved varieties (clones) developed is very less [10]. This condition is exacerbated by the weak bargaining position of farmers in marketing system that tend to oligopsoni [8].



**Figure 1:** Area, production and national export imports volume of cocoa from 2001-2015

Source: National Bureau of Statistics

The problem in the marketing of cocoa beans in West Sulawesi Province is the considerable distance between the location of farmers and exporters or industries, resulting in inefficiency in the marketing performance of cocoa beans. Price maker in the cocoa business is dominantly determined by the traders, as well as those who enjoy high margin in the marketing system of cocoa beans so that the price at the farm level becomes very low. This condition occurs because the mastery of information and financial strength owned by traders, making they are able to dictate the farmers, so that the conditions are used by traders to seek profit [13, 16]. Therefore, effective marketing is needed in the distribution of cocoa beans to increase the prices at the farm level. The high selling price of cocoa beans will motivate the farmers to increase their production.

The level of productivity is very influential on the sustainability of the supply chain [7], but the increase in productivity itself is not enough, but must be followed by the improvements in the marketing channels (supply chain) [12, 22]. One of the supply chains that needs an improvement is to increase the value received by the farmers [30] by strengthening institutions [2] and partnerships [23, 25, 31], so that there is efficiency and effectiveness of cocoa beans marketing to the downstream [15]. The effective marketing is needed in cocoa beans marketing to create price stability. The higher the selling prices of cocoa the more motivated farmers to increase production [1, 24].

The purpose of this research is to identify the characteristic or pattern of cocoa bean supply chain in Mamuju district, West Sulawesi province from farmers to collector traders to downstream and / or exporters.

## **2. Metodology**

This research was conducted for 6 months, from August 2016 up to January 2017. The outline of this research is conducted in three stages, namely data collection phase, data processing phase and data analysis phase. The data collection phase begins with a series of discussions with experts about the understanding of stakeholders or institutions involved in the cocoa bean supply chain.

The location of this research was in West Sulawesi Province because this province is the main source of cocoa producer in Sulawesi because the land is very suitable with cocoa commodity crop, and has been the center of Gernas Pro-Kakao Program by the central government. The object of this research is in two sub districts, namely Sampaga and Kalukku District, Mamuju District. The determination of these two sub-districts as a research site because their location as the main producer of cocoa has far enough supply chain in West Sulawesi Province.

The population as the respondent is the main actors of the cocoa supply chain (farmers, collector traders, wholesalers, exporters, and downstream industry businessmen) and cocoa experts and cocoa supply chains (supporting actors, government, private and academia). The respondents besides farmers are selected by purposively sampling based on his knowledge on cocoa and cocoa bean supply chains are 14 people (two people of each of these actors / stakeholders).

The respondent of farmer has big enough population size, so the sampling technique is using the technique of Area (cluster) Sampling [29], that is from 3 villages are chosen from every sub district and each village choose 5 cocoa farmers, so overall there are 30 cocoa farmers.

The data obtained consist of primary data and secondary data. The primary data is the data obtained directly from respondents such as data on the condition of the garden and the description of the cocoa supply chain at that time. The secondary data is obtained through relevant agency documents such as agriculture and plantation service, Central Bureau of Statistics (CPM) [20, 21].

Data collection, especially primary data is conducted through several ways as follows:

1. Field observation, which is to see directly the activities of all actors in the supply chain of cocoa commodities, ranging from producers (farmers), collectors trader, processors / industries, exporters to consumers.
2. In-depth interview with the cocoa supply chain actors or stakeholders to understand the characteristics / types of supply chain at the time and the risks they face.

The data analysis used in this research is qualitative descriptive analysis, which presents the data in accordance with units, indicators, and parameters that have been determined based on facts that occur in the field.

### **3. Findings and Discussion**

#### ***3.1. Cocoa Supply Chain Structure and the activity to Increase the Value of Cocoa Beans***

The things that will be discussed in this research are business activities ranging from farmers to cocoa beans exporters and industry or domestic processing.

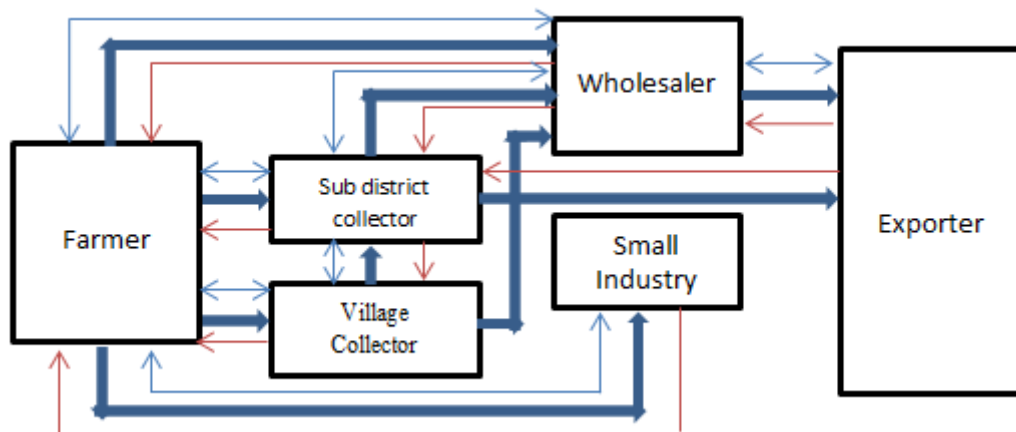
*Cocoa farmers* are the supply chain actors that conduct an activity of cultivation started with the preparation of the land, buy the quality seeds. Selecting the cocoa seeds for planting is very risky, so it must be really careful in choosing good quality seeds. It is because the cocoa tree is harvested at the age of the plant about 3 years. The good quality seed will produce a lot of cocoa beans and qualified. But unfavorable cacao seed may not bear fruit in the proper times, or seeds that are produced less and not qualified. After the planting process, farmers should maintenance his garden. The garden maintenance activities include embroidery (replacing the dead or less well-grown plants), fertilizing, weeding, pruning, and eradication of pests. The harvest time on proper cocoa fruit maturity, fermentation and drying greatly determine the quality of the seeds produced. The cocoa farmers often harvest before the proper time to meet the family needs and credit to the provider of facilities that also function as collecting traders. Now, cocoa farmers in Mamuju have an average land area of one to two hectares and tend to decrease due to shifting land to other commodities such as palm and maize. The transfer of land functions is due to the high pest of disease that decreases the amount and quality of cocoa beans. The production of cocoa beans in West Sulawesi Province is fully conducted by peasant self-help. The peasant self-help open and manage the gardens completely with their own efforts and funds or loans from middlemen (collecting traders). Farmers' activities in West Sulawesi in improving the productivity and quality of cocoa beans are maintenance by fertilizing, eradicating pests and diseases with the use of pesticide. The post-harvest handling with the separation of cocoa beans from its skin, drying for two days, separation from impurities and broken seeds. The fermentation is not conducted because there is no different price while the fermentation process takes 7 days. The flow of cocoa beans product produced by farmers in Mamuju Regency involves village collector traders,

sub-district traders and wholesalers. The flow pattern of cocoa beans supply chain is divided into three chains: 1) farmers selling through village collector traders, 2) farmers selling through sub-district collector traders, 3) farmers selling through wholesaler. The most widely used channel by farmers is channel one, which is 70%. Most farmers choose to sell to village collector traders because of the loan ties that farmers have received before harvest, few harvests volume, closer distances to farmers, and family relationships.

*Collector traders* are intermediary traders who seek, collect, receive and collect or buy cocoa beans from farmers. The collector traders consist of village and sub-district collector traders. These intermediary traders are the spearheads for wholesalers, as most wholesalers obtain cocoa beans supply from collector traders. Collecting traders do not only make cooperative relationships (partnerships) with wholesalers, but also make cooperative relationships with farmers with the provision of loan money or production facilities (fertilizers and pesticides). The loan to the farmer is paid by the farmer when selling the cocoa beans to the collector traders. But there are also collector traders who are not bound in partnership with farmers or exporters, called "*papalele*". The price of cocoa beans by *papalele* to farmers is sometimes higher than the purchase price of the collector traders who give the farmers capital. The collector traders who obtained the cocoa beans from the farmers were categorized as low quality cocoa beans because they were not fermented and did not use moisture gauge. The determination of moisture content on collector traders is solely based on experience. The buying price of the collector traders, especially the village collector traders to the farmers, is not related to the water content, so the purchase price is relatively low compared to the standard price. The reason is that the village collectors traders' margins have taken into account the physical risks (losses) and economic risks [18]. The treatment of village collector traders to increase the added value of cocoa beans obtained from the farmers is the re-drying and cleaning of the remaining dirt, then packed in a sack. While the sub-district collector traders are adjusting the water content required by wholesaler or exporters with water content test equipment.

*Wholesaler*, some provincial traders have representatives in the regency to purchase cocoa beans from collector traders with predetermined water content (6-8%). The relationships pattern between wholesalers and collector traders is in the form of incentives or premiums per semester by wholesaler to collector traders. Thus, the more instrumental in price determination is the wholesalers, whereby wholesalers have the freedom of comparing prices at the collector trader level. Meanwhile, the relationship between wholesalers and exporters is not patterned. The wholesalers generally have relationships with more than two exporters. This is conducted with considerations; 1) in the event of a bankruptcy of one of the exporters, the supply will still be distributed to other exporters, and 2) if the one of the exporters sets a relatively different purchase price, then a higher purchase price will be selected. Wholesalers other than as suppliers to exporters, also act as the suppliers of cocoa beans to downstream industries in Makassar which is also the exporters of cocoa beans, such as PT Cargill, PT Olam, PT ECOM, etc., which produce semi-finished materials for export needs. The cocoa beans in West Sulawesi are dominantly (80%) absorbed by PT ECOM because it has a unit of purchase in the area (CV Tana Mas). The wholesaler in West Sulawesi Province mostly makes warehouse purchases in Kalukku Sub-district as it is close to cocoa garden center. In the purchase unit, a quality control test of cocoa beans received from collector traders is conducted. In this unit of purchase, there is no more sorting activities or drying seeds. The seeds purchased are dried beans ready to be shipped; the process is only replaced the sack and deliver it to Makassar.

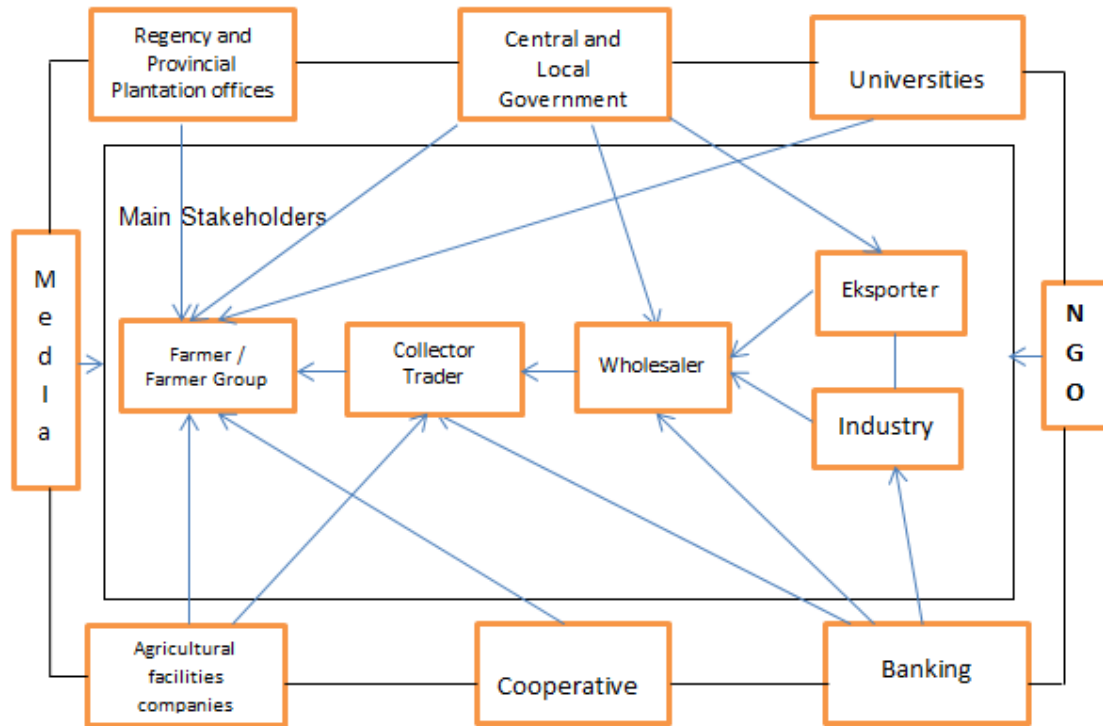
The treatment of wholesalers to increase the added value of cocoa beans obtained from collector traders is to separate the damaged and broken seeds, adjust the moisture levels required by the exporter or the industry with a water content test kit, then pack into a neatly stitched sack with a uniform weight. *The exporters of cocoa*, both in the form of seeds and semi-finished exported by some companies that are located in Makassar for Sulawesi area, such as PT ECOM, PT Cargill Indonesia Cocoa, PT Mars Symbioscience, PT Olam Indonesia, PT Barry Callebout, This exporter receives cocoa beans from wholesalers and collector trader in sub district. Several exporters such as Cv Tana Mas owned by PT ECOM also acts as a wholesaler who has a buying station in the regency or sub-district of cocoa beans producer such as in Kalukku Sub district. These exporters cooperate with wholesalers in the form capital assistance to purchase cocoa beans. The companies export cocoa in the form of seeds and semi-finished products. The main criteria that must be met is the form of cocoa beans, which must be large seed or in one kilogram count of 100 cocoa beans, the content of fungi and dirt max 1%, and water content amounted to 6-8%. As for the exports, the semi-finished products are in form of powder and cocoa butter. Currently, exporters mainly export in the form of semi-finished products due to the low quality of our cocoa beans and the imposition of exit costs (BK) 8-15% for cocoa beans exports [1]. *Downstream industries*, domestically divided into small and large scale. There are two small-scale cocoa processing units in West Sulawesi, in Kalukku and Sampaga Sub districts. The processed products produced are in the form of chocolate snack as snack food supplied to supermarket and stall. The production capacity is still small, which is made from 25 kg of cocoa beans/day because the processing place is a 5 x 10 meter building with a workforce of 5-10 people. The large-scale industries are semi-finished processing companies as well as exporters as the companies are on the exporter's points above. The small downstream industries obtain cocoa beans from a single group, while large industries that process cocoa beans into semi-finished products derive cocoa beans from wholesalers and some of cocoa beans from the exporting companies specializing in exporting cocoa beans.



**Figure 2:** Product flow, money flow, and information flow of cocoa beans in West Sulawesi.

Explanation:   
 ———→ Goods Flow   
 ↔ Information Flow   
 ———→ Money Flow

## Supporting Stakeholders



**Figure 3:** The relationships of major stakeholder with supporting stakeholders in the cocoa commodity supply chain, West Sulawesi.

### 3.2. Institution Support / Supporting Stakeholders to each Supply Chain Network of Cocoa Commodity

*Farmers*, as cocoa seed producers perform the production activities that begin with preparation of seed planting, maintenance, harvesting, and treatment of cocoa beans after harvest [14]. To produce qualified cocoa beans, the activities of farmers as cocoa producers should receive support from :

- a) The stall that provide of agricultural equipment (fertilizer, pesticide and agricultural equipment).
- b) Department of Agriculture as implementer of government assistance and extension provider or technical guidance of cultivation and information technology
- c) Government as a maker and monitor of policy success.
- d) Non-governmental organizations as volunteers to assist technical guidance.
- e) University as a research institute that produces new technological findings.
- f) Cooperative as an information container, lenders and the place to sell cocoa beans from small-scale farmer.
- g) Media, especially electronic media as the information providers of the rupiah exchange rate and the price of cocoa beans.

But in reality most of the farmers or farmer groups in Mamuju District, West Sulawesi do not get support from

most of these institutions. The farmers only get support from stall providers of agricultural equipment, and even only limited to the facilities that must be purchased in cash. However, it provides enough support for the farmers because it is not far from the location of the farmers' farm. The farmers do not get capital loan from banks. Most of the loans are obtained from the village collector traders and are paid when the farmer sells his cocoa beans to the trader.

Technical guidance from agricultural extension agencies is less than optimal because it is more administrative or data collection only. Moreover, if there is such activity, it is only partial in some groups of farmers. Similarly, extension workers from NGOs in Mamuju District conducted by Swisscontact, they only provide assistance to cocoa farmers on a particular group or a small portion of the farmers who are in their guardians. The policy of local and central government in the form of program to increase the production of farm has not optimal yet. There is not full support from other institution like university, cooperative and media.

*Collector traders* domiciled in villages and sub-districts buy cocoa beans to farmers largely due to support from multiple supporting stakeholders. Supporting institutions or supporting stakeholders that support the collector trader such as:

- a) Stall that provide agricultural equipment (fertilizers, pesticides and agricultural tools) as a provider of procurement cooperation means of such facilities to meet the needs of farmers with a loan system whose payments are cut when harvest.
- b) Banking as a lender of capital to buy cocoa beans to farmers.
- c) NGO as facilitator of quality improvement of cocoa beans by training how to treat and save the cocoa beans and qualified certifier.

*Wholesaler*, in Figure 2, shows that wholesalers with a buying station in the sub-district and regency are supported by supporting institutions or stakeholders, such as:

- a) Local Government, which provides support in the form of cooperation policy and licensing of cocoa beans trade in the region.
- b) Banking institutions, which provide support in the form of business capital loans.
- c) Media, as a provider of price information and the needs of exporters and domestic industries.
- d) NGO as technical guidance provider to manage qualified beans required by industry and exporter.

*Exporters and industries*, the exporters of cocoa beans and large industries that process cocoa beans into semi-finished product into ready-to-export product, receive support from supporting stakeholders such as:

- a) Central and local governments as a policy provider of investment licensing and exit duty as well as the percentage of taxes according to volume of exports.
- b) Banking, as a provider of loans.
- c) Media, as a provider of information on the rupiah exchange rate and fluctuations in world market prices.
- d) NGO, as a certificate of quality seeds and processed products ready for export.



#### **4. Conclusion**

The supply chain of cocoa commodity in Mamuju West Sulawesi has not been efficient because some of the obstacles to increase the productivity of the plantation have not been resolved. Among these obstacles is the high pest attack disease of cocoa plants, the lack of cooperation in the form of mutually beneficial partnerships between wholesalers, industry or exporters with farmers as the main actors of cocoa beans producers, and lack of support from supporting stakeholders, especially the government towards farmers.

The pattern of supply chain flow of cocoa beans from farmers is divided into: farmers as producers sell cocoa beans to village collector traders, to sub-district collector traders, and to wholesalers. However, most farmers sell their cocoa beans to village collector traders by reason; 1) there is an element of commitment because there is a loan tie the farmer has received before harvest, 2) the small harvest volume, 3) the closer the sale distance to the farmer, and / or a family relationship.

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