

# The Potato Value Chain in South Sulawesi

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**Abstract:** *The analysis of the potato value chain is conducted to identify the role of inter-sectoral cooperation from upstream to downstream. This research aims to identify the map of the value chain of potatoes and identify the activities of key actors value chain of potatoes in South Sulawesi. This research uses informants with purposive sampling and snowball sampling techniques so that the analysis method used is descriptive qualitative. Based on the results of the research, the analysis of the potato value chain involves the main actors and supporting actors. The main actors consist of potato farmers, gatherer traders, large traders, retailers, and processed potato industries. Supporters include agricultural extension workers, farmer groups, alsintan services, farm shops, farm laborers, seed breeders, inter-provincial traders, and consumers. Value activities undertaken by main actors in the potato supply chain in South Sulawesi at the farm level are farming planning, procurement, cultivation, harvesting and post harvest planning. At the gatherer traders level do planning, purchasing, sorting, and selling. At the large traders level do the planning, procurement, sorting, packaging and distribution. At the retailers level do the planning, purchasing, and selling. While at the level of processed industry do planning, procurement, production, and distribution.*

**Keywords:** Value Chain, Potato

## 1. Introduction

Potatoes are agricultural commodities that have excellent business prospects developed to meet the demand of domestic and regional markets as well as for export markets that can be used as an investment. Community needs for potatoes also continue to increase along with the increase in population and purchasing power (Setiadi, 1999).

One of potato production centers in Indonesia is South Sulawesi Province. In 2015 South Sulawesi is the 9<sup>th</sup> province with the largest harvest area and the largest potato production in Indonesia is 1,925 ha with production amount 29,522 Ton (BPS and Dirjen Hortikultura, 2016).

The current problem is that potato productivity in Indonesia is still low compared to its potential productivity. The average productivity of potatoes in Indonesia in 2015 reached only 18.2 tons per hectare (BPS and Dirjen Hortikultura, 2016). While the productivity potential can reach 30 tons per hectare (Gunarto, 2003). Even potato productivity in 2015 in Gowa Regency only reached 17.92 tons per hectare and in Bantaeng Regency only reached 13.61 tons per hectare. This is due to the lack of farmers to get quality seeds, unpredictable weather and pest and disease attacks are high, especially when the rainy season arrives so that traders are difficult to get quality products and unsustainable supply of potatoes (Kuntjoro, 2000).

Another problem is the occurrence of price fluctuations in potato commodities where potato growers usually only act as recipients of the price so that often their position in determining the price becomes weak. Meanwhile, a bigger role in potato price control is usually determined by the trader. The existence of price fluctuations can affect the income of farmers and other business actors potatoes. Therefore, it is necessary to coordinate and collaborate from the potato marketing actors to create effective and efficient marketing (Rahko, 2012).

Potato problems occur along the value chain. Value chain analysis is done to increase the role of cooperation between

sectors starting from upstream to downstream. In the value chain analysis book published by ACIAR (2012), it explains that value chain concepts cover organizational issues and coordination, strategy, and power relationships between various actors (major producers, processors, traders, service providers, etc.). Therefore, this research aims to identify the value chain of potatoes in South Sulawesi.

## 2. Review of Literature

### a) Potato

Potato (*Solanum tuberosum* L) is one of the most popular subtropical vegetables in Indonesia. The appeal of this vegetable lies in the potato tubers are rich in carbohydrates and high nutritional value, so it has a big role in efforts to meet the needs of world food, even in Indonesia has been used as one of alternative food other than rice, especially in the fulfillment of the nutrients of the people of Indonesia (Gunarto, 2005).

### b) Value Chain

A value chain is formed when all actors in the chain work in such a way as to maximize value creation along the chain. Value chain in the narrow sense describes a series of activities undertaken within a company to produce a certain output. These activities include the stage of conceptualization and design, the process of obtaining inputs / production facilities, production processes, marketing and distribution activities, and after sales service performance. All of these activities form the entire 'chain' that connects producers and consumers, and each activity adds 'value' to the final product. While in the broad sense describes the various complex activities undertaken by various actors (major producers, processors, traders, service providers) to bring raw materials through a chain until the final product is sold. This 'broad' value chain starts from a raw material production system that will continue to be associated with other business activities in trading, assembly, processing, and others. This broad approach not only looks at the activities of a single business. This approach involves all relationships either moving forward or backward, until when the raw material of production is finally connected to the

final consumer. The concept of the value chain includes organizational issues and coordination, strategy, and strength relationships between various actors within the value chain (ACIAR, 2012).

There are three main concepts of the value chain: first, the conceptual framework described by Porter (1985), which is about a competitive advantage, in which Porter uses a value chain framework to test how firms should position themselves in the market and how they relate to suppliers and competitors. Second, the concept of the Filiere approach (Durufle, Fabre et al., 1988), gives particular attention to the establishment of relationships between local production systems and manufacturing industries, trade, exports, and end consumer industries. The concept of filiere also includes an empirical perspective explicitly used to map the flow of commodities while identifying actors and their various activities. The rationale in a filiere approach is similar to the concept of a broad value chain, namely to look at the various complex activities performed by various actors to bring raw materials through the chain to the final product being sold. However, the philosophy concept primarily focuses on issues of physical and quantitative technical relations, which are summarized in the flowchart of the commodity and the mapping of transformational relationships. Third, the concept of a global approach proposed by Kaplinsky (1999) and Gereffi et al (Gereffi 1994; Gereffi and Korzeniewicz 1994; Gereffi 1999; Gereffi, Humphrey et al., 2013), is a concept that uses a value chain framework to test how firms and countries can be integrated globally, and to test the determinants of global income distribution (ACIAR, 2012).

### 3. Materials and Methods

This research was conducted in Gowa and Bantaeng districts, South Sulawesi Province. The selection of this location was done purposively with the consideration that the area is a center of potato commodity production in South Sulawesi. This research was conducted from August to October 2017.

Informants in this research are potato farmers determined by purposive sampling method or determination of informants with consideration or specific criteria in accordance with research objectives. The next research informant is the trader and the processing industry determined by snowball sampling. The snowball sampling technique implies an increase in the number of informants during observation.

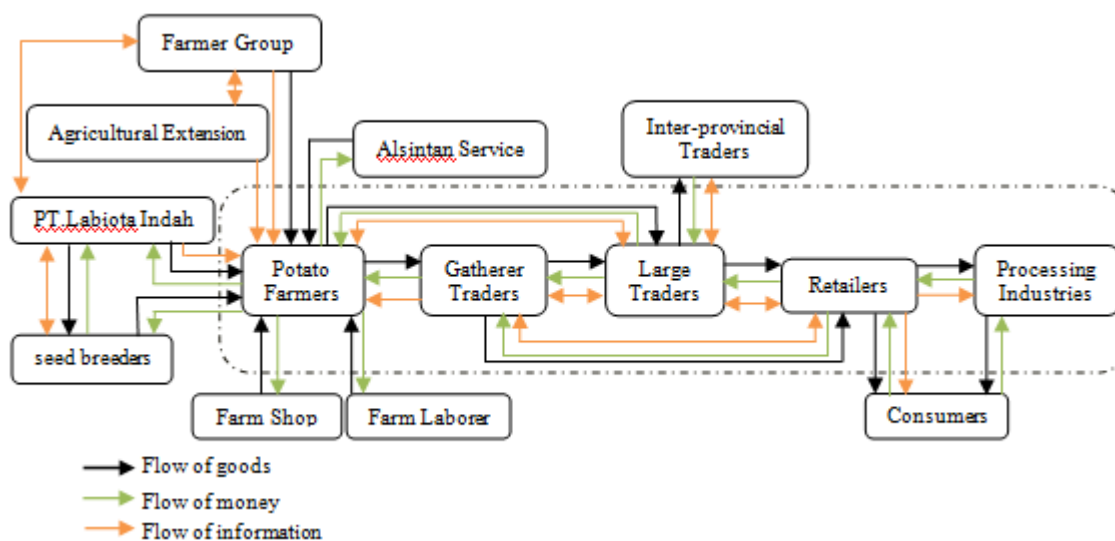
The method used in this research is a method based on the value chain mapping model, which is used to describe the mapping of actors, mapping the flow of goods, money and information in the value chain of potatoes. Furthermore, using qualitative descriptive analysis method that will explain the activities of the main actors in the potato value chain starting from planning, procurement, production process and distribution of goods.

### 4. Results

#### a) Value Chain Actors

In general, the structure of the potato value chain in South Sulawesi involves several actors, namely the main actors and supporting actors. The main actors consist of potato farmers, gatherer traders, large traders, retailers, and processing industries. Meanwhile, the supporters consisted of agricultural extension, farmer group, *alsintan* service, farm shop, farm laborer, seed breeders, PT Labiota Indah, inter-provincial traders, and consumers.

The role of each of the main actors among others is on potato farmers doing potato production from cultivation to harvest and selling it to gatherer traders and large traders. Gatherer traders buy potatoes from farmers and sell them back to large traders and retailers. Large traders buy potatoes from farmers and gatherer traders and resell them to inter-provincial merchants. Retailers buy potatoes from gatherer traders or large traders in relatively small quantities for resale to consumers. The processing industry buys potatoes from retailers who then processed potatoes into new value-added products for sale to consumers.



**Figure:** Value Chain Map in South Sulawesi, 2017.

The role of each supporting actors are agriculture extension workers providing innovation and technology information in potato cultivation and information on farming planning to farmers. Farmers' groups become a forum for farmers to exchange information on cultivation and market conditions as well as distribution of agricultural assistance and subsidized saprodi needed in the process of potato cultivation. *Alsintan* services provides tractor rental services for farming to farmers. The farm shop, being the supplier of saprodi needed by farmers in potato farming. Farm laborers provide services to farmers in the process of cultivating potatoes to harvest. Seed breeders distribute a seed for potato growers. PT. Labiota Indah is one of the private companies that develops superior / high quality potato seeds through tissue culture to be sold to farmers by involving seed breeders. Inter-provincial merchants buy potatoes from large traders and resell them to retailers on Borneo Island, Maluku Island, Baubau City and Kendari. Consumers are individuals who buy potatoes from retailers or who buy processed potato products from processed industries.

#### **b) Value Chain Activity**

The value chain of potatoes in South Sulawesi consists of several activities undertaken by farmers. These activities include agricultural planning, procurement, cultivation, harvesting and post-harvesting. At gatherer traders perform activities planning, purchasing, sorting, and selling. At large traders perform activities planning, procurement, sorting, packaging and distribution. At retailers do planning, purchasing, and sales activities. While in the processing industry activities include planning, procurement, production, and distribution.

### **5. Discussion**

#### **a) Flow of Goods, Money, and Information of Potato Value Chain**

The flow of goods occurring in the supply chain of potatoes in South Sulawesi starts from seed potatoes obtained from seed breeders, partly from tissue culture seedlings from private company PT Labiota Indah. Means of production in the cultivation of potatoes obtained from the farm shop and farmer groups. Workers in potato cultivation use agricultural labor. The use of tractors in the preparation of the land, some farmers rent it from *alsintan* services. Potatoes produced by farmers are then sold to gatherer traders or large traders. Gatherer traders sell potatoes to large traders if large traders do not get the supply of potatoes from farmers or large traders who live too far from farmers. Gatherer traders also sell potatoes to retailers in traditional markets. Furthermore, large traders sell potatoes to inter-provincial traders such as the existing Provinces in Kalimantan Island, Maluku Island, Baubau City and Kendari. Then retailers sell potatoes to consumers, both household consumers and industrial consumers.

The flow of money is the flow of potato prices from producers to consumers. The selling price from farmers to gatherer traders and large traders is Rp 8,000 / kg. Gatherer traders sell their potatoes to large traders at a price of Rp 9,000 / kg and to retailers with a price range of Rp 10,000 / kg - Rp 11,000 / kg depending on the distance from traditional markets occupied by seller. Furthermore, large

traders sell to inter-provincial traders with price range Rp 14.000 / kg - Rp 15.000 / kg. Then retailers sell potatoes to consumers in South Sulawesi with price range Rp 11.000 / kg - Rp 15.000 / kg.

The flow of information contained in the South Sulawesi potato value chain among others in agricultural extension provides information on innovation and technology in potato cultivation as well as information on farming planning to farmers through farmer groups. Later in the farmer's group also exchange information about cultivation and market conditions. Furthermore, the private company PT Labiota Indah provides information to farmers through farmer groups on the development of quality seeds produced through tissue culture by involving seed breeders to be sold to farmers. In the development of quality seeds, the private companies are looking for information on how to development of potato seeding at the seed breeder level and potato cultivation at the farm level. The flow of market information both demand and price that occurs in South Sulawesi potato value chain is determined by fellow traders because the traders themselves directly go to farmers to buy potatoes and then sold to consumers. Market information is obtained by traders based on the state of potatoes on the market. If the potato harvest season or the number of potatoes on the market increases then the market price of potatoes will decrease, if not the potato season or the number of potatoes in the market dropped then the price will be higher. In addition, traders also convey price information to consumers, that the increase in demand for potatoes in the market occurs in months 1-2 and 7-12, because that month there are many holidays. While in the month of 3-6 the demand for potatoes is not too much because the needs of consumers against potatoes is less because the consumption of potatoes is not used in everyday life and the price of potatoes is more expensive than the vegetables or other tubers. Potatoes are also only used at certain times or on certain dishes.

#### **b) The Activities of The Main Actors of The Potato Value Chain**

Planning processes undertaken by farmers include planting schedule planning, provision of production facilities (seeds, fertilizers, and pesticides), land preparation, cultivation, harvesting and post-harvesting. Planning is done within farmer groups by exchanging information, facilitated by agricultural extension workers. Much of the potato cultivation is done during the dry season. This is due to the lack of potential damage due to excess water and minimal pest disease that develops. The purchase of production facilities is obtained from agricultural shops, seed farmers, or private companies PT Labiota Indah. Several production facilities receive subsidized assistance through the Group Definitive Needs Plan (GDNP) prepared by farmer groups facilitated by agricultural extension workers. Before the seedlings are planted, the first thing to do is processing the land. The land processing is done in the first week. The land processing is done using hoes and hand tractors. Not all farmers have hand tractors because the price of one unit is high enough, so some farmers only lease it. The cultivation is done for 4 days per hectare of land. Land that has been made *bedengan* given the basic fertilizer in the form of manure. After processing for 4 days, then plant the seeds in

the *bedengan*. The seeds planted by potato farmers in Gowa Regency are Granola seedlings, with third generation seedlings (G3) and several other types of potato seeds. However, Granola potatoes are the most popular, because these potatoes have high productivity and high demand in the market. Maintenance of potato cultivation is done by advanced fertilization. This fertilization is routinely done every 30 days from the time of planting. The fertilizers used are chemical fertilizers such as Urea, ZA, KCl, TSP, NPK. Fertilization is done about three times the fertilization. Pest and disease control is done by spraying or weeding. Spraying is done after ten days planting and done twice a week or about 6 - 7 times spraying. Weeding is done after one month of planting and done again one month later. Generally the types of drugs used by farmers are Empoye, Arsinol, Victory, and Gromoxone. Control of potato pests and diseases is mainly done in the rainy season. Irrigation is done by farmers using *sprinkler* irrigation. Irrigation is done mainly in the dry season, according to the condition of the soil if it looks dry. The use of labor in potato farming, usually using labor coming from within and from outside the family. Workers in an ordinary family are not paid, just a sense of mutual help in the family. Workers from outside the family are paid Rp 50,000, with 7 to 8 working hours per day between 08.00-16.00 hours. Harvesting of potatoes is done when potatoes have reached the age of 3 to 4 months. Potato harvest should not be too early or too long. If too early will produce low quality potatoes because the overall formation of potatoes is not optimal, and too long will cause damage to potatoes due to disease. After the potatoes are harvested, gatherer traders or large traders will come and collect the potatoes purchased for Rp. 8000 per kilogram. The price set is the price determined by the trader itself. Farmers do not conduct sales activities to consumers directly because there will be marketing costs and additional work activities. Farmers also already have a trader as a permanent buyer in doing sales activities so no longer need to find a buyer.

Planning activities undertaken by gatherer traders include potato purchase planning, sorting and selling of potatoes. In the purchase of potatoes, the gatherer traders directly mandatangi farmers who have made a prior agreement, that the potato after the harvest will be purchased by him. Purchase and transport of potato production using *pickup* truck. There are two types of gatherer traders, gatherer traders who sell potatoes to large traders and selling them directly to retailers. The gatherer traders who sell to the large traders sort out the potatoes which are still good and which are not and immediately sell for Rp 9,000 per kilogram. While gatherer traders who sell to retailers sort and divide it into large plastic bags containing 10-20 kg, with selling price of Rp 10,000 to Rp 11,000 per kilogram. Sales of potatoes to retailers using *pickup* trucks with 2 tons or as many as 100 - 200 large plastic bags. Gatherer traders who sell to retailers through traditional markets in South Sulawesi.

Planning activities undertaken by large traders include potato procurement planning, sorting planning, packaging and distribution of potatoes. In the procurement of potatoes, large traders buy potatoes from farmers or gatherer traders. Sorting is done by separating potatoes that are still good

with those already broken. Large traders pack potatoes using plastic woven bags. One bag contains 60-70 kg, with the selling price of Rp 14,000 - Rp 15,000 per kilogram to inter-provincial traders, namely the provinces of Kalimantan Island, Maluku Island, Baubau City, and Kendari. Sales of potatoes to inter-provincial traders using a trucks with a load 6-7 tons or as many as 100 woven bags. Sales of potatoes to inter-provincial traders pass through the sea by boat. Planning activities undertaken by retailers include purchasing and sale planning of potatoes. In buying potatoes, retailers buy them from gatherer traders. Potatoes are purchased from gatherer traders of 50 to 100 kg at a purchase price of Rp 10,000 - Rp 11,000 per kilogram, depending on the retailer's premises. Retailers sell potatoes in traditional markets, for Rp 11,000 - Rp 15,000 per kilogram. This retailer traders do storage activities because the potatoes in one day sometimes do not run out. This potato is not damaged if it is stored as long as the storage is not wrapped and no more than a month.

Planning activities undertaken by the processing industry include procurement planning of processed materials, processing and distribution planning. One of the processed potato industry in South Sulawesi is a potato donut. In the processing of donut potatoes is done by buying raw materials of potatoes in traditional markets and auxiliary materials in the modern market. In the process of making processed potatoes is done by using processed machinery. Processed potatoes are made with various flavor variants. Processed potato donuts produce 7 - 8 kg per day, with 60 donuts in 1 kg. Sales using carton boxes or pastry boxes containing 4 pieces per box. Price 1 box sold for Rp 10,000. The sale of donut potatoes sells for Rp 10,000 per box.

## 6. Conclusion

The value chain of potatoes in South Sulawesi involves the main actors and supporting actors. The main actors consist of potato farmers, gatherer traders, large traders, retailers, and processed potato industries. Supporting actors include agricultural extension workers, farmer groups, *alsintan* services, farm shops, farm laborers, seed farmers, inter-provincial traders, and consumers, and private companies PT Labiota Indah.

Activities undertaken by main actors in the potato value chain in South Sulawesi at the farm level are farming planning, procurement, cultivation, harvesting and post harvest planning. At the gatherer traders level do planning, purchasing, sorting, and selling. At the large traders level do the planning, procurement, sorting, packaging and distribution. At the retailers level do the planning, purchasing, and selling. While at the level of processed industry do planning, procurement, production, and distribution.

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