

A Study of the Value Chain of Cassava (*Manihot esculeta*) in Toba Samosir District for the Analysis of Increasing Its Value Added to Stakeholders

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Abstract: The purpose of this study is to map out the value chain of cassava (*Manihot esculeta*) and to measure the extent to which the cassava commodity in Toba Samosir District could affect the economics of the relevant stakeholders. The method used in this research is descriptive-explorative with value chain mapping analysis as the main problem solving tool. The sample population used in this study are all stakeholders along the cassava supply chain in Toba Samosir Regency. From the study, we obtain three models of supply chain of cassava, namely: (i) supply chain where cassava is consumed without processing, (ii) food supply chain model, and (iii) cassava supply chain is processed into grade B tapioca flour. Afterward, a value chain mapping was conducted to determine the margins of each node in the supply chain. The value chain map reveals that the value engineering of cassava commodities is not yet optimal, where the final product produced from the supply chain is still far below the potential possible value. Therefore, from this research recommended some value-added improvement strategy, for example, diversify the product of cassava derivative that is more valuable that is grade A tapioca flour and mokaf flour.

1 INTRODUCTION

Production of cassava (*Manihot esculeta*) in Toba Samosir Regency occupies the sixth position in North Sumatera Province. However, Toba Samosir Regency still has great potential to develop cassava commodity, because the area of land that is not cultivated in Toba Samosir is bigger than land area which is already managed. At this time the area of land that is not managed in the District reached 33.392 Ha. From the demand side, in Toba Samosir Regency there is a tapioca flour mill with 10ton / hour capability. Total demand for tapioca flour at PT Hutahaeon is about 1000-1200 tons / month or equivalent to cassava supply of 4000-4800 tons / month. However, due to supply constraints, PT Hutahaeon is only able to get the supply of cassava as much as 3400 tons / month.

Along with the development of cassava based processing industry in Toba Samosir regency in recent years, people's desire in producing cassava as one of agriculture commodity also increases. This is reflecting by the increase of the cassava production in last 3 years (BPS, 2015). However, there is currently

no systematic study that maps the value chain and measures the extent to which this sector affects the economics of the respective stakeholders. Therefore a research that can describe and analyze the performance of supply chain and value chain of cassava commodity in Toba Samosir regency is needed. This study aims to determine the role and the importance of each stakeholder in the cassava industry and create a value chain of cassava that can provide added value for the stakeholders.

2 METHODOLOGY

The method used in this research is descriptive-explorative, research with problem solving which is explored widely about things that influence the happening of something based on the fact that happened in the field. The research technique used in this research is survey, which is direct observation to know the actual condition of research object. In addition to the survey also conducted interviews, which are direct questions and answers to relevant agencies such as agriculture and farmer groups and

stakeholders such as farmers, collectors, retailers, cassava processing industries, distributors, retailers and consumers about the situation or reality that occurred in the field, the more the number of respondents then the data obtained will be more valid

a. Sampling method

The sampling method was done by snowball sampling, the sampling was done gradually, the first thing to do was to determine the key informant in the cassava farmer who can give information and this person also used as informant to identify other person as sample which is considered can give information. Based on snowball sampling method obtained 48 respondents which consist of 30 farmers, 10 middlemen, 7 retail traders and 1 tapioca industry.

b. Data analysis

Value chain analysis refers to a series of activities required to present a product or service starting from a conceptual stage, followed by several stages of production, to delivery to end-consumers and destruction after their use (Kaplinsky & Morris, 2000).

c. Value chain mapping

Identify each part of the production process and identify where steps can be eliminated or improved. Improvements made aim to cut production costs or increase productivity (Porter, 1985).

d. Value chain analysis

This analysis aims to identify opportunities for value enhancement on the value chain map. Improved value chains can be performed on various sides such as processes, products, resources and functions. Value chain improvements aim to improve efficiency, product diversification, resource optimization and establish the most important activities in the value chain.

3 RESULT AND DISCUSSION

3.1 General Overview of the Study

1. Location and geographical state

Toba Samosir is a regency in North Sumatra Province with Balige as its capital. Toba Samosir Regency consists of 16 districts and 244 sub-districts. Toba Samosir Regency covers an area of 2,021.80 km² and is located between 2°03' and 2°40' North latitude and between 98°56' and 99°40' East longitude.

2. Social economic and environmental policies

According to Toba Samosir's central statistics agency in 2014, over the past three years economic growth in Toba Samosir has always been positive. In 2013 the amount of GDP per capita Toba Samosir district reached Rp 28.24 million with an increase rate of 12.36%. Tobacco PDRB contributes 1.24% to the formation of GRDP of North Sumatra. The large population of Toba Samosir Regency depends on the agricultural sector. Agriculture becomes the mainstay sector for Toba Samosir Regency in moving the local economy. In 2016 this sector contributed significantly in the formation of GRDP Regency Toba Samosir, which is about 34.93%. Toba Samosir regency is one of producing centers of rice, corn, cassava, and andaliman in North Sumatra.

3. Production and productivity of cassava in Toba Samosir district

Production of cassava in Toba Samosir Regency fluctuated where there is a decrease or increase in the number of production each year. Based on data obtained from BPS in 2005-2016 shows that the production of cassava in Toba Samosir Regency has a positive trend and move exponentially. The exponential movement means that cassava production will increase continuously. In 2010-2012 a significant increase in cassava occurred due to the presence of a tapioca starch factory in Toba Samosir Regency, PT Hutahaeen. However, in 2012-2014 cassava production has decreased very sharply. This happens because of the prolonged dry season that occurred in 2013-2014. While the productivity of cassava in Toba Samosir Regency has a positive trend and experienced a linear growth, this means that cassava productivity will increase in the long term. Increased productivity of cassava in Toba Samosir District is caused by several factors among others the use of superior seeds and the increasing ability of the community in processing cassava farming.

3.2 Supply Chain Mapping

According to (Chopra & Meindl, 2001) the supply chain consists of all parties involved, directly or indirectly, to meet customer demand. Based on data that have been collected from the interview and observation obtained 3 models of supply chain of cassava commodity in Toba Samosir Regency (Fig. 1).

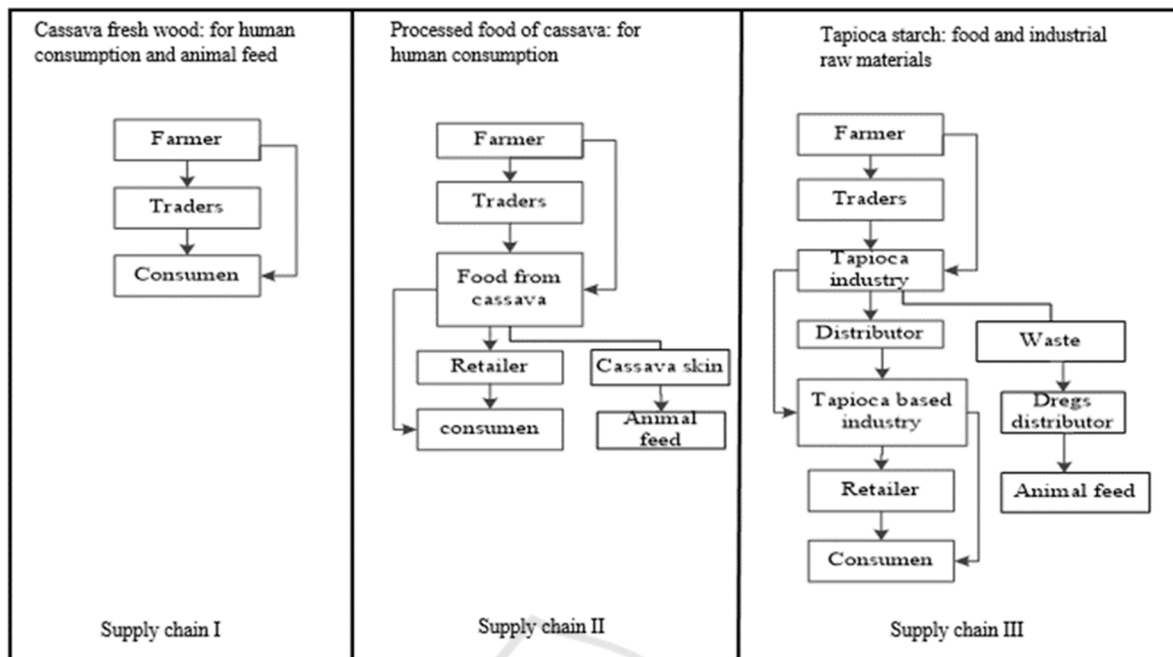


Figure 1: Cassava supply chain mapping

The description of the three models of supply chain is as follows:

- 4 Model of cassava supply chain without processing
The simplest supply chain model is the unprocessed cassava supply chain, in this chain there are only 3 actors namely farmers, small traders and consumers. Small traders act as intermediaries between farmers and consumers. The economic value of cassava in this supply chain model is low, this is because cassava does not undergo processing. Estimated around 2% supply of cassava in Toba Samosir Regency goes into this model.
- 5 Model of processed food supply chain of cassava
This supply chain model consists of five actors, namely farmers as suppliers of raw materials, middlemen as cassava collectors from various farmers, food industry that acts to process cassava so as to have a higher economic value, retailers act as distributors of processed products of cassava to consumers and consumers act as end-product users. In this supply chain there is an increase in the economic value of cassava, as it has undergone processing. Examples of processed products of cassava contained in Toba Samosir Regency are crisps and wet cakes. It is estimated

around 6% supply of cassava in Toba Samosir regency goes into this model.

6 Tapioca supply chain model

This supply chain is the most complex chain. It can be seen from the number of actors who play a role and the production process of its products. In this supply chain there are 8 actors, namely farmers, middlemen, tapioca factories, distributors, industries with tapioca flour raw materials, retailers and consumers. In this supply chain model the economic value is higher than in the previous supply chain model. In this model cassava will be processed by PT Hutahaean into tapioca flour with a large scale of 800-850 tons / month. The products produced will be distributed by the distributors to other places and tapioca flour based industries. It is estimated around 92% supply of cassava in Toba Samosir Regency goes into this model.

3.3 Value Chain Mapping

Based on the above supply chain map, we get a value chain for each model of supply chain of cassava commodity in Toba Samosir Samosir (Fig. 2)

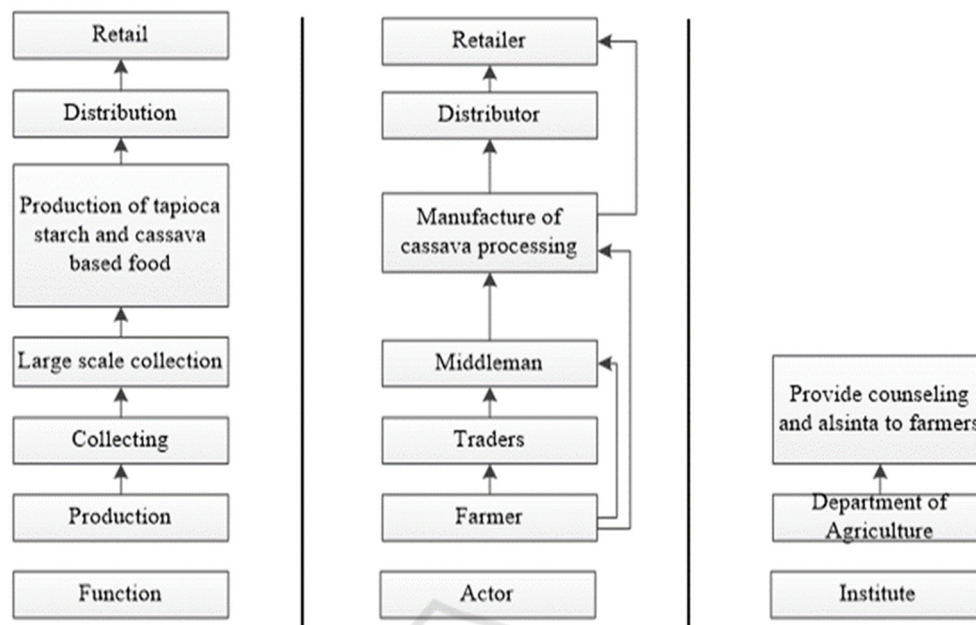


Figure 2: Cassava value chain mapping

In the value chain of cassava in Toba Samosir Regency, there are several actors ranging from farmers, cassava processing industry to retail traders (retailers). Farmers in this value chain function as the party that produces cassava. In general, farmers grow cassava for additional income, this is due to the low economic value of cassava compared to other crops such as rice, corn and coffee. However, since the establishment of PT Hutahaean in Toba Samosir Regency can increase the desire of the community in planting cassava. The second perpetrator is the collector, in the cassava value chain, the middleman or the collector acts as an intermediary between the farmer and the industry or the farmer with the consumer. The middlemen will generally collect the cassava directly to the location where the farmers will then sell it to consumers or industries with higher selling prices.

One of the actors who play an important role in the cassava value chain is the cassava processing industry. Industry plays a significant role in absorbing cassava produced by farmers and processed into products with higher economic value. Furthermore, products processed by the industry will be distributed through distributors to the next industry or to retailers. And the next actor retailers or retail traders, retail traders are traders who conduct buying and selling activities directly to consumers. In addition to the actors directly involved in the cassava value chain

there are some actors who are not directly involved but have a role in supporting the improvement of the cassava value chain that is the government. The government through the agricultural service strongly supports the development of cassava agriculture with the provision of superior seeds and agricultural equipment and agricultural machinery. The agricultural service through farmer groups scattered in each village became a place of farmers in channeling the aspirations of farmers and farmers to obtain agricultural knowledge through extension activities.

3.4 Value Added Calculation

The concept of added value is one of value development that occurs because of inputs that are treated on one commodity (Agni, 2013). Value added is calculated from value added during the production process and marketing process (Hayami, et al., 1986). Based on the results of interviews conducted on actors contained in the value chain regarding the costs required in the process of cassava production and the profits derived from the sale of cassava products, it can be calculated the value added obtained by each supply chain actor in the cassava commodity value chain system.

Table 1: Added values for each node in cassava supply chain in Toba Samosir

Variables	Unit	Farmer	Middleman	Traders	Tapioca industry
Output	kg	25,000	10,000	200	12,500
Input	kg	1,450	1,200	20	50,000
Direct labor	HOK	40	4	2	150
Conversion factor		17.2413	8.333333	10	0.25
Direct labor coefficient		0.02758	0.003333	0.1	0.003
Price of output	Rp/kg	750	850	2,250	6,500
Direct labor wages	Rp/HOK	60,000	50,000	50,000	55,000
Reception and profit					
Raw material price	Rp/kg	10,500	3,600	1,500	750
Other input	Rp	107.8	150	100	41.1
Output value	Rp/kg	12,931.	7,083.333	22,500	1,625
a. Value added	Rp/kg	2,323.2	3,333.333	20,900	833.9
b. Value-added ratio		18%	47%	93%	51%
c. Revenue of labor	Rp/kg	1,655.1	166.6666	5,000	165
d. Share of labor	%	71%	5%	24%	7%
e. Profit	Rp/kg	668.06	3,166.666	1,5900	778.9
f. Profit rate	%	29%	95%	76%	93%
Reproduction of owners of factors of production					
Margin	Rp/kg	2,431.0	3,483.333	2,1000	875
a. Income of labor	%	68%	5%	24%	6%
b. other inputs	%	4%	4%	0%	5%
c. profit	%	27%	91%	76%	89%

Based on the results of interviews at the study site, it is known that cassava does not have a stable price, the price is determined through negotiation between the seller and the buyer. In addition, the price of cassava also depends on its quality. Based on the analysis (table) that the added value in each supply chain in the value chain system is different.

3.5 Challenges for Development and Commercialization of Value Chain of Cassava in Toba Samosir Regency

- a. Market opportunities and access to market
The destruction of infrastructure in areas far from urban areas makes the actors in the value chain not optimal in developing cassava commodities. This is due to the difficult access to agricultural areas and the high cost of transportation
- b. Low diversification of cassava
In general, cassava in Toba Samosir Regency is only used as animal feed, direct consumption and raw material of tapioca flour. Whereas cassava is a commodity that has many derived products, so

that will produce a high value product if experiencing proper processing.

- c. Lack of community awareness in managing cassava farming

In general, cassava farming areas in Toba Samosir district are poorly maintained, this is due to the low level of awareness and ability of farmers to cultivate cassava farming.

3.6 Recommendations for Increasing Value Added Strategies for Stakeholders

1. Facilitate the access of farmers to the market, this is realized through the government by improving the infrastructure of remote areas such as Amborgang villages.
2. To diversify the products of cassava, cassava is processed into high-value products such as improving the quality of tapioca flour that is currently into grade A, cassava processing into mocaf meal
3. Increase the ability of each actor in the chain, such as giving superior seeds to farmers and

providing agricultural extension and the use of new technology in industrial processes.

4. Establishment of village-owned small-size enterprise so as to increase people's creativity in processing cassava.

4 CONCLUSION

Based on the analysis of value chain of cassava commodity in Toba Samosir Regency is divided into 3 parts namely supply chain mapping, value chain mapping and value added calculation. Mapping of supply chain of cassava in Toba Samosir Regency, there are 3 model that is, cassava supply chain model without processing process, food supply chain model and tapioca flour supply chain model. Actors involved in the supply chain model include farmers, middlemen, retailers, industry, retailers, and distributors. However, the effort to develop the added value of cassava commodity in Toba Samosir Regency has not been optimal yet. From the results of value-added analysis conducted can be seen that farmers get the lowest added value and retail traders get the highest added value. To be able to increase the value in the value chain can be done on the side of the process, products and functions. On the side of the process can be done with the use of technology in processing, improving on the product side can be done with diversification while on the side of the function can be done to produce a positive impact for value chain actors.

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