Current Condition of Agroindustrial Supply Chain of Cassava Products: A Case Survey of East Java, Indonesia

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Abstract

As an agricultural product, cassava is recognized as a special commodity which has high potential for local and export product. High production cost and low selling price are still become common problem faced by farmers. These common problem leads to low income for the farmers. The opinion to cassava product as unimportance product with low profit has consequence to make low of institution involvement to this product. The objective of this research was to evaluate the current condition of supply chain of cassava products. Direct visit to the farmers and discussion with some industries were implemented to this research. Sampling method was used to reach accurate data from farmers and industries in each research area. It was starting from the industries which use cassava as raw material for production process. The result revealed that strong involvement actors in supply chain of cassava product were farmers, big and small collectors, industries (processors or producer), food store and consumers. The details of flow of material, financial and information were identified in this research. Added value of selected products of cassava also explained is this paper.

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1. Introduction

Cassava is one of commodity which has big potential to be produced as local and export product. As a raw material of some industries, some kind of processed cassava products such as dried chips (namely gaplek), tapioca flour, modified cassava flour (mocaf), and cassava rice. Various products of cassava lead to the farmer to plant cassava as potential product with high profit product. Presently, some traditional products of cassava are made by some home industries or small and medium enterprises.

On the other side, Saragih (2004) explained that agriculture development with production increasing without better income need to be improved through new agriculture development paradigm to realize improved income of farmers. This new paradigm is an agribusiness approach. Daryanto (2009) described that industrial raw material procurement from agricultural sector needs strengthening of agricultural sector to secure raw material supply for continuity of industrial activities and cost efficiency of transport. In term of raw material supply, Indarjit and Pranoto (2002) defined that supply chain is a network of organizations with same objective, which is supply and distribution of materials. Connected points alongside chain with different role are called stakeholders. A clear relationship between stakeholders and farmers would give a clear mechanism of pricing process from farmers to stakeholders.

In term of marketing, Limbong and Sitorus (1987) explained that marketing is the distribution activities of agricultural material from producers to consumers. The product moving with long chain caused quality reduction of product. This also gives strong effect to reduce farmers’ income. Wardana (2006) also described that the farmers and small scale industries often in the low bargaining power positions. Regulation and strategy are strongly required to improve agroindustrial cassava product and improve farmers’ income.

In raw material market, middlemen have a strong role to drive cassava market. Its mean farmers have weak of bargaining power in the market. Because of long distance location of farmer from industry, farmers prefer sell their product to middleman. This was also due to high cost of transport which could reduce their profit. All of these were strong reasons for low of bargaining power of the farmers in cassava market (Wardana, 2006). Low ability and information around capital investment (time value of money) were also enhancing low selling price of the cassava.

The farmer was still in the weak position among market players. Limited information of market characteristic leads to the farmer to involve in traditional and modern market. The role of stake holder alongside supply chain was also needed to be analyzed to identify role of institution and partnership of cassava product. The objective of this research was to evaluate the condition of supply chain of cassava as agroindustrial product.

2. Methodology

This research was conducted in 2 districts with high number of cassava production namely Jember and Bondowoso. Beside production number, these districts were considered by distance of location from industry. Sampling method was implemented by field area and the number of farmers, to reach data based on proportion between farmers and industries in each area.

Stakeholder analysis was used in this research to identify the raw material supply. In term of supply chain institution, direct visit and brief discussion was implemented by purposive sampling, to identify raw material flow from field to industry. Beside material flow, financial flow and information flow were used to evaluate supply chain flow of cassava products. Added value analysis was also implemented to this research to define present condition of selected cassava products.

3. Result and Discussion

3.1 Selected Products of Processed Cassava Industries

This research was conducted in the district of Jember and Bondowoso. Respondent were grouped based on industrial tree. In this research population of small industries were first level industries of industrial tree. The first level industries of industrial tree were fermented cassava (tape), cassava flour (tepung singkong), kerupuk (dried and fried cassava) and cassava chips (keripik). Result showed that small industries used cassava as raw material to produce cassava processed products. In the next processing level, other products made from fermented cassava are
suwar-suwi (fermented cassava fig), prol tape (fermented cassava cake) and pia tape (fermented cassava pie). All of these products were categorized as traditional products as local products.

<table>
<thead>
<tr>
<th>Name of Industry (kinds of processed product)</th>
<th>Market (distance)</th>
<th>Raw material come from (distance)</th>
<th>Raw material requirement (kg/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Samiler Kemuning (boiled and fried cassava)</td>
<td>Local district (40 km)</td>
<td>Desa Arjasa (20 km)</td>
<td>60,000</td>
</tr>
<tr>
<td>Tape Reza 99 (fermented cassava)</td>
<td>Local district / province (100 km)</td>
<td>Mayang (15 km)</td>
<td>62,000</td>
</tr>
<tr>
<td>Tape Putih 67 (fermented cassava)</td>
<td>Local district (40 km)</td>
<td>Silo (15 km)</td>
<td>45,000</td>
</tr>
<tr>
<td>Chips (cassava chips)</td>
<td>Local district (100 km)</td>
<td>Silo (20 km)</td>
<td>90,000</td>
</tr>
</tbody>
</table>

Field survey revealed that raw materials (cassava) were supplied from some places with a distance of 15-20 km from processing places (Table 1). High quantity of raw materials was required to supply production of some selected products. Chips product was the highest number of raw material requirement followed by fried products and fermented products. Transportation facilities and road condition were still faced by supplier to send the raw material to production place. These lead to late of supply and decreasing of raw material quality.

In case of marketing activity, these selected products were also marketed (distributed) to other districts in the same province with a range of 100 km distance (Table 1). Beside packing method of product, roads condition and transportation facilities were also still faced as common problems to the producers. This indicates that the products have a strong potential cause to defected products during distribution process (Austin, 19982). This was relevance to Suryaningrat (2012), a survey result found that in fruit processed product, defected product in distribution processed could reach 10-20% because of transportation facilities and road conditions.

### 3.2. Stakeholders (Supply Chain Actors) and Roles

All of supply chain actors above have different characteristics and roles to the pricing mechanism on supply chain of cassava. Different characteristic of the stakeholders are mentioned in the Table 2.

Field survey revealed that pricing factor was the importance factor to cassava product as the raw materials flow. All of stakeholders have an involvement in pricing mechanism, but in each stakeholder has a different level to decide the price. As a starting point, farmers provide information of raw materials such as price, number and quality of product. But in the reality, its price was decided by wholesalers or next persons. In term of information, wholesalers and retailers has stronger involvement in this raw material flow. Industries has no formal contract with wholesalers or retailers to maintain information about price, number and quality of product because of high numbers of raw materials requirement.

The institution or organizations which organize activities of cassava farmers could not be found in this research area. Low of attention to cassava farmers was still face by cassava farmers because to the cassava product image as low profit or low prospect business of cassava product.

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Characteristics</th>
<th>Roles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmers (supplier)</td>
<td>Plantation, supply raw material from field</td>
<td>Provide raw materials (materials and information about price, number and quality)</td>
</tr>
<tr>
<td>Wholesalers</td>
<td>Buying, collecting and selling sell to the industries or retailer at market.</td>
<td>Offering price to the farmers (information)</td>
</tr>
<tr>
<td>Retailers</td>
<td>Selling cassava to industries or market, sell cassava to consumers at market</td>
<td>Get price from wholesalers and offer price to the industries and market (information)</td>
</tr>
<tr>
<td>Industries</td>
<td>Processing cassava as first level products or half products</td>
<td>Get price from wholesalers or retailers</td>
</tr>
</tbody>
</table>
3.3 Supply Chain of Selected Cassava Products

In simple supply chain, farmers supplied raw material to small collectors and big collectors. Big collectors send the raw material to the industries because of the high quantity requirement of cassava. Small collectors supply for non-industrial customers like retailer, traditional market, or other small number requirement. In some case of high supply season, big collectors also shared this fresh cassava with small collectors. Two type of customers were non industrial and industrial customers. The detail of supply chain with kind of cassava product shows in the Fig. 1.

Pujawan (2005) mentioned that in supply chain mechanism, three aspects should be well managed are material flow from upstream to downstream, financial flow from downstream to upstream, and information stream from both upstream and downstream. In Fig. 1, required raw material (cassava) of selected products such as fried cassava, cassava chip and fermented cassava were supplied by big collectors due to high number of industrial requirement. It was common for the farmers have a contract with big collectors to make sure about number, price and quality of products. Time schedule to send the raw material to the industries including transport facilities were also discussed between farmer and industry. In the research area, the highest requirement of cassava came from fermented cassava industry compare with dried and cassava chips. Beside direct consumption of fermented cassava, this product was also used as a raw material of pie (cake), brownies, fig and suwar-suwar. There were many industries involve in these products. This leads to high requirement of cassava as raw material in second level of product transformation. Related to the requirement of cassava as raw material, availability of cassava including quantity and quality was the most problem faced by these industries. Especially for fermented cassava industries which need yellow cassava. Quality of cassava was defined from freshness, maturity, colour, and size depend on kind of product would be processed. In term of transport facilities, road condition and truck were the most problem happened to these industries. This was also because of plant location of cassava which difficult to be accessed. All of these problem lead to inefficient of cost and time in raw material supply of these industries.

In term of financial flow, it was starting from consumers, producers of food products, retailers, small and big collectors, and farmers. Consumers spend their money to buy final product (cassava processed products) in the market or food store. High number of consumers would result to better performance of agroindustrial including better production capacity and profit. Transaction process in consumer level was conducted in cash payment in food traditional market and other market place. Payment process between store and production (industry) was conducted in cash and credit. It was frequently that the credit payment process between store and industries was conducted after
selling process (sold). Payment from industries to collectors and from big or small collector to farmers was conducted in cash. Only some of them conducted in credit payment or extended payment. All of payment process tends to “trust” concept as a commitment among them.

Information flow in cassava product was started from both side of farmers and customers. Information of requirement was coming from market (industries) and retailer (traditional market). This raw material requirement has a strong relationship with industrial capacity including order status and quantity would be sent to industries. Beside, this was also related to order quantity of processed products which distributed to the market. A strong commitment was needed in this mechanism to support transparent information flow from all supply chain actors. This could be reach from partnership to make a deal among them. The information (data) should be supported in this flow were production capacity to support agroindustries process, agroindustrial activities to produce products, product shipping based on the order, and consumer’ needs to the products. The accurate data of cassava price, quality and availability as information were also required to support supply chain activities. All of this information flow mechanism should be supported by good communication tools as a supporting facility.

3.4 Added Value of Cassava Products

Table 3 shows that in cassava products the ratio of added value has a range from 51% (cassava chips) to 80% (cassava cake). Cassava chips product has a simple making process compare to other products. High quantity of raw materials causes this low of added value ratio. Brownies and cake are the highest added value ratio. These products were made from fermented cassava as main raw material. High production quantity with high product price caused these products (brownies and cake) have highest ratio than others. Crackers and fermented cassava products have similar added value ratio. In research area, most of cassava products industries were using traditional technology, low number of workers, and low education level workers. These factors related to technical factors such as production capacity and using of raw materials. Higher processing technology, better packaging process, supported by higher education level of workers are strongly required to improve cassava products to meet consumers needs.

<table>
<thead>
<tr>
<th>Name of Industry (selected cassava products)</th>
<th>Number of Production (kg/year)</th>
<th>Raw material Requirement (kg/year)</th>
<th>Number of Workers</th>
<th>Product price (Rp/kg)</th>
<th>Raw material price (Rp/kg)</th>
<th>Added value</th>
<th>Ratio of added value (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Samiler (crackers)</td>
<td>12,000</td>
<td>60,000</td>
<td>6</td>
<td>25,000</td>
<td>1,500</td>
<td>3,500</td>
<td>70</td>
</tr>
<tr>
<td>Tape kuning (fermented cassava)</td>
<td>43,500</td>
<td>62,000</td>
<td>5</td>
<td>10,000</td>
<td>2,000</td>
<td>5,016</td>
<td>71.5</td>
</tr>
<tr>
<td>Cassava Chips Singkong</td>
<td>51,480</td>
<td>90,000</td>
<td>8</td>
<td>12,000</td>
<td>1,700</td>
<td>1,160</td>
<td>51</td>
</tr>
<tr>
<td>Tape Putih (fermented cassava)</td>
<td>32,000</td>
<td>45,000</td>
<td>4</td>
<td>9,500</td>
<td>2,000</td>
<td>4,755</td>
<td>70.3</td>
</tr>
<tr>
<td>Brownies (made from fermented cassava)</td>
<td>15,000</td>
<td>9,000</td>
<td>6</td>
<td>26,000</td>
<td>10,000</td>
<td>33,300</td>
<td>77</td>
</tr>
<tr>
<td>Cake (made from fermented cassava)</td>
<td>18,000</td>
<td>10,000</td>
<td>6</td>
<td>24,000</td>
<td>8,000</td>
<td>31,600</td>
<td>80</td>
</tr>
</tbody>
</table>

4. Conclusions

Transportation facilities and road condition were still faced by supplier to send the raw material to production place. These lead to late of order and decreasing of raw material quality. Strong involvement actors in supply chain of cassava product were farmers, big and small collectors, industries (processors or producer), food store and consumers. In financial flow, it was starting from consumers point to farmers using cash and credit method as common payment. Information flow in cassava product was started from both side of farmers and customers, and should be supported with well communication facilities to reach clear and transparent information. High production
quantity with high product price caused products brownies and cake reach the highest added value ratio than other products.

References


