

Pattern of Cassava Demand as the Promising Commodity in the Future

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ABSTRACT

The efforts have been made to prevent potential future food shortages caused by climate change. Climate change is important factor endangering sustainable food production. The local resources such as cassava are not currently considered as the main staple food. In addition, its production is not significantly affected by climate. The potential for cassava developing are still very wide open in line with livestock industry, processed food, and other industries such as alcohol, sorbitol, fructose and many others. The farming and processing of cassava can be supported by research technologies such as new varieties and cultivation and processing technology for food and industry. The analysis results that in the market, Cassava demand is inelastic and its price level is inversely proportional to the demand quantity. Its cross elasticity showed that rice is the strongest substitute for cassava. Also, cassava has negative income elasticity. In the future, there is a great opportunity for bio-industrial development of this cassava commodity and the model can be an embryo for the development of an efficient sustainable agriculture-bioindustri system. Strategy of cassava commodity development must consider several important factors that are cassava farming, new Technology, capital access, continuity of cassava raw material, diversification and improvement of cassava products and education to the community.

Keywords: *cassava, demand, development, bio-industrial*

1. INTRODUCTION

The efforts have been made to prevent potential future food shortages caused by climate change. Climate change is important factor endangering sustainable food production. The local resources such as cassava are not currently considered as the main staple food. In addition, its production is not significantly affected by climate. Access to adequate food is an important part of human rights. The right to food includes the right to be free from hunger to get safe drinking water, access to resources, including fuel. Food sovereignty is the right to sufficient food which means that every person, woman, man, and child individually and in the community must have access, both physically and economically, to food at all times [1,2,3].

Cassava is an important food crop commodity in Indonesia after rice, corn, soybeans, peanuts and green beans. Its products are used as a food, feed and industrial raw materials both upstream and downstream. In addition, this commodity is a plant with wide adaptability, easy to store, has a good taste so that it can open jobs and increase the income of farmers and their families. Apart from

having a role in fulfilling the need for carbohydrate sources for rice substitution, the cassava commodity is also an ingredient for food diversification. Cassava can also be used as a source of feed, industrial raw materials and bioethanol raw materials.

In increasing food security, the Ministry of Agriculture continues to reduce the level of public rice consumption by looking for food substitutes such as cassava. However, because it is considered a second-class food, cassava is less attractive. The strategy to increase interest in eating cassava starts with processing cassava into various value-added and high-value processed products. Currently, in several regions in Indonesia, cassava has been used as food material, such as in blocks, chips, cassava which is resistant to storage. This strategy cannot be separated from the 4P strategy, namely Product (product), Price (price), Promotion (promotion) and Place (distribution strategy) [4,5].

The paper aims to find out how the pattern of demand for cassava commodities is related to the hope of cassava as a food buffer in the future. In addition, with the wide

use of cassava besides food, it is also much needed for feed as well as industrial raw materials and energy.

1.1. Cassava as the Future Commodity

The development of cassava production provides industrial system is competitive raw material, its easy to grow because it has a wide growing power, both fertile and marginal land, so that cassava products will create job opportunities and increase of farmers' welfare. However, the supporting of institutions for cassava farming system for industrial purposes are not well organized.

Cassava is the fifth most important world food crop after wheat, maize, rice and potatoes. It is a vital food crop in tropical regions especially those in Africa and South America, while countries in Asia that consume cassava a lot are Indonesia and India. The China has accounting for approximately 80 percent of world trade of cassava and become the principal destination for internationally traded cassava products [6,7].

Mostly the world trade in cassava is in the form of pellets and chips for feed (70 percent) and followed by in the form of starch and flour. Thailand is a dominant supplier of the cassava product in the world with accounting 80 percent global trade of cassava. Overcoming the competitive advantage that Thailand possesses in exporting cassava products will prove a daunting challenge, particularly in the feed and starch markets [8,9].

Local resources such as cassava has great potential to be produced as food products for local needs such as dry chips (ie cassava), tapioca flour, modified cassava flour (mocaf), and cassava rice. Besides that, it is also used as industrial raw materials such as alcohol, sorbitol, and plastic. Currently, some traditional cassava products are made by several home industries or small and medium enterprises. Extensive use of cassava encourages cassava farmers to direct farmers to plant cassava as a potential product with high profit products. [10].

For industrial needs, cassava has a competitor, namely corn. The China has using the cassava product for ethanol, food processing, animal feed and industry. In China the demand for cassava almost entirely shaped by domestic policies for grains, especially maize, this constitutes cassava's chief rival. Cassava can be converted through processing into lots of food and it is capable of crop to provide food security [11]. .

1.2. Production Technology to Support Cassava Supply

The surplus in cassava production is predicted to continue, its provides a large export opportunity. This increase was more due to increased productivity. This means if new technology is applied, so increase in productivity of cassava will be even higher, which in turn will increase production. So surplus is getting bigger, which means export opportunity is getting bigger [12]. The consumption of cassava also shows higher increase,

but it can still be balanced with development of production which is also getting higher, so that cassava is always estimated to have surplus.

The problems, processed cassava for consumption has not been able to compete with rice or processed wheat flour. This can be seen that business actors for food is more attracted for processed rice or wheat flour as raw materials rather than cassava raw materials, such as tapioca flour, modified cassava (mocaf) flour, arrowroot flour, and so on. Business of cassava products are not non-existent at all, but they are only few in number and the products are not yet known by wider community. In addition, there are only a few people who specifically process cassava food products. And, most of the existing industries are still labor-intensive, and also, it not yet supported by good infrastructure so that their productivity is still low. In fact, by derivative products of cassava opened and it has opportunity to processed become flours, as a raw material for noodles, cakes, and it is ready consumed. Thus, it is important to increase efficiency and effectiveness of cassava post-harvest processing become intermediate product andr final product as a key to successful food diversification program.

The potential for cassava developing are still very wide open in line with livestock industry development, processed food, and other industries such as alcohol, sorbitol, fructose and many others. Even in the future, the plastic industry will use cassava as its raw material. The farming and processing of cassava can be supported by research technologies such as new varieties and cultivation and processing technology for food and industry. Not many cassava users are know that cassava can used to industrial products as raw material. Many kind of cassava varieties have characteristics and specifications suitable for industrial product purposes. Such as for foods have a good taste, for feed with a lot of biomass, high starch content for ethanol or many more that have not been identified for utilization.

In the period between 1978-2016 that ILETRI issued 12 superior varieties of cassava. That superior varieties, namely: Adira-1, Adira-2, Adira-4, Malang-1, Malang-2, Darul Hidayah, UJ-3, UJ-5, Malang-4, Malang-6, Litbang UK 2 and UK -1 Agritan [13]. Many cassava technologies are readily available for industrial purposes. However, this technology has not been utilized by users (farmers) in accordance with industry preference. Therefore, efforts to reduce yield gaps in farmers can be carried out by planting superior varieties through dissemination and technology promotion activities.

1.3. Type of Demand for Cassava Commodity

The results study that interesting of sensitivity of demand for food crops (Table 1). For cassava commodity, the own elasticity value of cassava is -0.459688. Implication of own elasticity shows price of cassava and demand for cassava has inversely proportional relationship. If there is increase 1% of price of cassava, it will decrease of 45.9% in amount of demand. Cassava commodity for food has substituted. Substitution pattern

for cassava is indicated by its cross elasticity for rice, maize, sweet potato and other goods, respectively 0.009743; 0.000182; 0.000068; 0.662905. This shows strongest substitute of cassava commodity is rice, corn, and sweet potato. Where a 1% increase in the price of rice, corn and sweet potato will result in an increase in the

Table 1. Demand Elasticity Matrix for Food Carbohydrate Source

Demand quantity (Q)	Real price (P)					
	cassava	maize	Sweet potato	rice	Others good (noodle, bread, etc)	Income
cassava	-0.459688	0.000182	0.000068	0.009743	0.662905	-0.213210
maize	0.000286	-0.765395	0.000114	0.016222	1.103781	-0.355009
Sweet potato	0.000144	0.000152	-0.383932	0.008135	0.553534	-0.178033
rice	-0.000024	-0.000026	-0.000010	-0.063672	0.093772	0.030160
Others good (noodle, bread, etc)	-0.000848	-0.000899	-0.000337	-0.048048	-1.001347	1.051479
Expenditure (w)	0.001493	0.003648	0.000521	0.042905	0.951434	1

Source: Rozi (2008)

The effect of increasing community income is indicated by income elasticity value is -0.213210 and is negative, meaning cassava is an inferior good. Where income increase will affect decrease amount of demand. This means if 1% of real income community increases, so demand for cassava will decrease is 21.32%. If it is related to cross elasticity pattern of cassava, so increase the income tends to be used to consume food other than rice, such as noodles, bread and other flour ingredients. The magnitude of substitutions for these other goods will increasingly abandon local foods such as cassava. It is very important can atten by authorities (government).

The cassava demand will continue to rise as income increases of community. The cassava is a normal food commodity and as food buffer for life. Thus, it is short sighted to consider cassava solely a subsistence crop and inferior food in the community. [15-19].

The effect of income increase has resulted in shift in food consumption patterns to foods made from wheat (non-rice). Such as, bread, noodle or others fast food. This condition needs to be watched out because wheat is not produced domestically (import). Dependence on imported food will make it difficult to achieve self-sufficiency and even national food sovereignty. It is suggested that in an effort to encourage local food consumption as source of carbohydrate food, it is necessary to synergistically

amount of cassava demanded in a small percentage of less than 1%. However, the cassava commodity also has stronger substitution than three commodities mentioned, namely other food such as noodles, bread, and foodstuffs made of wheat flour with very large effect is 66% [14].

handle in production for availability of cassava. Demand of cassava aspect by community can be socialized through education and advocacy on the importance of diverse and balanced food consumption of cassava as functional food [5,20].

2. DEVELOPMENT STRATEGY AND IMPLEMENTATION OF CASSAVA IN THE FUTURE

There is a great opportunity for bio-industrial development of this cassava commodity. Cassava is a plant that is well known to farmers in Indonesia and it can be planted easily in all parts of Indonesia even though the soil fertility is low. Cassava is also a very flexible plant in farming and is resistant to biotic and biotic stresses. In addition, cassava can produce well in sub-optimal environment compared to other plant growth. In fact, with the cassava technology recommended, productivity of cassava has increased to 100% of the average productivity of farmers currently [9,21,22].

However, some obstacles in the cassava sector include constrained by inadequate market infrastructure, processing facilities, and lack of information and unstable prices at the local level. The widespread diffusion of improved tropical manioc selection technologies and investments in market and marketing infrastructure, processing technologies, irrigation/water provision and information dissemination are recommended to enhance the potential of the cassava sector to support agricultural growth. [23].

Many cassava technologies have available for industrial purposes. However, this technology has not been utilized by users (farmers) in farming. Besides that, there is not much information about biomass preferences of cassava plant which are needed as raw material by industry. Thus, information is needed about potential and problems of cassava crops related to bio-industry. Biomass from cassava is not only used for food and feed but also for renewable energy sources that it can be converted into liquid biofuel. With the issuance of Presidential Decree No. 5 in 2006 concerning development of renewable energy sources, so from biomass (biofuel) can be used to biodiesel, bioethanol and bio-oil as substitute for fuel is a great opportunity for cassava to support raw materials for bioethanol.

The cassava bio-industrial system focuses on utilization of products and it is implemented into market demand, so that farmers' preferences depend on market demand.

Cassava plants are widely cultivated on marginal lands (low soil fertility). Thus, cassava cultivation is more directed at increasing use of organic matter (plant waste,

livestock waste or industrial waste) and reducing the use of external inputs (chemical fertilizers). Until now, farmers are still very dependent on chemical fertilizers, while land resources have decreased fertility which threatens sustainability of agriculture. Utilization of plant biomass for cattle feed and utilization of cattle biomass or industrial processed side products into liquid or solid organic fertilizer / compost to increase productivity of cassava plants also. This system is one of integration models of plants with cattle that can be introduced into dry land farming.

The bio-industrial system with the integration of cassava and livestock be able to flow of energy or food chain that it can take place in a balanced, harmonious and zero waste. The concept of agricultural development like this can be an embryo for the development of an efficient sustainable agriculture-bioindustri system [22,24]. By-product is waste material from production process or human activity that is no longer used. Plant and livestock waste can be processed into compost which is very good for adding soil organic matter to dry land. Besides that, it can also be used for animal feed, especially in the dry season where forage in form of natural grass is limited. A brief overview of the flow of by-product utilization (waste) in the integrated bio-industrial system of cassava and cattle as shown in Figure 1.

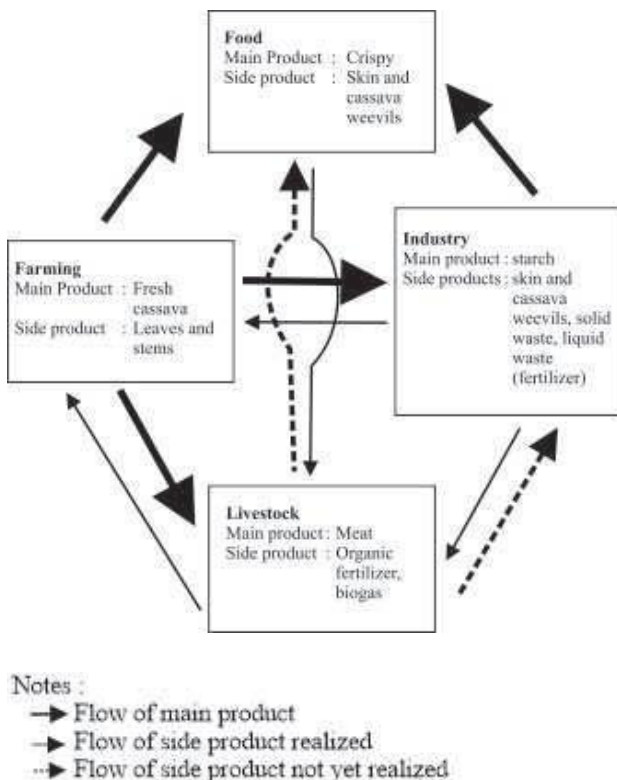


Figure 1. Pattern of cassava farming and livestock [25]

The development of the large food industry from raw cassava is slow [25]. This is in line with reported [26] technology of utilizing flour from local materials that we can produce ourselves, such as tapioca flour, rice flour,

corn flour, and sago flour have not been developed properly to become raw materials for bread, as a substitute for wheat. Therefore, most of the food industry still uses wheat flour as its raw material.

Based on results of synthesis above, strategy and implementation of future cassava commodity development with consideration of several important factors, including:

2.1 Cassava Farming Teknologi

It is a must in application of production technology on land using cassava new superior varieties and its cultivation technology in accordance with needs of location and product utilization specifications. Renewal of cassava processing technology in production processes that currently still use only human labor. Like a simple dryer technology that it can be used during the rainy season. This can maintain continuity in the production process. So far, to overcome production constraints in the rainy season, drying is done in a simple storage room, it has decreased both production and quality. Use of this technology will help small-scale processors in accordance with their capital capabilities so that its impact can minimize costs in the production process.

2.2 Capital Acces

Capital is very important in the development and increase of business scale. The capital used in process of producing cassava on farming and processed product comes from its own capital. So far, none of processors have applied for credit from banks to develop their business due to the bureaucracy is too complicated and its high interest rates. Thus capital becomes an obstacle for cassava users in developing their business. The problem of low capital can be overcome by providing soft credit with simple procedures for processor so that they can increase their business scale, this can be done in collaboration with banks or cooperatives.

2.3 Continuity of Cassava Raw material

Continuity of raw material from cassava is very important. Availability of cassava is seasonal because it is only planted at the beginning of rainy season and once a year it is 8-9 months old. Fresh cassava does not allow it to be stored too long because cassava becomes hard and difficult to process. When cassava is not available in market or when quality of the cassava is not good due to changing seasons, so price of cassava is uncertain. Impact is cassava products are lacking in the market and its price is increasing. Zoning policies and regulating planting season of cassava need to be made to maintain continuity of raw materials and stabilize prices.

2.4 Diversification and quality improvement of cassava products

Business of cassava commodity has a big and profitable opportunity, but there is still a need for improvement in product quality. Efforts to increase and diversify products by adjusting market demand need to be explored continuously. Need for functional food becomes an opportunity in the future with increasing community income.

2.5 Promotion and education to community

Eliminating stigma of cassava products as inferior goods in society. Promotion and education of the importance of cheap food and high nutritional content in cassava continues to be promoted massively. Program of food diversification policy is still very feasible for people to face the situation and condition of food in the future.

3. CONCLUSION

The potential for cassava developing are still very wide open in line with livestock industry development, processed food, and other industries such as alcohol, sorbitol, fructose and many others. Even in the future, the plastic industry will use cassava as its raw material. For this supporting, many cassava new technologies have available from upstream till downstream and for industrial purposes.

The analysis results that in the market behavior, cassava demand is inelastic and its price level is inversely proportional to the demand quantity. Its cross elasticity showed that rice is the strongest substitute for cassava. Also, cassava has negative income elasticity. It mean, the increase of income will be followed by decrease of cassava consumption. In the future, there is a great opportunity for bio-industrial develop of this cassava commodity. The bio-industrial system with the integration of cassava and livestock be able to flow of energy or food chain that it can take place in a balanced, harmonious and zero waste. This steps, it must consideration of several important factors that are cassava farming new Teknology, capital acces, continuity of cassava raw material, diversification and quality improvement of cassava products and Promotion and education to community.

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