

## Conference Paper

# Proposing Alternatives in Achieving Thai Cassava Agro-Industry Stability

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**Abstract**

Although Thailand cassava agro-industry is the huge industry generating high agricultural income for all involving actors; this industry still faces many troubles. Therefore, it is challenging on analysis of stability in this industry. The problems are from internal and external sources. The main analysis method chosen is internal-external analysis to understand the structure of the industry and to identify the key elements possibly propelling Thai cassava industry to stability. The stability of industry will occur if farmers can be self-sufficient in terms of economic gain. All of actors should join force as cluster in production technology improvement, Research and Development (R&D) of new and higher value products, and new market regionalization.

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## INTRODUCTION

Cassava (*Manihot esculenta* Crantz) is the third most important economic crops in Thailand after para rubber and rice in terms of export values. This crop has high drought tolerance and can be planted with low input requirements. These are critical reasons making cassava as leading crop choice for many Thai farmers. Currently, cassava production has been expanded throughout Thailand, especially in the Northeastern and Eastern [4].

According to Thai National Food Institute (NFI) (2006), the world top five cassava root producers are Nigeria, Thailand, Indonesia, Brazil, and Democratic Republic of Congo, respectively. Food and Agriculture Organization (FAO) [3] reports world average annual growth rate of cassava to be 1.91% for harvested area, 3.01% for production, and 1.08% for yield during 1994 to 2014. Thailand has growth rate of 0.44%, 3.11%, and 2.65% in the same respects. Clearly, Thailand shows overall better performance comparing to world average in greater improvement in yield and production

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despite of less expansion of harvested area. In 2016, Thai cassava production is totaled around 29.8 million metric tons (MMT accounting for 14.86% of the world production.

Cassava export products of Thailand are chips, pellets, and starch with export quantities of 7.42, 0.003, 3.83 MMT respectively in 2015 [8]. These are equivalent to export percentages of 65.79, 0.29, and 33.92 percent respectively [6]. Almost all of these export cassava products go to China, which is the main importer for Thailand. This situation makes China to possibly exercising monopolistic power if this prolongs. A closer look at China imports of Thai cassava products gives a clear picture of cassava chips as dominating product. Nonetheless, cassava chips, comparatively to other cassava products, are low value. However, cassava roots can be produced to higher value products including native starch, modified starch, in which can be further processed to sweeteners and other food derivatives for food and non-food products. In addition, ethanol can also be produced from cassava. These are the examples on alternatives to increase product values and options of utilization.

In 2013, total domestic demand of Thai cassava was 40.05 MMT, while supply side provided only 30.23 MMT, a situation of over-demand. This incident continued in the following years and the prospect of insufficient cassava supply persists. Despite this sticky insufficient cassava supply, Thai cassava prices still face the instability which can be resulted from both demand and supply influencers [9]. This research is aimed to draw out the suggestions based on the cassava agro-industry value chain actors in achieving stability of Thai cassava agro-industry.

Stability, in this research assumption, can be defined into three perspectives; economics, productions, and environments, which is modified from National Industrial Development Master Plan 2012-2031 [5]. The economic is one of the most important perspectives for stability in cassava agro-industry. It relates to crop prices and income distribution in the upstream or starting point in the industry, that is, farmer. If farmers properly gain income from selling cassava roots and such income can bring about the living sustainability; farmers carry on their occupation. Then, the next stage actors can unbrokenly be supplied raw material in a long run.

## MATERIAL AND METHODS

The main method used in this research is the in-depth interview of all value chain actors of Thai cassava industry. These actors include cassava farmers, cassava processors of chips and pellets, cassava starch millers, Thai Tapioca Trade Association (TTTA), related government officers: Bank of Agriculture and Agricultural Cooperatives

(BAAC) officers, and Agricultural Extension officers. This primary qualitative data shall be analyzed together with the secondary production and trade data of cassava and cassava products from Thai Office of Agricultural Economics (OAE) [7] and Bank of Thailand (BOT) [2]. Sets of questions are used in the interview with an attempt to draw out the feedback and insights from these actors in achieving the stability of the industry.

The scope of the study is limited to two main provinces significant for Thai cassava industry, Nakhon Ratchasima and Prachinburi. The main analysis method chosen for this qualitative study is internal- external analysis to understand the structure of the industry and to identify the key elements possibly propelling Thai cassava industry to stability through forms of alternatives. The internal analysis focuses inside the industry itself on key strategic strengths and disadvantages of the industry. On the other hands, the external analysis focuses on the impact from external forces of the Thai cassava industry.

## RESULTS

### Analysis on Cassava Agro-Industry Structure and Their Decision Mechanisms

The structure of Thailand cassava industry is consisted of involving actors and their interactive activities. There are many ac-tors involved in the industry from farmers in the upstream, collectors, manufacturers or processors in the midstream, trade associations, exporters, and government entities (managing the downstream to bridge with consumers and customers). Thai Cassava Agro-Industry Structure acquired by in-depth interview is shown in Figure 1. Each actor has different roles and different decision mechanism with regards to their benefits or value evaluation. The starting point are farmers who produce fresh cassava roots. Farmers can directly transport their produces to processors of choice or to have collectors to take their produces to processing plants. Farmers get income by selling cassava roots; however, they have many choices at which next- stage actors they supply their fresh cassava roots to. The farmer decision mechanism depends on different spot cassava prices offered by different cassava processors. Various prices are resulted from cassava quality of starch cost of transportation, and time. Most farmers choose the next-stage actors by the most economical gain, that is, net profits resulting from revenue deducting all costs incurred. Some farmers value convenience, therefore, they generally choose the

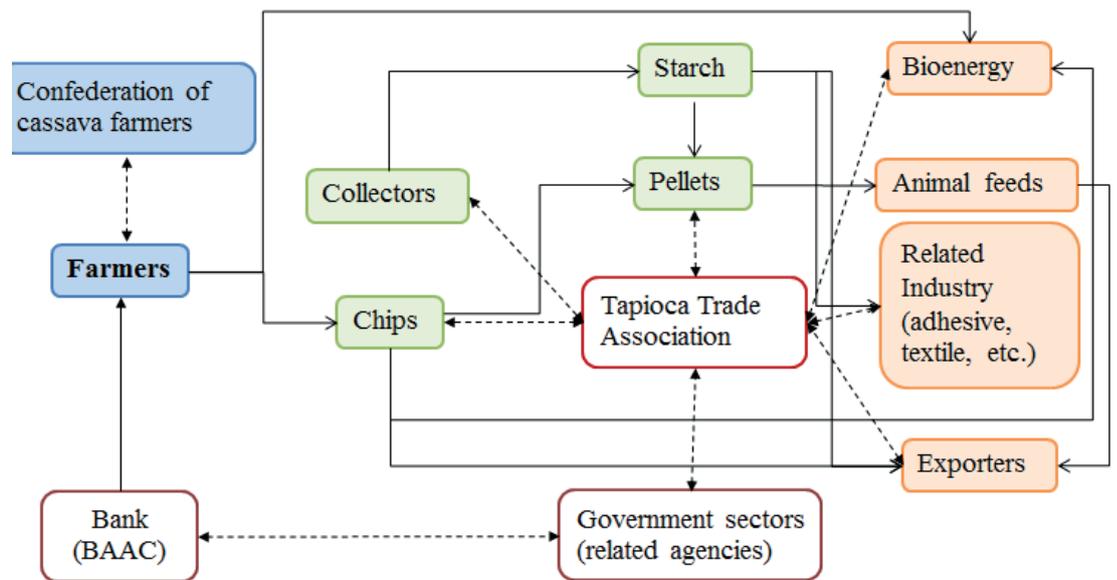


Figure 1: Thailand Cassava Industry Structure.

closest next-stage processors which can be chips or pellets processors, starch millers, or nearby collectors. These farmers with convenience preference tend to be those with limited transporting equipment or with remote harvested area.

The midstream actors, the collectors and processing plants use the similar decision mechanism for cassava roots purchasing and product selling as farmers. Nonetheless, key decision aspects differ among these mid-stream actors. Cassava starch millers, their decision involves starch percentage of fresh cassava roots as quality indicators. An exception is found in the large-scale millers who accept all grades of cassava roots. This is because of their advance in technology in end-product (starch) improvement; thus modification can resolve unstable material problems. Chip and pellet processors' main concern is in the cleanliness of cassava roots. Collectors' key decision depends on types of business they append with; they value the same aspects as their next-stage trading partners. The government official, Bank for Agriculture and Agricultural Cooperatives (BAAC), and Thai Tapioca Trade Association (TTA) are the supporters of farmers in terms of funding, information, and technology. BAAC judgement criteria to support the farmers are based on the financial discipline of each farmer in which they provide the funding [1]. This funding is analyzed and renewed on yearly basis; in other words, BAAC is the inexpensive source of loans for farmers. TTA is on the other hands works closer to the midstream processors in facilitating the trade of cassava and cassava products.

## Internal-External Analysis

The internal-external analysis is conducted on Thai Cassava Agro-Industry. Insights are obtained from industry actors' in-depth interview. The findings from internal-external analysis are divided into four perspectives. Firstly, for strategic strength, cassava is one of high carbohydrate sources at a cheaper price comparing to other carbohydrate crops such as rice and corn. Therefore, cassava has high competitiveness in terms of price for carbohydrates in general. Moreover, production technology of cassava starch in Thailand is advanced especially in the development and modification of native starch to modified starch that can be used in replacement of other starch. This also includes greater utilization of cassava starch in more variety of products. While disadvantages can be raising production costs in the upstream due to extra agricultural cares needed from planting soil degradation and climate change problems. The more impactful disadvantage is relating directly with the government. Currently, government policies do not directly support to Thailand cassava agro-industry development. For example, National Environmental Quality Act B.E. 2535 prohibits waste transportation. Waste in cassava industry according this Act includes cassava peels and liquid from starch production. These wastes have further uses at higher values where peels can be transformed to solid form and used in animal feed as part of feed raw materials. The cassava wash-waste water can be further processed for ethanol production after the fermentation or ethanol production. Thirdly, for opportunity perspective, market regionalization is yet an opportunity. With price fluctuation of other crop starch, unbalanced starch supply, and together with lower cassava starch price, Thailand can further expand the markets beyond existing trading partner, China who possesses 90 percent of total Thai cassava products exports. Europe, the leading starch consuming region, can be market to be developed for cassava starch. South America and Africa are the two regions with cassava tradition, yet deficit supply. The main obstacle for market development in these two regions especially from mid-stream processors concerns highly with transportation costs. As for the factors complicating the stability of Thai cassava agro-industry, drought has become greatest threat. In the 2015/2016 harvesting season, drought has sizable effect on roots quantity and quality resulting in weight and starch content. Such situation put farmers at risk from difficulty in farm management and lower output and yield. In turn, the revenue gained from cassava fell dramatically. Drought does not only affect the harvest; the new cassava crops are stunted from heat. Many farmers lost all of their new crop as they were burned from heat and drought. Furthermore, with export market dependence with

China especially for chips and starch, the recent Chinese's policy to encourage the use of domestic corn (of more than 100 MMT) for animal feeds in lieu of importing cassava chips jeopardize Thai cassava exports. The situation shall carry on as Chinese government will have to use up this shorter-life commodity; as such corn, in China respect, becomes competitive product for Thai cassava chips.

## DISCUSSION

Farmers are the starting point of the industry, who is the most important suppliers. They can choose which next actors they supply the roots to depend on value evaluation. The values are in terms of price or convenience. Most farmers value price relating to economic benefits - revenue deducting from cost. The midstream actors use similar decision as farmers. With nature of their business they have extra concerning factor which is quality of cassava roots that can have effect on their product yield, cost, and revenue.

The obstacles of stability are from both internal and external sources. Internal obstacles can be resolved by Thai actors' collaboration. They should use their strength to improve the industry. For example, they drive the production technology for new products or utilization. With regard to external obstacles, these are uncontrollable. Nonetheless, Thai actors can be ready for external changes, i.e., uncertain demands of main market like China. The stability of industry will occur if farmers can be self-sufficient firstly. Farmers must have sufficient economic gain, which is revenue deducting cost. Moreover, they should concentrate on agricultural cost-saving to manage their revenue and cost during the fluctuation of market. Government policies should support farmers directly, i.e. postponement of harvest to reduce the over-supply and lessen price fluctuation, All actors should join force as cluster in production technology improvement, R&D of new and higher value products, and market expansion.

## CONCLUSIONS

Thailand cassava agro-industry still faces internal and external obstacles. The development for stability will arise by basis of cassava agro-industry. That is quality of farmers who are the starting point. Government and other actors should support farmers more in knowledge, practices, specific purposive funds and supported policies. The further study on stability of Thai cassava agro-industry should stretch to the aspects of environment or to alternate to a closer look at production of each cassava products. The

in-depth interview from all actors also highlight some interesting points on specific concerns each processors face and hindering their development.

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