

The Public Policy Analysis Affecting Adaptation of Cassava Industry through Supply Chain Risk Management Simulation Model: A Case Study

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Abstract

This research, presenting research ideas to analyze policies or factors that affect the adaptation of the cassava industry to increase competitiveness by modeling the risk management of supply chains to be a guideline or use as a decision form for high level executives to formulate policies or provide support in the adjustment policy of Thai tapioca industry in order to solve problems that hinder imports processing problems and export problems. This research is a case study of the cassava industry in the province with the highest yield of cassava harvest in the country with choosing the province that is the top five case studies, representing a ratio of 60 percent of the whole country production consisting of Nakhon Ratchasima, Kamphaeng Phet, Chaiyaphum, Kanchanaburi and Sa Kaeo. To be a model for use with the cassava industry that encountered the same problems in other provinces can be found throughout the country in order to effectively manage the cassava industry system and increase the competitiveness of Thai cassava industry in the global market.

Keywords: *Risk analysis, supply chain management, interfering policy, simulation model*

1. Introduction

Thailand has products from cassava cultivation each year tends to increase, and cultivated land around the country about 9.4 million rai, which will be found in the northeast, it is the area of cassava cultivation and harvest the most, approximately 5 million rai, or 53 percent, followed by the central region, accounting for 26 percent and Northern region, 21 percent respectively [1]. The planting area, when divided into each province of the whole country, will find different quantities of cassava products depending on that area. Considering the highest average productivity in the country, the top 15 are; Nakhon Ratchasima, Kamphaeng Phet, Kanchanaburi, Chaiyaphum, Sa Kaeo, Nakhon Sawan, Ubon Ratchathani, Loei, Udon Thani, Buri Ram, Chanthaburi, Chachoengsao and Lop Buri respectively (taking into account the statistical data for the past four years, namely 2012-2015) [2], representing 74 percent of the country's output (total of 50 provinces) [3].

The cassava production, has a direct impact on the overall situation of import, processing and export of cassava-related products in the country such as cassava pellets, cassava flour, processed flour, etc., which will find that the price of each type of cassava products will have different prices depending on the cost in different processing processes such as price, cassava products, types cassava flour, cassava chips and pellets will be sold at a price higher than the price of fresh potatoes that farmers can sell. But, the process of processing cassava products in each category will be able to add value to farmers' products to have a better selling price than fresh cassava roots and be a product that can be sold for export, as for the import of cassava in Thailand, at present, there is still a tendency to import higher cassava products such as cassava pellets cassava, etc., which affects the current situation of Thai cassava, such as instability in the amount of production in each year, which depends on the price that farmers have sold in each previous season problems of farmers' system management regarding soil conditions, water and cultivated areas. The problems with cultivation and harvesting technology problems in production factors, labor, wage rates, processing costs, etc. From such problems, it is found that farmers or related persons such as cassava processing operators, exporters and importers, etc. are still able to control.

If supported by government policies that match the actual problems, it can enable farmers or those who do business with tapioca are even more successful. And now, farmers or those doing business with cassava are still facing other problems, such as problems with competitors, exports from neighboring countries that have developed and promoted tapioca industry from the government. The problem in various forms of trade protectionism, or marketing problems. There are restrictions on the export market, which is limited to certain products only, such as cassava and starch that is marketed in certain countries only. Which is affecting the trading system, or the tapioca industry for export, processing, and import of cassava products for trade encountered problems causing to affect the Thai cassava industry system.

Currently, the government has tried to support the cassava industry by setting policies or regulations in order to strike a balance between production and market demand, such as international trade promotion policies for exports and imports to slow down the harvest policy for accepting fresh cassava pledging, market intervention policies, etc.

From the nature of problems in policy making, or the determination of measures that must be applied to a diverse group of business people, such as the type of production costs, business sizes, cultivated areas, production problems, etc. The said policies must be applied to all sectors including those who formulate policies, or perform duties related to the policy themselves. If the policy does not respond to or truly support, then it will damage the value or the overall impact, such as the loss of a large amount of national budgets each year. When such a policy is established, it is a risk that policymakers must be concerned about the appropriateness of the policy or the ability to achieve goals for all relevant sectors

Therefore, the selection of tools called “Simulation model” is an alternative way to help those involved in policy making, such as senior management. Or those responsible for policy making have tools to help support decisions. Because, the advantage of using the situation model is Simulation of events that may occur in the real system, simulating events that have not happened to test the problem, damage that may occur Which have not yet implemented the real system, such as policy formulation or various measures, etc., so that those involved have tools to help them make confidence in the decision before taking action. Which considers the risk of supply chain management, because, it can cover all those involved in all sectors, including the system in which the policy is implemented.

Therefore, this research therefore propose a research idea to analyze policies or factors that affect the adaptation of the tapioca industry to increase competitiveness by using the supply chain risk management model (SCRMS model) to guide of decision-making, stipulate government regulations for senior executives to set policies, provide support from the government came to the adjustment policy of the Thai cassava industry to solve problems that impede imports processing problems, and the export problem to support the opening of free trade.

2. Objective

The objective of this research is to study and analyze government policies that affect the adaptation of the cassava industry, import, processing, and export of cassava products through Supply Chain Risk Management Simulation model (SCRMS model) to make the decisions in choosing policy.

3. Literature Review

3.1 Economics of Cassava Price Intervention

The intervention of agricultural price by the state has applied the demand, supply and flexibility theory. Because farmer’s problems occur because there are too many products to market during the same period, resulting in the product prices being too low for farmers to bear. The government therefore has to intervene in the market to increase the price of the product to the level that the farmers can survive. In theory, market price interventions can be made in two ways: minimum price insurance and advanced pricing. Normally, price intervention by the government on agricultural products tends to use a minimum price guarantee more often than advanced pricing, because agricultural products tend to face lower product prices than expensive. Which is why the government having to help if the price of

agricultural products is high Normally, the government will not intervene in the market because the market mechanism will act to push the price into equilibrium [4].

The price insurance policy [4] is to set the product price to be higher than the original balance due to the operation of the price mechanism to prevent the product price from being too low. In the case of helping farmers to insure agricultural prices. When the government considers that the market price or equilibrium price of agricultural products at a certain time is lower than the production cost and does not reflect the true production cost, causing farmers to suffer. The government therefore has a policy to guarantee the product price to be higher than the equilibrium price in order to help farmers. Resulting in farmers wanting to bring more products to sell, while merchants reduce the amount of purchases due to the increase in prices causing oversupply or oversupply, which, according to normal market mechanisms, agricultural prices will be pushed back to the market equilibrium. However, the government intervention caused the market mechanism to distort.

3.2 Strategy for Risk Management

Strategy for risk management May be divided into three major areas [5] which are;

1. Production strategy for risk management, the main objective is to protect the yield (Yield risk) to an acceptable level by integrated farming (Farm type diversification), which is the cultivation of many crops joint and rotating together to prevent soil damage and pests easily, specifying the appropriate area for each plant (zoning). Selecting appropriate plant varieties. Modern cultivation management by using technology to supplement etc.

2. Marketing strategy for risk management, the main objective is to protect the price of crops from becoming too low and to be stable by establishing a future or forward market to reduce the risk of fluctuations in crop prices make price stabilization. Establishing a market to prevent monopolies in the local market creates a fair reference price for agricultural products, pledge of crops to prevent the supply of crops more than demand. Which will prevent the price of crops to fall too low. The minimum price determination of crops is another measure that prevents the price of vegetables from falling too low.

3. The financial strategy for risk management has the main objective of protecting farmer's investments through insurance products so that farmers can receive investment compensation when disaster strikes. Promoting farmers with extra income from non-agricultural employment crop insurance based on the technical principles of insurance provided by Pooling of risks is a good risk management and is a generally accepted method. Therefore, it can be applied to protect the yield (Yield risk), the price (Price risk) and the cost of production (Investment risk) in the agricultural sector. As shown in the picture crop insurance will compensate the damage to a certain extent. Preventing the debt burden from rising until it is difficult for new incomes to repay the debt. However, crop insurance should be done step by step starting from crop insurance that covers production costs. Then extend

the coverage to the quantity of products and prices further as has been done in various countries.

3.3 Risk Management in the Supply Chain

Risk management in the supply chain that may occur from changes and modifications. The effective risk management is an important factor in making the organization or the people involved in the system able to survive under the current business environment. Nowadays, risk is one of the issues that is gaining attention and ongoing discussion, which is a result of the failure of various organizations. These failures are caused by both natural phenomena and human actions and affecting business as a whole the impact of these unexpected events has caused business organizations to pay more attention to the risks threatening their operations. Risk factors for failure to manage risk in the supply chain for an organization often arise from similar causes, which can be summarized as follows;

Costs, driven by external needs, failed crisis management, paying attention to the potential damage of the organization, and lack of appropriate motivation within the organization, etc.

3.4 Simulation Model

Problem simulation is the process of designing a simulation of a real system and then conducting experiments to learn the behavior of real systems, under various specifications laid down to evaluate the system's performance and analyze the results obtained from the experiment before continuing to use for solving real-life problems. The model must work like a real work system. For the simulation results to be most accurate. The simulation model is a technique for finding results of a problem by using a computer program through simulating the operating system of a real system or a system that is created. The actual work system study that is used to help study and analyze the results to solve problems in the system or work process, especially the policy formulation in the current agricultural industry conditions competition is fierce in all aspects. Simulation is one technique that is important and suitable to be used to help with analysis. The supply chain system, which is helpful in supporting policy decisions before being put into practice.

4. Methodology

This research has two methods, consisting of the first one: studying the supply chain system of the cassava industry in Thailand in order to study current and past government policies to analyze factors risks and impacts that affect the competitiveness of Thai cassava industry to find ways to develop and improve the management of government policies, three

policies, which include the pledge of income, insurance, and compensation for income. Which provides support to farmers and entrepreneurs involved in the supply chain system of the cassava industry. And, the second method is to study to find the suitable method for government policy formulation in the past by using the simulation method by using computer program in order to assume the policy formulation in the future to reduce the damage that may will occur and is a tool to help support decisions in future policy making.

In the part of studying the supply chain system of the cassava industry, primary and secondary data collection will be conducted together with the actual field survey of farmers, agencies, and establishments that are related to the cassava industry by means of sampling methods for collecting quantitative data and in-depth interviews with farmers and personnel in organizations and related agencies, to study the current and past situations, including operations methods, problems and obstacles, which the collected data will be analyzed statistically to test the hypothesis in the research. After that, the experimental approach is determined through simulating the situation to assume the event or case study that is interested to try and find the way from the case study with current and past data. Then analyze the results from the experiment with the simulation model and compare the results to be a guideline for policy formulation in the future.

This study will focus on the form of analysis of government price intervention policies that should change or not, or what should be done in the future, through the simulation of data collected from various interviews from farmers. Establishment personnel in the organization and related departments. The data collected consists of operations, benefits, problems, limitations, etc. Once the data has been collected, the data is analyzed to determine the guidelines for policy making in the future.

5. The Simulation Experiment

This research presents a case study to conduct experiments on all three government policies that affect businesses involved in the supply chain system in the cassava industry through simulating scenario through presenting the main factors of price and the amount of cassava. That represents the relationship of government policies with the cassava industry by considering the management of risks in the supply chain. The research team has presented the experimental situations to be used as three main models for two sub-experiments, total of six alternative scenarios as follows:

Case 1; Pledge policy that affects cassava export industry.

Case 1.1; Experiment in the absence of a pledge scheme in 2008/2009.

Case 1.2; Experiment in the case of increasing the budget of the pledge project in 2008/2009 in a ratio of one time to make the pledge scheme more thorough for farmers.

Case 2; Income insurance policy that affects the tapioca starch processing industry.

Case 2.1; Experiment in the absence of a project to guarantee income in the year 2009/2010.

Case 2.2; Experiment in the case of increasing the income guarantee project budget in the year 2009/2010 in the ratio of 50 percent, in order to encourage and encourage farmers to expand cultivation areas to increase supply in the supply chain system of cassava.

Case 3; Revenue compensation policy that affects tapioca chip industry.

Case 3.1; Experiment in the absence of a policy to compensate income in 2017/2018

Case 3.1; Experiment in the case of increasing the budget to compensate the income for the year 2017/2018 in the ratio of two times in order to cover the farmers who are affected or damaged by the cassava cultivation.

6. Conclusions

This research presents a research idea to analyse policies and factors that affect the adaptation of the cassava industry to increase competitiveness, through supply chain risk management model. The results to guide of decision-making for senior executives to set policies or support the adjustment policy of the Thai cassava industry, to solve problems that impede imports processing problems, and the export problem. This research is a case study of the cassava industry in the provinces with the highest cassava harvesting products in the country by selecting the provinces that are the top five case studies, accounting for 60 percent of the country's output consisting of Nakhon Ratchasima, Kamphaeng Phet, Chaiyaphum, Kanchanaburi and Sa Kaeo as a prototype for use in the cassava industry that has experienced similar problems in other provinces. Nationwide this is to enable the management of cassava industry systems to be effective and increase the competitiveness of the Thai cassava industry in the world market.

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