Analysis Cost of Transportation of Fresh Cassava roots in SaKaeo Province

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Abstract

This study was aimed to analyze the cost of transportation of cassava roots in Sa Kaeo province and developed guidelines to reduce the cost of transportation from farm to factory. It was found that cassavas were grown in nine districts of Sa Kaeo province in a total of 658,380 rai of land, where there were two factories that produced cassava starch. There were 36 private own purchasing sites available in Sa Kaeo province. It was found that 5.58 % of the cassava roots were bought at the farm by the middlemen, while 26.14 % were sold to the middlemen at those 36 purchasing sites and 68.28 % were sold to the flour mill plants. The types of vehicle that often used to transport the cassava roots were consisted of 63.45 % four-wheel trucks, 21.57 % six-wheel trucks, where 14.97 % were ten-wheel trucks. The average distances required for the transportation of cassava roots to the purchasing sites were in a range of 11 - 20 kilometers, where it was varied from 0.5 -10 km, 21-30 km, and 31-40 km, respectively. It was recommended that several purchasing sites should be available for the farmer in order to reduce of transportation costs. The recommended purchasing sites should be available at the several districts, i.e., Khao Chakan, Wang Nam Yen, Khlong Hat, Ta Phraya, Khok Sung, and Wang Sombun district, respectively.

Keywords: Cassava, logistic system, and cost.

INTRODUCTION

Thailand is the third largest producer of cassava in the world after Nigeria and Brazil. The production is 26 million tons per year, while the whole cassava production in the world is 228.14 million tons per year. Thailand is the world's No.1 exportor of cassava products and earns over 1,400 million USD per year because domestic consumption is less than competitors[1]. All parts of cassava are useful and they have been used as several constituents for household consumption, i.e., an ingredient in human foods and animal feeds, a component in a process of various products for creatures, as a modified starch industry, and used as raw materials in several industries, i.e., alcohol industry, and medicine industry. The utilization of cassava can be divided into three ways, i.e., Unprocessed raw cassava (directly consumption), processed products, i.e., cassava stick, cassava pellet, and cassava starch, and modified starch in which physical and chemical forms are used in various industries [2]. Modified starch is used in various industries including food, sweeteners, seasoning powder, textile, paper, ethanol, and biodegradable packaging. Thailand exports several cassava products, such as cassava stick, cassava pellet, and cassava starch. The large markets of cassava stick are Korea and China, while cassava pellet is exported to European Union (EU) including Netherland, Spain, Portugal, Germany, and China. Thailand is also ranked as the world's No.1 exportor of cassava starch to over 90 countries around the world. The production of cassava starch is more than 2 million tons per year, which is equivalent to nearly half of the total export of cassava products. The main markets of Cassava starch are United States of America, Taiwan, Japan, Malaysia, China, and Hong Kong [3]. Cassava is ranked the fifth of important food crops after wheat, rice, corn, and potato in the world. It also is an important food crop in tropical countries particularly in Africa and South America [4], while cassava is more consumed In Asia, Indonesia and India, where 60 % of annual amount of the production is used for human food, 27.5 % and 12.5 % of annual amounts of productions are used for animal feed, and other active ingredients, respectively [5]. Cassava is considered as an energy crop as sugar cane and oil palms. Fresh cassava roots are processed into cassava starch, cassava stick and cassava pellets approximately 21 million tons per year [6]. Cassava is used as one of alternative fuels. Fresh cassava roots are used to produce ethanol. The ethanol form of the production will be combined with gasoline to create a type of fuel known as “gasohol”. At present, the government has launched a policy to promote the using of gasohol, which is made from fresh cassava roots by approving 24 ethanol plants with a total capacity of 5 million gallons per day, while 6 million tons of fresh cassava roots is added per year for the increase of ethanol plants where an area of producing cassava in the country is limited, which is only 6.5 million Rai available for the cassava plantation. The method of increasing productivity is to increase amount of productivity per Rai and to extend the production base to neighboring countries. This method will help famers increase cassava roots to support the production of ethanol [7]. The transportation of cassava roots to factories is one of significant activities in a production process. In general, both farmers and factories are preferred to use a truck for transportation because of its movability and capacity. Trucks can transport cassava roots from cassava production areas to factories directly. A success of Cassava cultivation is depended on its harvest and transportation is essential. If the carry does not effective and suitable, all treatment and care before harvest is fruitless. The transportation of cassava, which is inefficient, will delay the delivery of products to factories. As a result, farmers will get less money because cassava is left in the fields for long period of time. Cassava should be delivered to the plant immediately after it is uprooted from the soil. If cassava is left in the field, its live-cells will use starch for breathing and other microorganisms will also use the starch in its root. Cassava roots will be rotten within 2 days. Starch in cassava roots is approximately 23.01 % right after digging, and the starch will not be decayed in 2 days

(23.7%), but about 1.62% of fresh cassava part will start to rot. The amount of starch will be decayed to 20.07, 13.13, and 9.94 percent, respectively, after 4, 6, and 8 days. It has been shown that In just 6 days after digging, starch is reduced 10 percent (from 23.01% to 13.13%), and in 8 days after digging, starch is reduced 14 percent (from 1.23% to 9.94%). The amount of deterioration of cassava root is quite significant during the delay in transportation. In addition, the deterioration rate of cassava roots will be increased with longer storage periods [8]. The type of transport or transportation modal will be affected by the transportation cost. The study of transport types in order to improve the cassava transportation is an important method to reduce costs of delivery and production.

Logistics and costs

Logistics is the management of the flow of resources between the point of origin and the point of consumption or storage of raw materials, machine, spare part, equipment, merchandise, and related information in order to respond customers' needs both at domestic and oversea levels, where its total cost is lower for the domestic one. The supply chain management is focused on the cooperation, data sharing, and joint planning with supply chain partners. The determination of the supply chain management is carried out in order to minimize the calamity and to achieve greater efficiency. Principles of logistics and supply chain management consist of two major parts, i.e., one is consideration of total cost without sub optimization because it may affect other parts of the supply chain, and the second part is to evaluate profit and loss of each alternative in terms of financial, non-financial, and risk, which are decided to the right choice of a situation [9]. The Council of Logistics Management (CLM) has set up the definitions of logistics as follows:

Logistics is the process of planning, operating, control of movement for delivery products and return, storage products, services, and related information more efficiently and effectively. The logistics will take place from the beginning of production to the last consumption, which is the requirement for customers.

The logistics process will cover two activities, i.e., the first activity, which is key activities that include inventory management, transportation management, ordering management, data management, and financial management; the second activity, which is supporting activities that include warehouse management, storage management, procurement management, packaging management, and demand management.

The key activities of logistics are dealing with supply goods or services, which meet the needs of customers, and deliver products to the places on time where customers require the punctuality. The products should reach customers in perfect conditions with reasonable cost [10].

Costs is expenses for procuring

Products or services:
The scopes of costs are - collection cost, selection, allocation cost depending on wishes of the management department. [11] If we can control the costs incurred in a business to be low, it may help to increase profits because it is easier than increasing its revenue.

Objectives and scopes

The study was aimed to determine cost of the transportation of fresh cassava roots from farmers to cassava starch factories in Sa Kaeo province, and to develop guideline for the reduction of transport costs from the farm to cassava starch factories.

The scope of this study was focused on the type of transportation of fresh cassava roots in Sa Kaeo province to and from cassava starch factories and analyze the time courses of transportation. The study was carried out from March to July 2011.

RESEARCH METHODOLOGY

Two demographic groups used in the studies were selected from two companies of cassava starch factories; while cassava farmers were selected from farmers lived in Sa Kaeo province. The participants were randomly selected from cassava farmers in Sa Kaeo province by using Taro Yamane table with 95 % of confidence, where a total of 394 farmers were selected from nine districts, i.e., 65 persons from Mueang Sa Kaew, 43 persons from Khlong Hat, 47 persons from Ta Phraya, 43 persons from Wang Nam Yen, 66 persons from Watthana Nakhon, 26 Aranyaprathet, 44 persons from Khao Chakan, 10 persons from Khok Sung, and 50 persons from Wang Sombun.

Data were collected using directly interviewing and questionnaire survey. Data used in questionnaire were consisted of transportation process of fresh cassava roots to cassava starch factories, transportation route from farms to factories, and the specific questionnaire for managers of cassava starch factories.

RESULTS

Types of cassava transportation

According to the questionnaire used for 394 farmers in nine districts of Sa Kaeo province, it was dealing with the types of vehicles used for transportation of cassava roots from farms to the purchasing sites. Results of an analysis showed that farmers were able to carry cassava roots to purchasing sites. Those farmers who had no vehicle transported the cassava roots by hiring a truck. If the planting areas were far from cassava starch factories, the demand of hiring trucks would be increased. Farmers who owned a vehicle could choose the appropriate time to transport the products and could control the quality of the products. Table 1 shows the type of vehicles used for the transportation.

Table 1. Types of vehicles used for the transportation.

Districts	Types of vehicles			Totals
	4-wheel Truck	6-wheel Truck	10-wheel Truck	
Mueang Sa Kaeo	35	16	14	65
Khlong Hat	30	8	5	43
Ta Phraya	37	6	4	47
Wang Nam Yen	28	10	5	43
Watthana Nakhon	40	9	17	66
Aranyaprathet	17	5	4	26
Khao Chakan	25	13	6	44
Khok Sung	6	3	1	10
Wang Sombun	32	15	3	50
Total	250	85	59	394
Percentages	63.45	21.57	14.97	100

Results in Table 1 showed the relationship between cassava farmers in Sa Kaeo province and types of vehicles used for the transportation of cassava roots. It was found that 250 farmers used 4-wheel trucks (63.45 %), 85 farmers used 6-wheel trucks (21.57 %). 59 farmers used 10-wheel trucks (14.97 %), whereas there was no one used a tractor for the transportation. The sequences of the most frequent way of transportation of cassava roots in Sa Kaeo province were 4-wheel trucks, 6-wheel trucks, and 10-wheel trucks respectively.

Table 2. The capacity of transportation (Weight) of cassava roots per trip.

Districts	Average load (tons).		
	4-wheel Truck	6-wheel Trucks	10-wheel Trucks
Mueang Sa Kaeo	2.16	5.66	9.00
Khlong Hat	1.75	5.71	9.20
Ta Phraya	1.77	5.00	10.15
Wang Nam Yen	2.26	6.12	8.00
Watthana Nakhon	2.55	6.10	14.33
Aranyaprathet	2.13	7.33	13.12
Khao Chakan	2.16	6.20	9.14
Khok Sung	1.86	7.12	15.35
Wang Sombun	2.16	7.65	13.45
Total	18.14	56.39	92.60
Averages	2.01	6.26	10.28

It was found that the average weight, which carried by 4-wheel trucks, was 2.01 tons, while 6-wheel trucks could carry 6.26 tons, and 10-wheel trucks could carry 10.28 tons.

Table 3. The distance of the transportation from the plantation sites to the purchasing sites.

Districts	Transportation distance (km.)			
	1-10	11-20	21-30	31-40
Mueang Sa Kaeo	35	42	31	2
Khlong Hat	19	22	13	8
Ta Phraya	12	19	11	-
Wang Nam Yen	15	23	3	-
Watthana Nakhon	25	29	11	-
Aranyaprathet	15	17	1	-
Khao Chakan	21	27	6	3
Khok Sung	3	7	5	1
Wang Sombun	18	19	5	1
Total	148	205	86	15

Results in Table 3 show that the carry distance of fresh cassava roots from the farm to the purchasing site was in a range of 11 - 20 km, 0 - 10 km, 21 - 30 km, and 31-40 km, respectively.

Planning design for reducing the transportation cost of fresh cassava roots.

The analysis of the data showed that the least frequent way for the transportation of farmers to carry fresh cassava roots was 4-wheel trucks due to its efficiency. There was no purchasing site available in some districts, so farmers had to transport the products for a long distance to the purchasing site. Researchers would like to recommend that there is a need to have a central place for collecting and distributing products.

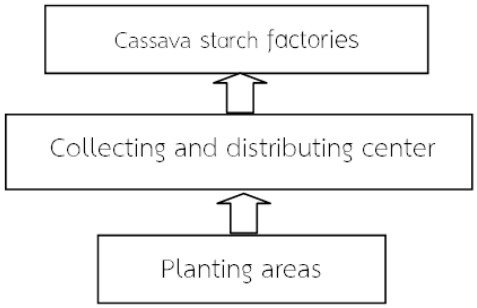

Figure 1. Showing the modes of transportation.

Table 4. The ratio between old cost / new cost of transportation from farms to Cassava starch factories.

Districts	Average cost (Baht)					
	4-wheel trucks		6-wheel trucks		10-wheel trucks	
	Before	After	Before	After	Before	After
Mueang Sa Kaeo	6	-	29	-	90	-
Khlong Hat	35	17	183	92	644	322
Ta Phraya	24	12	116	58	600	300
Wang Nam Yen	38	19	165	82	456	228
Watthana Nakhon	7	-	29	-	206	-
Aranyaprathet	6	-	33	-	-	-
Khao Chakan	25	12	110	55	300	150
Khok Sung	30	15	100	50	920	460
Wang Sombun	40	20	260	133	988	494

CONCLUSION AND RECOMMENDATION

Results indicated that cassava roots were grown in nine districts of Sa Kaeo province in a total area of 658,380 Rai, where there were two factories produced cassava starch. There were 36 private own purchasing sites available in Sa Kaeo province. It was found that 5.58 % of the cassava roots were bought at the plantation sites by the middlemen, while 26.14 % were transported to sell to the middlemen at those 36 purchasing sites, and 68.28 % of the products were sold to the flourmill plants. The types of vehicle that often used to transport the cassava roots were consisted of 63.45 % four-wheel trucks, 21.57 % six-wheel trucks, whereas 14.97 % were ten-wheel trucks. The average distances required for the transportation of cassava roots to the purchasing sites were in a range of 11 - 20 kilometers, which was varied from 0.5 -10 km, 21-30 km, and 31-40 km, respectively. It was recommended that several purchasing sites should be available in several districts for farmers in order to reduce the transportation costs, i.e., Khao Chakan, Wang Nam Yen, Khlong Hat, Ta Phraya, Khok Sung, and Wang Sombun, respectively.

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REFERENCES

[1] Wisenoi, W. 2009. "The 2009 World Conference cassava" Bangkok, Thailand (14-16 January 2009).

[2] Wisenoi,W. 2009. Benefits of cassava. (Online) Available at URL : http://www.cassavathai.org/E1.html.

[3] Phaewichai, P. 2005. "New wine cassava wine. Index in Thailand "Technology Natives. Volume 17, No. 354.

[4] Phaewichai, P. □□ ค. ศ. 2007 Elemental analysis of the product. (Online) Available at URL: http://aftc.or.th/itc/products_analyze.php?Id=86&fgrp_id=6&fmnu_id=31. Retrieved on 2010.

[6] Limsila, C. 2004. Papers cassava. Department of Agriculture, Ministry of Agriculture and Cooperatives, Bangkok, Thailand (inThai).

[7] Bunseng, O. 2007. "Productivity of cassava for ethanol production." *Farmers* 80(2): No. 34-39

[8] Orchanaritphiches, C. 2007. "Cassava starch" the 30-year anniversary of the Association of Thailand cassava. Thailand Cassava Starch Association, Bangkok, Thailand (in Thai).

[9] Paweenawat, A. 2007 "Reviews, the Interview with' Logistics" (Online) Available at URL: http://utcc2.utcc.ac.th/faculties/engineer/logistics/interview.htm. Retrieved on 2010.

[10] Center for Logistics and Management. 2009 "Development of Thailand. System Logistics Logistics (Logistics) "(Online). Available http: logisticsmrc.net / index.php. Retrieved on 2010.

[11] Komarathat, D. 2005. Cost Accountant. Chulalongkorn University. Bangkok, Thailand (in Thai).

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