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Thai Hommali Rice Mill (Entrepreneurship) Logistics Cost From Northeastern Provinces Of Thailand Based On The Activity Based Costing: Case Study Focusing On Northeastern Provinces Of Thailand

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The Ministry of Commerce (2023) reported that Thailand exported 694,996 tons of rice between January and June 2023. There are 14 different types of rice. The main markets are the United States, Hong Kong, China, Singapore and Canada, accounting for approximately 72.05 percent of total Hommali rice exports. There is a total area of 23 provinces promoting the cultivation of Thai Hommali rice in Thailand with an area of 23,029,010 rai, producing 7.8759 million tons of paddy. All are grown in 20 the Northeastern provinces, together with the 3 Northern provinces: Chiang Mai, Chiang Rai, and Phayao (Rice Department, Ministry of Agriculture and Cooperatives, 2019). The Northeastern Mill Association (2023) reported that 160 Thai Hommali rice mills in the Northeastern region have the potential to mill rice for export. The Rice Department (2024) mentioned that rice has been an important economic crop of Thailand for a long time and it is an important export product. Thailand is the world's largest rice exporter. It also mentioned the Cabinet resolution regarding the Thai rice strategy for 2020-2024 under the vision that Thailand is the market leader about rice marketing production and World quality rice products. The objective of this research is to study logistics activities cost of Thai Hommali rice mills in the Northeastern region of Thailand focusing on studying the logistics cost of the Thai Hommali rice mills based on activity-based costing system with operators of Thai Hommali rice mills from 20 provinces in the Northeastern region of Thailand.

The researcher applied quantitative method by studying 6 pilot sample mill groups of Thai Hommali rice mills. The information of 5 activities regarding logistics costs was studied based on the activity base cost method of the pilot Thai Hommali rice mills. They were 1.Activity base cost of paddy 2. Transportation activity base cost 3. Inventory activity base cost 4. Loss or damage activity base cost of raw materials or products and 5. Management activity base cost. The data is used as a central average for comparison with a sample of 155 mills. In this research, research tools such as questionnaires and in-depth interviews were used. The statistics used in the research was Excell as a calculation program. The results of the research found that collecting samples from the juicy chamber , summary of costs, distribution of proportion to the logistics activities of Thai Hommali rice mill, and the activities between the pilot survey group and the sample showed that space expenditure on inventory activities accounts for the highest proportion. In the case of storage

of paddy in warehouses, it was 57.22:54.22 percent, in case of storage of paddy in silos, it was 43.55:47.83 percent. This is followed by sub-activities in stocking rice in functional materials/consumables as sack fees. Sack sewing machine, electricity bill, etc. In the same inventory activity, jumbo sacks were 18.70 percent: 21.21. In addition, management activities constituted 16.35:20.40 percent. In case of quality treatment with drying plant dehumidification to 1.12:1.81%, storage of rice in Shilo warehouse was 0.83:3.63%, 1.86:1.55%, storage of rice in jumbo sacks was 1.42:1.59%, transportation activities in jumbo sacks were 2.38:2.92%, and paddy receiving activities were 0.73:0.89%, respectively. Cases of sampling from Lao Lek (steel lantern), summary of costs and proportional distribution to the cost of logistics activities of Thai Hommali rice mill between the pilot survey group and the sample. The activities collected from Lao Lek (steel lantern)of the pilot survey group compared with the sample of all 5 activities were found that space expenditure on inventory activities accounted for the highest proportion. In the case of storage of paddy in warehouses, it was 56.26:44.53 percent. In case of storage of paddy in silos, it was 42.28:44.96 percent. This is followed by sub-activities for rice stocking in functional materials/consumables such as sacks, sack sewing machines, electricity bills, etc. The inventory activities were the same as Jumbo sacks, 17.27:19.55 percent. The management activities were 16.08:18.55 percent, and transportation activities in jumbo sacks were 2.65:4.73 percent. Loss or damage activity in the case of quality treatment with drying plants, dehumidification was 0.80:1.74%, storage in warehouses and silos was 0.66:3.67%, 3.71:3.43%, storage of rice in jumbo sacks was 1.33:1.57%, and paddy receiving activity was 0.68:0.76%, respectively.

Keywords: cost, logistics cost, Medium entrepreneurship (Thai Hommali Rice Mill), Activity Based Costing (ABC)

Introduction

The Ministry of Commerce (2023) reported that Thailand exported a total of 694,996 tons of rice from all kinds of Thai Hommali rice between January and June 2023 with 14 different types of rice. The main markets are the United States, Hong Kong, China, Singapore and Canada, accounting for about 72.05% of the total Hommali rice exports. Areas promoting Hommali rice cultivation in Thailand have a total area of 23 provinces with an area of 23,029,010 rai with a production of 7.8759 million tons of paddy, which is grown in the Northeast region in all 20 provinces and the northern region in 3 other provinces, namely Chiang Mai, Chiang Rai and Phayao (Department of Rice, Ministry of Agriculture and Cooperatives, 2019). The Northeast Mill Association (2023) has reported the statistics of rice mills in export from the Northeast region provinces. There are 160 mills with potential to mill rice for export. Surasak Logistics (2023) found that Thai rice logistics costs consist of transportation costs, collection costs, inventory costs, product maintenance, costs related to packing and preparing goods for delivery, costs of loss or damage, and management costs.

Research objectives

The objective of this research is to study logistics costs by means of activity-based costs of Thai Hommali rice mills in the Northeastern Thailand.

Literature Review

The origins theory of logistics:

Vogt, Pienaar & Wite (2005) described the concept of modern logistics as having started in the core half of the 20th century and became widely used in the 1980s to the present. Executives in business organizations also understand that logistics is only an activity at the operational

level regarding warehouse management and delivery to distribute products to customers. In later eras, the concept of total cost was introduced. It is used to manage logistics systems with the objective of controlling total costs and creating customer satisfaction at the same time. In the third era, 1980-1990, the concept of integrated management with other units was introduced to create a competitive advantage and maximum profitability for the organization. Fourth Era 1990-present, Logistics has expanded the scope of coordination of enterprises in the supply chain. As a result of globalization, businesses become more competitive (Rut Phanomyong, 2007).

Meaning of Logistics

Definition established by Council of Supply Chain Management Professional as "Logistics Management is that part of the supply chain process that plans, implements and controls the efficient, effective flow and storage of goods, service and related information form the point-of-origin to the point-of-consumption in order to meet customers' requirements."

This has been translated into Thai that logistics management is part of supply chain management including the planning matters, execution, control, circulation, and storage of goods, services and information efficiently and effectively from the beginning to the final point of consumption to meet consumers' needs (http://www.cscmpthailand.org/index.php?option=com content&view=article&id, 2024). Logistics management refers to the planning process, implementation and control of movement and storage of goods, relevant services and information from the beginning to the final point of consumption that are efficient and effective to meet the customers' needs. From this definition, the scope of work is explained and indicates the purpose of logistics as customer's needs or expectations and what satisfies customers (Hofffman & Bateson, 2006: 304-305).

It is in line with the objectives of logistics management that focuses on customer's needs. The customer' needs from the most accepted definition of logistics is the core definition of The Council of Supply Chain Management Professionals: CSCMP which can be interpreted as part of supply chain management (supply chain management) with a planning process, implementation, control of movement and storage of goods, relevant services and information from the beginning of their inception to the point of efficient and effective consumption to meet the needs of customers (Ruthi Phanomyong, 2007: 11-12). There are two types of measurement: 1) Efficiency refers to the use of resources available in various categories to maximize benefits including cost control, which is commonly measured in the cost dimension, 2) Effectiveness is to meet customer's needs (Ruthi Phanomyong, 2007). Moreover, Stock, Lambert, Ellram (2024) has discussed that it starts with the inputs which consists of human resources, financial resources, natural resources, and lastly, information resources. Next is management work by managing logistics related to the receipt of raw materials, goods, or work in progress from suppliers or suppliers to be able to operate efficiently in logistics activities that include customer service, choosing the location of the factory or warehouse, forecasting the customer's product demand, distribution communications, destruction and reuse, warehouse & storage procurement packing to achieve good results and customer satisfaction by focusing on competitive market competition, leveraging time and place, moving efficiently

to customers, and creating assets that create value for customers. Logistics plays a role in the market as a supporting factor to ensure long-term profitability of enterprises.

Next is management work by managing logistics related to the receipt of raw materials, goods, or work in progress from suppliers or suppliers to be able to operate efficiently in logistics activities that include customer service, choosing the location of the factory or warehouse, forecasting the customer's product demand, distribution communications, destruction and reuse, warehouse & storage procurement, order process, traffic and transportation to achieve customers good results and satisfaction focusing on the competitiveness of a competitive market, leveraging time and place, moving efficiently to customers, and creating assets that create value for customers. Logistics plays a role in the market as a supporting factor to ensure long-term profitability of enterprises.

Concepts of total cost

The total cost concept is a success factor in logistics management. 6 Logistics-related cost areas of the 14 logistics factors driving each activity affecting 6 main areas. The areas that are the main factors affecting costs in activities include areas that are customer service activities, customer demand forecasting plans, inventory management information and information of logistics systems, holding raw materials, receiving orders, packaging, spare parts and support services, choosing factory and warehouse locations, procurement, returns, and return shipments

Background of the activity base cost

Activity-Based Cost (ABC) originated in the 1980s to understand the cost of activities and production processes to carry out effective activities and to determine the resources that must be used economically and how to procure them in a valuable way to be able to support the ABC system with three key strategic goals: to provide accurate cost reporting so that management can identify sources of revenue (Baykasoglu & Kaplanoglu, 2008);

The activity-based cost system method begins by identifying the cost for the activities that occur and then allocating the cost from the activities involved to the goods and services, where the cost of goods and services depends on the level of use of the activities related to that product and service, which is the cost driver that is the key information that executives in managing activities follow the behavior of costs (Sunil & Peter, 2007). Traditional cost analysis in logistics has the goal to focus on reducing total costs rather than reducing the cost of individual activities because focusing on specific costs in one activity may result in higher costs in other activities.

The activities at the studied upstream level are related to the procurement, transportation, storage of inputs and delivery, which are all activities in logistics. The production process can have costs such as 1.customer service cost, 2.transportation cost, 3.warehouse cost, 4.order size or quantity cost, 5. cost of handling orders or information systems, and 6. cost of maintaining inventory.

This concept distorts the total cost from reality. For this reason, Kaplan&Cooper (1988) supported the concept of Activities Based Costing (ABC) both in theoretical and practical application. The operation of the organization is issued as an activity and can be summarized as follows. 1) Analysis of activities 2) Stimulation of activities 3) Identification

of performance metrics and quality of work obtained 4) Identification of relevance in the results of each activity and cost drivers, which is information to control and reduce costs of the business. It is also used as information in controlling the business that occurs, and 5) Identifying the cost of activities and what will be taken into account. Identifying activity-based costs is a way to help control goods or products more accurately than conventional controlled accounting systems (Lambert, Stock, Ellaram, 2018).

Analysis of the activity-based cost structure

An activity-based cost system is a cost management that prioritizes activities and costs incurred in the activities that occur. Cost information is important to the business. Chatturong Plearnmead, (2016 : 68-69) has emphasized the importance of activity-based cost systems as follows: 1. Planning and decision-making in various fields ,2. Liquidity of the business and cash management, and 3. Activity-based cost system cost control.

Related Research

Surasak Logistics (2023) studied about the logistics cost of Thai-Thai rice. It was found that Thai rice logistics costs consist of transportation costs, product collection costs, inventory costs, and product maintenance, costs related to packing and preparing goods for delivery, costs of loss or damage, management costs, and costs involved in logistics costs of key stakeholders in the Thai rice logistics system.

Marinee Puttanu et al. (2018) studied the key factors of controlling base costs. It was found that the activities that cause high production costs in the rice cultivation process of farmers are the cost of harvesting and post-harvesting activities about 690 to 875 baht per rai.

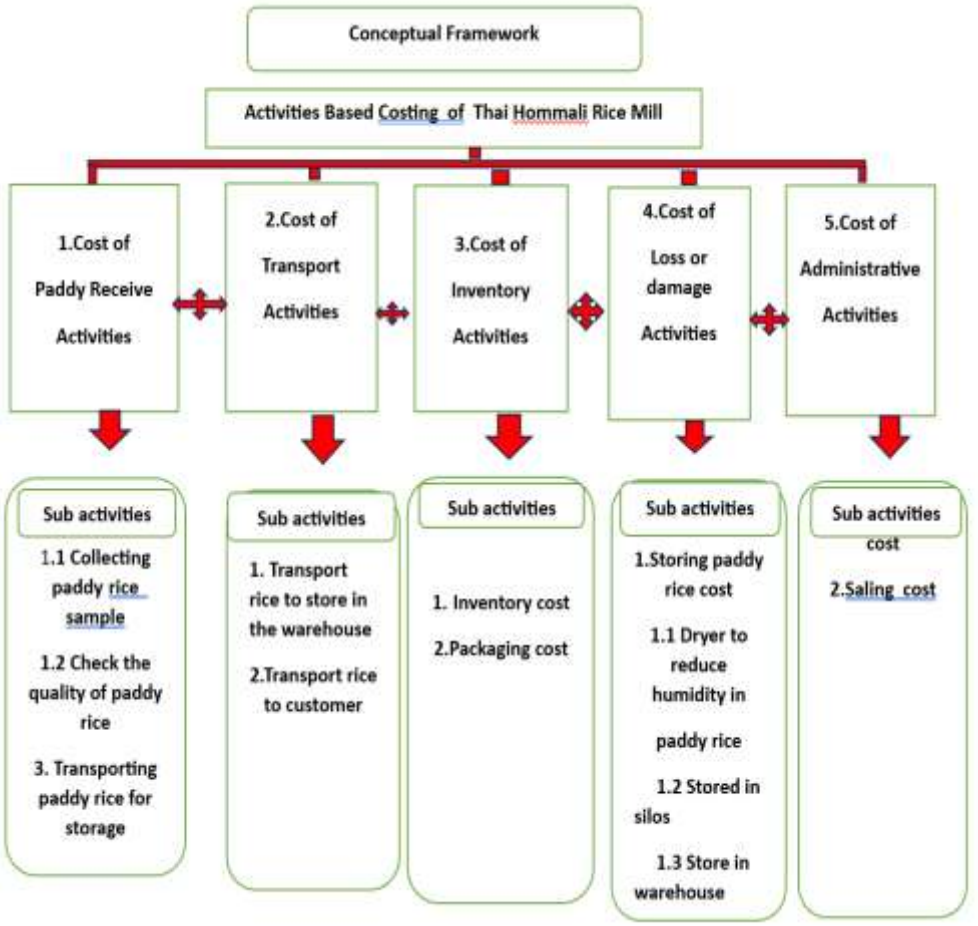
Hypothesis

H0 Thai Hommali rice mill logistics activity base cost = as a result of paddy acquisition activities + transportation Inventory +Loss or damage +management activities.

H1 Logistics activity base cost of Thai Hommali rice mill ≠ As a result of activities, paddy receipt + transportation, inventory +loss or damage +management activities

Research Conceptual Framework.

Cost structure of logistics activities of Thai Hommali rice mill



Methodology

This research has the following methods for conducting the research. The researcher applied the concept of activity-based cost analysis to analyze the logistics cost of Thai Hommali rice mills in the Northeast starting from the paddy pick-up activities, transportation activities, inventory activities, loss or damage of raw materials or goods and management activities. The cost of each activity was analyzed using the activity-based cost method in conjunction with Stock&Lambert's logistics management (2001) and a study by Ekachai Guptawatin et al. (2016).

The target population in this study was used from mill operators in the Northeast as an analysis unit by designating mill operators as respondents from 155 places and conducting in-depth interviews. It is information about information related to activities, paddy receiving, transportation, inventory, loss or damage of goods and management. The research instruments were questionnaires and in-depth interviews, consisting of general information questionnaires of respondents and logistics data cost factors related to these 5 activities. It is characterized by operational questions in the field of processes, labor, length of work, distance of transportation,

creating gauges and operational terminology definitions based on the literature review and a list of questions that scholars have used to collect historical data to form variables (Rahman,2002) and (Awanya,1997).

Suchart Prasitrathasin (2003) and Babbie (2001) have offered supportive comments that the question must be simple and feasible. The researcher himself has created and developed the research tool with a review of the directness and structure of the content and language by a qualified person.

After that, it was tested on 30 mill operators in the Northeast who were not the target population, and brought to confidence with Kronbach's alpha coefficient. It has an IOC of 1 and a high confidence of 0.82. Data collection, submission and data collection was submitted and collected by the researcher.

Data Analysis

Research limitations and requirements and data analysis

The researcher found that there were limitations of five data areas in this study. Therefore, the researcher interviewed pilot mill operators for research from 5 provinces such as Pongcharoen Mill Yasothon Province, Chaimongkol Mill, Thai Permphun Mill, Roi Et Province, Na Kaepongcharoen Mill Nakhon Phanom, Mill P. Nattapon Khon Kaen Province, about the operating information in the field of 5 activities, namely terms of paddy receipt, transportation, warehousing, loss or damage, and management, which has not yet been averaged as an intermediate value for use in the operation of jasmine rice mill operators. Therefore, the researcher conducted an in-depth interview and guidelines for preparing basic data related to 5 logistics activities of jasmine rice mills from pilot sample mills as a boundary to determine the rate of costs, depreciation and various sizes of loads packaging. After that, the data will be used as average data in the five activities to compare with the data collected from the sample using the Excel calculation program as follows:

1. **Research requirements**

1. Determination of labor wages: The researcher interviewed operators from 5 pilot mills about their daily wages and calculated them by the hour, minutes, and 0.42 baht each. Wages for loading and unloading sacks, the cost of cleaning old sacks, load rate of 6-wheel and 10-wheel vehicles, and transport truck charter wages including the rate of expenses, depreciation of the operation of the machine, conveyor operation, automatic sack filling machine, sack mouth sewing machine, plastic bag filling machine, using sack sewing rope, cost of using space in the warehouse, drying plants, silos, rice quality inspection costs, duration of work, duration of machine operation, diesel fuel prices, the milling ratio between paddy and milled rice, paddy price and sack size.

2. Guidelines for analyzing the cost of logistics activities of Thai Hommali Rice Mill in each activity. Methods for analyzing the activity base cost in each activity: The researcher conducted a pilot survey from 6 mills in 5 provinces and used the data from the analysis

guidelines that had been prepared. It is an average to compare with the samples collected using an Excel table for calculation as follows:

Analysis

1. Separate the calculation of the activity base cost into 2 devices, namely the juicy chamber and the steel spear.

2. Separate the delivery trucks into 6-wheel truck size and 10-wheel payload size.

3. Calculate the use of manual labor to work in each sub-activity mentioned above.

4. Calculate depreciation in equipment and machinery application.

5. Calculate the price of energy used in equipment and machinery and depreciation of the use of equipment and tools.

6. The results from 1-5 are summed up into the expenses of each activity and summed up to the sum of the large activities and compared with the average of the pilot mills where the average data has been prepared for comparison. The unit compares the value per ton of paddy.

1. Paddy receiving activities

Paddy reception activity cost = sampling cost+quality inspection cost+ Delivery of paddy to maintain quality

2. Transportation activities

Transportation activities = Moving rice to warehouse storage + Moving rice to customers

3. Inventory activities

Inventory Activity Cost= Paddy stock volume + Rice packaging cost

4. Loss or damage activity costs

Loss or damage activity cost= Paddy storage activities + rice storage activities

5. Cost of administrative activities

Management Activity Cost = Order Cost + Order Receipt Cost

Research Results

Comparative analysis results of costs and their proportion to the cost of logistics activities Thai Hommali Rice Mill by collecting samples from the juicy chamber steel spear between the pilot survey group and the sample, it was found that Logistics Cost Analysis of Thai Hommali Rice Mill Using the Activities Based Costing method, it is divided into 5 activities: rice receiving, transportation, inventory, loss or damage, and logistics management. The results of the analysis were presented by the logistics cost structure and proportion to comparative cost between the pilot survey group and the sample as follows:

Case of collecting samples from the juicy chamber: Summary of costs and distribution of proportion to the cost of logistics activities Hommali rice mill by activity samples collected from the juicy chamber of the pilot survey group were compared with the samples of the five activities: 1. Receipt of paddy, 2. Transportation, 3. Inventory, 4. Loss or damage, 5. Management. It was found that inventory activity space expenditure accounted for the highest proportion. In case of storage of paddy in warehouse, it is 57.22:45.84 percent, in case of storage of paddy in silo, it is 43.55:47.83 percent. This is followed by sub-activities on rice stocking in functional materials/consumables as sack fees, sack sewing machine, electricity bill, etc. In inventory activities, Jumbo sacks were 10.70:21.28 percent. Management activities were 11.12 percent: 1.86 percent. Storage of rice in Silos warehouses was 0.83,3.61:1.86,1.55 percent. Rice storage in jumbo sacks was 1.42:1.59%. Transportation activities in jumbo sacks were 2.38:2.92% and paddy receiving activities were 0.73:0.89%, respectively as shown in Table 1.

Table 1 summarizes the cost of activities by activity and its proportion to logistics costs of the pilot survey group with a sample. The case is collected from the juicy chamber.

Activities	Total Cost				Laber cost activities			
	Pilot servey group		Sample group		Pilot servey group		Sample group	
	Thai Bath	Proportion to total costs	Thai Bath	Proportion to total costs	Thai Bath	Proportion to total costs	Thai Bath	Proportion to total costs
1.Cost of Paddy Receive Activities	8.79	0.73	8.3	0.76	6.06	0.5	5.68	0.52
2..Cost of Transport Activities								
Jumbo bag 500 kg.	28.72	2.38	51.94	4.73	7.69	0.64	16.42	1.49
100 kg. sag	38.93	3.23	16.81	5.61	19.47	1.64	31.85	2.9
50 kg.sag	40.11	3.33	85.2	7.75	20.37	1.69	42.74	3.89
3.Inventory Activities								
Store paddy rice in the warehouse	689.63	57.22	489.36	44.53				
Store paddy rice in the silo	524.89	43.55	494.13	44.96				
rice store								
Jumbo bag 500 kg.	217.82	18.07	214.8	19.55	2.77	0.23	0.53	0.05
100 kg. sag	219.27	18.19	216.36	19.69	0.24	0.02	0.25	0.02
50 kg.sag	103.9	8.62	103.98	9.46	0.2	0.02	0.24	0.02
4.Cost of Loss or damage Activities								
Dryer to reduce humidity in paddy rice house	13.5	1.12	19.1	1.74	8.9	0.75	14.47	1.32
paddy rice	10.01	0.83	40.37	3.67	4.26	0.38	18.44	1.68
Silo	22.47	1.83	15.6	1.43	8.16	0.68	10.52	0/96
rice store								
Jumbo bag 500 kg.	17.09	1.42	17.21	1.57	3.83	0.32	3.61	0.33
100 kg. sag	11.84	0.98	20.88	1.9	3.19	0.26	7.33	0.67
50 kg.sag	11.84	0.98	30.21	2.57	3.19	0.26	7.57	0.69
5.Administrative Activities	197.41	16.38	210.19	19.17	0.22	0.02	6.76	0.62

Activities	Total space costs				Total eqiupment cost			
	Pilot servey group		Sample group		Pilot servey group		Sample group	
	Thai Bath	Proportion to total costs	Thai Bath	Proportion to total costs	Thai Bath	Proportion to total costs	Thai Bath	Proportion to total costs
1.Cost of Paddy Receive Activities					0.09	0.01	0.09	0.01
2..Cost of Transport Activities					2.44	0.2	2.46	0.24
Jumbo bag 500 kg.					2.47	0.2	2.64	0.27
100 kg. sag					2.62	0.22	3.64	0.37
50 kg.sag								
3.Inventory Activities								
Store paddy rice in the warehouse	689.63	57.22	489.36	44.6				
Store paddy rice in the silo	524.89	43.55	494.13	44.96				
rice store								
Jumbo bag 500 kg.					1.19	0.01	0.66	0.07
100 kg. sag					0.27	0.02	0.28	0.3
50 kg.sag					0.24	0.02	0.19	0.2
4.Cost of Loss or damage Activities								
Dryer to reduce humidity in paddy rice house								
warehouse					2.29	0.19	2.21	0.22
silo					2.57	0.21	4.2	0.43
rice store								
Jumbo bag 500 kg.					2.54	0.21	1.63	0.16
100 kg. sag					1.99	0.17	2.53	0.26
50 kg.sag					1.99	0.17	2.53	0.26
5.Administrative Activities					0.8	0.1	0.36	0.4

Activities	Consumable materials			
	Pilot servey group		Sample group	
	Thai Bath	Proportion to total costs	Thai Bath	Proportion to total costs
1.Cost of Paddy Receive Activities				
2..Cost of Transport Activities				
100 kg. sag				
50 kg.sag				
3.Inventory Activities				
Store paddy rice in the warehouse				
Store paddy rice in the silo				
rice store				
100 kg. sag				
50 kg.sag				
4.Cost of Loss or damage Activities				
Dryer to reduce humidity in paddy rice house	2.22	0.18	2.61	0.26
warehouse	2.28	0.23	16.02	1.62
Silo	11.19	0.93	2.38	0.33
rice store				
jumbo bag(500 kg.)	10.72	0.8	11	1.11
100 kg. sag	6.66	0.55	6.24	0.63
50 kg.sag	6.66	0.55	10.59	1.07
5.Administrative Activities	197.11	16.35	201.57	20.24

Case of collecting samples from steel spear: Summary of costs and distribution of proportion to activity costs of Hommali rice mill logistics activity collected from the samples from steel spear samples of the pilot survey group were compared with the samples of the five activities: they were 1. Receiving paddy, 2.Transportation, 3.Inventory, 4.Loss or damage, and 5.

Management. It was found that space expenditure in inventory activities accounted for the highest proportion. In the case of storage of paddy in warehouses, it was 25.26:44.53 percent. In case of paddy storage in silos, it was 42.82:44.96 percent. This was followed by sub-activities of stocking rice in use/consumable materials in sacks, sack sewing machine, electricity bill, etc. Jumbo sacks were 17.72:19.55 percent. Management activities were 16.08:18.53 percent. Transportation activity in jumbo sacks was 2.65:4.73 percent. Loss or damage activity in case of maintaining quality with baking moisture plant was 0.80:1.,1.74. Storage of rice in warehouses and silos was 0.66%, 3.67:3.71,1.43 percent. Storage of rice in jumbo sacks was 1.33:1.57 percent. Paddy receiving activity was 0.68:0.76% respectively as shown in Table 2.

Activities	Total Cost				Laber cost activities			
	Pilot servey group		Sample group		Pilot servey group		Sample group	
	Thai Bath	Proportion to total costs	Thai Bath	Proportion to total costs	Thai Bath	Proportion to total costs	Thai Bath	Proportion to total costs
1.1.Cost of Paddy Receive Activities	8.79	0.73	8.3	0.76	6.06	0.5	5.68	0.52
2.2.Cost of Transport Activities								
Jumbo bag 500 kg.	28.72	2.38	51.94	4.75	7.69	0.64	16.42	1.49
100 kg. sag	38.93	3.23	16.81	5.61	19.47	1.64	31.85	2.9
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100 kg. sag	219.27	18.19	216.56	19.69	0.24	0.02	0.25	0.02
50 kg.sag	103.9	8.62	103.98	9.46	0.2	0.02	0.24	0.02
4.Cost of Loss or damage Activities								
Dryer to reduce humidity in paddy rice	13.5	1.12	19.1	1.74	8.9	0.75	14.47	1.32
warehouse	10.01	0.83	40.37	3.67	4.26	0.38	18.44	1.68
Silo	22.47	1.83	15.6	1.43	8.16	0.68	10.52	0.96
Use store								
Jumbo bag 500 kg.	17.09	1.42	17.21	1.57	3.83	0.32	3.61	0.33
100 kg. sag	11.84	0.98	20.88	1.9	3.19	0.26	7.33	0.67
50 kg.sag	11.84	0.98	30.21	2.57	3.19	0.26	7.57	0.69
5.Administrative	197.41	16.38	210.19	19.17	0.22	0.02	6.76	0.62

Activities	Total space costs				Total eqiupment cost			
	Pilot servey group		Sample group		Pilot servey group		Sample group	
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1.Cost of Paddy Receive Activities					0.09	0.01	0.09	0.01
2..Cost of Transport Activities					2.44	0.2	2.46	0.24
Jumbo bag 500 kg.					2.47	0.2	2.64	0.27
100 kg. sag					2.62	0.22	3.64	0.37
50 kg.sag								
3.Inventory Activities								
Store paddy rice in the warehouse	689.63	57.22	489.36	44.6				
Store paddy rice in the silo	524.89	43.55	494.13	44.96				
rice store								
Jumbo bag 500 kg.					1.19	0.01	0.66	0.07
100 kg. sag					0.27	0.02	0.28	0.3
50 kg.sag					0.24	0.02	0.19	0.2
4.Cost of Loss or damage Activities								
Dryer to reduce humidity in paddy rice house								
warehouse					2.29	0.19	2.21	0.22
silo					2.57	0.21	4.2	0.43
rice store								
Jumbo bag 500 kg.					2.54	0.21	1.63	0.16
100 kg. sag					1.99	0.17	2.53	0.26
50 kg.sag					1.99	0.17	2.53	0.26
5.Administrative Activities					0.8	0.1	0.36	0.4

Activities	Consumable materials			
	Pilot servey group		Sample group	
	Thai Bath	Proportion to total costs	Thai Bath	Proportion to total costs
1.Cost of Paddy Receive Activities				
2..Cost of Transport Activities				
100 kg. sag				
50 kg.sag				
3.Inventory Activities				
Store paddy rice in the warehouse				
Store paddy rice in the silo				
rice store				
100 kg. sag				
50 kg.sag				
4.Cost of Loss or damage Activities				
Dryer to reduce humidity in paddy rice house	2.22	0.18	2.61	0.26
warehouse	2.28	0.23	16.02	1.62
Silo	11.19	0.93	2.38	0.33
rice store				
jumbo bag(500 kg.)	10.72	0.8	11	1.11
100 kg. sag	6.66	0.55	6.24	0.63
50 kg.sag	6.66	0.55	10.59	1.07
5.Administrative Activities	197.11	16.35	201.57	20.24

Discussion of results and conclusions

Discussion

The highest cost logistics activities were inventory activities, stocking of paddy in warehouses and silos. As a result, mill operators were required to have paddy for milling to be converted into milled rice for delivery to customers as ordered. Whereas, loans from commercial banks will be used for revolving for paddy procurement and interest expense charges for loans which result in logistics costs for entrepreneurs. This cost can be reduced by stocking as little paddy as is necessary to process the rice to the customer which was in accordance with Stock, Channuwong et al. (2022) and Lambert & Ellram (1998) who mentioned the cost of maintaining inventory which consisted of capital cost. Holding a commodity caused part of the cost to sink into goods and capital, which was considered an opportunity cost of capital. This cost was interest. In addition, the warehouse organization (2006) had studied the logistics system of Thai rice that storage cost and inventory holding cost consisted of the cost of preserving rice, such as interest incurred while it was necessary to hold or store the goods.

The mill operators manage the mills by taking orders from the operators and ordering paddy from aggregators or farmers. The devices used are telephone and fax, which are supplies/consumables. Another type of variable expense is the commission for collecting paddy from the delivery of paddy to the rice mill, and Yong value which is a marketing coordinator for the mill. This is another important cost for mill operators as well. Saving mill operators is to cut out rice brokerage or marketing by selling it directly to customers. However, there is still a need to maintain a broker to collect paddy and deliver it to the mill due to high competition in the paddy market. This information is in accordance with Lambert et.,al(1999) cited in Kamalchanok et al. Ballou(1999) and Bowersox,Closs (1998) that the key to profitability is to succeed in attracting and retaining customers. The flow of information systems and order management is the main task of logistics. Order fulfillment is intended to provide the right and at the customer's preferred time at the lowest cost. The end benefit of logistics is doing everything right from the start. The cost of logistics activities with a secondary cost includes loss or damage activities. Mill operators will use dehumidification plants as a tool to maintain paddy quality by drying and dehumidifying paddy to the level of 12-14% to store the paddy longer. The milling of paddy into milled rice will be of good quality. However, paddy dehumidifiers also have a fixed cost because they have to be installed in mill areas and close to warehouses and silos.

Drying paddy dehumidification will incur several costs and costs especially dehumidification drying plants, the cost of machinery is very high. If the air has a high relative humidity, then it is not possible to bake dehumidification. The storage of paddy at warehouses and silos is the result of dehumidification and is also a high fixed cost, resulting in costs to mill operators. If the operator will use other methods for dehumidifying the paddy such as drying on the drying yard by relying on sunlight, it will require a lot of space for the drying yard. It also requires more equipment and labor. In particular, pushing paddy in the drying yard will cause a loss of about 20 grams of paddy per 1 gram for square metre. Guidelines for cost reduction for mill operators require maximum use of resources, such as dehumidification to be able to operate at full capacity of the machine and storing paddy in silos and warehouses to make the most of the space. It is in accordance with the concept of Lambert et.,al (1999) Bowersox, Closs(1996) who said that There are 4 types of risk costs caused by warehouses: 1. Obsolescence This is due to the fact that the product cannot be sold at the normal price. It is calculated from the difference between the normal price of the product and the salvage value of the goods. 2.

Damage Cost is the cost of damage incurred during the transportation of goods. 3. Shinkage cost includes lost and consequential goods due to weight or quantity decrease. It can be formed from agricultural products, oils, or minerals. 4. Relocation cost occurs when moving goods from warehouse to another warehouse to reduce deterioration problems. The next cost of logistics activities are transport activities. The next cost of logistics activities are transport activities. Mill operators transport paddy and milled rice for milling paddy into milled rice and delivering rice to customers. There are machines and equipment to transport rice sacks, and Paddy to be shared with labour as variable expenditure. Guidelines to reduce spending for entrepreneurs include shortening the time to transport rice faster and increasing the volume of each shipment. It is in accordance with Stock, lambert, and Ellram (1998) cited in Wittaya Suharitdamrong, Yupa Klonklang (2007) that transportation creates economic value, namely delivery, receiving, storing, and removing between factories and production lines within factories. Finally, the least proportional cost of logistics activities is paddy receiving activities. Operators are required to collect paddy samples from paddy leaders and sell them to rice millers. In addition, moisture percentage of paddy, rice percentage and authenticity of paddy will be measured by chemical dyeing method. It can be considered that this step is the most important step. If the paddy received is not of high quality, high humidity, low percentage and there is a lot of other rice mixed in, it will cause the mill operators to lose their quality. It requires more costs. For example, if the paddy has high humidity, the mill operator will have to bake the paddy to reduce the moisture, which will incur additional costs. But if the moisture content of the paddy does not exceed 15%, the entrepreneur can turn the paddy into milled rice without the cost of dehumidifying baking. It is accordance with Chantana Sakhakorn and et al.(2005) who said that the use of goods must be counted correctly. There are many methods of inspection, especially some quality inspections may be visually inspected. Some send samples to the lab for examination. It is in accordance with the 3rd production and maintenance technology transfer center which said that sampling of paddy from sampling sacks at least 3 points per sack. Every sack is juicy with multiple sampling points.

Conclusion

Comparative analysis of costs and proportions to logistics activities of Thai Hommali rice mills collected samples from juicy chamber and steel spear between the pilot survey group and the sample. Cost Analysis of Thai Hommali rice mill activities use activity based costing (ABC). It is divided into 5 activities as follows**:** They are paddy receipt, transportation, inventory management, loss or damage, and logistics management. The results of the analysis were presented with a cost percentage structure and logistics costs compared between the pilot survey group and the sample. The study was conducted from a mill where paddy was collected from the juicy chamber and steel spear to transport to dehumidification plants, warehouses and silos are as follows. Collecting samples from the juicy chamber, summarizing the logistics costs of Hommali rice mills by activity collected the from the juicy chamber, and the pilot survey group compared with the sample of all 5 activities were found that inventory space expenditure accounts for the highest proportion. In the case of paddy storage in warehouses, it was 57.22, and 45.84 percent. In case of storage of paddy in silos, it was 43.55%, and 47.83%. This is followed by sub-activities on rice stocking of consumable materials such as sacks, sack

sewing machines, and electricity costs, etc. Inventory activity is the same. Jumbo sacks (500 kg) were 18.70%, and 21.82 percent. In addition, management activities accounted for 16.35, and 20.40 percent. Loss or damage in case of storage by moisture drying plants, it was 1.12%, and 1.86 percent. Storage of rice in Silo warehouses was 0.83,3.63,1.186, and1.55%. Storage of rice and jumbo sacks was 1.42%, and 1.59%. Transportation activity in jumbo sacks was 2.38%, and 2.92 %. Paddy receipt activities were 0.73% and 0.89% respectively.

In case of collecting samples from steel spear:

Summary of capital and logistics activities costs of Thai Hommali rice mill collected samples from steel spear of the pilot survey group and comparison samples of all 5 activities found that space expenditure on inventory activities accounted for the highest proportion. In the case of storage of paddy in warehouses, it was 56.26, and 44.53 %. In the case of storage of paddy in silos, it was 42.82, and 44.96 %. This was followed by sub-activities on rice stocking in consumable materials such as sacks, sack sewing machine, and electricity bill, etc. The inventory activities remained the same. Jumbo sacks (500 kg) were 17.72, and 19.55 %. Management activities were 16.08, and 18.53 %. Transportation activity in jumbo sacks was 2.65, and 4.73 %. Loss or damage activity in case of maintaining quality with dehumidification drying plant
Was 0.80, and 1.74 %. Storage of rice in silos was 0.66, 3.67,3.71, and 1.43%. Storage of rice in jumbo sacks was 1.33, and 1.57 %. Paddy receipt activities were 0.68 % and 0.76 % respectively.

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