

# **SUPPLY CHAIN MANAGEMENT OF COMMUNITY ENTERPRISE MANUFACTURING RICEBERRY IN NAKHON PATHOM PROVINCE**

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## **ABSTRACT**

The objectives of this research are: 1 . to explore the condition of supply chain management in the riceberry Community Enterprise in Nakhon Pathom by the SCOR Model Management Process by integrating with local wisdom and sufficiency economy philosophy.

The research methodology used in this work was qualitative research by analyzing the supply chain management process and the operating conditions of the riceberry community Enterprise group in Nakhon Pathom with local wisdom and sufficiency economy concepts. The In-Depth Interview was used with Riceberry Community Enterprise Group in Nakhon Pathom Province. The samples consisted of 2 groups of 6 persons, including 8 experts in supply chain management and agriculture.

The results of supply chain management guidelines for community enterprise manufacturing riceberry in order to be able to carry out agricultural activities with strength and self-reliance under the basis of local wisdom and applying the sufficiency economy philosophy to life found of factors that contributed to the success of supply chain management of riceberry production as follows: 1) 7s factors, including System, Skill, Staff, Situation, Standard, Satisfaction, and Sustainable 2) 4P factors, including Product, Packaging, Perception, Publicize 3) 1N factor, Network 4) 1M factor, Management. .

**Keywords:** Supply Chain Management, Riceberry Community Enterprise

## **INTRODUCTION**

Rice is a staple food for Thais and people all over the world for a long time. Thailand has an agricultural career that is mainly rice production. Thailand is also one of the most productive countries in the world. For the situation of Thai rice production, the Department of Agricultural Extension, Royal Irrigation Department, Office of Agricultural Economics, Rice Department GISTDA (2017) forecasts that growing rice in 2016/2017 is expected to have about 23.32 million tons of paddy production, which is the most jasmine rice yield 9.94 million tons or 42.61 percent of the predicted yield according to the planting area, followed by 7.05 million tons of rice production, 30.24 percent, 5.29 million tons of sticky rice, 22.69 percent, 1.01 million tons of Pathumthani fragrant rice, 4.35 percent and 0.02 million tons of other rice, 0.10 percent. In summary, it can be seen that the rice production in the rice growing area is more than the rice production expected in the target area for promoting rice cultivation of 2016/2017, round1 (22.89 million tons), about 0.43 million tons, equivalent to 1.88 percent of projected rice yield in the target area. [1].

Riceberry, dark purple rice, is the emerging rice arisen from cross-breeding between fragrant rice and Khao Dawk Mali 105. The dark purple color that is found in riceberry occurs naturally. It is composed of anthocyanin which is the chromatic object or color substance that can dissolve well and is classified as a group of highly efficient flavonoids or antioxidants. In addition, riceberry has long slender seeds, shiny skin with a unique aroma. It also has a sweet and attractive taste. It can be grown throughout the year. Its harvesting age is about 130 days. Furthermore, rice bran and rice bran oil from riceberry has good antioxidant properties used to make nutritional treatment product by medical profession.

**Figure 1**  
Benefits of Rice berry



With the agricultural development plan of Thailand, it is operated under the Committee on Agricultural Development and Cooperative Policy and Planning, which is in accordance with the provisions of the Agricultural Economics Act, BE 2522 (1979). The agricultural development plan will be specified to be consistent with the 12th National Economic and Social Development Plan (2017-2021), consisting of 4 strategies 1. Strengthen farmers and farmers' institutions 2. Increase the efficiency of agricultural product management throughout the supply chain 3. Increase the competitiveness of the agricultural sector with technology and innovation and 4. Management of agricultural and environmental resources with balance and Sustainable From the said agricultural development plan, the agricultural sector must adjust and strengthen the farmers' network and related agencies to keep up with the changing technology. For Thailand, the agricultural sector plays an important role in the country's economic system. Due to the large number of people involved in the production of food for the world, food security is a base for industrial and service sectors to generate income for the country as well as a way of life, wisdom and culture. For a long time Sustainable agricultural development is considered the heart of the country's economic and social development.

Nakhon Pathom province is another important source of rice production in the central region. There are 362,620 rai of rice growing area, or about 43 percent of the total agricultural area. Due to having complete basic production factors, farming can be done all year round. For these reasons, farmers use production factors, such as chemical fertilizers and various chemicals in rice fields, inefficiently and do not comply with government instructions and do not take into account costs. Using appropriate fertilizer technology can increase productivity which helps increase the rice production value of Nakhon Pathom Province.

The current economic and climate changes affect overall development, as the government's agricultural development plan is supported by the creation of immunizations in various dimensions covering all aspects of agriculture, including quality of farmer life development, production capacity development, agricultural product management and food stability, and agricultural resource development with efficiency and sustainability. In addition, the government defined the process of driving the agricultural development plan into practice by giving importance to linking local areas and communities with a more clear understanding of agricultural development strategies that are in line with the context of local areas and communities by using the concept and direction of national development to sustainability in accordance with the sufficiency economy philosophy following the development plan Agricultural development during the 10th Development Plan (2007 - 2011). Farmers must manage from upstream, midstream and downstream with 5 management processes including planning, procurement of raw materials, production, delivery, and return. This called a supply chain. The work of each process can add value and reduce costs under the offering of good quality products to consumers. The group of riceberry producers must have strength within the producer group to create a bargaining power and

network of rice farmer groups by integrating with knowledge of local wisdom and sufficiency economy philosophy. [2].

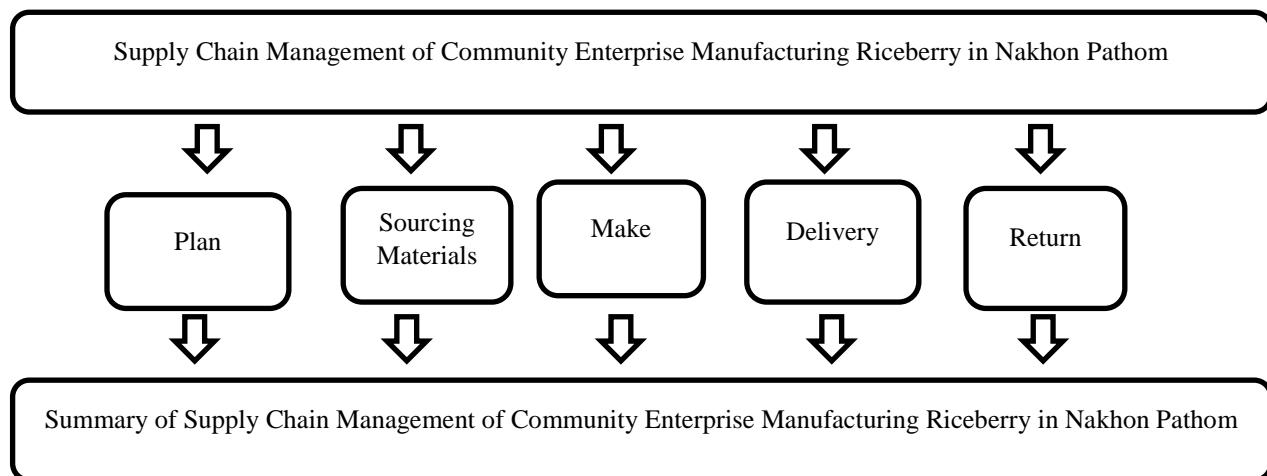
### OBJECTIVE

To explore the condition of the supply chain management of the community enterprise manufacturing riceberry in Nakhon Pathom province by considering on the SCOR model management process

#### *Conceptual Framework*

In conducting research, the researchers performed a qualitative research method that studies concepts and theories related to life style and local wisdom. The researchers selected the purposive sampling and conducted an in-depth interview to gather information from conversations with the informants on specific issues, including direct in-depth interviews to see factors that affect supply chain management from upstream to downstream, as well as the exchange of knowledge to analyze factors affecting supply chain management by defining questions in line with the questionnaire or questioning to find unclear answers to get new assumptions to use to evaluate the factors that affect the supply chain management services according to the following conceptual framework.

**Figure 2**  
**Conceptual Framework**



### METHODOLOGY

Qualitative research on supply chain management of the community enterprise manufacturing riceberry in Nakhon Pathom province has the objectives as follows: 1. To explore the condition of supply chain management of the community enterprise manufacturing riceberry in Nakhon Pathom province by considering on the SCOR model management process 2. To study the relationship of the supply chain management process with local wisdom in the successful community enterprise manufacturing riceberry in Nakhon Pathom province 3. To propose guidelines for supply chain management of the community enterprise manufacturing riceberry in Nakhon Pathom province by integrating with local wisdom and sufficiency economy philosophy.

#### *Main informants in the research*

The researchers used qualitative research methodology by surveying and observing the surroundings and the supply chain management process, including analyzing relevant documents and interviewing the persons related to the community enterprise manufacturing riceberry in Nakhon Pathom province. The researchers have verified the completeness of the data with Triangulation (Mathers, Fox and Hunn, 1998; Denzin and Lincoln, 2005; Yeasmin and Rahman, 2012) by selecting Maximal Variation Sampling (Buaphan, 2011). Then, the researchers have discussed the results and made the recommendations. The the following research procedures have been specified.

For the scope of the content, step 1 was a survey of the conditions and problems of supply chain management in the community enterprise manufacturing riceberry in Nakhon Pathom In accordance with the concept of SCOR model, comprising (1) planning (2) procurement (3) production and warehouse management

(4) product delivery and (5) product return. Target groups were group chair, group vice president, and members of 2 community enterprises manufacturing riceberry for sale in Nakhon Pathom province. These farmers were knowledgeable in riceberry production.

#### **Data Collection**

The tools for collecting data are in-depth interview form for interviewing 2 prototype community enterprises manufacturing riceberry. The questions used in the interview will be based on the SCOR Model approach, which is a tool to measure the results of the supply chain management procedure consisting of 5 management processes, namely planning, procurement and transportation, production and warehouse management, delivery of products to customers, and returning products from customers. The researchers has tested the suitability and quality of the questions with the consideration by experts in order to obtain the comprehensive interview questions, complete content, correct structure, and appropriate language for informants to make the results accurate and reliable (Charoenkitkajorn, 2012; Chantawanich, 2014) [4].

## **RESULTS AND DISCUSSION**

From the analysis of the supply chain management of the community enterprise manufacturing riceberry in Nakhon Pathom with the SCOR Model, it found that the process used in the production of rice berry has related management processes from upstream (producer) to downstream (customers). There was the coordination between internal and external departments. It was the integrated process of planning, procurement, production, delivery and return to create the flow of goods, work flow, and related information to reduce costs to the minimum. It also formed maximum customer satisfaction and sustainable competitive advantage (Supply-Chain Council. Inc., 2003, Pittsburgh, U.S.A.,) [5]. When considering the working process of the Riceberry manufacturer group, there was the members' coordination in planning and procurement of production factors, including bringing that production factor into the production procedure, processing, delivery to customers, and returning products from customers. It is a collaboration of all parties involved to ensure smooth operation. This conformed to Sungkorn, (2017), the study of spices supply chain of community enterprise in Surat Thani province. The objective was to study the supply chain of spices of community enterprises in Surat Thani province, consisting of inputs in the production process, cost and return, and the way of curry market. The results found that occupational groups were primarily planned for work based on consumer needs. Then, they planned to order raw materials and prepare production. Raw materials used in production were purchased from the community first. If not enough, then they selected to buy from the wholesale market in the city. As for the production cost, it found that the curry machine has the highest cost followed by green curry paste, and roasted curry in order. For curry pricing, community enterprises set the same price for all types of curry paste. It was sold at a retail price of 120 baht per kilogram and sold at wholesale price of 100 baht per kilogram. As for the way of curry market, it found that 90 percent of community enterprises were retail sales. The group members sold the products at the community market, including market fairs, municipal markets, schools, hotels, and trade shows. As for the distribution, there were middlemen receiving the products to sell at market fairs. In addition, the results of this research [6]. were consistent with the work of Chanthanaroj, (2009), the study of the application of Supply Chain Operation Reference (SCOR) models for performance evaluation of plastic recycles manufacturing: case study of plastic recycles manufacturing. This case study has applied the SCOR Model to analyze and improve the supply chain management procedure of the case study of plastic recycles manufacturing. [7].

The summary of the data analysis from the interview is as follows.

1. After analyzing the conditions and problems of the supply chain management of the community enterprise manufacturing riceberry in Nakhon Pathom by considering the SCOR model management process, it is found that there was a linkage of the work procedures related to rice production from the upstream to downstream. Rice Manufacturers (upstream) must plan to procure inputs from both internal and external agencies to import into the production procedure and sent to privatize to the community mill (midstream) and finally to deliver to the customers (downstream). It revealed that every procedure is planned and linked from upstream to downstream. When using the data to summarize the condition of the supply chain management, it found that the management procedure by using the SCOR model of riceberry growers in Nakhon Pathom have been summarized as shown in Table 1.

**Table 1**  
Shows the summary of supply chain condition analysis using SCOR Model Group 1

Process	Supply Chain Management
	Group 1
1. Plan	- There is a plan to procure production factors such as planting area, soil, water source, seed, biological fertilizer.
2. Sourcing	- There is a source to buy production factors, bio-fertilizer.
3. Make, Warehouse Management, Inventory Management	- There is an organic production process. - Use integrated production tools - Specify the storage area to prepare the packing, place of packing, and the place to store the finished product clearly in the house of group leader - Determine the responsible person in the group to distribute the work suitably
4. Deliver and Distribution	- Deliver the products by the common cars or by combining orders from customers as one-way delivery trip in one route to reduce transportation costs - Deliver by mail or transport company - Customers come to receive the product themselves from the manufacturer group. - sell on consignment in community stores
5. Return	- There is the return of goods in the event that the product is broken or damaged during transportation or before reaching the consumer

**Table 2**  
Shows the summary of supply chain condition analysis using SCOR Model Group 2

Process	Supply Chain Management
	Group 2
1. Plan	- There is a plan to procure production factors such as planting area, soil, water source, seed, biological fertilizer.
2. Sourcing	- There is a source to buy production factors, bio-fertilizer.
3. Make, Warehouse Management, Inventory Management	- There is an organic production process. - Use integrated production tools - Specify the storage area to prepare the packing, place of packing, and the place to store the finished product clearly in the community building - Determine the responsible person in the group to distribute the work suitably
4. Deliver and Distribution	- Deliver the products by the common cars or by combining orders from customers as one-way delivery trip in one route to reduce transportation costs - Deliver by mail or transport company - Customers come to receive the product themselves from the manufacturer group. - sell in community stores - sell on consignment in stores in Nakhon Pathom Province
5. Return	- There is the return of goods in the event that the product is broken or damaged during transportation or before reaching the consumer

**Table 3**  
Shows the summary of supply chain condition analysis using SCOR Model

Process	Supply Chain Management	
	Group 1	Group 2
1. Plan	- There is a plan to procure production factors such as planting area, soil, water source, seed, biological fertilizer.	- There is a plan to procure production factors such as planting area, soil, water source, seed, biological fertilizer.
2. Sourcing	- There is a source to buy production factors, bio-fertilizer.	- There is a source to buy production factors, bio-fertilizer.
3. Make, Warehouse Management, Inventory Management	<ul style="list-style-type: none"> <li>- There is an organic production process.</li> <li>- Use integrated production tools</li> <li>- Specify the storage area to prepare the packing, place of packing, and the place to store the finished product clearly in the house of group leader</li> <li>- Determine the responsible person in the group to distribute the work suitably</li> </ul>	<ul style="list-style-type: none"> <li>- There is an organic production process.</li> <li>- Use integrated production tools</li> <li>- Specify the storage area to prepare the packing, place of packing, and the place to store the finished product clearly in the community building</li> <li>- Determine the responsible person in the group to distribute the work suitably</li> </ul>
4. Deliver and Distribution	<ul style="list-style-type: none"> <li>- Deliver the products by the common cars or by combining orders from customers as one-way delivery trip in one route to reduce transportation costs</li> <li>- Deliver by mail or transport company</li> <li>- Customers come to receive the product themselves from the manufacturer group.</li> <li>- sell on consignment in community stores</li> </ul>	<ul style="list-style-type: none"> <li>- Deliver the products by the common cars or by combining orders from customers as one-way delivery trip in one route to reduce transportation costs</li> <li>- Deliver by mail or transport company</li> <li>- Customers come to receive the product themselves from the manufacturer group.</li> <li>- sell in community stores</li> <li>- sell on consignment in stores in Nakhon Pathom Province</li> </ul>
5. Return	- There is the return of goods in the event that the product is broken or damaged during transportation or before reaching the consumer	- There is the return of goods in the event that the product is broken or damaged during transportation or before reaching the consumer

### CONCLUSION AND FUTURE WORK

For the management, in addition to assistance from government policies, riceberry manufacturers must also have good management with pre-planned work. There are personnel structures within the appropriate group. There are assignments that can be put into action. There is a check and control of the work according to the plan. When there is a good management within the group, the supply chain management of riceberry production must be developed. It includes planning to preparation of production factors, production process, and harvesting. Every step of the production must be done with an organic system to create credibility for consumers in safety. Therefore, the development of riceberry production must be focused on good manufacturing systems, storage, processing method, distribution channels, and delivering products to customers efficiently. At the same time, farmers must develop knowledge and skills in organic farming, using modern production techniques, efficient delivery planning, collaborating with members within the group, and expanding cooperation to networks related to riceberry manufacturers. This aims to support each other in the production factors, production procedure, sharing knowledge in cultivation, processing, harvesting, packaging including the delivery, sufficient products sold to meet the needs of consumers, and distribution channels which corresponds to the Irawat Chomraka (2008) work, the research on the network management for the self-reliant community of the textile product group in the upper northern region of Thailand, which found new knowledge for network management. It initiated that the success factors of the network management model were managerial

knowledge, teamwork, collective consciousness, and accepting technology and links with relevant organizations. [10]. Organic riceberry will be no chemical contamination in production factors, production process, harvesting, processing which is safe for the health of manufacturers and customers. Riceberry manufacturers, therefore, had to find a way to present the advantages of riceberry which are different from the rice sold in general in quality differences, benefits from consumption, and safety by creating a brand for customer recognition. Public relations in terms of information on the riceberry production onto the label on the packaging were required. Riceberry manufacturers must communicate the way of life, culture, traditions, local wisdom in packaging design to make a difference and create a beauty, unique, and easiness to remember. When the customer recognizes the brand, the customer will come back to buy again. These components can create value added products.

For Customer Experience, making riceberry attractive requires the presentation on Thai rice history, discovery of riceberry, stories of Thai rice harvesting tradition, and others legends to the consumers. These can be presented via public relations channels on social media such as, Facebook, Line, Page, Various journals for the recognition of customers about the history, traditions, culture of eating rice from past to present. One of the philosophers in the Focus Group mentioned that, "How to make Thai people appreciate the value of rice consumption, know the history, and create stories and legends for eating rice as a culture". When customers consume the nontoxic riceberry, providing long-term health benefits, it will create customer satisfaction. This good experience will create customer satisfaction and repeat-buying behavior. It may help promote products to new customers. It is beneficial to the manufacturers that they will have the existing customer base that is loyal to the products. Those existing customers also help to find new customers for the manufacturers in another way without losing the cost. As a result, manufacturers can generate sales and revenues continuously and create wealth and sustainability eventually.

### ***Recommendations***

#### ***Recommendations for Management Level***

The results showed that the group of riceberry farmers received assistance from government agencies in production factors in each production period. Sub-departments have been set up to supervise and educate riceberry manufacturers and support some agricultural tools. Few farmers, however, obtained theses supports so that they procured the agricultural tools themselves by joint venture. In addition, a group of riceberry manufacturers want the government to help promote and support marketing in order to increase distribution channels. Therefore, government agencies should coordinate cooperation from many sectors in order to help and develop community enterprise manufacturing riceberry seriously and continuously. The government should be a link among the networks within the community and expand the network at the provincial and regional levels to allow farmers to have a network to help each other. The government sector should coordinate, promote, and support to strengthen the riceberry manufacturers so that they can be self-reliant, stable and sustainable.

#### ***Recommendations for Practitioner Level***

Riceberry manufacturing group must develop the supply chain management when there are orders from customers by systematic planning in terms of the process in sourcing, make, delivery, and return to generate continuity and system by creating a similar network of riceberry manufacturing groups as well to support production factors, transfer knowledge in the production of quality riceberry, and help each other in marketing in order to have enough products to meet customer needs. In addition, rice manufacturers can determine the selling price fairly under the confidence and trust of customers towards agricultural products, riceberry by applying the organic production process in every step, using sincerity to deliver the value of the product, and maintaining the quality with production standards

Packaging for riceberry products is an important element that will describe the value and benefits of riceberry consumption to customers. Riceberry manufacturers, therefore, should pay attention and add important information on the packaging so that customers can recognize and see the value of riceberry consumption that is good for long-term health. This creates value added for riceberry products and also generates an impulse in customers' making decision to buy riceberry products.

Riceberry manufacturer should look for markets and distribution channels for more diverse products. Various social media should be used, such as Facebook, Line, and Page. Another technique is to create a membership system for customers in order to repeat the purchase by giving special privileges on various occasions. Furthermore, there should be periodic promotions to stimulate sales or collaborating with the network to exhibit in important events organized by government agencies

#### ***Recommendations for Further Study***

For research on supply chain management of community enterprise manufacturing riceberry in Nakhon Pathom province, Thailand, the researchers were aware of the conditions and problems of supply chain management of riceberry manufacturers and studied the relationship of applying wisdom to the concept of

sufficiency economy. There are other issues that should be studied as shown in the work of Aunyawong et al. (2018) that depicted the effect of supply chain integration and logistics flexibility on supply chain performance. In addition, the researchers are interested in developing the research by studying other types of riceberry agricultural products and adding the samples to cover other areas of Thailand to study the feasibility of each process in order to create knowledge and benefits for those involved in the development of Riceberry agriculture. [11].

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#### **REFERENCES**

- [1] Department of Agricultural Extension, Royal Irrigation Department, Office of Agricultural Economics, Rice Department GISTDA. (2017).
- [2] Office of the Economic and Social Development Board (2007). Application of sufficiency economy principles.
- [3] Choprva, sunil, and Peter Meindl, 2001, “Supply Chain Management : Strategy,Planning and Operations”, Upper Saddle River,NJ:Prentice-Hall,Inc
- [4] Supang Chantavanich. (2014). Qualitative Research Method. 22<sup>th</sup> edition : Chulalongkorn University Press. Bangkok. Thailand.
- [5] Ahumada, O., & Villalobos, J. R. (2009). Application of planning models in the agri-food supply chain: A review. European journal of Operational research, 196(1), 1-20.
- [6] Techadham Sungkorn. (2017). Curry Paste Supply Chain of Community Enterprise in Surat Thani Province. RMUTT Global Business and Economics Review.
- [7] Chantaroj, S. (2009). The application of Supply Chain Operation Reference (SCOR) models for performance evaluation of plastic recycles manufacturing: case study of plastic recycles manufacturing.University of Thai Chamber of Commerce.
- [8] Ugoon Somkanae. (1992). Problems of implementation of popular wisdom in curriculum development in elementary schools under the jurisdiction of the Office of the Ubon Ratchatani Provincial Primary Education. A Thesis Submitted in Partial Fulfillment of the Requirements for the degree of Master of Education, Department of Educational Administration, Graduate School, *Chulalongkorn University*. Thailand
- [9] Boonla, T. (2008). Logistics and Supply Chain Management Seminar Guide Manual .Bangkok: Mister Copy (Thailand) Co., Ltd.
- [10] Irawat Chomraka. (2008) Management Network among Sustainable Self – Reliance Community Enterprises Textile Producers in the Northern Region of Thailand. Journal of Community Development Research (Humanities and Social Sciences), [S.I.], v. 1, n. 2, p. 55-78
- [11] Aunyawong, W., Wararatchai, P., & Hotrawaisaya, C. (2018). The Mediating Role of Trust among Supply Chain Partners on Supply Chain Integration, Cultural Intelligence, Logistics Flexibility and Supply Chain Performance. Science International Journal. Vol 30 No.4, pp. 629-633