

Management of Market Demand for Agricultural Products of Local Farmer with Agricultural Product Management Mechanisms of the Lower Central Region to the Network Marketing System, Rajamangala University of Technology Rattanakosin

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Abstract

The objectives of this research were 1) to study the context of the agricultural products in the South Central Thailand region and purchase demands of consumers toward the agricultural products of the communities affected by the Covid-19 pandemic, and 2) to develop the marketing activities of the agricultural products affected by the COVID-19 pandemic to enhance the potential purchase demands of the communities' agricultural products through the fair management system of the university to sustainably add the economic values to the products of the communities. The research employed a mixed method instrument (qualitative and quantitative research). The findings were demonstrated as demand of raw materials were vacuum-sealed riceberry rice and fresh mango. The riceberry rice had to be chemical-free and dehydrated directly supplied by the rice-planting farmers or community enterprises, and the mango had to be chemical-free or organic. The consignment entrepreneurs wanted to purchase the agricultural products of community enterprises and OTOP products. Some entrepreneurs did not specify the product standard to offer the sales opportunity to the farmers. However, some entrepreneurs, especially the entrepreneurs with the shops in shopping malls, required the healthy agricultural products certified under the quality standards and packed in good-quality and attractive packaging. The highest factor affecting consumers' purchase decision of riceberry rice and mango was sales promotion, followed by the distribution place and product price. However, the product itself did not affect the consumers' purchase decision. The results of the study on the purchase demands and the context of agricultural products in the South Central Thailand region were applied to plan the development of the consumers' purchase demands toward the agricultural products of the communities. The guideline of the trade agreement between the interested farmers, the university and members in the network was established and implemented under the concrete support of the university. The operations were carried out in three forms: business to business; consignment; and online selling. After the test of these distribution channels under the university's mechanism, it was found that the sale volume increased as it significantly promoted the distribution of agricultural products during the Covid-19 pandemic. However, based on the analysis of the purchase demands of the entrepreneurs and the consumers' opinions, it was suggested that the packaging should be developed to suit the transport conditions and impress the buyers. The manufacturing standard should be highly concerned- free from contamination, registering with Thailand's FDA and complying with other standards to promote the consignment.

Keywords: Demand for Agricultural Products, Economic Value, Lower Central Province Area, Impact of Covid-19

Introduction

The Covid-19 epidemic situation has a direct impact on Thai rice production in the first quarter, which is about 3 million tons of domestic residues with total of 2,885,536 tons, valued at 61,477.3 million baht which decreases of 33.78% in export volume compared to the same month in 2019 with 4,357,553 tons of exports worth 72,224.7 million baht (Thai Rice Exporters Association, 2020), resulting in a clear loss of commercial opportunities. Entrepreneurs need to look at sales channels in the country more. Due to the Covid-19 epidemic situation, people are more conscious about their health, especially the selection of food to eat. So it's an opportunity for riceberry which is a rice that has the taste of deliciousness according to the Thai way of choice for good health. In this case, marketing to increase distribution channels to deliver quality riceberry to consumers will help Thai farmers in another way to reduce the loss of trade opportunities.

However, the aforementioned of Covid-19 epidemic situation has resulted in a reduction in consumption (Demand-Side Effect). In addition, lockdowns have been found to increase income inequality. In fact, there are certain types of businesses and products that reverse social distancing growth rates with greater awareness of occupational health known as "New normal" to make commerce keep up with the changing needs and behaviors of consumers. The impact of Covid-19 on agricultural and economic demand are: 1) food demand is generally inelastic and has a limited overall effect on consumption; 2) it is possible where meat consumption is greatly reduced; 3) Fear of infection behavior may have a severe impact on food consumption through reduction of food market visits; and 4) Change in shopping is expected- decreased restaurant traffic, increased e-commerce deliveries, and increased consumption at home (Office of the National Economic and Social Development Council, 2020). Consequently, the researchers realized an opportunity to manage the demand for agricultural products among the basic farmers with the agricultural product management mechanism in the lower central provinces to the network market system of Rajamangala University of Technology Rattanakosin from agricultural products and processed agricultural products. The goal is to help farmers in the foundation community in terms of production of agricultural products during the Covid-19 situation by using the product management mechanism that has been managed by the university.

Research Objectives

1) To study the context of agricultural products in the lower central region and patterns of consumer demand for agricultural products of communities affected by the Covid-19 epidemic situation; and

2) To develop marketing activities of agricultural products affected by the Covid-19 epidemic situation to develop the potential of community demand for agricultural products through the management system of the government.

Research Methodology

Research Design

Phrase 1: An in-depth interview study of basic information on community resources in the field of cultural human capital, environment and economy, products, consumer groups, routes and transport methods from target groups

Phrase 2: Research and Development by using data from Phrase 1 to assess the feasibility, potential and suitability of developing a research framework to truly meet the needs of consumers. The research questions must be consistent with the community context, the integration of the whole system, planning and management of all activities related to procurement, procurement, transformation, coordination and collaboration with suppliers, intermediary raw material delivery, logistics service providers and customers which including both internal and external factors.

Population and samples

Group 1 Producer Group

Agricultural products affected by the Covid-19 epidemic situation were surveyed based on evidence that mango and rice had residual production in the country due to the inability to export. The research team, therefore, coordinated with the Farmers Council in the lower central region of 6 provinces, namely Prachuap Khiri Khan province, Phetchaburi province, Ratchaburi Nakhon Pathom province, Samut Songkhram province and Samut Sakhon province to compile a list of 21 enterprise groups that were affected. Then, purposive sampling was employed as they were negatively affected by the Covid-19 situation and were still running their business activities.

Group 2 Entrepreneurs Group

Purposive Samplings were compiled to four export operators, consignment operators, shops selling community products and health products.

Group 3 Consumers

Because the consumer group is a large population and the exact number is unknown. Therefore, the sample group was determined from the formula of unknown sample size of Cochran with 95 percent confidence value and 5% error level (Likert, 1967).

Research Instruments

A structured interview form for an in-depth interview with key informant groups was created in order to explore the characteristics of the demand for buying and selling of agricultural products to develop marketing activities correctly and to reduce the problem of agricultural residues in the area.

Quantitative research method was created by using electronic questionnaire data collection (Online Questionnaire) to analyze factors from the five components and the purchase decision of 35 questions using Likert Scale measurement of scoring criteria to be 1 – 5 points as follows:

5 points means consumer opinion was at the highest level.

4 points mean consumer opinion was at a high level.

3 points mean consumer opinion was at a moderate level.

2 points mean consumer opinion was at a low level.

1 point means consumer opinion was at the lowest level.

Data analysis

1) Qualitative Data Analysis. Data was interpreted and analyzed to answer research questions and to achieve research objectives by categorizing the data according to the issues studied. The interpretation was derived from the information in the interview and observation.

2) Quantitative Data Analysis. Consumers of Mango and Riceberry Products

2.1) Validating data from questionnaires and the integrity of the data to be processed.

2.2) Describing the demographic characteristics of gender, age, education level, occupation, average monthly income and purchasing behavior of mango and riceberry products. The results were summarized in the analysis of frequency distribution, percentage, and average.

2.3) Describing the population and summarizing the results by using a statistical package program which was One-way ANOVA and F-test.

2.4) Conducting an analysis of consumer opinions on mango and riceberry products with a linear regression model.

Results

Table 1: The context and model of agricultural product sales demand leading to the development of a concrete selling model of agricultural products

Group name	Yearly output	Product difference	Selling price before Covid-19	Selling price during Covid-19	Current sales channel	Distribution proportion	Product advertising format
1. Bang Phae Mango Producer Community Enterprise	2,345 tons	1. The area of Bang Phae District has good water and ventilation conditions causing no soot	120	120	Top Super Market	Selling fresh fruit to a wholesaler for product distribution (50% domestic)	Website and Facebook

		to stick to the mango surface which is different from other places where the mango skin is not very beautiful. 2. There is the most modern mango curing room.				sales and 50% export)	
2. Mango Farmers Group, Ban Phaeo District	200 tons		17	10	Agricultural Cooperatives	Selling fresh fruit to a wholesaler for 100% export to Malaysia	
3. A group of farmers who grow Sam Roi Yot mangoes	32 tons	The area is shale causing the mango pulp to be less watery when transporting.	110	85		Sell fresh fruit to a wholesaler for 100% export	
4. AoNoi off-season mango producer community enterprise	350 tons		90	40	Facebook, Line	Selling fresh fruit in the country for 10% and selling fresh fruit to a wholesaler 90% for export	Facebook
5. Organic Mango Community Enterprise, Nong Ta Taem Subdistrict	10 tons		80	40		Sell fresh fruit to a wholesaler for 100% export	
6. Fresh Fruit and Processed Agricultural Products Group, Ban Don Thong	Currently, there are no currently products sent for processing				King Power, Lemon Farm	10% processed and sold/ 90% consignment	
7. Community Enterprise, Sufficiency Agriculture Group, Don Kha Sub-District	200 tons		40	15	Sold by the shops	Selling fresh produce in the country for 50% and Selling fresh fruit to a wholesaler for 50% export	Storefront
8. Nong Kob Rice Farmers Group	40 tons		60	60			

9. Community Enterprise, Tambon Rai Makham Community Rice Center	5 tons		60	60	Sold in front of the community and in front of the BAAC, Ban Lat branch	100% domestic vacuum packs	
10. Organic rice community enterprise	60 tons	organic rice	80	60		Selling paddy to mills in Phetchaburi province for 50%	
11. Wat Pradu Sufficiency Community Enterprise	375 tons	the area causes the sticky rice softer and more delicious than other places	55	55	Sold at the center and in front of Samut Songkhram City Hall	The vacuum pack is sold in the country for 100%.	
12. Community Enterprise, Rice Mill Community Group TambonPhraek Nam Daeng	1,000 tons	The area is brackish soil caused a better taste, fragrant and softer than others	50	50	Contact the community	The vacuum pack is sold in the country for 100%	Provincial official Facebook
13. Community enterprise, large rice field group, bamboo elephant ear rice	30 tons	safe agriculture	50	50	Sold in front of the center	The vacuum pack is sold in the country for 100%	Trade show with the provincial office.
14. Ban Khlong Lam Phaya Group	0.8-0.9 tons	120- day rice which is softer than other places, and received 4- star OTOP	60	60	Lam Phaya Floating Market	The vacuum pack is sold in the country for 100%	Facebook

Table 2:Results of collecting data on demand for agricultural products and agricultural product processing entrepreneurs

Group 1 Agricultural Product Processing Entrepreneurs										
Entrepreneurs	Location	Product name	Annual Production	Volume of raw material procurement /month	Quantity/kg.		The highest demand for raw materials	Purchasing Channels	purchasing purpose	Type of the raw materials
					Before Covid-19	After Covid-19				

1. First entrepreneur	6/1 Moo 8, Sa Kruai Subdistrict Nakhon Pathom Province	xport "Riceberry	uncertainty	According to the production and harvesting cycle (120 days per time, about 4 months)	About 100 tons	About 20-30 tons per time	April of every year	Send the team down to see the rice fields every month and buy the product directly from farmers	help farmers	Riceberry Rice
2. Second entrepreneur	No. 1, Village No. 1, HuaiPhra Subdistrict, Don Tum District, Nakhon Pathom Province	Riceberry rice	uncertainty	40 tons per month	100 tons per month	40 tons per month	During festivals or important days such as Mother's Day and National Day	Through a farmer network	help farmers	Riceberry rice's Farmer's Network
3. Third entrepreneur	Kanchana phisek District, Prawet Sub-district, Prawet District, Bangkok Province	Whole wheat bread mixed with grains	About 1 ton	About 1 ton per 2 months	0.5 tons	Trading has been stopped.	May-October	Purchasing Riceberry Flour from the entrepreneur through the manufacturing industry from Phitsanulok Province	Produce whole wheat bread with grains	Riceberry Flour
4. Fourth entrepreneur	199 Moo 7 HuaiKhwang Subdistrict, Kamphaeng Saen District Nakhon Pathom Province	Dried Mango and Frozen Mango	By order	Uncertainty	About 10 tons	8-12 tons per time	February-June ๒๐๒๑	Purchase at the factory. and distribution points	Help farmers with leftover produce from exports	ripe fresh mango, no size limit ไม่จำกัดไซส์

Table 3: Summary of collecting data on demand for agricultural products and agricultural product processing entrepreneurs

Group 1 Agricultural Product Processing Entrepreneurs							
Entrepreneurs	Quality or standards	Buying decision factors	Terms of payment for raw materials	raw material purchase	Supplier's raw material delivery	Price for buying rice from farmers	Estimated purchase price
1. First entrepreneur	Chemical-free and moisture-free riceberry	No certificates from Thai authorities are required except "Moisture Certificate" and a "Certificate of Chemical Free"	Cash	Nakhon Pathom Province	Deliver rice in Big Bag form and have a truck to transport rice to farmers	Pricing is based on the current market price of Thailand.	+,-3%, about 48.50baht per kg or 51.50 baht per kg. .
2. Second entrepreneur	Chemical-free and organic riceberry rice	Buy chemical-free riceberry rice from a farmer group	Cash and transfer via bank system	Nakhon Pathom and nearby provinces	Farmers bring them to the mill.	Pricing is calculated from the market price	- unbranded is 45 baht per kg. - Branded is 48 baht per kg.
3. Third entrepreneur	Riceberry flour produced from a quality factory with a certified standard	Riceberry flour produced from a quality factory with the ISO standard, clean and hygienic in a standardized packaging	0 days of credit	from the manufacturer in Phitsanulok province	send in a big bag	price is negotiable and suitable for the quality of raw materials	Price as agreed with partners
4. Forth entrepreneur	Ripe fresh mango	Low cost products and degraded from export.	Cash	Nationwide from Chiang Rai, Uttaradit, Nakhon Sawan, Suphan Buri, Chaiyaphum, Prachuap Khiri Khan.	Deliver by the gardeners at the factory. and the collecting point	The lowest, the cheapest and the most satisfied price	Price as agreed with partners

Table 4: Result of Demographic variable analysis

	N	Product	Price	Place	Promotion	Decision
1. Gender						
1. Male	116	0.628	0.679	0.719	0.622	0.767
2. Female	284	0.736	0.766	0.710	0.704	0.698
t-test		2.346**	3.228***	0.042	1.831*	1.612
2. Age						
1. Less than 24 years	186	0.698	0.731	0.707	0.699	0.713
2. 24 - 38 years	139	0.717	0.718	0.723	0.687	0.685
3. More than 39 years	75	0.699	0.808	0.706	0.620	0.792
F-test		2.532*	3.536**	0.486	1.316	2.778**
3. Marriage status						
1. Single	324	0.708	0.735	0.712	0.704	0.713
2. Married	67	0.647	0.736	0.677	0.523	0.703
3. Others	9	1.000	1.000	1.000	0.987	1.000
F-test		6.413***	5.807***	6.862***	15.319***	6.341***
4. Educational background						
1. Lower than Bachelor degree	36	0.796	0.764	0.697	0.670	0.736
2. Bachelor degree	327	0.704	0.746	0.705	0.677	0.713
3. Master degree or above	37	0.626	0.675	0.790	0.717	0.741
F-test		2.280	2.951*	2.632*	0.074	0.312
5. Occupation						
1. Students	194	0.704	0.737	0.687	0.694	0.712
2. Government sectors	83	0.789	0.710	0.819	0.677	0.715
3. Private sectors	46	0.496	0.650	0.719	0.459	0.709
4. Own business	77	0.739	0.838	0.658	0.779	0.740
F-test		7.923***	5.157***	7.287***	6.455***	0.567
6. Monthly income						
1. Less than 15,000 Baht	231	0.706	0.732	0.693	0.653	0.677
2. 15,001 – 30,000 Baht	109	0.764	0.783	0.764	0.806	0.786
3. More than 30,000 Baht	60	0.593	0.697	0.695	0.554	0.751
F-test		2.184*	1.917	2.120*	12.722***	dd4.135***
7. Family members (including you)						
1.1 - 2	51	0.773	0.732	0.657	0.553	0.612
2. 3 - 5	285	0.677	0.729	0.725	0.676	0.712
3. More than 5	64	0.772	0.801	0.700	0.801	0.828
F-test		4.034**	2.177	1.064	10.923***	8.524***

8. Accommodation						
1. House	289	0.735	0.750	0.725	0.711	0.721
2. Apartment	55	0.648	0.737	0.652	0.646	0.671
3. Others	56	0.602	0.700	0.709	0.554	0.744
F-test		4.031***	0.691	4.008***	3.358***	1.730
9. Frequency of mango purchasing						
0. Never	35	0.699	0.743	0.649	0.675	0.730
1. 1-2 tunes per month	235	0.700	0.726	0.670	0.643	0.691
2. 3-4 tunes per month	88	0.765	0.800	0.842	0.795	0.779
3. More than5 tunes per	42	0.617	0.693	0.712	0.636	0.714
F-test		2.739**	1.799	10.048***	3.933***	1.653
10. Frequency of riceberry rice purchasing						
0. Never	125	0.720	0.744	0.669	0.679	0.695
1. 1-2 times per year	163	0.653	0.696	0.669	0.610	0.671
2. 3-4 times per year	69	0.737	0.787	0.790	0.808	0.825
3. More than5 times per	43	0.805	0.829	0.880	0.743	0.786
F-test		4.341***	3.313***	8.080***	4.138***	5.088***
11. Average expense of mango purchasing						
1. Less than100 Baht	176	0.599	0.655	0.669	0.602	0.672
2. 101-300 Baht	160	0.832	0.842	0.753	0.780	0.793
3. More than 300 Bath	64	0.679	0.724	0.732	0.644	0.655
F-test		17.514***	16.356***	3.087**	8.363***	7.971***
12. Average expense of riceberry rice purchasing						
1. Less than100 Baht	130	0.587	0.669	0.653	0.609	0.674
2. 101-300 Baht	159	0.752	0.757	0.727	0.719	0.754
3. 301-500 Baht	76	0.796	0.820	0.754	0.674	0.655
4. More than 500 Baht	35	0.729	0.764	0.777	0.783	0.852
F-test		11.883***	6.720***	4.501***	1.658	6.949***
13. Purchasing channels						
1. Fresh market	203	0.699	0.718	0.686	0.668	0.663
2. Supermarket	119	0.682	0.750	0.711	0.657	0.784
3. Others	78	0.754	0.785	0.785	0.747	0.725
F-test		2.348*	1.687	2.079*	1.900	4.647***
14. Online purchasing channels						
1. Line	21	0.794	0.926	0.606	0.94	0.90
2. Facebook	210	0.678	0.699	0.694	0.593	0.678
3. Store application	54	0.827	0.849	0.837	0.817	0.789
4. E-market	46	0.712	0.734	0.709	0.707	0.750
5. Others	69	0.554	0.610	0.534	0.563	0.551
F-test		3.891***	6.570***	4.652***	15.360***	5.681*** 55.5.681***
15. Payment methods						
1. Cash	341	0.690	0.730	0.690	0.657	0.699
2. Credit card	21	0.801	0.918	0.896	0.976	0.971
3. Others	38	0.782	0.740	0.816	0.725	0.746
F-test		7.001***	7.355***	9.853***	6.774***	

16. Payment methods of agriculture products						
1. Mobile banking	226	0.721	0.753	0.745	0.693	0.752
2. Credit card	39	0.687	0.808	0.763	0.791	0.803
3. Cash on delivery	99	0.683	0.703	0.640	0.624	0.629
4. Others	36	0.678	0.698	0.652	0.629	0.655
F-test		2.649**	2.905**	3.244***	3.742***	

Table 5:Result of linear regression analysis

Factor	Price	Place	Promotion	Decision Making
Product	0.5592***	0.2684***	0.0890	0.0384
Price		0.2283***	0.4217***	0.1377**
Place			0.3168***	0.2668***
Promotion				0.3947***
Constant	0.1389***	0.1597***	0.0872**	0.1163***
N	400	400	400	400
rss	5.7070	11.8500	13.3252	9.7147
F	271.39***	103.66***	99.40***	109.45***
r2	0.6899	0.4594	0.4490	0.5454
r2_a	0.6873	0.4549	0.4444	0.5404

* $p < .1$, ** $p < .05$, *** $p < .01$

Table 6:Result of Online distribution of agricultural products and related conditions

Group 3 Selling agricultural products online										
distribu tion channel	Product sales target	numb er of chann els	Channel name	Product		Adverti sing frequ ency	Sale volume	produ ct standa rds	transport ation or expenses incurred	Estima ted purch ase price
				Ricebe rry rice	Man go					
1. Mango & Rice page	a distribu tion channel for the newly create research project	1	mango& rice	/	/	Update every day	Uncerta inty	a produc t of the researc h project	actual shipping cost	Ricebe rry rice price is 69 baht per kg. and Nam Dok Mai mango is 350 baht per box
2. ROM page	A distribu ti	1	ROM : Rattanak	/	/	3 times per	Uncerta inty	a produc t	The sale of goods	Ricebe rry rice

	on channel for products of the research project with an agreement with Rattanakosin University		osin Online Market			week		t of the research project	will be deducted from the 35% processing fee.	price is 89 baht per kg. and Nam Dok Mai mango is 350 baht per box
3. Page UTK	a distribution channel for research project under an MOU with the Rattanakosin University, Bangkok Campus	1	UTK	/	/	3 times per week	Uncertainty	a product of the research project	The sale of goods will be deducted from the 35% processing fee.	Riceberry rice price is 89 baht per kg. and Nam Dok Mai mango is 350 baht per box

Conclusion and Discussion

The study was summarized as follows:

Entrepreneurs were central in the coordination between farmers and export sellers. It served to consider farmers and production processes in order to inspect the quality of rice and check the chemicals before purchasing that rice. The real purpose came from helping the farmers who had no power in the market. Characteristics of raw materials to be purchased were riceberry rice. The vacuum packs were focused on exporting and selling through long, quality standards of raw materials. Chemical-free and moisture-free riceberry rice were considered in the purchase decision. Consumers of agricultural products online commented on the factors that most affecting the purchasing decision which was promotion, followed by place and price, whilst the product itself did not affect the purchase decision of the consumer.

Consignment targets were divided into 3 groups, namely consignment via UTK Shop and "Mini Big C" of the RMU, and shops of RattanakosinRattanakosin. However, UTK Shop and "Mini Big C" of RMUTT, Bangkok were still in the process of renovation. Rattanakosin

University found that mango was a product that could be preserved in a short time with the conditions for consignment of goods.

Development of marketing activities of agricultural products affected by the Covid-19 epidemic situation towards developing the potential of community demand for agricultural products through the university's management system was to increase the value of the agricultural products to Business, Consignment and Online sales.

The findings are consistent with Butsopha (2019) who states that the factors of price, perception, safety, health and environment are significant in terms of product quality, attitude, trust affecting purchasing behavior of agricultural products through online networks by using a linear behavioral measurement technique of multiple groups of consumers. This is in accordance with Boonyanusonthi and Donkhua(2017) who highlight that consumers aged 60 years and over had a greater desire to purchase organic rice grains for healthy consumption than consumers aged 40-44 years. Moreover, consumers aged 60 years and over have a higher demand for organic rice grains for quality food consumption than consumers aged 50-54 and 40-44 years, respectively.

Recommendations

Recommendations to community enterprises or farmer groups

1. The transportation and packing of goods should be improved to be concise and careful in order to reduce the risk of damage before reaching the consumer.
2. Cooperation and business networks should be concerned to create a more comprehensive business.
3. The registration of FDA should be accelerated to meet various related standards.

Policy recommendations

1. There should be a training to pass knowledge to community enterprises or farmer groups in various fields, such as knowledge of business operations, knowledge of online marketing and content creation for online PR.
2. There should be a policy to promote healthy products, such as processed mango and riceberry rice for health to increase the sales of farmers in other channels.

Suggestions for further research

Further research should be done to manage the demand for other agricultural products that face the problem of oversupply during various crisis situations as well as studying the dimensions of agricultural products in other sectors.

Acknowledgements

We would like to thank Rajamangala University of Technology Rattanakosin, Area Development Fund Administration and Management Unit (TAMC) and Office of the National Council for Higher Education, Science, Research and Innovation Policy (NSTDA) for supporting funding source.

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