



## Structure and Conduct of the Purple Rice Market in Northern Thailand

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Received 14 December 2011 Accepted 18 April 2012 (\*: Corresponding Autor)

**Abstract** In recent years, health issues are a major concern for consumers. Northern Thai farmers are seeking alternative crops with high nutritional value and market potential. Recent studies show that purple rice (or Thai black rice) is rich in nutrients, such as gamma-oryzanol and natural antioxidants, and therefore, could be potential crop. The main purpose of this study is to investigate market structure and market conduct of purple rice in northern Thailand. Porter's five forces analysis was used to evaluate the competitiveness and relative attractiveness of growing purple rice. The surveying method was used to study market conduct. The result from the estimated Concentration Ratio indicated that market structure of purple rice differ in all three provinces. It was also found that the five competitive forces influence the collectors the most and the farmers the least. Even though the competitive forces aren't very high, survey data indicates that the purple rice market hasn't been found attractive by farmers, collectors or retailers. This study concludes that despite purple rice being a high-nutrient product, its market is still very small in northern Thailand. However, purple rice as a serious commercial crop is still not that attractive to the farmers.

**Keywords** structure, conduct, purple rice, Northern Thailand

### INTRODUCTION

As good health is a growing issue for consumers, many studies have been focusing on finding nutritious foods that can be used as a sort of alternative medicine. Northern Thai farmers are looking for crops with both high nutritional value and high marketability. Research by Boonsit, Kaladee and Phongpiachan in 2006 shows that purple rice (or Thai black rice) has a mean of 55.58 mg of gamma-oryzanol per 100 g, compared to white rice that has a mean of only 30.67 mg per 100 g. Additionally, purple rice contains big amount of natural antioxidants and its extract's antioxidants can be used as a natural preservative in meat products (Min, Chen & Green, 2009).

Due to these nutritional advantages, demand for purple rice may increase; creating an opportunity for farmers in northern Thailand. However, the factors that influence the farmers' decision-making process need to be understood in order to convince farmers to start growing purple rice instead of white rice. The farmers' decision to adopt a new crop is not solely led by economic factors, but socio-economic and psychological factors as well. Purple rice has been grown in Thailand for quite some time and is perceived as a crop for local consumption which hinders its attractiveness as a commercial crop by farmers.

As it is important to understand the production and market of purple rice, this study's purpose is to investigate the current marketing situation and better understand the market's structure and conduct of this crop in northern Thailand. Porter's five forces analysis was used to evaluate the rel-

ative competitiveness and the attractiveness of growing purple rice. The surveying method was used to study market conduct. Additionally, in order to successfully promote purple rice, this study aims to find the factors that could influence the farmers' adoption of this healthy alternative to white rice.

## **MATERIALS AND METHODS**

This study's primary data was collected from all players in the supply chain; farmers who grow purple rice in Chiang Mai, Chiang Rai and Phayao Provinces, local collectors, wholesalers and retailers over the course of the 2010-2011 production. Questionnaires and personal interviews were conducted in order to analyze the market's structure and conduct, and Porter's five force analysis was applied to examine the competitiveness and to analyze the attractiveness and profitability of the industry.

Porter's analysis is used to determine the degree of competition and the attractiveness of a market environment by looking at five forces; threat of new entrants, competitive rivalry, bargaining power of suppliers, bargaining power of consumers and the threat of substitute products (Porter, 2008). Factors of each force were identified and analyzed in order to gain understanding of the supply chain's key players and the influence each force has on them. The questionnaire was designed using the Likert scale that allows participants to measure the influence of each force by selecting a number between 1 and 5; 5 represents the highest level of influence while 1 represents the least influence (Likert, 1932).

The concentration ratio (CR) of the market structure was used to assess the monopoly power or degree of concentration in the system, if any. The CR is a partial index that measures the share of the industry that is made of a few large firms or groups. It is calculated as follows;

$$CR_n = \sum X_n / \sum X_i$$

$CR_n$  denotes the share of the industry accounted for  $n$  larger firms in the market,  $\sum X_n$  is the volume of product produced by  $n$  firms and  $\sum X_i$  is the volume of product produced by all firms in the market. The estimated value of CR for any given  $n$  should be between 0 and 1 - the higher the CR indicated, the greater the market concentration or monopoly power.

Market structure can be classified based on the size of the market share in the hands of the top firms (Bain, 1968). For example, if the top four firms control more than 70 percent of the market, it's revealed to be a highly concentrated oligopolistic market. Other factors such as barriers to entry, entry conditions and exit conditions are also evaluated. Production and marketing strategies, pricing behavior and policies of purple rice were examined during the personal interviews and surveys. Also, secondary data related to marketing purple rice in northern Thailand was collected from various sources and is listed in the references section of this paper.

## **RESULTS AND DISCUSSION**

### **Competitiveness of the industry**

The threat of new entrants is high for both collectors and retailers, while farmers have a medium level as most purple rice farmers belong to agricultural groups and usually produce under contractual agreement. Since this is the case, the farmer's suppliers of inputs and buyers of outputs are typically the same person - thus reducing their bargaining power as suppliers. The rivalry among competitors is low as there isn't much product differentiation with the same variety of purple rice. Threat of substitutes is also low due to the uniqueness of the product.

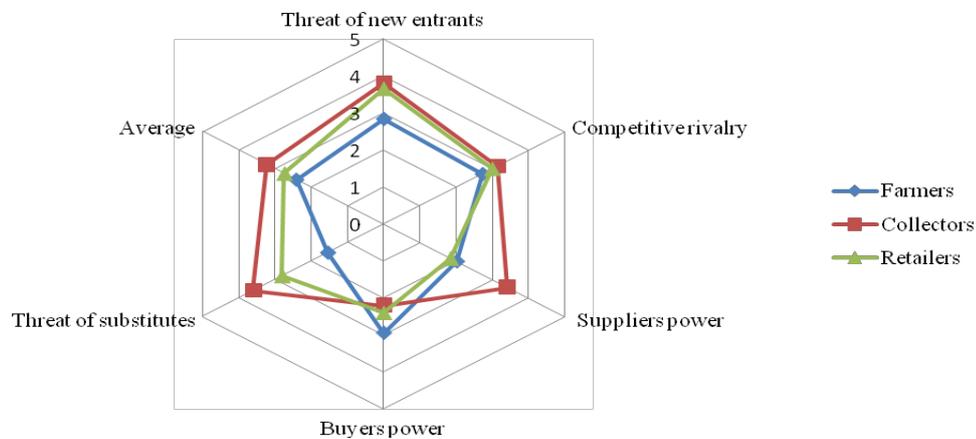
The results from the study's Porter's five forces analysis of the competitiveness of northern Thailand's purple rice industry can be seen in Table 1. These results indicate that the competitive forces influence the collectors the most (3.2) and the farmers the least (2.4) as shown in Fig. 1.

Even though the competitive forces aren't very high, survey data indicates that the purple rice

market hasn't been found attractive by farmers, collectors or retailers.

**Table 1 Influence level of competitive forces of marketing environment for purple rice**

Competitive Five Forces	Mean (Likert Scale Rating)		
	Farmers	Collectors	Retailers
1. Threat of new entrants	2.9 (medium)	3.8 (high)	3.7 (high)
2. Rivalry among competitors	2.7 (medium)	3.1 (medium)	3.0 (medium)
3. Bargaining power of suppliers	2.0 (low)	3.4 (medium)	1.9 (low)
4. Bargaining power of buyers	2.9 (medium)	2.2 (low)	2.4 (low)
5. Threat of substitutes	1.5 (low)	3.6 (high)	2.8 (medium)
Average Mean	2.4 (low)	3.2 (medium)	2.7 (medium)



**Fig. 1 Weighted score of marketing competitive forces**

**Market structure for purple rice**

After using the CR to measure the purple rice market, it was found that each of the three selected provinces' market concentration differs. However, pricing is set by buyers either through contract farming or the buyers' bargaining power in each market.

In Phayao Province, only one agricultural group, consisting of 33 farmers, exists. The member farmers obtain the seed from the group leader who also serves as the collector, miller and retailer. The Phayao market is monopolistic with the market share of this group accounting for 25.3 percent of northern Thailand.

Two major purple rice producers exist amongst over 100 very small scale farmers in Chiang Rai Province with an estimated CR<sub>2</sub> of 0.08. Despite the low CR, the two major farms run their own rice mills and have an outlet for selling the final product. Purple rice from the rest of other small farmers is sold to four large collectors with an estimated CR<sub>4</sub> of 0.73 which indicates a high oligopolistic market.

Chiang Mai Province's purple rice market is very small scale that allows for perfect competition.

**CONCLUSION**

This study concludes that despite purple rice being a high-nutrient product, its market is still very small in northern Thailand. However, there are signs of market growth in some areas. Even though

the market structures vary among the three provinces, the bargaining powers of both the buyers and suppliers are quite high for the farmers. It was also found that the concentration ratio was higher at the collectors' level and the pricing is still under the intermediary buyers' power. Purple rice needs to be promoted in order to make it an attractive alternative crop for farmers.

## **ACKNOWLEDGEMENTS**

We are grateful to the National Research Universities Program of the Office of the Commission on Higher Education, Ministry of Education, Thailand, whose funding made this study possible.

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