The Impacts of Thailand-China FTA for Agricultural Products on Thai Garlic Production: A Case Study of Chiang Mai and Si Sa Ket Provinces

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Abstract

This research aims to 1) study Thailand-China FTA for Agricultural Products and its possible impacts on Thai garlic production and garlic growers in Fang District of Chiang Mai and Wang Hin District of Si Sa Ket. The sample group included garlic growers in Fang District of Chiang Mai and Wang Hin District of Si Sa Ket, totaling 100 and divided into two groups of 50 subjects each. The research instrument was the questionnaire on garlic production and the impacts of Thailand-China FTA for Agricultural Products. The impacts on garlic production were analyzed using chi-square and they were classified into 7 aspects, which were production, marketing, export, import, smuggling, competitiveness of agricultural products and taste. For garlic production in particular, the impacts of Thailand-China FTA for Agricultural Products were classified into 10 aspects as follows: garlic production, garlic production volume, quality, marketing, price, sale, hoarding, taste, demand and supply for garlic production. Findings from the study of the impacts of Thailand-China FTA for Agricultural Products on garlic production suggest that the impacts can influence the farmers' decisions to grow garlic in the next season. The farmers based their decisions on price and income from garlic sale. The study of the impacts of Thailand-China FTA for Agricultural Products on the garlic market revealed the instability of the market system, price, production cost and volume. The impacts of Thailand-China FTA for Agricultural Products on the export of young garlic plants showed that Thai garlic is spicy and not very popular among foreign consumers. The impacts of Thailand-China FTA for Agricultural Products on import could lead to the instability of price and farmer's income. The impacts of Thailand-China FTA for Agricultural Products in respect of smuggling from China led to oversupply and price reduction. The impacts of Thailand-China FTA for Agricultural Products concerning competitiveness in the production of agricultural products could encourage farmers to adapt themselves to increase their production and reduce the production cost in order to compete with Chinese garlic. The impacts of Thailand-China FTA for Agricultural Products concerning garlic taste could result in the decrease of the number of Thai garlic consumers as Thai garlic is spicier and costs more.

Keywords: agricultural product marketing, FTA, Thailand-China FTA, impacts of FTA

Introduction

Thailand-China FTA is part of the ASEAN-China FTA signed to immediately effectuate part of the free trade agreement on certain agricultural product groups of eight tariff groups, 01-08, in which taxes were agreed to be reduced to 0%, effective on 1 January 2004. In this regard, six original ASEAN member states had to reduce their taxes by 2006 (Orasa and Jirapha, 2008). Thailand

started to reduce its taxes in 07 and 08 tariff groups (vegetables and fruits) three months earlier than other member states, effective on 1 October 2003, except four product items where taxes had to be reduced to 0% only within the tax quota determined under WTO, which the PRC joined as a member in December 2001. Thailand declared the tariff rate for garlic import both in and out of the quota assigned to the PRC at 27% and 57%, respectively, and the obliged amount was fixed at 65 tons. The Office of the Agricultural Economics reported that no garlic had been imported under such quota. The actual import has been done out of the quota, which was subject to 57% tax rate, and most garlic was imported from the PRC (Office of the Agricultural Economics, 2007b). The Thailand-China FTA implemented in 2003 has had the significant impacts on garlic production in Thailand, that is, the production volume in 2004 decreased while the import amount from China increased dramatically. Compared with such import amount (in 2002) before the FTA and that (in 2004) after the FTA, the garlic import from China was found to increase by 390% (Office of the Agricultural Economics, 2005). The garlic import from China resulted in the decrease of the average price of garlic sold by farmers by 21.1%, compared with the price set before the implementation of the FTA. As a result, farmers had to reduce their farming area from the average of 22,000 Rais from 1997 to 2002 to only half of it.

Garlic is considered one of the significant economic plants of Thailand. Northern Thailand has largest area for growing garlic accounting for 93% of the total garlic growing area in the whole country while the Northeast has only 5% of the total garlic growing area in the country. The major garlic growing area in the North is in Chiang Mai, while Si Sa Ket is the major growing area in the Northeast (Orasa and Jirapha, 2008). The production volume each year can vary significantly, posing risks on farmers and traders as well as consumers due to its price fluctuation and price unfairness since farmers are likely to sell garlic at low price while consumers have to buy it at high price. Problems also include garlic hoarding and smuggling into Thailand. The quota method cannot cope well with cheap garlic from China. According to the FAT, by 2015, Thailand will have to decrease the tax rate for the garlic out of the quota to only 50%, which means that more garlic will be imported from China to the extent that it can partly substitute Thai garlic. To this end, the domestic market of Thai garlic will be smaller as it will be substituted by garlic from China while farmers will reduce their growing area due to loss, resulting in less volume of Thai garlic in the market. The major production problem is the high production cost per Rai. For instance, in 1993-1994, the average production cost was 10.49 Baht kg^{-1} while in China, the world's largest garlic producer, the production cost was only 3 Baht kg^{-1}. In addition, the common problem of garlic production is garlic growing area can vary in size due to price fluctuation and the reason for such price instability is the inconsistency of the production volume. If the price is good in any year, it is more likely that farmers will increase their growing area, resulting in the oversupply and price downfall and instability. Price fluctuation also depends on the period of time; lower price is forecast at the beginning and higher price at the end of the harvest season. On the other hand, farmers hurriedly sell their products during the harvest time, leading to oversupply and price suppression. During the time price swings to the opposite direction, the government implements certain policies and measures for market intervention and control of the garlic production volume in order to maintain the price level in the short term. The government's measures to limit the garlic growing area and avoid oversupply, which lead to slump in price, are not effective as it appears that there are still many farmers both in and outside the assigned area who have not yet registered with the government agencies, making it more difficult to plan and control the production volume in order to meet the market demand when the garlic price is good and resulting in the low production volume per Rai amidst the high production cost as well as the lack of good young plants (Ministry of Agriculture and Cooperatives, 2004). Garlic favorably grown in Thailand is of native species with a small head, spicy taste and strong odor. It is popular among domestic consumers. Most farmers thus tend to grow native plants while at the international market, Chinese garlic is in greater demand thanks to its larger head size and softer taste. As Chinese garlic is more favorable at an

international level, the export market for Thai garlic does not expand as it should. With the improvement of species to meet the quality set by Chinese garlic, the door will be wider open for the import of Thai garlic.

Therefore, the study of the impacts of Thailand-China FTA for Agricultural Products on Thai garlic production in Fang District of Chiang Mai and Wang Hin District of Si Sa Ket will enable us to understand how such impacts can affect domestic producers and consumers as well as the country's economy as a whole. The objective of the study was 1) to investigate the impacts of Thailand-China FTA on Thai garlic production in Fang District of Chiang Mai and Wang Hin District of Si Sa Ket, 2) to study the impacts of Thailand-China FTA on the decisions to grow Thai garlic by farmers in Fang District of Chiang Mai and Wang Hin District of Si Sa Ket.

Materials and Methods

The research on the impacts of Thailand-China FTA for Agricultural Products on Thai garlic production and the decisions to grow garlic by farmers in Fang District of Chiang Mai and Wang Hin District of Si Sa Ket is a survey research using the questionnaire as an instrument for data collection in order to find the correlations between the independent variable, the impacts of Thailand-China FTA for Agricultural Products (FTA impacts) and the dependent variable, the garlic production.

Research Instrument

The research instrument used for data collection was the questionnaire consisting of two question types; open-ended and close-ended questions. The questionnaire structure was divided into 5 parts; Part 1: The farmers' socioeconomic backgrounds, Part 2: The garlic production factors, Part 3: The impacts of Thailand-China FTA for Agricultural Products, Part 4: The factors of support from the government to garlic growers and Part 5: Farmers' questions for discussion, problems and suggestions.

Instrument Testing

The questionnaire was tested for its validity and reliability by having the experts check its content validity and accuracy and then by having it revised and tried under the real data collection situation. The revised questionnaire was then tested for reliability by pre-testing it with 20 samples to apply Conbrach's Reliability coefficient alpha and find out the alpha coefficient (Bunreang, 2004).

Sample Group

The sample group included 100 garlic growers from the Quality Garlic Production Promotion Project based on the standard of Good Agricultural Practice (GAP) in Fang District of Chiang Mai and Wang Hin District of Si Sa Ket, who have completed the training courses in the internal auditors for garlic growers, Internal Control System: ICS, and the garlic production according to Good Agricultural Practice (GAP). They were divided into two groups, with 50 of them from Fang District of Chiang Mai and the remaining 50 from Wang Hin District of Si Sa Ket.

Data Collection

Data was collected from 1 November 2011 to 29 February 2012 through the use of the questionnaire to interview garlic growers.

Data Analysis

The statistics used in the analysis of data concerning the impacts was χ^2 (chi-square) at the statistical significance of .05 in order to find the correlations between independent and dependent variables. The research hypothesis was that the impacts of Thailand-China FTA for agricultural products (TCAFTA) correlate with the farmers' decisions to grow Thai garlic in Fang District of Chiang Mai and Wang Hin District of Si Sa Ket as follows:

H0 : There is no correlation between the impacts of Thailand-China FTA for agricultural products and the farmers' decisions to produce Thai garlic in Fang District of Chiang Mai and Wang Hin District of Si Sa Ket.

H1 : There is a correlation between the impacts of Thailand-China FTA for agricultural products and the farmers' decisions to produce Thai garlic in Fang District of Chiang Mai and Wang Hin District of Si Sa Ket.

The testing of a hypothesis to find the correlations between independent and dependent variables was based on the inferential method and crosstabs. The statistics used for data analysis was chi-square with a statistical significance of .05 to

find the correlations between independent and dependent variables through data processing with the SPSS program in order to get the required statistic figures (Bunreang, 2004).

Chi-squared test refers to testing of independence between two attributes (correlations between two variables).

$$\chi^2 = \sum_{i=1} \frac{(O - E)^2}{E}$$

where df = (r-1)(c-1), χ^2 refers to calculated chi-squar, O refer to observed frequencies, E refers to expected frequencies as

$$E = \frac{R \times C}{N}$$

When R = combination of row frequencies, C = combination of column frequencies and N = total combination of frequencies.

Critical χ^2 when $\propto = 0.05$, df = (r-1)(c-1), the results are then referred to chi-square table.

The calculated χ^2 is higher than that in the table so H0 is denied. Accordingly, the impacts of Thailand-China FTA for agricultural products on Thai garlic production in Fang District of Chiangmai and Wang Hin District of Si Saket are correlated at a statistical significance of 0.05 in χ^2 testing by applying SPSS for Windows.

Results

Impacts of TCAFTA on Thai Garlic Production

The study focused on factors causing impacts on Thai garlic under Thailand-China FTA for Agricultural Products. The impacts are sorted into 7 aspects i.e. the impacts on production, marketing, export, import, smuggling of Chinese garlic, competitiveness and consumer taste. The results showing the number of garlic growers in Fang District of Chiang Mai and Wang Hin District of Si Sa Ket affected by the agreement are illustrated in Table 1.

Impacts on Garlic Production

It was found from the study that the factor which had the most profound impact on garlic production was the consumer and market demand, accounting for 80%, while 20% of farmers were for garlic quality. The factor which had the highest influence on the farmers' decisions to grow garlic was garlic price and income from the sale of garlic, followed by the selling price, with the percentage of 80 and 20, respectively. The factor affecting the garlic volume in the market was the lack of good market management which led to oversupply, accounting for 100%. When comparing the impacts on production between the two growing areas, it was found that there was no difference in the factors which affected garlic production. (Table 1).

Impacts on Marketing

It was found that the Free Trade Agreement led to inconsistencies in the market system, price, production cost and production volume, accounting for 80 %, whereas 100% of farmers thought it resulted in the decreasing demand for Thai garlic in the foreign market as a result of its small size, spicy taste and strong smell, as opposed to Chinese garlic. In addition, 100% of farmers believed that the FTA between Thailand and China had impacts on the domestic garlic market with respect to volume and oversupply and was to blame for the slump in the garlic price (Table 1).

Impacts on Export

The study revealed that the FTA between Thailand and China has impacts on the export volume due to the decrease in foreign market demand for Thai garlic, with the percentage of 100. 52% of farmers thought the FTA affected the quality of Thai garlic due to the garlic species while the remaining 48% believed it was due to less favorable taste among the consumers (Table 1).

Impacts on Import

The study revealed that FTA between Thailand and China had impacts on the import volume from China at 100% due to its lower price and production cost as opposed to those of Thai garlic. 80% of farmers thought it was due to the instability of domestic price while 20% due to the farmers' income. All these factors resulted in the increase in the import of Chinese garlic. (Table 1).

Impacts on Smuggling of Chinese Garlic

It was found that the impact of smuggling of Chinese garlic accounted for 30%. The factors

Table 1 The number of subjects from the sample group of farmers in Chiang Mai and Si Sa Ket affected by Thailand - China FTA for Agricultural Products, based on 7 impacts.

Impacts of FTA and impact factors	The number of affected garlic growers (%)		
	Chiang Mai (N=50)	Si Sa Ket (N=50)	Average
1. Impacts regarding garlic production			
1.1 Impact on production			
- quality of garlic species	20	20	20
- consumer and market demand	80	80	80
- production cost	0	0	0
1.2 Impact on decisions to grow garlic (on the increase or decrease of growing area)			
- price and income	80	80	80
- good selling price	20	20	20
1.3 Impact on product volume in the market			
- lack of garlic marketing system	0	0	0
- lack of garlic market management	100	100	100
1.4 Impact on garlic growers			
- oversupply	0	0	0
- domestic garlic price decline	100	100	100
2. Impacts on garlic market			
2.1 Impact on market system, price, product, production cost			
- certainty	20	20	20
- uncertainty	80	80	80
2.2 Impact on lower demand for Thai garlic from international market			
- small size, spicy taste and strong smell	100	100	100
- low quality	0	0	0
- high production cost	0	0	0
2.3 Impact on oversupply			
- low export volume (decrease)	0	0	0
- smuggling of Chinese garlic	0	0	0
- oversupply	100	100	100
2.4 Impact on domestic market			
- market demand	0	0	0
- low price	100	100	100
3. Impacts on garlic export			
3.1 Impact on garlic export			
- lower demand from international market	100	100	100
- low quality/high production cost	0	0	0
3.2 Impact on Thai garlic quality			
- garlic species	40	64	52
- garlic taste not favored by foreign consumers	60	36	48
4. Impacts on garlic import			
4.1 Impact on Chinese garlic import			
- low production cost	0	0	0
- low price	100	100	100
- Chinese garlic taste favored by consumers	0	0	0
4.2 Impact on domestic price			
- price instability	80	80	80
- farmers' income	20	20	20
- price variation	0	0	0
4.3 Impact on price of imported Chinese garlic (lower than that of Thai garlic)			
- no tax levied against garlic	0	0	0
- low production cost	100	100	100

Table 1 Cont.

Impacts of FTA and impact factors	The number of affected garlic growers (%)		
	Chiang Mai (N=50)	Si Sa Ket (N=50)	Average
5. Impacts on smuggling of Chinese garlic			
5.1 Smuggling of Chinese garlic	52	8	30
- loss of international market	48	92	70
- Chinese garlic favored by consumers	0	0	0
5.2 Impact on garlic growers			
- quality and acceptance from the market	0	0	0
- low price	100	100	100
6. Impacts on competitiveness of garlic production			
6.1 Impact on competitiveness of garlic production			
- farmers' adjustment to competition	80	80	80
- high production cost and price	20	20	20
- popularity among consumers	0	0	0
6.2 Impact on garlic grower's ability			
- farmers' ability to compete in the market	0	0	0
- impacts on farmers	100	100	100
7. Impacts on consumer's taste			
7.1 Lower consumption demand for Thai garlic			
- small size, spicy taste, strong smell	40	36	38
- high price	60	64	62

which contributed to the smuggling of Chinese garlic included its lower price at 100% and the loss of foreign market share for Thai garlic at 70%.

Impacts on Competitiveness

It was found that to 100% of respondents to the questionnaire, the FTA between Thailand and China had impacts on the competitiveness of garlic growers as they were forced to adapt themselves in garlic production in order to enhance their competitiveness with Chinese garlic at 80%. However, 20% of them thought Thai garlic had a higher production cost than that of Chinese garlic, resulting in a higher price (Table 1).

Impacts on Consumer Taste

From the study of factors causing a lower consumption demand for Thai garlic, two major factors were the high price of Thai garlic, accounting for 62% and its small size, spicy taste and strong smell, accounting for 38% of the respondents to the questionnaire (Table 1).

Impacts of TCAFTA on the Production which Influence the Farmers' Decision to Grow Garlic

The findings indicated that significant impacts of TCAFTA on garlic production included price and income from the product sale and consumer and market demand. When these two impacts were studied in order to find the correlations with ten garlic production components which influenced the farmers' decisions to grow garlic in Fang District of Chiang Mai and Wang Hin District of Si Sa Ket, the study results are shown in Table 2.

Increase of Production Efficiency

Decrease of production cost

Findings from the impacts of FTA suggested that consumer and market demand has more influence on the farmers' decision to grow garlic than that of price and income from the product sale. The factors considered by farmers to improve production efficiency are reduction of seeds and chemical fertilizer costs, at 65.5 % and 100%, respectively, while seeds account for 34.5% in terms of the price and income from the product sale. The hypothesis testing by chi-square indicated that chi-square in the area of Chiang Mai was 9.821 at the statistical significance of .002, which was less than the required statistical significance of .05. In Si Sa Ket, it was 8.333 at the statistical significance of .004, which was less than the required statistical significance of .05. Therefore, H0 was rejected, which suggested that there are

correlations between consumer and market demand and the increase or decrease of production factors in relation to seeds and chemical fertilizer in order to increase production efficiency while reducing the production cost (Table 2).

Garlic production cost

It was found from the study that consumer and market demand affected the farmers' decision to grow garlic more than price and income from product sale in terms of the production coast, at 76.2% and 23.8%, respectively. The hypothesis testing by chi-square showed that chi-square in Chiang Mai and Si Sa Ket was 2.381 at the statistical significance of .123, which was more than the required statistical significance of .05. Therefore, H1 was rejected, which suggested that there is no correlation. In other words, consumer and market demand, price and income from product sale did not affect the farmers' decisions to grow garlic in terms of the production cost as the major problem in the garlic production sector in Thailand is the high production cost which varies year by year depending on the production factors and garlic price in the previous year (Table 2).

Production Volume

It was found from the study that price and income from the product sale could affect the farmers' decisions to grow garlic more than the consumer demand. The percentage was 100 for the production volume at 1,000 kg rai^{-1}, 50 for that at 2,000 kg rai^{-1} and 100 for that at 3,000 kg rai^{-1}. The consumer and market demand thus could affect the farmers' decisions to grow garlic more than price and income from the product sale. According to the hypothesis testing by chi-square, chi-square in Chiang Mai and Si Sa Ket was 50.000 at the statistical significance of .000, which was less than the required statistical significance of .05. Therefore, H0 was rejected, which suggested that the consumer and market demand and consumer and price and income from the product sale are correlated with the production volume for farmers to decide whether to grow garlic with more or less volume than that in the previous year. If farmers sell their products at a good price, they will decide to increase the production volume in the following year and if there is an oversupply resulting in the decrease of price, they will decide to decrease their production volume. The decrease or increase in the garlic price can affect the way garlic is grown. If the garlic price is high, the growing area will be enlarged, while production of other crops becomes less in size. However, if the garlic price decreases, the production of garlic may be switched to that of other crops. With this, oversupply is inevitable, resulting in the price decline and many recurring problems (Table 2).

Garlic Quality

It was found from the study that price and income from product the sale could affect the farmers' decisions to grow garlic more than the consumer demand with the percentage of 100 in quality classification from dryness while the consumer and market demand could affect the decisions to grow garlic more than price and income from the product sale with the percentage of 100 in garlic size and shrinkage. According to the hypothesis testing by chi-square, it showed that chi-square in Chiang Mai and Si Sa Ket was 50.000 at the statistical significance of .000, which was less than the required statistical significance of.05 and thus H0 was rejected. This suggested that there are correlations between price and income from product sale and the consumer and market demand and garlic quality could be affected. If garlic quality is good resulting in high price, farmer will grow good quality garlic. Quality classification is done by considering dryness, size and shrinkage which will be used as pricing criteria (Table 2).

Garlic Market

Chinese garlic is favored by international consumers and market and it was found that the consumer and market demand could affect the farmers' decisions to grow garlic more than price and income from the product sale with 66.7% for large size, 33.3% for lack of spicy taste and strong odor and 100% for the lower production cost of Chinese garlic compared to that of Thai garlic. According to the hypothesis testing by chi-square, it was found that chi-square in Chiang Mai and Si Sa Ket was 8.333 at the statistical significance of .004, which was less than the required statistical significance of.05 and H0 was hence rejected. This suggested that there was a certain correlation as

Table 2 Impacts of FTA regarding garlic production on production components of Thai garlic production by growers in Chiang Mai and Si Sa ket.

Components of garlic production	Number of garlic growers affected by FTA concerning production factors (%)[1/]					
	Price and income			Demand and market		
	Chiang Mai	Si Sa Ket	Average	Chiang Mai	Si Sa Ket	Average
1. Production efficiency improvement						
1.1 Production cost saving						
- seeds	35.7	33.3	34.5	64.3	66.7	65.5
- fertilizer	0	0	0	100	100	100
Total	20	20		80	80	
χ^2	9.82	8.33				
Significant level	0.002	0.004				
1.2 production cost (baht						
- 10,000-50,000 baht	23.8	23.8	23.8	76.2	76.2	76.2
-50,001 – 100,000 baht	0	0	0	100	100	100
Total	20	20		80	80	
χ^2	2.38	2.38				
Significant level	0.123	0.123				
2. Production volume/Rai						
- 1,000 kg/Rai	100	100	100	0	0	0
- 2,000 kg/Rai	0	0	0	0	100	50
- 3,000 kg/Rai	0	0	0	100	100	100
Total	20	20		80	80	
χ^2	50.0	50.0				
Significant level	0.000	0.000				
3. Quality affecting garlic price						
- quality classification based on dryness level	100	100	100	0	0	0
- Size and shrinkage	0	0	0	100	100	100
Total	20	20		80	80	
χ^2	50.0	50.0				
Significant level	0.000	0.000				
4. Market demand for Chinese garlic due to its favorite by consumer and foreign market						
- large size, less spicy and strong smell	33.3	33.3	33.3	66.7	66.7	66.7
- less production cost than that of Thai garlic	0	0	0	100	100	100
Total	20	20		80	80	
χ^2	8.33	8.33				
Significant level	0.004	0.004				
5. High price						
- market mechanism	0	0	0	100	10	100
- hoarding	100	100	100	0	0	0
Total	20	20		80	80	
χ^2	50.0	50.0				
Significant level	0.000	0.000				
6. Garlic sale						
- sale before harvest	0	55.6	27.8	100	44.4	72.2
- sale after harvest	33.3	0	16.65	66.7	100	83.35
Total	20	20		80	80	
χ^2	8.33	8.33				
Significant level	0.004	0.004				

Table 2 Cont.

Components of garlic production	Number of garlic growers affected by FTA concerning production factors (%)[1/]					
	Price and income			Demand and market		
	Chiang Mai	Si Sa Ket	Average	Chiang Mai	Si Sa Ket	Average
7. Hoarding by middlemen						
- higher demand due to shortage	33.3	45.5	39.4	66.7	54.5	60.6
- higher price	0	0	0	100	100	100
Total	20	20		80	80	
χ^2	8.33	8.33				
Significant level	0.004	0.004				
8. Taste						
- good taste	0	100	50	100	0	50
- spicy taste favored by Thai consumer	33.3	4.8	19.05	66.7	95.2	80.95
Total	20	20		80	80	
χ^2	8.33	8.33				
Significant level	0.004	0.004				
9. Consumer demand						
- low price of garlic from China	0	100	50	100	0	50
- better quality as opposed to Thai garlic	30.3	9.1	19.7	69.7	90.9	80.3
Total	20	20		80	80	
χ^2	6.493	27.273				
Significant level	0.011	0.000				
10. Measures to be implemented by the public se						
- price fluctuation	0	0	0	100	100	100
- hoarding, smuggling	100	100	100	0	0	0
Total	20	20		80	80	
χ^2	50.0	50.0				
Significant level	0.000	0.000				

[1/] N = 50

Chinese garlic has the lower production cost, resulting in the lower price. Besides, it is large in size, has thick skin and lack spicy taste and strong odor. The international market has lower demand for garlic from Thailand because of the higher production cost resulting in a high price, its small size, spicy taste and strong odor, which are not popular among foreign consumers. When Chinese garlic is imported, it will give impacts on farmers growing Thai garlic as well as the foreign consumer's taste (Table 2).

Garlic Price

It was found from the study that the consumer and market demand had an influence on the farmers' decisions to grow garlic more than price and income from the product sale with 100% in absolute market mechanism. The study also revealed that price and income from the product sale could have an impact on the decisions to grow garlic more than the consumer demand with 100% in hoarding by middlemen. According to the hypothesis testing by chi-square, it indicated that chi-square in Chiang Mai and Si Sa Ket was equal 50.000 at the statistical significance of .000, which was less than the required statistical significance of.05 and H0 was therefore rejected. This showed that there was a correlation with the high product price due to market mechanism and hoarding by middlemen for speculation purposes. When there is a shortage of garlic, they will sell their hoarded stock, causes the price to rise. Garlic import from China will cause traders to hurriedly sell their dried garlic, resulting in an oversupply and ultimately driving the garlic price down. (Table 2).

Garlic Sale

It was found from the study that the consumer and market demand could have an impact on the farmers' decisions to grow garlic more than price and income from product sale with 72.2% and 27.8%, respectively, for the pre-harvest season and 83.35 % and 16.65 %, respectively, for the post-harvest one. According to the hypothesis testing by chi-square, it revealed that chi-square in Chiang Mai was 8.333 at the statistical significance of .004, which was less than the required statistical significance of.05 and 22.222 in Si Saket at the statistical significance of .000, which was less than the required statistical significance of.05 and H0 was thus rejected. This suggested that there exists some correlation as farmers would sell garlic after harvest. Garlic sale can be done either before or after harvest. If farmers choose to sell garlic after harvest, fresh garlic will be sold to traders who offer the best price. If the price is still low, farmers will hang their garlic and wait to sell it as dried garlic. When dried garlic is imported from China to Thailand, it may lead to an oversupply and garlic price decline (Table 2).

Hoarding by Middlemen

It was found from the study that the consumer and market demand could have an impact on the farmers' decisions to grow garlic more than price and income from the product sale with 60.6 % and 39.4 %, respectively, in terms of the shortage of supply and the consumer demand and 100% in the high garlic price. According to the hypothesis testing by chi-square, it suggested that chi-square in Chiang Mai was 8.333 at the statistical significance of .004, which was less than the required statistical significance of.05 while in Si Sa Ket, it was 15.909 at the statistical significance of .000, which was less than the required statistical significance of .05, and H0 thus was rejected. This suggested that the consumer and market demand has some correlation with hoarding by middlemen. The middlemen normally buy large amounts of garlic for speculation purposes and the shortage of supply usually occurs at the end of the year causing its price to rise. The import of dried garlic from China has recently caused middlemen to be unable to continue with such speculation. As there is less confidence in price and it becomes under risk in competition with Chinese garlic, middlemen will not hoard garlic and instead choose to sell their dried garlic to the market, resulting in the oversupply and the garlic price decline (Table 2).

Garlic Taste

It appeared that price and income from product sale could have an impact on decision to grow more than consumer demand; 50 % and 50 %, respectively, in terms of good taste and it was further found that consumer and market demand had an impact on decision to grow more than price and income from product sale; 50% for good taste, and 80.95 % and 19.05 %, respectively, in terms of its spicy taste favored by Thai consumer. According to hypothesis testing by chi-square, it suggested that chi-square of Chiang Mai was equal to 8.333 at statistical significance of .004; less than statistical significance of. 05 while it was equal to 38.095 for Si Sa Ket at statistical significance of .000; less than required statistical significance of.05 and thus H0 was rejected. This suggested that there is some correlation in respect of garlic taste. While Chinese garlic has large size, thick shell, less spicy taste and strong smell, garlic from Thailand has smaller size but stronger taste and smell which is not favored by consumer in foreign country although it is popular for Thai people. This consumer taste can therefore have an impact on those Thai garlic growers (Table 2).

Consumer Demand

It was found from the study that the consumer and market demand could have an impact on the farmers' decisions to grow garlic more than price and income from the product sale with 80.3% and 19.7%, respectively, in terms of the high quality of garlic produced in Thailand and the result further suggested that price and income from the product sale could have an impact on the decisions to grow garlic more than the consumer demand, with 50% and 50%, respectively, in terms of the low price of garlic from China. According to the hypothesis testing by chi-square, it showed that chi-square in Chiang Mai was 6.493 at the statistical significance of .011, which was less than the statistical significance of.05 while it was 27.273 in Si Sa Ket at the statistical significance of .000, which was less than the required statistical significance of.05

and H0 was thus rejected. This suggested that there is some correlation as the high consumption demand for Thai garlic was due to the quality of Thai garlic but as Chinese garlic is cheaper; it has become popular among consumers (Table 2).

Garlic Production Measures

It was found from the study that the consumer and market demand could have an impact on the farmers' decision to grow garlic more than price and income from the product sale with 100% in respect of price variation while price and income from the product sale was found to have an impact on the decisions to grow garlic more than the consumer demand with 100% in respect of hoarding and smuggling. According to the hypothesis testing by chi-square, it showed that chi-square in Chiang Mai and Si Sa Ket was 50.000 at the statistical significance of .000, which was less than the required the statistical significance of.05 and H0 was thus rejected. This suggested that there was some correlation with measures for the production volume control in order to solve the price variation problem and hoarding and smuggling, resulting in the instability and variation of market, price and production volume (Table 2)

Discussion

The impacts of Thailand-China FTA on Thai Garlic Production in Terms of Consumer and Market Demand

Impacts on garlic price, the results of the study revealed that an oversupply could occur due to the lack of effective market management, leading to the decline of domestic price. The problem lies on the fact that farmers base their decisions to grow garlic on the consumer and market demand, which is in line with the survey report done by Office of Agricultural Economics (2008). If the garlic price of the previous year rises and the farmers can earn more money from garlic, it is likely that they will grow more by expanding the growing area especially in Chiang Mai. This also corresponds with the study done by Amorn Photsombun (2001). If farmers can sell their garlic at a good price, they are more likely to grow more in the following year but when the oversupply occurs leading to price depression, it will trigger their decisions to decrease their production. Therefore, the significant price change will encourage farmers to increase or decrease the growing area in reverse variation with other crops. This behavior can easily bring about oversupply and price depression.

Impacts on income from the product sale The existing problem is the instability of garlic price which poses uncertainty for growers and consumers. As garlic imported from China has certain advantages from its lower production cost, higher product volume per Rai and cheaper price, it is difficult for Thai garlic to compete with such Chinese garlic and Thai garlic has lost its competitiveness against Chinese garlic which has in turn affected the farmer's income.

Impacts on the consumer demand, it was found that the overseas consumer and market demand for Thai garlic does not reach its satisfied level as Thai garlic has a small size, spicy taste and strong odor and is not favored by consumers in other countries and thus having certain impacts on farmers growing Thai garlic. In respect of the domestic market, Thai garlic is still popular among domestic consumers for its characteristics. This is in line with the study by the Office of Agricultural Economics (2000) that the demand for export is still at a low level as Thai garlic has a small size and spicy taste while its production cost is high resulting in the higher price as opposed to those of Chinese garlic which has the lower production cost and price, a large size and a thick skin. As a result, farmers growing Thai garlic can be significantly affected when garlic imported from China has become more popular among the consumers for its cheaper price compared with that of Thai garlic.

Impacts on market, it was revealed that the market system, price and production cost could vary anytime. The oversupply resulting in price depression has made it difficult to make a production plan. The market for Thai garlic is mainly limited to the domestic one as the export cannot be expanded due to the limited demand. This is in line with the study done by the Customs Department (1992-1998) that the major problem relating to garlic production and market was that the garlic price was always at a low level. In addition, farmers growing garlic in Fang District of Chiang Mai wish to improve their seed stock for the better quality in order to meet the consumer

demand but those growing garlic in Wang Hin District of Si Sa Ket can keep the indigenous garlic strain with high quality for as long as 18 months. Their garlic is very popular for domestic consumers. This is also true according to the study done by the Office of Agricultural Economics (2000) that comparatively investigated the differences between garlic produced in Si Sa Ket and Chiang Mai with respect to quality and market acceptance sort by strain, which suggested that different strains could result in differences in quality. Si Sa Ket strain offered the best quality, compared with that of Chiang Mai and China for its longer storage time with lower water loss and shrinkage percentage.

Impacts of Thailand-China FTA on the Farmers' Decision to Grow Garlic

Improvement of production efficiency The Office of Agricultural Economics (2000) reported that the seed stock was usually expensive and thus farmers tended to keep it for themselves. The seed stock amount kept by farmers depended on the garlic price of that given year. Less supply in any year will mean that the better price of the next year can be anticipated and thus farmer feel encouraged to store more seed stock for growing without the need to buy it at the expensive price. This also includes reduction of the fertilizer amount. It is also true for the survey report done by the Office of Agricultural Economics (2008) about garlic production factors that Chiang Mai showed much more fertilizer use at the average of 210.57 kg rai^{-1} and seed amount at the average of 122.69 kg rai^{-1} while in Si Sa Ket, fertilizer use was at the average of 123.41 kg rai^{-1} and the seed amount at the average of 109.57 kg rai^{-1}. This means that the production cost can be saved by individually keeping garlic seed stock and reducing fertilizer amount.

Production cost, the production cost of domestic garlic is quite high. According to the report by Orasa and Jirapha (2008), the production cost of garlic in Thailand during 2007-2008 was at the average of 17,321.64 Baht rai^{-1} or 18.29 Baht kg^{-1}. The key problem of garlic production sector in Thailand is that the production cost can vary year from year depending on the production factors, the price of the previous year, the market system and the weather conditions.

Production volume, farmers will decide to grow garlic by taking into account the consumer and market demand resulting in the larger production volume from better production efficiency at the average of 1,000 kg rai^{-1} or above.

Garlic quality, farmers wish to produce garlic of quality, which is in harmony with the study done by the Department of Internal Trade (1993) that according to the garlic marketing process, it was classified by quality based on dryness, size and shrinkage as criteria for pricing.

Garlic market, the Chinese garlic demand is found among domestic and foreign consumers for its consumer taste, which will have an impact on farmers growing garlic. This is in line with the study of the Office of Agricultural Economics (2000) that as the Chinese garlic production cost was low and Chinese garlic had a lower price, larger size and thick skin, it became more popular and gave impacts on Thai garlic.

Garlic price, one of the existing problems found by the Office of Agricultural Economics (1999) was that the growing area could variably decrease or increase depending on the garlic price of the previous year to the extent that the good price earned by farmers in any year would encourage them to grow more garlic in the following year and thus sometimes leading to oversupply and price fluctuation.

Garlic distribution, Orasa and Jirapha (2008) found that the garlic sale could occur in two periods of time. The first one was the before-harvest deal or future contract in which farmers will make an agreement with the traders before they start growing garlic or during the garlic growth and when garlic is ready for harvest, buyers will collect the products at the farm by themselves. The second one was the post-harvest deal where garlic will be harvested and farmers then sell fresh garlic to traders who offer the best price and if price is not satisfied by farmers, they may keep their garlic in the storage place and wait for selling as dried garlic.

Hoarding by middlemen, the middlemen will normally buy the large amount of garlic for speculation purposes and the shortage in the market supply will usually occur at the end of the year

causing its price to rise. The Office of Agricultural Economics (2005) found that the import of dried garlic from China made the middlemen unable to continue such speculation. As there was less confidence on price and it became under risky to compete with Chinese garlic, the middlemen would not hoard garlic and chose to sell their dried garlic to the market resulting in oversupply driving the garlic price down.

Garlic taste Thai garlic has a small size, a spicy taste and a strong odor making it not popular among foreign consumers. This is in line with the study conducted by Office of Agricultural Economics (2000) that as domestically produced garlic had small size, spicy taste and strong smell causing it to still be favored by domestic consumers.

Consumer demand, most domestic consumers still have demand for Thai garlic due to its taste. The Office of Agricultural Economics (2000) found that the domestic demand for Thai garlic was at the average of 100,000-110,000 while consumers favor Chinese garlic because of its cheaper price.

Measures for garlic production, the existing problems in the garlic production sectors include price and hoarding or smuggling. The Office of Agricultural Economics (2005) found that the garlic market was not stable in terms of price and production volume with various factors influencing such variation. The significant cause was the smuggling of Chinese garlic into the country and the large order for Chinese garlic because of its cheaper price and the growing popularity among consumers.

Conclusions

China FTA for Agricultural Products on Thai garlic production: A case study of Fang District of Chiang Mai and Wang Hin District of Si Sa Ket has explored the factors causing impacts under the free trade agreement for agricultural products sustained by farmers as follows:

Impacts of Thailand-China FTA (TCAFTA) on Thai garlic production can be categorized into 7 aspects as follows:

Impacts on production: It was found that the factor with the most influence on production by farmers was the consumer and market demand while the factor with the most influence on the farmers' decisions to grow garlic was the price and income from the product sale.

Impacts on garlic market: It was found that the free trade agreement brought about the uncertainty of market system, that is, price, the production cost and the product volume became difficult to predict resulting in the impacts on the domestic market such as oversupply and price depression.

Impact on garlic export: The study results suggested that the demand for Thai garlic from an international market has significantly decreased. This also has impacts on the quality of Thai garlic resulted from the inadequate management of seed stock and the less popularity among consumers.

Impact on garlic import: When Chinese garlic is increasingly imported because of its cheaper price as a result of the lower production cost as opposed to that of Thai garlic, it has led to the increasing impacts on farmers growing Thai garlic and their income.

Smuggling of Chinese garlic: The smuggling of Chinese garlic is frequently found as Chinese garlic has a lower price than that of Thai garlic causing the latter to lose its domestic market share.

Impacts on competitiveness for garlic production: It was found that the free trade agreement concluded between Thailand and China caused direct impacts on farmers as they had to adapt themselves in their garlic production process in order to increase their competiveness with Chinese garlic. As the production cost for Thai garlic is still quite high, this causes its price to be higher than that of Chinese garlic.

Impacts on consumer taste: Thai garlic has a higher price with a smaller size, more spicy taste and a strong odor making it not popular among consumers in other countries.

Impacts of Thailand-China FTA (TCAFTA) on the farmers' decisions to grow garlic According to the hypothesis testing by chi-square at the required statistical significance of .05, it showed that the statistical significance was less than the required statistical significance of.05 and H0 was thus rejected. This means that there was some correlation between the impacts from Thailand-China FTA for agricultural product and the farmers' decisions to produce Thai garlic in Fang District of Chiang Mai and Wang Hin District of Si Sa Ket in terms of price and income from the

product sale and the consumer and market demand. Such impacts can be sorted into ten aspects of garlic production as follows:

Production efficiency improvement or increasing product volume per rai by reducing the production cost. Farmers keep the seed stock on their own and do not have to buy it at an expensive price. They also reduce fertilizer use in order to save the production cost.

Production volume: Farmers will decide whether or not to grow garlic based on the consumer and market demand which will encourage them to grow the greater volume of garlic with better production efficiency.

Garlic quality: Farmers wish to grow garlic of quality while quality classification which will determine the price is fundamentally based on dryness, size and shrinkage.

Market: Chinese garlic is favored by consumers and international market due to its large size, lack of spicy taste and cheaper price, which can significantly affect Thai garlic growers.

Garlic price: It can be highly variable while farmers need to rely on the price of the previous year to determine the production volume.

Garlic distribution: Garlic distribution can be divided into two periods of time; the pre-harvest deal or future contract and the post-harvest deal.

Hoarding by middlemen: Middlemen usually buy garlic at a large amount for hoarding purposes and in order to have enough garlic to sell for the whole year. This frequently results in the shortage in supply at the end of the year which will force the price to rise.

Taste: With a small size, a spicy taste and a strong smell, Thai garlic is not much favored by foreign consumers but it is still popular among domestic consumers.

Consumer demand: The Thai consumers' demand for Thai garlic is still high due to its taste while some consumers choose Chinese garlic because of its lower price.

Garlic production measures: The instability of market, price and production volume is the existing problems for garlic production.

Except garlic production cost of Chiang Mai and Si Sa Ket, according to the hypothesis testing by chi-square with the statistical significance of .05, the statistical significance was higher than that required at .05 and H1 was thus rejected, which means that the impacts of Thailand - China FTA for Agricultural Products and the farmers' decision to grow Thai garlic in Fang District of Chiang Mai and Wang Hin District of Si Sa Ket have no correlations in terms of price and income from the product sale and the consumer and market demand upon the garlic production cost incurred by garlic growers.

Production cost: The higher production cost in Thailand will remain the crucial problem for garlic production in Thailand.

Recommendations

The study of the impacts of Thailand – China FTA on Thai garlic production:
A case study of Fang District of Chiang Mai and Wang Hin District of Si Sa Ket gives recommendations as follows:

The government should have a comprehensive understanding in making and adopting Thailand-China FTA and it should give priority to the impacts and their countermeasures as well as finding how to adapt and improve the garlic production performance to be able to compete with Chinese garlic and help Thai farmers to minimize the impacts of the import of Chinese garlic on them.

Research findings will provide a guideline for preparing ourselves to produce Thai garlic to be able to compete with Chinese garlic and help the farmers to adapt themselves to respond to the challenges. Moreover, it will be the model to deal with other impacts of Thailand - China FTA for Agricultural Products. In order to mitigate such impacts on Thai garlic producers, they have to preserve their product quality to meet the market requirement and the international standard for agricultural products in terms of export and R&D.

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