CHAPTER 1

Introduction

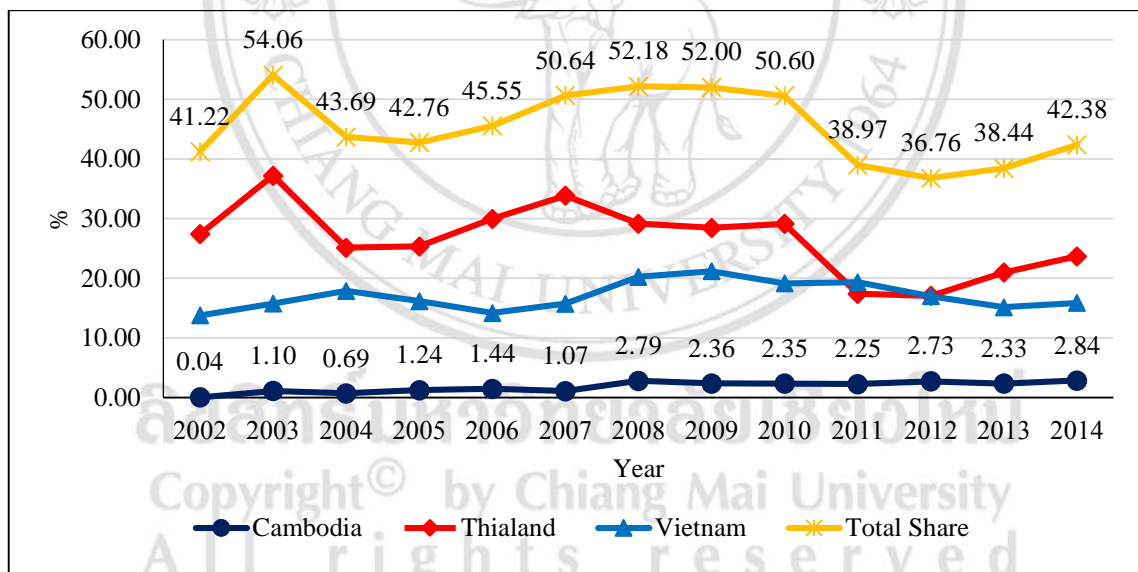## 1.1 Principle and Rational of the Study

Between 1997 and 2020 the world's population has been expected to increase nearly 2 billion more. Such a large absolute, increase in population raises serious concerns about whether the world's food production system will be able to feed so many individuals in the face of a stagnant or even declining stock of natural resources (Babu, Gajanan, & Senyal, 2014). Food security is the main factor to represent food availability, accessibility, utilization, and stability of a country (FAO, 1983; United Nations, 1975) . Food security can be achieved according to suitable policies that can ensure food sufficiency and availability both through national production or raising international trade volume (Babu et al., 2014, p. 1).

Among the world's 7 Billion people, haft of them use rice as a staple food. More than two-thirds of world's poor and hungry people are in Asia where around 90 percent of rice production is consumed. Factors of rice supply and demand plays a very important role to influence rice production. As what was addressed in Barker and Dawe (2000), rice production in Asia annually grew nearly 3% during almost 20 years between the mid-1960s to the mid-1980s. Since the mid-1980s, rice production has been growing slowly which has been influenced by factors of supply and demand.

Since the international demand for rice gradually increased along the year, the rice supply has also been increased by all rice exporters. Zolin (2010) proposed that it is marginal for trading in rice if compared with other cereals such as wheat and maize. While local demand for rice is the major concern, increasing exporting volume of rice is the most wanted target and main policy of rice comparative advantage countries. Huang, Rozelle, Hu, and Li (2002) also addressed that while the rice sector has been strongly penalized by price policy, marketing policy, and other macroeconomic policies

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such as the overvaluation of domestic currency, productivity-improved investments like agricultural research and irrigation brings a substantial gain for rice productivity.

Cambodia, Thailand, and Vietnam are the three countries among rice exporters in Asia which account for respectively 41.22% to 42.38% of the total word rice exports between 2002 and 2014 (Figure 1.1). There is very low growth of rice exports shared to the total word rice export for those three countries during last 13 years. The reason is roughly given that because there are more rice producing and exporting countries dominating to produce and export large amounts of rice like China, India, Indonesia, Bangladesh, etc. Somehow, as what was reported by Workman (2014) on the webpage of World Top Exports (WTEx), Thailand's rice exporting volume shares are around 18.6% of total rice export in 2013, which dominates second rank; meanwhile, India is the first rank (34.4%), Vietnam stands at fifth rank which accounts for 6.4%, and Cambodia is at rank number 13 which shares 1.1% of total rice exports by 15 main rice exporters which accounts for 92.7 percent of the world rice exporting volume.

Source: Author's calculation from USDA (2015)

Figure 1.1: Shares of Rice Export to Word Rice Exports from 2002-2014 (%)

Table 1.1 shows that during the last 13 years, 2002-2014, three indicators of rice supply including beginning stock of rice, milled rice production, and rice imported in Cambodia, Thailand, and Vietnam are increasing annually. For Cambodia during 2002-2014, milled rice production, increased from 2.41 million tons to 4.70 million tons, and Thailand's milled rice production increased from 17.20 million tons in 2002 to 19.15

million tons in 2014. If compared with those two countries, Vietnam is able to produce higher amount of milled rice during the same period. The production increased from 21.53 million tons in 2002 to 28.25 million tons in 2014. Since there is higher local demand for milled rice in Vietnam if compared to Thailand, Vietnam's rice export is relatively lower than Thailand's during the last 13 years. Vietnam's rice export volume was between 3.80 and 6.70 million tons during 2002-2014; meanwhile, Thailand was able to export rice between 7.55 and 11.00 million tons during the same period. For Cambodia, rice export was much lower than Thailand's and Vietnam's due to lower production along the years. Cambodia was only able to export 10 thousand tons rice in 2002 and 1.10 million tons in 2014.

Since rice is one of most important crops for world food, it significantly influences world food security. The way that each rice exporter around the globe balances between supply and demand is really important to address the tendency of future food security. The local policies are really important to promote rice production, rice trade, and farmers' income which are precisely measured by the impact of policy changes and reformation. There is incentive to study about the way that policies affect rice sectors because it does not only affect the other sub-sectors in agriculture, but all sectors of an economy also receive the changes.

Table 1.1: Rice Supply and Demand Main Indicators

Indicators	2002/ 2003	2004/ 2005	2006/ 2007	2008/ 2009	2010/ 2011	2012/ 2013	2014/ 2015
Cambodia							
Area Harvested (1000 HA)	1,995	2,109	2,516	2,613	2,777	2,980	3,025
Beginning Stocks (1000 T)	0	0	41	107	150	136	301
Milled Production (1000 T)	2,408	2,627	3,296	3,992	4,233	4,670	4,700
Paddy Production (1000 T)	3,834	4,170	5,232	6,238	6,614	7,297	7,344
Imports (1000 T)	65	350	150	50	5	40	0
Exports (1000 T)	10	200	460	820	860	1,075	1,100
Local Demand (1000 T)	2,463	2,777	2,960	3,220	3,370	3,550	3,700
Ending Stocks (1000 T)	0	0	67	109	158	221	201
Yield (Paddy) (T/HA)	1.92	1.98	2.08	2.39	2.38	2.45	2.43
Thailand							
Area Harvested (1000 HA)	10,158	9,995	10,270	10,800	10,667	10,837	10,400
Beginning Stocks (1000 T)	3,116	1,706	3,594	2,707	6,100	9,330	11,724
Milled Production (1000 T)	17,198	17,360	18,250	19,850	20,262	20,200	19,150
Paddy Production (1000 T)	26,058	26,303	27,652	30,076	30,700	30,606	29,015
Imports (1000 T)	0	0	3	300	200	600	300
Exports (1000 T)	7,552	7,274	9,557	8,570	10,647	6,722	11,000
Local Demand (1000 T)	9,460	9,480	9,780	9,500	10,300	10,600	10,900
Ending Stocks (1000 T)	3,302	2,312	2,510	4,787	5,615	12,808	9,274
Yield (Paddy) (MT/HA)	2.57	2.63	2.69	2.78	2.88	2.82	2.79
Vietnam							
Area Harvested (1000 HA)	7,463	7,450	7,203	7,334	7,607	7,864	7,770
Beginning Stocks (1000 T)	843	1,025	1,317	2,018	1,470	1,826	999
Milled Production (1000 T)	21,527	22,716	22,922	24,393	26,371	27,537	28,250
Paddy Production (1000 T)	32,617	34,418	34,730	38,904	42,194	44,059	45,200
Imports (1000 T)	40	320	450	500	500	100	400
Exports (1000 T)	3,795	5,174	4,522	5,950	7,000	6,700	6,700
Local Demand (1000 T)	17,447	17,595	18,775	19,000	19,400	21,900	21,900
Ending Stocks (1000 T)	1,168	1,292	1,392	1,961	1,941	863	1,049
Yield (Paddy) (T/HA)	4.37	4.62	4.82	5.3	5.55	5.6	5.82

Note: T=ton, HA=hectare

Source: USDA (2015)

Due to the above background, the study aims to seek out some solutions. Overall objective of this study is to analyse the way that rice policies influence food security using rice supply and demand indicators like rice production, consumption, price, and trade, and so on. In order to achieve this main aim, the study needs to fulfill the following objectives by answering the following questions:

1) *What is the recent situation of rice supply and demand in Cambodia, Thailand, and Vietnam along with their local rice and other related policies?*
2) *What are the impacts of policy interventions to the rice sector on food security (rice by using rice supply and demand indicators) in Cambodia, Thailand, and Vietnam?*

This study is going to employ some methods like quantitative descriptive data analysis and price transmission model to analyse the situation of rice supply and demand with a link to world market using rice prices. This study also uses Computable General Equilibrium (CGE) models in order to make a precise analysis of the impact of policies on food security by taking a look at rice supply and demand in Cambodia, Thailand, and Vietnam. The policy interventions will be focused on government rice policies in those three countries involving price and market polices, production policy, subsidy policy, and trade policy, which are going to be used to shock the economy; especially, the rice sector with contribution to food security.

1.2   Purpose of the Study

There are two main purposes in this study. The first purpose is to make a descriptive analysis to show a real picture of the current situation of rice supply and demand in Cambodia, Thailand, and Vietnam by employing quantitative time series data plus rice price transmission analysis to reflect the trend of food security. The second purpose is to employ Computable General Equilibriums (CGE) model which is used to adapt and construct Global Trade Analysis Project (GTAP) database to simulate and analyse the impact of policy interventions in the rice sector in Cambodia, Thailand, and Vietnam on economy wide and food security at the local and international levels.

1.3   Advantages of the Study

With the overall aim to see the whole picture of the impact of the policies that intervene in rice sectors on food security at the local and international levels, this study will significantly give information about the trend of food security. With this study result, it

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is useful for policy makers as well as investors to get the information that the food security is closely related to rice production, especially in Asian countries. Locally, this study will show the changes of rice supply and demand systems affected from the changes of local policies related to rice sector. Simultaneously, the situation of local food security is also recovered which is measured by the changes of rice quantities and prices. In addition, the changes of the other sectors in the countries are also revealed due to the changes of rice sector. Since the major rice exporters such as Thailand, Vietnam, and Cambodia significantly affect the world rice market both in rice price and quantity, structural change in rice sectors in those countries will lead to changes in price and quantity in the world markets. Internationally, this study also gives a picture of the impact of the changes in policies intervened in rice sector of Cambodia, Thailand, and Vietnam which will lead to changes in the international food market and food trade. More importantly, the trend of world food security is also analysed due to international rice price and quantities changes.

1.4 Scope of the Study

With the aim to study how changes in policy interventions in rice sector will impact food security, this study is going to mainly focus on three rice exporting countries, consisting of Cambodia, Thailand, and Vietnam. The picture of the rice supply and demand situation will be depicted in a simple, descriptive way except the rice price will be econometrically estimated using price transmission model to link the local rice market with world market. Quantitative simulations using CGE models will be specifically conducted based on GTAP database plus regions and sectors disaggregation. Due to limited data in GTAP 9 database, the study is going to be conducted by using data in 2003 for Cambodia, 2005 for Thailand and Vietnam as based year. CGE models are employed to simulate the impact of rice policy reform in single-country on each economy-wide and multi-countries' (Cambodia, Thailand, and Vietnam together) effect on the world rice market price and quantity.

Within this research, the study will be divided into three main scenarios as following:

      1) Scenario I: Making a quantitative data description of rice sectors and related policies in Cambodia, Thailand, and Vietnam. Descriptive statistics will be used intensively from different data sources. Also, the policy effectiveness is roughly measurement based on the change of data and performances.

2) Scenario II: This scenario will analyse price transmission between local prices of rice in those three countries with international price of rice. Also, the transmission among local prices of those three countries are investigated. The analyses will employ some econometrics models to test for co-integration and causality.

3) Scenario III: This scenario is going to examine the effect of some policy changes in rice production and trade of Cambodia, Thailand, and Vietnam. The analyses will be done by simulating the experiments using adapted CGE model within GTAP database.

1.5   Research Designs

This research thesis consists five chapters, consecutively. The first chapter primarily gives an introduction of the study. The latter is chapter 2 which is the theoretical background and literatures review. Data descriptions and methodologies of the study appear in chapter 3. Chapter 4 will be the empirical result discussions part, followed by the conclusion, recommendations and further research suggestions in chapter 5.