

CHAPTER 1

INTRODUCTION

1.1 Principle and Rationale of the Study

Rice, which contributes the staple food for Cambodian population, is important to the economy of many developing countries. In 2012, 85 percent of Cambodia's cultivated land was contributed to rice production (MAFF, 2012). Agricultural is the second largest sector of the Cambodian economy, representing for 36 percent of real gross domestic product (GDP), the industry sector has accounted 24 percent and service sector 40 percent of real GDP in 2013 (World Bank, 2013). Rice is the most significant crop in term of production in Cambodia. It also employs the population in remote area and provides the major source of income in rural areas (Thomas, 2013). Approximately 80 percent of the Cambodian population relies on agriculture, especially rice production for their livelihoods and unsurprisingly the huge majority of those are living on less than \$1.25 a day (Thomas, 2013). Cambodia is seen as a low income country, rice plays crucial food for households and source income of rural people, when looking at food security. FAO (1994) approximated rice nutrition intake on average for 75 percent, with per capita consumption needed approximately 151 kg of white rice or 250 kg of white rice, or 1.4 tons per household annum (MAFF, 1996). Rice is planted in both the wet and dry seasons. Wet-season rice is planted in June or July and harvested in November or December and this contributed to 86 percent of the total rice area in 2007 (MAFF, 2013). According to (Young et al., (2001), the area under early wet season is estimated to be approximately 2,241,114 hectares in 2007. Dry season rice is planted December or January to April or May (Dawe, 2009). However, these planting periods are not clearly limited due to diversity of farmer practice of staggered planning (Javier, 1997). In 2007, paddy harvested area in the dry season was approximately 344,791 hectares or about

14 percent of the total rice area (MAFF, 2009). The yield of dry season paddy in 2007 accounted for 3.96 tons per hectare or 64 percent over the yield of wet season paddy (2.41 tons per hectare) (Dawe, 2009).

The paddy production trend has experienced significant changes for the past five decades (Dawe, 2009). There are four different trends (see Figure 1.1). Between 1960 and 1970, rice production went up but with high year-to-year volatility. At that time, the paddy harvested area increased and decreased at around 2 million hectares, with the yield of paddy rice growth being the major indicator of the production growth (Dawe, 2009). Paddy production went down sharply during the 1970s as much of the harvested area was unable to grow during the Khmer Rouge regime (Dawe, 2009). Paddy production was slowly went up after the fall of the Khmer Rouge regime and kept increasing at remarkable point until 1994. The major source of production growth from 1980-1994, was grown in rice while the yield still below 1.5 tons per hectare (Dawe, 2009).

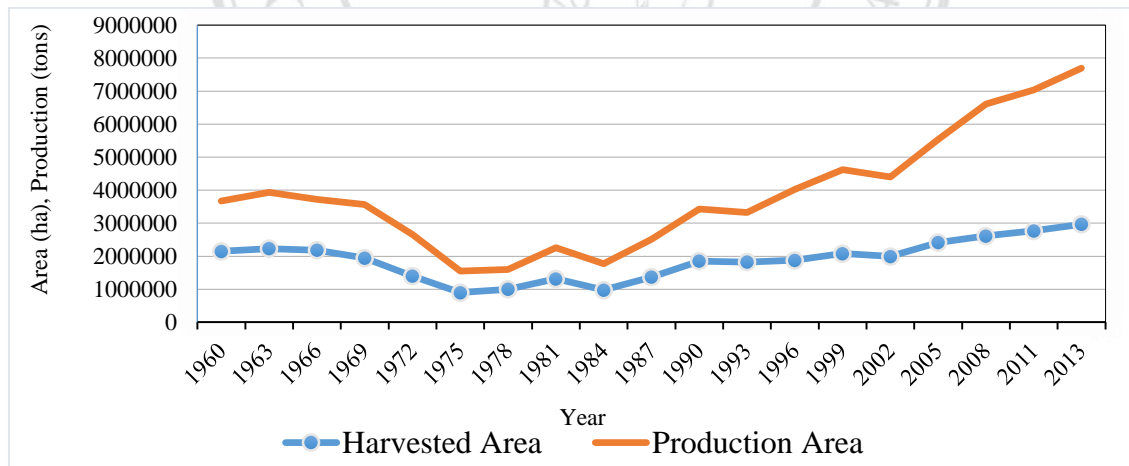


Figure 1.1: Trends in area and production of rice, Cambodia, 1960 – 2013

Source: Data from United States Development of Agriculture (2014)

In 1994, agriculture was considered as priority in national development policy; the strategies have been created to enhance food security, boost economic growth, raise rural income, and develop agricultural export industries (FAO, 2013). Since 2004, harvested area has increased

every single year. It specifies approximately 2.3 million hectares of cultivated land; however, in 2013 it has increased to 2.6 million hectares (Table 1.1: Key indicators of rice production in Cambodia (2004-2013)). Rice product has increased from approximately 4.1 million tons in 2004 to 9.3 million tons in 2013. This increase in rice production may be due to high technologies, access to fertilizers and knowledge in rice production could be demonstrated rising of productivity. From the data of the Ministry of Agriculture, Total paddy rice production has increased more than 6 percent in 2012 compared with 2011 due to an increase in paddy rice fields in the previous season. The data showed that the paddy rice production went up to 6.06 percent to 9.3 million tons in 2012 compared with 8.8 million tons in 2011. The yield production per hectare went down from 1.18 percent to 3.136 tons per hectare in 2012 compared with 3.173 tons per hectare in 2011. Paddy field increased by 106 percent to 16,766 hectares.

Table 1.1: Key indicators of rice production in Cambodia (2004-2013)

Key Indicators of Rice Production in Cambodia (2004-2013)											
	Units	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Cultivated Area	ha	2,374,17	2,443,530	2,541,905	2,585,905	2,615,741	2,719,080	2,795,892	2,968,529	3,007,545	2,636,612
Harvested Area	ha	2,109,05	2,414,455	2,516,415	2,566,952	2,613,363	2,674,603	2,766,617	2,980,297	2,968,967	2,566,111
Paddy yield	ton/ha	1.977	2.479	2.489	2.621	2.746	2.836	2.970	3.173	3.117	3.163
Production	ton	4,170,284	5,986,179	6,264,123	6,727,127	7,175,473	7,585,870	8,249,452	8,779,365	9,290,940	9,389,961
Consumption	ton	1,905,896	2,013,533	2,053,983	2,096,025	1,970,270	1,979,214	2,076,542	2,108,022	2,142,178	2,137,878

Source: Ministry of Agriculture, Forestry, and Fisheries, Cambodia (2013)

However, this increase heavily dependent on milling technology, weather, farmers' experience, machinery, and rice cultivated technique. The rice yield has increased year-to-year. The main reason for the enhancement of rice production because of better accessing to fertilizers, machinery, irrigation, and other inputs (Tong, 2010).

The Cambodian government is making an effort to stimulate rice exports to 1 million tons by 2015, and is investing in rice processing technologies as well as providing financial support to farmers. These measures were being taken to help rice exports in 2012 that were hurt due to lack of buying by traditional Vietnamese buyers in previous year and the confrontation of increasing supply of paddy in the global market (Yang, 2013). Domestic consumption for rice per capita was about 143 kg/year and demand per annum was about 2.11 million tons. The population growth per annum was about 1.5% and surplus paddy rice was about 4.34 million tons in 2012 (Yang, 2013).

Moreover, the Cambodian government has considered the agricultural sector as the main economic strategies to reduce rural poverty and increase farmer incomes. Farmer and the government have to work together in order to raise food production and also to help rising the income of farmers. In 2012, Cambodia exported 200,000 tons of rice to 48 countries. Two major rice producers have been known as Thailand and Vietnam. Thailand exported 10.5 million tons of milled rice last year. Vietnam exported 7.2 million tons. This means that the price of rice product does not depend on Cambodia (Khoun, 2012). Cambodia's rice production has kept rising from 8.2 million tons in 2010 to 8.8 million tons in 2011, according to (Khoun, 2012). Eighty percent of population is in the agricultural sector with 3 million hectares of land. However, Cambodia needs more investment in agricultural sector to enhance quality of rice production and create value added to Cambodian rice in turn better the lives of Cambodian people (Khoun, 2012).

After a civil war lasting for two decades, the Cambodian economy has grown at an average rate of 7.8 percent per year from 1994 to 2010 (Annual development review, 2012). Cambodian economy has been driven by four sectors which include garments and footwear, hotels and restaurants, construction, and agriculture. Agricultural sector is known as the lowest growth among those four sectors, at an average of 5 percent per year. Agricultural

growth has mainly been based on the expanded use of inputs as against intensive improvement in productivity (Chandararot and Liv, 2013). Agriculture is the key to reducing poverty and eradicating hunger in Cambodia (FAO, 2013). Cambodia is rich in natural resources including land and water, favorable climatic conditions and geographic position, which represent potential comparative advantages for increased agricultural production and livelihood improvements (FAO, 2013). Crop production contributes about 54 percent of the sector GDP, with fisheries accounting for 25 percent, livestock for 15 percent and forestry and logging for about 6 percent. Although only 8 percent of the rice is irrigated, the rice production has increased steadily and made Cambodia not only self-sufficient in rice, but even an important exporter. Other important food crops include corn, soybean, mung bean, cassava and fruits such as mango, pineapple, jackfruit, durian, rambutan and banana. Cash crops have also seen a significant expansion in particular sugarcane, rubber and palm oil (FAO, 2013).

In 1989, paddy production in Cambodia has been introduced to a new global market in the early 1990s which is seen in Table 1.2: shares of real GDP over the period of time. Agriculture is the largest sector of the Cambodian economy, contributing to 43-49 percent of real gross domestic product (GDP). The industry sector has represented for 16-19% and the service sector, 32-35 percent of GDP (World Bank, 1995). Agriculture is considered as a major area in national development policy. Strategies have been created to enhance food production, push economic growth, improve rural incomes, and develop agricultural export industries (FAO, 1994).

Three among four largest subsectors of the economy in the early 1990s are within the agricultural sector. Rice is the main subsector, representing an average 17 percent of GDP. Livestock is the third among other subsectors, contributing for 13 percent of GDP and other crops and rubber were the fourth largest subsectoral contribution, at 10 percent of GDP (Nesbitt, 1997).

Table 1.2: Shares of real GDP by sector (in percent)

Sector	% share of GDP		
	1990	1992	1994
Agriculture	52.3	49.4	44.9
Rice	20.4	16.6	12.8
Other crops and rubber	10.0	11.5	10.1
Livestock	14.0	13.1	13.2
Fishing	5.1	4.5	3.9
Forestry	2.8	3.5	4.9
Industry	14.9	16.3	19.6
Services	32.8	34.4	35.6
Total GDP (billion riels)	240.9	243.7	306.8

Source: World Bank (1995), cited in Nesbitt (1997)

From 1993 to 1999, agriculture was the first largest sector of the Cambodian economy; contribute 39-46 percent of gross domestic product (GDP). The services sector had accounted for 40 percent and the industry sector, 13-21 percent of GDP (see Figure 1.2: Percent share of GDP by sector at constant prices (in percent), Cambodia). Since 1999, agricultural sectors was expanded moderately and considered as the second largest sectors among other sectors. An average GDP growth in Cambodia has increased every year because it has gone up in services and industry sectors, especially garment export and tourism. The growth rate among three major sectors have changed in very small amount and positively impacted on GDP growth in Cambodia.

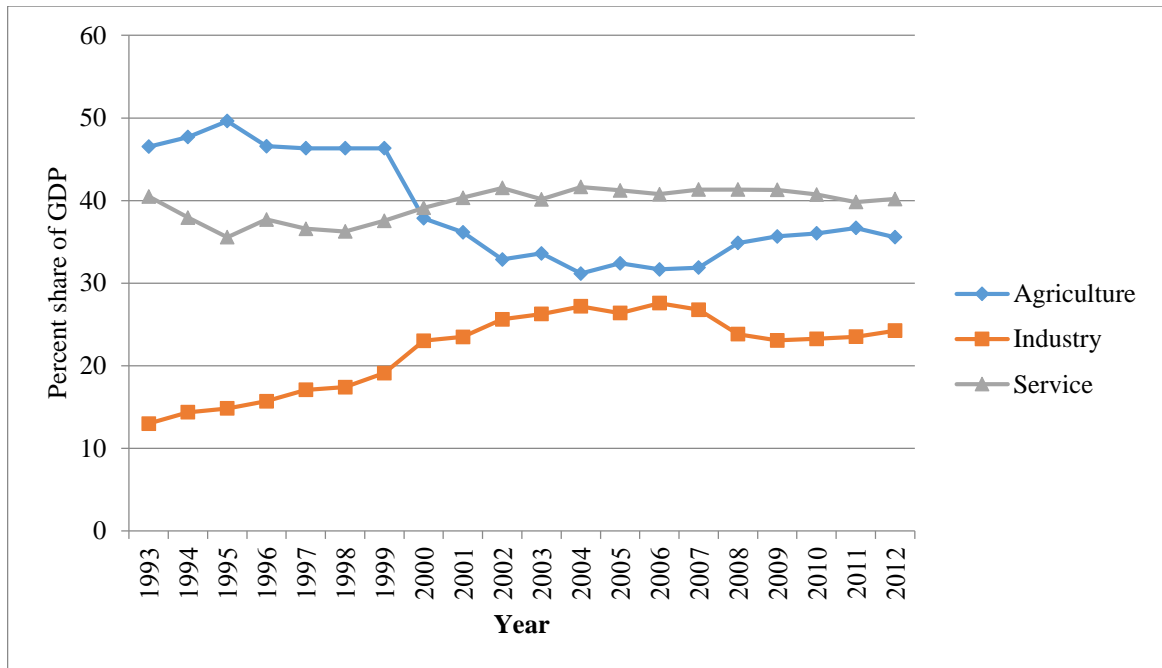


Figure 1.2: Percent share of GDP by sector at constant prices (in percent), Cambodia

Source: World Bank (2014)

Despite the fact that the agricultural sector plays a crucial role in developing Cambodian economy, the country encounters many challenges and constraints that result in numerous obstacles which make it difficult to take advantage of the new opportunities. The difficulties of Cambodian farmer include the lack of access inputs (e.g., labors, fertilizers, machineries, and seeds) and credit, deficiency of public services in marketing, less support from the government in term of investment and infrastructure in rural area. The huge majority of poor rice farmers due to the lack of capital. Insufficiency of capital or access to affordable line of credit, poor rice farmers could not find it virtually impossible to move beyond subsistence to producing a marketable surplus (Thomas, 2013).

In order to achieve the objectives of this study, three significant questions have been created to identify rice production in Cambodia which are as following:

- 1) *What is the rice production situation in Cambodia?*
- 2) *Is rice export growth necessary for fostering Cambodian economic growth?*

3) *How much quantity of rice production should be produced in Cambodia during the time periods 1960-2013 using a forecasting model?*

1.2 Purpose of the Study

The study has three main purposes. Firstly, it aims to analyze the situation of rice production responses. Secondly, this paper also attempts to evaluate the factors affecting to rice production, and forecast rice production in Cambodia based on current data of rice productivity. Thirdly, to estimate the contribution of rice export to economic growth.

1.3 Advantages of the Study

Rice is considered as the staple food of Cambodia and food security, its most significant field crop today. This study will help government on the handling of the issue of food problem essentially rice in Cambodia. This study also benefits investors, rice exporters, agricultural factories, farmers, the Cambodian ministry of agriculture, forestry, and fisheries, the international rice research institute, and governments. The results will provide rice information and knowledge for the Cambodian government especially, the Cambodian ministry, forestry, and fisheries to enhance rice production and marketing and to improve the effectiveness of strategic plan to boost rice production in Cambodia. The findings also furnish the fundamental knowledge of rice production contributes to economic growth as well as forecasting of rice production in order to minimize the production uncertainty and to help the government and rice producers are able to forecast future production more effectively and accurately in Cambodia. This paper will be the first study to use an econometric analysis of the rice production, economic growth and forecasting rice production in Cambodia in order to understand the major factors that influence rice production and rice export to stimulate Cambodian economic growth and agricultural extension. The results of this study will help in developing the rice production and its marketing in Cambodia.

1.4 Scope of the Study

The study examines current situation of rice production and its history in Cambodia. Production function will clarify the factors that enhance the possibilities of rice production

that can be produced. ARIMA model is used to forecast rice production within five years in advance. Economic growth model will also analyze agricultural sector and rice production to stimulate Cambodian economic growth.

1.5 Research Designs

This research uses the Porter's Diamond and ARDL models to examine the situation of rice production in Cambodia and investigate the input factors impact on rice production output. Finally, the third objective of this study employs ARIMA model.

Chapter 2 provides the concepts and theories of production and economic growth and review the related previous studies.

Chapter 3 identifies model specification and provides the information of data collection and conceptual framework.

Chapter 4 deals with the empirical results and discussion.

Chapter 5 provides the policy implications and conclusions from the three objectives of studies. Suggestions are also made for future study.

This study will analyze how the Cambodian rice production can contribute to economic growth, forecast rice production for farmers and government planning, and increase rice output in responding to high prices in order to boost the income and well-being of farmers.

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