DEVELOPMENT OF AGRICULTURAL INDUSTRY AND LOCAL COMMUNITY EMPOWERMENT IN MANAGING SUSTAINABLE AGRICULTURAL RESOURCES IN SOUTHEAST ASIA: Case Study Thailand

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E-mail: bmrlipi@centrin.net.id
lipipress@centrin.net.id
press@mail.lipi.go.id

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PREFACE

This book is a research report which offers some explanation about how Thailand develops its rice production. Some supporting and inhibiting factors are presented and discussed in detail to get a comprehensive understanding about the topic. The topic in this book is a new topic of the Research Center for Regional Resources, especially for the Southeast Asia division, but it is in line with the grand focused research theme in The Indonesian Institute of Sciences.

The study takes Bangkok as the researched location. We would like to thank to Dr. Sunait Chutintaranond, Ph.D. as our counterpart and Ms. Michiko (broad member of API in Thailand) for her helps during our visit in Thailand. We also thank to Dr. Supa Yaimuang, the Director of the Sustainable Agriculture organization for her precious information about Thailand agriculture and her help in trying to link us to other Thai agricultural experts. We are grateful for many helps from the Indonesian Embassy, library of the University of Chulalongkorn and Thammasat University, as well as some Indonesian students in Thailand, who make this research study possible.

Writers

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1
Agricultural Development in Southeast Asia: Sustaining Rice Production in Thailand

Mayasuri Presilla and Rucianawati

A. Rice Development in Thailand: A Glance Introduction

Rice is life for more than thousands of millions of people around the world. It is mostly cultivated in Asia as it is a staple food for around 2,000 million Asian people (FAO, 2004). The top ten rice producing countries are located in Asia, consisting of China, India, Indonesia, Bangladesh, Vietnam, Thailand, Myanmar, the Philippines, Brazil, and Japan (see Table 1.1). However, among those countries, Thailand is the most well-known rice growing country although China, India, Indonesia, Bangladesh, and Vietnam produce much more rice. For Thailand, rice is the main and preeminent agricultural commodity. Therefore, it is not surprising if a considerable part of agricultural land use in Thailand is intended for paddy fields. In 2006, the total paddy field area was estimated at reaching 26.3 million hectare (MOAC, 2006) or about 49.76% of total agricultural land in Thailand, whereas land use for crop field and vegetable, flower and ornamental is only 21.39% and 0.81% respectively. However, land area for rice field usage in Thailand is unevenly distributed in every part of the country (see Table 1.2).

Table 1.1 Top Ten Rice Producing Countries, 2009–2010

Countries	Rice Production (Mt)
China	166,417,000 (32.7%)
India	132,013,000 (26.0%)
Indonesia	52,078,832 (10.2%)
Bangladesh	38,060,000 (7.5%)
Vietnam	34,518,600 (6.8%)
Thailand	27,000,000 (5.3%)
Myanmar	24,640,000 (4.8%)
The Philippines	14,031,000 (2.8%)
Brazil	10,198,900 (2.0%)
Japan	9,740,000 (1.9%)

Source: *Rice Trade*, 2010.

Table 1.2 Rice Field Percentage and Contribution per Region in Thailand, 2010

Thailand Region	Rice Field Percentage	Contribution (%)
North	22	25
Central	21	30
Northeast	53	41
South	6	n.a.

Source: *IRRI*, 2010.

It is fortunate that the amount of Thailand's rice production has been increased every year. The significant increase happened when the country applied the Green Revolution Program in its agricultural sector in the 1960s (Phongpaichit dan Barker, 1995). Since then, although it often comes about

in fluctuations, Thailand continuously experiences rising rice production every year (FAO, 2009) as can be seen in Table 1.3.

Table 1.3 Thailand Rice Production, 1990–2007

Year	Production (thousand ton)
1990	17193
1991	20400
1992	19917
1993	18447
1994	21111
1995	22016
1996	22332
1997	23580
1998	23450
1999	24172
2000	25844
2001	26523
2002	26057
2003	27038
2004	28538
2005	30292
2006	29269
2007	27879

Source: *FAO*, 2009.

In 2009, rice production had increased to 31.48 million tones. Moreover, it is estimated to have been 31.64 million tones in 2010 and is forecasted to be 31.41 million tones in 2011 (see Table 1.4).

Table 1.4 Thailand Cash Crops Production

Crops	Production (Million tonnes)		
	2009	2010E	2011F
First rice	**23.24**	**23.25**	**22.94**
Second rice	**8.42**	**8.39**	**8.47**

Source: *Center for Economic Information; Office of Agricultural Economic*, 2010.

E = Estimate

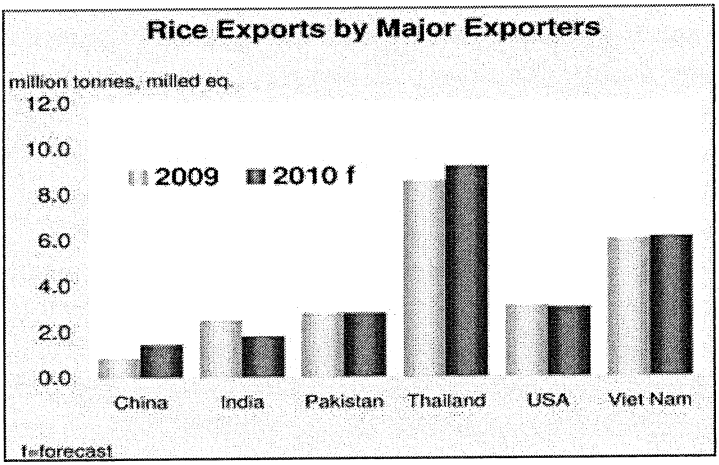
F = Forecast

Due to high rice production every year, Thailand can fulfill domestic needs as well as the world market's needs through exporting its rice surplus to the international market. The higher rice production also means higher rice export. In other words, rice production is in line with its export. The journey of Thailand rice exports had started thousands of years ago. Table 1.5 shows that Thai rice exports have continuously increased since 1990 until 2007. In 2009, Thailand succeeded to export around 8 million tonnes of its milled rice to the world market, and it was projected that in 2010 its rice export reached about 9 million tonnes (see Diagram 1.1). High rice export brings large meaning in Thailand's economy since it contributes to foreign exchange income.

Table 1.5 Thailand Rice Export, 1990–2007

Year	Export (thousands ton)
1990	4017,08
1991	4333,07
1992	5151,37
1993	4989,22
1994	4858,63
1995	6197,99
1996	5454,35
1997	5567,52
1998	6537,49
1999	6838,90
2000	6141,36
2001	7685,05
2002	7337,56
2003	8394,98
2004	9989,73
2005	7537,12
2006	7433,57
2007	n.a.

Source: *FAO*, 2009.



Source: *Rice Trade*, 2010

Diagram 1.1 Rice Export by Major Exporters, 2009-2010

Thailand's big success in rice production and export is an indication that this country has succeeded in developing and sustaining its rice production. Therefore, Thailand's experiences are important as a lesson learnt for other rice based countries to develop their rice cultivation.

Based on the background above, one big issue in this research is to know how Thailand develops and sustains its rice production. Specifically, this book asks:

- What are the problems encountered by Thailand in developing rice production?
- What are the significant factors behind Thailand's success in sustaining and developing rice production?

B. Agricultural Growth and Development: a Theoretical Framework

It is not easy to get the right theoretical framework for this specific topic. Therefore, the theoretical framework for this topic will be drawn on a larger scope, i.e. agricultural growth and its development. Agriculture is an essential sector, mainly for developing countries since the majority of their population heavily depends on it. Besides, agriculture attaches great significant meaning to general economic development and industrialization in particular. The process of agricultural growth itself accordingly has to be the concern and should get top priority. Hayami and Ruttan (1985: 42) says that a theory of agricultural development should provide 'insight into the dynamics of agricultural growth and its development'. This theoretical framework will review several theories of

agricultural development which delineate, implicitly and explicitly, the process of agricultural development and its relations to economic development. Those famous agricultural development theories are the resource exploitation, the conservation, the location, the diffusion, and the high-payoff model.

According to Hayami and Ruttan (1985: 42–45), the Resource Exploitation Model is based on the implications of the expansion of land and labour. The roots of this model are 'the staple model' and 'the vent-for-surplus model'. Staple Model theory was developed by the Canadian economic historian, Harold A. Innis, in the late 1920s. He emphasizes the importance of rapid agricultural growth and agricultural export to gain economic development in the newly settled areas of North America in the early stage of Canadian economic development. A second model, the 'vent-for-surplus', was introduced by the Burmese economist, Hla Myint, who explained the rapid growth of production and exports by peasants in a number of tropical countries during the nineteenth century. Myint notes that 'surplus land and labor capacity enabled peasant producers to expand production rapidly under the stimulus of new markets opened up by the reduction of transport costs'. It is apparent that these models heavily exploit natural resources, particularly (new) land and labour, for expanding agricultural surpluses and further economic development. Yet, according to Hayami and Ruttan (1985: 45), the resource exploitation model is only relevant in the new pioneer settlement land or plantation development. In order to sustain agricultural growth, they suggest developing other models, such as (a) resource-

conserving or enhancing technologies for crop rotation or manuring; (b) fertilizing natural soil with fertilizer; and (c) developing modern fertilizer-responsive crop varieties.

The next theory of agricultural development is the conservation model. This model evolved from the advances in crop and livestock husbandry associated with the English agricultural revolution and the concepts of soil exhaustion. This model was actually initiated in the late eighteenth and early nineteenth century by Arthur Young and other exponents of agricultural science. This model believes that soil exhaustion is very dangerous and all elements of the soil needs to be completely restorated. The presumption of this model is that '...good farming practice should maintain the organic content of the soil at the definite level, usually the level natural to the particular soil' (Usher cited in Hayami and Ruttan 1985: 46). Therefore, this model introduces more intensive use of bio from new forage and green manure of crops and animal fertilizer for plant nutrition. In other words, the input used in this conservation model comes largely from the agricultural sector itself. Hayami and Ruttan (1985: 52) assure that agricultural development within this approach can sustain growth of agricultural production over a long period of time. Further, this approach is the embryo and inspiration to organic farming and the agrarian fundamentalist movement in the developed countries.

The third agricultural development theory is the location model. This model was initially formulated by Johann Heinrich von Thunen in 1783-1850, who explained geographic variation

in the location and intensity of agricultural production in an industrializing economy. Later, this model was reformulated by Theodore W. Schultz in 1953, who introduced the 'urban-industrial impact hypothesis'. Schultz (cited in Hayami and Ruttan 1985: 53) says that '(1) Economic development occurs in a specific locational matrix... (2) These locational matrices are primarily industrial-urban composition... (3) The existing economic organization works best at or near the center of a particular matrix of economic development and it also works best in those parts of agriculture which are situated favorably in relation to such a center'. The rational in this hypothesis is the efficient function of factor and product market in rapid urban-industrialized areas rather than in urban non-industrialized areas. Extracted from some development economists, Hayami and Ruttan (1985: 54) assert that urban-industrial growth gives two different impacts on agricultural development. On the one hand it brings modernization, but on the other hand it is as a source of exploitation. Further, Hayami and Ruttan (1985) implicitly state that the agricultural growth process under the urban-industrial model has to deal with labour force, new inputs, techniques, and market demands.

Two approaches of agricultural development which seems in line with the location model (urban-industrial model) are the Balance-Growth approach and the Agricultural Demand Led Industrialization (ADLI) approach. The Balance-Growth Approach was introduced by Singer in 1979 (Susilowati 2008: 46). The accentuation of this approach is on the balance between agricultural sector and industrial sector

development. In his approach, Singer claims that agricultural development will stimulate industrial sector development, such as industry of fertilizer, seed, and agricultural machines; while on the other hand; industrial development will widely open the market for agricultural products. Unfortunately, the orientation of those agricultural sector and industrial non-agricultural sector developments in this approach are in a big scale. This means a necessary immense investment. This then becomes a hindrance for developing countries due to capital limitation. Another approach is the Agricultural Demand Led Industrialization (ADLI) approach. This approach is a perfection of an approach introduced by Adelman in 1984. This approach puts the agricultural sector as a part of development strategy. According to Adelman, this approach is fit to be implemented in developing countries since it lays the emphasis on agriculture in small and medium scale and it entails many workers, particularly from rural areas. Additionally, Adelman argues that agricultural sector development will generate other sectors developments, for example the industrial sector. The industrial sector is useful for producing agricultural input (for example fertilizer, pesticide, and seed) or for processing agricultural output (agricultural products), such as agro industries. These sectorial developments certainly require numerous workers. Besides, economic development based on agricultural sector will build national food security since it can fulfill domestic needs (Susilowati 2008: 47).

Based on Adelman (cited by Susilowati 2008: 48), ADLI strategy implementation can be done by investing

infrastructure on agricultural sector, agricultural technology distribution, and research and development on agricultural sector mechanisms in small scale for setting up agricultural productivity. It is hoped that the relation between agricultural sector and other sectors will increase and evenly distribute people's income. As a result, it tries to improve and sustain economy in national as well as society level (Vogel 1994: 137).

The next agricultural development theory is the diffusion model. This diffussion model links two sciences agriculture and economics. Hayami and Ruttan (1985: 57) reveal that 'the route to agricultural development in this model is through more effective dissemination of technical knowledge and a narrowing of dispersion in productivity among individual farmers and among regions'. The emphasis of this model is on international technology transfer and the intellectual foundation, such as research and extension, particularly for the farmers. It is expected to encourage innovations among the farmers and contribute to agricultural productivity growth. Thus, at the end, it can transform traditional farmers into 'economic men' which can increase their income. However, the model has some limitations, such as the lack of technical assistance and community development programs which in turn bring failure to 'generate rapid moderation of traditional farms or rapid growth in agricultural output' (Hayami and Ruttan 1985: 59).

The last agricultural development theory is the high-payoff input model. The key of this model is to convert a traditional agriculture into a productive source of economic growth by

investing modern high-payoff inputs to farmers in poor countries. According to Schultz (cited by Hayami and Ruttan, 1985), there are three important investments for agricultural development under this theory, specifically (1) investment in the agricultural experiment stations to produce new technical knowledge; (2) investment in the industrial sector to develop, produce, and market new technical inputs; and (3) investment in the education and research for farmers to use modern inputs effectively. The aim of these investments is to develop high-yielding modern grain varieties which are highly responsive to industrial inputs, such as fertilizer and other chemical, effective soil and water management. This model is to be 'heralded' as in line with the Green Revolution. Nonetheless, Hayami and Ruttan (1985: 61) call this model as 'incomplete as a theory of agricultural development' for the following reasons:

> The mechanism by which resources are allocated among education, research, and other alternative public and private sector economic activities is not fully incorporated into the model. The model does not treat investment in research as the source of new high-payoff techniques. But, it does not explain how economic conditions induce the development and adaptation of an efficient set of technologies for a particular society. Nor does it attempt to specify the process by which factor and product price relationships induce investment in research in a particular direction. Moreover, the high-payoff input model does not explain how economic conditions induce the development of new institutions such as publicly supported agricultural experiment stations to enable both individuals and

society to take fuller advantage of new technical opportunities. Nor does it attempt to specify the process by which farmers organize collective action for the creation of public infrastructure, such as irrigation and drainage systems.

C. Mapping and Conducting Rice Development Field Work in Thailand: a Foreword

The research about Rice Cultivation Development in Thailand is the first of five years planned research about Agricultural Sector Development in the South East Asia from 2010 to 2014. This first year research (2010) in Thailand is focused on learning several inhibiting factors and some strategies to raise rice production and rice export in Thailand. The second year research (2011) will also be held in Thailand, however, with different focus. The research in the second year will give emphasis to a recent interesting agricultural issue in Thailand, which is sustainable agriculture. The same research theme and focus in those two years research in Thailand will be carried on the third (2012) and the fourth (2013) year research, which will be conducted in Vietnam.

The last research year will be conducted in Cambodia in 2014. The focus will be on the role of agricultural sector in the Cambodian economy after its internal conflict. This research will also summarize all the five research series and will also make a comparison study of agricultural development in Thailand, Vietnam, and Cambodia. The five years research result is expected to give a comprehensive understanding and

to be a precious lesson learnt about the dynamic and development of agricultural sector in these three countries.

This first year research (2010) takes Thailand as the research location since it is the centre of rice production and export in the world. Bangkok, the capital city of Thailand, is chosen for searching primary and secondary data. Some universities in Bangkok, such as Chulalongkorn University, Thammasat University, and Kasetsart University are the main destinations of the researchers in this study.

Primary as well as secondary data collection for this research was done in both Indonesia and Thailand. To get primary data, the team interviewed some informants, who were purposively chosen by considering their understanding on these research issues. Also, literature study was done to acquire secondary data and to complete the primary data. PDII, ASEAN Secretariat library, and CSIS were taken as places to find secondary data in Indonesia, while TDRI and universities' libraries in Bangkok were the places for getting primary data in Thailand. The team research also did observation in two regions near Bangkok, which are Ang Thong and Ayutthaya Provinces since these regions are well known as central rice production areas in Thailand.

Collected data are descriptively analyzed by using multidisciplinary perspectives, consisting of historical studies, economic developmental studies, and socio-anthropology. Historical study is used to draw historical development of rice production and agricultural systems development in Thailand,

for instance the technological use in Thailand. Economic developmental study is utilized to exploit some impeding and supporting factors of rice agricultural development in Thailand, while socio-anthropology study was used to understand some changes in rice production strategies and to see some parties involved in this rice production increase in Thailand. The application of these multidisciplinary studies is expected to explain Thai success in developing rice agriculture.

The research has been conducted by some researchers of the Research Center for Regional Resources, of the Indonesian Institute of Sciences. However, this research also involved researchers from other research centers in order to get fruitful input and to get an in depth result of this research. Cooperation with some parties; such as academicians in Thailand and other parties related to this issue; was done with the purpose of collecting information, data, and also experiences. It is hoped that through this research study the Government of Indonesia can learn from Thailand about the strengths and weaknesses in sustaining rice production so that Indonesia can improve and develop its rice production.

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2
Rice Farming in Thailand: History and Its Meaning for the Thai People

Rucianawati

A. Background

Thailand is a country that depends a lot on the agricultural sector in the economy. The country has fertile soil especially in the Chao Phraya River delta. This region has a variety of main crops such as rice, vegetables, and fruits. Agricultural products of Thailand including vegetables and fruits are traded in several countries. These products are famous for their good quality, such as Siam rice (jasmine rice), durian Bangkok, papaya Bangkok, and guava Bangkok, and many more.

For some time, Thai exports of rice to the world market has been through bilateral cooperation with other countries. Around the 1960s, Thailand had abundant rice production. Therefore the country was able to surpass the position of Burma in production of rice. Burma's rice exports significantly declined due to the political upheaval caused by the seizure of power by Ne Win in 1962 whose coup d'état ended the rule of Prime Minister U Nu. United Nations Food and Agriculture Organization in April 1965 reported that Thailand had replaced Burma as the biggest rice exporter in the world. In 1964, Thailand traded 7.8 million tons of rice and this country earned about 4.4 billion baht from shipments of 1.89 million tons of rice. It was a world record at that time

(http://www.bangkokpost.com/news/local/35895/the-world-s-rice-bowl, accessed June, 13 2010).

This section will explain how the history of cultivation, especially rice cultivation in Thailand. The background of the history of agriculture in Siam (Thailand) will be considered here from the middle of the 19th century. It is very interesting to look at the chronological rice farming development in Thailand, because it will let us know each step of the Thai rice farming condition. Recently, the Thai Government has an agenda to promote Thailand as the "*Kitchen of the world*" and an "*Organic producer*" (Interview with Ms. Supa, 30 July 2010).

B. History of Rice Farming in Thailand

The history of rice farming in Thailand can be traced from about a thousand years ago, before rice was cultivated in China and India. Fossil remains of rice have been found in Punghung Cave, Maehongsorn Province, and is expected to be more than 5000 years old (RRI & DOA, 2004: 2). The fossils show that wild rice had become a source of human consumption for some time. Together with the development of knowledge, rice has been cultivated to obtain the maximum yield results.

Thailand has a geographical advantage with the weather and soil fertility, so this country is a productive agricultural region. Chao Phraya River Delta for example, has long been a major rice producing areas in Thailand. In the era of the Sukhotai kingdom, agricultural advantage was described by the term

"fish in the river and in the rice fields." However, the Sukhothai kingdom economy did not depend on the agricultural sector, but depended more on trade. At that time the rice was planted for food sufficiency (subsistence), and not trading. In the 49th inscriptions, written in 1412, it is mentioned that the community worked together to open the forest and built rice farms, fruit plantations, and building dams for irrigation purposes. The farmers planted glutinous rice for their consumption (RRI & DOA, 2004: 14–16).

In the era of Ayuthaya Kingdom, agriculture was a major concern. In that time, development focuses on communications, maritime trade and the expansion of rice farming, especially in the delta of the Chao Phraya (Molle and Srijantr, 2003: 1–2). Channels for irrigation were built, such as Klong Bangyai (1525), Klong Bangkruey (1538), Klong Samrong (1493), Klong Watkaitia (1608), Klong Muengnon (1636), and Klong Watpakjan (1661) (RRI and DOA, 2004). With the construction of adequate irrigation facilities, the agricultural products, especially rice increased. No wonder then that Thailand became a major rice producer in Southeast Asia, since development has started hundreds of years ago.

The success of Thailand in rice farming these days is not just stopping to meet the domestic consumption, but also exporting overseas. Since 1656–1714, the Dutch had a good relationship with the King of Siam. The Netherlands shipped rice, minerals, coal, and tin every year from Thailand. Since 1660, the Netherlands made a monopoly contract of rice with Thailand. Nevertheless Thailand also had sent its rice to

Manila, Japan, Macau, and Cochin China. In 1722–1757 Thailand has also exported rice to China (RRI & DOA, 2004: 19).

At the end of the 18th century to the 19th century, sugar was the best commodity; even so rice also became a commodity that could not be ignored. Since the mid-19th century, Thailand began to expand its rice exports to many countries in Europe and America. Thailand rice exports began to enter the British market when there was an agreement called 'Browing Treaty' between King Mongkut with the British Empire in 1885. Following the agreement, Thailand also had agreements with other countries such as France and United States (1856), Denmark (1858), Portugal (1859), Netherlands (1860), and Prussia (1862). In 1868, Thailand entered into agreements with several more countries, namely Belgium, Italy, Norway, and Sweden (Hall 1988: 645).

The agreements, particularly regarding the rice trade with other countries, encouraged Thailand to boost its rice production. In the Central Plain many new agricultural areas were opened. The opening of this new land had pushed labor migration, especially from the Northeast. The land in the Northeast is less fertile, so the people tended to go out from their area to look for a job (Tarling, 1999: 160). The decline of sugar prices in the year 1870–1880's, also affected to the expansion of rice farmland. During this period many cane farms changed to rice farms.

The increasing area and production of paddy cannot be separated from the kingdom's efforts to develop irrigation and infrastructure. In the late 1880s the government built canals in the delta of the Chao Phraya River and constructed irrigation facilities to control water supply and flood. Beside that, the Government also built rice millings to facilitate the processing of rice production. To support the transportation of agricultural products, the government developed a train way from Bangkok to northern Thailand. Due to the efforts made, Thailand rice production increased sharply. Between the years 1860–1930, Thai rice exports volume increased by more than 25 times (Tarling 1999: 142–143).

Since the beginning of 20th century, rice farming got more attention from the Government, for example through the holding of a contest of paddy rice seed varieties and rice farming development programme. The contest has started since 1907 in Thanyaburi. In the era of King Rama VI (1910–1925), a center for research of rice, and a rice experiment station was established (1916) in Amphor Thanyaburi, Pathumthani province. Now, this centre is known as Pathumthani Rice Research Center. In 1933, the best varieties of rice in Thailand, called Pin Gaew won the contest in the Regina City, Canada. Thai rice is regarded as the best, by various countries (RRI, DOA, 2004: 29).

Following the success of Thailand in developing the rice varieties, the exports of rice continue to rise. Until the beginning of the 20th century, the value of rice exports reached more than 70% of the total number of Thai exports

(2006: 166 Church). Thailand's success in developing new rice varieties and its success in selling rice in the international market has encouraged the government, farmers, and the rice research center to be more concerned in building the rice farming industry.

The development of the rice plant actually began in 1911–1922 with the compilation of the best varieties of rice nationwide. From 4,764 types of rice varieties collected over three years, eight best varieties of seed were elected, i.e. Poung-ngeun, Thong-raya-dum, Khao-Thodlong, Jumpasorn, Pin Geuw, Bangpra, Nam-Dawkmai, and Nang-Tani. In 1954, the new rice plant varieties were initiated in Bang Kaen Rice Experiment Station and Sanpatong Rice Experiment Station. Not only from the local rice experiment stations, Thailand also was planting the best varieties of rice from IRRI. In 1966, IRRI introduced the best rice varieties, e.g. RD, RD 7 and RD 23. To maximize the results, RRI and DOA recommend about 38 varieties of rice to be planted on suitable lands, for example, in the lowlands, highlands, wetlands, etc (RRI and DOA, 2004: 56–57). The introduction of new varieties of rice encouraged the growth of agricultural production in Thailand. During the period 1960–1980 average growth of agricultural production was 5% for the year (2006: 2 Hirsch).

According to the data of Thailand's Depatment of Agriculture, during 1956–1968 there are 18 rice varieties that have been introduced and reproduced. They can be divided into five different groups as follows:

(1) Non-glutinous rice variety for every region.

This group consist of two varieties of fragrance rice namely KDML105 and Nahng Mon S-4. KDML105 has been recommended since 1959 to grow in every region. This variety can adapt well, tolerant to drought, saline soil and acidic soil conditions.

(2) Non-glutinous rice varieties for Central Plains and Lower Northern Region.

Six varieties of this group are recommended for the Central plains and four varieties for the Lower Northern region. They are Gow Ruang 88, Khao Tah Haeng 17, Khao Pahk Maw 148 and Leuang Pratew 123. One variety for the North is called Leuang Yai 148. The Nam Sagui 19 is for the Northeast, being drought resistant and flood tolerant.

(3) Non-glutinous rice variety for the South.

They are Nahng 132, Peuak Nam 43 and Puang Rai 2.

(4) Floating rice varieties

This group consist of four rice varieties, three of them are non-glutinous rice i.e. Ta Pao Gaew 161, Pin Gaew 56 and Leb Mue Nahng 111, and one glutinous rice variety which is called Nahng Chalong.

(5) Non-glutinous rice–glutinous for the North and the Northeast.

Muey Nawng 62M, recommended for the North requiring early maturity varieties and areas full of gall midges; Hahng Yi 71, recommended for upland farms in the Northeast with quick rainfall, getting leaf blight disease during nursery period; Niaw San-pah-tawng glutinous rice, recommended for flooded farms in both regions (http://thaihandiwork.com/thairice_themonarchyandthairice8.php, accessed on September 12, 2010).

Although there are groupings of varieties of rice from the Department of Agriculture, the local community also has their own grouping. In Northern Thailand which is dominated by glutinous rice as an example, rice plants (glutinous) are grouped in three varieties, namely:

(1) Khaaw pii

This late-maturing rice varieties requiring approximately 135 days from transplanting to harvest. These are long-steamed rice that are well-suited to fields which are subject to flooding. Khaaw pii rice gives the highest yield of the local varieties but requires a great deal of water.

(2) Khaaw klaang

This variety is shorter-stemmed and mature earlier than khaaw pii rice. This rice is mature in approximately 105-120 days from transplanting to harvest. These varieties are best suited to average fields and water conditions.

(3) Khaaw doo

The rice is mature in 90–105 days from transplanting to harvest. The earlier maturation means that khaaw doo varieties will provide better yield under drought conditions that would lower yields of khaaw pii and khaaw klaang varieties. The rice is best suited for high fields, those far away from the irrigation source, and dike, rain-fed fields.

(4) Khaaw raj

This variety is also called as upland rice that usually grown only in 'forest fields', but occasionally planted in dike, rain-fed fields as well. The rice is approximately matures

in 150 days from direct seeding to harvest (Lando, 1982: 127–130).

In 1980, RD6 and KNS were introduced in Northern Thailand. These varieties have had a profound effect on rice agriculture in this area (Lando, 1982: 134). These new varieties preferred by farmers as a result are quite good. The comparison of local and new varieties rice yields can be seen in the following table:

Table 2.1 Rice Yield Obtained in 1981 in Northern Thailand

Variety/Classification	Tons/hectare
RD6	4.8
KNS	5.0
Khaaw klaang	4.4
Khaaw doo	2.6
Khaaw pii	4.2
Khaaw raj	1.2

Souce: *Lando*, 1982: 138.

The success in spreading of the improved varieties can be traced to the fact that they fit well into the local system of rice agriculture and are demonstrably superior to the local varieties they have displaced (Lando, 1982: 145). Nevertheles the introduction of new rice varieties to the farmers is not easy. It requires a long process, beginning with trial plantings with good harvest. Farmers who will switch rice plants with new varieties must be convinced that the crop is better than the old varieties. This process often also involves the respected head of the village so that farmers more easily follow his example.

Richard P. Lando (1982: 142) in his research in the Northern Thailand noted some reasons given by farmer for deciding to plant improved variety of rice, among others are:

- Good harvest from their experimental plot, so they expanded plantings to other fields.
- Rice varieties from the Department of Agriculture should be better than local varieties.
- The yield was good.
- Recommended by the village headman.
- See others in the village that got good yield from the new variety.

From the reasons above, it can be seen that the farmers have various reasons for trying to plant new varieties of rice. However, the main attraction for the farmers to replace to new varieties of crops is that the harvest of new varieties has more and better quality than previously existing varieties. This is understandable because with better agricultural yields can be assumed that the welfare of farmer is also better. The Government supports this program because more yields means that exports are also increased, so the Government gets more revenue.

The rapid development of agrarian sector in Thailand is closely related with the various policies issued by the Government. Agricultural development was included in the agenda of the Government, First National Economic and Social Development Plan (July 1, 1961). Since this time the development of agricultural sector was formulated by the Ministry of Agriculture and Cooperatives, in conjunction with the National

Economic and Development Board. Some government planning can be explained, in a series of five year plans as follows:

- The First Plan (1961–1966)

  In the first plan, the development was more focused on the means of irrigation to support agriculture, such as construction of dams, canals, and reservoirs. Some dams were built, among others, the Bhumibol Dam (Tak Province), Sirikit (Uttaradit province), and Mae Klong (Kanchanaburi Province). Agricultural research centers were also established, especially in the Central Plains and Northeast. In 1966 founded the Bank of Agriculture and Agricultural Cooperatives, which provides loans for farmers.

- The Second Plan (1967–1971)

  In the second program, the Government pursued acceleration of agricultural production, improving the socio-economic conditions of rural populations, and the protection of natural resources. The development of irrigation was focused on the Northeast, as lack of irrigation in this region had caused low levels of agricultural production. In addition, the Government also made efforts to improve varieties of rice and rubber, improving the health of livestock, and reforestation.

- The Third Plan (1972–1976)

  In the third plan, the government focused on the promotion of agricultural products for export. Agricultural institutions such as farmers' associations are also reinforced to strengthen the cooperation

between farmers, facilitate the production, marketing, suitable distribution for agricultural credit, and stabilize prices of agricultural commodities.

- The Fourth Plan (1977–1981)

  The fourth plan, focused on increasing agricultural production through intensive land use, infrastructure development, and utilization of labor force. Up to this fourth plan, agricultural development shows positive result, so since the 1980's the Thai economy experienced rapid growth. Agriculture became an important sector for national income. Approximately 76% of the population was involved in this sector (Chomchai, 1988: 181).

- The Fifth Plan (1982–1986)

  In the fifth period, the government focused on restructuring agricultural production by improving production efficiency and utilization of natural resources, as well as increasing production through the expansion of planting areas. The farmers could also obtain more credit to support its production. Government promoted crop diversification, with the aim to reduce the risk to farmers against price fluctuations (Adulavidhaya, 1990: 45–47).

Agricultural development program persisted in increasing agricultural production, especially rice. Research for the superior varieties continues to be developed. In 1960s the popularity of Thai rice continued to rise, so it could penetrate the new markets in the Middle East and African markets. Slowly, the two regions were emerging as big buyers and

offsetting the drop in sales to Europe (http://www.bangkokpost.com/news/local/35895/the-world-s-rice-bowl, accessed June, 13 2010).

In 1981, rice production contributed 21.4% of total GDP in Thailand. The ratio declined sharply in 1990 to 12.4%. Exports of agricultural commodities also declined; in 1982 export agricultural product amounted to more than 50%, but in 1990 reached only 21.2% of Thailand's total exports. The decline was closely related with the reduced opening of new farmland and declining prices for agricultural products (Hori, 2000: 43). Nevertheles, in 1989, Thailand became one of the main exporters of rice in the world, with total exports of six thousand tons. In addition, Thailand also becomes one of the largest exporters of maize, cassava, rubber, and sugar (Hirsch, 2006: 5). This fact indicates that the agricultural sector became the main economic supporter in Thailand until the early decades of the 1990s.

C. Centres of Rice Farming in Thailand

Thailand has long been known as an agricultural area with rice as the main product. However, in reality many other agricultural products also become export commodities, such as maize, sorghum, peanuts, soy, and coconut. Thailand is also a producer of cotton, sugar, tobacco, rubber, pineapple, and coffee. Some areas have an excellent product yeild such as Northern Thailand which supplies about 80% of the total production of soybean in Thailand, and 50% of peanut, and vegetables (Hori, 2000: 44). Southern Thailand that borders with Malaysia is a major producer of rubber latex. In addition,

Thailand also exports sugar cane and teak (Chomchai, 1988: 181-182).

Ecologically, Thailand is divided into four regions: North, Northeast, Central Plain and Southern. The fourth region has different topography and different levels of soil fertility. The Central Plain becomes a major rice area especially the Chao Phraya River alluvial plains which are often called the Menam Valley area. Total production of rice in the Central Plain reaches approximately 1/3 of the total production of rice in Thailand. This area also produces sugar (53% of the total from Thailand), vegetables, fruits, and livestock (Srijantr, 2003: 125). Vegetables and fruit farming were also developed in the areas around Bangkok, for example in Chandraburi district. This product is mainly to supply the demand of the market in the city of Bangkok (PSDR-LIPI, 2003: 16).

Northeast is a rather arid area, majority high terraces and less fertile. The area covered about one third of the entire area of Thailand, and also produces rice, although with a limited number. In 1985, it was recorded that the agricultural land in the Northeast reached 44% of the total agricultural area in Thailand. Nevertheless, the Northeast region has a very low productivity. The reason for the low production is the low proportion of irrigation in the Northeast which is only 12%, while the national average reached 36%. Therefore, the Government built up the big scale irrigation projects in the Mun River and Chi River basin in the Northeast. As the result, the development of the irrigation in 1980s in Northeast grew

up about 9% annually, while at national level 5% per year (Hori, 2000: 43).

Northern Thailand is a hilly area, but there is also a fertile terrain for agriculture. The important agricultural product of this area is glutinous rice (sticky-rice) which is the main food for the people in the Northern Thailand. In addition, Northern Thailand is also a producer of rice, vegetables, and fruits. Since 1991, Northern Thailand has developing organic farming, especially organic rice.

South region has a variety of characteristics, such as mountainous areas, lowland and coastal areas. A plain area usually is producing rice, in coastal most communities is fisherman, while in mountainous areas many people rely on forest products (PSDR-LIPI, 2003: 18). The main commodity of the region bordering Malaysia is rubber.

The description above shows that the North, Northeast, Central Plain and Southern Thailand are rice-producing areas although in varying amounts. Because of differences in geography, how to plant and rice varieties adapted to the natural conditions, such as for mountainous, water shortage and excess water areas. Generally, the system of cultivating rice in Thailand is divided into three methods, namely:

(1) Upland Rice

The upland fields are severely affected by slash-and-burn agriculture, which creates serious problems in land degradation and soil erosion. Rice is directly transplanted

in non-flood, well-drained soil on both leveled and steeply sloping fields.

(2) Lowland Rice

It requires a naturally flooded land bed that could retain water throughout the growing season. Rice is directly transplanted into the puddled field that maintains water level from 5 to10 cms. Yields vary depending on rainfalls.

(3) Deep-Water Rice

Deep-Water or Floating Rice is characterized by medium to very deep flooding (50 to more than 300 cm) from nearby natural water sources, such as rain, rivers, and tides in river mouth deltas. Rice is directly transplanted at the beginning of the rainy season. The rice plant grows as the water rises, and it is ready to be harvested after the water recedes (http://www.foodmarketexchange.com/datacenter/product/grain/rice/detail/dc_pi_gr_rice0303_02.htm, accessed September 12, 2010).

The different characteristics of the North, Northeast, Central Plain and Southern of Thailand does not seem to make a significant difference in agricultural production. The four areas are rice producers. Each region has certain varieties and methods adapted to their natural conditions. Although the Central Plain is the main rice producing areas, the role of other regions cannot be ignored. Production of rice from the fourth region supports Thailand as a major rice exporter in the world.

D. The Role of Rice to People's Lives and for the Country

Rice has a very important role for the Thai people. Beside to fulfill the food needs of the people, rice is also supporting the country's economy. Together with income from other major items including teak, rubber and tin, the rice export revenue brought substantial foreign currency into Thailand. This condition persisted until the beginning of the 1980s when the country's export structure began to change. In that time industrial products such as textiles, garments, electronics and computer parts became major contributors and replaced the agricultural products (http://www.bangkokpost.com/news/local/35895/the-world-s-rice-bowl, accessed June 13, 2010).

Rice gives impacts in various fields, including economic, political and social. In the economic side for example, it can be explained that in the realm of Ayuthaya, the country's economy depends on rice production. In the 1960s, Thailand became a major rice exporting country in the world. At this time rice became a superior agricultural product which played an important role in supporting the country's economy. Benefits of rice in the economic aspects cannot be separated from the social aspect. The abundant rice certainly has an impact on the welfare of farmers. From the social aspect it can also be exemplified that in Ayuthaya era, rice could be a factor that indicated the level of wealth (RRI and DOA, 2004: 20–22). This can be explained that a person who has a lot of rice stock (rice granary) can be classified as wealthy. By having a lot of rice stocks at least someone would not get food shortages.

When rice stocks are redundant, then it could be sold and spent on the other needs. More rice stocks owned means that one will be richer.

Rice also can affect the political condition. The shortage of food (rice) can lead to rebellion. Prosperous people tend to believe more in government than the people who live in hardship and hunger. People who are poor and face food shortages will most likely rebel. They consider that the government failed and are unable to make common people prosper. People will always fight for welfare or at least demanding sufficient food security. Therefore, food shortages could trigger the emergence of insurgency.

On the other hand, rice can strengthen the relationship between two countries. A country that has an abundance of rice production needs to distribute its rice to the world market, while a country that cannot afford the rice sufficiency takes another country as a supplier of rice. The two countries, exporter and importer of rice, can make a mutually beneficial cooperation. However, such cooperation could be defective and lead to political problems in case of an unbalanced control. The stronger importing country may seek to control rice-producing countries, or make it as a colony. Thus the relationship is not equal as one country is oppressed by other country.

In the case of Thailand, rice can make this country respected by other country because of the large amount of its exports. The new role of the country as the global rice champion in

1960s became a source of great pride when attention was focused on regional political tensions and anti-communist propaganda from the government under the control of the National Revolutionary Council led by Field Marshal Thanom Kittikachorn.[1] Considering the importance of rice for the country, Thanom give special attention to the agricultural sector, particularly for rice farming. Thanom had stated in the national plans a goal to support the growing and expansion area of rice as well as other cash crops, hoping to drive gross domestic product from the farm sector to 24.78 billion baht, part of the total GDP of 72.7 billion baht in 1965 (http://www.bangkokpost.com/news/local/35895/the-world-s-rice-bowl, accessed June, 13 2010).

Because of its importance to the people and kingdom, there are many festivals in honor of rice. Jarod Pranangkul Raknakwan (Royal Ploughing Ceremony) for example, is the festival to respect the rice which was held since 1782, when Rama I ruled. Rama I has special concern for farmers. In the case of crop failure, Rama I had a policy to distribute the supplies of rice from the royal storehouse to the people. With this policy, the farmers were not starving (RRI & DOA, 2004: 24). Royal Ploughing Ceremony was discontinued in 1936–

[1] Thanom Kittikachorn, soldier and politician: born Tak, Thailand 11 August 1911; Minister of Defence 1967-63; Prime Minister 1958, 1963-71, 1972-73, Deputy Prime Minister 1959-63; married (one son, one daughter); died Bangkok 16 June 2004 (http://www.britannica.com/EBchecked/topic/590008/Thanom-Kittikachorn, accesed June 13, 2010).

1959, but celebrated again since 1960. This celebration is held every year at the beginning of the rainy season (around May). This ceremony becomes the spiritual support to the farmers to produce rice.

There are various traditions in many places in Thailand to respect of rice plants. As it was described in the book "The Tale of Rice" (RRI & DOA, 2004), the ceremony in honoring of rice can be seen as follows:

(1) In Northern Thailand there are some traditions, among others:
    - *Rub Kwan Kwao* (Rice Solace)
      This ceremony led to the worship of the goddess of rice (Mae Posop) and invited her to remain in the stable.
    - *Satueng* (giving rice to the spirit)
      This tradition means that people ask for protection for rice plants from various pests.
    - *Then Kam Ram Keay* (the rice harvesting dance)
      This dance usually performed after the harvest with the purpose of entertainment after working hard in the fields.
    - *Taan Khan Khao* (rice dedicated for the dead)
      This tradition shows public gratitude by carrying rice and other food for the monks at the temple.
    - *Kryasart, banana* (stirred pop rice and peanut, banana)
      The tradition implemented in the Khampangpetch Province since 1981 aims to respect rice and other food.

- *Hae Nang Maew* (Cat parade)
  The ceremony is intended to invoke the rain.
- *Hak Na* (the first ploughing)
  This is the first activity carried out in the time of planting. Before that, farmers declared fertility and protection against pests.

(2) In the Central Plain there are some traditions, such as:

- *Tam Khun Khao* (the rice auspicious bumper year ceremony)
  This ceremony aims to ask for protection for rice plants to be free from pests.
- *Hae Nang Maew* (cat parade)
- *Tham Boon Klang Thung* (rice for the good)
  This tradition aims for the good of the rice plant.
- *Su Kwun Khao* (the blessing ceremony for longevity of life)
  The purpose of this ceremony is worshiping Mae Posop to help rice plants to give good results.
- Stirring *Khao* Tip of Bandai Temple
  This tradition carried out by eats together with rice Khao Tip or Khao Matupayath type that regarded as supernatural rice. After that, the people wish will earn good fortune and health
- *Kong Khao Bueong Srueong* (the rice moral worship)
  This tradition performed in Chonburi province aims for health and longevity of the people.

(3) In the Northeast there are some traditions such as

- *Boon Khao Saak* (the ancestor worship)

This tradition, usually held on the 10th month each year, carried out by offering rice to worship the ancestors.

- *Boon Khao Pradab Din*
  This ceremony is almost the same as above but the celebration held on the 9th month.
- *Boon Khao Lan* (the blessing ceremony for longevity of life)
  This ritual aims to be grateful for the expansion of the agricultural fields of paddy each year.
- Ritual to thank to cows and buffaloes that have helped farmers in working.

(4) In Southern

- *Khao Yakule* (*Khao Matupayath*)

Besides to worship and honor of rice, some of these traditions, among others are also intended to deter or ask for protection from pests and plant diseases. In Thailand, there are many pests and diseases which attack rice plants, and even to result in crop failure. For example in Northern Thailand there are the acknowledged rice pests such as:

- *Bua* → the rice gall midge (*Orseolia oryzae*). The pest ussualy attack irrigated fields.
- *Phiang faj* →this has been tentatively identified from farmer description as rice thrips (Thrips orysae walker).
- *Phiang naw* → white worm that affected plants stop growing and have no roots.
- *Phiang hun* → the rice ripens affected plants remain green when the others are turning yellow and there is no development of a panicle.

- Rodent and field crab → these pests damage the rice crop (Lando, 1982: 132–133).

Although there are many pesticides to eradicate the pests and diseases, there is also belief among farmers that it can be treated with traditional rituals. Pests and diseases become a serious problem for farmers due to the large dependence on rice. Apart from being a staple food, rice is intended to underpin the economy of the country. King Bhumibol Adulyadej likens the "agriculture is the human life" (IRR and DOA, 2004: 30), which can be interpreted that the life of the Thais are heavily dependent on agriculture. This is very reasonable because Thailand relies more on the agricultural sector.

E. Conclusion

Rice is one of Thailand's agricultural products that has a very significant role for farmers as well as for the Thai Government. The importance of rice is involving almost all aspects of human life, such as economy, social, and also political aspects. The significance of rice for the country can be traced from the history of rice farming from hundreds of years ago. Thai rice which was originally only used for subsistence, then developed into one of the prides of export for Thailand, especially in the era of the 1960s - 1990s. Since awareness of the importance of rice, government gave special attention by including agricultural development in the agenda of the Government, National Economic and Social Development Plan.

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Interview:

Interview with Ms. Supa, 30 July 2010

3
Constraints to Rice Agricultural Development in Thailand

Mayasuri Presilla

A. Background

Thailand is well known as the biggest rice exporter in the international rice market. It also has reached its national food security. However, Thailand also faces some problems in developing its rice agriculture. This proves that developing rice agriculture to increase rice production is not easy. In this section, some problems faced by Thailand in developing its rice agriculture are discussed.

B. Problems in Rice Agricultural Development in Thailand

In developing its rice agriculture and increasing its rice production, Thailand faces many problems. Some literature identifies factors which are problematic for agricultural development. These include human migration, production cost, pest, water crisis, world rice price instability, and misguided rice policy. These are factors which inhibit rice agricultural development in Thailand.

1. Migration and a Decline of Agricultural Labour

Migration is a natural and rational activity done by people to face their situation and environment. There are so many reasons why people migrate from one place to another. For

instance it may be because they want to increase their income, to get new job experiences, and to improve their lives (Chamratrithirong, 2007: 3).

How can migration be an inhibiting factor in developing rice agriculture in Thailand? The answer can be analyzed from its high internal migration dynamics. As generally happened in other developing countries, urban areas have fast development which is supported by industrial and service sector development and also by rapid and advanced infrastructural development. These engender internal massive migration flow, mainly from remote rural areas to economic center urban areas. Thailand obviously experiences this migration. Many rural people migrate to Bangkok, the Capital City of Thailand. They are mainly come from the Central Region because of the proximity to Bangkok. Rapid economic development of Bangkok attracts many workers from other regions to come in.

The impact of migration within the borders of Thailand is various, not only for destination region but also for the migrants' region of origin. For a migrants region of origin, migration gives two opposite consequences. The first consequence is remittance which can give advantage to the development of that region and also to the family member in that region. This is the result of the migrant sending city earnings back to their original location. The second consequence is a decreased number of labour in the region of origin, in this case is rural areas. Since the majority of people

there work in the agricultural sectors, it means that there will be a reduction in the number of agricultural labour.

With younger people moving away to the industrial and service industries in the city, there will consequently be the old population of farmers left in rural areas, who engage in agricultural sector in Thailand. In other words, internal Thai migration dynamics are part of a shift in employment patterns from agriculture to industry. Isvilanonda (2001: 25) informs us that the number of agricultural labour in 1970 was 10.44 million people or about 39.8%. In the early 1980, this number increased to 11.83 million people. However, this did not last. In the mid 1980s, agricultural labour force declined along with other sectors' development and numerous developments of infrastructure. As can be seen in Table 3.1, the percentage of agricultural labour declined to 37.7% in 1980. The slight increase in 1990 is against the trend. Indeed overall agricultural population and workforce is diminishing every year. In 2000, the percentage of labour engaged in the agricultural sector was only 34.6% and then shrank to 29.7% in 2010 (FAOSTAT, 2009).

Table 3.1 Total Percentage of Agricultural Population and Agricultural Labour Force in Thailand, 1961–2010

Years	Agricultural Population (%)	Agricultural Labour Force (%)
1961	78.7	42.9
1970	74.5	39.8
1980	64.3	37.7
1990	56.9	38
2000	49	34.6
2010	41.1	29.7

Source: *FAOSTAT*, 2009

2. Production Cost

Another inhibiting factor for rice agricultural development in Thailand is the high production cost, consisting of labour wage, chemical fertilizer and pesticide price.

a. Labour Wage

Since the early 1980s, there was high augmentation of labour wage in the agricultural sector in Thailand, impacting on the raise of rice agricultural production cost. This augmentation of labour wage exceeded the speed of the augmentation of rice price. Isvilanonda (2001: 25) argues that the base problem of this issue is a reduced number of rice agricultural labour. As is aforementioned, this decline, particularly in the Central Plain area, is a result of the high number of farmers migrating from rural to urban areas. One of the reasons many people move to urban areas is the higher wage of industrial or service sector compared to the agricultural sector.

b. Chemical Fertilizer and Pesticide

Another thing that makes high production cost in rice agriculture is chemical fertilizer and pesticide usage. Rice farmers in Thailand highly depend on chemical fertilizer. Their reason is to increase rice production. Additionally, modern rice variety, which is developed and widely used by the farmers, is very responsive to chemical fertilizer rather than local rice variety or traditional variety which does not need much fertilizer.

For that reason, the use of chemical fertilizer in Thailand increases every year. For instance the increase of fertilizer utilization grew by more than 4 times within 20 years, from 27 kg/ha in the early period of 1970s to 115 kg/ha in the early 1990s (Isvilanonda and Hossain, 2000: 94). The Office of Agriculture Economics Thailand urges that fertilizer consumption amongst farmers in Thailand is high, around 3.6 million tons every year between 2004 and 2010 (see Table 3.2).

Table 3.2 Thailand Fertilizer Consumption, 2004–2010

	Fertilizer Consumption (million tons)						
	2004	2005	2006	2007	2008	2009E	2010F
Total	3.4	3.6	3.8	3.9	3.4	3.6	3.9

Source: *Data base from Bureau of Agriculture Policy and Planning, Office of Agriculture Economics cited by Laudee*, 2010.
E: Estimate, F: Forecast

For rice cultivation alone, the amount of chemical fertilizer continuously increases every year as can be seen from Table

3.3. Table 3.3 also shows that there is a difference on chemical fertilizer use in rice agriculture in wet and dry season. Farmers use much more fertilizer to replace deficiency of water supply in dry season.

Since farmers in Thailand use much chemical fertilizer and it do not produce chemical fertilizer by themselves, this country has to import large amounts of chemical fertilizer. The higher the consumption means the higher quantity of import. Table 3.4 shows the increased amount of Thailand fertilizer import from 2006–2010. There is indeed fertilizer import reduction in 2008, but that was because Thailand had imported large quantities of fertilizer in 2007.

Table 3.3 Chemical Fertilizer Use on Rice Agriculture in Thailand, 1971–2000

Year	Wet Season (kg/ha)	Dry Season (kg/ha)	Use/year (kg/ha)
1971–1975	23.32	169.4	27.2
1976–1980	32.8	236.1	43.6
1981–1985	44.2	295.2	60.1
1986–1990	66.9	297.1	83.6
1991–1996	113.3	340.6	129.7
1996–2000	157.6	325.6	175.5

Source: *Ministry of Agriculture Thailand cited by Isvilanonda*, 2001.

Table 3.4 Thailand Fertilizer Import, 2006–2010

Year	Fertilizer Import (mt tons)	Diff (%)
2006	3.53	6.53
2007	4.35	23.15
2008	3.79	-12.71
2009	3.87	1.83
2010E	4.4	13.7

Source : *Bureau of Agriculture Policy and Planning , Office of Agriculture Economics.2009-2010, R&D Dept. Thai Central Chemical Public Company Limited cited by Laudee*, 2010.
E= Estimate

Beside chemical fertilizer, another burdened production input of rice agriculture in Thailand is pesticide. Just like chemical fertilizer, Thailand does not produce pesticide by itself. It has to import pesticide from other countries. The application of the Green Revolution in 1966 is the first time for Thailand to import pesticide. Since then, total import of pesticide increase every year. This is because of the excessive use of pesticide among Thai farmers. In 1994, Thailand imported about 20.000 ton of pesticide. This number became 80.000 ton in 2004 (Green Peace, 2008). Table 3.5 below compares pesticide use among rice production region in South East Asian countries between 1994 and 1999, and the largest consumer of pesticide was the Central Plain region in Thailand. In 2009, the fertilizer consumption across Thailand reached 1.96 ton, and it is forecasted that in 2010 this country consumes around 2.07 ton of fertilizer (The Office of Agricultural Economics, 2009 cited by Dawe, 2010).

Table 3.5 Pesticide Use in Rice Producing Countries in Southeast Asia, 1994–1999

Region	Pesticide Use (kg active ingredient ha-1 crop-1)			
	Insecticide	Herbicide	Others	Total
Central Luzon, Philippines	0.18	0.34	0.18	0.70
Mekong Delta, Vietnam	0.51	0.49	0.10	1.10
Red River Delta, Vietnam	0.61	0.65	0.34	1.60
West Java, Indonesia	0.62	0.69	0.54	1.85
Central Plain, Thailand	0.97	0.89	0.25	2.10

Source: *The Office of Agricultural Economics, 2009 cited by Dawe*, 2010.

There are several reasons for explaining the high use of pesticide in Thailand. *First,* the Government of Thailand does not intervene for the circulation of pesticide within the country. There is no import tax, no license, and no price control for pesticide from the Government of Thailand. *Second,* there are programs from the Thai government to farmers in subsidying and facilitating the farmers to get the import of chemical fertilizers. The circulation of imported chemical fertilizers in Thailand is free from government intervention so that the price of chemical fertilizer can be expensive. For that reason, the government helps farmers by subsidizing the cost of shipping transportation of fertilizers through two organizations, namely farmers' organizations (the Marketing Organization of Farmers) and the Agricultural Cooperatives (AC). Through both organizations, farmers can obtain low-interest loans to buy fertilizer. The program also

provided soft loans for farmers under the auspices of the Bank of Thailand. Through this state bank, all commercial banks are required to allocate 5% of their funds for loans to farmers with low interest rates. In recent years, BAAC's involvement in low-interest loan program is providing credit to farmers for various purposes, such as for marketing and other business in the countryside (Isvilanonda, 2001: 31–32). *Third,* there is limited knowledge among farmers about pests and the purpose and the impact of pesticide (Jungbluth, 1996: 16). The farmers get information about pesticide use and its purpose from one side only, which is from the merchants, pesticide companies, other farmers, and agricultural extension workers. *Fourth,* there are many other factors influencing the high use of pesticide, such as global warming, drought, water supply, and widespread effects of pest and disease (The Office of Agriculture Economics, 2009 cited by Dawe, 2010).

Just like drugs, Thai farmers'dependence on chemical fertilizer and pesticide is very high. Rice cultivation means the use of both these things. For the farmers, there will be no success in their rice cultivation without chemical fertilizer and pesticide. Realize it or not, chemical fertilizer and pesticide have increased production cost for the farmers in their rice agriculture. Besides, chemical fertilizer and pesticide give other bad impacts for the environments and also for the health of the farmers themselves.

3. Pest

Another obstacle in rice cultivation development in Thailand is the pest problem. In 2000 Isvilanonda and Hossain (2000: 13–

14) state in their research report that different areas and different seasons have different pest problems. For example, in northeastern Thailand in the wet season, the major pest is thrips; while brown spot, Brown Plant Hopper (BPH), stemborer, and tungro usually appear in the dry season. In the Central Plain, BHP, brown spot, and tungro are the major pest in irrigated areas, both in wet and dry season. Further, they say that pest is not a big problem for rice agriculture in Thailand because the yield loss due to insect pest in the wet season in several areas was rather small, only 52 kg/ha and due to diseases was only 11 kg/ha. This amount is equivalent to 4% of the farm yield. The yield loss because of pest was even smaller in dry season, which was only 21 kg/ha or only one percent of the farm yield. The biggest constraints to rice cultivation based on their survey to farmers are drought, and submergence.

However, the pest issue has become a crucial problem in Thailand recently, and it needs good handling since it threatens rice production. The information from the Thailand Ministry of Agriculture states that there was a big loss of 1.1 million ton rice of US$275 million just within seven months or one planting time in dry season. This was from November 2008 to May 2009, caused by Brown Plant Hoppers (Integrated Regional Information Networks (IRIN), 2010).

For the year of 2010, Wattanesk (2010) reports that Brown Plant Hopper had destroyed 30% rice field or surround 74.800 ha in rice production provinces in the Central Plain of Thailand in 2009/2010 planting time. Allegedly, the immense pest

attack in 2010 is as a result of continuous rice cultivation by the farmers in order to get high profit from the high world rice price in 2009 (Miller, 2010). At the year of 2009, two rice producing countries, which are India and the Philippines, were hit by severe calamity. Two major producing rice regions in the southern part of India, Andhra Pardesh and Karnataka, were attacked both by drought and flood, causing damage to rice fields. As a consequence, rice production in wet-season reduced by 15 million tons from a total of 85 million tons in the previous wet-season. Meanwhile, at the same time, the Philippines were hit by two major typhoons, damaging rice crops on the ground and approximately one million ton of rice in storage. These two major disasters made India and the Philippines purchase rice instead of trading it. Consequently, low supply of rice in the international market resulted in high world rice price in 2009. This brought big motivation for farmers in Thailand to continuously cultivate rice in their fields. Frequent rice cultivation means excessively used chemical fertilizer and pesticide. Chemical fertilizer can fertilize paddy plant, but on the other hand, it also can fertilize Brown Plant Hopper which then accelerates their proliferation. Meanwhile, pesticide will just kill beneficial insects for paddy plants, such as spiders which are the big natural enemy of Brown Plant Hoppers (Miller, 2000).

4. Water Crisis

In Thailand, the agricultural sector is the biggest consumer of water, about 70% of water resource. Rice agriculture mostly depends on rainfall and irrigation. Paddy plant needs much

water and lack of water will intrude rice agriculture. Therefore, enough water resource is obviously needed.

In Thailand, water resource is also the most significant issue for farmers. Water deficiency will deter their rice agriculture. In the past, Thailand rarely faced water crisis. This problem of water scarcity arises because it is influenced by climate change and is compounded by environmental destruction which caused by large scale forest clearing for expanding agricultural land (Poapongsakorn and Isvilanonda, 1995: 6). Drought has caused several dams and dikes to close their water tap for agricultural irrigation, but widely open for many other needs of consumption, such as for drinking, electricity water plant, and for urban and industrial growth (Isvilanonda and Hossain, 2000: 95). Therefore, water conflict is inevitable. There are many studies about conflict over water in Thailand, such as study of Flatters and Horbulyk about economic perspective of water conflict in Thailand (1994), the study of Wongbandit (1994) about water allocation problem in the Upper Northern and Central regions of Thailand, and so forth.

Severe water crises hit Thailand several times, in 1993, 2005, 2008, and 2010. In 1993, drought happened in Thailand because of the abnormal rainfall (Fernquest, 2010) between 1990 and 1993 (Kisner, 2008). In addition, the drought also occurred because there was high demand for electricity generation and water supply for the expansion of industrial development and settlement in the metropolitan region (Sirisup and Kammeier 2000: 75). However, two years later, 1994-1995, Thailand experienced intensive rainfall which

caused the worst flood in its history. Further, this country suffered again from drought in 2005 and 2008 (Kisner, 2008). Drought in 2005 was the worst drought in Thailand, causing agricultural land damage, mainly paddy field, in 71 of 76 provinces (Fernquest, 2010).

The year of 2010 is also the terrible year for farmers in Thailand due to severe water crisis. Once again, climate is blamed for this water crisis. Low rainfall brings an impact on low water discharge in several rivers and dams, which is only 13% of that ought to be received or about 9,265 meter cubic (Financial Express, 2010). Drought in 2010 has hit seven large reservoirs in the Northeastern region and also the largest dam in Thailand, namely the Queen Sirikit dam in Uttaradit Province. Consequently, water shortage delays rice planting in several regions in Thailand, such as in the Central Plain and the lower North.

The majority of rice cultivation in Thailand is rain fed land. The significant bad impact of drought in this country is the sharp decline of rice production at national level. Rice agriculture in Thailand is divided into two or three planting times in one year. Drought and water crisis mean that there will be only one planting time for one year. Drought also means decrease yield per rai in the second-crop paddy.

5. Irrigation and Water Management

One of the Thai Government's obstacles to solve water crisis in developing rice farming is building irrigation projects. Massive construction of large and medium-scale irrigation

projects have indeed been done by the government between the 1950s and 1960s, followed by small-scale projects throughout the years 1970-1980 (Isvilanonda, 2001: 22). This means that there was a rapid growth of irrigated areas in Thailand, from 1.6 million ha in 1961 to 3.2 million ha in 1981 and to 4.8 million ha in 1994 (Isvilanonda and Hossain 2000: 9).

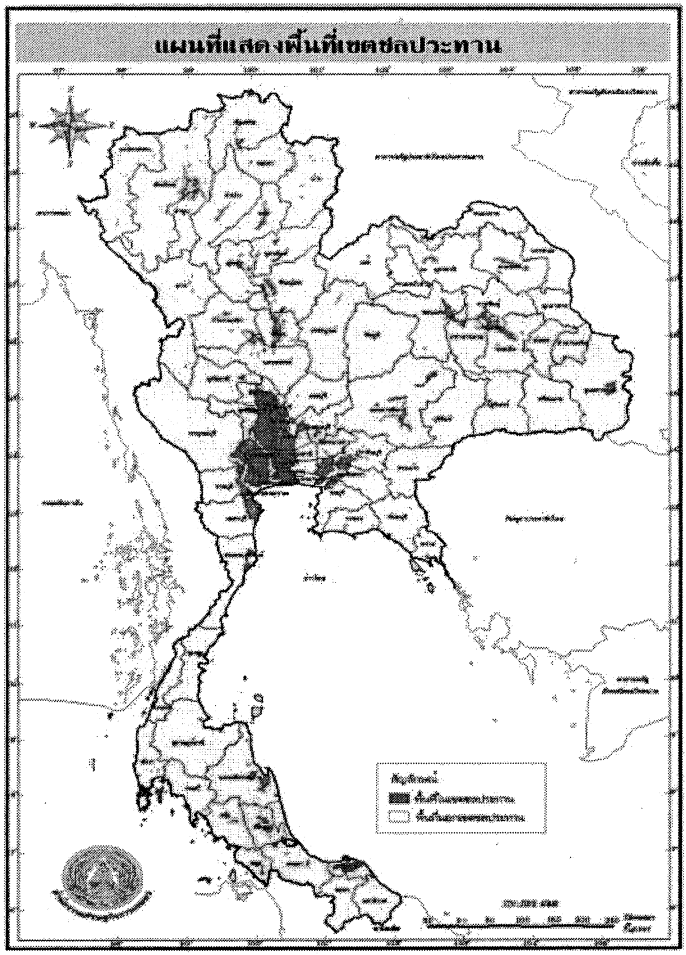
Irrigation construction has also got fairly serious attention from His Majesty the King of Thailand. The King himself was involved with a lot of irrigation projects in the period 1980-1990, among are Khun Wang Weir, Khun Wang Royal Projects, The Mae Thi Resevoir, the Huai Tapaed Resevoir (1983), the Khlong Si Siad Reservoir (1995), the Huai Tad Hai Yai Reservoir (1984), the Huai huad Reservoir (1983), Ban Parinyo Weir, Bang Nara Basin Development Project (1990). Below are several the Royal-initiated irrigation projects in different regions (MOAC, 2005):

1. Pak Panang River Basin Development Project, Nakhon Si Thammarat Province.
2. Kam River Basin Development Project, Sakon Nakhon and Nakhon Phanom Provinces.
3. Upper Huai Bang Sai River Basin Development Project, Dong Luang District, Mukdahan Province.
4. Upper Lam Phayang River Basin Development Project, Khao Wong District, Kalasin Province.

However, the study conducted by Isvilanonda and Hossain (2001: 9) shows that irrigation only covered a quite small of rice areas, which was about 30% in early 1990s. In other

words, construction of irrigation projects has not been able to cover all the rice farms in Thailand. The irrigation projects are still centralized in the Central Plain, while irrigation to Thailand's north and northeast is small-scale irrigation (Isvilanonda, et.al, 1992: 75). Areas covered by irrigation projects (green colour) can be seen in the figure 3.1.

Nonetheless, the royal party feels that more construction of irrigation projects is not the solution for the current water crisis because of three factors, which are the high cost, the magnitude of environmental damage, and the scarcity of water. Therefore, during the year 1990-2000, the focus of the irrigation system for agricultural land diverted to water management. This involved improving the efficiency of water distribution arrangements especially when drought hit the country (Isvilanonda, 2001: 24). To achieve this goal, the unity and cooperation between government and private organizations are needed. However, the government has to realize that communication with people and learning the conditions and situation of each region are important because each area is different.



Source: *Laudee*, 2010.

Figure 3.1. Irrigation Areas in Thailand

6. Agricultural Land

The next inhibited factor in rice agricultural development in Thailand is the extent of agricultural land. One of the methods developed by the Thai government in its efforts to increase rice production is to expand areas of rice farming. Based on the results of calculations performed by the Office of Agriculture Economics at Thailand's Ministry of Agriculture, it is known that during the period of approximately 30 years, there has been growth of agricultural areas from 8.15 million ha in 1971–1975 to 10.26 million ha in 1996–2000 (see Table 3.6).

Table 3.6 Rice Agricultural Land Area in Thailand, 1971–2000

Period	Agricultural Land Area (million Ha)	Average Growth (%)
1971–1975	8.15	
1976–1980	9.35	2.94
1981–1985	9.87	1.11
1986–1990	9.97	0.2
1991–1995	9.64	-0.68
1996–2000	10.26	1.31
Average Growth/year		1.04

Source: *The Office of Agricultural Economics Thailand cited by Isvilanonda*, 2001

However, table 3.6 also shows decreased growth of agricultural land in Thailand for about 4 years in the period between 1991 and 1995. This was a result of drought, which then spread the problem of water availability in the early 1990s, leading to the reduction of planting areas. There are some other factors behind this reduction.

The study of Molle and Srijantr (1999) points out that the reduction of agricultural land, particularly in the Chao Phraya Delta and near urban centres, has been principally caused by urban and industrial growth. These growths transformed agricultural land into real estates, sand pits, golf courses, Sunday-gardens, roads, etc (p. 178). Further, there has been demographic transition paralleled by out-migration and the spread of landlessness which has also lessened agricultural land area in Thailand (p. 191–192, 195).

Recently, there is awareness of the Thai government not to add and expand agricultural areas since it will add to forest destruction. In other words, the addition of agricultural land means forest clearing, which in turn brings a negative impact on the environment. Forest areas in Thailand experience a decrease from year to year. Most forest areas in Thailand are converted to be arable areas. The increase of arable areas means the reduction of forest areas. This country has lost half of its forest area in about four decades, which is from 29.075 million ha in 1961 to just about 14.402 million ha in 2007 (see table 3.7) (FAOSTAT, 2009).

Table 3.7 Thailand Forest and Arable Areas, 1961–2007

Year	Forest Areas	Arable Areas
1961	29,075	10,400
1970	22,280	12,300
1980	16,547	16,515
1990	15,965	17,494
2000	14,814	15,654
2007	14,402	15,200

Source: *FAOSTAT*, 2009

7. World Rice Price Instability

Thailand is the biggest exporter in the world rice market. Rice surplus in Thailand is exported to the international market. The basic principle of trade liberalization is rice surplus in the international market will influence rice price itself. The higher supply means the lower price, and vice versa, the lower supply means the higher rice price in the international market. However, when the increase of rice supply and the decline of rice price give a good impact on consumers, it does mean bad times for producers. Unfortunately, rice farmers cannot escape from this world market system (Poapongsakorn dan Isvilanonda, 1995: 110 & 112). In addition, the fluctuation of rice price in the international market has an effect on the fluctuation and the instability of rice price within the country.

The history of instability of world rice price can be traced from its historic development. From the period of 1960s until 1980s, the rice price experienced wild fluctuation. The rice price reached its peaks in 1967, 1974, and 1981 with respectively prices of 971, 1418, and 728US$ per ton (Forssell, 2009: 15). The reasons for that high price are the world limited rice exporter countries, with their limited rice trade to the international market, crop failures in some rice producer countries, unexpected large demand from some rice consuming countries such as Indonesia, and the rise price of many commodities as a result of the two oil shocks (Wailes, 2005: 177). However, rice price plunged to the lowest level to US$ 520 per ton in 1971 and US$ 555 per ton in 1979. A derivation of this rice price was caused by the application of Green Revolution, which produced a large rice surplus in some

rice producing countries, such as Vietnam (Ryan, 2002: 1). Accordingly, in the following years, these countries succeeded to increase their export and engaged in the rice international trade.

As a consequence of the world rice price fluctuation there is fluctuation of domestic rice price in Thailand. In this country, the rice price also reached its peak in 1967, 1974, and 1981; and it plummeted to around US$ 500 per metric ton in 1971 and 1979; and this continued to happen during 1980s until the early 2000s. At those periods the rice price was no more than US$400 per ton. The lowest level of rice price happened at the beginning 2000s. The low world rice price means big suffering and loss for farmers. Farmers in Thailand did not get the benefit since the selling rice price could not cover production cost (Sirilup dan Kammeier, cited by Morita, 2003: 14).

However, the rice price started to slowly increase after 2001 and dramatically increase at the end of 2007. Selling price of 5% broken Thai rice increased from US$329.2 in October 2007 per ton US$907 per ton in April 2008. There are three reasons behind this increase (Barker, 2008). *First* is an imbalance between the supply and demand of rice. There is a consumption growth from 0.75 percent to 0.94 percent in the decade between 1997 and 2007, whilst world rice stocks were almost empty because of the slow increase of supply rice from the rice producing countries in Latin America and Asia. A decrease on agricultural investment, such as research, development, and rural infrastructure, in the rice producing countries had resulted in a stagnation of rice yields. In

addition, there was a rise in energy prices which then made high production cost for rice cultivation. Moreover, the majority of rice producing countries faced several shortages, such as water, labour, and land shortage.

Other constraints to rice supply, as is happened in Thailand, include pressure from the government to farmers to promote agricultural diversification and transformation and to change crops. Climate change is also a responsible factor for this reduction (Barker, 2008). As distinct from supply side factors is a demand side factors. Fast world population growth recently results in the increased consumption. Southeast Asia, Sub-Saharan Africa, and the Middle East are the biggest rice import countries since 1990s due to their fast population growth; leading rice consumption outpaced its production.

The second reason for the increasing rice price between 2007 and 2008 is the increasing food crop price, such as corn, soya, and wheat, which respectively increased 31, 87, and 130 percent. There was also the increasing price for other commodities, especially agricultural inputs, for instance fertilizer, fuel, and seeds (Barker, 2008). The latter increase affected the cost of production and inevitably the price of rice. *The third* reason is the speculation from people involved in the rice production and trade, such as the private actors and also governments (Barker, 2008). Rice production shortage plus the increased number of rice importing countries caused many rice exporting countries to change their rice policies and regulations. For example, India and Vietnam applied export

restriction which impacted on the world market supply (Barker, 2008).

Due to the world rice price instability, having a career as a rice farmer is not promising anymore. Many rural people choose to run away from rice agriculture. The majority of them move to urban areas to find a better off occupation for their life and family.

8. Misguided Rice Policy

Rice is a main commodity in Thailand. It has a very important role in Thai society and its economy. Its vital role demands that the Thai government pays much attention to control rice. However, history shows that the Thai government had been wrong in establishing rice policy. It is useful to find out how the history of rice policy is presented, starting from the first time rice became the world commodity. Rice policies have been applied since the 19th century. In the mid 1850s, the Thai government had succeeded to supply the high demand of rice amongst some western countries. This then led to the increase of rice cultivated areas and a large scale infrastructure investment such as canals and roads, especially along Chao Phraya River delta (Siamwalla and Setboonsarng, 1991: 238). Between 1946 and 1947, Thailand was asked to ship its all rice surplus to its allied countries. But then it was lifted in 1949. In 1949, private rice exporters were allowed to export rice but under license from the Rice Office. That was done because the world rice price was higher than the domestic rice price at that time.

After the Second World War, between the 1950s and the 1970s, Thai government began to implement some regulations and taxes to control and stabilize rice price. The objective of the Government of Thailand was on revenue and export earnings in the 1950s. Further in 1960s, the objective was on consumer welfare, price stability, and industrial growth. Regarding these objectives, applying the high export tax rate up to 40 percent (called as "rice premium") as well as restricting rice export to the international market were two things done by the government. The government also introduced "a rice reserve requirement" program which forced all rice exporters to sell their rice under the market price to the Ministry of Commerce. It is true that rice premium ended with the more stable domestic rice price. However, on the other hand, the farmers only received lower profit since they were the ones who bore high rice taxes. Meanwhile, three parties who enjoyed high profit from the rice premium program were the exporters, the retail shop, and the millers (Siamwalla and Setboonsarng, 1991: 240).

The next period of rice policy in Thailand is the 1970s. This period is also well known as the Phase Out period and it was marked by lowering rice taxes to around 20 percent (Warr and Khopaiboon, 2007: 7). The cutting of rice taxes at this period aimed to help farmers. Another significant alteration in this period was the shifting purpose from pro consumers to pro producers. However, once again, the one who got the most benefit from this support program was the millers. The millers were the golden boys of the Thai government. They financed

political campaigns so that they could influence and control politics (Siamwalla and Setboonsarng, 1991: 240–243).

Henceforward, rice policy in Thailand was changed to the free trade orientation in 1980s. Some of the government's efforts toward liberalizing the rice policy included signing the GATT agreement in 1982 (Kajisa and Akiyama, 2003: 7), totally abolishing rice premium in 1986, and introducing export subsidies (Chouen et.al., 2006: 105–108). By entering rice free trade, the domestic rice prices was determined not by Thai Government but instead by the world market. However, the government still had its role in supporting rice farmers. The mechanization, crop diversification, crop substitution, crop rotation were the heart of the rice policy in Thailand in the mid 1980s. Organic farming was also introduced at this time.

Free trade and open economic system brought fluctuation of rice price in Thailand. The period of 1990s was a period with wild fluctuation of rice price. The rice price in this period ranged between 2 and 7 Baht per kg. Even in the early 1990s, the rice price was only 2.5–2.6 Baht per kg (Sirisup and Kammeier, 2000: 68). This was the hardest situation particularly for farmers because they could not cover the input costs. Low rice price was worsened by a critical water shortage in 1993 as mentioned above. Regarding the low rice price mixed with water shortage and also declining land resource, the Thai government then launched the diversification program in 1993.

The program was under a policy for "Agriculture Restructuring for the Chao Phraya River Basin", and it was in the framework of a "Work Plan for Restructuring Agricultural Production", lining with the Seventh National Plan (1992–1996). In Chao Phraya Basin, the crop diversification program consisted of two strategies, namely minor and mayor strategies. The point of minor strategy was to substitute the second rice crop in dry season with other crops, such as vegetables and flowers. The mayor strategy was to permanently replace rice farming with other forms of land use, particularly fruit trees, animal husbandry and aquaculture (Sirisup and Kammeier, 2000: 76). To succeed and entice farmers to follow this program, the government allocated a large budget of credit support and local extension services. The diversification program was supposed to be implemented in 22 provinces, however, due to budget limitation, it was only to be a pilot project in four provinces, i.e. Lopburi, Angthong, Suphan Buri, and Ayutthaya. The weakness of this program is it was not accompanied with detailed framework for monitoring and evaluation.

Thailand further developed its rice policies and strategies in the 21th century through cooperation between the Ministry of Agriculture and Cooperatives, the Ministry of Commerce, and the National Rice Policy Committee. In this century, the government was re-involved in the rice market. In the early 2001, the Thaksin Sinawatra administration introduced a rice price guarantee policy which functioned as a mortgage program. By this program, the farmers sold their rice or paddy to the government at the guaranteed price, and they can get their rice back with three percent interest rate within three

months time (Head 2009; Prasertsri, 2008: 2). However, this policy weakened the market mechanism since the government directly buys rice from the farmers with the price higher than the market price. A large amount of rice stock was accumulated by the government. Between 2005 and 2006 there was more than five million tons of rice. The program was then suspended for two years but it was re-launched by the Samak administration in 2008.

The arguments for this reintroduction were to increase farmers' living standard, to prevent price fluctuation in harvest time, and to increase rice supply, rice exports, and rice stock (Forssell, 2009: 35). In June 2008, the government allocated 10,000 Baht per ton of rice for the first harvest and 14,000 Baht per ton for the second harvest. During that time, the government had spent 35 million Baht to buy up to 2.5 million tons of rice (The Nation cited in Forssell, 2009: 28). By the end of 2008, the government had built up a stock of 2.82 million tons of rice (Reuters cited by Forssell, 2009: 28). Nevertheless, the mortgage program was not successful because of four reasons (Head, 2009; Forssell, 2009: 34–36). First, the Thai Government had to spend much money to buy paddy rice from the farmers, which meant large expenditure from the country's budget. Second, there was a suspicion that the program was full with corruption since many parties, particularly the politicians, acquired money from other parties involved in rice trade. Third, the program has brought difficulties to rice traders and exporters to join. As a consequence there is a decrease of export orders from importing countries. Fourth, the program has only benefited

rich farmers but it has done less for the small farmers. It is interesting to note that Nipon Poapongsakorn, the Dean of the Economic Faculty of Thammasat University, claimed that the mortgage program will bring negative impact to rice agricultural development in Thailand because 'the farmers are discouraged from concentrating on the quality of their rice and on increasing their productivity' (Forssell, 2009: 36).

9. Rice Marketing System

The last factor identified as an inhibited factor of rice agricultural development in Thailand is the rice marketing system. It is said that the rice marketing system in this country has 'a complex structure with many intermediaries and different systems for different types of rice' (Forssell, 2009: 30). Below is the discussion about the marketing system for paddy and for milled rice.

a. Marketing Paddy

Although there is only one month for storaging paddy rice between harvest and selling time, the marketing system for paddy rice in Thailand is very complicated because it is divided into two levels, local and central, and it involves many parties (Dawe et.al., 2008: 459). At the local level, there are five actors playing in paddy rice marketing system, consisting of the farmers, local traders, brokers and commission agents, farmer organizations, and government agencies. We can consider these five actors here:

Farmers. The farmers can directly sell their paddy rice to millers, however, since they are usually small farmers and do not have appropriate transportation, they often sell their

paddy to local traders. From those local traders, the paddy will be sent to the millers. It could be said that local traders are intermediaries between farmers and millers. Local traders are usually local people or even local farmers (Wiboonpongse and Chaovanapoonphol, 2001: 195).

Farmer Organizations. Another actor engaged in the marketing system of paddy in Thailand is farmer organizations. There are two different farmer organizations at the local level, which are Farmer Groups and the Agricultural Cooperative. Farmer Group comprises with at least 30 farmers who have the same vision, which is 'to increase their bargaining power on the market'. They work hand in hand in many things: marketing, transporting, equipping, storing, and even financing transactions of paddy rice. They do not use anyone's help in selling their paddy to traders or millers. The agricultural cooperative is another form of farmer organization. This cooperative collects paddy from its members which to be then sent to larger cooperatives or millers. Even, there are cooperatives acting as millers for their members. Unfortunately, they are only in small number (Wiboonpongse and Chaovanapoonphol, 2001: 195).

Government Agencies. Thai Government also takes part in paddy rice local marketing systems through its local agencies. The local government agents buy paddy rice directly from local farmers with prices usually above the market price. The offered price attracts many farmers to sell to the government agencies.

Brokers. Brokers get paddy from farmers and sell it to millers or local traders. Brokers are needed by millers and also exporters because brokers can help them to find specific rice they want, not only in quality but also in quantity. Therefore, brokers act as a liaison between millers and exporters (Wiboonpongse and Chaovanapoonphol, 2001: 196).

At the local level, traders and millers meet in the central paddy markets. These places are set up by the government agencies or private sectors. The private central paddy markets are supported by the Ministry of Commerce. Activities in these places are various, such as providing labour, drying lawn for the rice, gauging moisture of paddy, or storing rice. Meanwhile, the government central paddy markets are managed by the Department of Agricultural Extension and the Agricultural Cooperatives. These markets have almost the similar functions as the private ones. There are about 176 sub districts of goverment paddy market centres spreaded throughout the country (Wiboonpongse and Chaovanapoonphol, 2001: 196). The existence of these two types of paddy market have made the cost low for searching the right rice type.

b. Marketing Milled Rice

Paddy has to be milled before further selling to consumers. Herein lies the importance of millers. Paddy is processed to be milled in the millers. There are different sizes of millers, namely small, medium, and large millers. Usually, the small millers serve farmers and villages; while the medium and large millers play in the local, regional, and even export markets (Wiboonpongse and Chaovanapoonphol, 2001: 201). In 2007,

there were thousands of millers in Thailand, and the majority of them were small and medium ones. Not just like small and medium millers, the larger ones have standardized their companies with Good Manufacturing Practices (GMP), International Organization for Standardization (ISO), and Hazard Analysis and Critical Control Points (HACCP) (Vanichanot, 2004: 4).

Rice from the millers is bought by differents agents. The study of Wiboonpongse and Chaovanapoonphol (2001: 198–200) says that:

> 'The largest share of milled rice is bought by the commission agents who help exporters and wholesalers to find the right qualitities and varieties of rice..... Government agencies also buy a substantial share of rice from millers. The government agencies then sell the rice to wholesalers who sell it on to reatilers and finally to consumers. Some rice is sold directly from the millers to exporters or even to foreign importers, but only the really large millers sell directly. In the same manner millers sometimes sell directly to wholesalers, retailers or even consumers, but only a small percentage of the rice is sold in this way'.

Many actors and rice paths make the marketing system of rice look complicated, and this is different between rice types. Diagram 2 below shows the general rice marketing system in Thailand based on the study of Wiboonpongse and Chaovanapoonphol (2001).

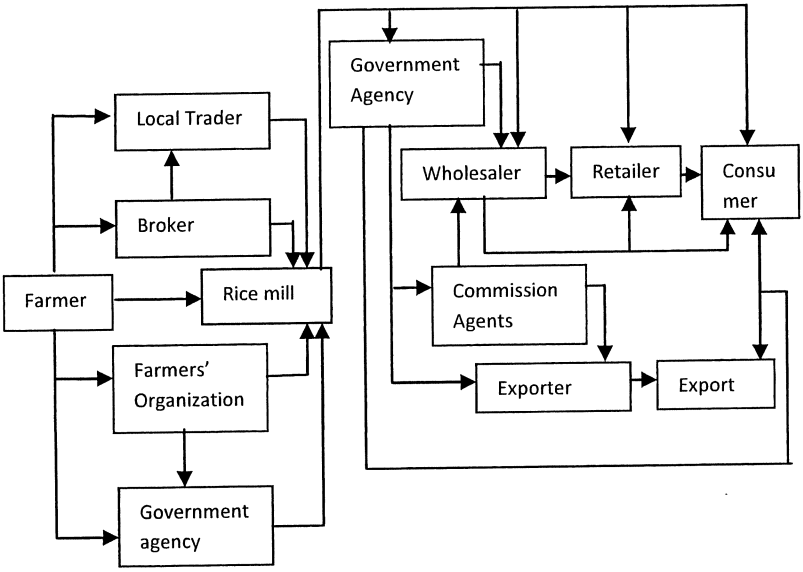


Diagram 3.1 General Rice Marketing System in Thailand

C. Summary

Thailand encounters many problems in developing its rice agriculture. There are nine identified issues which influence rice development, consisting of labour migration, high production cost, the spread of pest, water crisis, the limitation of irrigated land, the reduction of agricultural land, the world rice price instability, misguided rice policy, and ineffective rice marketing systems. These are all interrelated. The eight latter factors eventually encourage people to migrate. Two types of migration occur in Thailand. First is horizontal migration, which means the movements of people from rural to urban areas. The second is employment migration, which is the preference changes of employment, particularly in rural areas,

from agricultural sector to non-agricultural sector. The point is many people think that farming is not a promising career for the young generation in Thailand, especially in rural areas because it cannot guarantee their welfare. Recently, many Thai people prefer to work in the industrial and service sectors since they can earn more from those two sectors. The obvious effect is the reduced number of farmers and also rice production.

However, despite many inhibiting factors above, Thailand is still a number one rice exporter in the world. Thai rice is well known both in quantity and quality. It seems that Thailand turns those inhibiting factors to be the challenges that have to be solved and this is discussed in the next chapter of this report.

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4
Strengthening and Sustaining Rice Development in Thailand

Mayasuri Presilla

A. Background

Rice is the most important crop of Thailand for several reasons. First, it occupies about 55% of Thailand's total arable land. Second, it is the staple food of all Thai people. Third, Thailand is the biggest rice exporter in the world. Therefore, rice has important roles that are not only laid in economic value, but also in the social and political ones (Surono, 2006). From the latter two values, the point is rice has a role in the stabilization of the country. The instability of rice supplies or fluctuation in rice prices are two important things which if not immediately anticipated will be able to trigger the emergence of national unrest that leads to criminal acts (Suryana and Ketut, 2008). Conversely, when there is food availability, there will be no occurrence of political turmoil. Surely the social and political strategic value inherent in rice is a value that is closely related to economic value. Sufficient rice production, directly or indirectly, can maintain social and political stability in the country.

However, developing and sustaining agricultural production is not easy since there may be many inhibiting factors, as experienced by Thailand. Thailand has to address several

difficulties, i.e. limited land, rapid population migration, amenities, pest, negative impacts of chemical pesticides and fertilizers, distribution and marketing system, and so forth. Interestingly, these problems do not hinder the country in its rice development. Data from FAO (2009) shows that Thailand has succeeded in increasing continuously the quantity and quality of its rice from 1990 until now. A discussion topic in this chapter points to Thailand's strength in developing and sustaining its rice production.

B. Road Construction and Mechanization

Roads and agricultural equipment are two things which play significant roles in rice development, in Thailand. That is why the first discussion of this chapter focuses on road expansion and mechanization in relation to Thailand's strength of its rice production. Based on the study of Isvilanonda (2001), the Thai government has expanded road construction since the 1960s. He said that 'The government made massive investments in road construction during 1960s and 1970s that help to facilitate the reclamation of new farmland and improved marketing efficiency'. For the massive construction and improvement, the government increased the average budget between 1966-70 and 1986-91 from 11,000 baht per ha to 74,000 baht per ha (Isvilanonda and Poapongsakorn, 1995 cited by Isvilanonda, 2001: 22).

The great attention of the Government of Thailand to the road construction has generated good results. Currently, the total road network in Thailand is approximately 218,000 kilometres, where about 60,000 kilometres are national roads with a

reasonable condition and the rest are low standard rural roads. However, the government has constructed roads in most parts of the country; making almost all regions accessible (Global Road Safety Partnership, 2008). So this means roads can open the isolation of a region. The expansion of road construction throughout the country gives a lot of convenience and profits, no exception to the agricultural sector. The question is how road construction correlates with rice production in Thailand? The possible answer is it helps in marketing crops from farmers to markets as well as minimizing costs and distribution inputs, such as pesticides and fertilizer, from markets to farmers. When the research team went to the Province of Ayutthaya and Ang Thong (rice is mainly growth there), the team found that road conditions to and from the city of Bangkok in a few areas adjacent to Bangkok are fairly good and wide (see Figure 4.1).

Road construction also brings the expansion of mechanization in the agricultural sector. Based on the Free Dictionary by Farlex (2010), mechanization means 'the act of implementing the control of equipment with advanced technology; usually involving electronic hardware; "automation replaces human workers by machines"'. In Thailand, mechanization in the agricultural sector had begun since the 1950s with the aim of opening new farmland and to prepare agricultural land before planting (Isvilanonda, 2001: 26). Along with the massive migration, environmental damage, and the limitation of new farmland, the farmers had improved technological means in the next second phase of agricultural development in the period of 1980–1992 (Poapongsakorn and Isvilanonda, 1995:

6). Mechanization or intensive technology in Thailand is the reaction amongst farmers in response the challenges of the availability of agricultural labour every year due to massive migration, particularly from rural to urban areas (Isvilanonda, 2001: 25). The number of agricultural labourers has decreased every year in this country. A very obvious example is the number of rice farmers, which dropped from 51% to 36% of the total labor force during 1971 until 1992 (Isvilanonda and Hossain, 2000: 92).

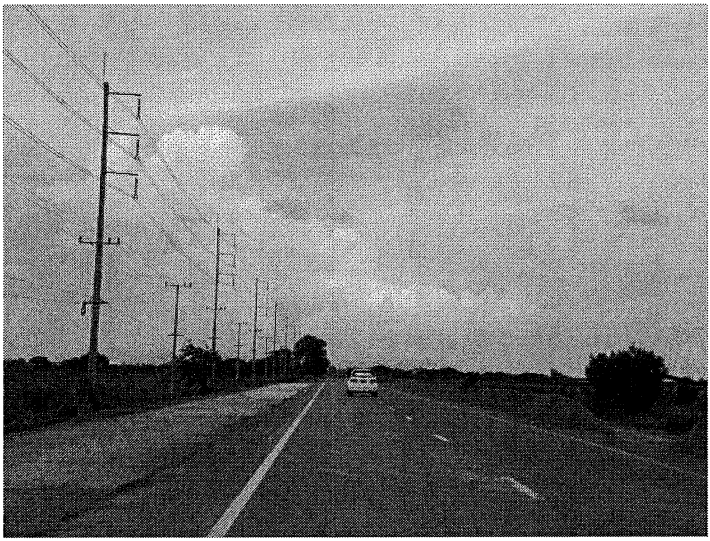

Figure 4.1 Road Condition Near Bangkok

Power tillers, large tractors, and threshing machines are some of the tools used by farmers in Thailand for their rice farms. The large amount and the intensive use of those machines benefits farmers in four ways. First, it reduces working day for

farmers. For example, farmers usually worked over 58 days/ha in 1987/1988, but it reduced to only 24 days/ha in 1998/1999 due to mechanization. Therefore, farmers have much spare time to do other useful activities. Second, it minimizes the use of labour in agricultural activities, which also means a decrease in agricultural labour wage rates as one of the production costs in its process. For rice cultivation itself, the study of Isvilanonda and Hossain (2000: 92) shows that the rural wage rate had increased faster than the rice prices, raising quite sharply the cost of producing rice. Third, it improves labour productivity (Isvilanonda and Hossain, 2000: 94). The study of Isvilanonda (2001: 27) reveals that the adoption of machinery and equipment in rice cultivation had risen the average of labour productivity from 1.69 tons rice/labour during 1971–1975 to 3.25 tons rice/labour in 1996–1997.

The increased use of tools and machinery in agricultural activities has spread in a short time. For example, the use of tractors and power tillers increased by 14 times and 30 times respectively only in two years the period 1996–1998 (see Table 4.1) (Isvilanonda, 2001: 26). In turn, this high rise generates several self-producing machine businesses.

Tablel 4.1 Tractors and Power Tillers Use on Agricultural Land in Thailand, 1971–1998

Year	Tractor (unit)	Power tiller (unit)
1971–1975	8,935	53,449
1976–1980	27,133	190,185
1981–1985	34,164	347,143
1986–1990	45,967	591,817
1991–1995	102,518	1,787,171
1996–1998	127,999	2,051,550

Source: *Agricultural Statistics of Thailand, various issues, cited by Isvilanonda*, 2001.

C. Rice Research

Thailand is well known for its rice quantity and quality. One of the strengths of rice development in Thailand lies on research. The concern of the Thai Government on rice research is very high even though in reality it lacks sufficient funding. Conducting serious research for getting the best quality rice requires a lot of money. However, the Thai Government (the DOA) had reduced budget allocation for rice research institution during 26 years (1971–1997) as shown in Table 4.2. Even, in the 2000s, Nipon Poapongsakorn, the President of Thailand Development Research Institute (TDRI) said that Thailand's average annual expenditure on Rice Research and Development is only 200 million Baht (about $6.7 million) per year or about seven Baht per ton of paddy, which is very low. This is very far from the amount suggested by the International Rice Research Institute (IRRI), i.e. $120 million per year (Bangkok Post, 2010). The inadequacy of funding happens because the Thai Government does not see the short-term benefits of rice research.

Table 4.2 Budget Allocation for Agricultural Research from the Department of Agriculture (DOA), 1971–1997

Period	Average Budget of DOA (million Baht)	Average Budget Allocation for Rice Research Institution (million baht)	Average Annual Growth (%)
1971–1975	495.74	73.53 (14.83)	
1976–1980	700.75	87.63 (12.51)	3.83
1981–1985	875.08	111.14 (12.70)	5.36
1986–1990	1,018.18	102.47 (10.06)	-1.56
1991–1995	1,637.01	197.46 (12.06)	18.54
1996–1997	2,018.27	220.20 (10.91)	5.75

Source: *Agricultural Statistic of Thailand, cited by Isvilanonda*, 2001.

Regardless of the research budget issue, the Thai Government continues to see the importance of rice research as the most effective means for increasing rice production since it can improve and produce good grain characteristics and quality. The responsibility for handling rice research is entrusted to the Department of Agriculture (DOA). To help the work of the DOA, in 1969, the government established the Department of Agricultural Extension (DOAE) which has an important role in spreading the new technologies of research and results to farmers (Poapongsakorn and Isvilanonda, 1995: 14). In 1995, DOA has had 25 research centers and 26 research stations scattered across the country (Isvilanonda and Hossain, 2000: 95). In 2010, the government plan to build 'a new fully integrated rice research centre' (Bangkok Post, 2010) for strengthening rice research and development. This centre is hoped to speed up the number of rice researchers, which is from recently around 200–300 researchers to be 1,030

researchers in the next 10 years. The Thai Government through its research institutions has vast research focus, i.e. the growth of productivity through improved rice varieties and creation, the setting up activities of planting, the farming techniques, water sources, salinity, eradication of insects and diseases which attack rice plants, etc. (Ministry of Science and Technology, 2006: 10). Therefore, the quality rice seeds will be improved and there will be new innovative varieties that are resistant to pests, drought, and floods. Thus, the growth of the rice industry can be sustained and the competitiveness of Thai rice exports can be improved. The centre is equipped with many facilities, including laboratory units and a greenhouse pilot farm with controlled temperature, water, and light.

The history of rice research in Thailand started in the early 1960s. Soon after the establishment of the International Rice Research Institute (IRRI) in 1960, Thailand entered into collaboration with the IRRI. The formal relation was marked by the assignment of several scientists from Thailand to be trustees in the IRRI, such as Prince Chakrabandu, Dr. Sala Dasananda (1966–1969), Dr. Bhakdi Lusanandana (1975–1979), Dr. Yookti Sarikaphuti (1984–1988), Dr. Pecharat Wannapee (1989–1992), Mr. Montri Rumakom (1993–94), and Mr. Mechai Viravaidya Board (1995–2000). Conversely, the IRRI has also assigned its scientists to work in Thailand, for example Dr. B.R. Jackson, who worked in the country from 1966 to 1982. Other IRRI scientists posted in Thailand included Dr. Donald W. Puckridge, agronomist and former leader of the flood-prone rice ecosystem program, who also served as IRRI's

liaison scientist for Thailand and Vietnam from 1981 to 1996; Dr. Derk HilleRisLambers, plant breeder assigned to Thailand in 1975 and 1981. This relationship also gets support from the Royal family. His Majesty the King Bhumibol Adulyadej became the first and only Royal Patron of IRRI in 1996. The relation between Thailand and the IRRI has a long standing of over 50 years (Rice Today, 2010).

The joint rice research between Thailand and the IRRI was begun in 1974. The initial focus of Thai rice research was on increasing rice production and improving rice varieties for deepwater rice, particularly on agricultural land with irrigation systems (Poapongsakorn and Isvilanonda, 1995: 14). In 1975, the Prachinburi Rice Research Center was established, which then became one of the leading centers in Asia for deepwater rice. The Thai Department of Agriculture (DOA) of the Ministry of Agriculture and Cooperatives (MOAC) had provided physical facilities and support staff while IRRI had provided scientists as resource persons and gave some financial support. The research then generated various modern rice varieties (MVs). The adoption of MVs brought Thailand to increase its rice production as much as 2.67% per year (Isvilanonda, 2001: 21). The advantages of MVs compared to local varieties are on its short planting time. Farmers can plant two to three times within one year, or five times in two years. Therefore, farmers may get two or three harvest times in one year (Isvilanonda, 2001: 21). With these modern varieties, the Thai government created a program called the Rice Cropping Intensity. The joint rice research between the MOAC and the IRRI in rice research had also produced a memorandum of understanding (MOU) in

1991 to work together to improve deepwater rice culture and to develop new rice varieties and farming practices for farmers in Thailand and other countries in the region. Through this agreement, most of the IRRI's deepwater rice breeding activities was transferred to Thailand.

However, modern rice varieties are varieties that desperately require water as a main component of growth, so there will be good rice crops if only the areas have abundance of water or good irrigation systems (Isvilanonda et.al, 1992: 75). This means that MVs are only suitable to be planted in the Central Plain, not in the Northern and Northeastern part of Thailand. Consequently, this condition has resulted in yield gaps between regions. Therefore, in the 1980s, precisely under the 5th National Economics and Social Development Plan, the Thai Government produced and implemented several programs in order to raise and to narrow the yield gap, consisting of rice varietal improvement program; seed production and seed exchange program; production technology improvement program; rain fed improvement program; upland rice production improvement program; land consolidation, dike and ditch construction program; water resource development program; and irrigation pump for rice cultivation program (Kupkanchanakul, 2000). Of the seven programs, the four concentrated on rice research are:

1. Rice varietal improvement program.

Rice Varietal Improvement Program is a program for developing High Yield Varieties (HYVs) in irrigated environment that are resistant to drought, diseases, and

pests. Some of the released HYVs in the past two decades were RD10, RD21, RD23, Suphanburi 60, Suphanburi 90, Suphanburi 1, Suphanburi 2, Khao Jao Hawn Suphanburi, Khao Jao Hawn Khlong Luang 1, Phisanulok 60–2, and Chainat 1 (Kupkanchanakul, 2000). These varieties were estimated to produce double yields compared with than that of traditional ones.

2. Production technology improvement program.

Production Technology Improvement Program was developed in order to change the high cost labor intensive method in seedling preparation and transplanting of rice production. Technology used in the program was wet seeded rice technology. Until now, this technology is widely used in more than 90% of irrigated rice areas in Thailand.

3. Rainfed improvement program.

The program was intended for poor rice farmers. The aim of the program is to elevate rice production in rainfed environments. The implementation of this program was spreading and recommended several improved rice varieties, such as RD6, RD7, RD8, RD10, RD13, RD15, RD23, BKN6902–3–1, BKN7914–179–4–1, and Niew Ubon 1. Not only that, the program also developed and established dry seeded method for farmers in drought prone environment.

4. Upland rice production improvement program.

This program was the continuation from the same program under the Royal Initiated Project. In the 5th National Economics and Social Development Plan, the goal of the

program was to increase rice production in the upland ecosystems for food self-sufficiency. The concrete steps taken for that goal was to develop several rice varieties accordance to the upland ecosystems, such as Sew Mae Jan, Khao Pong Krai, Jao Haw, Nam Roo, R258, R293, Blechai, and Motoza.

Rice research still continues in Thailand until now. Not only for finding high quality and stronger rice seeds that are tolerant to drought, flood, pest; but also for finding healthy and good tasting rice as there is always big market for it. After successfully breeding several varieties of jasmine rice (Thai Hom Mali or Fragrant Rice or Khao Dawk Mali), Thai scientists from Kasetsart University Rice Genome Centre developed another new super rice variety in late 2010, called Khao Hom Nin or Black Fragrant Rice (The Nation, 2010). The scientists claim that this new black variety retains Jasmine's cooking qualities of softness, good taste, good smell and had a 12.5 per cent protein content compared with 6.5 per cent in ordinary rice. Other special characteristics of the black new variety are fast growing, capable of three crops per year, and has the same quality as top-quality jasmine rice (The Nation, 2010).

Not long after that, the Thai plant breeding researchers have succesfully developed new rice varieties, called Rice Berry, which contains higher minerals and antioxidants that can reduce the risk of diabetes. Rice Berry is a cross-bred unmilled rice which is a combination of Hom Nin Rice and Hom Mali Rice (Pattaya Newspaper, 2010). Rice Berry contains three times more iron than other varieties, a high level of

antioxidants such as beta-carotene, gamma oryzanol, vitamin E, and folic acid (folate), and it is soft and aromatic when cooked, which is the outstanding trait of Thai Hom Mali Rice. This type of rice is found to be resistant to drought, floods, and the rice blast disease, one of the world's most destructive rice diseases that can strike all aerial parts of the plant.

Research on rice is obviously very important. With all new rice varieties Thailand can maintain its position in the rice world market since currently the Thai position is threatened by China and India. Therefore, it cannot be denied that the collaboration with the IRRI has given good impact to Thailand.

Rice research collaboration between the IRRI and the MOAC is subsequently not limited to find new varieties. Among the other major programs of collaboration were the following:

a. **Small Farm Machinery Project**. This project was a collaboration between the IRRI and Thailand which was conducted from 1976 to 1985 and was funded by the United States Agency for International Development (USAID). This project produced a successful product, called the axial flow thresher. The IRRI provided the basic design which was then modified by Thai engineers and manufacturers. Its efficiency makes this machine popular throughout Thailand. This country could produce 3,000–5,000 units of this mobile thresher locally every year. In turn, the blueprints of its axial flow water pump were sent to the IRRI where it was then modified and widely fabricated and distributed by manufactures throughout Asia to increase efficiency (IRRI, undated: 3).

b. Interregional Research Program on Methane Emission. Rice fields evidently produce environmentally harmful byproduct, i.e. methane emission. To mitigate methane emission from rice fields, the MOAC was involved in a mitigation methane project from 1993 to 1997. The project was funded by the United Nations Development Programme (UNDP) and implemented by the IRRI in cooperation with the Prachinburi Rice Research Center. Acceptable soil, water, fertilizer (organic and inorganic), crop management and breeding strategies were developed in this project to mitigate methane emission from rice fields. The beneficiaries of the project were not only the farmers in the deepwater rice ecosystem but also national, international and global environment (IRRI, undated: 3).

c. Consultancy, International Symposium, Conference, Training, and Scholarship

The IRRI provided short-term consultancies in the research program; devoted IRRI liaison scientists for Thailand; invited Thai scientists to the international symposiums, conferences, and workshops; and provided trainings and scholarships for Thai scientists (IRRI, undated: 4). All of those collaborations are listed in its MOU which prioritise:

1. Development, evaluation, and utilization of rice varieties that were semi-dwarf, early-maturing, or photoperiod-sensitive and high-yielding; with good grain quality; tolerance for drought, submergence, and salinity; and resistance to blast and other diseases and insect pests;

2. Research on cultural management practices such as direct seeding and integrated weed and pest management;
3. Development and evaluation of machines and engineering systems for rice production and postharvest processing as well as encouraging local industry to manufacture machines adapted to local conditions;
4. Training of rice researchers from Thailand and other Asian countries in short courses and in other specialized training programs at the IRRI or in Thailand. Thai-IRRI collaborative projects also involved several universities and agricultural research institutes in Thailand.

d. Ecosystem Collaborative Projects

Other collaboration projects involved genetic evaluation of rice, network studies on integrated pest management and biotechnology, and studies of soil fertility and the causes of yield decline in irrigated rice–all of which were leading to wide information sharing among countries. Collaborative projects by ecosystem included (IRRI, undated: 4–5):

- Irrigated rice ecosystem,
- Hybrid rice,
- Reversing trends of declining productivity in irrigated rice systems,
- Integrated pest management (IPM) network rain fed lowland rice ecosystem,
- Rainfed Lowland Rice Research Consortium,
- Breeding for drought and blast disease resistance,

- Characterizing blast fungus populations,
- Breeding for submergence tolerance,
- Characterization of the microenvironments for extrapolating technology in disease management,
- Genotype environment interactions,
- Integrated nutrient management,
- Agroecological characterization of rain fed rice production,
- Pest damage assessment methodology,
- Genetic variability of root morphology,
- Modeling approaches to analysis of yield potentials and yield gaps,

Flood-prone rice ecosystem

- Breeding for flood-prone conditions,
- Physiology of flood-prone rice,
- Breeding and evaluation of rice for tolerance for acid soils,
- Role of carbohydrates in flooding tolerance,

Upland rice ecosystem

- Analysis of major causes of low, variable, and declining productivity in upland rice;
- Screening for cold tolerance and blast resistance;
- Cumulative responses to applied phosphorus-fixing soils;
- Genetic variability of root morphology;
- Upland Rice Research Consortium;

Cross-ecosystems

- Tagging and pyramiding gall midge resistance genes for rice improvement,

- Developing a blast management tool kit for farm and regional application,
- Assessing rice research capacity in Thailand,
- Characterizing the biodiversity in Chiang Mai Valley to develop sustainable pest management systems,
- Marker-assisted breeding of bacterial blight-resistant rice cultivars,
- Projection and policy implications of medium- and long-term rice supply and demand for Thailand,
- Preservation of the biodiversity of the rice gene pool,
- Asian Rice Biotechnology Network,
- Post harvest technologies for rice in the humid tropics
- Machinery development and testing,
- Forecasting model for rice blast disease,
- Sustaining biological control of rice disease in farmers' fields
- Microbial diversity of rice seeds.

e. **Shuttle Breeding Program.** This was a collaborative program started in 1982 for rain fed lowland rice breeding. It involved field selection of promising lines in northeastern Thailand. The Ubon Rice Research Center produced advanced breeding lines for South and Southeast Asia. Research for drought-prone rain fed lowland rice systems in Asia was conducted in Ubon Ratchathani (IRRI, undated: 5).

f. **Deepwater Rice Research Program**. This program involves rice producing countries in the Southeast Asian region. In this program, Thailand acted as the "hub" and the IRRI as a coordinator for partners in Cambodia, Indonesia, Myanmar, and Vietnam. The aim of the program was to help

and improve the capacities of less experienced partner countries in deepwater rice research. In the program, rice scientists from other South and Southeast Asian countries visited Thailand to observe deepwater rice materials growing in the field and assisted in selecting breeding materials for their particular programs. Meanwhile, Thai deepwater rice scientists selected, tested, evaluated, and distributed plant breeding materials in the region.

Germplasm of Thai rice is known for good grain quality and these were used by other countries in this breeding program. The major objective of the collaborative breeding programs was to develop a range of deepwater rice varieties that could guarantee yields of 3–4 ton/ha. Workshops involving flood-prone rice breeders of South and Southeast Asia had been held in Thailand to promote regional cooperation in the exchange of germplasm and research information. The result was the improvement of high-yielding varieties and rice-based farming systems for Thailand and other rice-producing countries of the world (IRRI, undated: 5).

g. **International Rice Drought Screening Facility.** Thailand and the IRRI established the International Rice Drought Screening Facility, funded by the Rockefeller Foundation. This centre strengthened the rain fed lowland breeding programs between Thailand and the IRRI. It also involved scientists from the Australian Centre for International Agricultural Research, University of Brisbane, Commonwealth Scientific and Industrial Research Organisation (all in Australia), Cornell University, Texas Tech University, and others in the

Rockefeller Foundation's International Rice Biotechnology Program. The goal of the centre is to help them to understand drought resistance in rice and breed more drought-resistant rain fed rice cultivars (IRRI, undated: 6).

h. Rainfed Lowland Rice Research Consortium (RLRRC). The following research themes under RLRRC were: "(1) varietal improvement for South and Southeast Asia; (2) pathogen/pest population studies and breeding; (3) physiology and genetics of drought; (4) crop establishment and intensification; and (5) integrated nutrient management" (IRRI, undated: 6).

i. Upland Rice Research Consortium (URRC). Thailand had been a major partner of this consortium since its inception in 1991. The objective of the consortium was to utilize regional research capacity in South and Southeast Asia. It also shared research responsibilities and research results for increasing and sustaining rice production in the uplands while maintaining and enhancing the resource base. The consortium involved several countries, such as Thailand, India, Indonesia, the Philippines, Lao PDR, Vietnam, and Brazil. Thailand benefited from enhanced collaboration and communication between and among the major consortium members. Under the consortium, research activities on drought, blast, weeds, and nutrients were carried out in Phrae, Samoeng, Sanpatong, and Dong Luck Muen. Drought research aimed to identify root systems conferring drought tolerance to upland rice. Studies continued on nutrients, influenced by water interactions. From this research, it was hoped that nutrient management

could be improved to lessen the yield-reducing effects of drought on upland rice (IRRI, undated: 6).

j. **Biotechnology**. Pest is the serious problem for the rice plant that has to be destroyed. Therefore, the IRRI scientists together with scientists from the Kasertsart University and the National Center for Biotechnology and Genetic Engineering worked to map, and tag the genes for rice plant resistance to gall midge–an insect pest that may have caused losses in northern and northeast Thailand, and combine resistant genes into Thai rice varieties. In due course, these genetic materials would be used in the regular breeding programs of the DOA (IRRI, undated: 7).

k. **Exploiting Biodiversity for Sustainable Pest Management**. The exploiting biodiversity collaboration between Thailand and the IRRI was intended to develop rice varieties with resistance genes by using farmer's knowledge and forces of nature. The approach was establishing a "lighthouse" which showed different habitats for the pest (IRRI, undated: 7).

l. **Reversing Trends of Declining Productivity in Intensive Irrigated Rice Systems**. The collaboration with the IRRI also touched productivity issues. Together with the Pathum Thani Rice Center and Suphan Buri Rice Experimental Station, the IRRI studied soil quality in the irrigated rice farms in the Central Plain as the important element of productivity. The collaboration also identified the long-term fertility experiments at 25 on-farm sites. In their study, they found

that soil properties, management practices, and socioeconomic factors associated with soil nutrient which can bring decline in productivity. Therefore, it needs some strategies to sustain productivity, such as identifying abiotic and biotic soil nutrients, arranging time cropping systems, and managing site-specific nutrients (IRRI, undated: 7).

m. Germplasm Conservation and Exchange. Sharing genetic diversity conservation is another of IRRI's policies help to increase Thailand's rice production. The IRRI has carefully kept 5,185 types of Thai rice in the International Rice gene bank. Currently, there are more than 110,000 types of rice from throughout the world, and Thai farmers and rice breeders can access these types of rice and other non-Thai rice from this gene bank to breed new rice varieties. Therefore, the IRRI had enhanced the capabilities and skills of several Thai plant genetic resources personnel through training and it continued to provide technical assistance in gene bank management (Rice Today, 2010).

Furthermore, the IRRI developed the concept of a Thai Rice Knowledge Bank (RKB) which then was launched by Thailand's Rice Department in 2007. The aim of RKB is to help Thai farmers and the extension workers receive knowledge about high-quality rice production and technologies information from the latest scientific advances. Based on IRRI's evaluation, this RKB has succeeded to help farmers and the extension officers to gain higher revenue, higher income, and less cost production (Rice Today, 2010).

n. Emerging Relationships with NGOs. Building relationships with other institutions or agencies is important to assess research results. This is also done by the IRRI. It has not only worked with the government-supported agricultural research institutes and national extension agencies but also with some Non-Government Organizations (NGOs). NGOs are often seen as the major provider of extension services, thus they can be social agents of change to improve farmers' livelihood. The IRRI worked with the PDA, one of the largest NGOs there In the Northeastern part of Thailand, to promote technologies that could increase rice production. The cooperation with the PDA was based on its community-based approach in the rural people in Thailand since 1974. The IRRI worked closely with the PDA to transfer technological information effectively to farmers based on the result of the IRRI-Thai scientists' research, particularly about rice in rain fed condition in northeast Thailand (IRRI, undated: 8).

o. Training and Information Dissemination. Supports for Thailand to its rice development has also been given by the IRRI by providing training and exchanging information related to rice and rice-based farming systems. The collaboration was carried out between the IRRI, the MOAC, and several universities in Thailand, such as Chiang Mai University, the Asian Institute of Technology, and the Kasetsart University. The training was given to graduate students who had completed their coursework at the university or to graduate students who were doing their PhD thesis research. The aim of the training was to encourage sharing of experiences, scientific knowledge, and technological advances, and to

exchange information such as co-publication of thesis research. Scholars usually spend about 2 years at the IRRI headquarters, working under the supervision of the IRRI scientists. From 1963 to 1997, there were about 779 Thai researchers has received training at IRRI through graduate degree programs and short-term courses (IRRI, undated: 9).

Since 1992, the IRRI also extended its working areas. Together with the Rice Research Institute of Thailand, the IRRI had offered an international course on rice production research for participants from Asia, Australasia, Africa, and Europe. Instructors were primarily scientists from the DOA and Thai universities. The IRRI provided logistical support, training materials development and production, and assistance. The IRRI also engaged other Thai institutions to work together, including the PDA and other NGOs. Some examples material offered in the training are Principles of Research in Flood-prone Rice Ecosystems, Experimental Design and Data Analysis, Genotype by Environment Interaction, and Problem-based Technology Generation for Rain fed Lowland Scientists (IRRI, undated: 9).

D. Conclusion

Developing and sustaining rice production is not an easy thing to do. There are many barriers that have to be passed. Thailand is not an exception although it is the biggest rice exporter in the world market. It suffers from various kinds of obstacles, such as limited natural resources, environmental disaster, human resources shortage, pest outbreaks, etc. However, one noteworthy lesson from the Thai experience is

that Thailand is not pessimistic. All of the obstacles are seen as challenges that have to be dealt with.

There are two strengths in Thai rice development. **First** is rice research. It has to be admitted that rice research for over 50 years has brought power to Thai rice production in quantity as well as quality. Through research, limitations and obstacles in rice development, such as limited arable land and environmental challenges, can be minimized. More and more new rice varieties have been created. As a result, not only can Thailand boost rice production but it also can generate high quality rice. The success of Thailand in carrying out rice research cannot be separated from its strategy to couple the IRRI in almost every rice research activity. The created collaboration between them brings a lot of advantages to Thailand since the help from the IRRI is not only on research. The cooperation with the IRRI also opens the opportunity for Thailand to cooperate with other rice producing countries, such as Vietnam, India, China, and Indonesia. This opportunity is used by Thailand to exchange knowledge and information about rice. Support from His Majesty the King and the spirit to be the number one rice producer in the world further strengthens rice research in the country.

Second is the expansion of road construction, which in turn opens isolated areas. Related to rice development, the existence of adequate roads is an access for farmers to further access the result of rice research and other information related to practicing good rice farming from the Thai Government, the IRRI, or other institutions. With such access,

farmers can increase their productivity and produce good quality of rice. Certainly, it brings dual advantages, namely for the country and for farmers in particular. Therefore, Thai experiences in strengthening and sustaining rice development should be a lesson learnt, especially for Indonesia as a rice producing country for developing and sustaining rice production.

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Executive Summary

PEMBANGUNAN INDUSTRI PERTANIAN DAN PEMBERDAYAAN MASYARAKAT LOKAL DALAM PENGELOLAAN SUMBER DAYA PERTANIAN YANG BERKELANJUTAN DI ASIA TENGGARA: STUDI KASUS THAILAND

A. Latar Belakang

Beras merupakan bahan makanan pokok bagi kebanyakan penduduk di kawasan Asia sehingga pertanian padi banyak diusahakan oleh negara-negara di kawasan ini. Thailand merupakan salah satunya. Bagi Thailand, beras merupakan komoditas pertanian utama dan unggulan. Total luas lahan pertanian padi di Thailand diperkirakan mencapai 26,3 juta hektare (MOAC, 2006). Komposisi luas lahan pertanian padi di setiap wilayah negara ini berbeda-beda: 22% di Thailand bagian utara dengan kontribusi sekitar 25% dari total produksi, 21% di Thailand bagian tengah dengan kontribusi sebesar 30%, 53% di Thailand bagian timur laut dengan kontribusi hanya sebesar 41%, dan sisanya yang hanya 6% berada di Thailand bagian selatan (IRRI, 2010).

Hasil produksi beras di Thailand setiap tahunnya sangat tinggi sehingga negara ini dapat mencukupi kebutuhan dalam negeri sekaligus mengekspor surplus beras yang dimilikinya ke pasar internasional. Dengan penguasaan sebesar 40% di pasar beras internasional, Thailand kini menjadi negara pengekspor beras

terbesar di dunia. Perjalanan panjang ekspor komoditas beras di Thailand telah dimulai semenjak ribuan tahun yang lalu. Namun, kenaikan ekspor yang signifikan terjadi di akhir tahun 1960-an, yaitu dengan diaplikasikannya program "Green Revolution" di sektor pertanian (Phongpaichit dan Barker, 1995). Kenaikan demi kenaikan dalam produksi dan ekspor beras terus berlanjut setiap tahunnya (FAO, 2009) walaupun memang sering terjadi fluktuasi sebagaimana tampak pada Tabel 1.

Tabel 1. Produksi dan Ekspor Beras Thailand, 1990–2007

Tahun	Produksi (ribu ton)	Ekspor (ribu ton)
1990	17193	4017,08
1991	20400	4333,07
1992	19917	5151,37
1993	18447	4989,22
1994	21111	4858,63
1995	22016	6197,99
1996	22332	5454,35
1997	23580	5567,52
1998	23450	6537,49
1999	24172	6838,90
2000	25844	6141,36
2001	26523	7685,05
2002	26057	7337,56
2003	27038	8394,98
2004	28538	9989,73
2005	30292	7537,12
2006	29269	7433,57
2007	27879	n.a.

Sumber: *FAO*, 2009.

Besarnya ekspor beras Thailand tentunya memberikan andil yang cukup besar sebagai penyumbang devisa negara. Ini merupakan bukti nyata bahwa komoditas ini berpengaruh besar terhadap perekonomian negara.

Sukses dan prestasi gemilang yang terus dicapai oleh Thailand dalam hal produksi dan ekspor beras bukan berarti tidak adanya masalah. Berbagai masalah, baik yang berasal dari dalam maupun luar negeri datang mendera. Namun, bagaimana menyikapi dan mencarikan solusi adalah langkah yang terpenting. Oleh karena itu, Thailand adalah negara yang tepat untuk dijadikan contoh dalam pembangunan pertanian padi. Hal ini sangat penting sebagai bahan pembelajaran dan masukan bagi sektor pertanian di Indonesia.
Pertanyaan-pertanyaan yang muncul dalam penelitian ini, yaitu:

- Masalah-masalah apa yang menjadi hambatan dalam ppembangunan pertanian padi di Thailand?
- Faktor-faktor apa yang mempengaruhi pembangunan pembangunan pertanian padi di Thailand?

B. Kerangka Pemikiran

Menggiatkan pembangunan ekonomi adalah cara yang dipercaya oleh banyak negara untuk mencapai kesejateraan masyarakat. Namun, tentu saja hal ini tidaklah mudah dilakukan karena banyak faktor-faktor pendukung yang diperlukan, sementara itu banyak pula faktor-faktor lainnya yang menjadi penghambat. Strategi pembangunan yang tepat adalah salah satu faktor pendukung dalam keberhasilan pembangunan.

Negara-negara berkembang yang mayoritas penduduknya sangat bergantung pada sektor pertanian membutuhkan alternatif strategi pembangunan yang menitikberatkan pada pengembangan sektor pertanian. Ada beberapa pendekatan alternatif pembangunan yang menekankan pada pembangunan sector pertanian. *Pertama* adalah *Balance-growth Approach* yang dikembangkan oleh Singer pada tahun 1979 sebagaimana dikutip oleh Susilowati (2008, p. 46). Penekanan strategi dari pendekatan ini adalah pada keseimbangan antara pembangunan sektor pertanian dan sektor industri. Lebih lanjut, Singer mengemukakan bahwa pembangunan sektor pertanian akan menstimulus pengembangan sektor industri, seperti industri pupuk, benih, dan mesin-mesin pertanian. Sebaliknya, pengembangan sektor-sektor ini memberikan perluasan bagi pasar produk-produk pertanian. Namun sayangnya, orientasi pembangunan sektor pertanian dan industri non-pertanian pada pendekatan ini adalah berskala besar. Ini menjadi hambatan bagi negara-negara berkembang karena keterbatasan modal. *Kedua* adalah pendekatan *Agricultural Demand Led Industrialization* (ADLI). Pendekatan ini merupakan penyempurnaan dari pendekatan pertama yang dicetuskan oleh Adelman pada tahun 1984. Ini merupakan strategi yang mengedepankan sektor pertanian dalam pembangunan. Menurut Adelman, strategi ini sangat cocok diimplementasikan di negara-negara berkembang karena menekankan pada pertanian berskala kecil dan menengah, dan tentu saja bersifat pada karya karena menyerap banyak tenaga kerja, khususnya di daerah pedesaan. Lebih lanjut, Adelman berpendapat bahwa

pembangunan sektor pertanian akan membangkitkan pengembangan sektor-sektor lainnya, baik sektor industri untuk *input* pertanian, seperti pupuk, pestisida, dan benih, maupun industri *output* yang mengolah produk-produk pertanian, seperti agroindustri. Tentu saja pertumbuhan industri-industri lainnya ini secara otomatis membutuhkan banyak tenaga kerja. Selain itu, pembangunan ekonomi yang dilandasi oleh sektor pertanian akan mampu untuk mencapai ketahanan pangan karena dapat memenuhi kebutuhan domestik (Susilowati 2008: 47).

Menurut Adelman (dikutip oleh Susilowati 2008: 48), pengimplementasian strategi ADLI dapat dilakukan dengan cara investasi infrastruktur di bidang pertanian, pendistribusian teknologi pertanian, serta penelitian dan pengembangan pada mekanisme sektor pertanian dalam skala kecil untuk memperbaiki produktivitas pertanian. Oleh sebab itu, pada akhirnya, keterkaitan antara sektor pertanian dengan sektor-sektor lainnya dapat meningkatkan dan memeratakan distribusi pendapatan penduduk. Dengan demikian, strategi ini berusaha untuk membawa perekonomian negara dan masyarakat ke arah yang lebih baik dan berkelanjutan (Vogel 1994: 137). Namun, strategi ADLI hanyalah sebuah alternatif strategi yang tidak menjamin seratus persen terciptanya keberhasilan pertumbuhan ekonomi yang tinggi (Vogel 1994: 152).

Buku ini merupakan hasil dari penelitian tahun pertama dari rencana lima tahun penelitian tentang Pembangunan Sektor Pertanian di Asia Tenggara. Pada tahun pertama (2010)

penelitian dilaksanakan di Thailand dengan fokus mempelajari faktor-faktor penghambat dan strategi peningkatan produksi dan ekspor beras di Thailand. Pemilihan Thailand sebagai lokasi penelitian di tahun pertama ini adalah karena negara ini merupakan pusat produksi dan ekspor beras dunia.

Tahun 2011, tim peneliti juga berencana untuk menerbitkan buku tentang pertanian di Thailand, tetapi dengan tema yang berbeda, yaitu pertanian berkelanjutan (*sustainable agriculture*). Selanjutnya, dengan tema buku pada tahun ketiga (2012) dan keempat (2013) akan disesuaikan dengan fokus penelitian di Vietnam pada tahun-tahun tersebut. Sebagai negara yang menganut paham sosialis dan kapitalis, sangat menarik untuk melihat pembangunan pertanian di Vietnam. Penelitian tahun terakhir (2014) akan dilakukan di Kamboja dengan fokus pada perkembangan sektor pertanian di Kamboja setelah berakhirnya konflik internal serta peranan sektor pertanian dalam perekonomian Kamboja. Selain itu, pada tahun 2014 yang merupakan akhir dari rangkaian penelitian selama lima tahun, akan dirangkum hasil dari semua penelitian yang sudah dilakukan selama lima tahun dan akan dilakukan studi komparasi pembangunan pertanian di Thailand, Vietnam, dan Kamboja. Buku yang merupakan hasil penelitian yang dilaksanakan selama lima tahun tersebut nantinya diharapkan dapat memberikan gambaran yang komprehensif dan pelajaran yang berharga tentang dinamika sektor pertanian dan strategi pembangunannya di ketiga negara tersebut.

C. Hasil Temuan

1. Sejarah Pertanian Padi di Thailand

Sejarah pertanian padi di Thailand dapat dirunut sejak sekitar ribuan tahun yang lalu, sebelum beras dibudidayakan di China dan India. Fosil beras ditemukan di Goa Punghung, Provinsi Maehongsorn, dan diperkirakan berumur lebih dari 5000 tahun (RRI & DOA, 2004: 2). Dari fosil yang ditemukan dapat disimpulkan bahwa sejak zaman kuno beras yang diambil dari alam telah menjadi konsumsi manusia. Dengan berkembangnya pengetahuan, padi kemudian dibudidayakan untuk mendapatkan hasil yang lebih maksimal.

Thailand memiliki keunggulan geografi dengan cuaca dan kesuburan tanahnya sehingga menjadi daerah pertanian yang produktif. Delta Sungai Chao Phraya sebagai contoh, telah lama menjadi daerah penghasil beras yang utama di Thailand. Pada masa kerajaan Sukhotai, digambarkan keunggulan pertanian kerajaan Sukhothai dengan istilah "*Fish in the River and Rice in the Paddies*". Meskipun demikian, perekonomian Kerajaan Sukhothai tidak bertumpu pada sektor pertanian, tetapi lebih tergantung pada sektor pedagangan. Pada masa itu padi ditanam untuk memenuhi kebutuhan sendiri (subsistensi). Dalam prasasti ke-49 yang ditulis tahun 1412, disebutkan bahwa masyarakat Sukhothai bekerja sama untuk membuka hutan dan membangun lahan pertanian padi, membangun perkebunan buah-buahan, dan membangun dam untuk keperluan irigasi. Petani menanam ketan yang menjadi konsumsi mereka (RRI & DOA, 2004: 14–16).

Pada masa kerajaan Ayuthaya, pertanian juga menjadi perhatian utama. Kerajaan Ayuthaya menitikberatkan pembangunan pada komunikasi, perdagangan maritim, dan perluasan lahan pertanian padi, khususnya di Delta Chao Phraya (Molle & Srijantr, 2003: 1–2). Pada masa ini dibangun kanal-kanal untuk sarana irigasi, misalnya Klong Bangyai (1525), Klong Bangkruey (1538), Klong Samrong (1493), Klong Watkaitia (1608), Klong Muengnon (1636), dan Klong Watpakjan (1661) (RRI & DOA, 2004: 18).

Kesuksesan Thailand dalam petanian padi tidak hanya berhenti untuk pemenuhan konsumsi dalam negeri. Sejak tahun 1656–1714 Belanda berhubungan baik dengan Raja Siam karena Belanda setiap tahunnya mengapalkan beras, mineral, batu bara, dan timah dari Thailand. Sejak tahun 1660 Belanda memiliki kontrak monopoli dengan Thailand, yang pada waktu itu telah mengirim berasnya ke Manila, Jepang, Macau, dan CochinChina. Pada tahun 1722–1757 Thailand juga telah mengekspor beras ke China (RRI & DOA, 2004: 19).

Pada akhir abad ke-18 hingga awal abad ke-19, gula merupakan komoditas unggulan. Namun, sejak pertengahan abad ke-19, Thailand sudah mulai mengekspor berasnya. Ekspor beras dari Thailand mulai memasuki pasaran di Eropa ketika terjadi perjanjian Browing Treaty antara Raja Mongkut dengan pihak kerajaan Inggris pada tahun 1885. Setelah perjanjian tersebut, Thailand juga melakukan perjanjian dengan negara-negara lain seperti Prancis dan Amerika Serikat (1856), Denmark (1858), Portugis (1859), Belanda (1860), dan Prusia (1862). Pada tahun 1868, Thailand mengadakan

perjanjian dengan beberapa negara, yaitu Belgia, Italia, Norwegia, dan Swedia (Hall, 1988: 645).

Adanya perjanjian-perjanjian khususnya yang menyangkut perdagangan dengan negara-negara lain mendorong Thailand untuk meningkatkan produksinya. Di Central Plain banyak dibuka areal pertanian baru. Pembukaan lahan baru ini mendorong migrasi tenaga kerja, terutama dari Northeast sebagai daerah yang kurang subur (Tarling, 1999: 160). Penurunan harga gula pada tahun 1870–1880-an juga berpengaruh terhadap perluasan lahan pertanian padi. Pada masa tersebut banyak lahan pertanian tebu yang kemudian dijadikan lahan pertanian padi. Peningkatan luas lahan persawahan dan produksi beras tidak dapat dipisahkan dari usaha-usaha kerajaan membangun irigasi dan infrastruktur. Pada akhir tahun 1880-an pemerintah membangun kanal di delta Chao Phraya dan membangun sarana irigasi untuk mengontrol supplai air dan bahaya banjir. Selain itu, juga dibangun usaha-usaha penggilingan padi dan pembangunan jalan kereta api dari Bangkok ke bagian utara Thailand. Karena usaha-usaha yang dilakukan, produksi beras di Thailand naik dua kali lipat (PSDR-LIPI, 2003: 20–21). Antara tahun 1860–1930, volume ekspor beras Thailand meningkat hingga lebih dari 25 kali (Tarling, 1999: 142–143).

Pertanian padi menjadi fokus perhatian pemerintah. Pembangunan industri ini terus berlanjut, misalnya dengan mengadakan kontes pembangunan pertanian padi dan varietas beras unggulan. Kontes tersebut telah dimulai sejak 1907 di Thanyaburi. Selain itu juga didirikan pusat penelitian

padi, Rice Experiment Station (1916) pada masa King Rama VI di Amphor Thanyaburi, Propinsi Pathumthani. Sampai saat ini pusat penelitian ini terus berfungsi, yang dikenal dengan nama Pathumthani Rice Research Center. Pada tahun 1933, padi varietas unggulan di Thailand yang disebut Pin Gaew menang dalam kontes beras di Regina City, Kanada. Setelah itu, beras Thailand lebih dikenal di berbagai negara (RRI & DOA, 2004: 29). Ekspor beras terus mengalami peningkatan, hingga awal abad ke-20, nilai ekspor beras mencapai lebih dari 70% dari total ekspor Thailand. Komoditas ekspor lain adalah timah, kayu jati, dan karet (Church, 2006: 166).

Pengembangan tanaman padi sebenarnya telah dimulai sejak tahun 1911-1922 dengan mengumpulkan varietas-varietas padi terbaik dari seluruh pelosok negeri. Dari 4.764 macam varietas padi yang terkumpul selama tiga tahun, terpilih delapan varietas unggulan, yaitu Poung-ngeun, Thong-raya-dum, Khao-Thodlong, Jumpasorn, Pin Geuw, Bangpra, Nam-Dawkmai, dan Nang-Tani. Pengembangan tanaman padi dengan sistem pembibitan baru dimulai pada tahun 1954 di Bang Kaen Rice Experiment Station dan Sanpatong Rice Experiment Station. Pada tahun 1966 juga diperkenalkan padi varietas unggulan dari IRRI, misalnya RD 1, RD 7, dan RD 23. Untuk memaksimalkan hasil, RRI dan DOA mengeluarkan dan merekomendasikan sekitar 38 varietas padi untuk ditanam di lahan-lahan yang cocok, misalnya di daerah dataran rendah, dataran tinggi, daerah basah, dan sebagainya (RRI & DOA, 2004: 56–57). Pengenalan varietas padi yang baru mendorong pertumbuhan hasil pertanian di Thailand. Selama periode

1960–1980 rata-rata produksi pertanian tumbuh 5% per tahun (Hirsch, 2006: 2).

Pesatnya pembangunan sektor agraria di Thailand tak lepas dari berbagai kebijakan yang dikeluarkan pemerintah. Pembangunan pertanian masuk dalam agenda pemerintah, First National Economic and Social Development Plan (1 Juli 1961). Sejak masa ini pembangunan sektor pertanian diformulasikan oleh Ministry of Agricultural and Cooperatives, bersama dengan National Economic and Development Board. Beberapa perencanaan pemerintah yang masing-masing dilakukan untuk periode lima tahun dapat dijelaskan sebagai berikut (Adulavidhaya, 1990: 45–47):

- *The First Plan* (1961–1966)

Dalam rencana pertama ini pembangunan lebih difokuskan pada sarana irigasi untuk menunjang pertanian, misalnya pembangunan dam, kanal, dan tempat resapan air (reservoir). Beberapa dam dibangun, antara lain Bhumibol Dam (Propinsi Tak), Sirikit (Propinsi Uttaradit), Mae Klong (Propinsi Kanchanaburi). Pusat-pusat penelitian pertanian juga didirikan, khususnya di Central Plain dan Northeast. Pada tahun 1966 berdiri Bank for Agriculture and Agricultural Cooperatives, yang menyediakan pinjaman untuk para petani.

- *The Second Plan* (1967–1971)

Pada program perencanaan yang kedua ini pemerintah mengusahakan percepatan produksi pertanian, perbaikan kondisi sosial-ekonomi penduduk pedesaan, dan perlindungan terhadap sumber daya alam. Pembangunan irigasi difokuskan

di bagian *Northeast* karena minimnya irigasi di daerah ini menjadi salah satu sebab rendahnya produksi pertanian. Selain itu pemerintah juga melakukan usaha untuk perbaikan varietas padi dan karet, perbaikan kesehatan ternak, dan reforestasi.

- *The Third Plan* (1972–1976)

Dalam perencanaan yang ketiga, pemerintah fokus pada promosi hasil pertanian untuk kebutuhan ekspor. Institusi pertanian seperti asosiasi petani juga diperkuat untuk mempererat kerja sama di antara para petani, memfasilitasi produksi, pemasaran, distribusi yang layak untuk kredit pertanian, dan menstabilkan harga komoditas pertanian.

- *The Fourth Plan* (1977–1981)

Perencanaan yang keempat, lebih difokuskan pada peningkatan produksi pertanian dengan cara penggunaan lahan secara intensif, pembangunan infrastruktur, dan pemanfaatan angkatan kerja yang masih menganggur. Sampai dengan perencanaan yang keempat ini pembangunan pertanian menampakkan hasil yang nyata sehingga sejak tahun 1980-an perekonomian di Thailand mengalami pertumbuhan yang pesat. Pertanian menjadi sektor penting bagi pendapatan nasional. Lebih kurang 76% penduduk terlibat di sektor ini (Chomchai, 1988: 181).

- *The Fifth Plan* (1982–1986)

Pada periode kelima, pemerintah memfokuskan pembangunan pertanian pada restrukturisasi produksi pertanian dengan meningkatkan efisiensi produksi dan

pemanfaatan sumberdaya alam, serta peningkatan produksi melalui perluasan area penanaman. Para petani juga dpat lebih banyak memperoleh kredit untuk mendukung produksinya. Pemerintah lebih mempromosikan diversifikasi tanaman, dengan tujuan untuk mengurangi risiko petani terhadap fluktuasi harga.

Program pembangunan pertanian terus berlanjut sehingga mampu meningkatkan hasil pertanian, khususnya beras. Di samping itu, penelitian untuk pengembangan varietas-varietas unggulan juga terus dilakukan. Pada tahun 1987 mulai diperkenalkan produk pertanian organik, baik beras, sayur-mayur, maupun buah-buahan. Beras organik sendiri mulai dikembangkan di daerah utara sejak tahun 1991 (RRI & DOA, 2004: 74). Pada tahun 1989 Thailand menjadi salah satu ekportir beras utama di dunia, dengan total ekspor enam ribu ton. Selain itu, Thailand juga termasuk salah satu pengekspor terbesar untuk jagung, ketela, karet, dan gula (Hirsch, 2006: 5).

Pada tahun 1981 produksi beras mampu menyumbang 21,4% dari total GDP Thailand. Rasio tersebut mengalami penurunan drastis pada tahun 1990 hingga ke angka 12,4%. Ekspor produk-produk pertanian juga mengalami penurunan, jika pada tahun 1982 ekspor produk perrtanian mencapai lebih dari 50%, pada tahun 1990 hanya mencapai 21,2% dari total ekspor Thailand. Peenurunan tersebut disebabkan terbatasnya pembukaan lahan pertanian yang baru dan penurunan harga produk pertanian (Hori, 2000: 43).

Sejak lama Thailand dikenal sebagai daerah pertanian dengan padi sebagai produk utamanya. Meskipun demikian, sebenarnya banyak produk pertanian lainnya yang juga menjadi komoditi ekspor, misalnya jagung, sorghum, kacang tanah, kedelai, kelapa, dan sebagainya. Thailand juga menjadi penghasil kapas, gula, tembakau, karet, nanas, dan kopi. Masing-masing komoditi dibudidayakan di tempat yang sesuai, misalnya Northern Thailand yang memasok sekitar 80% dari total hasil tanaman kedelai, 50% kacang tanah, dan sayur-sayuran (Hori, 2000: 44). Thailand Selatan yang berbatasan dengan Malaysia merupakan produsen utama untuk getah karet. Selain itu, Thailand juga mengekspor gula tebu dan kayu jati (Chomchai, 1988: 181-182).

Secara ekologis, Thailand terbagi dalam empat wilayah, yaitu North, Norteast, Central Plain, dan South. Hampir semua wilayah tersebut menghasilkan padi dengan produksi yang bervariasi jumlahnya. Dari keempat wilayah Thailand, Central Plain yang sebagian besar merupakan dataran rendah yang rata menjadi daerah penghasil padi yang utama, khususnya di sepanjang dataran aluvial Sungai Chao Phraya, atau yang sering kali disebut sebagai lembah Menam. Total produksi beras dari Central Plain lebih kurang mencapai 1/3 dari total produksi beras di Thailand. Daerah ini juga menjadi penghasil gula (53% dari total produksi gula di Thailand), sayur-sayuran, buah-buahan, dan produksi ternak (Srijantr, 2003: 125). Sebagai daerah yang subur dan produkif, tak mengherankan jika Central Plain, terutama di Delta Chao Phraya memiliki jumlah penduduk yang cukup padat. Di daerah-daerah sekitar Bangkok dikembangkan juga pertanian sayur dan buah-

buahan, terutama untuk menyuplai permintaan pasar di Kota Bangkok. Distrik Chandraburi sebagai contoh, banyak lahan pertanian yang dimanfaatkan untuk penanaman buah-buahan (PSDR-LIPI, 2003: 16).

Northeast merupakan daerah yang agak tandus, dan sebagian besar merupakan dataran tinggi yang berteras-teras dan kurang subur. Daerah yang luasnya mencakup sepertiga bagian dari seluruh luas area Negara Thailand ini juga menghasilkan beras walaupun dengan jumlah terbatas. Di daerah ini terdapat dua jenis pertanian, yaitu pertanian permanen dan non-permanen. Pertanian permanen merupakan pertanian yang berada pada lahan yang tetap, sedangkan pertanian non-permanen biasanya merupakan pertanian dengan sistem ladang berpindah (PSDR-LIPI, 2003: 17).

Pada tahun 1985 tercatat luas lahan pertanian di kawasan Northeast mencapai 44% dari total area pertanian di Thailand. Walaupun memiliki lahan yang luas, tetapi kawasan Northeast memiliki tingkat produktivitas yang sangat rendah. Hal tersebut antara lain disebabkan oleh rendahnya rasio irigasi, yaitu 12%, sedangkan rata-rata secara nasional mencapai 36%. Oleh karena itu, pemerintah membangun proyek-proyek irigasi skala besar di DAS Mun River dan Chi River. Sebagai hasilnya, pada tahun 1980-an pembangunan irigasi di Northeast tumbuh sekitar 9% per tahun, sedangkan di tingkat nasional hanya sekitar 5% per tahun (Hori, 2000: 43).

North Thailand merupakan daerah yang berbukit-bukit, namun terdapat juga dataran subur untuk pertanian. Produk pertanian yang penting di kawasan ini adalah beras ketan (*glutinous-rice*) yang merupakan makanan utama penduduk di daerah tersebut. Selain itu, *North* Thailand juga menjadi penghasil beras, sayuran, dan buah-buahan. Sejak tahun 1991, *North* Thailand mengembangkan pertanian organik, terutama beras organik.

Daerah Selatan memiliki karakteristik wilayah yang beragam. Di bagian yang memiliki datar, biasanya menjadi daerah penghasil padi, di kawasan pesisir sebagian besar masyarakatnya adalah nelayan, sedangkan di daerah perbukitan penduduk banyak mengandalkan hasil hutan (PSDR-LIPI, 2003: 18). Hasil utama daerah yang berbatasan dengan Malaysia ini adalah karet.

Beras memiliki peranan yang sangat penting bagi masyarakat di Thailand. Selain untuk memenuhi kebutuhaan pangan masyarakat, beras juga menjadi penunjang perekonomian negara. Pentingnya peranan beras menjadikan komoditas ini mempunyai dampak dalam berbagai bidang, antara lain ekonomi, politik, dan sosial. Dalam bidang ekonomi, dapat dijelaskan misalnya pada masa kerajaan Ayuthaya, perekonomian negara tergantung pada produksi beras. Beras juga dapat memengaruhi kondisi politik. Kekurangan stok pangan (beras) dapat memicu timbulnya pemberontakan. Di sisi lain, beras juga bisa menjadi sarana yang dapat mempererat hubungan antar negara. Dari sisi sosial dapat dicontohkan bahwa pada masa Ayuthaya beras bisa menjadi

salah satu faktor yang menunjukkan tingkat kekayaan seseorang (RRI & DOA, 2004: 20–22).

Karena pentingnya peranan beras untuk masyarakat dan kerajaan, ada festival-festival tertentu untuk menghormati beras, misalnya Jarod Pranangkul Raknakwan (Royal Ploughing Ceremony) yang diadakan sejak 1782 ketika Rama I berkuasa. Rama I mempunyai perhatian khusus terhadap petani. Apabila terjadi gagal panen, Rama I mempunyai kebijakan untuk membagikan persediaan beras dari gudang kerajaan kepada rakyatnya sehingga rakyat tidak kelaparan (RRI & DOA, 2004: 24). Ritual Royal Ploughing sempat dihentikan pada tahun 1936–1959, namun kembali dirayakan kembali sejak tahun 1960. Perayaan ini diadakan setiap tahun, pada awal musim hujan (sekitar bulan Mei), sebagai dukungan spiritual kepada petani untuk memproduksi beras. Selain itu, sebagaimana dipaparkan dalam buku "The Tale of Rice" (RI & DOA, 2004), terdapat berbagai tradisi untuk menghormati tanaman padi, antara lain sebagai berikut.

(5) Di Thailand utara terdapat beberapa tradisi, antara lain:

- Rub Kwan Kwao (*Rice Solace*), yaitu tradisi yang dilakukan untuk menyembah Dewi Padi (*Mae Posop*) dan mengundangnya untuk tinggal di lumbung-lumbung padi.
- Satueng (*giving rice to the spirit*), yang bermakna bahwa masyarakat meminta perlindungan untuk tanaman padinya dari berbagai hama.

- Then Kam Ram Keay (*the rice harvesting dance*), yaitu tarian yang biasanya dilakukan setelah panen, dengan tujuan untuk hiburan setelah bekerja keras di ladang.
- Taan Khan Khao (*rice dedicated for the dead*), yang menunjukkan ucapkan terima kasih masyarakat Thailand, dengan membawa beras dan makanan-makanan lain untuk diberikan kepada para biksu di kuil.
- Kryasart, banana (*stirred pop rice and peanut, Banana*), dilaksanakan di provinsi Khampangpetch sejak tahun 1981.
- Hae Nang Maew (*Cat parade*), yang dimaksudkan untuk memohon hujan.
- Hak Na (*the first ploughing*), yaitu aktivitas pertama yang dilakukan dalam masa menanam. Sebelum menanam, para petani memohon kesuburan dan perlindungan dari hama.

(6) Di Central Plain, terdapat beberapa tradisi seperti:

- Tam Khun Khao (*the rice auspicious bumper year ceremony*), yang bertujuan untuk meminta perlindungan agar tanaman padi bebas dari serangan hama.
- Hae Nang Maew (*cat parade*).
- Tham Boon Klang Thung (*Rice for the good*), yang bertujuan untuk kebaikan tanaman padi.
- Su Kwun Khao (*the blessing ceremony for longevity of life*), dengan tujuan memuja Mae Posop agar membantu tanaman padinya sehingga memberikan hasil yang baik.

- Stirring Khao Tip of Bandai Temple, yaitu makan bersama beras jenis Khao Tip atau Khao Matupayath yang dianggap sebagai beras supernatural sehingga mendapat keberuntungan dan kesehatan.
- Kong Khao Bueong Srueong (*the rice moral worship*), yang bertujuan untuk kesehatan dan panjang umur. Tradisi ini biasa dilakukan di Provinsi Chonburi.

(7) Di daerah Timur Laut, terdapat beberapa tradisi, misalnya:

- Boon Khao Saak (*the ancestor worship*), yaitu dengan mempersembahkan beras untuk memuja nenek moyang. Biasanya dilaksanakan pada bulan ke-10 setiap tahunnya.
- Boon Khao Pradab Din, hampir sama dengan perayaan di atas, tetapi dilaksanakan pada bulan ke-9.
- Boon Khao Lan (*the blessing ceremony for longevity of life*) yang bertujuan untuk mensyukuri perluasan ladang pertanian padi setiap tahunnya.
- Ritual untuk berterima kasih pada sapi dan kerbau yang telah membantu pekerjaan petani.

(8) Di daerah selatan:

- Khao Yakule (Khao Matupayath)
  Pertanian, khususnya beras, sampai saat ini mempunyai arti yang sangat penting bagi masyarakat Thailand. Selain sebagai makanan pokok, beras sangat berarti untuk menopang perekonomian negara. Raja Bhumibol Adulyadej mengibaratkan "agriculture is the human life" (RRI & DOA, 2004: 30), yang dapat

diartikan bahwa kehidupan masyarakat Thailand sangat tergantung dari sektor pertanian. Hal tersebut sangat wajar karena Thailand banyak bertumpu pada sektor pertanian.

2. Hambatan dalam Pembangunan Pertanian Padi di Thailand

Membangun pertanian padi bukanlah hal yang mudah karena banyak factor yang menjadi penghalang dan hambatan. Hal ini pulalah yang dialami Thailand dalam usaha membangun pertanian padi untuk meningkatkan produksi berasnya.

a. Migrasi

Migrasi merupakan suatu hal yang wajar dan rasional sebagai respons alamiah masyarakat terhadap situasi lingkungan yang dihadapi. Migrasi dilakukan guna meningkatkan pendapatan, mendapatkan pengalaman kerja, dan mencapai penghidupan yang lebih baik (Chamratrithirong, 2007: 3).

Bagaimana migrasi dapat menjadi faktor penghambat dalam pembangunan pertanian padi di Thailand? Jawabannya bisa dianalisis dari dinamika migrasi internal di Thailand sangat tinggi. Sebagaimana yang umumnya terjadi di negara-negara berkembang, pesatnya pembangunan perkotaan yang didukung oleh perkembangan sektor-sektor industri dan jasa, ditambah lagi dengan pembangunan infrastruktur yang pesat menyebabkan tak terbendungnya arus migrasi internal, yaitu dari daerah-daerah terpencil di pedesaaan ke daerah pusat pertumbuhan ekonomi, seperti Bangkok. Daerah yang jelas-jelas mengalami migrasi besar-besaran dari desa ke kota

adalah daerah Central Plain, yang merupakan daerah pertanian yang jaraknya cukup dekat Kota Bangkok sebagai ibu kota sekaligus pusat pertumbuhan ekonomi negara. Pertumbuhan Bangkok yang pesat bagaikan gula yang menarik minat para pekerja dari berbagai daerah.

Dampak yang ditimbulkan dari migrasi sangat bervariasi baik bagi daerah asal para migran maupun dari daerah tujuan para migran. Sebagai contoh adalah daerah asal para migran. Bagi daerah ini, migrasi bisa menimbulkan dua konsekuensi yang saling bertolak belakang. Konsekuensi pertama adalah pengiriman *remittance* ke daerah asal migran yang dapat memberikan keuntungan bagi pembangunan daerah dan kehidupan keluarga yang ditinggalkan di daerah asal.

Konsekuensi kedua adalah berkurangnya jumlah tenaga kerja di daerah asal, yaitu di daerah pedesaan. Karena jenis pekerjaan yang mayoritas digeluti di daerah pedesaan adalah sektor pertanian tentunya akan terjadi kekurangan dalam jumlah tenaga kerja di sektor ini. Berkarir di sektor industri dan jasa tampaknya lebih menarik minat para pekerja, khususnya angkatan kerja muda, daripada berkarir sebagai petani di pedesaan. Dengan demikian, yang tersisa di daerah pedesaan adalah populasi petani yang berumur tua untuk terus bergelut pada sektor pertanian di Thailand.

Isvilanonda (2001: 25) menginformasikan bahwa jumlah pekerja yang terlibat dalam pertanian padi sempat mengalami peningkatan antara tahun 1970 dan 1980, yaitu dari 10,44 juta orang menjadi 11,83 juta pekerja. Namun, di pertengahan

tahun 1980-an, angka ini mengalami penurunan seiring dengan perkembangan sektor-sektor lainnya dan pembangunan infrastruktur. Di pertengahan tahun 1990-an, jumlah pekerja yang terlibat dalam pertanian padi kembali turun ke angka 10 juta orang, dan semakin mengalami penurunan setiap tahunnya.

b. Biaya Produksi

Faktor selanjutnya yang menjadi hambatan dalam pembangunan pertanian padi adalah biaya produksi yang tinggi. Komponen biaya produksi yang tinggi meliputi upah pekerja serta harga pupuk kimia dan pestisida.

1). Upah Pekerja

Semenjak awal tahun 1980-an, telah terjadi peningkatan pada upah pekerja di sektor pertanian yang berimbas pada peningkatan biaya produksi pertanian padi. Peningkatan upah pekerja ini melebihi kecepatan harga beras itu sendiri. Isvilanonda (2001: 25) berargumen bahwa pangkal dari masalah tingginya upah pekerja adalah kekurangan tenaga kerja di lahan pertanian padi. Sebagaimana dikemukakan sebelumnya bahwa penurunan tenaga kerja pada pertanian padi, terutama di daerah Central Plain merupakan konsekuensi dari tingginya angka migrasi para petani dari desa ke kota yang disebabkan oleh pembangunan infrastruktur, kedekatan jarak dengan ibu kota Bangkok, dan lebih tingginya penghasilan yang didapatkan dari sektor industri dan jasa dibandingkan dengan pendapatan dari sektor pertanian.

2). Pupuk Kimia dan Pestisida

Ketergantungan petani padi Thailand pada pupuk kimia bisa dibilang tergolong sangat tinggi dengan alasan untuk meningkatkan produksi beras. Tambahan lagi, varietas padi yang modern yang dikembangkan dan banyak digunakan oleh para petani sangat responsif terhadap pupuk kimia daripada varietas padi lokal tradisional yang hanya memerlukan sedikit pupuk.

Oleh karena itu, penggunaan pupuk kimia di Thailand mengalami peningkatan setiap tahunnya. Misalnya penggunaan pupuk NPK yang meningkat lebih dari 4 kali lipat dalam kurun waktu 20 tahun, yaitu dari 27 kg/ha pada awal periode 1970an menjadi 115kg/ha di awal tahun 1990-an (Isvilanonda dan Hossain, 2000: 94). Gambaran secara lengkap penggunaan pupuk kimia pada pertanian padi di Thailand digambarkan pada Table 2 di bawah ini.

Tabel 2. Penggunaan Pupuk Kimia pada Pertanian Padi di Thailand, 1971–2000

Tahun	Musim Hujan (kg/ha)	Musim Kering (kg/ha)	Pemakaian/tahun (kg/ha)
1971–1975	23.32	169.4	27.2
1976–1980	32.8	236.1	43.6
1981–1985	44.2	295.2	60.1
1986–1990	66.9	297.1	83.6
1991–1996	113.3	340.6	129.7
1996–2000	157.6	325.6	175.5

Sumber: *Ministry of Agriculture Thailand dikutip oleh Isvilanonda*, 2001.

Selain pupuk, pestisida merupakan salah satu input yang membebani biaya produksi pertanian padi di Thailand. Dengan diterapkannya kebijakan "Green Revolution" pada tahun 1966, untuk pertama kalinya Thailand mulai mengimpor pestisida. Semenjak saat itu, total impor pestisida semakin meningkat dari tahun ke tahun. Sebagai contoh adalah impor pestisida sebanyak kurang lebih 20.000 ton pada tahun 1994 meningkat menjadi kurang lebih 80.000 pada tahun 2004 (Green Peace, 2008). Ini berarti penggunaan pestisida di kalangan petani sangat tinggi, bahkan bisa dikatakan tergolong berlebihan. Dibandingkan dengan beberapa negara di Asia Tenggara, Thailand merupakan negara yang paling banyak menggunakan pestisida untuk lahan pertaniannya. Pemakaian pestisida di Thailand, khususnya di daerah Central Plain, dapat dilihat pada Table 3 di bawah ini.

Table 3. Penggunaan Pestisida di beberapa wilayah penghasil padi di kawasan Asia Tenggara, 1994–1999

Wilayah	Penggunaan Pestisida (kg active ingredient ha-1 crop-1)			
	Insektisida	Herbisida	Lainnya	Total
Central Luzon, Philippines	0.18	0.34	0.18	0.70
Mekong Delta, Vietnam	0.51	0.49	0.10	1.10
Red River Delta, Vietnam	0.61	0.65	0.34	1.60
West Java, Indonesia	0.62	0.69	0.54	1.85
Central Plain, Thailand	0.97	0.89	0.25	2.10

Sumber: *D. Dawe*, 2010.

Tingginya tingkat penggunaan pestisida di Thailand dikarenakan beberapa hal. *Pertama,* tidak adanya kontrol dari pemerintah terhadap peredaran pestisida yang di dalam negeri, misalnya tidak adanya pajak impor, lisensi, dan kontrol harga. *Kedua,* tidak adanya pengetahuan petani akan hama, kegunaan pestisida serta dampak yang dapat ditimbulkan dari pestisida kepada petani (Jungbluth, 1996: 16). Informasi sepihak mengenai pestisida dan kegunaannya didapatkan oleh petani bersumber dari pedagang, perusahaan pestisida, petani lainnya, dan tenaga penyuluh pertanian.

Layaknya candu, ketergantungan petani Thailand pada pupuk kimia dan pestisida sangat tinggi. Penanaman padi oleh petani tidak pernah lepas dari keduanya. Bagi mereka, tanpa kedua elemen ini pertanian padi yang mereka kerjakan tidak akan berhasil. Disadari atau tidak, pupuk kimia dan pestisida, telah menambah biaya produksi petani dalam pertanian padi. Selain itu, pupuk kimia dan pestisida dapat menimbulkan beberapa dampak lainnya yang merugikan petani itu sendiri.

c. Hama

Hal lainnya yang menjadi kendala dalam pembangunan pertanian padi di Thailand adalah masalah hama. Salah satu jenis hama yang dikategorikan sebagai ancaman yang paling membahayakan pertanian padi di Thailand adalah wereng coklat.

Pada tahun 2000, Isvilanonda dan Hossain (2000) dalam laporan penelitiannya menyatakan bahwa hama bukanlah masalah yang besar bagi pertanian padi di Thailand. Namun

saat ini, isu hama merupakan persoalan yang sangat krusial untuk segera ditangani karena mengancam jumlah produksi beras. Menurut informasi dari Kementerian Pertanian Thailand (*The Ministry of Agriculture*), telah terjadi kerugian sebesar 1.1 juta ton atau sebesar US$ 275 juta hanya dalam jangka waktu kurang lebih tujuh bulan (satu kali masa tanam pada musim kering), yaitu dari bulan November 2008 sampai dengan bulan Mei 2009, akibat dari berjangkitnya hama wereng tersebut (United Nations Office for the Coordination of Humanitarian Affairs–Integrated Regional Information Networks (IRIN), 2010).

Untuk tahun 2010 ini, *The International Rice Research Institute* (IRRI) Thailand dan *Asian Development Bank* (ADB) (2010) melaporkan bahwa hama wereng coklat telah merusak 30% lahan pertanian atau sekitar 78.400 ha di provinsi-provinsi penghasil padi di Central Plain Thailand pada masa tanam 2009/2010. Penyerangan hama wereng yang cukup besar ini diduga merupakan hasil dari penanaman padi yang terus-menerus dilakukan oleh petani untuk memperoleh keuntungan dari tingginya harga beras pada tahun 2009 (Miller, 2010). Dalam usahanya untuk memperoleh hasil dalam jumlah besar, petani banyak mempergunakan pupuk kimia dan pestisida. Pupuk kimia yang diyakini dapat menyuburkan tanaman padi sehingga dapat memberikan hasil yang besar ternyata juga dapat mempercepat perkembangbiakan wereng coklat karena dapat meningkatkan kesuburan wereng coklat, sedangkan pestisida yang disemprotkan tidak juga efektif membunuh wereng. Sebaliknya, pestisida hanya akan membunuh serangga yang

menguntungkan tanaman padi, seperti laba-laba yang merupakan musuh alami dari wereng coklat (Miller, 2010).

d. Krisis Air

Sektor pertanian merupakan pengonsumsi air terbesar di Thailand, yaitu sekitar 70% dari total ketersediaan air. Kurangnya pasokan air tentunya sangat menganggu keberlangsungan sektor pertanian, terutama pertanian padi yang sangat bergantung pada curah hujan dan sistem irigasi. Tanaman padi merupakan satu jenis tanaman yang sangat bergantung pada air bagi pertumbuhannya. Oleh karena itu, ketersedian air yang cukup adalah mutlak diperlukan.

Di Thailand, sumber air merupakan suatu isu yang besar bagi para petani yang dapat menjadi hambatan dalam usaha pertanian padi mereka. Kelangkaan sumber air di negara ini banyak dipengaruhi oleh iklim dan diperparah oleh kerusakan lingkungan yang disebabkan oleh pembukaan hutan secara besar-besaran untuk menambah luas lahan pertanian (Poapongsakorn and Isvilanonda, 1995: 6). Kekeringan yang melanda mengakibatkan beberapa bendungan tidak membuka kran air mereka untuk mengairi lahan-lahan pertanian karena terhalang oleh kebutuhan pada sector lain, seperti konsumsi air minum bagi masyarakat, pembangkit tenaga listrik, dan pertumbuhan kota dan sektor industri. Persaingan ini pada gilirannya bisa menjadi konflik pada penggunaan air (Isvilanonda dan Hossain, 2000: 95).

Beberapa tahun belakangan ini, krisis air melanda Thailand. Misalnya pada tahun 1993, 2005, 2008, dan 2010. Pada tahun

1993, Thailand sempat mengalami kekeringan yang cukup parah yang disebabkan oleh curah hujan yang di bawah normal (Fernquest, 2010 and TDRI, 1994) antara tahun 1990 dan 1993 (Kisner, 2008). Namun pada dua tahun berikutnya, 1994-1995, Thailand mengalami curah hujan yang sangat intens yang kemudian menyebabkan banjir terburuk dalam sejarah. Selanjutnya, negara ini kembali menderita kekeringan di tahun 2005 dan 2008 (Kisner, 2008). Tahun 2005 merupakan kekeringan terparah yang mengakibatkan 71 dari 76 provinsi di Thailand mengalami kerusakan lahan pertanian (Fenquest, 2010), terutama lahan pertanian padi.

Tahun 2010 juga merupakan tahun yang buruk bagi para petani di Thailand akibat minimnya ketersedian air. Sekali lagi hal ini disebabkan oleh rendahnya curah hujan yang berdampak pada rendahnya debit air di beberapa sungai dan bendungan yang hanya memiliki kurang lebih 10% dari kapasitas yang seharusnya bisa ditampung oleh bendungan, yaitu sekitar 9.300 meter kubik. Kekeringan pada tahun 2010 ini juga menimpa bendungan terbesar di Thailand, yaitu The Queen Sirikit di Provinsi Uttaradit. Namun, keadaan ini tidak sepenuhnya berlaku pada bendungan Sungai Chao Phraya dan Sungai Mae Khlong di sebelah barat provinsi Kanchanaburi (McCartan, 2010).

Pertanian padi yang dibudidayakan di Thailand mayoritas merupakan jenis lahan pertanian tadah hujan. Dampak yang ditimbulkan dari buruknya kekeringan yang melanda Thailand cukup signifikan, yaitu penurunan jumlah produksi beras secara nasional. Sistem pertanian di Thailand terbagi dalam

dua sampai tiga waktu tanam dalam satu tahun. Kritisnya ketersediaan air menyebabkan para petani padi hanya dapat menanam benih padi sekali dalam setahun saja.

e. Ketidakstabilan Harga Beras

Thailand merupakan eksporter beras terbesar di pasar dunia. Surplus beras yang dimiliki Thailand diekspor ke pasar internasional. Dengan memakai prinsip liberalisasi perdagangan, besarnya suplai beras di pasar internasional akan mempengaruhi harga beras itu sendiri. Semakin besar suplai berarti harga beras di pasar internasional akan menjadi turun. Sebaliknya, bila suplai rendah maka yang terjadi adalah harga beras yang tinggi di pasar internasional. Namun, ketika peningkatan suplai dan penurunan harga berakibat baik bagi konsumen, ini berakibat buruk bagi para produsen. Sayangnya, petani sebagai produsen tidak bisa tidak untuk melepaskan diri dari keterikatan mereka pada pasar dunia (Poapongsakorn dan Isvilanonda, 1995: 110 & 112).

Harga beras yang berfluktuasi di pasar dunia berpengaruh terhadap berfluktuasinya harga beras di dalam negeri. Penurunan harga beras di pasar dunia sempat terjadi sepanjang tahun 1993 sampai dengan tahun 1995, di mana harga beras hanya mencapai 2.5-2.6 baht/kg. Kerugian sangat dirasakan oleh para petani di Thailand karena harga jual tidak dapat menutupi biaya produksi (Siriluk dan Kammeier, dikutip oleh Morita, 2003: 14).

Ketidakstabilan harga beras di Thailand juga disebabkan oleh sistem pemasaran beras di dalam negeri yang bebas dari

campur tangan pemerintah. Kontrol harga beras di pasar domestik Thailand lebih banyak dikuasai oleh bandar, yang membeli beras dari para petani dengan harga yang rendah. Hal ini diperparah dengan rendahnya *bargaining position* petani yang biasanya terjadi karena utang mereka kepada bandar. Sebagai akibatnya, nasib petani sangat tidak diuntungkan (Morita, 2003: 13–14).

Ketidakstabilan harga beras, baik di pasar dunia maupun dalam negeri, pada akhirnya menyebabkan penurunan minat masyarakat, khususnya di pedesaan, untuk tetap bertahan di pertanian padi di Thailand.

f. Area Pertanian

Salah satu cara yang dikembangkan oleh Pemerintah Thailand dalam usahanya menambah jumlah produksi beras adalah dengan memperluas area pertanian padi. Berdasarkan hasil penghitungan yang dilakukan oleh Kantor *Agriculture Economics* Thailand pada Kementerian Pertanian, diketahui bahwa selama kurun waktu lebih kurang 30 tahun, telah terjadi penambahan area pertanian sebesar 1% per tahunnya, yaitu dari 8.15 juta ha pada tahun 1971–1975 ke 10.26 juta ha pada tahun 1995–2000 (Isvilanonda, 2001: 21).

Tabel 4. Luas Lahan Pertanian Padi di Thailand, 1971–2000

Periode	Luas Lahan (juta Ha)	Rata-rata Pertumbuhan (%)
1971–1975	8.15	
1976–1980	9.35	2.94
1981–1985	9.87	1.11
1986–1990	9.97	0.2
1991–1995	9.64	-0.68
1996–2000	10.26	1.31
Rata-rata Pertumbuhan/tahun (1971-2000)		1.04

Sumber: The Office of Agricultural Economics Thailand dikutip oleh Isvilanonda, 2001.

Dari Table 4 di atas dapat dilihat juga bahwa ada pertumbuhan minus area pertanian yang terjadi pada periode 1991–1995. Hal ini merupakan akibat dari terjadi kekeringan, yang kemudian merebak kepada masalah ketersediaan air pada tahun awal tahun 1990-an, yang kemudian berujung pada berkurangnya luas lahan penanaman.

Namun, langkah penambahan/perluasan area pertanian bukan lagi suatu langkah yang diambil oleh Pemerintah Thailand untuk meningkatkan produksi. Hal ini karena keterbatasan lahan kosong. Selain itu, penambahan lahan pertanian berarti pembukaan hutan yang pada akhirnya bisa berakibat buruk pada lingkungan.

g. Irigasi dan Manajemen Air

Pada bagian sebelumnya telah disebutkan bahwa salah satu hambatan dalam membangun pertanian padi di Thailand adalah pengairan lahan pertanian padi. Proyek pembangunan irigasi berskala besar dan menengah memang telah dilakukan oleh pemerintah semenjak tahun 1950-an, yang kemudian dilanjutkan dengan proyek berskala kecil sepanjang tahun 1970–1980-an (Isvilanonda, 2001: 22). Namun, pembangunan proyek irigasi belum bisa meng- *cover* seluruh lahan pertanian padi di Thailand karena sebagian besar pembangunan proyek irigasi masih tersentral di daerah Central Plain, sedangkan irigasi untuk Thailand bagian utara dan timur laut adalah irigasi berskala kecil (Isvilanonda et.al, 1992: 75).

Penambahan pembangunan proyek irigasi dirasakan tidak lagi memungkinkan karena biaya yang tinggi dan besarnya kerusakan lingkungan yang ditimbulkan. Oleh karena itu, sepanjang tahun 1990–2000, fokus dari sistem pengairan untuk lahan pertanian dialihkan menjadi manajemen air, yaitu bagaimana memperbaiki efisiensi pengaturan distribusi air khususnya ketika kekeringan melanda (Isvilanonda, 2001: 24).

h. Kebijakan Pendukung Pertanian Padi

1) *Rice Support Program*

Program pemerintah yang berkaitan langsung dengan pembangunan pertanian padi dan peningkatan produksi beras adalah *rice support program* yang diperkenalkan pada tahun 1986. Dengan program ini, petani dapat memperoleh pinjaman jangka pendek dari *the Bank of Agriculture and*

Agricultural Cooperatives (BAAC) dengan agunan berupa padi mereka kepada pihak bank. Pembayaran kembali utang mereka dapat dilakukan setelah musim panen tiba. Namun belakangan, program ini kurang mendapat minat yang besar dari petani (Isvilanonda, 2001: 31).

2) Program Subsidi

Selain itu terdapat juga program subsidi dari Pemerintah Thailand bagi para petani untuk memudahkan para petani mendapatkan import pupuk kimia. Seperti telah didiskusikan pada bagian sebelumnya bahwa Thailand tidak memproduksi pupuk kimia, melainkan mengimpornya dari negara-negara lain, dan peredaran pupuk kimia impor di Thailand bebas dari intervensi pemerintah sehingga harga pupuk kimia menjadi mahal. Untuk itu, cara yang dilakukan oleh pemerintah untuk membantu para petani adalah dengan mensubsidi biaya transportasi pengiriman pupuk melalui dua organisasi, yaitu organisasi petani (*the Marketing Organization of Farmers)* dan *the Agricultural Cooperatives (AC)*. Melalui kedua organisasi tersebut, petani bisa mendapatkan pinjaman dengan bunga rendah untuk membeli pupuk.

Program kebijakan pinjaman lunak juga diberikan pemerintah Thailand kepada para petani melalui bank-bank yang berada di bawah naungan *the Bank of Thailand*. Melalui bank pemerintah ini, semua bank komersial diwajibkan untuk mengalokasikan sebesar 5% dari dana pinjaman yang mereka miliki untuk pinjaman bagi para petani dengan bunga rendah. Belakangan ini, keterlibatan BAAC dalam program pinjaman berbunga rendah sangat tinggi, yaitu dengan menyediakan

kredit kepada petani untuk berbagai keperluan, seperti dalam hal pemasaran dan bisnis lainnya di pedesaan (Isvilanonda, 2001: 31–32).

3. Faktor-Faktor Pendukung Keberhasilan Pembangunan Pertanian Padi di Thailand

Beras merupakan komoditas utama bagi Negara Thailand. Tidaklah mengherankan bila komoditas ini mendapatkan perhatian khusus dari Pemerintah Thailand. Beberapa strategi pemerintah Thailand dalam mendukung pembangunan pertanian padi di antaranya adalah perluasan area pertanian, pengembangan varietas padi, pembangunan infrastruktur, dan stabilisasi harga beras.

a. Pembangunan Infrastruktur dan Mekanisasi

Pembangunan infrastruktur adalah hal lain yang dilakukan oleh Pemerintah Thailand dalam membangun pertanian padi. Terdapat dua infrastruktur utama yang dibangun oleh Pemerintah Thailand dalam membantu pembangunan di sektor pertanian, khususnya pertanian padi, yaitu kontruksi jalan. Pembangunan jalan berarti membuka keterisolasian suatu daerah. Kontruksi pembangunan jalan besar-besaran dilakukan oleh Pemerintah Thailand sepanjang tahun 1960 sampai dengan tahun 1970-an dengan maksud untuk memfasilitasi petani dalam membuka lahan pertanian baru dan juga memfasilitasi petani dalam memasarkan produk hasil pertanian mereka. Proyek pembangunan jalan ini telah mengeruk dana pemerintah sebanyak 11.000 baht/ha pada

tahun 1966–1970, yang kemudian meningkat menjadi 74.000 baht/ha pada tahun 1986–1991 (Isvilanonda, 2001: 22).

Kini kondisi jalan dari dan menuju kota Bangkok di beberapa daerah yang berdekatan dengan Bangkok bisa terbilang bagus dan lebar. Misalnya saja di provinsi Ayutthaya dan Ang Thong yang merupakan Provinsi penghasil beras di Central Plain. Kondisi kondusif ini tentunya sangat menguntungkan bagi petani, tidak hanya dalam memasarkan produk hasil pertanian, tetapi juga dalam proses pembangunan pertanian padi itu sendiri dengan meminimalisir biaya yang harus dikeluarkan untuk mendatangkan input produksi, seperti pupuk atau alat-alat pertanian dari Kota Bangkok atau kota lainnya.

Banyak cara yang dilakukan oleh petani padi di Thailand dalam merespons tantangan-tantangan pada usaha pengembangan pertanian. Misalnya dalam menghadapi kekurangan tenaga kerja akibat tingginya angka migrasi ke daerah perkotaan, petani meresponsnya dengan melakukan teknologi intensif atau mekanisasi pada lahan pertanian mereka (Isvilanonda, 2001: 25).

Sebenarnya, mekanisasi pertanian dimulai pada tahun 1950-an dengan tujuan untuk membuka lahan pertanian baru dan untuk menyiapkan lahan pertanian sebelum ditanami (Isvilanonda, 2001: 26). Pembukaan hutan untuk lahan pertanian secara besar-besaran berakibat pada kerusakan lingkungan dan berkurangnya ketersediaan air, yang kemudian dampaknya berujung pada keterbatasan untuk pembukaan

lahan pertanian baru. Masalah ini pun direspons oleh petani dengan lebih meningkatkan mekanisasi atau teknologi intensif pada fase kedua dari pembangunan pertanian di tahun 1980–1992 (Poapongsakorn dan Isvilanonda, 1995: 6).

Beberapa alat yang sampai sekarang dipergunakan petani Thailand untuk menggarap lahan pertanian padi mereka adalah *power tillers*, traktor besar, *threshing* mesin. Besarnya angka penggunaan mesin untuk kegiatan pertanian membuat negara ini memproduksi sendiri mesin-mesin yang dipergunakan tersebut. Dalam waktu singkat, penyebaran penggunaan alat dan mesin dalam aktivitas pertanian semakin bertambah. Misalnya penggunaan traktor yang meningkat sebanyak 14 kali dan power tiller sebanyak 30 kali pada periode 1996–1998 (Isvilanonda, 2001: 26).

Tabel 5. Penggunaan traktor dan power tiller pada lahan pertanian, 1971–1998

Tahun	Traktor (unit)	Power tiller (unit)
1971–1975	8.935	53.449
1976–1980	27.133	190.185
1981–1985	34.164	347.143
1986–1990	45.967	591.817
1991–1995	102.518	1.787.171
1996–1998	127.999	2.051.550

Keuntungan yang didapat dari mekanisasi pertanian adalah berkurangnya hari kerja bagi para petani, peminimalisasian tenaga kerja, peningkatan produktivitas tenaga kerja, dan penurunan biaya produksi (Isvilanonda dan Hossain, 2000: 94).

b. Penelitian

Sebelumnya pendekatan yang dilakukan pemerintah Thailand dalam meningkatkan pertumbuhan hasil pertanian adalah dengan menekankan pada penambahan area pertanian. Namun, ketersediaan lahan yang semakin terbatas menggeser pendekatan pemerintah dari penambahan area pertanian kepada usaha-usaha penelitian pertanian dan kelanjutannya.

Sebenarnya penelitian pertanian telah dilakukan pada awal tahun 1960 dengan fokus pada perbaikan hasil padi per hektare di area yang teririgasikan (Poapongsakorn dan Isvilanonda, 1995: 14). Kepedulian pemerintah terhadap penelitian padi sangat tinggi karena hasil penelitian bisa dipergunakan untuk meningkatkan produksi beras. Tanggungjawab terhadap penelitian padi di Thailand dipercayakan oleh pemerintah kepada salah satu institusi pemerintah yaitu *the Department of Agriculture (DOA)*. Untuk membantu kerja DOA, maka pada tahun 1969, pemerintah membentuk *Department of Agricultural Extension* (DOAE) yang memiliki peran penting dalam menyebarkan teknologi-teknologi baru hasil penelitian kepada petani (Poapongsakorn dan Isvilanonda, 1995: 14). Pada tahun 1995, DOA telah memiliki 25 pusat penelitian dan 26 stasiun penelitian yang tersebar di seluruh wilayah negara (Isvilanonda dan Hossain, 2000: 95).

Fokus awal dari lembaga-lembaga penelitian ini adalah pada peningkatan hasil produksi beras, khususnya pada lahan pertanian dengan sistem irigasi. Semakin lama, fokus dari lembaga-lembaga penelitian ini semakin berkembang, yaitu

pada pertumbuhan produktivitas lahan pertanian melalui perbaikan dan penciptaan varietas padi, pengaturan pada aktivitas penanaman, teknik pertanian, ketresedian air, salinitas, pembasmian serangga dan penyakit yang menyerang tanaman padi, dan lain sebagainya (Ministry of Science and Technology, 2006: 10). Dalam melakukan penelitiannya, lembaga-lembaga penelitian di bawah DOA ini berkolaborasi dengan organisasi penelitian internasional, yaitu *International Rice Research Institute (IRRI).*

Untuk menjaga keberlangsungan lembaga penelitian dan penelitian yang dijalankan, pemerintah Thailand mengalokasi dana yang selalu bertambah setiap tahunnya sebagaimana terlihat pada Table 5.

Tabel 6. Alokasi Dana untuk Penelitian pada The Department of Agriculture (DOA), 1971–1997

Periode	Dana DOA (juta Baht)	Alokasi Dana untuk Lembaga Penelitian Padi (juta baht)
1971–1975	495.74	73,53
1976–1980	700.75	87,63
1981–1985	875.08	111,14
1986–1990	1.018,18	102,47
1991–1995	1.637,01	197,46
1996–1997	2.018,27	220,20

Sumber: *Agricultural Statistic of Thailand, dikutip oleh Isvilanonda*, 2001.

Salah satu hasil dari lembaga penelitian padi di Thailand adalah menciptakan varietas modern padi baru. Jenis-jenis Modern Varietas (MVs) meliputi Suphan Buri 1, Chainat 1, Phitsanulok 1, dan Jasmine Rice 105 (Genilo, 2005: 32). Pengadopsian modern varietas (MVs) padi pada awal dekade

1970-an telah berhasil meningkatkan produksi padi di Thailand sebanyak 2.67% per tahunnya (Isvilanonda, 2001: 21). Keunggulan yang dimiliki oleh MVs dibandingkan dengan varietas lokal adalah waktu tanam yang singkat, sehingga petani dapat melakukan dua sampai dengan tiga kali masa tanam pada satu tahun atau lima kali masa tanam dalam dua tahun. Dengan kata lain, petani dapat merasakan dua atau tiga kali panen dalam satu tahun (Isvilanonda, 2001: 21). MVs merupakan varietas padi yang memerlukan air sebagai komponen utama pertumbuhannya, sehingga tanaman padi ini sangat baik tumbuh di area dengan sistem irigasi yang baik. Dengan demikian MVs tidak cocok ditanam di Thailand bagian utara dan timur laut, melainkan di Central Plain (Isvilanonda et.al, 1992: 75). Dengan varietas modern ini pemerintah menciptakan program yang disebut dengan *Rice Cropping Intensity.*

c. Kerja Sama Internasional

Peran penting beras tidak hanya terletak di bidang ekonomi. Beras juga memiliki nilai strategis lainnya, yaitu nilai sosial dan politik (Surono, 2006). Maksudnya adalah beras memiliki peran dalam kestabilan sosial dan politik negara. Ketidakstabilan persediaan pangan dan atau berfluktuasinya harga beras adalah dua hal penting yang apabila tidak segera diantisipasi akan dapat memicu munculnya kerusuhan nasional yang mengarah pada tindakan kriminal (Suryana dan Ketut, 2008). Sebaliknya, ketika ketersediaan pangan masih aman, masalah pangan tidak akan mendorong terjadinya kemelut politik. Karena dampak besar yang bisa ditimbulkan oleh beras terhadap kehidupan sosial dan politik

masyarakatnya maka tidak salah bila Thailand pernah menghentikan sementara kegiatan ekspor berasnya ketika terjadi krisis beras pada kuartal kedua tahun 2008. Peran penting beras dalam menjaga kestabilan situasi sosial dan politik memunculkan wacana baru bagi beberapa negara penghasil beras utama di Asia Tenggara, seperti Thailand, Vietnam, Kamboja dan Myanmar untuk membentuk sebuah kartel perdagangan beras yang berfungsi untuk mengatur suplai beras di dunia dan menjaga kestabilan harga beras di pasar dunia. Hal ini dirasakan perlu karena sebagian besar masyarakat di negara-negara pengonsumsi beras menghendaki adanya kontinuitas dari ketersedian pasokan beras, kestabilan harga beras, kemerataan dalam distribusi beras, dan keterjangkauan harga beras, khususnya bagi kalangan ekonomi lemah (Sawit, 2001). Tentunya nilai strategis sosial dan politik yang melekat pada beras adalah nilai yang berkaitan erat dengan nilai ekonomis. Produksi beras yang mencukupi untuk memenuhi kebutuhan dalam negeri, secara langsung maupun tidak langsung dapat menjaga kestabilan sosial dan politik di dalam negeri.

d. Pelatihan

Salah satu usaha pemerintah dalam membangun pertanian padi adalah dengan memberikan pelatihan kepada para petani. Salah satu lembaga yang didirikan oleh pemerintah untuk melaksanakan tugas ini adalah *the Agriculture Technology Transfer Center* (ATTC). ATTC dibentuk pada tahun 1999 dan berada pada tingkat Sub-district. Lembaga ini berfungsi untuk mentransfer pengetahuan dan teknologi secara efisien melalui partisipasi petani dan penyuluh

pertanian. Adapun pengetahuan-pengetahuan itu adalah *Integrated Pest Management (IPM), integrated production, management kitchen of gardens,* dan penciptaan varietas-varietas padi yang baru. Bisa dikatakan ATTC bagaikan sekolah untuk para petani di tingkat provinsi (Morita, 2003: 40).

Selain pemerintah, terdapat pihak-pihak lain yang terlibat dalam pembangunan pertanian padi di Thailand, yaitu pihak kerajaan dan petani sendiri.

e. Pihak Kerajaan

Pihak kerajaan Thailand, terutama Raja Bhumibol Adulyajej pada saat ini, memegang peranan yang sangat signifikan dalam sektor pertanian di Thailand. Dari informasi yang didapatkan dari Museum Agriculture di Thailand, diketahui bahwa kontribusi raja lebih banyak pada bidang penelitian.

Kepedulian pihak kerajaan terhadap pembangunan pertanian padi pada bidang penelitian dituangkan ke dalam pembentukan beberapa lembaga penelitian. Beberapa masalah yang menjadi perhatian lembaga-lembaga penelitian ini (yang merupakan inisiatif dari raja Thailand) adalah masalah ketersediaan air, rehabilitasi hutan, konservasi tanah dan air, program intensifikasi pertanian, pelatihan, dan pengenalan *sustainable agriculture*.

Terdapat beberapa lembaga penelitian di bawah naungan kerajaan, seperti the Huai Sai Development Study Centre (Thailand Selatan bagian tengah), the Puparn Royal Development Study Centre (Thailand bagian timur laut), the

Huay Hong Kheai Royal Development Study Centre (Thailand bagian Utara), the Khao Hin Sorn Development Study Centre (Thailand bagian tengah), Kuang Krahaen Bay Royal Development Study Centre, The Royalty Initiated Pikaithong Royal Development Study Centre (Thailand bagian selatan). Pusat-pusat penelitian yang dikembangkan oleh raja Thailand tersebut merupakan tempat yang disediakan bagi staf dari setiap departmen pemerintahan (pertanian, kesejahteraan social, tenaga kerja, pendidikan, dan lain-lain) untuk saling bekerja sama dalam mencari solusi bagi petani dan masalah pertanian yang dihadapi pada setiap daerah.

Kesimpulan

Surplus beras dan penguasaan pasar beras dunia merupakan bukti nyata dari kerja keras Thaiand dalam membangun pertanian padinya. Kesuksesan yang diraih Thailand bukan berarti pembangunan pertanian padi di negara ini bebas dari masalah. Banyak faktor, baik itu faktor internal maupun eksternal, yang masih menjadi hambatan bagi Thailand untuk diselesaikan. Pencarian solusi dari masalah yang dihadapi bukanlah pekerjaan yang mudah untuk dilakukan. Kerja keras merupakan kunci keberhasilan sesungguhnya. Thailand sebagai negara yang unggul dalam sektor pertaniannya sudah membuktikannya. Berbagai pembaharuan dan inovasi, kerjasama dengan berbagai pihak, serta dukungan bagi petani adalah beberapa hal penting yang dilakukan oleh pemerintah Thailand.

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