Thai Rice

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1. INTRODUCTION

In Thai language, the meaning of two words, rice and meal, is synonymous. Both are called : "Khaow" and "Kab Khaow"(dishes). By far, rice is the most important single dietary item. For the Thai, rice is the staple food for breakfast, lunch and dinner.

As a crop, rice occupies the largest area of cultivated land (64.2%, 61.5% and 57.7% of the total cultivated land in 1978, 1983 and 1988, respectively — Table 1). It provides the best employment opportunity for the majority of the people (about 63.87% of the total population in 1986 — Table 2). Rice does not only serve as the source of food for household consumption but is also considered as a main source of foreign exchange. In 1989, Thailand exported 140 metric tons of rice amounting to Baht 44, 803 million (245,520 million Yens), which is about 8.81 % of the total export (Table 3). Rice is also considered as the main source of revenue for the Thai government for the last two decades or more. No one can talk about economic developement in Thailand without taking a close look at the latest status of rice production and trade.

Before proceeding to the discussion, it should be mentioned at the outset that an in—depth discussion of the rice market cannot be dealt with due to time limitation.

The paper shall begain with an overview of the Thai rice production. This shall be followed by a discussion of the rice trade under the existing free trade policy. The last part shall delve on the problems facing the rice industry, including the present and past view on the farmers and the rural areas of Thailand.

2. BACKGROUND AND CHARACTERISTICS OF THAI RICE PRODUCTION

2. 1 LAND AND CULTURE.

Known as the "Land of Smiles", Thailand is located in the Tropical zone. The territory of the Kingdom of Thailand extends from 6 to 20 degrees north latitude and stretches from 97 to 109 degree east latitude, covering an area of about 514,000 square kilometers or 321 million rais (about 51 million hectares) of land in the Indo Chinese Peninsula. Of the total land area, about forty percent is farmland and twenty—nine percent is forestland based on the 1985 data (Table 4).

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2. 2 PHYSICAL CONDITIONS.

Rice is an unusual crop which is grown under different climatic conditions, soil type and various levels of topography that provide sufficient amount of moisture. It is a kind of food crop that is suited to the physical conditions of Thailand.

Thailand has three distinctive seasons : dry, hot and wet. The dry season is from November to February, the hot season is from March to May and the wet season is from June to October (in some years it can extend up to November or December). Like all of the Southern Asian countries, Thailand is a typical humid tropical country with an average annual rainfall ranging from 900—1500 mm. In the Norhern, North—eastern and Central Plain Region, almost 80% of the rainfall comes within a period of six months from May to October. This leaves the rest of the year relatively dry with intermittent rains. The Southern Rigion has only dry and wet seasons. Rainfall is as high as 2,000—3,000 mm. which is more suitable for perrenial tree than the paddy field. Thailand is seldom hit by tropical disturbances compared with other neighboring countries which damages agriclutural crops particularly rice.

Most part of Thailand appear quite flat, especially the Central Plain Region and the lower part of the Northern Region. The upper part of the Northern Region is mountainous with forests and rivers. In the North—eastern Region, most of the land are high and hilly. Some areas arable, some parts (upper) are saline, some parts (middle) are flat and highland, and some parts (lower) are dry. The Southern Region is narrow and mountainous.

2. 3 CULTURAL PRACTICE.

To adapt of the local conditions, two methods of rice cultivation are being practice: one for the dry land and one for the wet land. The first method is known as shifting cultivation which is mostly practiced by hill tribes. Since the produce is only for household consumption, the total acreage for this method is small. This type of rice cultivation is harmful to forest and soil, hence the government is implementing various measures to discourage this type of farming.

The most important method of paddy growing is done in the wetland or rainfed field. This method depends greatly on natural conditions and is implemented in two ways: by broadcasting and by transplanting. Broadcasting is direct sowing in the paddy field; while transplanting is the process of direct sowing in the nursery and transplanting the seedling from the nursery to the paddy field.

Broadcasting practice is particularly suitable to lowlands. The land preparation has to start as soon as the paddy field is wet by the first few showers in late April or early May. Broadcasting enables rice to grow tall enough to escape the submersion in the flood during the wet season. Certain rice variety known as "Khaow Khun Nam" or floating paddy have peculiar growing habit in that it can grow as high as 3 to 4 inches per day to cope with sudden rise in the flood level.

In large areas of the Central Plain Region and the lower part of the Northern Region, the depth of the water during the wet season can be 3 to 4 meters for a considerable length of time which only quick growing deep water paddy rice can survive. Weeding is not required. Under this practice, crop will be harvested in early November up to December or sometimes late January, depending on the rainfall.

Transplanting practice are pooular in the medium land for two reasons. First, during the dry season, the clayey soil is too hard to break and plowing has to wait for the early rain. Second, since the land is above the river water level, rice depends entirely on rainfall. By raising seedlings in the nursery for 4 to 6 weeks (from May to June or later), transplanting can start as soon as the moonson arrives.

Transplanting has also been practiced on the lowlands under two conditions: first in the saline areas where early sowing is not possible unless the salt is washed away by the rain and second in the poor drainage areas where the water tend to be stagnant for a long period of time making the soil unsuitable for direct sowing. Generally speaking, transplanting requires more labor but this gives uniform quality of grain and higher yield as compared to the broadcasting practice.

The steps in rice cultivation involves plowing, harrowing, broadcasting, transplanting, fertilizing, weeding, harvesting, threshing and winnowing. The traditional style of farmwork is done manually. For heavy work like plowing, harrowing and hauling is done by farm animals. At present some farmers use new technology in broadcasting called "Na-Namtom" which demand less human labor than the transplanting method.

3. DEVELOPMENT OF RICE PRODUCTION

Four major factors have to be taken into consideration in rice-farming. First, the land must produce crops of high quality and quantity. Second, the land productivity must be maintained and further improved. Third, the cost of production must not be too high. Last, the net income must be sufficient enough for decent living.

A study of the Division of Africultural Economics, Ministry of Agriculture and Cooperative revealed that the average size of the paddy farm is 26.3640 rais or 9.4647 acres (1 rai=0.359 acres) per farm household in 1985 (Table 4). The 1988 Intercensal Survey of Agriculture of theNational Statistical Offices showed that about 59.7 percent of farmholding is between 10−39.9 rais (3.59−14.32 acres) which is not far from the 1985's data. Because of the small size farms and the prevalence of the mono crop income farm household, High Yield Varieties

(HYVs) were introduced to increase income and to intensify paddy production to meet market demand. Rice Development (RD) project for water control high yield variety and quality of milled rice developed by the Rice Department of the Thai Government make the intensification possible. It should be noted, however, that about 70% of the rice production is consumed locally and only 30% is traded in the international market. Therefroe local demand is a major consideration in rice production.

Large amount of fertilizers and chemical inputs are essential for the high yield varieties. A study of the Development of Agricultural Economics in 1985 showed that the average consumption of fertilizer in paddy fields from 1982/83 to 1984/85 was fifty two percent (average) per cropping season (Table 6), and that the second crop season in each region has higher consumption per rais rhan the first crop season (Table 7, first crop = 8.03, second crop = 45.19 kilogram per rai in average). The paddy field in the Central Plain Region consumed the highest quantity in both seasons crops. Fertilizer consumption increased from 56.2 percent in 1978 to 78.4 percent in 1988 and the consumption of inorganic fertilizers increased compared with organic fertilizers (Table 8).

High yield varieties demand not only large amoumts of fertilizer and chemical inputs but also water supply in proportion to humidity. A study conducted by Direk Tong-aram in 1982 (NESDB 1987) observed that water supply consumption of rice per day is high, particularly in the dry season (second crop) see Table 9. Water supply is essential during the period of transplanting and early growth of grains.

To support the development and production of rice varieties, the government allocated higher budget for irrigation system in both surface water and ground water. This resulted in increased production during the dry seasons.

The data collected by the Center for Agricultural Statistics, Office of Agriculture and Co-operatives showed the correlation between rice production and irrigation in 1987. In Table 10, the non-irrigated land (75.88% of planted area) produced 66,31% of the total volume in the first crop season. In Table 11, the irrigated land (86.85% of planted area) produced 89.37% of the total volume in the second crop season. (Most of the irrigated land are in the Central Plain Region). The two table also showed the yield per rai under irrigated and non-irrigated land by region in both crop season.

A study was conducted in 1990 by Siamwala, A., et al on Thailand's rice production from 1961–86 divided in into three periods (Table 12). The study revealed that the increase in rice production and yield per rai increased due to different factors. From 1961–63 to 1967–69, production of rice increased by land extension in both first and second crop season. The percentage increase of yield per rai of non-glutinous rice (0.7) is lower than glutinous rice (63.0) in the period. From the 1967–69 to 1976–78, production of rice increased by land extinsion the same as the period of 1961–63 to 1967–69, but yield per rai in both non-glutinous rice (–8.6%) and glutinous rice (–269.5%) decreased. In the period of 1967–69 to 1976–78, the production of glutinous rice increased by yield while ono-glutinous rice increased by land extension particularly in the North-eastern and lower part of Northern Region (data did not show in the Table) due to the completion of the Naresuan Irrigation Project. The potential of land productivity in the North-eastern Rigion is stil high. (Siamwala, A., et al 1990 p.137).

The development of rice production gave raise to tractorization during the past two decades as revealed in the 1988 Intercensal survey of Agriculture (Table 13). The trend of the number of the holding machine and equipment between 1978, 1983 and 1988 in the agriculture increased except tractor. Power Tiller increased at a high rate of 9.2 to 35.3 percent in ten years. Most upland crops utilize large tractors. Farm tractors were used for custom tilling of rice and upland crops, mainly in the Central and Northern Region. The trend is rapidly replacing buffaloes with custom tilling by large tractors and self-tilling by hand tractors in The Chao Phya Delta areas (Hiroshi Tsujii, 1989, Tsujii 13). Table 14 showed that for every one unit of power tiller an average of 12.09 farm households and 306.49 rais is serviced. Classified by region, one unit of power tiller serve 5.13 farm households and per 172.03 rais (Central Plain Region), 9.84 farm household and 205.85 rais (Northern Region), 12.58 farm household and 277.14 rais (Southern Region) and 52.07 farm house-holds and 1337.05 rais (North-eastern Region).

Besides tractors, threshers are popular. The quantity of tresher increased more than three times. From my observation in the villages in the lower part of the North-eastern Region, most of household used tresher in rented paddy rice fields.

4. RICE MARKET

Paddy plantations in Thailand are situated in the rural areas ,while consumption are largely in the urban areas. After harbest, paddy will flow from the farmers (producers) to the consumers through the middleman. Rise trade flow consists of the transfer of paddy from farmer to the rice miller, and the flow of white rice (milled rice) from the miller to the consumers.

Figure 1. shows the flow of paddy and milled rice from the farmers to the local maket. Another flows is the transaction from the local dealers to the wholesale dealers (big rice millers, merchant and representative dealers) to the retailers and consumers in the form of processing (white rice or milled rice).

Flow of paddy product to the market starts in late November to February (first crop), and June to August (second crop) every year. Harvest starts from the upper part of the

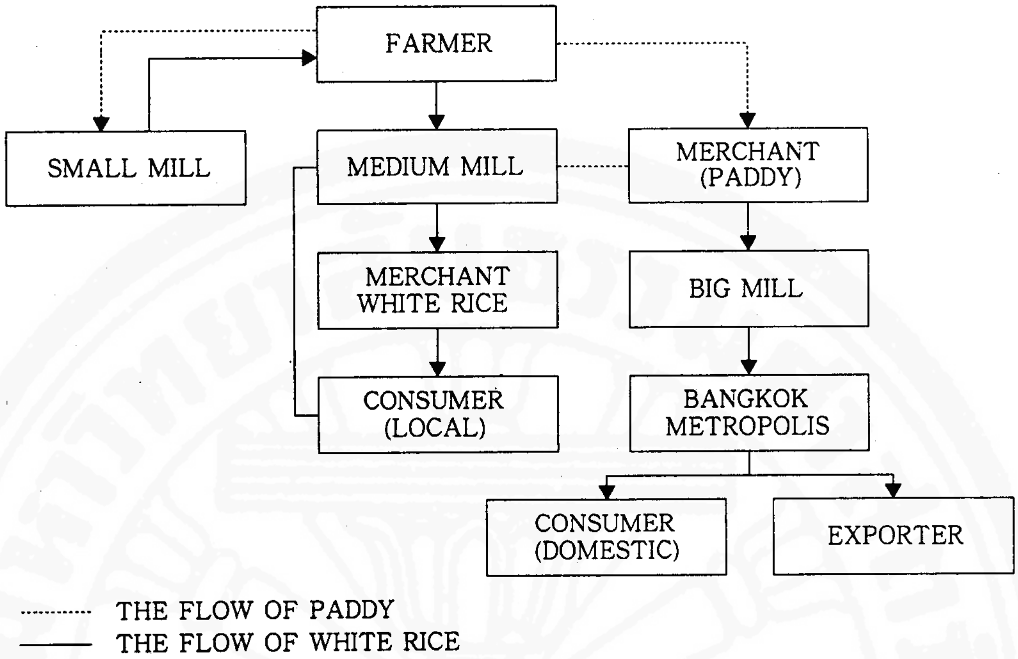

FIGURE 1. THE TRADE FLOW OF RICE: FARMER TO CONSUMER AND EXPORTER

and the North-eastern Region, followed by the lower part of Northern and Central Plain Region and then the Southern Region.

Rice is a seasonal crop and the trade of paddy is not the same as manufactured products the whole year round. A study of Siamwala, A., et al in Table 15 showed the distribution of 17 million tons of paddy in the cropping season year between 1977/78 to 1979/80 by purpose. The distribution between glutinous and non-glutinous rice are quite different, in both domestic consumption and exports. Seventy percent of glutionus rice consume by the producers, while seventy percent of non-glutinous rice is traded in the market. The data is not too updated but the proportions remained unchanged compared to the study of Mr. Bang-ooh, S. (NESDB 1987. p115). The data showed the volume of the total production of the first crop at 17—18 million tons of paddy rice, consumpion and seed at 7.47 million tons. The residual which is about 9.53—10.53 million tons, sixty percent of production is alloted for trade. The value for the second crop season was not revealed since the study was concerned about the surplus of paddy in the first cropping season only. About seventy percent of glutinous white rice is consumed and about seventy percent of non-glutinous white rice is traded in the market (local and abroad). The instability of price is affected by the non-glutinous rice market and farm income in certain places of non-glutinous paddy fields.

The development of portable mills during the 1950's (Sriplung, S.1968 p.16) created a new market structure. The demand for milled rice increased, as the rural and urban population increased. The rural investors could afford the establishment of portable mills in the village and city. Small size rice millers have a milling of capacity per 5 tons of paddy per day while medium size rice millers have milling capacity of 5—20 tons per day. Portable millers buy paddies from the farmers in the nearby villages and sell the milled rice in the nearby towns. One of the most common practices of the farmers is to bring the paddy to the miller for milling without fee with the miller getting the rice barn. To make the business profitable, millers take the entire paddy from the farmers at the future market price. Farmers can withdraw at any time without cost milled rice for home consumption.

Portable mills collect large quantity of rice from the farmers. If the milling process is continuous throughout year, the portable medium mill business is very lucrative. Now a days the large number of independent millers in the rural areas have changed. More serveces are offered to the farmers, and the condition in the local market is nearer perfect competition.

The surplus of paddy in one region is sold in other regions. Most of the paddy in the large surplus areas are sold to the big millers (milling capacity more than 20 tons per day) along the Chao Phya River near Bangkok. Millers buy rice from two welknown central paddy markets in Nakorn-sawan and Pitsanulok Province. However the grading of rice is not a high quality as Khaow-Hom-Mali or Khaow-Sao-Hai (Jek-Chuey) and other. In the case of a high quality graded of rice, the big millers (mostly exporters) will trade through the representative dealers or wholesalers in specific areas. Some representative local dealers receive money in asvance from the wholesale dealers, and act as agencies in the rural areas to buy rice and loan money to the farmers.

The transaction of white rice are undertaken by wholesale dealer and retailer in the market. In the local market, wholesale dealers are divided in three levels, classified by the size of capital inflows: large, medium and small levels. The large wholesaleres trade an average of 1,500 tons of white rice; medium size dealers trade about 700—1,500 tons, and the small size dealers trade less than 600 tons per month. The wholesale dealers in all levels acts as the middlemen and creditors. Big wholesale dealers are speculators and stockers which balances the market. The accelerator gactor of the instability of domestic rice price depends on these group.

Pattern of international rice market is more complex than domestic market. Rice export had undergone liberalization in both local and abroad. Since the free trade policy in local market was enacted, the number of exporters increased, and the group of traders had changed too. Most of the exporters trade more than one crop, while some groups trade other commodities in the export market.

The pattern of rice export market can be divided into two, private and government importers. Thai rice export is traded by international broker and trader. International brokers and traders contract directly exporters under given conditions. Contract is awarded to exporters with lowest price bid. Welknown international brokers and traders, whicvh contracts Thai exporter have main offices in the Great Britain, France,Belguim, Netherlands, the United States and Asia (including Japan). Now a days, some of Thai exporters trade directly to the importers and the dependency of international brokers and traders declined in the rice export market.

5. SITUATION AND THE EFFECTS

Thai produces about 21 million tons in 1989 (about 15−16 million ton of white rice), export 6.14 million tons of white rice (BOT, Quarterly Bulletin 1990), and the residual is for domestic consumption. By average, the proportion of export is about 30−35 percent of produce in a certain years except 1989 year. The yearly quantity of rice available for export depends largely on the production of the year concerned, and domestic requirements. Rice price fluctuation in the local market vary each year, but the cycle is constant. The farm gate price of paddy in the early period of the harvested time is in the low levels from December to February. In the later months, the trend of price increases gradually until the time of harvest in the later cropping season. In case of export, price of white rice is low from May to June compared to other month. From May to June, quantity of paddy are still available.

Why is the price of rice in Thai local and export market unstable? The answer will be illustrated by the situation in the cropping season from 1987/88 and 1988/89.

In the midyear of 1987, Thailand faced intermittent rain and drought. Under this condition, Thai exporters speculated a decline in the quantity of paddy, and an increase in the farm gate price of paddy. Exporters demanded for rice to increase their stocks before the time of harvest. This action of the exporters affected the price of both paddy and white rice. However when the harvest come, paddy produce were ont damaged as expected. The exporters and whoesale dealers have to bear the cost of stock which is about 21−25 percent per year of the value of rice (Siamwala, A., et al 1990, p.244). This is one of the factor affects the instabity of rice market in Thailand.

The other unexpected occurance was in the second crop during the drought in the mid year of 1987. The production of the second planted area decreased because the water supply in the reservior of the Dams (named in the Majesty King Plumipol and the Majesty Queen Sirikit) which decreased under a given level. The irrigated land under the area of the mentioned Dams cannot support the irrigation system. However in the early stage of the harvest of the first cropping season farm gate price of paddy was high compare to the previous year (table 16). In January-March 1987 farm gate price of paddy (first crop) was 4,045—4,133 Bahts (78,877.5—80,593.5 Yens) per ton and 3,325—3,916 Bahts (64,837.5—76,362.0 Yens) per ton in second crop season. Under the law of supply, farmers increased plantation in the second crop period by investing the ground water. During the cultivation time, there was an unexpected rainfall and the planted areas faced less damages.

The success in rice production affected the farmers'income by decreasing price, compare to the price of the first crop of the year. The instability of price depends on the active action of the producers.

In 1988/89 paddy production increased in large amount resulting in exporters increasing the market share in the world rice market. The year 1989 was the only year that Thai exported rice in a large quantity.

It should be noted that the price of rice in the local market is not absorbed by the supply and demand domestically. What is the factor that gives rise to the price of Thai rice market? As observed in the study, the action in the world rice market is the main factor affecting price of rice in the Thai market. The data in Table 17 showed the trend of Thai white rice (5 percent) in U. S Dollars per tons. In 1988 to 1989 the price of rice increased: 230 to 319 U. S Dollar per ton. Two situations affected increase and decrease of price. In the cropping season 1989 severe damages occured in world supplying rice countries such as India, Indonesia, Pakistan and Bangladesh, while the quantity of rice in Thailand was high. Shortage in supply affected the price of rice worldwide.

The reduction of Thai rice export price in 1986 as affected by policies of some importing countries specifically the Farm Act policy. In the implementation of the Farm Act by the Commodity Credit Corporation (CCC), the price of white rice (5 percent) decreased from 484 in 1981 to 210 U. S Dollar per ton in 1986. The effect of this Act was to sell rice on long tern credit as at a lower price to the importing countries. Developing country like Thailand cannot support the rice importing countries as the United States. During the releasing period of surplus rice in the United States, Thai farmers faced severe poverty.

The last point to be mentioned here is the increase in the large amount of world rice production by the development of progressive technology and intensive farming of paddy fields. The quantity of world rice production increased from 419 million tons of paddy in 1982 to 523 million tons in 1986 (Center of Agricultural Statistic. 1988 p.18). For this year (1990/91), FAO predicted that rice production will be 521 million ton of paddy (Ministry of Trade, 1991), an increase of one percent from the previous year. The production of rice increases through the increased production of countries like as China, India, the Philippines, Myanmar Vietnam and Pakistan. New exporting countries increase but importing countries decline. One example is South Korea Which imported 2.3 metric tons of rice in 1981 and is now facing surplus in supply. Thai rice market is now facing high competition, particularly in the lower grade of rice market.

6. THAI FARMERS AND GOVERNMENT POLICY

A wellknown saying in Thailand is: "The farmer is the back-bone of the nation". Since the largest part of the population is still engaged in agriculture (more than sixty percent in Table 2), the gain from economic growth should redound sufficiently ot the largest part of the population; ie, the farmer. Growth that favors only a small portion of the population and leaves the greater number (the farmers) worse off can be considered as mis-directed growth. In part three I talked about the developments in the paddy field which is mostly successful. Even if the productivity will increased, farmers' income will increase or decrease depending on the price of rice. Price of rice are unstable and the trend decrease since 1981, affecting farmers' income to a large extent. The data in Table 18 showed the average household real income per year classified by farmer and non-farmer grouping in 1976, 1981 and 1986. The data showed that the average real income of farm household in each year under study are the lowest real income, compared to the other groups. In 1976 the average real income (of the whole Kingdom) of rice farmer was 3,067 Baths (59,806.5 Yens: given the approximately exchange rate at 1 baht = 19.5 yen: Nation May 2, 1991); but ten years later the average real income was 2,818 Bagts (54,951 Yens). Compared to the non-rice-farmer (in the rural areas) average real income in 1976 was 5,406 Bahts (105,417 Yens) and in 1986 was 5,948 Bahts (115,986 Yens). In Bangkok Metropolis and urban area have higher average real income compared to the rice farmers, and non-rice farmer in the rural areas. Based on these data, we can conclude that rice farmers are the poorest income group, facing poverty even under higher growth levels.

A study by Siamwala, A., et al showed the proportion of the farmers dependent on rice as main occupation and income. Farmers were classified by the level of income into three groups: high, medium and low income (Table 19). In table showed that the main occupation of the low income group depended on planted rice by 43.7 percent in 1976. The percentage of dependency increased to 55.6 in 1986 while the percentage of dependency of the group of the high income decreased from 14.2 to 6.2. In area of rice planting dependency, the Central Plain (in the Chao Phya Delta) the lower part of the Northern and the upper part of the Northeastern Region depended on the income from rice more than the low income group. Most of the low income groups depend from off-farm income.

The data showed a correlation with the Thai farmers and poverty. The poverty will prevail for as long as the government is passive. By the observation of mind; the farmers are still poor because the following factors:

6. 1 Rice plantation mostly depends on the rain fall in a certain years, which is an uncontrolled factor. Rice production and farmer income are uncertain.

6. 2 Rice production is a seasonal crop and the bulk of the flow depends on the power of price bargaining affected by the law of supply and demand.

6. 3 The close relationship between farmers, merchants and landlords and rice mill owners which act as the local dealers, still prevail in the Thai society. This affect the flexibility of the contracts: resulting in lower price of rice, higher interest rate and rent, or transfer the repayment of the debt in the damaged year etc. The concept of competition market in the local rice market is not being practice the farmer having less bargaining power.

6. 4 Price of rice in the local market is sometimes determined by the government as the policy maker, such as price supported policy. From the history, rice market was controlled by the government in the period of time while the price of rice in the world market is high (seller's market). Governmernt used export tax to protect export, and supported the consumers by given the ceiling price of white rice. At present the price of rice in the world market is quite low, and the government encourages increase in exports. All of these policies gave negative support to the farmers while supporting positively the government.

6. 5 The bargaining power of the Thai farmers association is weak compare to the labor union. Farmer can establish the associations under the control of the government. The pattern of activities are controlled and must conform to the political view. There was a study of the political of economy of the history of Thai movements, presented that the status of the Thai farmer in the society is very low. They have elimitation the bargaining power and collective association among farmers. The study also presented that there were settlements condented among farms failed and the leaders were arrested.

Aside from lack in bargaining power there is also lack of the active leaders. The elected head in village act as if they were government officers. They reporter in serious problems to the government and transform government policies to the village. Actions should be always advantageous to the village but attacks to the government policy should be avoided.

6. 6 More efficient policy in the later year since 1981 is the "Paddy Pledging Scheme", implemented by the Bank for Agriculture and Agricultural Cooperatives (BAAC), gave more chance for higher of rice price. This policy support the farmers by which they can avoid having to sell their immediately after harvest when the price are low, in order to meet urgent household and other expenses. Under this scheme, the BAAC

offers consumer loans to farmer at an interest rate of only 3%, taking pledges of rice as security. Farmer can then afford to wait to sell their rice at a time when market condition are good. This policy benefits only the farmers who are the Bank customers, but in the long run, this will indirectly effect gain for more farmers.

7. CONCLUSION

Rice is predominantly a politic crop in Thai economy. It does not only serve as a staple food for the Thai population, but is also considered as the main source of foreign income. It occupies over sixty percent of working population and land use more than fifty percent of planted area in agriculture sectors.

Rice cultivation are mostly influened by physical conditions. About sixty percent of the total size farm holding is 10−39.9 rais (3.59−14.32 acres). Irrigated land is limited, which is about twenty four percent of the total planted land. Most of Thai farmers' main occupation is paddy production and income is dependent on rice. Rice product increased in the extension of land and yield per rai, but less in the land extension. Increased in rice product in yield per rai, result from the development of high quality of seed grain and increasing in a large amount of inorganic fertilizer consumption.

Rice market now a days is confronted by free market both local and abroad. Thai export rice more than 30−35 percent per year, under given production lebel and foreign demand in a certain year. Opened economy and strong dependency in export of rice, the economy and rice market is very sensitve to the actions of the world rice market. Thai rice farmers' income is still low compare to the non-farmer income.

TABLE 1 AREA OF HOSDING BY LAND USE
利用別農地保有

LAND USE HOLDING 利用別保有	PERCENTAGE AREA OF HOLDING 保有地比率		
	1978	1983	1988
TOTAL AREA OF HOLDING 総保有	100.0	100.0	100.0
RICE 米（水田）	64.2	61.5	57.7
FIELD／VEGETABLE CROPS 畑／野菜	21.2	22.5	23.5
PERMANENT CROPS 永年作物	9.0	10.0	12.6
OTHERS その他	5.6	6.0	6.2

SOURCE: NATIONAL STATISTICAL OFFICE, 1988 INTERCENSAL SURVEY OF AGRICULTURE: WHOLE KINGDOM, (1989), TABLE 6 P.36.

TABLE 2 ECONOMICALLY ACTIVE POPULATION, 15−64 YEAR OF AGE IN AGRICULTURE AND NON-AGRICULTURE SECTOR, 1978−1986.
農業及び非農業部門における労働力人口（15−64才）

（UNIT : 000 PERSONS）
（単位：千人）

YEAR 年	TOTAL 計		FARM 農業		NON-FARM 非農業	
	QUANTITY 人数	%	QUANTITY 人数	%	QUANTITY 人数	%
1978	43,870	100	30,195	68.83	13,675	31.17
1980	47,724	100	31,922	66.87	15,802	33.11
1983	50,928	100	33,194	65.18	17,734	34.82
1986	53,638	100	34,261	63.87	17,377	36.13

SOURCE: DIVISION OF AGRICULTURAL ECONOMIC RESEARCH, QUOATED BY CENTER FOR AGRICULTURAL STATISTICS, TABLE 7, P.14.

TABLE 3 QUANTITY AND VALUE OF RICE EXPORTS: 1984－1989
米の輸出量及び輸出額

YEAR 年	RICE 米 QUANTITY 量 (METRIC TONS) (t)	VALUE 額 (000 YENS) (千円)	TOTAL EXPORTS 総輸出額 (000 YENS) (千円)	PERCENTAGE OF EXPORTS 割合
1984	4,615,802	505,674	3,417,122	14.80
1985	4,062,240	439,218	3,770,637	11.65
1986	4,523,597	396,143	4,550,969	8.70
1987	4,443,301	442,709	5,847,134	7.57
1988	5,089,357	481,182	7,869,615	8.59
1989	6,140,151	886,509	10,068,143	8.81

SOURCE: BANK OF THAILAND: QUARTERLY BULLETIN (Q2), 1991. (EXCHANGE RATE: 1 BAHT = 19.50 YENS).

TABLE 4 LAND UTILIZATION
土地利用状況

ITEM	YEAR 年 1978	1982	1985
WHOLE KINGDOM 全国 (%)	100.00	100.00	100.00
1.1 FOREST LAND 林地	34.15	30.52	29.05
1.2 TOTAL FARM HOLDING LAND 総保有農地 (%)	36.31	38.54	40.10
－FARM SIZE 農家保有面積 (RAIS)	26.5993	26.3767	26.3640
－HOUSING AREA 農家住宅 (%)	0.81	0.80	0.95
－PADDY LAND 水田 (%)	22.85	22.83	23.04
－UNDER FIELD CROPS 畑 (%)	7.41	9.13	9.86
－UNDER FRUIT TREE & TREE CROPS 樹園地 (%)	3.25	3.70	4.20
－UNDER VEGETABLE & FLOWERS 野菜・花き	0.11	0.11	0.15
－GRASS LAND 草地	0.11	0.51	0.26
－IDLE LAND 遊休地	0.92	1.06	1.17
－OTHER LAND その他	0.85	0.51	0.48
1.3 UNCLASSIFIED LAND 分類外	29.54	30.94	30.85

SOURCE: 1. ROYAL THAI SURVEY DEPARTMENT.
2. ROYAL FOREST DEPARMENT: FOREST LAND FROM LAND SAT2 AND 1978, 1982 AND 1985.
3. QUOTED BY CENTER FOR AGRICULTURAL STATISTICS, IN AGRICULTURAL STATISTICS IN BRIEF CROP YEAR 1987／88. TABLE 2. P.9.

TABLE 5 NUMBER OF HOLDINGS BY SIZE HOLDING
規模別農家数

SIZE OF HOLDING 保有規模		NO. OF HOLDING (000 HOUSEHOLDS) 農家数 (1,000戸)			PERCENTAGE CHANGE 上昇率	
		1978	1983	1988	1983／78	1988／83
WITHOUT LAND	無保有農家	47	7	4	−85.9	−43.8
%		1.2	0.2	0.1		
WITH LAND	保有農家	3,971	4,464	4,874	12.4	9.2
%		98.8	99.8	99.9		
UNDER 6 RAIS	6ライ未満	591	655	699	10.9	6.8
%		14.7	14.7	14.3		
6− 9.9 RAIS		482	552	602	13.9	9.1
%		12.1	12.3	12.3		
10−39.9 RAIS		2,243	2,580	2,911	15.0	12.8
%		55.8	57.7	59.7		
40RAIS AND OVER	40ライ以上	652	677	611	3.8	− 2.2
TOTAL NO. OF HOLDINGS	総農家数	4,018	4,471	4,878	11.3	9.1

SOURCE: NATIONAL STATISTICAL OFFICE, "1988 INTERCENSAL SURVEY OF AGRICULTURE (WHOLE KINGDOM), 1989. TABLE 2, P.32.

TABLE 6 CONSUMPTION OF ORGANIC FERTILIZERS IN CROPPING SEASON 1982／83−1984／85
年度別・作物別有機肥料消費割合

CROPS 作物		CONSUMPTION 消費 (%)			AVERAGE (%) 平均
		1982／83	1983／84	1984／85	
RICE	米	52.12	52.59	51.97	52.23
−FIRST CROP	一期作	35.86	36.67	35.60	36.06
−SECOND CROP	二期作	16.25	15.92	16.97	16.17
OTHERS	その他	47.88	47.41	48.03	47.77
TOTAL	計	100.00	100.00	100.00	100.00

SOURCE: DEPARTMENT OF AGRICULTURE ECONOMICS, "FACTS IN THAI AGRICULTURE" 1986. TABLE 10, P.15.

TABLE 7 AVERAGE CONSUMPTION FERTILIZER FOR RICE PRODUCT CLASSIFIED IN REGION IN 1983／84
稲作の地帯別・作期別肥料消費量（1983／84年度）

（UNIT KILOGRAM PER RAI）
（単位：kg／ライ）

CROP 作期	REGION 地帯				
	NORTHERN 北部	NORTH EASTERN 北東	CENTRAL PLAIN 中央平野	SOUTHERN 南部	AVERAGE (WEIGHTED) 平均
FIRST CROP 一期作	5.12	5.90	16.72	8.40	8.03
SECOND CROP 二期作	32.15	26.24	50.30	32.02	45.19

SOURCE：DEPARTMENT OF AGRICULTURAL ECONOMICS, "FACTS IN AGRICULTURE" TABLE 16, P.18.

TABLE 8 USE FERTILIZERS: YEAR 1978, 1983 AND 1988
農家の肥料使用状況（1978，1983，1988年）

（UNIT ：000 OF FARMHOUSEHOLD）
（単位：千農家）

LAND HOSDING 保有地	YEAR 年		
	1978	1983	1988
TOTAL HOLDING 総計	4,018	4,471	4,877
(%)	100.0	100.0	100.0
HOLDING (DONOT USE FERTILIZERS) 肥料無使用	1,761	1,531	1,051
(%)	43.8	34.2	21.6
HOLDING (USE FERTILIZERS) 肥料使用	2,258	2,940	3,826
(%)	56.2	65.8	78.4
−ONLY INORGANIC 無機肥料のみ	990	1,404	1,862
(%)	24.6	31.4	38.2
−ONLY ORGANIC 有機肥料のみ	470	387	339
(%)	11.7	8.7	6.7
−BOTH 両方	798	1,149	1,624
(%)	19.9	25.9	33.3

SOURCE：NATIONAL STATISTICAL OFFICE, 1988 INTERCENSAL SURVEY OF AGRICULTURE: WHOLE KINGDOM, (1989), TABLE 9, P.41.

TABLE 9 QUANTITY OF DEMAND FOR WATER SUPPLY CLASSIFIED BY CROPS
作物別の用水必要量

CROPS 作物		CONSUMPTION USE OF WATER SUPPLY 用水消費量 (㎥/ライ) CUBIC METRE PER RAI	PLANTING TIME 栽培日数 (DAYS)
RICE (AVERAGE)	米 (平均)		
—WET SEASON	雨期	1,280	140
—DRY SEASON	乾期	1,940	140
MAIZE	とうもろこし	670	110
SORGHUM	ソルガル	480 — 640	90 — 110
SOYBEAN	大豆	320 — 400	100 — 120
GREENBEEN	インゲン豆類	450	60 — 70
NUT	ナッツ類	640 — 800	100 — 130
SUGARCANE	さとうきび	1,920 — 2,136	360 — 550

SOURCE: TONG-ARAM, D., (1982), QUOTED BY SIAMWALA, A., ET AL 1990. TABLE 3.1, P.44.

TABLE 10 FIRST CROP RICE: AREA, PRODUCTION AND YIELD CLASSIFIED BY IRRIGATED LAND, NON-IRRIGATED LAND AND REGION, 1987.
地帯別の灌漑・非灌漑地別面積・生産 (1987年一期作)

REGION 地帯		PLANTED AREA 作付面積 %	HARVEST AREA 収穫面積 %	PRODUCTION 生産量 %	YIELD PER RAI 単収 (kg/ライ)
IRRIGATED LAND	灌漑地	24.12	25.33	33.69	416
—NORTHEASTERN	北東	4.43	4.58	4.17	285
—NORTHERN	北部	5.36	5.73	9.37	510
—CENTRAL PLAIN	中央平野	12.76	13.41	18.50	431
—SOUTHERN	南部	1.58	1.61	1.65	320
NON-IRRIGATED LAND	非灌漑地	75.88	74.67	66.31	278
—NORTHEASTERN	北東	45.20	44.87	33.77	235
—NORTHERN	北部	17.73	16.92	20.60	381
—CENTRAL PLAIN	中央平野	8.31	8.28	8.36	315
—SOUTHERN	南部	4.46	4.61	3.58	242
WHOLE KINGDOM	全国	100.00	100.00	100.00	313

SOURCE: CENTER FOR AGRICULTURAL STATISTICS, "AGRICULTURE STATISTICS IN BRIEF CROP YEAR 1987/88" TABLE 16, P.24.

TABLE 11 SECOND CROP RICE: AREA, PRODUCTION AND YIELD CLASSIFIED BY IRRIGATED LAND, NON-IRRIGATED LAND AND REGION, 1987.
地帯別の灌漑・非灌漑地別面積・生産（1987年二期作）

REGION 地 帯	PLANTED AREA 作付面積 %	HARVEST AREA 収穫面積 %	PRODUCTION 生 産 量 %	YIELD PER RAI 単 収 (kg/ライ)
IRRIGATED LAND 灌漑地	86.85	86.85	89.37	580
−NORTHEASTERN 北 東	2.18	2.18	1.62	423
−NORTHERN 北 部	5.14	5.14	5.34	585
−CENTRAL PLAIN 中央平野	76.68	76.68	80.31	589
−SOUTHERN 南 部	2.85	2.85	2.11	420
NON-IRRIGATED LAND 非灌漑地	13.15	13.15	10.63	454
−NORTHEASTERN 北 東	1.49	1.49	0.88	328
−NORTHERN 北 部	8.08	8.08	7.30	507
−CENTRAL PLAIN 中央平野	1.62	1.62	1.27	455
−SOUTHERN 南 部	1.96	1.96	1.18	333
WHOLE KINGDOM 全 国	100.00	100.00	100.00	563

SOURCE: CENTER FOR AGRICULTURAL STATISTICS, "AGRICULTURE STATISTICS IN BRIEF CROP YEAR 1987/88". TABLE 18, P.26.

TABLE 12 GROWTH IN PADDY PRODUCTION CLASSIFIED BY LAND EXTENSION AND YIELD PER RAI AVERAGE PERIOD 1961−63 TO 1976−78 AND 1984−86.
1960年代以降の米生産の成長率

ITEM	NON-GLUTINEOUS (%) うるち米			GLUTINEOUS もち米 (%)
	FIRST CROP 1期作	SECOND CROP 2期作	WHOLE KINGDOM 全国	
1. ABERAGE PERIOD IN 1961−63 TO 1967−69 % INCREASED IN PRODUCT 生産増加率 1961−63年度，1967−69年度平均	94.4	5.6	100.0	100.0
−INCREASED BY LAND EXTENSION 農地面積増加率	52.4	4.9	57.3	37.0
−INCREASED IN YIELD PER RAI 単収増加率	42.0	0.7	42.7	63.0
2. AVERAGE PERIOD IN 1967−69 TO 1976−78 % INCREASED IN PRODUCTION 生産増加率 1967−69年度，1976−78年度平均	34.3	65.7	100.0	100.0
−INCREASED BY LAND EXTENSION 農地面積増加率	42.8	49.9	92.8	369.5
−INCREASED IN YIELD PER RAI 単収増加率	− 8.6	15.8	7.2	−269.5
3. AVERAGE PERIOD IN 1976−78 TO 1984−86 % INCREASED IN PRODUCTION 生産増加率 1976−78年度，1984−86年度平均	77.0	23.0	100.0	100.0
−INCREASED BY LAND EXTENSION 農地面積増加率	40.2	18.6	58.8	21.8
−INCREASED IN YIELD PER RAI 単収増加率	36.8	58.8	41.2	78.2

SOURCE: SIAMWALA, A., ET AL (1990), TABLE 6.2, P.138−9.

TABLE 13 NUMBER OF HOLDING THAT USE MACHINERY AND EQUIPMENT
機械・設備の保有台数

TYPE OF MACHINERY AND EQUIPMENT 機械・設備類型		PERCENTAGE OF TOTAL HOLDINGS 保有率		
		1978	1983	1988
TOTAL HOLDING	計	100.0	100.0	100.0
−TRACTOR	トラクター	23.8	27.0	19.7
−POWER TILLER	耕耘機	9.2	23.9	35.3
−WATER PUMP	揚水機			
−ENGINE OPERATED	動力	13.5	17.0	17.1
−HAND OPERATED	手動	0.1	0.2	0.3
−NATURAL ENERGY OPERATED	自然力	1.5	1.0	2.6
−SEEDER	播種機	0.2	0.1	0.5
−FERTILIZER THROWER	肥料散布機	0.2	0.1	0.8
−THRESHER	脱穀機	5.4	13.3	15.1

SOURCE: NATIONAL STATISTICAL OFFICE: "1988 INTERCENSAL SURVEY OF AGRICULTURE: WHOLE KINGDOM". TABLE 10, P.41.

TABLE 14 NUMBER OF TRACTORS AND EQUIPMENTS CLALLIFIED BY REGINOS: 1985.
地帯別機械普及台数

TYPE	REGION 地帯				
	TOTAL 全体	NORTHERN 北部	NORTH-EASTERN 北東部	CENTRAL PLAIN 中央平野	SOUTHERN 南部
1. TRACTOR (18H.P & 75H.P) トラクター (18馬力・75馬力)					
−UNIT 単位（台数）	31,415	9,296	4,950	16,082	1,087
−PERCENTAGE %	7.25	2.15	1.14	3.71	0.25
−FARM／UNIT 一台当たりの農家数	154.78	141.12	408.06	54.89	596.12
−RAIS／UNIT 一台当たりの面積	3,922.72	3,095.35	10,477.63	1,761.38	13,125.24
2. POWER TILLER (8H.P) 耕耘機（8馬力）					
−UNIT 単位（台数）	402,082	139,785	38,790	172,027	51,480
−PERCENTAGE %	92.75	32.25	8.94	39.68	11.88
−FARM／UNIT 一台当たりの農家数	12.09	9.84	52.07	5.13	12.58
−RAIS／UNIT 一台当たりの面積	309.49	205.85	1,337.05	172.03	277.14

SOURCE: DEPARTMENT OF AGRICULTURAL ECONOMICS, "FACTS IN AGRICULTURE", TABLE 7, P.11.

TABLE 15 PRODUCTION, CONSUMPTION AND EXPORTS OF RICE IN THE AVERAGE YEAR 1977／78 TO 1979／80.
米の生産量・消費量・輸出量（1977／78年～1979／80年平均）

TYPE	NON-GLUTINOUS うるち米		GLUTINEOUS もち米	
	QUANTITY 量 (000 TONS) (千t)	%	QUANTITY 量 (000 TONS) (千t)	%
1 PRODUCTION (WHITE RICE IN EQUIVALENT) 生産量（精米換算）	7,437	100	3,709	100
2 CONSUMTION (DOMESTIC) 消費量（国内）	4,752	64	3,488	94
2.1 FARMERS 農家	2,585	28	2,655	72
2.1.1 CONSUMPTION 消費量	1,773	24	2,486	67
2.1.2 SEED 種籾用	307	4	169	5
2.2 NON-FARMERS 非農家	2,672	36	832	22
2.2.1 RURAL AREA 農村部	1,484	20	513	15
2.2.2 URBAN AREA 都市部	1,188	16	280	8
3 EXPORTS 輸出量			221	6

SOURCE: SIAMWALA, A., ET AL, (1990). TABLE 9.1, P.194.

TABLE 16 FARM GATE PRICE OF PADDY5 PERCENT
農 家 庭 先 価 格

UNIT : BART／TON
単位：バーツ／t

PERIOD 期 間	CROPPING SEASON 作 物 年 度							
	1 9 8 7		1 9 8 8		1 9 8 9		1 9 9 0	
	FIRST 1期作	SECOND 2期作	FIRST 1期作	SECOND 2期作	FIRST 1期作	SECOND 2期作	FIRST 1期作	SECOND 2期作
JAN 1月	2,249	—	4,045	3,325	3,896	—	3,846	—
FEB 2月	2,503	—	4,276	3,600	4,007	—	3,998	—
MAR 3月	2,678	2,493	4,133	3,916	4,063	3,917	4,022	3,792
APRIL 4月	2,713	2,521	4,212	3,906	4,169	3,917	3,906	3,656
MAY 5月	2,738	2,521	4,125	3,319	4,375	4,139	3,734	3,323
JUNE 6月	2,802	2,530	4,270	3,692	4,732	4,422	3,808	3,247
JULY 7月	2,908	2,625	4,487	3,882	5,116	4,630	3,782	3,286
AUG 8月	3,238	3,031	4,471	3,760	4,987	4,268	3,876	3,426
SEPT 9月	3,692	3,520	4,459	3,689	4,939	4,117	3,827	3,367
OCT 10月	3,839	3,528	4,402	3,621	4,924	3,970	3,761	3,457
NOV 11月	3,422	3,328	3,851	3,566	3,969	—	3,567	3,546
DEC 12月	3,426	3,070	3,733	—	3,741	—	3,256	3,200
AVERAGE 平 均	2,863	2,785	4,170	3,611	4,410	4,179	3,782	3,430

SOURCE: MINISTRY OF AGRICULTURE AND CO-OPERATIVES, AND DEPARTMENT OF INTERNAL TRADE, 1991, PAPER WORK.

TABLE 17 WORLD COMMODITY PRICES WHITE RICE
(5% f. o. b. BANGKOK)
精米の世界市場価格（バンコクFOB価格）

U. S $／TON
ドル／t

PERIOD 年 度	WHITE RICE 5% 精米価格
1983	276
1984	253
1985	217
1986	210
1987	230
1988	302
1989	319
1990	315

SOURCE: BANK OF THAILAND, QUOTED BY BANGKOK BANK LIMITED MONTHLY REVIEW, JANUARY 1990, VOL 31.

TABLE 18 AVERAGE INCOME : CLASSIFIED BY GROUPING IN 1976, 1981 AND 1986 (1976 PRICE)
グループ別平均所得（1976, 1981, 1986年）

HOUSEHOLD GROUP グループ	YEAR 年		
	1976	1981	1986
1. RURAL AREA 農村部			
1.1 RICE FARMERS 稲作農家	3,067	3,168	2,818
1.2 FARMERS 農家	3,440	3,875	3,613
1.3 NON-FARMERS 非農家	5,406	6,358	5,948
2. URBAN AREA (NON-FARMERS) 都市部（非農家）			
2.1 BANGKOK METROPOLIS バンコク大都市圏	9,103	12,591	12,739
2.2 OTHERS その他	8,665	10,628	10,916

SOURCE: SIAMWALA, A., ET AL, (1990), TABLE 6.5 P. 146-7.

TABLE 19 PROPORTION OF FARM-HOUSEHOLD DEPENDENCY ON RICE AS MAIN OCCUPATION AND INCOME GROUP
所得階層別稲作依存度

ITEM	YEAR 年		
	1978 %	1981 %	1984 %
1. HOUSEHOLD DEPENDENCY ON RICE AS MAIN OCCUPATION 就業面 (INCOME LEVEL) 所得水準			
HIGH 高	14.2	10.0	6.2
MEDIUM 中	42.1	39.1	38.3
LOW 低	49.7	51.0	55.6
2. NET INCOME FROM RICE TO TOTAL INCOME 所得面 (INCOME LEVEL) 所得水準			
HIGH 高	70.0	67.0	61.0
MEDIUM 中	67.0	64.0	59.0
LOW 低	61.0	55.0	46.0

SOURCE: SIAMWALA, A., ET AL, (1990), TABLE 6.6 & 6.8, P. 148-151.

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