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**Review of Rice Policies in China,
Thailand and Vietnam**

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Review of Rice Policies in China, Thailand and Vietnam³

Sina Xie⁴ and Orachos Napasintuwong⁵

ABSTRACT

China, Thailand, and Vietnam are key players in world rice market in terms of production and trade. In the past few decades, rice policies in these three countries have changed significantly resulted in changes in production, exports and influences in the world market. This paper reviews major rice policy reforms in China, Thailand and Vietnam during past five decades. It is observed that although each country has practiced different policies at different periods, with the economic development, individuals and market forces have played more important roles in domestic market while government interventions still exist and it is important for the government to invest in rice breeding technology and infrastructure construction. It was found that China and Vietnam have benefited from farm system reforms, the adoption of hybrid rice and the investment in irrigation while liberalization of rice export premium and provision of credits in 1980s have helped Thailand to become the largest rice exporter.

Keywords: rice, policy, China, Thailand, Vietnam

JEL: Q17, Q18

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1. Introduction

China, Thailand and Vietnam are important players in the world rice market. China is the largest producer and consumer of rice while Thailand and Vietnam are the two largest rice exporters, accounted for more than 50% of the world total rice exports. During the past few decades, rice production and trade in China, Thailand and Vietnam have changed significantly as these three countries have undergone a series of policy reforms which influenced the initiative of rice farmers and traders. Evidently China's position in the world rice market had slipped from the 1st or 2nd exporter in the 1960-70s to the 6th place in the 2000s while Thailand maintained the largest rice exporter from 1980 to 2012 when it was surpassed by Vietnam who became a rice net exporter after 1989. This paper aims at summarizing major policy changes in the three countries and their influences on rice farming by first illustrating recent trends in rice production, consumption and trade, followed by reviewing major policies in terms of farm system reform, market liberalization, price and input policies. In the last section, the implications from policy reviews on rice production and trade are provided.

2. Trends in Rice Production, Consumption and Trade

2.1 Trends in Rice Production

Rice production in China can be divided into three periods. During the first period from 1961 to 1977 while the "people's communal system" was implemented, both of rice yield and harvested area had increased with an average annual growth rate of 1.85% and 3.56%, respectively. This has contributed to a significant increase in China's rice production. In the second period from 1978 to 2003 when the "household responsibility system" was established and market liberalization was implemented, rice harvested area decreased at 1.88% annually on average. This has led to a relatively low increase in total rice production although rice yield increased at 3.24% annually as a result of extensive plantation of hybrid rice (Table 1). From 2004 until now, rice production in China has increased for consecutive years as agricultural tax has been gradually abolished, and the "producer subsidy program"⁶ was implemented in 2004.

In Thailand, although investment in irrigation system, adoption of modern varieties and increasing cropping intensity have resulted in increasing yield of rice since the 1970s (Isvilanonda and Poapongsakorn, 1995), it is still relatively low compared other Asian countries as Thailand has a considerable share of rain-fed rice cultivation areas, particularly in the Northeast region where Hom Mali or Jasmine rice, traditional high-quality aromatic yet low-yielding varieties are grown. Despite lower yield, rice production in Thailand has been increasing during the past four decades contributed primarily by the expansion of rice cultivation area prior to the 1980s (Table 2) and a widespread adoption of non-photoperiod sensitive varieties in the 1990s that increased multiple cropping in irrigated areas. As Thailand's position in the world rice market is the premium rice, maintaining quality rice production has always been one of the main targets. Due to agronomic and environmental constraints, Jasmine rice is

⁶ The Producer Subsidy Program is composed of five operations: (a) direct payments to grain growers; (b) subsidy for the adoption of excellent varieties; (c) subsidy for farm machinery purchase; (d) comprehensive support for the purchase of production materials; and (e) agricultural insurance (Junichi ITO, Jing NI, 2013).

always low-yielding than other varieties. Evidently price support program and pledging program have contributed to increasing rice production, it may hinder the production of quality rice as the price is set by the government and not recognized by its quality.

As of Vietnam, since the 1980s after the “contract production system” was introduced, rice production has shown a significant increasing yield, and on-farm productivity became greatly improved (Table 3). In addition, the harvested area has started to increase rapidly since 1986 when the renovation policies which include allocation of agricultural land for households were implemented. Irrigation investment by the government under the agricultural economic reform in the 1980s, and the promotion of hybrid rice in the 1990s have been the main sources of the advancement in rice production in Vietnam. Land reform, particularly the legalization of farm land ownership and leasing cooperative land to individual farmers was perhaps one of the most significant agricultural reforms in Vietnam that contributed to immense incentives for farmers to produce rice.

Table 1. Rice total production, harvested area and yield in China, 1961-2010.

	Production		Harvested Area		Yield	
	Quantity (million tonne)	Growth rate (%)	Quantity (million ha)	Growth rate (%)	Quantity (tonne/ha)	Growth rate (%)
1961	56.22	-	27.04	-	2.08	-
1965	90.71	12.70	30.57	3.11	2.97	9.30
1970	113.10	4.51	33.11	1.60	3.42	2.86
1975	128.73	2.62	36.48	1.96	3.53	0.65
1980	142.88	2.11	34.48	-1.12	4.14	3.27
1985	171.32	3.70	32.63	-1.10	5.25	4.85
1990	191.61	2.26	33.52	0.54	5.72	1.72
1995	187.30	-0.45	31.11	-1.48	6.02	1.04
2000	189.81	0.27	30.30	-0.52	6.26	0.80
2005	182.06	-0.83	29.12	-0.79	6.25	-0.04
2010	197.21	1.61	30.12	0.68	6.55	0.93

Source: FAOSTAT, 2013.

Table 2. Rice total production, harvested area and yield in Thailand, 1961-2010.

	Production		Harvested Area		Yield	
	Quantity (million tonne)	Growth rate (%)	Quantity (million ha)	Growth rate (%)	Quantity (tonne/ha)	Growth rate (%)
1961	10.15	-	6.12	-	1.66	-
1965	11.16	2.41	6.27	0.61	1.78	1.79
1970	13.85	4.41	6.85	1.80	2.02	2.56
1975	15.30	2.01	8.36	4.05	1.83	-1.95
1980	17.37	2.57	9.20	1.94	1.89	0.62
1985	20.26	3.13	9.83	1.34	2.06	1.77
1990	17.19	-3.23	8.79	-2.21	1.96	-1.04
1995	22.02	5.07	9.11	0.72	2.42	4.32
2000	25.84	3.26	9.89	1.65	2.61	1.58
2005	30.29	3.23	10.23	0.67	2.96	2.54
2010	35.58	3.27	12.12	3.46	2.94	-0.18

Source: FAOSTAT, 2013.

Table 3. Rice total production, harvested area and yield in Vietnam, 1961-2010.

	Production		Harvested Area		Yield	
	Quantity (million tonne)	Growth rate (%)	Quantity (million ha)	Growth rate (%)	Quantity (tonne/ha)	Growth rate (%)
1961	9.00	-	4.74	-	1.90	-
1965	9.37	1.02	4.83	0.43	1.94	0.59
1970	10.17	1.66	4.72	-0.43	2.15	2.09
1975	10.29	0.24	4.86	0.55	2.12	-0.31
1980	11.65	2.50	5.60	2.89	2.08	-0.38
1985	15.87	6.39	5.72	0.42	2.78	5.95
1990	19.23	3.90	6.04	1.11	3.18	2.76
1995	24.96	5.36	6.77	2.29	3.69	3.01
2000	32.53	5.44	7.67	2.53	4.24	2.83
2005	35.83	1.95	7.33	-0.90	4.89	2.87
2010	40.01	2.23	7.49	0.43	5.34	1.79

Source: FAOSTAT, 2013.

2.2 Trends in Rice Consumption

For the whole country, rice consumption per capita in China was much lower than that of Vietnam and Thailand as rice is not the only staple food in China, but China still maintains the largest total rice consumption in the world due to its largest population. Population growth has been the main source of the increase in total rice consumption in China while during the early 1980s, per capita rice consumption

also significantly rose as result of the ration system which allowed urban dwellers to get a certain quantity of rice at a much lower price than the free market price (Yap, 1994). Furthermore increasing production after the implementation of the household responsibility system has aided the market price. However, as population growth rate started to slow downward and per capita rice consumption remained stable since 1995, China's total rice consumption as food increased slightly with an average annual growth rate of less than 1% (Table 4).

In Thailand, changes in total consumption of rice were mainly contributed by changes in per capita rice consumption. Population growth rate declined considerably after the 1980s due to a successful birth control program. Because of the food was not so expensive as today, per capita rice consumption in Thailand maintained high prior to 1980s (Table 5). Along with the economic development and increasing food availability, Thai consumers have shifted to consuming less rice and more meat; as a result, per capita and total rice consumption in Thailand showed a downward trend between the mid-1980s and the mid-1990s. However, recently, per capita rice consumption has slightly risen, but still at lower rate than that before 1980 (Table 5), which might reflect the fact that after the devaluation of the Baht in 1997, rice inflation increased at a lower rate than meat inflation so consumers eat more rice to get the same calories.

Similar to China, an increase in total rice consumption as food in Vietnam was mainly generated by population growth. In the early-1980s, during the support of rice production under the contract production system, per capita rice consumption in Vietnam increased rapidly and surpassed the amount consumed in Thailand thereafter (Table 6). After 1986, as per capita consumption has shown a downward trend and the population growth has slowed down, the growth rate of total rice consumption in Vietnam has declined.

Table 4. Rice total consumption, population and per capita consumption in China, 1961-2009.

	Total Consumption		Population		Per Capita Consumption	
	Quantity (million tonne)	Growth rate (%)	Quantity (million person)	Growth rate (%)	Quantity (tonne/person/year)	Growth rate (%)
1961	42.67	-	681.35	-	0.06	-
1965	70.07	13.20	726.75	1.63	0.10	11.40
1970	87.22	4.48	833.39	2.78	0.10	1.67
1975	100.29	2.83	935.73	2.34	0.11	0.47
1980	114.33	2.65	1006.28	1.46	0.11	1.17
1985	138.94	3.98	1081.52	1.45	0.13	2.50
1990	145.28	0.90	1171.58	1.61	0.12	-0.71
1995	145.17	-0.01	1241.69	1.17	0.12	-1.17
2000	152.97	1.05	1298.27	0.90	0.12	0.15
2005	153.12	0.02	1337.61	0.60	0.11	-0.57
2009	156.31	0.52	1365.58	0.52	0.11	0.00

Source: FAOSTAT, 2013.

Table 5. Rice total consumption, population and per capita consumption in Thailand, 1961-2009.

	Total Consumption		Population		Per Capita Consumption	
	Quantity (million tonne)	Growth rate (%)	Quantity (million person)	Growth rate (%)	Quantity (tonne/person/year)	Growth rate (%)
1961	5.80	-	28.15	-	0.21	-
1965	6.84	4.20	31.79	3.09	0.22	1.07
1970	8.43	4.25	36.92	3.03	0.23	1.19
1975	9.74	2.93	42.40	2.81	0.23	0.11
1980	9.36	-0.79	47.48	2.29	0.20	-3.01
1985	8.73	-1.39	52.33	1.96	0.17	-3.28
1990	8.90	0.41	57.07	1.75	0.16	-1.33
1995	8.62	-0.65	59.65	0.89	0.14	-1.52
2000	10.85	4.72	63.16	1.15	0.17	3.53
2005	11.95	1.94	66.70	1.10	0.18	0.82
2009	13.70	3.49	68.71	0.74	0.20	2.73

Source: FAOSTAT, 2013.

Table 6. Rice total consumption, population and per capita consumption in Vietnam, 1961-2009.

	Total Consumption		Population		Per Capita Consumption	
	Quantity (million tonne)	Growth rate (%)	Quantity (million person)	Growth rate (%)	Quantity (tonne/person/year)	Growth rate (%)
1961	7.35	-	36.06	-	0.20	-
1965	8.37	3.31	39.89	2.56	0.21	0.73
1970	9.44	2.42	44.93	2.41	0.21	0.02
1975	10.55	2.26	49.90	2.12	0.21	0.13
1980	10.57	0.03	54.02	1.60	0.20	-1.55
1985	13.54	5.09	60.31	2.23	0.22	2.80
1990	13.25	-0.44	67.10	2.16	0.20	-2.54
1995	15.40	3.05	74.01	1.98	0.21	1.05
2000	17.20	2.23	78.76	1.25	0.22	0.96
2005	17.95	0.86	83.16	1.09	0.22	-0.22
2009	18.40	0.61	86.90	1.11	0.21	-0.49

Source: FAOSTAT, 2013.

2.3 Trends in Rice Trade

During the past decades, rice exports in these three countries have changed significantly. Although the types and markets of rice exports are different for the three countries⁷, here we simply compare the

⁷ For example, in 2007, most of China's rice exports are low quality Indica exported to African countries, while 53% of Thai rice exported to

total exports quantity. From 1961 to 1979, China and Thailand had exported almost the same quantity of rice in total with 28.81 million tonnes from China and 30.05 million tonnes from Thailand. However, in the 1980s, Thailand rice exports have increased rapidly while China decreased dramatically. China's position in the world rice exports market had slipped to the sixth place in the 2000s while Thailand maintained the largest rice exporter until 2012. For Vietnam, it has changed from a net rice importer to net rice exporter in 1989 and since then until 2010 rice exports from Vietnam has increased rapidly with an average annual growth rate of 7.8% during 1989-2010 (Table 7). In 2012, Vietnam became the second world largest exporter and surpassed Thailand in the same year.

Although Thailand has imported some specialty rice such as Italian risotto, Basmati, and short-grain Japanese rice, rice imports to Thailand have been diminutive during the past decades because of trade restriction. It is noted that rice imports in Thailand increased substantially particularly in 2010-2011 due to the ASEAN agreement requiring Thailand to open the degree of rice import. For China, most of rice imports are Thai fragrant rice varieties, which are consumed at high-end hotels or restaurants located in affluent coastal cities (FAS, 2012). Rice import in china increased significantly since 2004 mainly due to the higher support price policy. In Vietnam, rice imports significantly declined after the production achieved a drastic increase since the late-1980s (Table 8). Currently Vietnam imports a limited amount of high-quality rice varieties, also mainly from Thailand.

Table 7. Quantity and average annual growth rate of rice exports from China, Thailand and Vietnam, 1961-2010.

	China		Thailand		Vietnam	
	Quantity (million tonne)	Growth rate (%)	Quantity (million tonne)	Growth rate (%)	Quantity (million tonne)	Growth rate (%)
1961	0.11	-	1.57	-	0.18	-
1965	1.22	80.87	1.88	4.64	0.00	-64.32
1970	1.71	6.93	1.06	-10.84	0.02	44.29
1975	1.98	2.98	0.95	-2.23	0.02	3.55
1980	1.38	-6.93	2.79	24.11	0.03	8.64
1985	1.06	-5.16	4.05	7.68	0.06	12.27
1990	0.43	-16.51	4.01	-0.18	1.62	93.80
1995	0.26	-9.22	6.19	9.07	1.99	4.13
2000	3.06	63.12	6.13	-0.19	3.48	11.83
2005	0.67	-26.27	7.51	4.14	5.25	8.59
2010	0.61	-1.76	8.91	3.47	6.89	5.58
2011	0.50	-17.86	10.67	19.82	7.11	3.18

Source: FAOSTAT, 2013.

Table 8. Quantity and average annual growth rate of rice imports to China, Thailand and Vietnam, 1961-2010.

	China		Thailand		Vietnam	
	Quantity (thousand tonne)	Growth rate (%)	Quantity (thousand tonne)	Growth rate (%)	Quantity (thousand tonne)	Growth rate (%)
1961	535.042	-	0.00	-	18.50	-
1965	511.824	-1.10	0.00	-	329.59	105.45
1970	366.578	-6.46	0.00	-	1260.00	30.76
1975	402.382	1.88	0.00	-	350.00	-22.60
1980	511.395	4.91	0.00	-	201.40	-10.46
1985	612.335	3.67	0.00	-	336.10	10.79
1990	463.157	-5.43	0.00	-	1.90	-64.48
1995	2028.235	34.36	0.07	-	11.00	42.08
2000	578.425	-22.19	0.52	50.44	0.00	-100.00
2005	932.962	10.03	2.38	35.36	0.34	0.00
2010	875.06	-1.27	5.27	17.22	0.98	23.66
2011	1059.294	21.05	10.63	101.75	2.41	145.07

Source: FAOSTAT, 2013.

3. Rice Policy Reviews

Based on the literature reviews, this section gives a narrative history of government intervention in the rice sector of three countries and classifies relative policies in terms of farm system reform, market liberalization, and finally price and input policies. Furthermore, this section discusses the implication of these policies. Subsequently to the discussion in this section, Table 9-11 summarizes major policy reforms in China, Thailand and Vietnam, respectively. The influences of those policies on rice production in three countries can be observed from Figure 1-3.

3.1 Farm system reform

Both China and Vietnam have implemented a farm system reform, providing farmers with land management rights and the freedom to make production decisions, which increased farmers' initiative and therefore productivity. It has been seen that rice production, especially yield, has greatly benefited from the farm system reform in China and Vietnam.

During 1956-1978, China had implemented "people's communal system" where government-owned institutions managed the production and circulation of agricultural products from farm gate to consumers (Fang & Beghin, 2000). Some research found that this system constrained farmers' incentives and productivity (Lin, 1992). Since 1979, the "household responsibility system", where farmers were given the right to manage their own contracted land and have the freedom in making decisions about crop choices and production, was introduced, and meanwhile the communal system was abandoned. Under the

household responsibility system, farmers should sell a fixed quantity of rice to the government at a quota price, and then they could sell the surplus production at the “above quota price” or keep it for household consumption. The household responsibility system has greatly improved farmers' initiative and productivity; thus, during the period of 1979-1984, paddy yields in China increased by 26%, and paddy outputs rose by about 23%. However, as farmers have the freedom to plant more profitable crops rather than rice, the rice area harvested show a diminishing trend since 1979.

Similar to Chinese policy reform of shifting from communal system to household responsibility system, Vietnam switched from the collective agricultural production system to individual-oriented contract system in 1981. Under the new contract system, individual rice farmer was allowed to take responsibility for fulfilling their own production quotas (Ghosh & Whalley, 2004). The contracted output had to be sold to the state at a fixed price while above quota surplus could be sold on a free market. Upon the introduction of a contract system of production, rice production in the period during 1981-1986 was marked by a sharp increase with an average annual growth rate of 5%, most of which was attributed to the increasing yield rather than the expansion of cultivated area.

3.2 Market liberalization

Government intervention had played a central role in earlier periods particularly in the situations of insufficient food supply, low consumer income and low foreign exchange earnings. While with the economic development, market liberalization has been implemented in these three countries in order to respect and generate individual's creativity and initiative, increase the role of the market, as well as follow international rules.

Market liberalization in China mainly includes the “procurement system reform” and the “ration system reform”. During the period of 1985-1993, with an objective to increase the role of markets in grain production and distribution, Chinese government changed the mandatory quota procurement system to the contract procurement system, where the procurement quantity was determined by contracts based on mutual agreements between the government and individual farmers (Lin, 1997). Until 1993, the domestic marketing system in China was almost entirely centrally controlled and managed by the ration system, where rice was distributed by the Grain Bureau at a fixed subsidized or ration price to urban dwellers. The ration price of rice, which was about one-quarter of the free market price, had remained unchanged during 1966-1991 (Yap, 1994). As a result, per capita food consumption of rice increased significantly in the first half of the 1980s. In May 1991, in order to reduce the massive cost of consumption subsidies, the Chinese government raised the ration prices of staple foods, including those for rice, and in 1993 with the implementation of market liberalization, the grain ration system was abolished.

In Vietnam, the market liberalization is known as the “renovation policy” which involved legalizing the private ownership of farm assets and allocating the cooperative land to individual farmers in 1988, and since then farmers were no longer required to sell a large part of their outputs to the state at low price. The renovation policy has been widely recognized as the underlying factor behind a boost in rice production and exports in the 1990s (Pingali & Xuan, 1992; Young *et al.*, 2002). Along with improved

farmers' incentives, rice production increased 4.4% per year during 1987-2011 and rice exports increased 8% per year during 1989-2010.

3.3 Price policy

In the domestic market, the government often uses price policies to promote rice production, ensure grain self-sufficiency or improve rice quality, but the price support policies would create a heavy financial burden for the government. For example, during 1995-1998, China introduced the new policy called "provincial governor responsibility system" with the aim to ensure grain self-sufficiency, under which the provincial governors are required to be responsible for the balance of grain demand and supply in their provinces, involving providing the high procurement prices (Lin, 1997; Nielsen, 2002). The high procurement prices have resulted a notable increase in rice output such as in 1997, rice production in China reached a new peak record and in 1998, rice exports in China reached the historical highest level of 3.79 million tonnes, but the policy also created increasingly heavy financial burden of the accumulated stocks and poor quality of the procured rice (Nielsen, 2002).

In the late 1990s, with an aim to reduce the government's financial burden and enhance high quality rice production, procurement price reform was introduced in China. Since 1997, Chinese government has gradually lowered procurement prices. In addition, differentiated prices for low and high quality cereals were introduced in 1999 (FAO, 1999). Low grade early rice varieties in Southern China had not been eligible for government procurement at all since 2000. As a result of low procurement price and also the promotion of changes in planting structure by local governments, rice farmers replaced their low quality early rice with other more profitable crops, and planted area for early rice in Southern China has decreased, which brought down the nation's total rice output during 1998-2003. Rice production recorded the lowest level in 2003 over the past two decades at 162 million tonnes, and rice exports sharply decreased in 2004.

The consecutive six-year decline of rice production caused the concerns of the Chinese government. For the purpose of encouraging grain production and maintaining profit margins for grain farmers, China implemented the floor price support program⁸ in 2004. Together with the policy of direct payment to grain farmers and input subsidies, the floor price support program has stimulated rice production between 2003 and 2011, which increased by 40.4 million hectares or equivalently a 25% increase.

In Thailand, domestic price policies mainly include the price support program and rice pledging program. The main difference between which is that the price support program was implemented at the guarantee price higher than the market price while the rice pledging program was implemented at the pledge price lower than the market price; however, recent pledging prices have been set at higher than its potential market value. Due to the concern over low paddy price in the early 1970s, Thai government launched the farm support program to intervene the paddy market by purchasing rice at guarantee prices

⁸ If domestic grain market prices fall below the floor price, state grain enterprises will purchase the grain at the floor price from farmers (FAS, 2012). Thirteen provinces covered by the floor price program are located in the grain-surplus regions that produce about 80% of nation's commercial grains to meet the demand in other grain-deficit provinces (FAS, 2008).

higher than market levels. This program, however, has not had a significant impact, because the amount of paddy purchased by the government was very small and the support price to be paid to farmers was frequently inadequate due to the lack of budget (Yap, 1982). Starting in 1981, in order to make farmers withhold the products from the market at the early harvesting season and delay their sales until prices rose up, the Bank for Agriculture and Agricultural Cooperatives (BAAC) has operated a rice pledging program to provide a loan at low interest rate for farmers who need cash. The farmers pledge their paddy with the BAAC at the price of 80% of the market price⁹ and get the loan equivalent to the value of pledged rice. As the government needed to subsidize the 5% interest to BAAC to make up for a total loan rate of 8% per annum (Isvilanonda & Bunyasiri, 2009), this program created a huge burden for the government.

In 2001, a big change in the scheme occurred that the organization in charge of directing the pledging rice changed from BAAC to the rice millers, and there was a dramatic increase in the price pledging of rice by 120% - 130% of the market price in 2001 (Chulaphan, *et al.*, 2012), thus transforming the rice pledging program into a price support scheme (Isvilanonda & Bunyasiri, 2009). As the share of pledged rice increase, government has become the largest holder of the domestic rice inventory. Titapiwatanakun (2012) found that this scheme benefited mainly the farmers and rice millers who participated in the program while Thai rice exporters were affected by the higher rice in the pledging season and lost their competitive edge in the word rice market.

In the international market, these three countries also use the price policies, which mainly include rice exports tax or subsidies, with the aims to control or support rice exports, stabilize domestic prices or generate government exchange revenue. However, when these countries reached a production surplus or entered into the WTO or FTA agreements, prices instruments were nearly completely removed. For example, before the entry to WTO, China has implemented rice exports tax rebate and subsidies to encourage rice exports. Before 2002, rice exporters in China were levied by 13% value-added tax (VAT), but refunded by 5% after exports; in addition, the government provided export subsidies, of which the standard was different in each province. After becoming a member of WTO, in order to follow the WTO rules, Chinese government started to implement VAT exemption on rice exports in 2002, and by 2004 export subsidy under any programs was abolished. However, it has been shown that rice exports in China exhibited a decreasing trend since 1988, which might be mainly due to the six consecutive years of decline in rice production. This observation is consistent with Fang (2007) who found that export companies did not get benefit from the VAT exemption and the elimination of export subsidies make them lost some advantages.

In Thailand, rice exports policy changed from export tariff to export subsidy in 1986. The former has guaranteed the domestic consumption and meanwhile created large government exchange revenue, but it had made the development of rice exports stagnated. On the contrary, the later has stimulated a rapid development of rice exports. Before 1986, Thai government adopted several instruments to tax rice exports, including export premium, export duty and rice reserve requirement. This means that private traders needed to pay a premium for obtaining an export license and all rice exporters were levied by a 5% ad valorem export duty. By calculating the nominal protection rate (NPR)¹⁰, it was estimated that tax

⁹It was later adjusted to be 90% of the market price in 1990/91 and to 95% in 1998/99 (Isvilanonda & Bunyasiri, 2009).

¹⁰ $NPR = (RDP - RBP) / RBP$. To measure rice export taxation rate, NPR is defined as the percentage difference between the real domestic

rates were very high during the 1960s-1970s, and then were reduced appreciably in the 1980s (Kajisa & Akiyama, 2004; Choeun *et al.*, 2006). As result of export taxation, world rice price rose while domestic price declined (Choeun *et al.*, 2006; Lam, 2002) which partly led to the stagnated rice exports until 1980. After 1986, the rice export tax policy was abolished and a provision of discounted credit rates or a packing credit¹¹ has become available for exporters to subsidize their export cost (Isvilanonda & Poapongsakorn, 1995). In 1995, government provided subsidies of USD10 per ton for low and medium grade of rice exports and offered private rice exporters a subsidy of 250 Baht per ton for rice storage and rice quality improvement. As result of the elimination of export taxation and the offer of export subsidy, rice exports in Thailand remain increasing since the 1980s.

Rice exports in Vietnam has changed from being controlled by export quotas to being supported by export subsidy or credit assistance, and since its entry to WTO, the government has abolished all export subsidies. During 1989-2000, in order to ensure domestic consumptions and maintain stable rice prices, rice exports from Vietnam were strictly controlled by export quotas which have been allocated to two regional, state-owned trading enterprises¹² and to a number of provincial, state-owned trading enterprises¹³. Except for export quota, export tariff was also imposed, but it has been managed flexibly in the sense that it has not always been levied, particularly in times of low world market prices (Son, 2010). Previous studies (Minot & Goletti, 1998; Nielsen, 2002) showed that the bidding export quota resulted in domestic prices below the relevant border price and has kept the exports well below their potentials.

However, as Vietnam became a member of Association of Southeast Asian Nations (ASEAN) in 1995 and engaged in zero export tariff commitments, on May 1, 2001, the export quota has been abolished. Along with the removal of the export quota, the government applied export promotion through export subsidies¹⁴ and loosen compensation. In addition, with export promotion fund, rice exporters were given credit assistance with the interest rate between 0 - 50% of the prevailing rate (FAS, 2006). As a result of exports subsidy and credit assistance, rice exports reached highest level in 2005 since Vietnam returned to the international market in 1989.

With the commitment to WTO principles, all export subsidies under any type in Vietnam were terminated in 2005. The only incentive that can be applied is providing a favorable loan interest for the export companies to buy rice for temporary stock at the peak of harvest season. Although being a member of WTO, China, Thailand and Vietnam have abolished relative tariff or subsidy for rice exports, China and Vietnam still interpose rice exports with tariff when the domestic supply-demand balance is threatened or the domestic price is not stable. For example, as the international market price of rice increased sharply due to the food crisis in 2008, and in order to stabilize the domestic price, Chinese government decided to banned the exports of rice and impose a temporary tariff of 5% on rice exports,

price (RDP) and the real border price (RBP). NPR is negative when rice is taxed and is positive when it is protected.

¹¹Packing credit means the local bank provides the exporter who has received a letter of credit from his foreign buyers with special loans for procurement, production and shipment.

¹² VINAFOOD I (also known as the Northern Food Company) located in Hanoi and VINAFOOD II (Southern Food Company) located in Ho Chi Minh City.

¹³ Although since 1997 and 1998, private trading companies was allowed to export rice but they accounted for just 4% of total rice exports in 1999 (Minot & Goletti, 2000).

¹⁴Rice exporters will receive a subsidy of VND 180 (about USD 0.012) per export dollar (Son, 2010).

resulted in a decrease in rice exports by 27% compared with that in 2007. Similarly, worried about fast increasing food prices in the domestic market affected by global food crisis, the Prime Minister in Vietnam had stopped signing new rice exports contracts for three months which resulted in lowering rice export volumes to 2.5 - 4.0 million tons in 2008. In addition, on July 21, 2008, Vietnamese government imposed an absolute tax on rice exports with the price taxable limit of USD800.

3.4 Input policy

The instruments of input policy include the investment in variety innovation, investment in irrigation, land reserve and input subsidies. Innovation of new varieties is one of important instruments to increase rice yield; therefore, it has been attached great importance in these three countries. China and Vietnam have adopted and promoted the hybrid rice while Thailand has adopted modern rice varieties.

Since the 1960s, China has put substantial investments in hybrid rice research. In the early-1980s, hybrid rice was massively diffused among small-scale farmers in China. Hybrid rice now accounts for 63% of total rice cultivation in China (Spielman, *et al.*, 2012). It was found that the dissemination of hybrid rice between 1978 and 2008 has contributed to 67.5% increase in national rice yields (Spielman *et al.*, 2012). The increasing yield, in turn, has compensated a decrease in total rice land area during this period. In Vietnam, the hybrid rice research was initiated in 1992 and by 2009, the planting area of hybrid rice in Vietnam reached 0.71 million ha, accounting to 10% of total planted area (Bo & Buu, 2010).

Modern rice varieties, mainly defined as non-photoperiod sensitive and/or early maturing, have been introduced in Thailand in the early-1970s and rapidly adopted in the 1980s. The modern varieties generally produce higher yield than local varieties and help improving the cropping intensity especially in irrigated areas. However, as modern rice varieties are constrained by the degree of water control, the adoption rate of modern rice varieties is low in most of the rice cultivation areas except in irrigated areas.

In addition to variety improvement, the government of China, Thailand and Vietnam also put attention to the investment of water reserve and irrigation. During the 1960s and the 1970s, massive investments in irrigation infrastructure by the Chinese Government had helped improving crop production by increasing cultivation intensity (Huang *et al.*, 2006). As a result, rice yield and total production in China respectively increased 3.6% and 5% per year and rice exports maintained at high level during 1961-1977. Along with disrepair or damage of water conservancy facilities, grain production in China has suffered heavy losses because of droughts and floods during the past decade. Therefore, the Chinese government has pledged to intensify construction of water facilities by releasing relative policies and increasing investment fund since 2009.

Thai government has also made massive large and medium scale irrigation projects during the period from the 1st to the 5th Economic and Social Development Plans (between 1961 and 1986) and rice irrigated area had increased from 1.56 million ha in 1961 to 3.91 million ha in 1986. However, due to large investment and long, slow-return, the government has shifted the investment priority to small scale projects and water distribution system rather than constructing new irrigation projects during 1990s and

2000s, which led to a slower growth in irrigated area after the 6th plan. Currently, the irrigated area is only about 23.9% of the total cultivated area (Isvilanonda & Bunyasiri, 2009).

In Vietnam, even though total rice cultivation area has decreased, the irrigated rice area and the harvested rice area have been increasing since 1976 as Vietnamese government attached great attention to irrigation systems, particularly in the main paddy production regions. Currently 85% of rice areas in Vietnam are irrigated (Bo & Buu, 2010). The improvements in irrigation bring about increasing cropping intensification and rice planted areas. For example, in the 1980s, the improvements in irrigation and drainage in the Mekong River Delta have allowed single rice cropping system during the rainy season to double and triple rice cropping system (Minot & Goletti, 1998).

Land is the decisive factor for rice production. In order to reduce farmers' burden and rice production cost, both Chinese and Vietnamese governments have abolished land use tax. In addition, with the aim to maintain grain self-sufficiency and prevent a decline in total agricultural land or rice land, China and Vietnam have followed a strict policy of maintaining basic farmlands for grain production or a certain proportion of agricultural land for rice cultivation. For example, land use tax waiver and reduction were introduced in Vietnam in 2003, and since 2004, Chinese government has eliminated taxes on agricultural land. Chinese government has released the policy requiring retain basic farmlands for grain production with no less than 1.56 billion mu (about 0.104 billion ha) since 2008 (Ito & Ni, 2013). In 2009, Vietnamese government has set the goal to keep rice land at 3.8 million hectare by 2020 (Son, 2010).

Agriculture, especially grain production, is the foundation of national economy, and at the same time is some sort of weak industry. The government often uses input subsidies to stimulate grain production and improve profits of the farmers; however, input subsidies also create financial burden for the government so they are usually terminated in restriction situations. In China, from 1978 to 1990, after selling a fixed quantity of rice to the government at a quota price, farmers can in return, obtained subsidized diesel fuel, fertilizers and a cash prepayment for their sales (Yap, 1994), which partly contributed the 36.84% increase in rice production during 1978-1990. However, in order to reduce government financial burden, during the early 1990s, the government's distribution of subsidized farm inputs had declined (Fang & Beghin, 2000). Thus, rice production in China had decreased in the early 1990s. Followed by the consecutive six-year decline in rice production during 1998-2003, Chinese government released a series of policy to promote grain production which includes the input subsidies after 2004. In 2005, for example, Chinese government provided a subsidy for farm machinery, and in 2006, added a direct subsidy for fuel and fertilizers (FAS, 2010; FAS, 2012). To a certain extent, input subsidies have stimulated a 25% increase of rice production between 2003 and 2011. On the contrary, in Thailand, the agricultural input markets are mostly free from government intervention (Isvilanonda & Bunyasiri, 2009) although the government had previously distributed chemical fertilizer to the farmers at subsidized transportation costs.

Table 9. Chronology of major rice policies in China.

Year	Events
1956-1978	Implementation of People's Communal System where government managed production and circulation of agricultural products.
1960-1978	Massive investments in irrigation infrastructure.
1978	Introduction of Household Responsibility System where farmers were given the rights to manage their own land and have the freedom in making production decisions.
1980s	Hybrid rice was introduced and massively diffused.
1985	Mandatory quota procurement system was replaced by contract procurement system where the procurement quantity was determined by contracts based on mutual agreements between the government and individual farmers.
1993	Abolished the ration system where rice was distributed by the Grain Bureau at a fixed subsidized or ration price.
1995-1998	Introduction of Provincial Governor Responsibility System where provincial governors were responsible for the balance of grain demand and supply in their provinces.
1997	Procurement price for rice has been gradually lowered.
1999	Differentiated prices between low and high quality cereals.
2000	Low grade early rice varieties in Southern China no longer be eligible for government procurement.
2004	A series of policies were implemented to encourage grain production, including reducing agricultural taxes on farmland, providing a direct payment to grain farmers and floor price support program.
2005	Subsidy for farm machinery.
2006	Direct subsidy for farm use of fuel and fertilizers in addition to existing VAT exemption for farm use of seed and fertilizers. .
2008	Release the policy requiring retain basic farmlands for grain production with no less than 1.56 billion mu (about 0.104 billion ha).

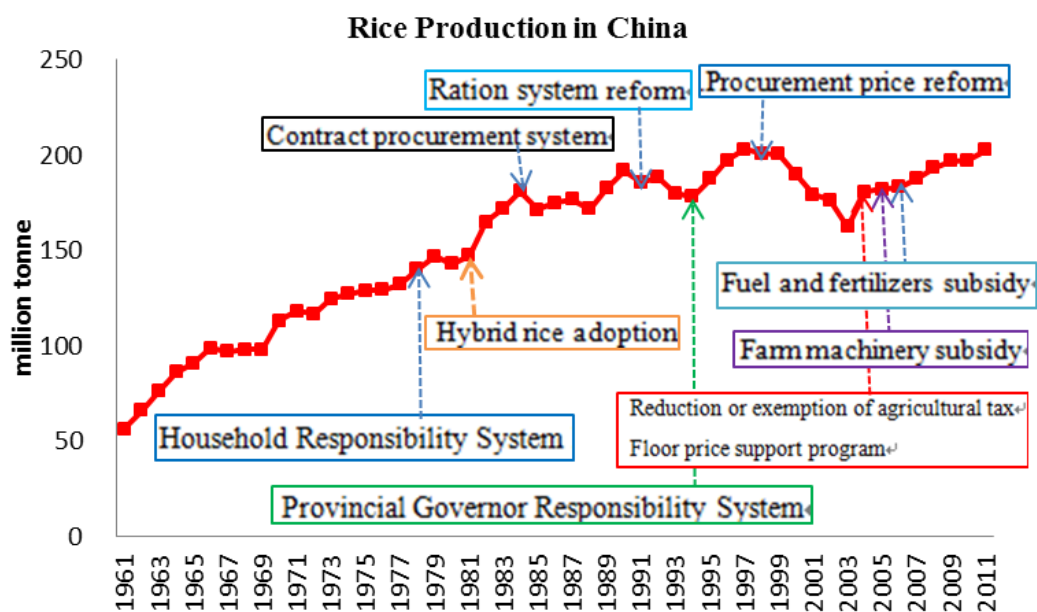


Figure 1. Rice production and chronology of major rice policies in China.

Source: FAOSTAT, 2013.

Table 10. Chronology of major rice policies in Thailand.

Year	Events
1961-1986	Large and medium scale irrigation projects during the 1 st (1961-1996) to the 5 th (1982-1986) Economic and Social Development Plans
1970s	Farm support program by purchasing rice at guarantee prices higher than market levels.
1970s-1980s	Modern rice varieties have been introduced.
1981-2000	The Bank for Agriculture and Agricultural Cooperatives (BAAC) has operated a rice pledging program to provide a loan at low interest rate and the pledge price is usually 80%-95% of the market price.
2001	Rice miller instead of BAAC representing the government buy pledged rice from farmers, causing the pledge price up to 120% to 130 % of the market price, thus transformed the pledging program into a price support scheme.

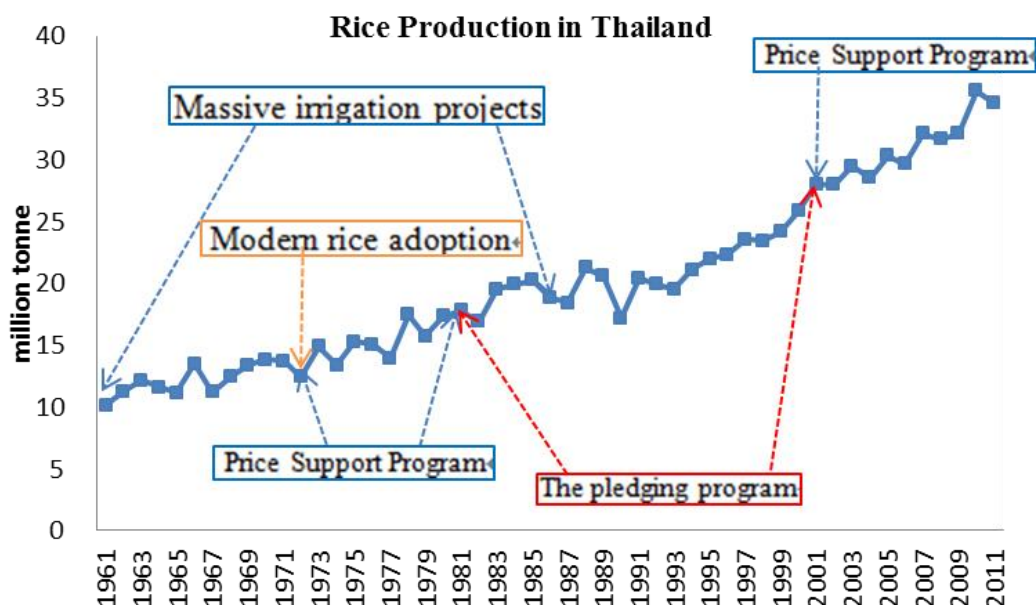


Figure 2. Rice production and chronology of major rice policies in Thailand.

Source: FAOSTAT, 2013.

Table 11. Chronology of rice policies in Vietnam.

Year	Events
1981	Collectivized agricultural production system is replaced by individual-oriented contract system.
1988	Private ownership of farm assets was legalized and cooperative land was leased to individual farmers.
1990s	Input subsidy policy for farmers and set a minimum purchase price on paddy
1992	Hybrid rice research was initiated and the first hybrid rice was released.
2003	Land use tax waiver and reduction were introduced.
2009	Vietnamese government has set the goal to keep rice land at 3.8 million hectare by 2020.

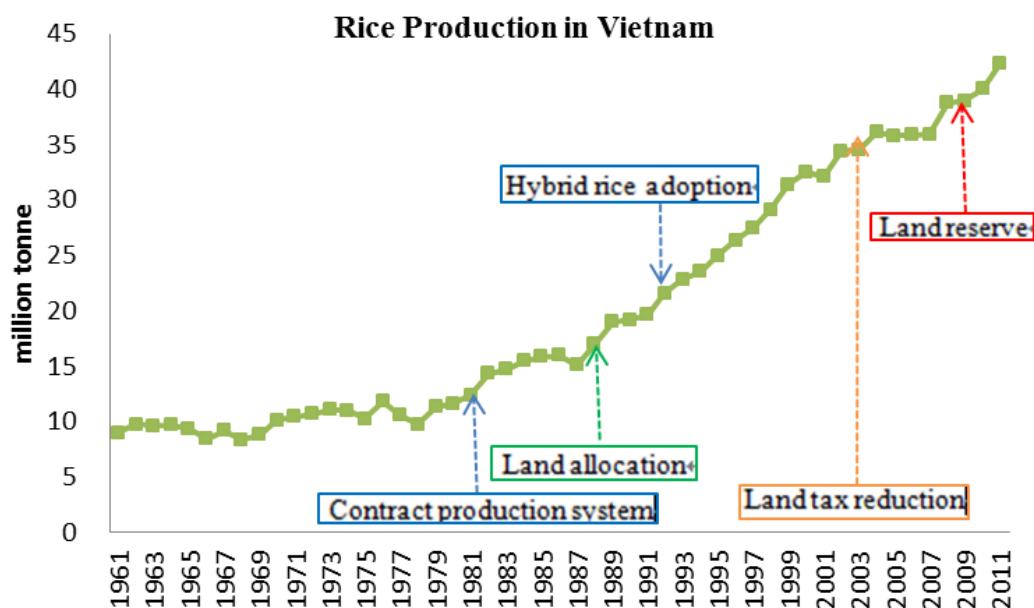


Figure 3. Rice production and chronology of major rice policies in Vietnam.

Source: FAOSTAT, 2013.

4. Policy Implications and Conclusions

As rice is a staple food and important crop that incorporates a majority of farmers in China, Thailand and Vietnam, government interventions in the rice sector is unavoidable for economic, social and political reasons. By reviewing policies in the rice sector of three countries, this paper classifies policy instruments in terms of farm system reform, market liberalization, price policies and input subsidies.

The farm system reforms, changing from collective production system to individual production system, have improved farmers' initiative and productivity in China and Vietnam, therefore contributes to the increased rice yield. But with the right to make the production decision and under the principle of profit maximization, farmers inevitably will substitute part of the rice with more profitable crops, so the farm system reform doesn't necessarily mean the increased rice harvested area. For example, the rice harvested area in China has been decreasing since 1978 to 2003. The land reserve policy implemented in China and Vietnam reflect the need to maintain sufficient rice cultivation areas during the urbanization, but this policy could not provide sustainable rice production as there are few possibilities existing for further expansion of the country's rice growing area.

The increasing rice supply in China proved that higher yield can compensate decreasing rice growing area. So far, with a higher proportion of irrigated areas and hybrid rice cultivated, China maintains a relatively higher rice yield than Vietnam and Thailand. It is advisable for these three countries to keep attaching importance to the investments in irrigation system and the adoption of modern rice varieties that could increase the rice yield as well as cropping intensification. However, due to the lack of flexibility in

demand, the increased rice yield and production couldn't guarantee farmers' income. In order to ensure farmers' income and stimulate the plantation of rice, the rice price support program, removal of land tax or agriculture tax, and input subsidies have been provided in different ways in these three countries. Those prices and subsidies policies to an extent generated financial burden for the government. Furthermore, the higher price support program might hinder rice exports such as in Thailand and increase the rice imports such as in China.

Promoting rice production is the most important way to ensure rice self-sufficiency and is helpful for stabilizing the rice price in domestic market. But for an open economic, the international market also plays an important role in the domestic food supply. Governments would use export tariffs and quotas to control the rice exports during the food shortage period and incline to provide export subsidies and credit assistance to encourage rice exports after achieving a sufficient surplus of rice supply. In the case of Thailand, it has gradually benefited from the liberalization of rice export premium and the provision of credits from BAAC during the 1980s. After joining ASEAN and WTO, rice exports taxation and subsidies policy in these three countries has been gradually abolished and trade liberalization improve, but government interventions still exists in the particular time. For example, in 2008 when the international rice price sharply rose, China and Vietnam governments imposed temporary export tariff on rice to achieve food security for their population.

Above all, the governments in these three countries have been practicing series policies to ensure rice self-sufficiency. In the process, individual and market forces have increased their role. But no matter the past or the future, the government still plays an important in providing rice breeding technology and infrastructure construction for sustainable rice production.

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