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**Understanding "linking together the four houses"
in rice production and commerce:
A case study of An Giang province,
Vietnam and lessons learnt from Chiba prefecture, Japan**

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Abstract

There is a growing awareness amongst policy-makers, entrepreneurs, researchers and farmers of the importance of interrelationships between different actors in an attempt to solve the problems of outlet markets for rice farmers through contract farming, and the consequent need for adequate analysis as a precondition for rice sector development. The close links between actors referred to as "linking together the four houses" - government, enterprises, researchers and farmers - have been acknowledged by the central government and related stakeholders. However, more work is needed to understand and put into practice these links.

This paper attempts to map some of the key links in "linking together the four houses", which should be taken into account when developing strategy, as well as approaches to supporting farmers in producing and selling their rice products. In particular, it suggests that supporting policy and coordinating governance institutions provide an important function in creating links. Some key challenges to achieving better synergy in practice amongst the "linking the four houses" are identified, with special reference to a case study from Chiba prefecture. Finally, the paper proposes a number of recommendations that point to areas where further work is required - which must be practically implemented in order to more effectively coordinate the links within these partnerships.

1. Introduction

Starting in 1986, policy-reforms (*Doi moi*) were initiated to further liberalize Vietnam's agricultural sector, with new policies directly related to agriculture (Pingali and V-T Xuan, 1992). Major important policies can be listed, such as the new land law, according to which farmers have the right to control their lands, and are encouraged to reclaim additional fallow or virgin lands; in regard to farming households, the government considers farm households to be independent and have the right to do their own business; in regard to science and technology, the government has increased investment in agricultural technology and extensions to help farmers increase crops yields; in regard to agro-products and agro-input materials, the government has adopted a new mechanism that allows free circulation of retail products and the purchase of input materials at the best price. Such appropriate encouragements from government have been stimulating farmers into producing enough rice not only for consumption, but also a surplus for export (Pingali and V-T Xuan, 1992; Tang, 1994). As part of *Doimoi* policies starting in 1986, more dramatic reforms were introduced, including land allocation to farming households and market liberalization, which have made Vietnam into one of the three largest rice exporters in the world (Minot, 1998). Since then, more rice producing farmers have been facing huge challenges such as unstable markets, low prices and low income. This is likely to be happening due to the fact that Vietnam has booming rice exports, but is not generating wealth (Jaffee, 2010; ISG-MARD, 2011). This situation has prompted the Government to rethink a policy that can help farmers, both in reinforcing production and in solving the problems of market outlets for the large increase in rice production that the country has achieved.

In addition, the fact is that it is not easy for farmers in Vietnam - from a poor country - to access the market, because those farmers lack information on prices and technology, have weak connections with market actors, suffer instability in input and output markets and credit constraints, and are dependent on middleman and rice export companies when selling their paddy rice. To solve these problems, the Government has announced "Linking together the four houses", meaning links between Government, Researchers, Entrepreneurs and Farmers (GREF). Under this strategy, contract farming is one of the most important measures linking the key actors, as emphasized by the government in the 'Decision 80/2002/QD-TTg' on the encouragement of consumption of commercial agricultural products through contract farming.

The contract system leads to close links between farmers, traders, processors (rice millers), and input suppliers, and better access to services such as market information, extension services and supportive policies. It even leads to better incomes in the beginning, but relations between firms and farmers worsen over time, and links between those key actors are not stable. However, it is important to understand these links, based on evidence from a certain case study, and to recognize the role of key actors while helping farmers to access markets.

This paper provides an overview of the process for the promotion of links between actors and contract farming in the Mekong Delta of Vietnam, and an analysis of rice production changes that have taken place since 1990 and farmers' s incomes. Subsequently, this paper will take An Giang's case as an example and show the history of "linking together the four houses" and

contract farming. Lesson learnt from a case study in Chiba prefecture will also be included. Finally, this paper will also provide recommendations as an attempt to strengthen links in order to improve farmers' welfare and sustainable productivity in the rice sector. This study has made use of different data and information sources, including a detailed field survey implemented in An Giang province in 2011, regulations and resolutions issued by government or provincial authorities, discussions with experts, policy makers, and a field visit to Chiba prefecture in Japan.

2. Policies on "linking together the four houses" in rice production and marketing

In order to understand the true magnitude of linking together the 'four houses' it is essential to start with a historical perspective on the process of links between the 'four houses' in Vietnam's Mekong Delta. Starting in 1988, policy reforms were initiated to further liberalize the agricultural sector of Vietnam, the most important of these reforms being aimed at increased ownership of land allocated to individual farmers, and the privatization of output markets and input supplies. These measures stimulated farmers and had a significant effect on rice productivity, which transitioned from subsistence to market-oriented rice production. Across the whole country, the nation produced 19.23 million tons by 1990, and 24.96 million tons by 1995, a 3% increase. On the average, annual growth rate in rice production was 5.4% per annum during the period 1990-1995. The same trend was seen during the period 1995-2000. Likewise, surplus rice for export has also increased since 1990, as shown in the next section.

As a result of increased rice production, farmers have been faced with unstable or low farm-gate prices. As a result, farmers have earned no or low profits from their rice production. This has been happening since 1998, as a result of which some farmers stopped producing rice, and converted to other crops. In order to solve the aforementioned problems, in 2000 the government issued a resolution on shifting economic structures and the consumption of agricultural products (Resolution No. 09/2000/NQ-CP). The major important points of the resolution that directly relate to the rice sector include: rice is an advantageous production sector and should maintain 4 million ha of rice land; ineffective rice land should be converted to other, more effective crops; links should be built among actors, promoting forms of contract farming, and linking effectively between production, processing and selling; the provincial People Committee (State) should take the lead in facilitating and implementing their roles. This resolution allowed the Mekong Delta provinces to overcome effectively the problems of unstable markets and low rice prices. Some enterprises expanded contracts with farmers by providing input supplies and buying output products. This took place, for example, in An Giang province - a major rice producing province - leading to the implementation of contract farming and links between the state, farmers, firms and scholars, initially successfully.

The experience of the Mekong Delta provinces in promoting the links amongst key actors and its so-called 'linking together the four houses' prompted the government to issue the decision about policy for encouragement for consumption of agricultural commercial products through contract farming (Decision No.80/2002/QĐ-TTg; dated 24/6/2002). Under this policy

decision, agro-industrial firms, farmers, researchers (research institutions, Universities) and government agencies worked together to improve production systems to reduce price risk and market uncertainty, while farmers improved their technical knowledge, raised production efficiency and improved the quality of raw materials.

In fact there is no specific policy so called "linking together the four houses". Rather, it is a political slogan that is implied in most plans and directions for the agricultural sector by government at all levels. An Giang is the first province to promote the 'linking together the four houses'. The 'four houses' here means the involvement of the four key actors: the government, researchers, entrepreneurs and farmers. The principle of the 'linking together four houses' is to link between producers and consumers of rice, where their roles can be defined as:

- The government (state): functions by organizing or linking between key actors and having appropriate policies, and plays as "referee"/ or "bandmaster" in facilitating the links;
- Researchers: providing/transferring rice technologies, and supporting farmers in increasing productivity and quality of rice;
- Entrepreneurs: through contracts with farmers, ensuring input supplies and market outlet for products (rice);
- Farmers: as producers, need to apply new technologies introduced by researchers, upgrade their products, and ensure quality and quantity of output supplies.

The contract system had been practiced in some forms before the policy reforms. In 1981 the Central Politburo of the Communist party issued a directive (Directive 100 CT, 1981) that introduced the contract system in Vietnam (Pingali and V-T Xuan, 1992). As with the current directive, all farmers had to make a contract with a cooperative to produce a certain output from their land. The cooperative would provide the farmer with adequate inputs for producing that output level. After the policy reforms of 1986, this form of contract system was no longer applicable; instead privatization in production was practiced. Since the later 1990s a number of enterprises have contracted with farmers to produce rice. Subsequently, these farms were contracted by private enterprises and expanded into vegetables, fish and shrimp.

The problems of bad markets and low rice prices would eventually lead to national food security and social problems. By 2009 the government issued resolution number 63 on ensuring national food security (No. 63/NQ-CP; December, 2009). This resolution states that an adequate food supply, with production higher than the population growth rate, must be achieved by 2020 and in visions for 2030; and that farmers should earn a net margin of more than 30%. In implementing this resolution, the government has announced 'floor prices' for paddy rice at each harvesting crop, and provided interest free loans for milling and trading companies to purchase and store additional quantities of rice at these times. These purchases are supposed to ensure that farmers earn a profit of some 30%, but often companies purchase at lower prices than recommended.

As for policies related to technology for rice production, since 2002 agricultural agencies have been recommended to apply 'three reductions - three gains': the three reduction are the

use of less seed, less fertilizer and less agri-chemicals, and the gains are higher productivity, higher quality, and more economic efficiency. About 60% of farmers applied these in An Giang and Can Tho, but the figure is lower in other provinces. Recently the agriculture sector has announced the application of so-called 'one must-do - five reductions'. The must-do is certified seed, and the five reductions include the former three, plus a reduction in irrigation water usage and post-harvest losses.

Some farmers applied GobaGap, or VietGap in contracts with agro-firms (through which farmers can get prices 5-8% higher at the farm gate than ordinary farmers), but these were not attractive to farmers because of the increased investment required for these techniques. The Ministry of Agricultural and Rural Development (MARD) has also encouraged the agricultural sector to apply a "large sample field" model (2012-2013). The "large sample field" model means that small farmers join together to produce a specific variety on a larger area of land, e.g. a field of at least 300 ha for growing one rice variety. The proposal for this strategy has been submitted to the government for the 2013-2020 plan.

Currently, the government pays more attention to improving farmers' production organization, such as contract farming, or improved cooperatives. Although there is no specific policy for linking together the 'four houses', government agencies have continued to implement it. Links between the 'four houses' is a slogan associated with the lifting of poor farmers, and collective action to overcome the problems of markets toward sustainable agricultural development.

3. Rice production and commerce in the Mekong Delta

3.1 Rice production

Climate and cropping patterns

The Mekong Delta (MKD) of Vietnam is located in the south, consisting of 12 provinces and a city, covering 3.97 million ha (12% of the total national area). The climate in the MKD is warm and is part of the monsoon tropical climate. Average temperatures range from 26.4 to 28.8°C. The delta has two well-defined seasons: rainy and dry. The rainy season lasts from May to November (supplying 80% of the rainfall) and the dry season lasts from December to April. The MKD is influenced by the flow of the Mekong River, the diurnal tidal movement of the East Sea, and the semidiurnal tidal movement of the Gulf of Thailand. High rainfall combined with a high water discharge of about 40,000 m³s⁻¹ from the Mekong River results in regular floods of 0.5 to 3.0m deep between August and December, and causes damage to agriculture.

The Mekong Delta is a flat, low-lying region, which was formed through slow alluvial depositions. The major soil types of the MKD includes alluvial soils that cover 1.1 million ha (about 28% of the delta), acid sulfate soils on 1.6 million ha (41% of the delta), and saline soils on 1.08 million ha (21% of the delta); the remaining soils are mountainous soils and peat soils (Sanh et al., 1998; Duong et al., 2005).

In terms of particular characteristics regarding to physical conditions in the MKD, soils and water are considered as the two major environmental factors that influence farming systems. In particular, the regular floods bring alluvial deposits to fertilize the soil and make it most favorable for rice growing (Can et al., 2007).

There are three types of rice cropping systems: the single-rice cropping (locally called *lua mua*), double-rice cropping and triple-rice cropping systems. Historically, in most parts of the Delta only one rice crop was grown. With the introduction of modern rice – and improved quick-growing varieties - the rice production has been intensified, first by single crop to double cropping, and then more recently triple cropping.

The production of paddy rice in the MKD can be classified into three seasons (or cropping patterns): the winter-spring, the summer-fall and the fall-winter crops. In almost all provinces of the MKD, the winter-spring crop is planted in November-December and harvested in February-March. The summer-fall crop starts during April-May and is harvested in July-August, while the fall-winter crop is planted as soon as after summer-fall crop and harvested in October-November.

The winter-spring rice crop is often part of a triple or double-rice rotation. The triple-rice cropping system is practiced in fresh water zones with alluvial soils, which are not prone to flooding but have irrigation canals available, or dike systems to prevent floodwater. The winter-spring rice area has increased year to year, accounting for a 7.58% greater area in 2010 than in 2000.

The summer-fall and winter-spring are the two major seasons for the double-rice cropping system. The double-rice cropping system is also practiced in fresh water zones with alluvial soils, which may be affected by floods, and have no irrigation systems available, and no dike systems to prevent floodwater. The summer-fall rice area has also increased year on year, increasing by 6% (area in 2010 vs. 2000).

The single-rice cropping system or *lua mua* has declined significantly over time from year to year (demonstrating a 41.8% reduction in area in 2010 vs. 2000). Currently it remains one-fifth of the total MKD rice land and is practiced in micro-ecosystems such as flood zones or coastal zones (rain fed).

The MKD rice-growing land has actually declined over the long term. Total rice land in 1995 was 2.155 million hectares, while fifteen years later (in 2010) it was 1.945 million hectares. Some 209,000 hectares are being converted for other crops. However, the cultivated area for paddy rice has continued to increase, but declined slowly in 2010 compared to 2000. These changes in composition of the MKD rice land and cropping intensity are illustrated in Table 1.

Table 1. The changing structure of rice planting in the Mekong Delta

Component	1995	2000	2010	Change 2010/2000 (percentage)
a) Winter-spring (000 ha)	1,035.70	1,482.90	1,595.30	7.58
b) Summer-fall and fall-winter (000 ha)	1,397.60	1,843.00	1,953.70	6.01
c) <i>Lua mua</i> paddy (000 ha)	757.30	595.90	349.80	-41.30
d) Total cultivated area (a+b+c) (000 ha)	3,190.60	3,921.80	3,898.80	-0.59
e) Total rice land (000 ha)	2,154.90	2,078.80	1,945.10	-6.43
f) Cropping intensity (d/e)	1.48	1.89	2.00	

Source: Statistical Office of Can Tho City (2010); GSO (2011); and author calculations

Currently, the MKD is striving to maintain 2 million ha for rice, about 60% of which is fully irrigated and 40% is semi-irrigated or rain fed. *Indica* rice is the main type grown in the MKD. However, some *Japonica* varieties (locally called *lua Nhat*) are also grown here, which were introduced by Angimex-Kitoku company (in 1996). More than 80% of rice varieties used are modern varieties, and direct seeding is a common practice.

Production trends

The Mekong Delta of Vietnam is well known as a most favorable area for rice growing and often called the "rice bowl" of Vietnam. Figure 1 illustrates the long-term and virtually steady progression of rice production in Vietnam and the productivity of the delta. As a whole, the MKD contributes over 55% of the national rice product. From 2010-2012 the delta produced 21.6 - 24.6 million tons of paddy rice annually. These results have been basically attributed to appropriate policies by government, efforts in investment in irrigation canals, infrastructure and other water management services, agricultural extension activities, and support from researchers, as well as the great contribution of hard work and proactive farming by households. Although the delta frequently faces problems with flood inundation, salt water intrusion, drought and/or outbreaks of pests and diseases, the overall production pattern of the delta has increased remarkably. Only twice have relative reductions in output occurred - between 2000-2001 and then 2005-2006 – during the past two decades. The years noted for reductions in paddy production coincided with years of serious flood damage or poor market prices for rice. It has also been noted that by the year 2000, the government had instituted a new policy that encouraged farmers to use rice land effectively (Resolution 09/2000/NQ-CP), as a result of which demand for rice production dropped, and some farmers converted their rice land to other crops.

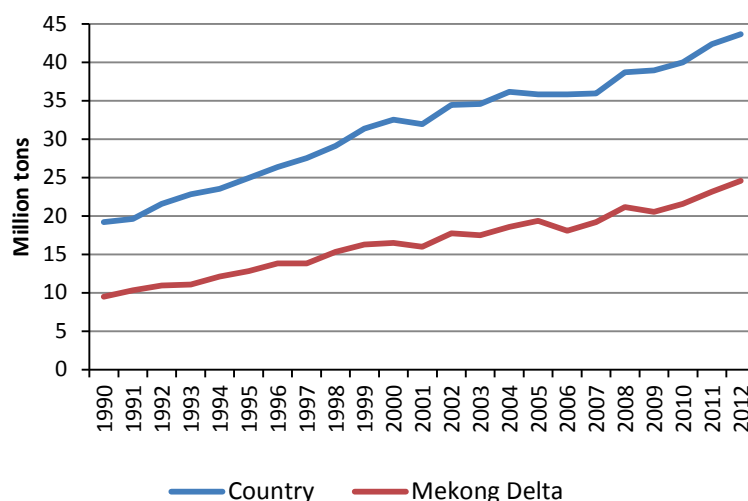


Figure 1. Whole country and Mekong Delta paddy production, 1990-2012

Source: SOCC (2010); GSO (2011)

However, in the MKD, rice production still plays a dominant role in the economy. Attempts to produce more rice have been the main focus of farmers as well as the government since the past two decades.

Table 2 shows paddy rice production performance by time period from 1995-2011 in the MKD. The cultivated area of rice in the MKD increased by 4.29% per annum, from 3.2 million ha in 1995 to 3.9 million ha in 2000. However, the growth rate of the cultivated area reduced by 0.23% per annum in the period 2001-2005. This was due to market problems and poor prices for rice as mentioned before. The growth rate in rice yield in the region during the period 1995-2000 was 1.73% per annum, while the growth rate in rice production during the latter period was high, at 6.10%. This increase in rice production was the result of increases in cultivation area.

Rice yield increased at 4.40% in the period 2001-2005 but slowed down to 3.29% in the period 2006-2011. But the growth rate in rice production remained at 5.0-5.2% per annum for the periods 2001-2005 and 2006-2011, respectively. These relatively high growth rates per annum were demonstrated in rice yield and total production in 2001-2011. The results obtained have been attributed to efforts in investment and management of production, such as the application of 'three reductions three gains', 'one must do, five reductions' and other management services.

Table 2. Rice production performance in the Mekong Delta, 1995-2011

Time period	Growth rate in cultivated area per annum (%)	Growth rate in yield per ha per annum (%)	Growth rate in total production per annum (%)
1995-2000	4.29	1.73	6.10
2001-2005	0.23	4.40	5.00
2006-2011	1.65	3.29	5.21

Source: SOCC (2010); GSO (2011); and author calculations.

The MKD has a range of agro-ecological and hydrological conditions, which cause differences in the cultivated area and productivity during different paddy growing seasons. Figure 2 illustrates the sowing area by different cropping seasons. The sown area for the summer-fall season is dominant, accounting for about 51% of the total cultivated area of the region, while the cultivated area of winter-spring and Lua mua paddy seasons account for 38% and 11% respectively. The cultivated area of Lua mua paddy rice has declined over time, while the cultivated area for winter-spring and summer-fall has increased.

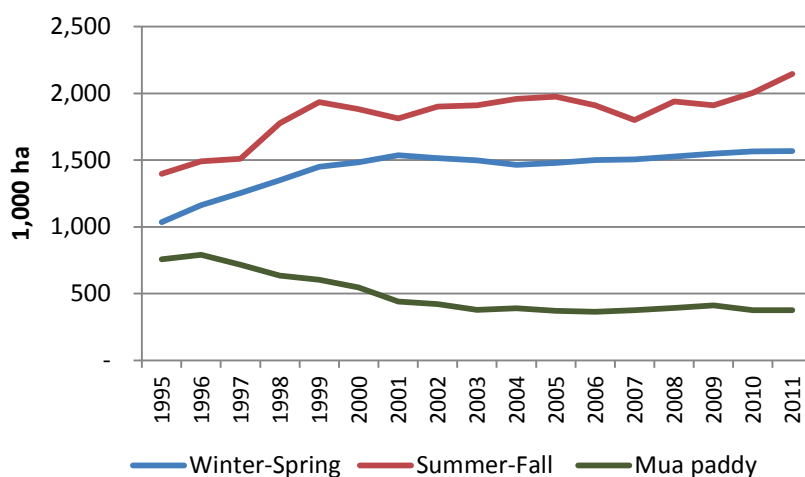


Figure 2. Trends in cultivated areas for different rice growing seasons in the MKD

Source: SOCC (2010); GSO (2011)

In terms of production, the most productive season is the winter–spring season, and average yields can nowadays reach 6.5 to 6.7 tons/ha. The rice yield of the summer-fall season is lower, ranging from 4.8-5.2 tons/ha in recent years. The Lua mua paddy rice is usually grown with local varieties or longer duration modern varieties, with average yield ranging from 4.0-4.3 tons/ha, and it has become less important in the region. Figure 3 illustrates the trends in rice yields for different rice growing seasons in the MKD over time.

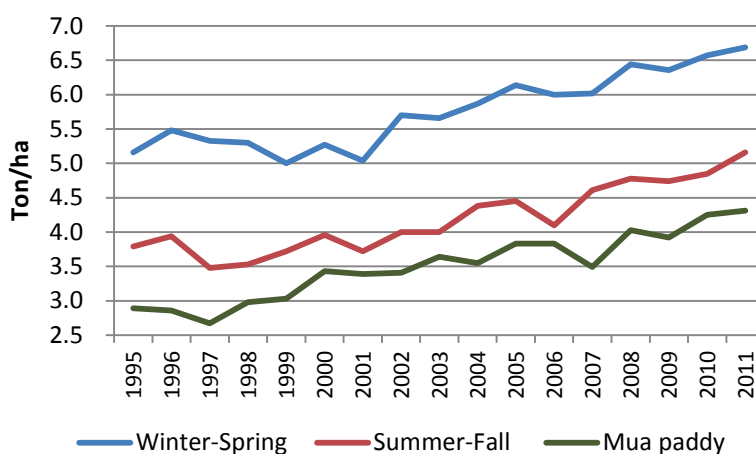


Figure 3. Trends in rice yields for different rice growing seasons in the MKD

Source: SOCC (2010); GSO (2011)

In recent years, the winter-spring crop has become the major crop as it accounts nearly 50% of the annual paddy production of the MKD and is the primary source of rice sold as exports. The second most important season is the summer-fall season. This cropping season is often affected by climates such as rainy, drought, extended times of flood and insects and diseases, and these make some increment of production costs. In recent years, farmers also increase significantly production of fall-winter crop. This crop often practices as soon as after harvesting summer-fall crop. The fall-winter crop recently accounts for less than 10% of the annual MKD total rice production. In recent years, average yields for this season have topped out at 4 tons/ha (ISG, 2011).

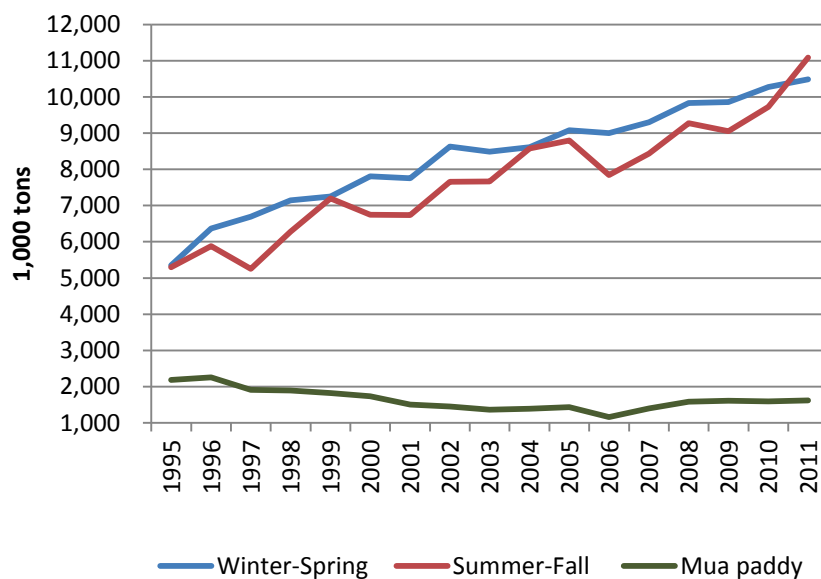


Figure 4. Trends in rice production for different rice growing seasons in the MKD

Source: SOCC (2010); GSO (2011)

3.2 Markets and production economic

Rice marketing system

Before policy reforms, agricultural marketing was small scale, with short marketing channels. Since the Vietnamese government released an important policy in 1988 (Ordinance No. 193, issued on Dec. 23, 1988) private traders have had equal rights to those of the state in the purchase of food grain from farmers (Pingali and Xuan, 1992). Small private traders and dealers have come into the rice market to compete with the state marketing system. Under favorable market conditions, farmers will likely continue to invest and expand their rice production. This open door marketing system has had great impact, and become a driving force in improving the productivity of MKD rice production.

As a result, since the 1990s the marketing system in the MKD has handled an enormous volume of rice. In 1995, for example, farmers in this region produced about 12.8 million tons of paddy rice, of which an estimated 7.6 million tons passed through the marketing system (about 5.2 million tons is supposed for domestic consumption). As in other regions, over 96%

of farmers reported selling to a private assembler and two-thirds of the volume handled by assemblers was sold in paddy rice form to millers, predominantly medium and large millers (Minot, 1998). An investigation by Khiem et al. (1996) showed 10% of farmers selling to state assembly, 80% of farmers selling to private wholesale assemblers and 10% of farmers selling to retail assemblers and millers. The commercial trade, particularly in export rice, is dominated by state owned enterprises (SOEs), which control 70% of the market (Son, 2011).

This assembler-miller-SOE route is the most important marketing channel, and farmers may acquire advantages from this marketing channel. However, now the MKD is producing more rice, marketing problems have developed. Typically, small farms sell paddy rice to traders, mostly assemblers and brokers/collectors who visit remote areas. In many cases, small farms also sell "fresh paddy" to traders, as they receive money in advance. Prices are often set by traders/brokers based on the previous season's price or production costs, and price fixing among traders is common. As a result, there is the widespread perception that traders are exploiting farmers. Farmers usually receive lower prices than the price offered by the Vietnam Food Association (VFA) or the "floor prices" announced by government.

Rice exporting in Vietnam presents not only a purely economic issue, but also political and food security issues. Therefore, in specific periods, the government has had particular policies on rice exports. Below are the core elements of trade policy for rice export (Son, 2011):

Table 3. Summary of trade policy for rice export

Time period	Important elements in the policy
1989 - 1995	<ul style="list-style-type: none"> • From 1989 to 1991, no limitation of export rice • From 1992-95: quotas system applied; rice export quotas allocated to leading SOE (70%) and provincial companies
1996 - 2000	<ul style="list-style-type: none"> • Rice export quotas still remained • SOEs play a predominant role in rice exporting
2001 - 2005	<ul style="list-style-type: none"> • Government removed the export quotas system • All economic entities allowed to engage in rice export • Exporting rice is managed by the Vietnam Food Association (VFA) through rice export registration and minimum export prices
2006 - 2010	<ul style="list-style-type: none"> • Foreign investors can participate in rice trading and distribution • Control of export contract registration • Conditions on rice export enterprises

Source: D.K. Son (2011)

Since 1989, the rice surplus, mainly from MKD, has been exported to world markets. The VFA has recorded that the major export markets for Vietnamese rice are Asia and Africa. The Asian market accounted for 47.5%, with major markets comprising the Philippines, Indonesia, Malaysia, Singapore and Taiwan. The African market accounted for 25.5% and South Africa is important market. Middle Eastern markets such as Iraq accounted for 11.5% of total rice exports. Others, such as America, Europe and Australia, are also important markets for

Vietnamese rice. Figure 5 illustrates the average rate of rice exported to all continents in the world as recorded from 1989-2005.

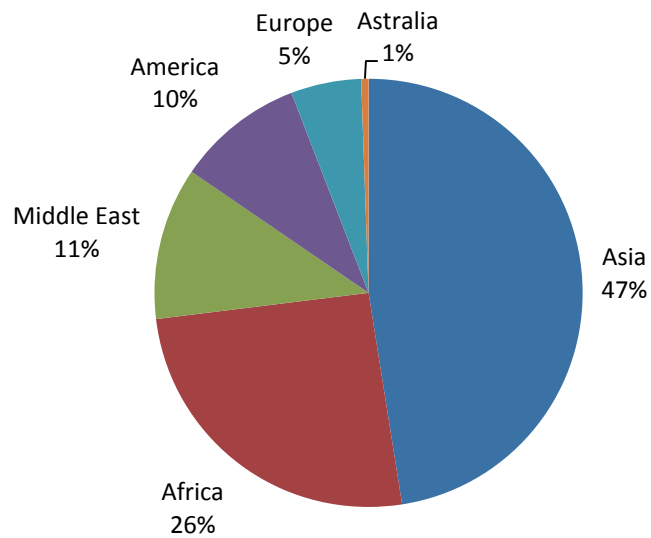


Figure 5. Average rate of rice exported to the continents for 17 years (1989-2005)

Source: VFA (2012)

Table 4 shows the volume of rice exports, the value of rice exports, the value of rice exports as percentage of total agricultural exports and growth rates from 1995 to 2012. In 2012, Vietnam exported its highest volume of 7.71 million tons of rice. There has been a significant increasing growth rate in export rice of 9.45% in volume per annum. A similar increase has been seen in the value of rice exports, by 14.9%, and the value of total agricultural exports, by 13.7% per annum.

Table 4. Trends in rice exported and rice export values

Year	Rice exports (million tons)	Value rice exports (million US\$)	Total agricultural exports (million US\$)	Value of rice as % of total agricultural exports
1995	2.05	538.8	2521.1	21.4
1996	3.06	868.4	3068.3	28.3
1997	3.68	891.3	3238.6	27.5
1998	3.79	1005.5	3323.7	30.3
1999	4.56	1009.0	3688.7	27.4
2000	3.39	615.8	4197.5	14.7
2001	3.53	544.1	4413.7	12.3
2002	3.25	608.1	4616.1	13.2
2003	3.92	693.5	5066.9	13.7
2004	4.06	859.2	5972.3	14.4
2005	5.20	1279.3	7452.4	17.2
2006	4.69	1230.0	9008.0	13.7
2007	4.53	1490.0	11204.6	13.3
2008	4.68	2663.0	14218.4	18.7
2009	6.05	2464.0	13071.5	18.9
2010	6.75	2912.0	16460.3	17.7
2011	7.11	3651.0	19112.3	19.1
2012	7.78	3546.0	21200.0	16.7
Annual growth	9.49	14.95	13.76	

Source: VFA (2012); Statistical Office of Can Tho City (2010); GSO (2011)

Vietnam has exported larger volumes of rice, but the values of rice exports are low, due to the fact that Vietnam usually exports at bottom prices. In recent years export prices per metric ton for Vietnam rice have seen some increases, but have often remained lower than those for Thai rice, or the international prices ranging from fifty to one hundred US dollar per metric ton. For example in 2012, export prices per metric ton for Vietnam white rice FOB were US\$ 428 for 5% broken, US\$ 410 for 15% broken, and US\$ 380 for 25% broken, while Thai white rice was US\$ 555 for all three types (5%, 15% and 25% broken), showing that the average export price per metric ton for Vietnam rice was US\$ 150 lower than Thai rice (USDA, 2013). Due to low export prices, exporters also purchased from farmers at extremely low prices. For example, by February 2000, export prices were US\$ 179-186 per metric ton for average white rice, while domestic prices were US\$ 121-129 per metric ton for farm gate paddy rice (16% moisture). And by June 2000, rice export prices ranged from US\$ 136-165 per metric tons, while local white rice prices had dropped to US\$ 71-92 per metric ton, which is below the production cost (Kenneth et al., 2002). These low rice export prices seem to be a direct factor affecting the low income of MKD rice farmers.

Production economics

Table 5 provides specific results per cropping season for the survey sample in the four major rice producing provinces An Giang, Kien Giang, Long An and Soc Trang of the MKD. These provinces feature some of the highest yielding farmers in the region. On average, the production cost is 3,220 VND (or US\$ 0.18) per kilogram of paddy rice, and the gross margin

is 1,380 VND (or US\$ 0.077) per kg of paddy rice. Gross margin for the winter-spring season is highest, accounting for US\$ 634 per ha, while the gross margin for summer–fall is lowest, accounting for US\$ 204/ha. The lower gross margin for summer-fall is due to the low price of outputs, lower yield and high production costs.

Table 5. Cost benefit analysis for different cropping seasons

Cropping season	Total costs (000 VND/ha)	Total costs per kg (000 VND)	Gross return (000 VND/ha)	Gross margin (000 VND/ha)	Gross margin per kg (000 VND)	Gross margin (US\$/ha)
Winter-spring	16,866	3.28	28,276	11,410	1.840	633.89
Summer-fall	15,905	3.42	19,569	3,664	0.570	203.56
Fall-winter	14,042	2.78	25,103	11,061	1.990	614.50
Average (n=224)	15,854	3.22	24,211	8,357	1.380	464.28

Source: Dung (2010).

In terms of sources of the income of rice growers, results from a survey in the MKD by the Institute of Policy and Strategy for Agriculture and Rural Development (IPSARD) reported that in general, the income structure of rice farmers can be classified into four different sources: crop growing (including rice) income, livestock rearing income, non-farm income and other income, of which income from crop growing is the greatest (accounting for 76.8%), while the others contribute only 15.2% (Duong, 2009). The income structure of rice farmers depends on the economic conditions (wealth) of the household; better-off farmers have 78.5% income from crop growing, while for medium-income and poor farmers this figure is 54.4%. For poor farmers, off/non-farm income is important, accounting for 30.4% (Duong, 2009).

The results of the author’s field survey show that the majority of crop growing income is raised from rice cropping as shown in Figure 6. Figure 6 illustrates the major sources of rice farmers income. It shows that the major source of income is rice (accounting for 44%), and non/off-farm activities is the second most important source (34%).

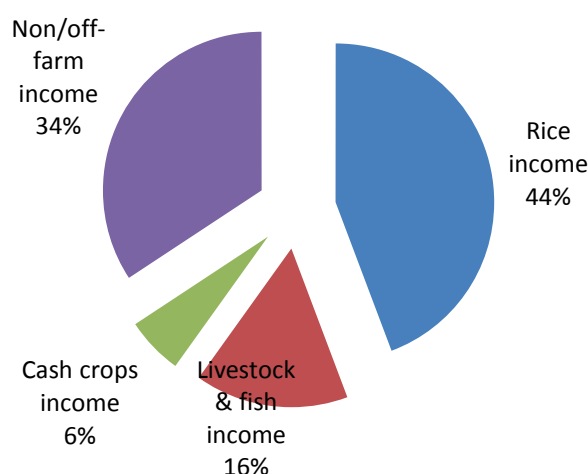


Figure 6. Sources of income of rice farmers in the MKD

Source: Author Farm survey, 2010

Although farm size for rice growing varies among MKD provinces (for example, the average farm size for An Giang is 2.57 ha, Kien Giang 5.84 ha, Long An 0.89 ha and Soc Trang 1.30 ha) most rice growers have small farms ranging from 0.5 ha to 1.0 ha (79%) (Dung, 2010). It is often said that small and medium sized rice farmers sell the majority of their paddy rice, as they need cash for home expenses, after which most of them buy back their rice with a price equivalent to or greater than the price of selling. Therefore, for the majority of small and medium rice farmers, household welfare is more affected by the retail prices of purchased rice than the farm gate price of sold paddy rice, while larger-sized farm growers with commercial production are more affected by farm gate prices (Policy note #2, 2011).

Survey results from the Mekong Delta Development Research Institute (MDI) based on a sample of 117 farmers showed that the MKD farmer with a small rice land holding earns little money from rice and is therefore very dependent upon animal-aquatic income and non/off-farm income. Only larger rice growers can earn a reasonably good livelihood from rice production and sales, although they also earn some income from non-rice sources. Viewing these figures from the perspective of income per capita and comparing them to the new official rural poverty line of VN\$ 400,000 per capita per month, rice farmers in this survey with less than two hectares were earning less than this from rice, although they were generally earning above the poverty line through diversification into non-crop and non-farm activities.

Table 6 presents the aggregate and distinct sources of household incomes by farm size category, which is an important criteria for classification or wealth ranking.

Table 6. Rice farmers' income from different sources

Unit:1000 VND/month/person					
Farm size	Total income per capita	Rice income per capita	Other crop income per capita	Animal and aquatic income per capita	Off/non-farm income per capita
Less 1 ha	849	151	84	82	533
1-2 ha	1165	284	72	359	449
2.1-3 ha	1901	658	26	728	490
> 3 ha	1933	1296	10	88	540
Total	1312	535	56	209	512

Source: ISG-MARD, (2011)

The situation of small farmers, who earn low incomes from rice, has been recognized by the government. This is also the reason why the government continues to seek appropriate solutions to support rice farmers in earning more profitability from rice, in order to ensure that farmers continue to grow rice for the economic benefit of the region and the food security of the nation. Along these lines, the slogan for "linking together the four houses" (Government, Researchers, Entrepreneurs and Farmers) seems to show great promise. Linking between farmers and entrepreneurs may help farmers achieve a stable market for outputs and better prices to ensure profitability. Links between farmers, researchers and entrepreneurs may help farmers and even enterprises to reduce production costs, and increase the quality of rice products by applying new technologies.

3.3 Rice value chain

The study of the rice value chain in the MKD was first reported by Loc and Son (2011). The rice value chain is designed to analyze the entire chain from farm level to the consumer. Figure 7 illustrates the conceptual framework of the entire chain (M4P, 2008; GTZ, 2007). Using such an approach, key actors in the chain and their roles can be described. It is also a major and vital point of this study. Considering the entire rice value chain also helps to identify the strengths and weakness in the chain, for appropriate improvement.

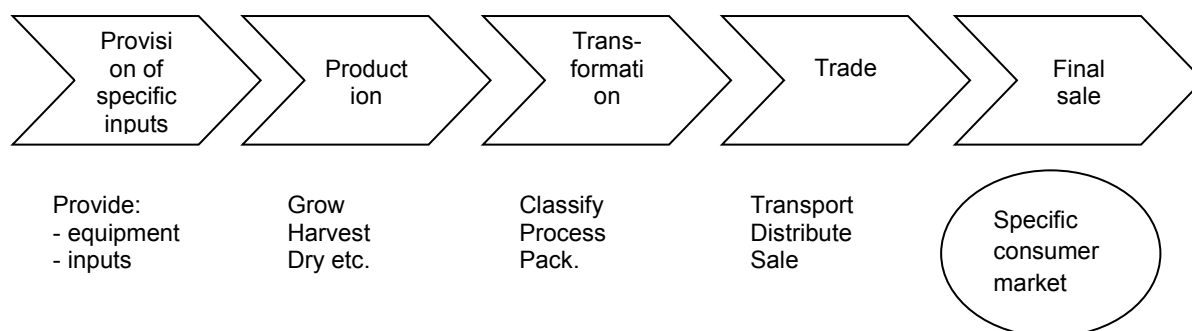


Figure 7. The conceptual value chain
Source: GTZ Value Links (2007)

Actors in rice value chain and their situation in Mekong Delta

Farmer:

The primary actors in the rice value chain are the farmers, who are the key actors in the chain and can be regarded as the backbone of the country. In the MKD there are about 1.46 million rice growing households. Each household has approximately four members, of which two members are mainly laborers. To put this into the perspective of the value chain, farmers can be classified into three groups: small-scale (subsistence farmers), medium-scale (potential farmers) and large-scale (commercial farmers). Small-scale farmers refer to farmers who own less than 1 ha; their production is mainly used for household consumption, with a small amount of surplus sold to recoup production cost (in some cases, farmers sell the majority of their paddy at harvest time, then buy it back later for household consumption). The medium-scale farmers refer to farmers who own 1-2 ha of rice land; their production is also used for household consumption, while surplus is sold for income. The large-scale commercial farmers refer to famers who own larger areas of rice land (more than 2 ha), and mainly produce rice for the export markets.

The majority group in the MKD is the small-scale farmers. Next is the medium group, while large-scale commercial farmers are in the minority. Most farmers are member of the Farmers' Association, some of them join into Farmers' Clubs, production groups or cooperatives. In recent years, a remarkable proportion of medium and large-scale farmers produce has been sold through contract farming and large-scale agribusiness (large field sample model).

Although the use of farm mechanization has developed in the MKD, rice farming still remains highly labor-intensive. Mechanization is mainly practiced for ploughing and

harvesting, while other activities are manual. Recently, combine harvesters have been introduced, but many small-scale farmers can not use them, as their paddy fields are too small to apply such machinery. Direct seeding is a common method. In recent years farmers have applied row-direct seeding using row drum seeders. This tool was also introduced within the "3 reductions - 3 gains" program.

The MKD farmers grow rice professionally, and on average most of them have more than 15 years experience in rice farming. Paddy rice is the product rural farmers perceive as their major asset. Usually farmers utilize paddy rice in four ways: they keep it as seeds for next growing season, use it to pay-off debts (from buying inputs in advance), consume it at home, or sell it.

Farmers often sell their paddy rice immediately after harvesting it and drying it, while some small-scale farmers or poorer farmers have to sell their paddy rice in advance. This means selling "fresh paddy" to get the money in advance, and allowing the buyer to come to harvest it at harvesting time. Most farmers have no storage to store their paddy rice, and cannot wait for better prices to sell, so they often sell at low prices. The government has recognized the challenge faced by farmers in storing and waiting for good prices, and now the government has started providing loans to companies to invest in storage in the villages. This appears to be a type of link between government, entrepreneurs and farmers.

Local collectors/ Assemblers:

The local collector plays an important role in the rice value chain in the MKD. The collector is likely a paddy-paddy trader who directly buys product from farmers and sells it to a miller, wholesale rice market or company. These collectors usually own barns for keeping paddy rice, and their own boat (usually a big boat) for transportation. Local collectors can be in a village or outside a village, they can be a big farmer and/or purely a trader who owns a boat to transport paddy rice to the miller or the wholesale rice market.

Local collectors from outside a village are middle men whose businesses are located nearby the rice producing areas. These local collectors play a significant role in An Giang, Dong Thap and Kien Giang provinces, where the highest paddy production volumes are. They sometimes even provide market information, financial credit and farm inputs to farmers who have limited capital for operating farms during the rice growing season. In turn, farmers promise to sell their paddy rice to the collectors at agreed prices.

Farmer's production group and Cooperatives:

From the perspective of production, farmers' organizations in the MKD can be classified into two types: Farmers' production groups and Cooperatives. Farmers' production groups are formed voluntarily between about twenty five to thirty five farmers in a particular area. The production group is formed with the purposes of cooperation and support among members in terms, for example, of finance, buying inputs, water management, transportation and sharing experiences. Farmers' production groups often gain support or advice from Farmers Associations (FA). The government often supports farmers through the group. Paddy production and marketing is not, however, conducted by farmers' groups, but by individual farmers.

Agricultural cooperatives are the other form of farmers' organization and are legal units. Most agricultural cooperatives in the MKD are small with a single purpose, that of providing benefits in regard to input supplies, and not marketing rice. However, there are a few cooperatives that implement contract farming with farmers, or sign contracts with companies on their behalf to ensure input supplies and outlets for paddy rice for members. The government is now paying more attention to strengthening such cooperatives.

Central Market:

The central markets are both established by government agencies or the business sector, and located particularly in main production areas, usually in the center of provinces. Some companies set up market places as a venue to directly purchase paddy rice from farmers and local collectors. Currently the central market is the most likely place for the temporary storage of paddy rice from different suppliers during each harvesting season.

Millers:

The miller plays two important roles, as a processing unit and marketing unit simultaneously. As the processing unit, the miller mills paddy rice to produce milled rice for packing and selling. As marketing unit, they buy paddy rice from farmers and collectors, then mill it to sell to companies. There are several millers in located in the district, and usually each village has a miller, especially in rice production areas. In the MKD, rice millers are concentrated in Cai Be and Tien Giang, near big wholesale markets or the central market for rice exports.

Brokers:

Recently, when rice marketing has become common at village level, so-called "brokers" have emerged. A broker does not buy paddy rice, but his main function is to build up market connections between farmers and buyers (local collectors, especially collectors outside village) or millers. The broker can earn tips from buyers, and also from farmers.

Wholesalers and Retailers:

These actors play an important role in the distribution channels to consumers in domestic markets. In some cases, big wholesalers are also big millers who fully integrate the processing, and both market milled rice to domestic markets, and supply milled rice for exports.

Domestic consumers:

The MKD produces rice not only to feed the MKD people, but also those in other parts of the country producing little rice. Rice consumption per capita is approximately 135 kg/person/year. The MKD has 17.3 million inhabitants (2011) and will consume 2.33 million tons of rice. It is noted that in many cases, rice farmers are the rice consumers. They produce paddy rice and sell it all to the market. Then, they buy back rice for household consumption at a higher price than that at which they are selling.

Exporters:

Export of rice in Vietnam tends towards a free trade orientation, but the government still controls export contract registrations and conditions applied to rice export enterprises. The VFA plays an important role in exporting it, and functions to manage the country's rice exports. In recent years, foreign investors have become able to participate in rice trading and distribution, while in the private sector, enterprises with adequate conditions may join in rice trading. Major rice exporters in the MKD region include VinaFood II, Agimex Company, Long An Food Company, Vinh Long Food Company, Codo Agricultural Company and Gentraco Company.

Supportive actors:

Apart from the major stakeholders directly involved in the rice value chain, there are other institutions whose roles also impact the chain. The key supportive actors include:

Vietnam Food Association (VFA):

VFA is an organization established in 1998 in order to manage the entire rice export of Vietnam, and to support both state and private rice traders.

Universities/ Institutes:

Cantho University and Cuulong Delta Rice Research Institute are two institutions that play crucial roles in transferring rice technologies and providing new varieties. Those institutions often link with government agencies and enterprises to support farmers in term of providing knowledge and technology. They also come to work directly with farmers.

Role of government:

The Vietnamese government has given top priority to farmers, and also to the rice sector. Various policies have been launched in order to increase production and improve farmers' livelihoods. Those policies, such as "floor price", "3 reductions - 3 gains", etc., have been mentioned in previous chapters. One of the top focuses of central government and also the MKD province authorities is "linking together the four houses". This linkage is thought to support the rice value chain, making it more effective in management and economic terms.

Value-adding to the rice chain

Figure 8 illustrates the rice value chain map in MKD, showing the many actors involved in the chain of rice exporting. Each actor plays a significant role in adding value to the product, in terms of both monetary and non-monetary value. Based on research results published by Loc and Son (2011), value-adding to the rice value chain in MKD can be summarized in Table 7. The sale price for rice that each actor receives depends on the costs and marketing margins at different levels.

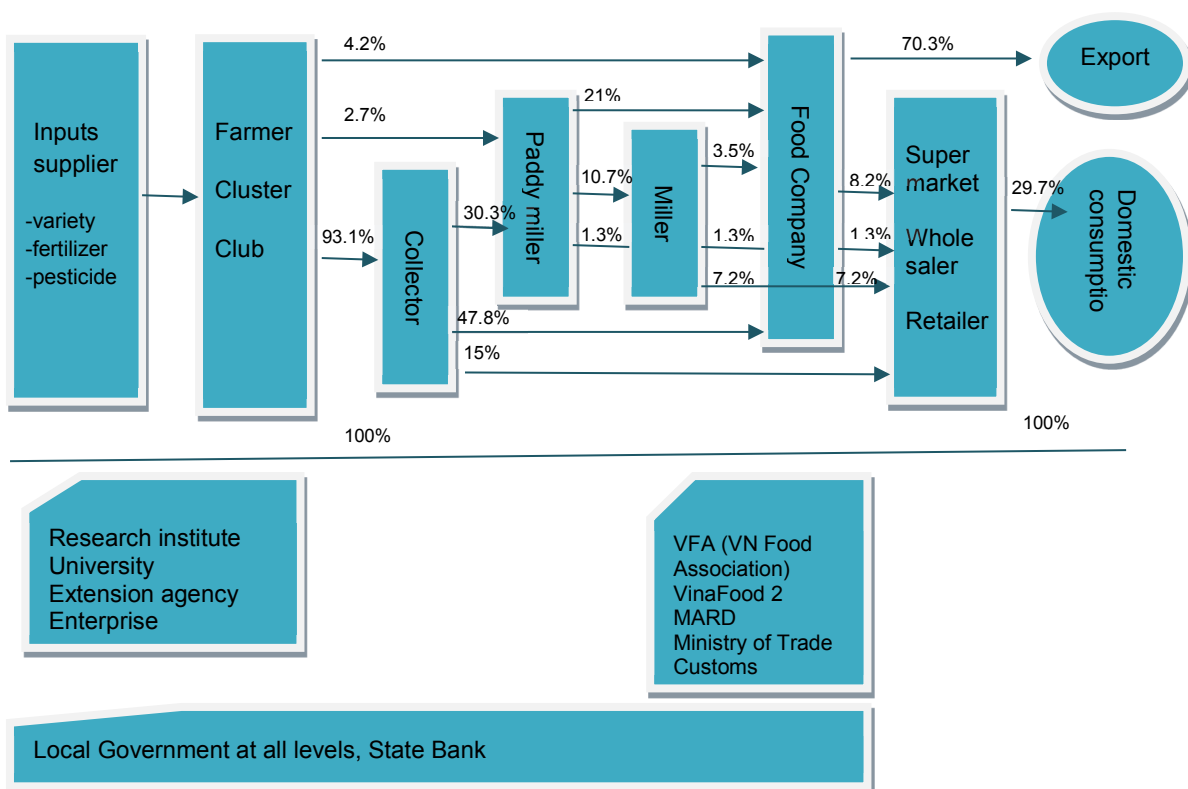


Figure 8. Rice value chain map in the MKD 2010

Source: Loc and Son(2011).

Profit (marketing margin) is equal to the difference between the sale price of a product and total production costs (including the cost of product purchased and cost-added). Table 7 shows actors' sale prices, total production costs, value-added and percentage of value-added.

According to Table 7, actors in the rice value chain are categorized into six groups: farmers, collectors, paddy millers, millers (rice polishers), wholesalers and retailers. The exporter is not included here due to data not being available. The farmer, as producer, uses many inputs to produce rice. Total costs consist of purchasing costs (of seed, fertilizer, pesticide) and value-added costs (wages, depreciation costs, transport costs, brokerage, irrigation and interest). As analyzed in Table 7, the total gross margin is VND 1,478 for export rice value chain and VND 2,111 for domestic rice value chain. The higher different margin for domestic rice value chain is due to variations in the retailer actor. The actors who gain the highest margin in the domestic rice value chain are the wholesaler (VND 727) and the retailer (VND 632), with the farmer ranking third (VND 540). So, if a farmer sells directly to a company, they can obtain a higher margin.

Table 7. Value-adding to the rice value chain (Unit: VND per kg of rice)

	Farmer	Collector	Paddy miller	Miller	Wholesaler	Retailer	Total
Domestic rice value chain							
Received price	5,212	5,530	6,100	6,943	8,822	9,454	
Purchased cost	1,982	5,212	5,530	6,100	6,943	6,943	
Value-added cost	2,690	279	447	793	1,152	1,879	
Total costs	4,672	5,491	5,977	6,893	8,095	8,822	
Unit margin	540	39	123	50	727	632	2,111
% unit margin	25.6	1.9	5.8	2.4	34.4	29.9	100
Export rice value chain							
Received price	5,212	6,700	6,163	6,943	8,142		
Purchased cost	1,982	5,212	5,530	6,100	6,581		
Value-added cost	2,690	1,208	447	793	1,139		
Total costs	4,672	6,420	5,977	6,893	7,720		
Unit margin	540	280	186	50	422		1,478
% unit margin	36.5	18.9	12.3	3.4	28.9		100

Source: Loc and Son (2011)

Table 8 presents the margin analysis of the rice value chain in the MKD, in which actors are divided into seven groups: farmers, collectors, paddy millers, millers, transporters, wholesalers and retailers. The total cost, received price, unit margin, average quantity per actor per year, and per actor margin are estimated for both the domestic rice value chain and the export rice value chain. According to Table 8, in both domestic and export rice value chains, the per actor margin for farmer is lowest, while the wholesaler has the highest margin in the chain (US\$ 52,900 per year). In the export rice value chain, the miller earns the highest margin (US\$ 225,500 per year).

Table 8. Margin analysis of rice value chain in the MKD 2010

Actor	Total cost (VND/kg)	Received price (VND/kg)	Unit margin (VND/kg)	Ave. quantity per/actor/yr (tons)	Per actor margin (mill. VND)	Per actor margin (\$'000/yr)
Domestic rice value chain						
Farmer	4,672	5,212	540	8.4	4.5	0.3
Collector	5,491	5,530	39	1,700	66.3	4.0
Paddy miller	5,977	6,100	123	4,948	608.6	36.9
Miller	6,893	6,943	50	1,300	65.0	3.9
Transport carrier	240	120	120	3,528	423.4	25.6
Wholesaler	8,095	8,822	727	1,200	872.4	52.9
Retailer	8,822	9,454	632	240	151.7	9.2
Export rice value chain						
Farmer	4,672	5,212	540	8.4	4.5	0.3
Collector	6,420	6,700	280	1,700	476.0	28.8
Paddy miller	5,977	6,163	186	4,948	920.3	55.8
Miller	6,893	6,943	50	74,400	3,720.0	225.5
Transport carrier	150	121	29	8,550	248.0	15.0
Exporter	7,720	8,142	422	100,000	42,200.0	2,557.5

Source: Loc and Son (2011)

Considering the current official poverty line (income VND 400,000 (# US\$ 240) per month, on a per capita basis), these rice farmers may earn an annual profit of US\$ 300, putting them in close proximity to the official poverty line. It is considered that MKD farmers appear not to be major beneficiaries from export rice. As showed in the chain, profits from rice are gained by other actors. There is therefore a need to improve the chain, in order to improve profits for rice growers.

4. The practice of "Linking together the four houses": A case study in An Giang province, Vietnam

4.1 History of "linking together the four houses"

"Linking together the four houses" (Government - Researcher - Entrepreneur - Farmer) in An Giang is approaching maturity. In its early stage, "linking together the four houses" was a general term, like a political slogan. Since 2000 this linkage became a practical strategy or policy for agricultural development in An Giang province. In order to implement this "linking the four houses", contract farming has been instrumental in providing farmers access to supply chains with market and price stability, as well as technical assistance. For example, resource-poor farmers, production input and farm investment on credit are often provided by enterprises. In return, contractors expect delivery of goods in specified quantities and of specified quality, and at set prices. This contract farming has overcome the difficulties faced by farmers of unstable markets and prices. The links between the four houses are associated with contract farming and contract farming has been a measure by which to implement the links, as has been documented in several reports and plans of An Giang province (An Giang DARD, 2004). "Linking together the four houses" has gone through several periods. Table 9 shows a timeline analysis as a historical record of links between the actors related to rice production in An Giang. An Giang province is considered as a foundation of this term of linking the four houses.

Over time, through the policy of linking the four houses, the authorities in An Giang have been coordinating and linking with government agencies, scientists and enterprises to support farmers, and the province has gained significant success. In these links, the government is used as a backbone and facilitator, and plays as a 'bandmaster' (in musical terms) or 'referee' (in sports terms) (N.M. Nhi, 2004). Presently, the policy of linking together the four houses is the major policy under consideration not only by An Giang province, but also by all MKD provinces in respect of supporting rice farmers.

The "Linking together the four houses" policy has been extended to other provinces not only in the MKD, but also in central and South-east Vietnam, and as a solution for sustainable development in different commodities. Recently, linking the four houses has been implemented in Vinh Phuc, Phu Tho in the North (rice commodity); Quang Nam, Phu Yen in Central (rice) and Binh Thuan in South-east (green dragon fruit). There is evidence that the "linking the four houses" policy was not successful in the MKD for shrimp farming (Braian, 2010).

Table 9. Timeline analysis for "linking together the four houses" policy.

Time period	Important event	Remarks
1995-2000	An Giang province planned commercial production of rice (shifting from subsistence production to commercial production)	
2000	Term of "Linking together the four houses" initiated by DARD under the project No. 31 (Co-operatives - Linking the four houses)	Mr. Nguyen Minh Nhi is an initiator of the term "Linking together the four houses"
2000	The central government issued the policy on shifting economic structures and consumption of agricultural products (Resolution No. 09/2000/NQ-CP).	
2001	An Giang starts to implement "Linking together the four houses" policy	"Linking together the four houses" policy included in Plan 2001-2005 of the province
2001	Contract farming applied for the first time through cooperatives, farmer's production groups and large-scale farms with enterprises	30,000 ha of rice under contract
2002	Central Government issued Decision No.80/2002/QĐ-TTg - promoting contract farming - linking the four houses	
2003	Promoting the development of co-operatives as a measure to achieve "linking the four houses"	Mr. N.M. Nhi - Chairman of PC An Giang
2003 onward	All MKD provinces implement the "linking the four houses" policy	
2005	"Linking the four houses" implemented for Basa-catfish in An Giang	

Source: PRA survey, 2010; DARD, 2004.

4.2 Basic information from the household survey

Household survey was conducted in 2010 at An Giang province, as part of the Cantho University Project funded by the Ministry of Education and Training. The purpose of this survey was to learn farmers' situations and the "linking the four houses" in rice production and consumption. Over 300 rice farmers were interviewed using a formatted questionnaire.

Sample Households' characteristics

Table 10 presents sample households' characteristics in An Giang province. On average, the family size among rice farmers is 4.4 persons (2.4 adults) per household. Each household, on average, has 2 persons participating in rice farming. Rice farmers in An Giang gain much experience in growing rice as they have been farming for 20 years. They become professional rice-growers, and this becomes the way for them to earn their livelihood.

Most farmers have available budget to invest in their rice farm, but some lack budget during the growing season (27%). This limitation affects farm operation and yields.

On average, a household with 1 ha of rice earns about 34.8 million VND per year, while income from other sources is about 23.6 million VND. Earnings from rice are relatively high because in this case farmers engage in commercial rice growing.

Table 10. Household characteristics

Variable	Value	STDEV
No. of family member	4.4	1.34
Average age	45	11.35
Experience in rice farming (yr)	20	9.56
Labor per HH participating in growing rice	2	1.17
Budget available for rice growing (million VND per crop)	14.04	7.08
Percentage HH lack capital for rice farming (%)	27	12.07
Income from rice per HH per year (million VND)	34.8	22.6
Income from other sources per yr (million VND)	23.6	32.97

Source: Author's survey, 2010

Farming situation of sample households

As showing in Table 11, the average farm size for rice farmers is 2.22 ha. All land is used for rice growing. Most farmers grow 3 crops per year. Cropping seasons are winter-spring rice, summer-fall rice and fall-winter rice. Winter-spring rice is often started in November - December and harvested in February - March. Summer-fall rice crop starts during April - May and is harvested in July-August, while the fall-winter crop begins soon after harvesting the summer-fall rice. Rice yields for winter-spring season are higher than the other two seasons; winter-spring season produces 7.26 ton per ha, while the others produce 5.58 ton per ha. Winter-spring rice is the main crop, with good harvests and commercial quality.

Farmers in this province grow diverse varieties; more than 10 varieties were found at the time of the survey. They include: OM4218, OM2517, IR50404, Jasmine, OM6976, OM2514, OM1490, OM5451 and OMCS2000. The diversity of rice variety growing has caused some disadvantages in terms of quality and markets for specific products. It is often said that farmers select a variety to grow without paying attention to market needs. Thus, sometimes farmers have difficulty selling, due to their small quantities.

Table 11. Farming characteristics of sample households

Variable	Value	STDEV
Average rice land per household (ha)	2.22	1.31
No. of growing season	2.54	0.49
No. of variety used	10	
Yield of winter-spring rice	5.58	0.71
Yield of summer-fall rice	5.58	0.54
Yield of fall-winter rice	7.26	0.71
Rice price (VND/kg)	4,800	

Source: Author's survey, 2010

In terms of sources of seed used by farmers, 56.8% of farmers reported that they used seeds from seed companies, and 26.2% of farmers used seed from their own produce. Only 8.5% of farmers used seeds from research institutes or universities (Fig. 9).

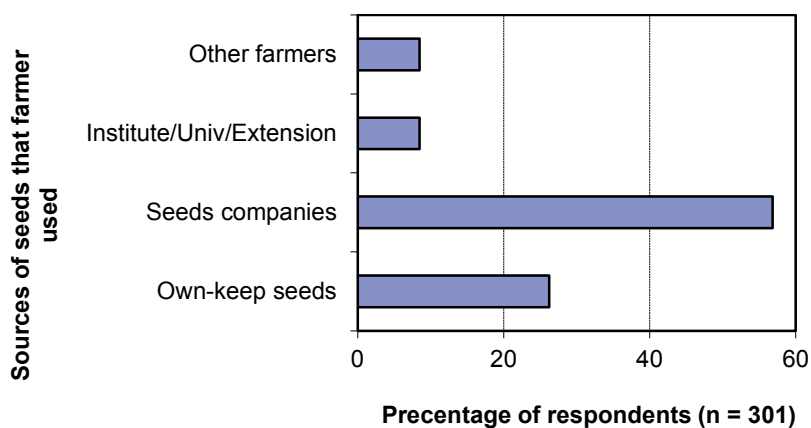


Figure 9. Sources of seeds that farmers used for production

Source: Author' survey, 2010.

For input supplies, farmers have faced unstable and high prices for agro-inputs. According to the results of the survey, about 32% reported facing problems of high input prices, and 28% of farmers faced unstable prices. Resource-poor farmers who lack budget had to purchase inputs with high interest deferred payments (22% of cases). Farmers also reported that they often purchase fertilizer of low quality (false fertilizer) locally. Figure 10 shows farmers' constraints in input supply.

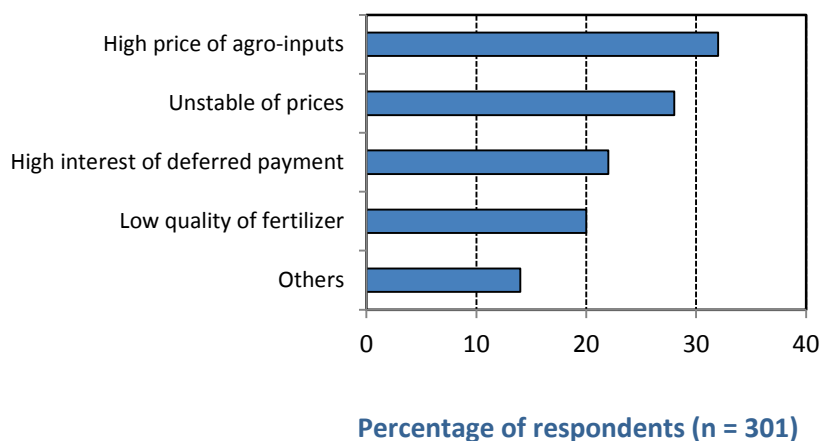


Figure 10. Farmers' constraints in inputs supply

Source: Author' survey, 2010.

For paddy production, most farmers use their own experience in farm operation (51% of farmers). About 40% of farmers reported they make use of technology from extension agencies. A small proportion of farmers said they use technology directly from contract enterprises (Fig. 11).

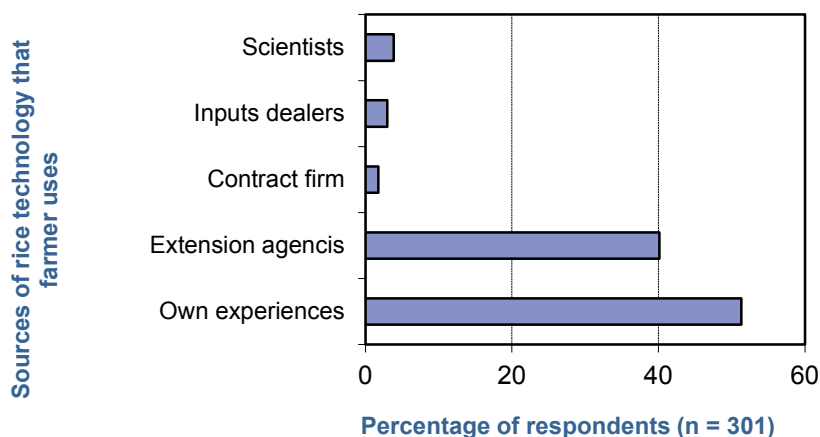


Figure 11. Sources of rice technology used by farmers

Source: Author' survey (2010).

Farmers often sell paddy rice to local collectors and the selling price is usually decided by collectors, sometimes through a local broker, locally called "co". The price that farmers received at the time of the survey was 4,800 VND/kg. When asking about constraints on the selling of rice, about 46% of farmers reported they received low price or forced price by collectors. 21% of farmers said that there were no buyers at all in their village at harvesting time. These may be villages located in remote areas. About 16% of farmers felt collectors exploited farmers, by trying to force prices down to earn more profit (Fig. 12).

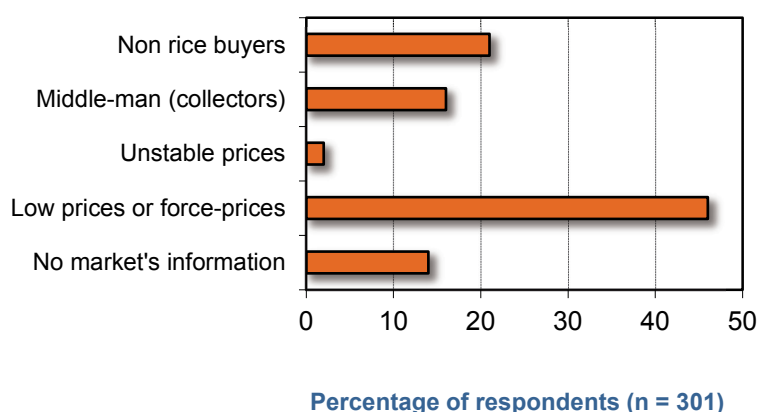


Figure 12. Farmers' constraints in rice selling

Source: Author' survey, 2010.

Table 12 shows total costs, gross returns and margins for three cropping seasons. The summer-fall rice gives lowest margin, accounting for 6.14 million VN\$ per ha, while winter-spring rice gives highest, accounting for 15.19 million VN\$ per ha. The total margin for all three crops accounts for 34.81 million VN\$ per ha, equivalent to earning US\$2,110 per year from rice.

Table 12. Total costs and margins for different growing seasons

Item	Summer-fall (million VN\$/ha)	Fall-winter (million VN\$/ha)	Winter-spring (million VN\$/ha)	Whole year (million VN\$/ha)	Whole year (US\$)
Total cost	19.09	16.76	17.66	53.51	3,243
Gross return	25.23	30.24	32.85	88.32	5,353
Margin	6.14	13.48	15.19	34.81	2,110

Note: 1 US\$ equal to 16,500 VN\$ (2010)

Source: Source: Author' survey, 2010.

4.3 Farmers' attitudes toward "linking together the four houses"

"Linking together the four houses" is a government policy that depends on practicality, with the acceptance of civil duties a prerequisite for its success. The policy is expected to support links between key actors, with rice farmers as a key component. This section presents the results of a survey by the author in 2010. Although the farmers surveyed were not separated into contract and non-contract farmers, it reflects the farmers' perception of the policy.

According to Figure 13, certain linking mechanisms are used by farmers in rice production and commerce. Farmers have links with government and institutions in terms of being the recipients of supporting policy and administration assistance in the villages. It was considered that government, at a local level, should utilize their roles and be more active in supporting farmers in terms of laws and regulations, especially in issues related to production.

Farmers also had links with extension agencies through technology provision. In fact, extension officers at provincial and district levels have supported farmers by training, advising on the production of new rice varieties, pest control, and applying '3 reductions - 3 gains' - a new technique in rice cultivation.

Farmers had links with input dealers in regard to input supplies. Small-scale farmers who lack budget to purchase inputs may get inputs in advance on condition of deferred payment. The farmers perceive, input dealers as important partners, since they provide fertilizer and pesticides, and sometimes they also advise farmers how to use specific pesticides.

Local collectors/ traders are the most important partners for farmers, and they have formed links. Most of farmers sell their paddy rice to collectors. Farmers also receive information about markets and prices from collectors, not from other actors. Sometimes farmers borrow money from collectors at the start of the cropping season. In some cases farmers also sell "fresh paddy" to collectors, who come to harvest it at harvesting time.

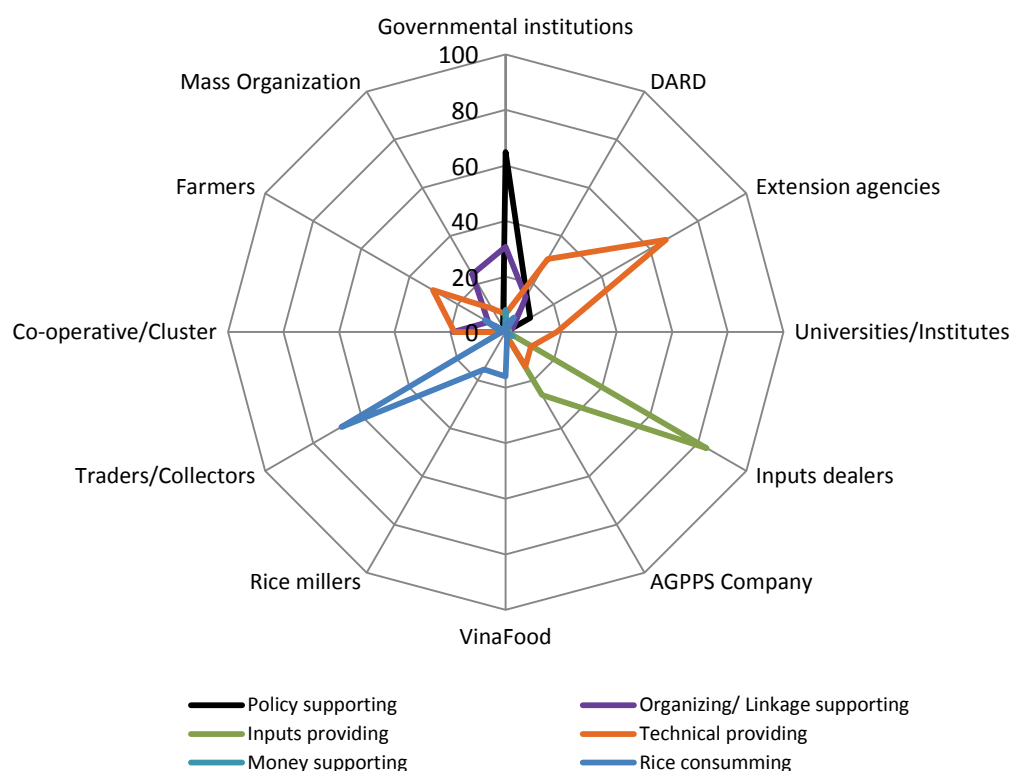


Figure 13. Links between Farmers and other actors

Source: Author' survey, 2010.

Figure 14 presents farmers' perception of the benefits of the "linking the 4 houses" policy. About 38% of farmers reported that the "linking the 4 houses" policy ensured markets for them, or that they were hopeful it would do so. Farmers believe that the policy supports them in solving the problem of low prices and unstable rice markets. About 33% of the 301 respondents claimed that this policy ensured their household income. Once the markets for rice improve, their income will rise. Some farmers thought this linkage policy motivates farmers to improve production as well as quality, while some said the policy was not implemented well in their locality.

In general, the "linking the 4 houses" policy has brought some benefits to farmers, especially rice farmers. However, this success is still at a low level.

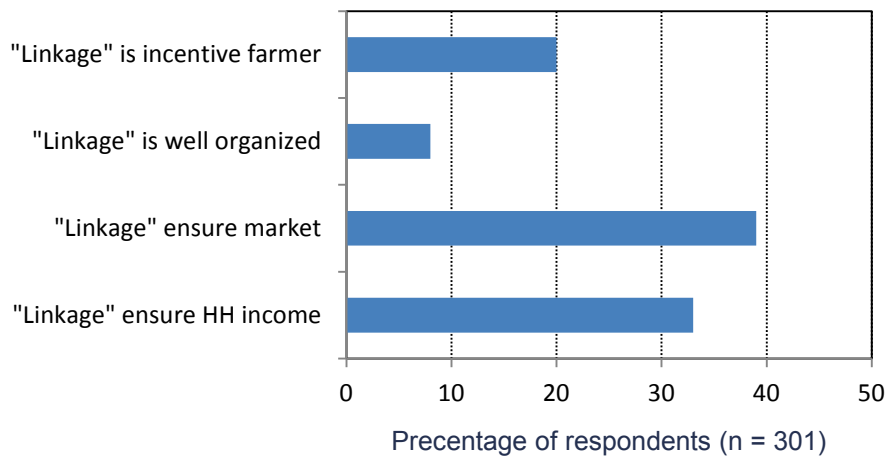


Figure 14. Farmers' perception of benefits from "linking the 4 houses"

Source: Author' survey, 2010.

4.4 Effectiveness of contract farming: Two successful cases of KITOKU and APPS firms

In An Giang, contract farming has been promoted by the provincial People Committee since the 2000s. In the beginning, the contract system led to better incomes and ensured market outlets for farmers' commercial products. However, relations between farmers and enterprises worsened over time and many farmers or enterprises gave up such contracts, leaving farmers once again faced with unstable markets and prices after harvesting their rice. Some studies in the 2000s reported that most contract farming schemes had failed, and/or that some successes were not sustained (M4P, 2005; Khiem, 2005; Nhan, 2012). There are four major reasons for the lack of support for contract farming in An Giang in the past (Khiem, 2005; Nhan, 2012). First, the weakness of institutions or regulations in enforcing the contract. Limitations in farmers' knowledge about laws, or lack of support from government leads to contract infringement. Secondly, the unstableness of prices of agricultural products in the markets led to both sides - farmers and enterprises - breaking the contract. When prices go up, farmers do not need the firms, and when prices go down, the firms do not need farmers (Khiem, 2005). Thirdly, profitability from the contract is not sufficiently "attractive" to both farmer and firm. The price offered by the firm is usually low, and requests by the firm regarding quality cause too much inconvenience for the farmer to continue the contract. Fourthly, the pressure of markets on both farmer and firm is not strong enough to make them actively pursue the contract. Results from the rice value chain show that about 93% of paddy production is sold to collectors, while only 4.2% is sold to firms (Loc and Son, 2011). This means that farmers can easily sell their paddy rice to others, while at the same time, firms can easily buy paddy rice from others.

In this context, this section presents two successful cases of contract farming: ANGIMEX-KITOKU and An Giang Plant Protection Joint Stock Company (APPS), in order to discuss their reasons for success.

ANGIMEX-KITOKU

ANGIMEX-KITOKU firm was established in 1991 as the joint stock of Angimex of An Giang province and KITOKU of Japan. ANGIMEX-KITOKU is a firm who has maintained good links among "3 houses" {Government - Farmer - Enterprise} (DARD, 2012). This company began contracts with individual farmers to produce Japonica rice in 1996. Early contracts failed, however. The contract system to produce Japonica rice was continued since the "linking the four houses" policy, and with the support of provincial Farmers' Associations (FA) and the Agricultural Extension Center (AEC). The provincial FA helps to form farmer production groups and signs the contract with KITOKU, while AEC assists farmers in learning methods for growing Japonica rice.

Approximately 4 Japonica rice varieties are grown under contracts with farmers, they include Hananomai, Kinu, Akitakomachi and Koshihikari. Japonica rice is only grown in the winter-spring season. The area of contracted farms is increasing from year to year. In 2002, there were only 460 ha under contract, but by 2012 this increased to 5000 ha. The average yield of Japonica rice is 6 ton/ha. Companies often purchase contract rice at a high price, for example double the price compared to normal rice. This makes it attractive for farmers to join the contract farming program, and they earn better income.

According to Table 13, contract farmers growing Japonica can earn approximately 30.26 million VND per ha, while non-contract farmers growing long grain rice earn just half that of contract farmers.

Table 13. Total costs and margins for different varieties of Japonica and long grain rice in winter - spring.

Item	Japonica rice (Contract farm)	Long grain rice (Non-contract)
Total cost (million VN\$/ha)	19.542	16.007
Average yield (ton/ha)	6	7
Selling price (VN\$/kg)	8,300	4,800
Gross return (million VN\$/ha)	49.8	33.6
Margin (million VN\$/ha)	30.26	17.59

Source: DARD, 2013

The factors in the success of KITOKU's contract farming can be summarized as follows:

- The contract farming implemented by KITOKU seems different from other enterprises, with very strong intervention and promotion by the government under the 4-house policy. At the beginning, the FA and provincial AEC officers from two government agencies had an active role in coordination and extension.
- Contract farming of a specific rice variety (Japonica rice in this case) seems to offer more advantages. Monopolistic conditions, in particular those for Japonica rice, have been favorable in contract farming (Glover 1992).
- The profitability from contracts is "attractive" both to farmers and to firms. The price offered by the firm is usually higher (often double the price compared to normal rice), and the quality requirements included in the contract by the firm do not cause any

constraints to farmer. In addition, the firm often gives a bonus to farmers when they do a good job.

- It seems to be that the needs, and proactive attitude, of the firm (the firm's willingness to contract with farmer) are also important factors in sustaining the contract system, at least in this case.

An Giang Plant Protection Joint Stock Company (APPS)

The An Giang Plant Protection Joint Stock Company (APPS) is one of the firms leading the implementation of the "linking together the 4 houses" policy (DARD, 2012; AGPPS, 2012). Basically, this company provides the service of selling pesticides, but builds links with government agencies, researchers from institutes and universities to assist farmers in gaining knowledge and skills for management of the paddy field. In recent years, this company has started contract farming with farmers to produce some specific high quality rice for export, mainly Jasmine and aromatic rice.

In order to link with farmers, this company has initiated a program entitled "Working in the field with farmers", as a means of approaching farmers for business. The "Working in the field with farmers" is performed by "Farmers' Friends" (FF) who come to work together with farmers. The program started in 1996 with 12 technicians (FF), and in 2012 had increased to 844 FFs. These FFs are active and enthusiastic in working to assist farmers in rice growing.

In 2010, AGPPS signed a 1200 ha rice contract with farmers in Vinh Binh, An Giang. The company has expanded the contract system with farmers to follow the "linking the 4 houses" policy, under the "large-scale sample field" model strategy.

Table 14 presents the total costs, yield, margins and production costs per kg for different growing seasons in 2011 and 2012 based on the records of demonstration contract farmers. According to the results, contract farmers can earn higher profits from rice during all three seasons, compared to non-contract farmers growing normal rice. Non-contract farms receive a margin of 15.19 million VN\$ for winter-spring crop (Table 10), while contracted farms earn double that margin.

Although profits from contracts may attract farmers to participate in the contract system, contract farming is not suited to every farmer, and not every firm can succeed. Given the market competition, contract farming needs specific products or monopoly products in order to be successful (Sonsak, et al., 2008).

Table 14. Total costs and margins for different growing seasons in 2011 and 2012.

Item	winter-spring (2011)	summer- fall(2011)	fall-winter (2011)	winter-spring (2012)
Total cost (million VN\$/ha)	18.135	17.424	19.139	21.529
Average yield (ton/ha)	8.02	6.02	6.00	7.56
Selling price (VN\$/kg)	6,336	6,330	7,468	6,733
Gross return (million VN\$/ha)	51.397	38.102	47.102	50.903
Margin (million VN\$/ha)	33.178	20.678	25.562	31.159
Production cost (VN\$/kg)	2,263	2,901	3,197	2,840

Source: AGPPS, 2013

The factors in the AGPPS case being successful can be summarized as follows:

- AGPPS is a provincial enterprise with strong intervention and promotion by the provincial People Committee through the "linking the 4-house" policy, under the "large-scale sample field" model program. This company has good links with government agencies (e.g. FA and DARD through AEC) that support coordination with and extension to farmers.
- AGPPS has good links with scientists from research institutions (e.g. Cuu Long Rice Research Institute, Cantho University, AnGiang University) that help provide technical assistance to farmers.
- Contract farming of specific rice (in this case, Jasmine rice and aromatic rice) seems to be more advantageous, as AGPPS has an export market for this rice.
- The profitability from contracts is "attractive" to both contracted farmers and to firms. AGPPS has a group of FF who are young, active and enthusiastic, and who assist farmers to implement the contract.

It appears that AGPPS make use of and exploits the rice value chain, since in the chain profits for intermediates (dealers, paddy milling factories, polishing factories) are so huge, and AGPPS has invested in this. Figure 15 shows the AGPPS strategy towards contract farming.

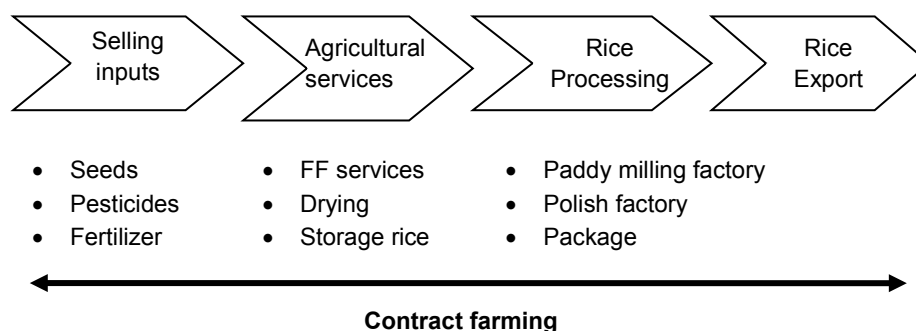


Figure 15. AGPPS strategy towards contract farming

Source: Author based on AGPPS strategy 2012.

4.5 Opportunities for farmers to approach new agricultural technology in contract farming, and the contributions of “linking 4 houses” to rural development

Farmers under contract for Japonica rice with Angimex KITOKU, and farmers participating in the "3 reduction 3 gains" program, the "one must - 5 reductions" and the "large-scale sample field" model program learned new knowledge directly from enterprises, extension agencies, and sometimes scientists from universities and institutes.

The "working in the field with farmers" program led by AGPPS helps farmers gain management skills from the farm, and control insects and diseases in rice. AGPPS has a weekly TV program "Bridge to Farmers" that links with scientists to disseminate new

technology in agriculture, especially rice. Contract farmers who grow Japonica rice learnt more about new rice varieties and methods for cultivation. Besides this, contract farming helps farmers change their attitudes and develop their knowledge.

The "linking together the 4 houses" policy is not a perfect policy. It has been successful in some cases, but not all. However, there is evidence that this policy has made significant progress in rural areas. Through this policy, resources have been mobilized. Scientists and entrepreneurs have had opportunities to contribute to rural development. Economies in rural areas have increased, and farmers' living conditions have improved, especially farmers who have contracts with KITOKU and AGPPS. The "linking together the 4 houses" policy has been a key element in the development plan of most MKD provinces.

The forming of new farmers' organizations and the reinforcing of farmers' production groups, as well as the co-operatives during the early stages of the "linking together the 4 houses" policy, resulted in some increases in development knowledge and decision-making ability among farmers. In addition, the involvement of FAs and other mass organizations have strengthened networks among rural people.

5. Response to consumers: Lesson learnt from Chiba prefecture, Japan

In Japan, rice marketing systems have a long history of heavy protection by the government. . As a consequence of this protection policy, domestic prices increased to almost four times the world market price for rice (Fujiki, 1998; Breisinger et al., 2003; Moody, 2012). It is true that rice production and consumption in Japan is completely different to that of Asian developing countries, particular Vietnam. Therefore, this paper doesn't intend to make any comparisons between Japan and Vietnam regarding policies and marketing systems for rice in general. Instead the author tries to pick up lessons learnt through field visits in Chiba prefecture, focusing on agricultural production and contract farming.

5.1 Agricultural production and marketing in Chiba prefecture

Interviews in Chiba Prefecture were conducted on 29 July, 2013. Chiba has a mild climate with fertile soil, and is one of the major agricultural prefectures of Japan. The value of agricultural output from Chiba was 421.6 billion ¥ in 2008, which ranked 3rd nationwide. Chiba produces several agricultural products in significant volumes, such as Japanese radishes, pears, white rice and flower. Chiba is located very close to Tokyo - the biggest consumer of the regions - therefore it has an advantage in marketing all its products. Vegetables, particularly, such as Japanese mustard spinach and spinach have been successfully produced and marketed. Table 15 shows the output value of the main agricultural products of Chiba in 2008 (www.pref.chiba.lg.jp, 2013).

Table 15. Output value of main agricultural products in Chiba in 2008

Items	Output value (billion ¥)	Ranking in Japan
Rice	77.4	8 th
Vegetables	165.2	2 nd
Tubers and roots	22.8	3 rd
Flowers	19.1	3 rd
Raw milk	24.0	3 rd
Pork	36.7	4 th
Hen eggs	31.7	2 nd

Source: Chiba Prefecture Statistics, 2008 (after www.pref.chiba.lg.jp)

Rice production in Chiba ranks 8th nationwide and ranks 9th among prefectures, accounting for 3.8% of the total production of Japan (APSPD, 2013). According to the Agricultural Production and Sales Promotion Division (APSPD) of Chiba Prefecture, the total area for rice cultivation was 63,600 ha (ranks 9th largest among prefectures, accounting for 3.6% of the total rice cultivation area in the whole country), and rice production was 349,000 tons (ranks 10th largest, 3.6% share). The main rice variety grown in Chiba is Koshihikari, with a harvest season during mid-August, a month earlier than the Kanto region harvest season during mid-September. This is one of the reasons why it is relatively easy for farmers in Chiba to find outlets. Figure 16 summarizes a case study on rice prices (in 2000) in Chiba Prefecture that demonstrates different prices within the value chain.

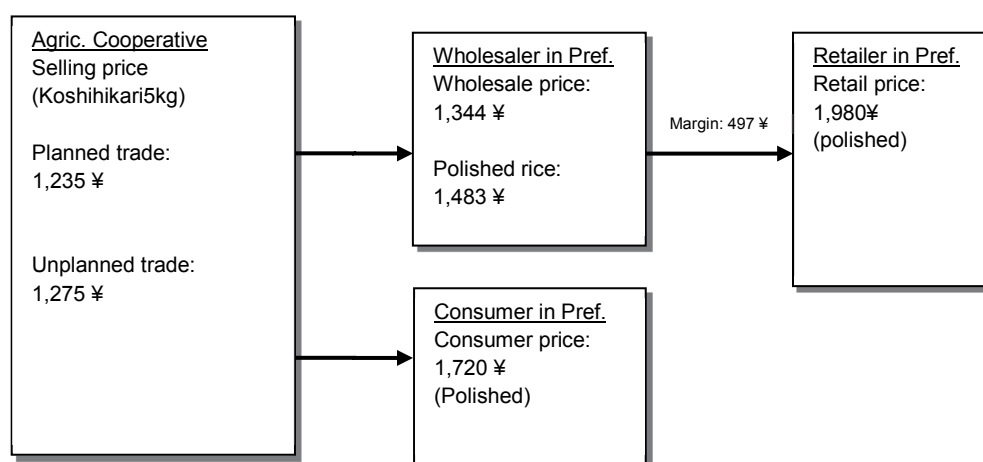


Figure 16. Rice price within the value chain (case study in 2000)

Source: Author's interview at APSPD (29 July, 2013).

In the period 1991-2000, rice production in Chiba did not keep up with demand. In fact, rice produced in Chiba is sold not only within the prefecture but also to other prefectures. In turn, Chiba's consumers buy rice not only produced in Chiba but also produced in other prefectures. So the gap in supply and demand is not a problem. Figure 17 shows rice production and distribution channels in Chiba prefecture.

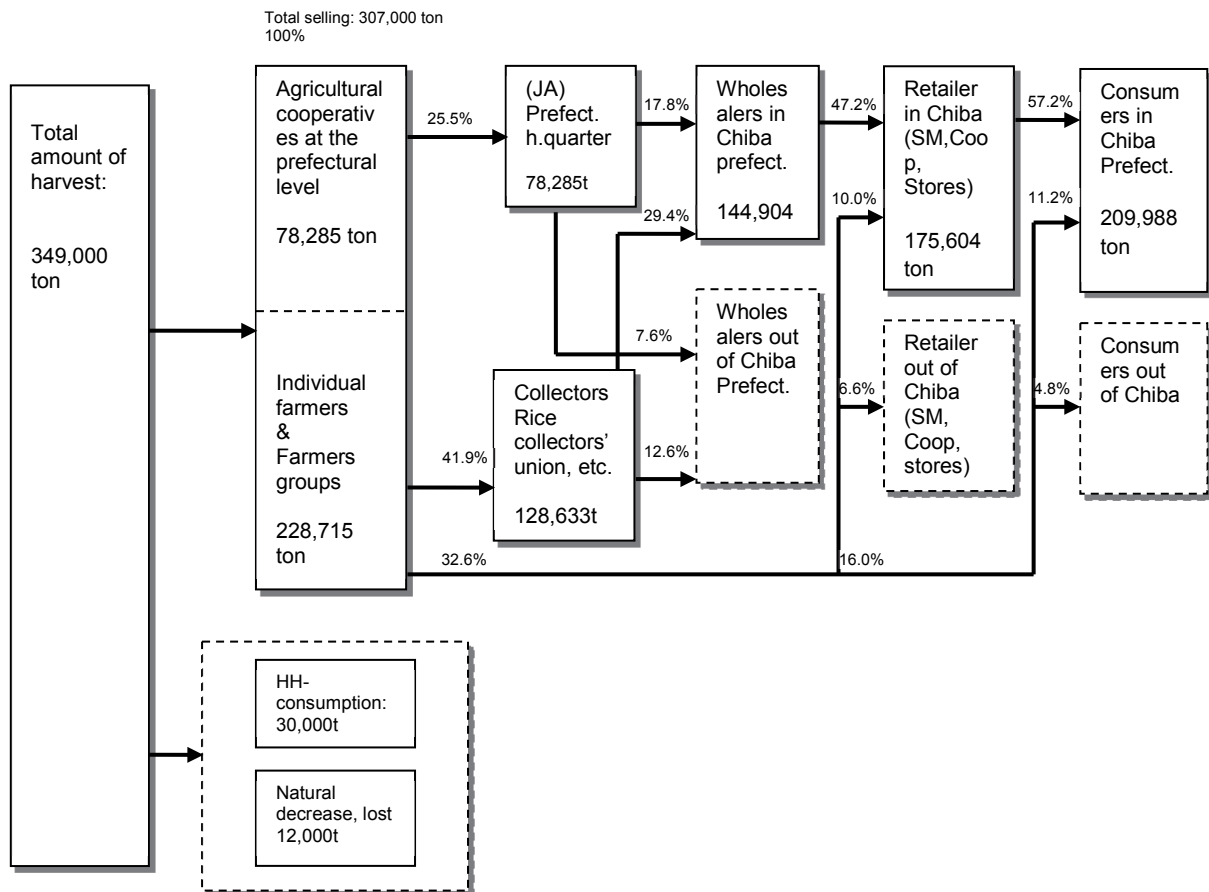


Figure 17. Rice value chain map in Chiba prefecture

Source: Author's interview survey at APSPD (29 July 2013)

5.2 Roles of the government in regard to rice farmers

For the rice sector, the Japanese government has provided subsidies through a number of different government programs. The most direct subsidy program called the "Japanese rice farming income stabilization program", and was implemented in 1998 (Moody, 2013). The income stabilization program or compensation policy allows for rice farmers to earn a compensation payment equal to the difference of domestic rice prices and a predetermined standard, should the market price fall.

Like other prefectures, the Chiba governor has provided compensation payments to rice farmers in order to support farmers in continuing to grow rice. According to this policy, the prefecture sets a target production amount. Farmers who meet the target receive compensation from the government. In Chiba, only 2% of rice farmers participate in this prefectural program. The reason that not many farmers join the program is because they want to produce as much rice as they want; farmers can easily sell their products, due to the harvest season in Chiba being earlier than in the Kanto region. In addition, rice is not an important source of income, as family members earn more income from non-farm works.

Chiba Prefecture literature from 2009 indicated four structural reforms in the agricultural sector. First, marketing innovation, as economic development has brought changes in the means of food consumption. Formerly, foodstuffs were prepared at home, but there is now a trend towards the simplification of food preparation and consumption of "processed food" or "ready meals". The traditional agricultural marketing system comprised the chain:

farmers→cooperatives→wholesale market→retailers→consumers. In this traditional marketing system, cooperatives and the wholesale market were the key actors. As consumers' demand become diverse and complicated, the roles of each business must be defined. Therefore, it becomes important to develop a system that provides "direct selling" and "contract farming" in order to satisfy each specific demand of businesses and producers. Second, the establishment of a Hub-organization to link between diversified producers and diversified demands. Third, land consolidation based on the indigenous community system; while most farmers are small scale, this may cause constraints in meeting business needs. Fourth, the establishment of a food supply system that can adapt to a global environment.

As the economy changes, agricultural cooperatives (JA Tomisato) also change their function. Before, JA focused on shipping their products to the wholesale market following the national policy of JA. JA Tomisato has now shifted to a position of corresponding to the various demands of consumers, supporting the development of direct selling and contract farming with specifications (Pref.Chiba, 2009).

The Prefecture has supported firms, parties and even farmers to develop and promote innovation. Support usually takes the form of budget for construction of infrastructure, budget for technical research, and also training and learning new technologies.

An interview survey at APSPD in 2013 showed that within the prefecture, APSPD plays a crucial role. APSPD has to implement central government policies in regard to planning, providing agricultural services to farmers, and sales promotion. The points mentioned below are a summary of planning by APSPD for 2013-2014, as reported by Mr. Ishi IE, Chief of APSPD (Survey, 2013).

Development of distribution systems:

- Enhancing sales abilities of wholesale market
- Development of distribution systems that can add value to products
- Development of various sales channels through organizing business meetings
- Expansion of sales channel for wood produced in Chiba

Support for production that matches consumer demands:

- Establishing local trademark brands
- Developing products which are original to Chiba
- Support for producers/producers organizations that try to process and sell their own products
- Support for development of new products by producers, through producers' own methods of production, processing and sales
- Support for activities that promote business use of agro-products

Expansion of export:

- Support for producers/organizations by efforts to export their products
- Improving methods of export
- Sales promotion to expands export, for example, by organizing Chiba Fair in Thailand (holding a seminar about export of agro-products)

5.3 Lessons learnt from Aeon Agri Create Firm

A field visit to Aeon Agri Create was carried out on 14 August 2013. Aeon Agri Create is a subsidiary of the supermarket chain operator Aeon Co. The Aeon Agri Create was established in 2009. Aeon Agri Create has a total of 45 ha on six sites around Tokyo, including, Kashiwa (site visited), Hidaka and Ushiku in Ibaraki prefecture. The company mainly produces vegetables, and products are sold through Aeon's sales network, with low quality products used in ready-made meals and sold at Aeon outlets. Although the company was just established a few years ago, the firm has shown some successes and great promise, according to Mr. Yasuaki Fukunaga, president of Aeon Agri Create. Lessons learnt and potential applications of such a model can be summarized below.

- The company produces vegetables, and its engagement in all processes, from growing to processing, then retailing on its own, makes it highly profitable.
- The company constantly studies consumers' demands and responds to them. This in turn attracts more consumers, making their products easy to sell. Aeon Agri Create plans products that are used in the processing of "ready-made meals", or "eating out".
- Aeon enterprise started contract farming 25 years ago. The firm only contracts with farmers to produce specific products that Aeon outlets can sell, and does not contract every product.
- The firm buys all the products produced by contracted farmers, even though some products do not satisfy the quality requirements in the contract. This builds incentives and trust with farmers, and is one of the key factors for Aeon's success in contract farming.
- When contracting with farmers, Aeon also monitors carefully to ensure the quality of products. The company will also test quality to ensure the safety of goods for consumers. Testing quality of products is also a way of marketing, strengthening their trademark, and convincing consumers.
- Aeon Agri Create also has a contract with Tokyo University for technical assistance, worth 30 million yen per year. Workers at Aeon Agri Create can improve their knowledge and skills through this contract.
- Aeon has supported producers through financial services that build links between the firm and farmers. As part of this, Aeon provides a "Sunday Agrish Card" to farmers to help solve the issue of a lack of producers. Unlike normal credit cards, the card has no monthly payment, but allows farmers to purchase the materials they need when needed, and provides some leeway when it come to financing (Author's interview at Aeon (14 August 2013)).

6. Conclusions and Recommendations

This section summarizes the lessons for “linking 4 houses” successfully drawing from literature reviews, case studies and the author's observations. The major conclusions and recommendations can be summarized as follows:

- a. The "linking together the 4 houses" policy brought some success in its early stages, but at a low level and not to all farmers. The most successful implementations of this policy have mobilized all social resources (government, scientists, entrepreneurs, farmers) to solve the problem of marketing.
- b. When implementing the "linking together the 4 houses" policy, at the initial stage it is necessary that all key actors should have a clear understanding of the concept and roles they play in the link. The "linking together the 4 houses" as a slogan is untenable, as farmers do not fully understand the concept, expecting government to give help, while not being active in production and marketing.
- c. Universities or research institutes are public sector and they have a role to play in technological and institutional development. The government should plan incentives they can manage, and provide regular and effective training and advice within these links, with the support of firms and local officials.
- d. The "Linking together the 4 houses" policy is followed by contract farming. Contract farming is only successful for specific products (e.g. Japanese rice contracted by KITOKU, Jasmine rice contracted by AGPPS, etc.). In the MKD, local governments expect contract farming to expand to all rice products for marketing; this would be risky for firms and does not work. Contract farming only works well when it benefits all parties (farmers and firms), and the products are actually needed by enterprises.
- e. As for the role of government, it should support the building of local brands for promising agricultural products. This is a basic step towards marketing and contract farming (as in the case of Chiba prefecture).
- f. Lessons learnt from Chiba' JA Tomisato show the change in function of cooperatives, corresponding to the diversifying demands of consumers, towards supporting the development of direct selling and contract farming of specific products.
- g. It appears that contract farming may be sustained and promise of high profits if firms engage in the entire process, from growing to processing and marketing (as in the cases of AGPPS for rice and Aeon for vegetables).
- h. In contract farming, at the initial stage, it is important that both contractors and farmers have a clear understanding of the agreements, and that both sides respect each other to follow the contract. It is also necessary to have government agencies such as FAs, extension officers etc., to help farmers not only with technical assistance but also laws, rules, etc.
- i. Commitment from local officials is a key element of success in implementing linkage policies or contract farming. There should be a non-financial incentive system to encourage officials' involvement.
- j. Price stabilization can help diminish income risk; however, ‘floor prices’ and subsidized finance for companies to buy up additional paddy or rice are not

effective as these policies are applied in an ad hoc and non-transparent manner. Instead, governments should support the application of new technologies to reduce production costs, which may in turn benefit farmers.

- k. The government should intensify its efforts in implementing the "linking together the 4 houses" - partnerships with researchers, the private sector, and farmer organizations - to promote the adoption of more efficient and environmentally sustainable rice production. This may require further investment in infrastructure, support research, development of rice technologies, and some direct subsidies for farmers when they follow the program.
- l. As the success of the "linking the 4 houses" policy and also contract farming are influenced by specific environments, and in particular the settings in which they are implemented, it will be necessary to establish a specific project to evaluate this policy and FC in the MKD, employing thorough scientific analysis. Prior studies have been limited to general views and perceptual analysis, and many issues have not been addressed so far. These need to be studied carefully, therefore, to make an exhaustive assessment of the various implications of "linking the 4 houses" policy and contract farming, and ensure that this policy is a practical, powerful tool for agricultural and rural development.

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