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Small-Scale Field Survey on Rice Economy in Can Tho Province of Mekong River Delta

Mitsuo Nishiya
Nippon Giken Inc.

1. Salient Feature of Mekong River Delta and Can Tho Province

1.1. General

The total land area of Viet Nam is about 329,000 sq.km. The land is administratively divided into 61 provinces and geographically grouped into eight regions. Mekong River Delta region occupies approximately 40,000 sq.km or 12 % of the national land. The total area of Can Tho province in Mekong River Delta region is about 3,000 sq.km or 0.9 % of the country. The total population of the region is about 16.6 million or 22 % of the country. The population density is 420 per sq.km, which is much higher than the national average.

Regarding economic production, Mekong River Delta region contributes about 27 % of GDP of Viet Nam. The region is very advanced in agriculture production. The regional agriculture production is 47 % of the national agriculture production. Further, the region contributes 50 % of the national rice production and 60 % of the national fruit production.

There are administratively one city and six districts in Can Tho province. Under those units, 94 administrative units, such as commune, town and village, has been established. Then, there are 704 small units like hamlet in total. The total population of the province was about 1,930,000 with the population density of 651 person/sq.km in the year of 1997. The ratio of the rural population to the total was 80.2 %. The population growth rate is 1.84 %.

1.2. Agriculture

Mekong River Delta region plays an important role in agriculture sector of Viet Nam. The vast flood plain of the Mekong River is subjected to intensive land use in production. About 56.1 % of Mekong River Delta region is used for agricultural production, which is very high, compared to the national average of 19.3 %. In Can Tho province the share of an agricultural land is as high as 71.7 %. Another rice production area, Red River Delta region shows high percentage of the agricultural land of more than 50 %.

Table 1 Structure of All Kinds of Land in Rural Area

(Unit: %)

Item	Viet Nam	Mekong Delta	Can Tho Province	Red River Delta
Total	100.0	100.0	100.0	100.0
Inhabitant Land	2.2	3.1	3.1	8.3
Agricultural Land	19.3	56.1	71.7	53.9
Forestry Land	36.7	8.9	3.1	5.1
Water Surface for Aquaculture	1.0	4.3	0.2	4.3
Special Used Land	3.7	7.8	12.8	15.1
Unused Land	37.1	19.7	9.2	13.3

Source: Agricultural and Rural Census in 1994

From a viewpoint of population by economic industry, the farming household is dominant in the country and Mekong River Delta, whose shares are 80.5 % and 72.4 %, respectively. The share of fishery households and commercial households is relatively higher than other regions.

In 1994, the population ratio of cooperative households and groups is only 11.5 % in Mekong River Delta, which is much lower than the national average of 57.5 %. The ratio of private households and hired farming households are 68.8 % and 16.0 %, respectively. The ratio of farm labor is triple of the country. On the contrary, 94.1 % of the population in Red River Delta is classified into the cooperative households and groups.

Table 2 Structure of Population in Rural Area by Economic Industry and Type of Household

(Unit: %)

Item	Viet Nam	Mekong Delta	Red River Delta
By Economic Industry			
Farming Households	80.5	72.4	91.3
Forestry Households	0.2	0.2	0.0
Fishery Households	2.2	2.4	0.3
Industrial Households	1.4	1.0	2.1
Construction Households	0.3	0.2	0.1
Commercial Households	3.2	4.5	1.1
Service Households	1.2	1.3	0.8
Others	11.2	18.0	4.3
By Type of Household			
Cooperative Households and Groups *	57.5	11.5	94.1
Private Households	30.6	68.8	1.1
Hired Farming Households	5.5	16.0	0.1
Others	6.4	3.7	4.7

Source: Agricultural and Rural Census in 1994

Note *: Members of cooperatives registered under the new cooperative law and other groups.

The paddy, a most important crop in Viet Nam, is produced for domestic consumption as well as export for foreign countries. Mekong River Delta region is the most important area in terms of the paddy production. The cropped area and production of paddy in the region contribute more than half of the country. The yield rate of paddy is about 4 ton/ha in both of national and regional average.

The double or triple copping of paddy in a year is commonly practiced in Mekong River Delta region. In 1998, the cropped area of the first crop from December to March, the second

crop from April to July, and the third crop from August to November are 1,349,000 ha, 1,776,000 ha and 638,000 ha, respectively.

Table 3 Paddy Production in the Year of 1998 (estimate)

Item	Unit	Viet Nam	Mekong Delta	Can Tho Province	Red River Delta
Cropped Area of Paddy	'000 ha	7,362	3,760	430	1,046
Yield of Paddy	ton/ha	3.96	4.07	4.37	5.13
Production of Paddy	'000ton	29,142	15,300	1,894	5,365
Cropped Area by Season					
Spring Paddy	'000 ha	2,783	1,349	167	515
Autumn Paddy	'000 ha	2,140	1,776	165	-
Winter Paddy	'000 ha	2,438	638	100	531

Source: General Statistic Office

The mechanization in agriculture is relatively advanced in Mekong River Delta. Especially, numbers per 100 households of diesel engine, pump and transport boat are much higher than national average. About 10 % of household have a pump for irrigation in farm land, and more than 3 % of households have a boat for passenger and freight in Mekong River Delta region. However, rice mill and thresher are not so popularized in Mekong River Delta in the country. In Red River Delta, the mechanization on farming is in slow progress for some reasons.

Table 4 Main Machines Per 100 Households in Rural Area

(Unit: nos/100 households)

Item	Viet Nam	Mekong Delta	Red River Delta
Large Tractor	0.24	0.47	0.08
Small Tractor	0.63	1.04	0.44
Electric Engine	0.76	0.33	1.42
Diesel Engine	2.89	10.55	0.67
Electric Motor	0.91	0.27	0.02
Pump	4.49	9.98	0.87
Rice Mill	0.89	0.35	0.89
Thresher	0.82	1.04	0.97
Feeding Processing Machine	0.13	0.05	0.15
Fish Boat	0.60	0.62	0.18
Transport Boat	0.82	3.20	0.15

Source: Agricultural and Rural Census in 1994

1.3. Agricultural and Rural Development in Can Tho Province

The total area of the paddy field is 170,000 ha in Can Tho province. Besides, there are 40,000 ha of orchard and 24,000 ha of sugarcane field in the province. The production of paddy in the province is 1,918,000 ton in 1998, which is larger than 1997 by 200,000 ton. The export of rice is done by three SOEs and two state farms. The export amount of rice from Can Tho province was about 0.5 million ton in 1998, out of 3.8 million ton from the country.

The geographic area of paddy field has gradually decreased in Can Tho province in 1990's.

However, the cropping intensity has constantly increased. Triple cropping has started in 1993 and then nearly 40 % of paddy field area is used for the triple cropping in 1996. In parallel single cropping field practically disappeared in these years.

The common cropping pattern in the area is triple cropping of paddy which is acceptable and profitable for the many farmers. The cropped area of paddy was 167,000 ha for the first crop, 165,000 ha for the second crop, and more than 100,000 ha for the third crop in 1998. From the viewpoint of soil fertility and plant protection, however, such dense cropping is not recommendable. The middle development option of the 2010 master plan of agricultural and rural development in Can Tho province says the paddy field area will continuously decrease and the cropping intensity will not increase up to the target year of 2010.

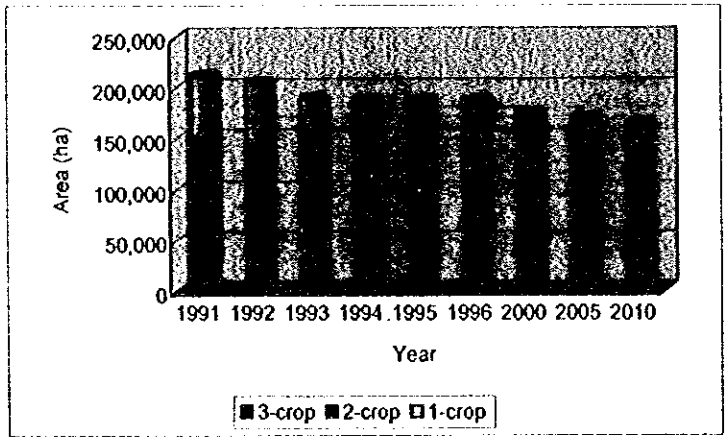

Figure 1 Paddy Field Area in Can Tho Province by Type of Multiple Cropping (1991-1996/-2010)

The master plan says that the total cropped area of paddy in a year will gradually decrease from the peak of 448,000 ha as of 1998. The annual cropped area of paddy is anticipated being less than 400,000 ha in 2005 and then 378,000 ha in 2010 in case of the middle development option, as shown in the following figure.

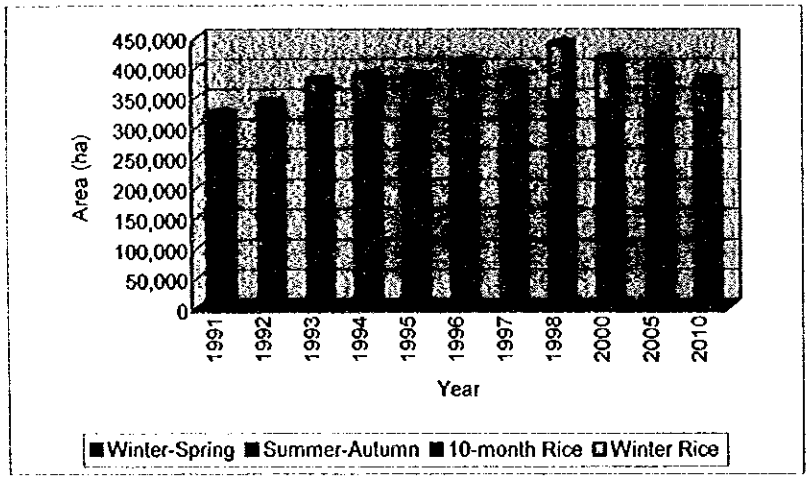

Figure 2 Cropped Area of Paddy in Can Tho Province by Season (1991-1998/-2010)

The yield rate of paddy is expected to increase from the present level of 4.4 ton/ha in annual average. The said middle option of the Can Tho master plan sets the yield rate of paddy is more than 5.0 ton/ha in 2005 and 5.3 ton/ha in 2010.

As a result of that the cropped area will decrease but yield rate will be increase for next 10 years, the annual production of paddy in Can Tho province is expected to be continuously at about 2 million ton a year which is higher than the present paddy production.

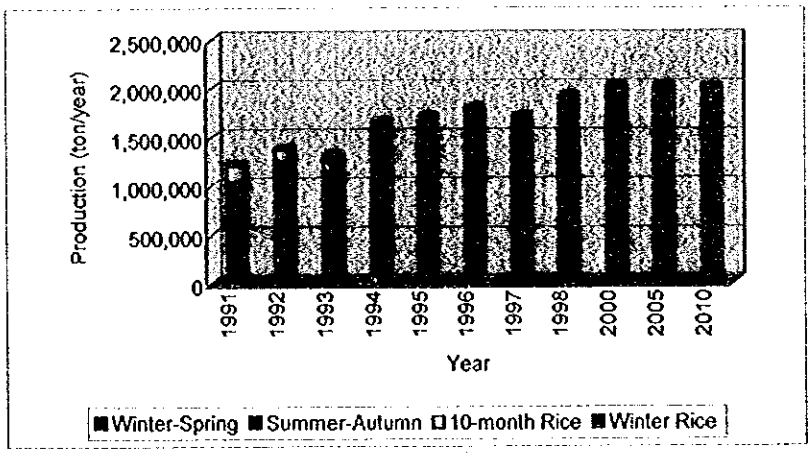

Figure 3 Paddy Production in Can Tho Province by Season (1991-1998/-2010)

In Can Tho province 78 % of population lives in agriculture. The total number of farm households is about 250,000, of which nearly 10 % is landless or petty farmers.

The agriculture and rural development sector is the most important issue and the largest target of the public investment in Can Tho province. The 1999-budget of the provincial government to the sector is about 150 % of 1998. In 1998, the provincial government collected land tax of VND 85 billion and the total tax revenue was about ten times of it. The government used 30 to 38 % of the tax revenue to the agriculture and rural development, while the share of agriculture sector in GDP was almost 50 %.

The priority policies in the agriculture sector are: 1) infrastructure development (irrigation, drainage and flood control; transportation, such as road improvement; and electrification), 2) research and development (development of new varieties; mechanization; and irrigation and drainage), 3) land distribution (poverty alleviation; and equalization of land distribution), and 4) price of agricultural output (stabilization of price of agricultural products; standardization of price of agricultural products; and securement of procurement by SOEs).

Since about 78 % of the people live by agriculture in Can Tho province, the improvement of the farmers is crucial issue. The priority policies in the social development in the rural area are education, public health, family planning and rural industrialization.

The problems in the development of agriculture and rural sector are: 1) lack of farming budget (expansion of financial support is necessary but difficult to improve), 2) lack of investment of the provincial government (all of the agricultural tax revenue is invested to

agriculture sector, but the budget still cover only 40 % of the requirement), 3) varieties of crops and livestock (the higher productivity and better quality of crops and livestock is expected by introduce new varieties), and 4) agricultural cooperative (the activity of the agricultural cooperatives is lower than other countries).

2. Small-Scale Field Survey in Can Tho Province

2.1. Method of Small-Scale Field Survey

The small-scale field survey in Can Tho province was carried out in February and March 1999. The objective of the survey was a preliminary study on the total rice reproduction process in consideration of input supply, cropping, supporting system, processing, marketing, etc.

At first, the discussion meetings were held with People's Committee, Department of Planning and Investment, and Department of Agriculture and Rural Development of Can Tho province. Then, some rural financial institutions and agricultural research institutions, i.e., the provincial branch offices of Viet Nam Bank for Agriculture and Rural Development and Viet Nam Bank for the Poor, Can Tho University, Mekong Delta Farming System Research and Development Institute, and Coo Long River Delta Rice Research Institute.

In the districts, semi-organized interview was conducted at farm households, agricultural cooperatives, rice processors and traders, and state farms, as shown in the following table and figure.

Table 5 Number of Interviewees by Kind and District

	Can Tho	Thot Not	O Mon	Chau Thanh	Phung Hiep	Vi Thanh	Long My	Total
Farmer	-	-	2	2	2	1	-	7
Cooperative	1	1	-	2	1	1	1	7
Processor/ Trader	1	2	-	1	2	-	2	8
State Farm	-	-	2	-	-	-	-	2
Research Institute	2	-	1	-	-	-	-	3

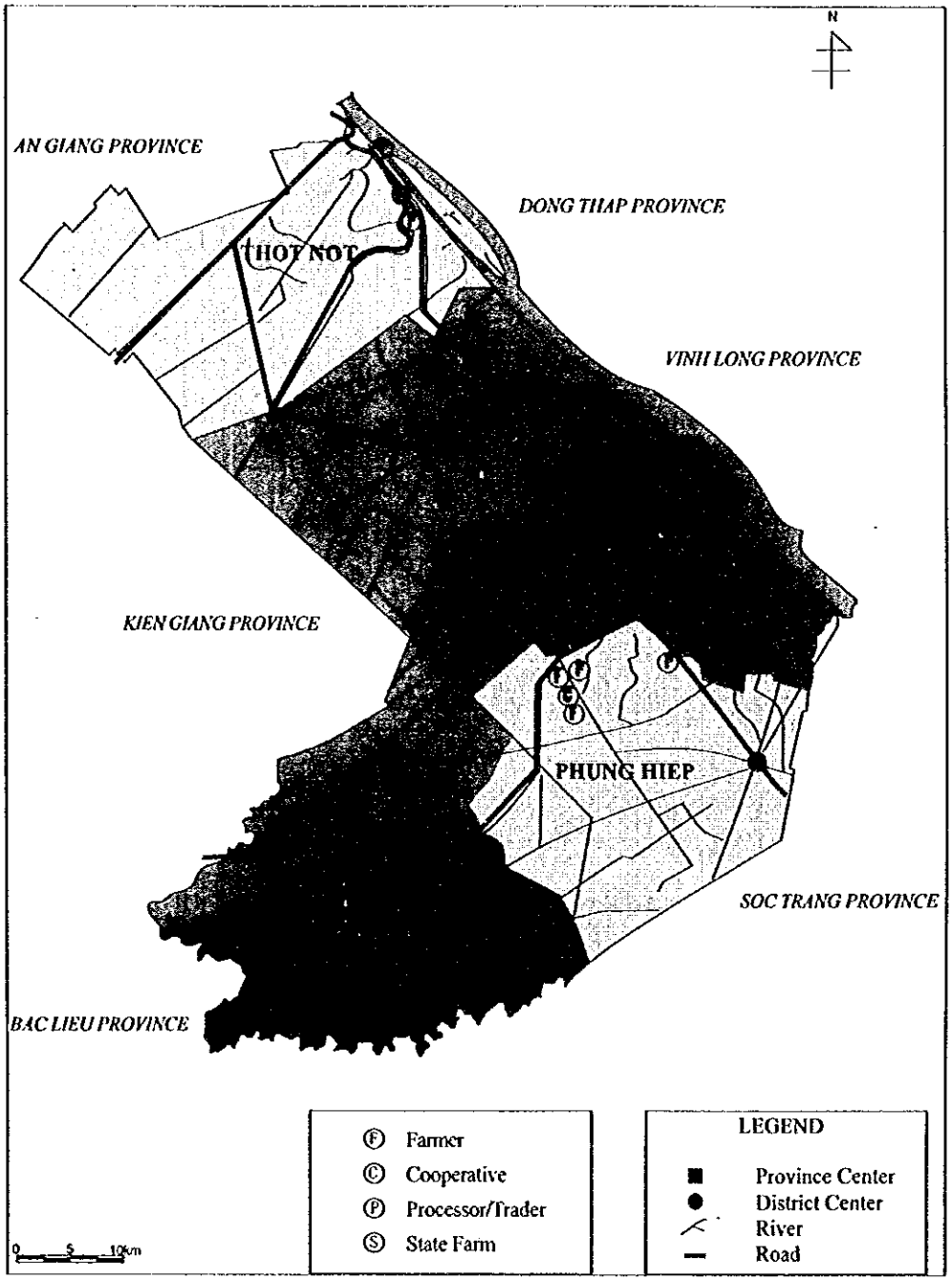

Figure 4 Location Map of the Small-Scale Survey in Can Tho Province

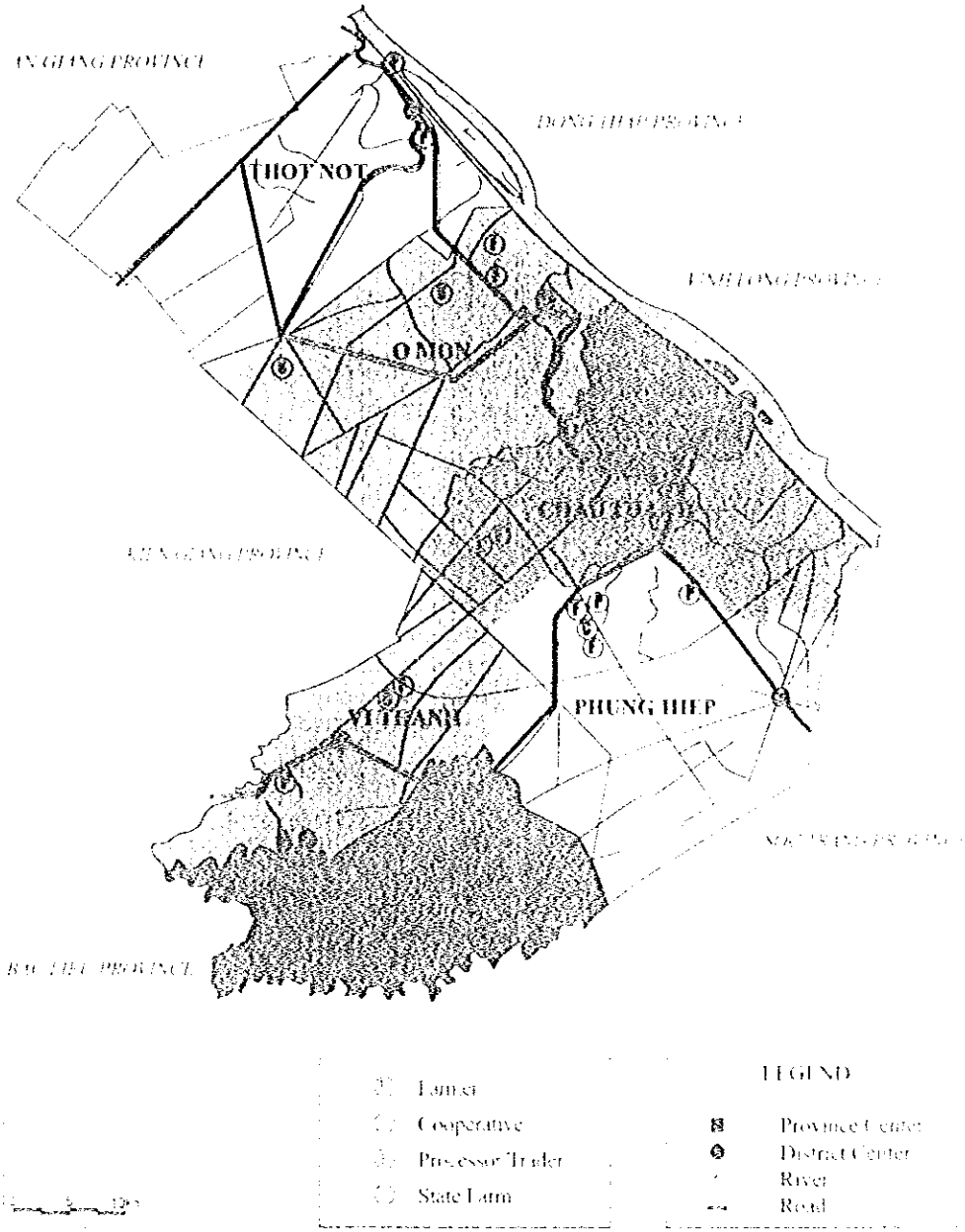

Figure 4 Location Map of the Small-Scale Survey in Can Tho Province

2.2. Results of Small-Scale Field Survey

2.2.1. Land Holding

In April 1988, Viet Nam government changed the land policy to distribute land use right to individual farmers. Under the 1988 Land Law, the distributed farm size in Mekong River Delta was 1.2 ha per household in average. Afterward, the new land law has been enforced since June 1993. The 1993 Land Law allows the farmers to 20-year land possession with five rights of transfer, exchange, lease, inheritance and mortgage. In these movements toward expansion of individual land ownership, the transference of land from small farmers to large farmers and the bipolarization of farmers come out considerably.

The households who have no agricultural land or little land are increasing rapidly in Can Tho province. According to the agricultural and rural census in 1994, the number of landless farm households was 825 in Can Tho province. In 1998, provincial People's Committee announced the number increased to 16,147, which was about 20 times from 1994 (perhaps there is some difference in the definitions as mentioned below). About 5 % of household or 6.5 % of farm household do not have their own land use right and earns by working as farm labor in their neighborhood.

The number of households who have not enough agricultural land to live also increased from 11,538 in 1994 to 22,155 in 1998. More than 10 % of households have to work at off-farm job or as farm labor for additional income source.

Table 6 Farm Households with No Land and Little Land in Can Tho Province

Item	Households no land (nos)	Households no land (%)	Households lack of land (nos)	Households lack of land (%)
1994; General Statistic Office	825	0.44	11,538	6.16
1998; Provincial People's Committee	16,147 (1,957 %)	5.00	22,155 (192 %)	10.40
Increment; 1994 to 1998	15,322		10,617	

Source: Agricultural and Rural Census in 1994; and Provincial People's Committees

There are three types of landless farmers. The first one is the farmers who have not received land certificate. The number of such household is estimated at about 10,000 in the province. Probably the data as of 1994 could exclude this type of landless and little-land farmers.

The second type is the farmers who once held land use right on enough area during the land distribution action but returned the land to its original land owner after the enforcement of the new Land Law. It is said that this type of landless or little-land households amount for about 6,200 in Can Tho province. The government supports those farmers by means of

credit supply to get other jobs instead of farming. For this purpose, Ministry of Labor established the system of Fund for Creating Job under Job Creation Program. The Viet Nam Bank for Agriculture and Rural Development (VBARD) and the Viet Nam Bank for the Poor (VBP) implement this credit service. The interest rate of the credit is very low at 0.1% a month and the repayment period is 3 years at the maximum. The borrowers are first required to submit the business plan, which must be appraised by the VBARD or VBP.

The third type is the farmers who lost their land certificate as a collateral on their loan from institutional or informal moneylender. There are about 2,600 farm households classified in to this type. The VBARD and the VBP have not disposed of the land certificates, which are received from such farmers. The government supports such landless farmers by means of additional loan to be advanced to the farmers for the purpose of return their land certificates. After the evaluation of the reason of the unpaid back by the government, the loan is supplied to the farmers by VBARD and VBP under a condition of low interest rate and 3 to 5-year repayment period.

2.2.2. Farming System

(1) Cropping Pattern

The cropping pattern in paddy fields is very simple like a monoculture of paddy. Double or triple cropping of paddy is common in Can Tho province. Out of total paddy field of 170,000 ha, about 100,000 ha is used for triple cropping of paddy, about 70,000 ha is for double cropping of paddy, and only 6,000 ha is for single cropping of paddy. Other food crops or vegetables are seasonally cultivated in very limited area of paddy field. The typical cropping pattern of paddy fields in Can Tho province is shown below.

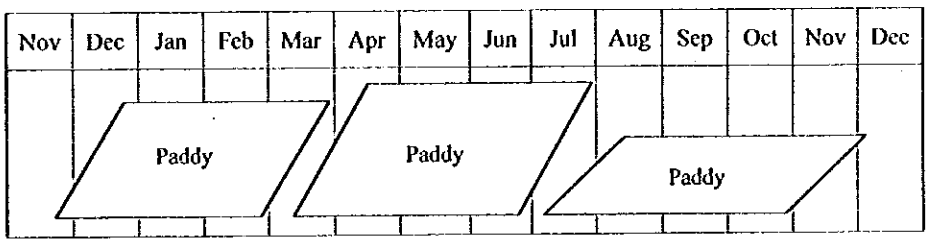

Figure 5 Typical Cropping Pattern of Paddy Field in Can Tho Province

(2) Land preparation

For land preparation, tractor is commonly used in the province. Unlike the Red River Delta region, buffaloes and cattle are not used for land preparation any longer. The 4-wheel or 2-wheel tractors are owned by only rich farmers. They rent tractor to other farmers in neighbor with some rental fee. A plowing is fully practiced in common but land leveling is still not enough.

(3) Seed

A direct sowing of paddy seeds under impounded condition is common, and a transplantation of nursery is very rare in the province. Seed rate of spreading ranges from 100 kg/ha to 300 kg/ha. The experimental data of Mekong Delta Farming System Research & Development Institute shows that the rate of 100 kg/ha obtained the highest yield during the dry season. Drilling method is also in experiment stage. The lack of land leveling is the main constraint in introduction of such sowing method to the farmers.

All of the paddy seeds are produced in the country, except little amount of import from China. The production of the paddy seeds is done by the state farms and the contracted farmers. The private companies do not take part in the seed business because of the low profitability. Most of the farmers buy seeds from the private retailers. High yielding varieties developed in Viet Nam are commonly used by the farmers.

(4) Fertilizer

Chemical fertilizer is commonly applied to the field and the demand to it is increasing year by year. The average application rate of fertilizer is about 165 kg/ha of urea, 90 kg/ha of NPK composite, 100 kg/ha of DAP, etc. in Mekong Delta region[1]. While the production of chemical fertilizer is just started in the country, the domestic production of fertilizer is still very limited. Most of fertilizer is freely imported from foreign countries by the private companies and the private retailers play a main roll in distribution of chemical fertilizer, but the quality management is poor in their trading process. Most of the farmers buy chemical fertilizer at the retail shop near or around the villages.

Organic fertilizer such as manure is seldom used to paddy field in Mekong River Delta region because its supply is very short to the demand.

(5) Agro-chemical

Pesticide is often used in paddy cropping. Fungicide and herbicide are also used but not so often. The agro-chemical is also mainly imported from foreign countries without government control. The agro-chemical is generally supplied to the farmers by the private retailers. The poor quality of the chemicals is a problem in farmers' use.

(6) Irrigation

The irrigated area in Viet Nam has doubled for these 20 years owing to the large investment by the government. In Mekong River Delta region, about 90 % of paddy field are irrigated today. In Can Tho province the irrigation generally means irrigation water supply, field drainage and flood control. Canal network is constructed by the government and installation and operation of pumps are responsible for farmers or agricultural cooperatives. In case of cooperative type irrigation, water users pay irrigation water fee to the cooperatives.

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[1] Rice Market Monitoring and Policy Options Study; IFPRI; 1996.

(7) Harvesting

The harvesting of paddy is completely practiced by hand tools. The harvester is not introduced in the region.

The ear of paddy is threshed on the paddy field soon after harvesting. Most of farmers use thresher. If the farmers borrow the thresher, they pay the rent in cash or in kind. The rental fee is usually about 5 % of threshing amount of paddy.

The threshed paddy is dried under the sun, spread on the plain ground, such as road and home yard. The moisture content after sundry is 14 - 15 %. The lack of flat land and difficulty during the rainy season are problem in drying. For these years, therefore, the small-scale dryers has been equipped in some individual farmers or farmers' groups in Can Tho province.

(8) Labor

In Mekong River Delta region, the labor input to paddy cultivation is much less and the ratio of hired labor in total labor is much higher than in Red River Delta region. The total labor input is about 90 man-day/ha in Mekong River Delta, while 252 man-day/ha in Red River Delta. The ratio of hired labor is 35 % in Mekong River Delta and only 5 % in Red River Delta[2]. These significant differences mainly come from the larger operating farmland and more intensive use of machinery in farming in Mekong River Delta region.

2.2.3. Processing of Rice

There are a number of the rice processing factories with various scales in Can Tho province. As describes later, some state farms and state owned companies (SOEs) also have a function of the large-scale rice processors and traders. In this part, the results of the interview to the eight rice processors are mentioned.

[2] Rice Market Monitoring and Policy Options Study; IFPRI; 1996.

Table 7 Outline of Rice Processors Surveyed

	A	B	C	D	E	F	G	H
District	Thot Not	Thot Not	Can Tho	Chau Thanh	Phung Hiep	Phung Hiep	Long My	Long My
Establishment	1995			1975	1994	1980	1998.8	1999.1
Staff / labor	110/500	2/13	2/20	5/40	2/16	1/5	12/50	2/20
Activities	Processing & trading	Processing & trading/ Processing only	Processing & trading/ Processing only	Processing & trading	Processing & trading	Processing only	Processing & trading	Processing & trading
Facilities	Drier (5 t/hr) Miller (1,000 t/d) Polisher (1,100 t/d) Storage (23,000 t) Boat (3)	Miller (80 t/day) Storage (1,000 t)	Miller (25 t/day) Storage (800 t)	Drier (9 t/10hr) Miller (3 t/hr) Polisher (3 t/hr) Storage (1,800 t)	Miller (2.1 t/hr) Storage (200 t)	Miller (0.8 t/hr) Storage (80 t)	Drier Polisher (2 t/hr) Storage (1,000 t)	Miller (3 t/hr) Storage (500 t)
Processing amount a year	120,000-150,000 t		500 t	> 20,000 t	2,000 t	1,000 t	1,200 t (5 month)	500 t (3 month)
Others	11 investors, 3 branch offices						Collection center of Sohafarm (SOE)	

Rice processor A, a large-scale private rice processor is located in Thot Not district. The company is located at the right bank of the Mekong river at few km from the district center. It was established in Dong Thap district by the 11 individual investors in 1995, and then the present head office cum factory was constructed there in 1997. The company now has three branch offices/factories and a office in Ho Chi Minh city. For the establishment, it used loan form Saigon Industry and Commercial Bank. There are 110 permanent staffs and 500 workers in maximum.

The main activity is processing and trading of rice with an annual handling amount is 120,000 - 150,000 ton of processed rice. The company has intention to export rice directly to foreign countries in future. The main facilities are electric dryers (5 ton/hr), millers (1,000 ton/day), polishers (1,100 ton/day), storage (23,000 ton) and three freight boats, all of which are made in Viet Nam.

The private traders, who are commonly richer farmers, bring paddy to the factories by their small boats in many cases. The paddy was immediately dried if necessary, then milled and polished at the factories. The major destinations of shipping are SOEs, such as Can Tho Food Company. The shipping of processed rice is done under contracts with them by using its own boats or hired boats.

The buying price of paddy is VND 1,700 - 1,800 /kg, and the selling price of polished rice is 2,600 VND/kg of 25 % broken quality to VND 3,100 /kg of 2 % broken quality in this season.

Rice processor B, a small-scale private rice processor is located in Thot Not district. It is located on the riverside with about 1-km from the district center. This family company employs 15 permanent staffs. It facilitates a rice miller (80 ton/hr) and a storage (1,000 ton). It does not use any credit services of the banks.

The company purchases paddy from small regular collectors, as well as provides processing service to other traders. The buying price of paddy is VND 1,600 - 1,700 /kg, the and rice processing fee is VND 55 /kg of paddy. The paddy was collected from Can Tho and other provinces.

The company mostly ships rice to Food Company (SOE) at the rate of VND 2,500 - 2,600 /kg for 25 - 35 % broken quality (for domestic market) and VND 2,700 - 2,800 /kg for 5 % broken quality (for export).

Rice processor C, a small-scale private rice processor is located in Can Tho city. This family company employs about 20 workers by daily wages. It facilitates only a rice miller (25 ton/day).

Paddy is collected and brought to the factory by small traders. The company buys it or only processes it, depend on the market price and available budget. The buying price of paddy is VND 1,600 - 1,700 /kg, and rice processing fee is VND 60 /kg of paddy. It has about 100 regular customers of paddy suppliers, who spread widely with different harvesting time. The transportation cost of paddy is VND 50 /kg in average.

The main destination of the shipping is Mekong Food Company and Can Tho Food Company (SOEs), and its price is VND 2,500 /kg for white rice and VND 2,300 /kg for brown rice. Trucks are used for the shipping of rice. The processing amount of paddy is 500 ton a year, which is equivalent to 350 ton of milled rice. The storage capacity of paddy is 800 ton.

The company uses credit from Saigon Income Bank for procurement of paddy. In addition, the SOEs advance money to the company before buying paddy and the company repay money to the SOEs after processing and shipping. The company also has a contract with Mekong Food Company for the storage of paddy at a rate of VND 10 /kg.

Rice processor D, a small-scale private rice processor is located in Chau Thanh district. It was established in 1975. This family company employs five permanent staffs and maximum 40 workers on daily wages. It facilitates a drier (9 ton), a rice miller (3 ton/hr) and a polisher (3 ton/hr). Its storage capacity is 1,800 ton.

The manager orders the traders to collect paddy on telephone. The paddy is bought at a rate of VND 1,700 /kg.

After milling or polishing, the rice is shipped to the retailers in Can Tho city or the SOEs. The average price of the processed rice is VND 2,630 - 2,640 /kg, and the highest is over VND 3,000 /kg, depend on varieties and moisture content. From the 100 units of paddy,

about 45 units become 5 - 10 broken quality rice for the SOEs, and 55 units become lower quality rice and husk for the local market and processing plants. The amount sold to the SOEs is more than 20,000 ton a year. The trading contract between the SOEs and the company is very short (only few days) on the fixed rate.

Rice processor E, a small-scale private rice processor is located in Phung Hiep district. This family company employs 16 permanent workers on daily wages. It facilitates only a rice miller (2 - 2.2 ton/hr). Its storage capacity is 200 ton. The handling amount was 2,000 ton in 1998.

Some paddy is collected by itself, and the other is collected by the small traders. The custom farmers are located in Can Tho and other provinces. The main destinations of the milled rice are the SOEs and the private rice polishing companies, decided on the price information. The buying price of paddy is determined through negotiation with the farmers and is VND 1,650 /kg in average. The selling price of milled rice is VND 2,500 /kg for the SOEs.

The company uses credit of a monthly interest of 1.2 % from the Asian Bank for the purposes of installation of facilities and buying paddy. The credit from the VBARD is not used because of complexity of the process.

Rice processor F, a small-scale family-operation rice processor is located in Phung Hiep district. This family company established in 1980 employs five workers on daily wages. It facilitates only a rice miller (0.8 ton/hr) working 10 hr a day. Its storage capacity is 80 ton. The company does not use any credit services. The handling amount was 1,000 ton a year.

The company provides the rice milling service to the three regular traders. The milling charge is VND 80 /kg of paddy. After milling, the traders bring white rice to the local retailers and brown rice to the polishing factories.

Rice processor G, a paddy collector cum rice processor of the So Ha Farm is located in Long My district. It is established in August 1998 as the ninth processor of the 11 processors of the farm. Although the chairman is a staff of the So Ha Farm, the company is a autonomous body apart from the farm. The company employs other 11 permanent staffs and maximum 50 workers on daily wages. It facilitates two polishers (2 ton/hr each) and two dryers. Its storage capacity is 1,000 ton and maximum storage period is 1 - 2 months. The handling amount from the establishment was 1,200 ton.

The company buys milled rice from farmers directly or some regular collectors. They bring milled rice to the company to negotiate the price and volume based on its quality and moisture content. The farmers and collectors are responsible to all transportation of rice.

The funds for buying milled rice are usually advanced by the So Ha Farm. As the funds are not sufficient for making company's profit, the company makes efforts to collect cheaper rice from remote areas. All the polished rice at the factory are shipped to the So Ha Farm

by the boats or trucks of the farm, and exported to foreign countries.

The buying price of milled rice is VND 2,400 /kg, which is cheaper than the last year by VND 600 - 700 /kg. The main reason is the export price of rice declines from US$ 260 /ton in the last year to US$ 197 /ton. The selling price of polished rice is VND 2,700 /kg or 10 % higher than milled rice.

Rice processor H, a new private rice processor is located in Long My district. This family company was established in January 1999. It facilitates only a rice miller (3 ton/hr). The investment to the factory was VND 700 million covered by the owner. Its storage capacity is 500 ton. It does not have any transportation means. The company does not use any credit services from the banks, but sometime use a SOEs' advance payment for procurement of paddy.

All paddy are directly brought by the 40 - 50 farmers in the village. The handling amount was about 500 ton in the first harvest season of 1999. The company sells milled rice to the SOEs or the private traders considering the prices. The buying price of paddy is VND 1,680 - 1,700 /kg and the selling price of milled rice is VND 2,400 /kg in average.

In Can Tho province, the Post Harvest and Rice Processing Development Project has run under grant aid from Danish government (DANIDA) since 1997.

The Post Harvest and Rice Processing Development Project covers three provinces of Can Tho, Soc Tran and Thai Binh in Mekong River Delta region. The project components are; 1) training on post-harvest technologies to 40,000 participants, 2) supply of 600 dryers of paddy, and 3) construction of three rice processing centers. The duration of the project is 5 years from 1997. The training started in August 1997, and the financing for purchasing of the dryers started in April 1998, and the rice centers will start the operation in September 1999.

The means of the training component is an exhibition of new varieties of paddy and new technologies in farming at the 2,000 demonstration farms established in the three provinces. The main items of the exhibition are; 1) drill seeding with a low seed rate of 100 - 125 kg/ ha, 2) economical fertilizer application at a rate of 100 kg/ha of urea by using a leaf color scale, 3) integrated pest control (IPM) saving about VND 300,000 /ha for insecticide, 4) post-harvest technologies, and so on.

The dryers employed in the project are manufactured in the University of Agriculture and Forestry in HCM city. At the survey time, the numbers of the dryers installed in Can Tho, Soc Tran and Thai Vinh provinces are 186, 100 and less than 10, respectively. The several types of the dryers are used, such as 4 ton type with a cost of VND 25 million and 8 ton type of VND 38 million, and are planned to be used, such as 1 ton type of VND 10 million and 10 ton type. The dryers are supplied to individual farmers or agricultural cooperatives through loan advancement by VBARD. The condition of the loan is 2 - 3 years of repayment period and 0.81 % of monthly interest rate, which is the same as the VBP loan. The benefit to the farmers is a higher price of dried paddy at VND 100 /kg due to higher quality. The

dryers will last more than ten years.

For the rice processing centers, Viet Nam government invests to the buildings and Danish government invests to facilities and equipment. The joint stock companies will be established to operate the centers. About 6,000 farm households will be involved in the companies and will hold their stocks. The agricultural cooperatives will be organized around the centers to collect paddy on schedule and to store paddy in the cooperatives' warehouses.

The rice processing center of Can Tho province is located at the riverside of 3 - 5 km from Vi Thanh town. The location is a central area of parry production and has an advantage of land and water transportation. Within the area of more than 3 ha, a large-scale warehouse and a processing building (30 m * 90 m each), as well as an office building and a dormitory are constructed. The construction was commenced in 1997, then the achievement at the survey time is 95 % for the construction works, 80 % for the rice mill, 60 % for the drier. The center will be put in operation in September 1999.

The Ministry of Agriculture and Rural Development, a responsible agency of the project, plays a leading role in the construction of the center. The Can Tho Food Company, a SOE, also take part in the construction. Both organizations have dispatched members of the Board of Directors of the center. For the operation stage, the both may have responsibility.

2.2.4. Distribution of Rice

The distribution system of paddy and rice in Viet Nam is rather complicated, and that causes higher trading cost on the price of rice. The typical trading channel of paddy and rice is shown in the following figure. Many small to medium traders, including collectors, middlemen and wholesalers, and processors play their roll in the trading chain. The large scale SOEs also take part in the trading. The trading channel for export of rice is fixed from the SOEs to the authorized exporters. About 80 - 90 % of rice is traded through the SOEs in the province.

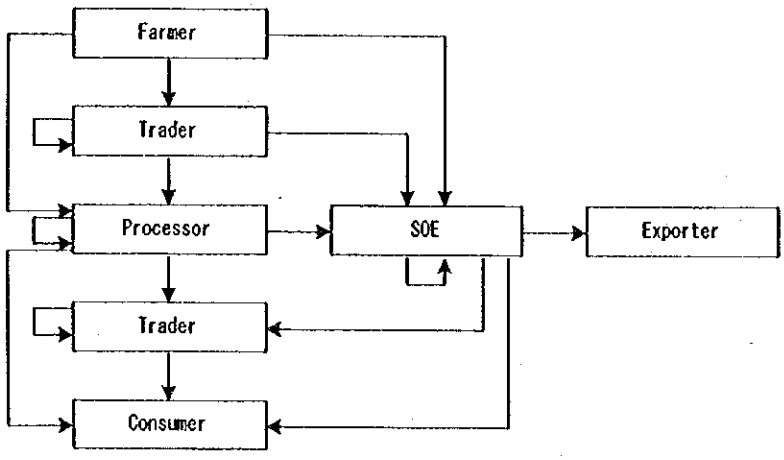

Figure 6 Trading Channel of Paddy and Rice

The government of Can Tho province recognizes the stabilization of prices of farm products as a crucial issue in agricultural and rural development. The domestic and export prices of milled rice of the province are tabulated by quarter in the following table. The fluctuation of the prices is not clear in the table, but monthly or weekly fluctuation may be much larger.

Table 8 Price of Rice in Can Tho Province

	1st quarter 1998	2nd quarter 1998	3rd quarter 1998	4th quarter 1998	1st quarter 1999
Export Price (US$/ton)					
5 % broken	258	275	300	305	245
10 % broken	254	268	290	295	235
25 % broken	232	239	263	270	208
Wholesale Price (D/kg)					
5 % broken	3,000	3,700	3,150	3,150	3,100
25 % broken	2,750	3,200	2,650	2,650	2,600

Note: Export Price: FOB price of Can Tho rice at HCM City port.
Wholesale Price: Average price at Can Tho wholesale market.
Retail Price: 10 % higher than wholesale price.
Source: Department of Planning and Investment, Can Tho Province

In the interview, the price of rice steeply descended in the world market and then the domestic market during the first harvest season of February to March 1999. The farmgate price of paddy also declined from about VND 2,000 /kg at the end of 1998 to VND 1,400 /kg in Can Tho province. That is a very serious problem for the rice growers, although the provincial government decided that the agriculture tax fixed at a lower level.

2.2.5. Research and Extension System

Can Tho province, where several research institutes are located, is a center of agricultural research in Mekong River Delta region. Can Tho university is one of the agricultural research institutes. Faculty of Agriculture has a function of a scientific research in agronomy, and Faculty of Economics focuses on agro-economic research in the rural areas. In addition to education to students and postgraduate students, the university carries out training to the agricultural extension workers and farmers.

The major functions of Can Tho University are education, research and survey and extension. Faculty of Agriculture carries out training to farmers, guidance to extension workers, and demonstration of technologies at the farm level.

The agro-economy is now one of the subjects of Faculty of Economics, but it is planned to be separated from the faculty in future. The course of agricultural cooperatives will be established in Faculty of Agriculture in this year. There are nine master courses in the university, but they will be increased in future.

The number of the students is 12,000 in main campuses, and 10,000 in satellite schools scattered in several provinces.

Mekong Delta Farming System Research and Development Institute, one of the institutes in Can Tho University, executes deeper research and study in Mekong Delta agriculture, with a target of sustainable agricultural development and diversification of farming.

The institute employs 70 staffs, out of which 40 staffs are researchers. Twenty-three are the permanent staffs but the others are the temporary staffs, of whom some are dispatched by the other countries. They consist of one doctor, 12 masters, and many bachelors. Although most of the researchers are agronomists, there are also two fishery experts, two veterinary, two economists, one soil scientist, and one forestry expert.

The institute has four experimental stations in four eco-zones; flood-prone zone, flood-free zone, coastal zone and acid sulfate soil zone. They research variety, farming method, fertilizing, plant protection suitable for each environment.

The institute is a main member of the Farming System Network, which is organized by six universities and three institutes in the country. In April 1999, the Natural Resources Network will be established as a expanded network.

Coo Lóng River Delta Rice Research Institute is an important institute in terms of new variety development and seed production of paddy. The institute also set up a sustainability in agriculture as the main theme, and its main research activities are new varieties development, optimum use of natural resources, economic viability and environmental impacts, considering the suitability for various eco-systems.

The institute is established under Ministry of Agriculture and Rural Development in 1977. The major functions of it are 1) research of rice, other crops and agricultural system, 2) coordination with other organizations, 3) production of seeds, 4) collaboration with other research organizations, and participation to training. Its main achievements are 1) development of 59 new paddy varieties, 2) introduction of new farming technologies, 3) training and so on.

The yield rate of paddy in Mekong Delta has increased by 1 ton/ha for these ten years. The institute makes efforts to new variety development, setting the target of paddy productivity as 4.5 ton/ha in the rainy season and 6.5 ton/ha in the dry season. The improvement of rice quality is also important issue in their research toward export.

The institute produces paddy seeds in its own seed farm of 200 ha, and under contract with farmers. The institute recommends rotational farming with double cropping of paddy and another crop, because triple cropping of paddy may bring about soil degradation and widespreading of pest and plant diseases. It also strongly recommended that agricultural extension services should be combined by technical training and financial support. The institute provides periodical training to agricultural extension workers and farmers, as well as education to postgraduate students.

The agricultural extension center of Department of Agriculture and Rural Development of Can Tho province is a main organization in agricultural extension. The center provides education and demonstration of the new farming technologies and training courses to the

farmers. The agricultural extension station is established in every seven districts, and has about five extension workers in each station. There are about 100 agricultural technicians in every commune level.

2.2.6. Rural Finance

The Viet Nam Bank for Agriculture and Rural Development (VBARD) is the most important institution for the rural credit services in Can Tho province. The VBARD has a provincial office in Can Tho city, seven district branch offices in every districts, and 15 commune-level branch offices in every three communes. Total number of staffs is 330 in the province. Out of those 120 financing staffs covers 125,000 farmers in the province. As luck of the staffs, the number of staffs is increasing in the province, while the staffs of the VBARD is decreasing mainly in the northern part of the country.

The main objectives of the loan are 1) budget for farming, 2) investment on rural infrastructure, and 3) procurement budget of agricultural products.

The total amount of loan advanced is VND 1.7 trillion. About 70 % of the loan are the short-term loan with maximum one year repayment period, and the rest 30 % is the medium-term loan with one to five year repayment period. The loan amount supplied to farmers is VND 800 billion, and its average size is VND 3 million to VND 4 million. The VBARD will provide credit to agricultural cooperatives from this year.

Among the short-term loan, 70 % is advanced to companies and 30 % is to farmers. Besides, 20 % of the short-term loan is used for purchasing farm inputs and 50 % is for purchasing farm products by companies.

Among the medium-term loan, 50 % is used for infrastructure improvement, 25 % is for warehouse construction, and 25 % is for budget for new technology introduction. About 90 % of the loan for the new technologies are advanced to companies and only 6 % are to farmers.

The interest rate on loan is 1.10 % /month for the short-term loan and 1.15 % /month for the medium-term loan. The interest is decreasing because of the relatively stable prices of agricultural commodities and the currency exchange rate, according to an explanation made by a bank officer.

About 90 % of the saving are done by individuals mainly living in urban area. The rest 10 % is a support from the State Bank. The VBARD does not expect the savings by farmers so much.

The government supports the solution of the land certificates as collateral transferred from farmers. The VBARD allows extension of repayment period if the farmers can not repay due to unavoidable reasons such as natural disasters. The VBARD loans can sometimes be transferred to the lower-interest VBP loans. In case of mismanagement of credit use, the VBARD keep the land certificates without selling out.

The Viet Nam Bank for the Poor (VBP), a state-owned nonprofit bank, provides credit

to the poor people. The VBP has a provincial office in Can Tho city and seven district branch offices in every districts. At the commune-level, the VBARD branch offices work on behalf of the VBP. Total number of staffs is only 27 in the province.

The poor are defined as the people whose monthly income is lower than VND 70,000 in rural area and VND 90,000 in urban area. The People's Committees of commune identify the poor.

The interest rate of the loan is about 0.8 % /month, which is lower than VBARD. The present interest rate of the saving is only 0.3 %, which is much lower than VBARD. Therefore, the amount of the savings is very limited. These interest rates are decided by the Ministry of Finance.

The credit should be used only for the agricultural production of crops, livestock, etc. There are the short-term loan with the repayment period of less than one year and the medium-term loan with the 1.5 to 3 year repayment period. The maximum credit size is VND 3 million. Only the credit for the perennial crop production is allowed VND 5 million and 5-year repayment period. In 1998, the total number of credit advanced was 32,000, and the total loan amount was VND 41 billion in the province. The amount not repaid yet was about VND 10 billion.

Since the VBP started the operation in 1996, about 60 % of the loan were repaid already, but the 40 % are subjected to rescheduling. During the VBP operation, about a half of loan was rescheduled. The provincial government allows the borrowers listed by the VBP to prolong the repayment period at 3 years without additional interest. The most crucial issue of the VBP is to educate the borrowers for the proper use of the credit.

The People's Credit Funds (PCFs) have not been introduced yet in Can Tho province. The main reason is that there is less incentive to establish PCFs since the VBARD and other financing institutions have been set up for the rural credit already.

2.2.7. Agricultural Cooperative

The number of the agricultural cooperatives is not so many but is growing gradually in Can Tho province. The benefits of the agricultural cooperatives are, 1) better access to the bank credit, 2) lower costs on irrigation and drainage, 3) lower prices of the farm inputs, 4) better access to the agricultural extension services, and so on. The present activities of the agricultural cooperatives are 1) irrigation and drainage, 2) fertilizer and agro-chemical supply, 3) rental of machinery, 4) credit service from the banks to the poor[3], and so on.

The followings show the results of the interviews to the seven agricultural cooperatives in Can Tho province.

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[3] In this credit service, the cooperative plays only a role of a loan distributor to its members after some bank loan is advanced. The cooperative does not have a banking function directly collecting money deposit from the members and supplying credit to the members.

Table 9 Outline of Agricultural Cooperatives Surveyed

	A	B	C	D	E	F	G
District	Long My	Chau Thanh	Can Tho	Chau Thanh	Phung Hiep	Vi Thanh	Vi Thanh
Establish	1997	1983.9.2	1998	1998.4	1998	1997.5.19	1998.5.5
Member	125	437	107	9	107	83	41
Facility	Pump		Polisher, Storage	Drier, Polisher, Storage	Pump, Tractor, Thresher	Drier	Pump, Tractor
Activity	Irrigation	Cropping schedule, Irrigation, Extension, Fertilizer supply	Rice processing	Rice processing	Irrigation, Fertilizer/ chemical supply, Machine rental	Irrigation, Fertilizer/ chemical supply, Drier rental, Credit	Irrigation, Machine rental, Credit
Future plan	Fertilizer supply, Machine rental, Credit, Trading	Fertilizer/ chemical supply, Irrigation, Processing/ trading	None	None	Fertilizer/ chemical supply, Drier rental, Irrigation, Machine rental	Storage, Livestock service, Petroleum supply	Fertilizer/ chemical supply,

Agricultural cooperative A was established in Long My district in 1997. It has 125 members, of which more than half is the village farmers. Main facility is a pump station with 3 pumps.

Present activity is irrigation only. The pumps were installed by the cooperative and the canals were constructed by the government with participation of the farmers. The irrigation area is 120 ha of paddy field under triple cropping of paddy. The cooperative collects the irrigation water fee of VND 250,000 /ha /crop from the farmers. There are the water users but the cooperative member.

Future plans are; 1) joint buying of fertilizer (*from the state farms*), 2) joint use of tractors, 3) credit service (*the cooperative will borrow credit from the VBARD to supply it to the poor members*), and 4) joint selling of rice.

Agricultural cooperative B was established in Chau Thanh district on September 2, 1983, afterward re-registered. It has as many as 437 members.

Present activities are; 1) adjustment of cropping calendar, 2) irrigation (*pumps owned by some members are used with no water fee*), 3) agricultural extension (*training to the members, demonstration of new varieties, seminar on agro-chemical, etc.*), 4) joint buying of fertilizer (*various kinds of fertilizer are bought from Can Tho Food Company under the conditions of low price and deferred payment*).

Future plans are; 1) strengthening of joint buying of fertilizer and agro-chemical, 2) improvement of irrigation facilities including dikes and pumps, and 3) processing and trading of rice.

Agricultural cooperative C was established in Can Tho city in 1998. It has 107 members; and a polisher (3 ton/hr) and a storage facilities.

Present activity is rice processing only. The cooperative polish milled rice collected from Can Tho and other provinces by collectors, and then ship polished rice mainly to SOEs. Annual processing amount is 7,000 - 8,000 ton.

Agricultural cooperative D was established in Chau Thanh district in April, 1998. It has only 9 members; and a drier (6 ton), a polisher (6 ton/hr) and a storage (4,000 ton) facilities.

Present activity is rice processing only. The cooperative polish milled rice collected from Can Tho and other provinces by collectors, and then ship polished rice mainly to SOEs. Annual processing amount is 12,000 ton.

Agricultural cooperative E was established in Phung Hiep district in the beginning of 1998. It has 107 members, all of whom are village farmers; and 10 pumps, a tractor, and a thresher.

Present activities are; 1) irrigation, 2) joint buying of fertilizer and agro-chemical (*the cooperative purchases them from SOEs and private retailers in advantageous condition, then supply them to the members at the lower price by 7 %*), and 3) joint use of tractor and thresher (*the rental fee of them is lower than the normal rate by 30 %*).

Future plans are; 1) establishment of shop of fertilizer and agro-chemical, 2) installation of a drier of paddy, 3) strengthening of irrigation service and 4) strengthening of machinery service.

Agricultural cooperative F was established in Vi Thanh district on May 19, 1997, accorded to the Rice Processing Center. It has 88 members, all of whom are village farmers; and a rice drier (8 ton).

Present activities are; 1) joint buying of fertilizer and agro-chemical (*fertilizer is bought from Binh Dien Fertilizer Company, a SOE, and agro-chemical is bought from private companies*), 2) irrigation (*the new pump station is under construction to irrigate 70 - 90 ha of paddy field with a support of District People's Committee. The cooperative will collect a water fee from the water users*), 3) joint use of drier (*there are two paddy dryers with a capacity of 8 ton; one is owned by the cooperative and another by a member. Both of them are procured under the DANIDA project. When an installation of the drier, the cooperative received the VBARD credit of VND 4.3 million (VND 3.8 million for the facility and VND 0.5 million for the land) through an appraisal by the bank. The cooperative used it for 200 ton of paddy in the first harvest season of 1999*), and 4) credit service (*the cooperative borrows credit from the VBARD on behalf of the poor members*).

Future plans are; 1) installation of storage for paddy, 2) supply of livestock and feed, and 3) supply of petroleum.

Agricultural cooperative G was established in Vi Thanh district on May 5, 1998. It has 41 members, including 39 village farmers, and 2 pumps and a 2-wheel tractor.

Present activities are; 1) irrigation (*irrigation water fee is VND 250,000 /ha /crop*), 2)

joint use of tractor (*rental fee of the tractor is VND 300,000 /ha, lower than normal rate of VND 350,000 /ha*), and 3) credit service (*the cooperative borrows credit from the VBARD on behalf of the poor members*).

Future plan is joint buying of fertilizer and agro-chemical.

2.2.8. State Farm

There are two state farms; So Ha Farm and So Do Farm in Can Tho province. Both of them were established in O Mon district in the late 1970's. The farms are agricultural production units of agricultural commodities, as well as food processors and traders. The results of the interview to the state farms are as follows.

So Ha Farm Import and Export was established in 1979 and is a very successful state farm within the country. The total area of the farmland is about 7,000 ha. The main cropping pattern in the paddy fields is double cropping of paddy or combination of paddy and fish culture. The farm practices rather diversified agriculture with fruits of mango, guava, etc., vegetables and livestock. The processed foods of vegetables, fruits, mushrooms and meats are exported to foreign countries. The farm has the export quota of rice at 200,000 ton a year, while the capacity of the rice export is 300,000 ton a year. The farm also exports 200,000 heads of chicken, 500 ton of frozen chicken meat to Japan. The farm import only fertilizer at 2,000 ton a year. The main fertilizer imported is urea followed by NPK composite, phosphate and potassium.

Out of the total amount of the paddy handled, only 10 % is a product within its own farm, and the rest 90 % is a product purchased from outside. There are three rice processing factories in the farm and eight factories in outside of the farm such as Thot Not, O Mon, Chau Thanh and Phung Hiep districts. The farmers or collectors bring paddy to the factories. The processed rice varies from high quality for Asian countries to low quality for African countries.

There are 2,800 households and 15,000 people living within the farm. Of those 10,000 people are working as the farm worker. The So Ha Farm employs 371 permanent staffs including 132 teachers for 3,000 children within the farm. The farm also provides credit to the agricultural cooperatives in outside of the farm with the same condition as the VBARD.

All of the farmland is a property of the farm. The farm provides every necessary farm inputs to the farm workers, and the farm purchases the farm products of the workers. The farm workers must pay agricultural tax, water fee and interest.

Another state farm, So Do Farm has 6,500 ha of the farmland, including 5,300 ha of paddy field and 500 ha of orchard. It was established in 1977. About 1,500 farm workers, who have a 20-year contract with the farm, cultivates 2.2 ha in average.

The farm supply every necessary farm inputs to the contract workers, and the farm products of the workers are purchased by the farm. The production cost of paddy is higher than outside by 5 %. However, the yield rate of paddy is higher due to proper water control

in the farm. The triple cropping of paddy is commonly practiced in the farm.

The rice processing factories handles some paddy from outside. The processed rice is directly exported to Iran and European countries.

3. Conclusion

Mekong River Delta region contributes about 27 % of GDP of Viet Nam. The region is very advanced in agriculture production. The regional agriculture production is 47 % of the national agriculture production. Further, the region contributes 50 % of the national rice production and 60% of the national fruit production.

The small-scale field survey in Can Tho province was carried out to make a preliminary study on the total rice reproduction process in consideration of input supply, cropping, supporting system, processing, marketing, etc. The discussion meetings, at first, were held with the government organizations of Can Tho province, rural financial institutions and agricultural research institutions. In the districts, semi-organized interview was conducted at farm households, agricultural cooperatives, rice processors and traders, and state farms.

The total area of the paddy field is 170,000 ha in Can Tho province. The production of paddy in the province is 1,918,000 ton, of which about 0.5 million ton of rice is exported in 1998. About 78 % of population live in agriculture and the total number of farm households is about 250,000 in the province. The agriculture and rural development sector is the most important issue and the priority policies in the sector are infrastructure development, research and development, solution of land distribution, and price stabilization of agricultural output.

The number of landless or petty farm households are increasing rapidly in Can Tho province. There are three types of landless farmers; the farmers who have not received land certificate, the farmers who once held land use right on enough area but returned the land to its original land owner, the farmers who lost their land certificate as a collateral on their loan. The government supports those farmers by means of credit supply to get other jobs instead of farming, or additional loan to return their land certificates.

The cropping pattern in paddy fields is very simple like a monoculture of paddy. Double or triple cropping of paddy is common in Can Tho province. A plowing is fully practiced by tractors but land leveling is still not enough. A direct sowing of paddy seeds under impounded condition is common. Chemical fertilizer is commonly applied to the field and the demand to it is increasing year by year. Pesticide is often used in paddy cropping, but fungicide and herbicide are seldom used. About 90 % of paddy field are irrigated today. Paddy is harvested by hand tools, threshed on the paddy field soon after harvesting, and then dried under the sun. In Mekong River Delta region, the labor input to paddy cultivation is much less and the ratio of hired labor in total labor is much higher than in Red River Delta region.

Rice processing is done by a number of the rice processing factories with various scales as well as some state farms and state owned companies (SOEs) in the province.

The distribution system of paddy and rice involves many small to medium traders, including collectors, middlemen and wholesalers, processors and large scale SOEs. The trading channel for export of rice is fixed from the SOEs to the authorized exporters.

Can Tho province is a center of agricultural research in Mekong River Delta, where the important research institutes is located, including Can Tho university, Mekong Delta Farming System Research and Development Institute, and Coo Long River Delta Rice Research Institute. The agricultural extension center of Department of Agriculture and Rural Development of Can Tho province is a main organization in agricultural extension, organizing seven agricultural extension stations in district level and about 100 agricultural technicians in commune level.

The VBARD is the most important institution for the rural credit services in Can Tho province. The VBP, a state-owned nonprofit bank, provides credit to the poor people. The PCFs have not been introduced yet in Can Tho province.

The number of the agricultural cooperatives is not so many but is growing gradually in Can Tho province. The benefits of the agricultural cooperatives are, better access to the bank credit, lower costs on irrigation and drainage, lower prices of the farm inputs, better access to the agricultural extension services, and so on. The present activities of the agricultural cooperatives are irrigation and drainage, fertilizer and agro-chemical supply, rental of machinery, credit service from the banks to the poor, and so on.

There are two state farms; So Ha Farm and So Do Farm in Can Tho province. Both of them were established in O Mon district in the late 1970's. The farms are agricultural production units of agricultural commodities, as well as food processors and traders.

This small-scale field survey on rice economy in Can Tho province is a case study by some interviews. It is necessary for quantitative understandings to make a large-scale survey using questionnaires. The JICA Hanoi office ordered Can Tho University to conduct the questionnaire-style survey on the agricultural marketing and rural credit in Can Tho and Tien Giang provinces in the beginning of 1999. The survey aimed to research quantitatively on the situation of the farmers, processors, traders, financial institutes, and so on. The survey results are attached as a next paper.

The surveys in Mekong River Delta may explain a half of the Viet Nam rice economy. The other surveys should also be carried on in Red Rive Delta, another rice production center, and other regions. The overall rice economy in Viet Nam will be clear by such comparative survey.

11

Distribution, Processing and Marketing of Rice in the Mekong Delta, Viet Nam (The Case of Can Tho and Tien Giang Provinces)

Mai Van Nam
Luu Thanh Duc Hai
Bui Van Trinh
Do Thi Tuyet
Nguyen Phu Son
Cantho University, Viet Nam

I. General Features of Rice Production in the Mekong Delta

This section describes the present state of rice production in the Mekong Delta.

1. Objectives of the Study

The general objective of the study is to produce a report on status of distribution, processing and marketing of rice in Can Tho and Tien Giang provinces, the Mekong Delta-Viet Nam.

The specific objectives of this study are:

- To study and describe the marketing channels for rice in two provinces, namely Can Tho and Tien Giang provinces in the Mekong Delta;
- To analyze the differences between producer price and market price, determining the price margins of the different intermediaries and the cost involved in performing rice marketing functions;
- To compare small scale and large scale processing and marketing companies at various levels;
- To analyze current situation on storage facilities and transportation system;
- To study the relation between traders and farmers in order to identify current situation on credit availability, frequency of visits to farmers by traders, availability of market information, etc.
- To pay attention to informal sector with an emphasis on its role in marketing of agricultural products.

2. Study Areas

The study used both primary and secondary data in analysis. The secondary data were collected from the country, provincial, and national agricultural institutes in Can Tho, and Tien Giang provinces, the Mekong Delta, Viet Nam in 1999. The primary data were obtained

from the survey conducted by the research team in February, 1999. A sample size of 271 households was collected in OMON district of Can Tho province, and CAIBE district of Tien Giang provinces (as agreement between JICA and SEBA, CTU, in the TOR). The data gathered pertain to two season crops, wet and dry season crops. This interview was conducted using questionnaires (attached).

3. General Information

The Mekong Delta is a region where the land level is very flat. The average annual temperature is around 27℃, and the annual rainfall ranges from 1,500㎜ to 2,000㎜. The Mekong Delta is a network of tributaries, natural creeks and manmade waterways which turn and twist before flowing into the Pacific Ocean. Almost every year, the Mekong Delta suffers flooding that floods an area of 1.4-1.9 million hectares for 2 to 6 months per year to a depth of 1-4 m. The Mekong Delta consists of twelve provinces that are long An, Tien Giang, Ben Tre, Vinh Long, Tra Vinh, Can Tho, Soc Trang, An Giang, Dong Thap, Bac Lieu, Ca Mau, Kien Giang.

The Mekong Delta population is about 17 million, consisting of 22% of the country population. The agricultural labor force in the region is about 40% of the region population. The average household size is 5.4. It is the most important and the largest rice production region in the country. The Mekong Delta consists of twelve provinces with 1.95 million hectares of rice land and 3.4 million hectares of sown area of rice production (table 1). It contributes greatly to the total rice production of the whole country. It produces about 50% of the total country's rice production and contributes more than 70% of the annual rice export volume.

Table 1. Sown area of rice production by province, 1995-1997 (1000 ha)

Province	1995	1996	1997
Long An	325.7	371.3	374.5
Dong Thap	361.0	390.8	371.9
An Giang	391.8	417.2	415.0
Tien Giang	269.3	280.2	281.7
Vinh Long	206.0	209.8	198.0
Ben Tre	92.7	97.7	98.8
Kien Giang	380.3	449.6	439.7
Can Tho	401.8	405.8	388.2
Tra Vinh	169.3	159.2	200.5
Soc Trang	275.6	320.2	330.7
Bac Lieu	130.0	139.8	153.3
Ca Mau	187.1	201.1	220.5
Mekong Delta	3190.6	3442.7	3472.8

Source: Statistical yearbook 1997.

4. Rice Production

There are two major systems of rice production in the Mekong Delta: rainfed and irrigated systems.

• *Rice production on rainfed land:* Rainfed land in the Mekong Delta is classified into deepwater areas and intermediate deepwater areas.

The deepwater areas with maximum water depth of more than 1 meter in the wet season. In these areas, rice varieties with good elongation ability are planted, e.g., Nang Tay Dum, Chet Cut, Ba Bong, etc.

Intermediate deepwater areas with 0.5-1 meter water in depth. In these areas, rice varieties with tall stems are photoperiod sensitive and less elongated are cultivated, e.g., Trang Chum, Trang Phuoc, Nang Huong, Tau Huong, Tai Nguyen, Mot Bui, etc.

An Giang, Dong Thap, and partly in Long An and Kien Giang provinces are the deepwater areas. The other eight provinces of the Mekong Delta are the intermediate deepwater areas. Most farmers on rainfed land have planted traditional rice varieties ("Mua" crop). The yield of traditional rice varieties is low due to many constraints in production, especially during the years when droughts or floods take place early with 4-5 month duration. Low rice yield is also due to seed varieties that degenerate through time and other problems such as soil quality, credit support, technology transfer, poorly educated farmers, and inadequate extension services.

• *Rice production on irrigated land:* Modern rice varieties have been planted on these areas. The modern rice varieties contribute about 71 percent of the total rice production in the region. There are two modern rice crops in a year, the wet season crop and the dry seaso n crop (Summer-Autumn crop and Winter-Spring crop; Summer-Autumn and "Mua" crop). In fully irrigated areas where water is available year round, some farmers grow three rice crops in a year (Winter-Spring, Summer-Autumn and Autumn-Winter crop).

- Winter-Spring crop: from December to March, cultivate with high-yielding varieties (mostly from IRRI)
- Summer-Autumn crop: also cultivate with high-yielding varieties, broadcasting in April, May and harvesting in July or August.
- Mua crop (Wet crop): mainly with traditional varieties (local varieties), transplanting in September/October, harvesting in February.
- Autumn-Winter crop: some farmers use the high-yielding varieties in mua crop, named Autumn-Winter crop, from September to December and they can cultivate three rice crops per year with the short-duration varieties.

There are some hundred types of modern rice varieties such as IR42, IR58, IR61, IR64, IR66, OM80, OM86, OM88, OM90, MTL61, MTL85, MTL97, MTL99, etc. About 95 percent of rice land in fully irrigated area, and 70 percent of rice land in partially irrigated area have been planted with modern rice varieties. Average seed rate was 200kg/ha for the wet season, and 280kg/ha for the dry season. On irrigated land, most farmers have planted hybrid rice varieties in both dry and wet seasons. It is supplied by Can Tho University and The Mekong Delta Rice Research Institute. On good irrigated farms, modern rice varieties can yield 8 tons/ha

in the dry season and 6 tons/ha in the wet season. Thus, the adoption of modern rice varieties has increased land productivity by increasing rice yield per hectare per crop and by making possible an increase in cropping intensities.

Table 2. Yield and sown area of rice production by season in the Mekong Delta, 1995-1997

Season	Mekong Delta			Can Tho			Tien Giang		
	1995	1996	1997	1995	1996	1997	1995	1996	1997
I. Winter-Spring									
Area (1000 ha)	1035.7	1152.2	1254.0	165.6	163.6	167.2	79.3	87.7	96.1
Yield (tonnes)	5.16	5.19	5.33	5.23	5.65	5.68	5.50	5.34	5.62
Production (1000 tonnes)	5348.5	5985.1	6689.8	865,3	924,3	949,1	435.8	468.0	539.7
II. Summer-Autumn									
Area (1000 ha)	1397.6	1619.5	1499.7	230.0	233.8	212.8	178.6	183.6	178.0
Yield (tonnes)	3.79	3.46	3.45	3.58	3.66	3.50	4.00	4.04	3.97
Production (1000 tonnes)	5296.4	5598.2	5173.6	824.1	855.6	744.7	714.0	741.1	706.2
III. Traditional Rice Varieties Crop									
Area (1000 ha)	757.3	671.0	719.1	6.2	8.4	8.2	11.4	8.9	7.6
Yield (tonnes)	2.89	3.33	2.92	3.44	2.76	2.76	3.67	2.02	3.01
Production (1000 tonnes)	2186.8	2235.5	2100.2	21.3	23.2	22.6	41.8	18.0	22.9

Source: Statistical yearbook 1997

Most of farmers in the study area apply the direct seeding method. In the wet season (WS), time of planting is from April to June for modern varieties, and from May to June for short-term traditional varieties; time of harvesting is from July to September for modern varieties, and in November for short-term traditional varieties. In the dry season (DS), time of planting is from November to December for modern rice varieties, and from August to September for long-term traditional varieties; time of harvesting is from January to March. Furthermore, cropping patterns can be classified as follows:

- 3 rice crops: rice crop (WS)-rice crop (DS)-rice crop (DS-WS);
- 2 rice crop-1 non-rice crops: rice crop (WS)-rice crop (DS)-non-rice crop (DS)
- 1 non-rice crop-2 rice crops: non-rice crop (WS)-rice crop (WS)-rice crop (DS)
- 2 rice crops: rice crop (WS)-rice crop (DS);
- 1 rice crop-1 non-rice crop: rice crop (WS)-non-rice crop (DS).

Labor sources for rice production are the family and hired labor. About 70 percent of total man-days per hectare were applied by the family labor, and 30 percent from the hired labor source. The pre-harvest labor included land preparation, seedbed preparation, crop establishment, and crop care activities.

Power sources of land preparation are tractor, tiller, and animal (buffaloes). In rainfed rice land, plowing and harrowing were done by tiller and/or animal while in irrigated rice land, tractor and tiller were adopted in land preparation. The cost of land preparation is based on the number of plowing or harrowing.

All farmers in both environments used chemical fertilizer. The average amount of fertilizer applied per hectare on irrigated rice land is higher than on rainfed rice land. Nitrogen (N) is the most important component of fertilizer that every farmer applies. For phosphorus (P), there are 70 percent of farmers apply P in irrigated rice land and 50 percent of farmers apply P in rainfed rice land. For potassium (K), a few farmers use K in their rice production. Farmers on irrigated rice land applied fertilizer 2-4 times per cropping season. The timing of fertilizer application is the 10th day after planting for the first time, the 20-25th day after planting for the second time, and the 30-40th day after planting for the third time. Some farmers preferred to apply fertilizer on the 60th day when rice has just bloomed for the fourth time.

There are about 90 percent of farmers in the study area to apply pesticides/insecticides for pest control in both wet and dry seasons. Cut Worm, Brown Plant Hopper, Green Leaf Hopper, Stemborer, Leaf Folder, Green Semi Looper are the common pests that were found in the study area . The timing of pesticide application varies across farmers. About 70 percent of farmers spray pesticide whenever pests are present, 10 percent of farmers spray pesticide when pest infestation is heavy, and 20 percent of farmers combine between pesticide and IPM technique that they only spray pesticide after 40 days of seeding. In recent years, farmers used pesticide for their crop protection with increasing trend because of incorrect doses.

5 . Processing and Marketing of Rice

The farmers are the rice suppliers (producers). They are the first link in the marketing chain. The farmers harvest their rice crops and supply the products to the second agent. Acting as suppliers, farmers could contact with Village merchants, Town merchants and State companies. The small size of farmers' rice production is one of the main factors, which affects farmers' decision making on marketing their rice. They marketed their rice individually. There was no cooperation in marketing among rice farmers that was observed in two surveyed areas.

Figure 1 shows a typical rice marketing channel in the Mekong Delta. Private traders play an important role in agricultural input supply and marketing of rice in the domestic market. However, government sector undertakes the main role of exporting rice through government-owned food companies.

In 1997, the area exported 2.4 million tonnes of rice and in 1998, the amount increased 2.583 million tonnes with a growth rate of 10.76%. In the international market, the main quality standard of rice is based on the percentage of broken grains. In the study sites, the 5 percent and 10 percent broken rice are the two major quality standards for exported rice; and the 35 percent broken rice is the main quality standard for the domestice market.

Table 3. Volume of rice exported by provine in the Mekong Delta, 1998.

(1000 tonnes)

Province	Direct exporting	Indirect exporting	Total
Long An	183.179	78.961	262.140
Tien Giang	303.409	16.575	319.985
Vinh Long	295.155	10.331	305.487
Dong Thap	237.900	45.841	283.742
Can Tho	377.478	128.826	506.304
Soc Trang	95.536	57.164	152.700
An Giang	249.293	104.216	353.509
Kien Giang	35.530	45.673	81.203
Tra Vinh	68.213	31.697	99.910
Bac Lieu	68.071	17.670	85.742
Ca Mau	68.100	25.764	93.864
Ben Tre	2.516	36.006	38.522
Mekong Delta	1984.38	598.726	2583.106

Source : Association of Food Export Companies of Viet Nam, 1998.

Regarding rice buyers, there are two channels of marketing of rice in the Mekong Delta, the private channel and the government channel.

1 . *The private channel:*

1) Assemblers:

They are middlemen usually local people, who have an in-depth knowledge of cropping patterns and the production traditions of local farmers. They also are farmers that located in the village. They may include small village paddy merchants, large traders-wholesalers without mill or warehouse connections whose business primarily involves collecting or assembling rice production from farmers and transport them to wholesalers', miller-wholesalers', wholesaler-retailers' place or sell them at their trading places.

2) Assemblers-wholesalers:

The assembler-wholesalers usually owned boat/truck, but did not own stalls in the market. They bought paddy and shipped large amounts to rice millers, they mill the paddy which they later sell to wholesalers or private store in large volume.

3) Private store/agent to get commission:

The private store owned stalls or warehouse that usually located along the river/main road or near by rice miller. They bought large amount of paddy or raw rice from assembler-wholesalers and directly sell to local assemblers. Sometime they can get commission from seller only.

4) Miller/polisher:

They are rice processed factories to produce raw rice, milled rice or just polished the raw rice and receiving the processing costs from rice traders, they are not buying and selling rice at all.

5) Miller-wholesalers:

They are middlemen that usually located near the town or market centers, purchasing a large volume of paddy delivered by farmers or raw rice by assemblers and are engaged in milling/polishing activities. Their main outlets are wholesalers or government agencies.

6) Wholesalers:

Middlemen who purchase and sell their supply in big or small volumes, they purchase either paddy or rice from farmers, assembler-wholesalers. They mill/polish their paddy/raw rice into clean rice and deliver it to other wholesalers, government agencies, and retailers in the market centers.

7) Assembler-retailers:

They are middlemen that usually located in the local markets and their main outlets are consumers in off-season and either consumers or wholesalers during the harvest time.

2. *The government channel (Government-owned food companies/rice exporter):*

State owned enterprises engaged in rice marketing system is mainly the Food Companies that exist at the provincial level. They are the big rice traders. They buy paddy and rice from farmers, wholesalers, miller-wholesalers, wholesaler-retailers and perform storage, and initial processing and later sell out of the province for domestic consumption or rice exports.

The identified rice trading agencies in Can Tho and Tien Giang provinces as follows:

1) Can Tho province:
   (1) Can Tho Food Company
   (2) Mekong Food Company
   (3) Thot Not Trading and Food Company
   (4) Song Hau State Farm
   (5) Co Do State Farm

2) Tien Giang province:
   (1) Tien Giang Food Company
   (2) Viet Nguyen Trading and Food Company

II. Pricing, Profit Margins and Marketing Channels Analysis

In this section, the different marketing channels of rice and the different marketing institutions participating in rice marketing in Cantho and Tiengiang province are presented.

1. Rice Marketing Channel Analysis

Marketing process is the link between the producers and the ultimate consumers. The routes by which products move from the point of production to the final consumers are termed marketing channels.

There were two groups of participants in rice marketing in Cantho and Tiengiang province, namely:

1) The rice suppliers (the farmers); and
2) The rice buyers: Assemblers, Assemblers-wholesalers, Private store/agent to get commission, Miller-wholesalers, Wholesalers, Assembler-retailers, Food companies/rice exporter,

From rice farmers, the rice marketing channels was traced up to the final consumers. The flow chart was used to trace the market channels and then the percentage of paddy/rice distributed through each channel was computed. The short and the longest routes and the optimal channel distribution were also determined based on the flow chart analysis.

The flows of rice in different marketing channels in Cantho and Tiengiang province are presented in figure 1.

At farm level, farmers sold paddy and received cash immediately for their household needs after keep some paddy for their home consumption (about 24,2% of total production on average see Table 4). The types of outlet were local assemblers, small assembler-miller, assembler-wholesalers, assemblers-retailers and procurement places of food companies in the province.

At buyer level, four types of dealers were important in the province namely: assembler-wholesalers, small assembler-millers, wholesalers and food companies. Assembler-wholesalers and small assembler-millers sold to wholesalers, food companies and wholesalers out of the province. Assembler-retailers on the other hand, sold to wholesalers and consumers in the province while food companies of the province export directly or sold solely out of the province after grading and polishing for exporting.

Table 4. Total rice production and rice marketed by different rice crops of 127 farmers in Cantho and Tiengiang Province, 1998

Rice crops	Total Prod.		Sold To Mk		Home Cons.	
	Volume (Tons)	%	Volume (Tons)	%	Volume (Tons)	%
Winter-Spring	25,376	41.4	19,620	42.2	5,766	38.9
Summer-Autumn	18,730	30.6	13,904	29.9	4,826	32.5
Autumn-Winter	17,176	28.0	12,931	27.9	4,245	28.6
Total	***61,282***	***100.0***	***46,455***	***75.8***	***14,827***	***24.2***

Source: From the Survey of 127 Farmers, 51 rice traders and 37 rice processing factories in Cantho and Tiengiang province, 1998 under JICA and SEBA, CTU Project, 1999

The list of marketing channels identified operating in Cantho and Tiengiang province is shown in Table 5. There were eleven types of marketing channels, in which channel number 2,4, 7 and 10 were very important channels, because those channels incurred the most volume of rice that distributed through out of the market system.

Table 5. List of paddy and rice channels in Can Tho and Tien Giang province, 1998

CHANNELS
1. Farmers – procurement places -- food companies – out/export
2. Farmers – local assemblers -- procurement places – food companies – out
3. Farmers – small millers-wholesalers – food companies – out/export
4. Farmers – small millers-wholesalers – wholesalers/agencies – private procurement – food companies – out/export
5. Farmers – small millers-wholesalers – wholesalers/agencies – retailers – consumers
6. Farmers – small millers-wholesalers – private procurement – food companies – out/export
7. Farmers – assembler-wholesalers – millers/polishers – polishing/grading – export
8. Farmers – assembler-wholesalers – procurement place – food companies
9. Farmers – assemblers-retailers – millers/polishers – retailers – consumers
10. Farmers – assemblers-retailers – millers/polishers – wholesalers – private procurement – food companies – polishing/grading – export
11. Farmers – assemblers-retailers – millers/polishers – polishing/grading – export

2 . The Differences Between Farm Gate Price and Market rice and Profit Margins Analysis

1) Price differentiate between farm gate and retail price

Based on the data that collected from the survey of 127 farmers, 51 rice traders and 37 processing factories in Cantho and Tiengiang province, the average producing costs of paddy and the average price of milled rice by different market level were calculated as present in Table 6, 7, 8 and 9.

The 12 monthly price fluctuation of paddy and milled rice also were summarized as Figure 2, 3, and 4. These Figure shown that the price usually going up from August to October (the end of harvesting period) and reach at lowest price during the time of February to March (the main harvesting season).

Figure 1 : Marketing channels of paddy/rice in Cantho and Tiengiang province,Mekong Delta, Viet Nam

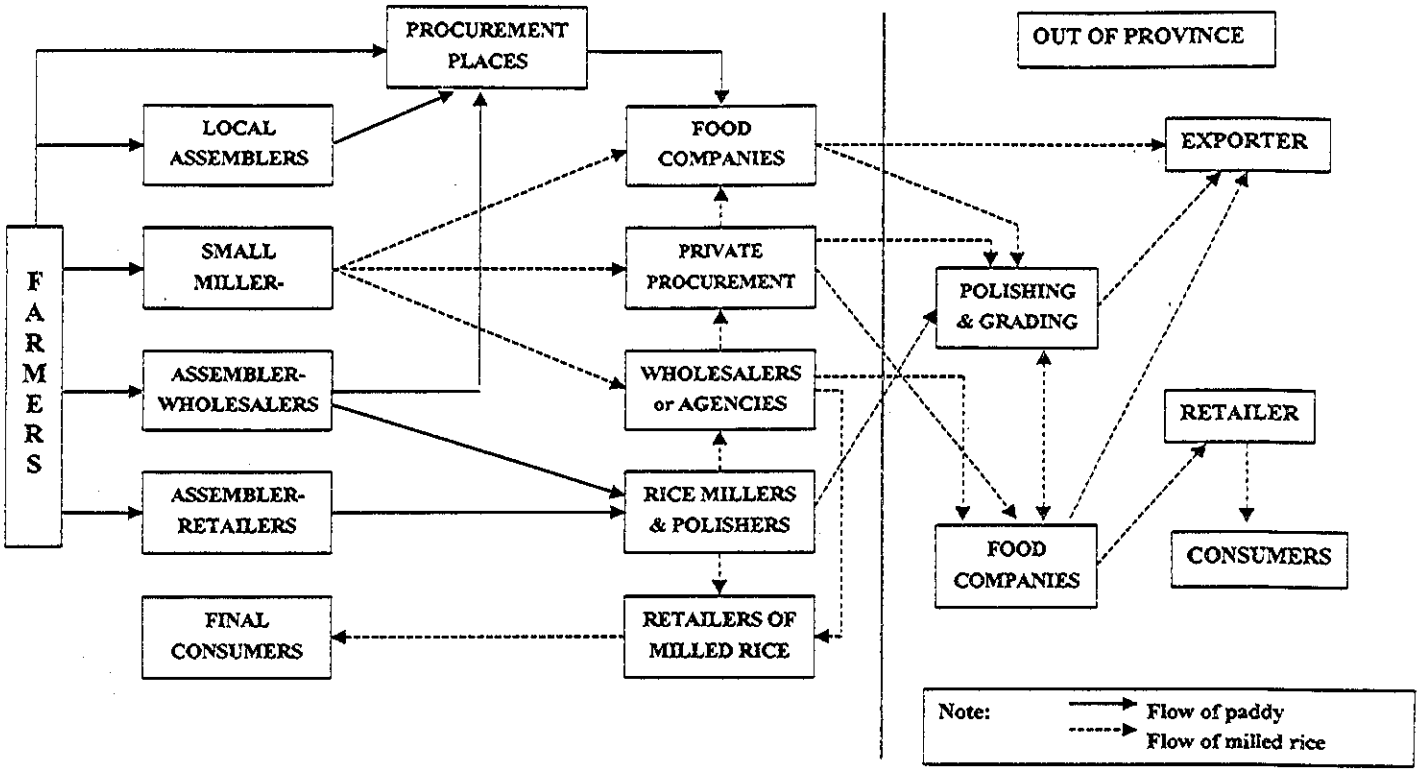

Table 6 : The average rice production costs per hectare (for 3 rice crops per year) of 127 farmers in Cantho and Tiengiang province, Mekong Delta, Viet Nam, 1998

(Unit : VN Dong)

I. COST ITMES	Home	Hired	Total
I. Input Factors			
1. Varieties			995,000
2. Fertilizers			
+ EREA			1,110,000
+ Supper Phosphate			131,000
+ Kali			228,000
+ NPK			953,000
+ Others			467,000
3. Pesticides			
+ Insecticides			292,000
+ Virus desease			514,000
+ Weedicide			420,000
+ Others			199,000
II. Labors			
1. Land preparation	580,000	721,000	1,301,000
2. Seeding and transplanting	307,000	850,000	1,157,000
3. Crop care, weeding	560,000	960,000	1,520,000
4. Fertilizer application	308,000	345,000	653,000
5. Irrigation (including Fuel....)	540,000	680,000	1,220,000
6. Harvesting	870,000	1,250,000	2,120,000
7. Post harvest activities	1,030,000	1,170,000	2,200,000
III. Machinery (hired)			
1. Plowing,			715,000
2. Threshing			970,000
3. Others			370,000
IV. Irrigation Fee			162,000
V. Payment loan-Interest			550,000
VI. Other costs			320,000
Total Costs			18,567,000
Income from rice production	16,450 Kg	1,700 d/Kg	28,100,000
Income from by products			2,200,000
Home labor costs presented as income			4,195,000
Gross Income			34,495,000
Net Income			15,928,000

Source : From the Survey of 127 Farmers, 51 rice traders and 37 rice processing factories in Cantho and Tiengiang province, 1998 under JICA and SEBA, CTU Project, 1999

Note : The value of each cost item was calculated based on the average price of inputs and the amount of input used that was reported directly from farmers.

Table 6b : The average rice production costs per hectare (for 3 rice crops per year) of 71 farmers in Cantho province, Mekong Delta, Viet Nam, 1998

(Unit : VN Dong)

COST ITMES	Home	Hired	Total
I. Input Factors			
1. Varieties			966,000
2. Fertilizers			
+ EREA			1,112,000
+ Supper Phosphate			138,000
+ Kali			226,000
+ NPK			948,000
+ Others			468,000
3. Pesticides			
+ Insecticides			290,000
+ Virus desease			515,000
+ Weedicide			422,000
+ Others			197,000
II. Labors			
1. Land preparation	590,000	810,000	1,400,000
2. Seeding and transplanting	305,000	820,000	1,125,000
3. Crop care, weeding	550,000	980,000	1,530,000
4. Fertilizer application	410,000	435,000	845,000
5. Irrigation (including Fuel....)	408,000	345,000	753,000
6. Harvesting	550,000	685,000	1,235,000
7. Post harvest activities	1,050,000	1,250,000	2,300,000
III. Machinery (hired)			
1. Plowing,			720,000
2. Threshing			965,000
3. Others			360,000
IV. Irrigation Fee			162,000
V. Payment loan-Interest			580,000
VI. Other costs			330,000
Total Costs			17,587,000
Income from rice production	14,820 Kg	1,700 d/Kg	25,194,000
Income from by products			1,900,000
Home labor costs presented as income			3,663,000
Gross Income			34,620,000
Net Income			17,033,000

Source : From the Survey of 127 Farmers, 51 rice traders and 37 rice processing factories in Cantho and Tiengiang province, 1998 under JICA and SEBA, CTU Project, 1999

Table 6c : The average rice production costs per hectare (for 3 rice crops per year) of 56 farmers in Tiengiang province, Mekong Delta, Viet Nam, 1998

(Unit : VN Dong)

COST ITMES	Home	Hired	Total
I. Input Factors			
1. Varieties			978,000
2. Fertilizers			
+ EREA			1,120,000
+ Supper Phosphate			122,000
+ Kali			230,000
+ NPK			960,000
+ Others			460,000
3. Pesticides			
+ Insecticides			300,000
+ Virus desease			520,000
+ Weedicide			425,000
+ Others			200,000
II. Labors			
1. Land preparation	550,000	680,000	1,230,000
2. Seeding and transplanting	330,000	835,000	1,165,000
3. Crop care, weeding	530,000	940,000	1,470,000
4. Fertilizer application	323,000	357,000	680,000
5. Irrigation (including Fuel....)	524,000	676,000	1,200,000
6. Harvesting	845,000	1,175,000	2,020,000
7. Post harvest activities	980,000	1,000,000	1,980,000
III. Machinery (hired)			
1. Plowing,			710,000
2. Threshing			985,000
3. Others			395,000
IV. Irrigation Fee			162,000
V. Payment loan-Interest			525,000
VI. Other costs			308,000
Total Costs			18,145,000
Income from rice production	17,020 Kg	1,700 d/Kg	28,934,000
Income from by products			2,320,000
Home labor costs presented as income			4,082,000
Gross Income			35,336,000
Net Income			17,191,000

Source : From the Survey of 127 Farmers, 51 rice traders and 37 rice processing factories in Cantho and Tiengiang province, 1998 under JICA and SEBA, CTU Project, 1999

Table 7 : The average selling price of paddy in Cantho and Tiengiang province, 1998

Unit : Dong/kg

Month	1	2	3	4	5	6	7	8	9	10	11	12
Max	1,850	1,963	2,036	2,100	2,111	2,253	2,227	2,267	2,142	2,175	2,125	2,072
Min	1,594	1,618	1,692	1,790	1,717	1,715	1,800	1,738	1,750	1,820	1,681	1,664
Averg.	1,722	1,790	1,864	1,945	1,914	1,984	2,014	2,002	1,946	1,997	1,903	1,868

Source : From the Survey of 127 Farmers, 51 rice traders and 37 rice processing factories in Cantho and Tiengiang province, 1998 under JICA and SEBA, CTU Project, 1999

Table 8 : The average Price of milled rice in Cantho and Tiengiang province, 1998

Unit : Dong/kg

Month	1	2	3	4	5	6	7	8	9	10	11	12
Max	2,600	2,700	2,700	2,900	2,900	2,900	3,000	2,900	2,900	3,000	3,000	3,000
Min	2,425	2,500	2,650	2,700	2,700	2,700	2,975	2,700	2,700	2,800	2,800	2,800
Averg.	2,513	2,600	2,675	2,800	2,800	2,800	2,988	2,800	2,800	2,900	2,900	2,900

Source : From the Survey of 127 Farmers, 51 rice traders and 37 rice processing factories in Cantho and Tiengiang province, 1998 under JICA and SEBA, CTU Project, 1999

Table 9 : The average Wholesale price of rice n Cantho and Tiengiang province, 1998

Unit : Dong/kg

Month	1	2	3	4	5	6	7	8	9	10	11	12
Max	2,680	2,790	2,774	3,008	2,980	2,993	2,988	3,116	3,100	3,107	3,130	3,120
Min	2,497	2,557	2,736	2,765	2,747	2,775	2,971	2,757	2,766	2,729	2,852	2,855
Averg.	2,589	2,674	2,755	2,887	2,864	2,884	2,980	2,937	2,933	2,918	2,991	2,988

Source : From the Survey of 127 Farmers, 51 rice traders and 37 rice processing factories in Cantho and Tiengiang province, 1998 under JICA and SEBA, CTU Project, 1999

2) Marketing margins or profit margins

Marketing margin refers to the difference between prices at different levels of the marketing system. Rice marketing margin is the difference between what the consumer pays and what the producer/farmer receives for his paddy or rice, in other word is the difference between retail price and farm price. The wide margin means high prices to consumers and low prices and incomes to producers. In practice, a wide margin implies an inefficient marketing system, and vices versa.

The value of marketing margin may be subdivided into different components: marketing costs and net returns. The marketing costs include wages as return to labor; interest as return to borrowed capital; rent as return to land and buildings; and profit as return to entrepreneurship and risk capital. In the case of rice trading, marketing margins or profit margins are used to cover the collection of marketing services, which bring the rice from the farmer to consumer. These include assembly, processing, transportation and retailing.

Other component of the marketing margin is net returns according to the various agencies or institutions involved in the marketing of products such as: the return to retailers for their services, to wholesalers for their activities, to processors for their manufacturing activities and to assemblers for the work they perform. The net return is derived by deducting the marketing costs from the marketing margin. The net return is used to reflect the payment for risks, management and capital employed in moving the product from one market level to another.

Profit margin of each type of rice	=	Marketing margin of each type of rice trader	−	Marketing cost of each type of rice

From Table 7, 8 and 9 and the data from our survey, the marketing costs, and gross margin were computed for different rice traders in the marketing process as presented in Table 10.

Table 10 : Marketing costs and gross margins of Farmers, Assemblers, Millers, Wholesalers and Retailers

Cost Items	*Cost per kg (Dong)*	*Gross marketing margin(*) (1)*	*Total mar. cost (2)*	*Profit Margins (3 = 1 –2)*	
				Amount	*%*
I. Farmers		*600*		*600*	*34.28*
1. Producing costs	1,150				
2. Average selling price of paddy	1,750				
II. Assemblers		*80*	*58*	*22*	*1,16*
1. Average buying price of paddy	1,750				
2. Loading and unloading	8				
3. Transportation	50				
4. Average selling price	1,830				
III. Millers		*1,137*	*917*	*220*	*7.50*
1. Average buying price	1,830				
2. Drying, storage	28				
3. Milling and Polishing	100				
4. Others (Interest of capital, Taxes, Licenses...)	57				
5. Conversion ratio (60%)	732				
6. Average selling price	2,967				
IV. Wholesalers		*218*	*120*	*98*	*3.10*
1. Average buying price	2,967				
2. Total marketing cost	120				
3. Average selling price	3,185				
V. Retailers		*115*	*60*	*55*	*1.70*
1. Average buying price	3,185				
2. Total marketing cost	60				
3. Average selling price	3,300				

Source : From the Survey of 127 Farmers, 51 rice traders and 37 rice processing factories in Cantho and Tiengiang province, 1998 under JICA and SEBA, CTU Project, 1999

(*) Note : Gross marketing margin = Average selling price - Average buying price

The total profit margin of the whole rice market system was calculated based on this formulation:

Total profit margin of net profit	=	Gross Marketing Margin	−	Total Marketing cost

Table 11. Total Profit margins of rice traders in Cantho & Tiengiang province

Unit : Dong/kg

Traders	*Avg. buying price*	*Avg. selling price*	*Mar. margin*	*Mar. cost*	*Profit margin*	*Mar.cost as % of grossMM (%)*	*Profit as % of grossMM (%)*
1. Assemblers	1,750	1,830	80	58	22	72.5	27.5
2. Millers	1,830	2,967	1,137	917	220	80.7	19.3
3. Wholesalers	2,967	3,185	218	120	98	55.1	44.9
4.Retailer	3,185	3,300	115	60	55	52.2	47.8

Source : From the Survey of 127 Farmers, 51 rice traders and 37 rice processing factories in Cantho and Tiengiang province, 1998 under JICA and SEBA, CTU Project, 1999

This Table indicated that, among rice traders, rice millers and wholesalers obtained the highest profit margin, 220 VND/Kg and 98 VND/Kg respectively. They also incurred the highest marketing cost, because they are the main intermediaries of the marketing system that provided very important services through out the marketing process-processing, storage and distributing rice to final consumers.

Ⅲ. Analyzing the Difference Between Small Scale and Large Scale of Rice Processing Factories

This section aims to compare small scale and large scale processing and marketing companies at various levels.

1. General information

Depending on the availability of rice milling or polishing machines, millers are classified into three groups: pure millers, polishers, and miller-polishers.

+Pure millers are millers without any polishing machines.

+Polishers are rice processors engaged only in polishing activities and do not mill paddy into milled rice. They buy raw rice from other mills and process it further to white rice

that usually use for export. Moreover, polishers may receive raw rice from traders, they only process its into white rice and collect the processing fee for their activities.

+ The third group of miler-polishers consist of those millers who have also polishing machines. These are the most technologically complete mills, able to process paddy into a polished rice/white rice of high quality suitable for export.

Depending on their daily rate of processing (capacity of milling or polishing machine) and also based on number of permanent workers of their factories, rice millers are further classified into two groups: small/medium and large mills. Small/medium mills have a daily processing rate of less than 2 tons. Large mills have a daily processing rate from 3 to 5 tons and over.

The majority of rice millers in the sample of this study are small/medium scale (56.8 percent). Larger mills, polishers, and miller-polishers constitute the remaining 43.2 percent of the sample. Large mills and polishers involved in milling and polishing are older and have also older management staff with good experiences on rice trading and processing. Polishers and small mills is more recently established.

Table 12 : Characteristics of rice millers in Cantho and Tiengiang province, Mekong Delta, Viet Nam, 1998.

Characteristics	Small scale	Large scale
Structure (%)	56.8	43.2
Stating year of operation	1990	1979
Number of mill/polish machine	1 – 2	5 – 8
Milling capacity (Tons/day)	1.5 – 2.0	10.0 – 15.0
Polishing capacity (Tons/day)	0.5 – 1.0	8.0 – 10.0
Storage capacity (Tons)	2.0 – 5.0	60.0 – 100.0
Number of permanent workers	1- 3	20 – 25

Source : From the Survey of 127 Farmers, 51 rice traders and 37 rice processing factories in Cantho and Tiengiang province, 1998 under JICA and SEBA, CTU Project, 1999

2. *Milling/Polishing and Business Operation*

1) Main business activities

Among 37 rice millers and polishers as the sample of this study, there were 16 millers that are classified as large rice processing factories. Their main business are processing, buying and selling paddy/rice for domestic consume or providing high quality of rice for export.

The data that were collected from this study also indicated that there are 62.5 percent of large processing factories only perform milling and polishing activities. They just provided the service of process paddy to milled rice or from raw rice to white rice and received the processing fee. The remaining 37.5 percent millers responded on buying and selling activities accompany with milling and polishing. They usually buy paddy or raw rice from assemblers of other provinces and local small mills, process into white rice with high quality and then

sell to procurement places of government for export.

To smaller scale of rice millers, it was about 56.8 percent of total rice millers in this study, their major business were buying paddy from farmers or local assemblers, milling and selling milled rice to retailers in local market. On the other hand they also provided the processing service only and received the payment from other rice traders.

2) Assets and source of capital

The main feature of the assets situation for marketing agents in Viet Nam is that the average value of assets is much higher among state-owned enterprises than among private rice traders.

The survey data from this study shown that most of the assets of rice processing factories are in the form of machinery, equipment for processing storage buildings, and transportation facilities, it was more than 70 percent of total business capital on average.

The working capital that used for rice trading and processing are also very important. On average, for small scale of rice processing it was about 20 millions VND needing for operating their milling and business activities. Large scale of mills, of course, need higher demand of working capital, it was about more than 300 millions VND.

The data from this study also indicated that most of the working capital usually obtained from their owned capital (saving, accumulate profit from the last business). In more detail, for large scale of mills, the sources of working capital come from:

+ 87.50 % from their owned money
+ 6.25 % borrowing from their relatives or friends
+ 6.25 % loaning from government banks

In the case of small-scale millers, they obtained the working capital from their owned money, no one need to borrow from other sources.

3) Buying and selling activities

Buying and selling paddy/rice are the main activities of marketing agents. Those activities also are important to rice processing factories, especially to large scale of mills, because large millers need an adequate amount of paddy or raw rice throughout the year as material for their processing activities. Buying adequate amount of paddy/raw rice and selling them are the major factors that effect to the economic efficiency of rice millers.

The procurement and sales of paddy/rice of small and large mills are presented in Table 13.

Table 13 : Buying and selling activities of rice mills in Cantho and Tiengiang province, Mekong delta, Viet Nam, 1998

Activities	Small scale	Large scale
Total buying (Tons)	22,446 (62%)	13,800 (38%)
Source of buying	(1)Local assemblers in the province 97.5% (2)Others 2.5%	(1) Assemblers from other provinces 42.8% (2) Local assemblers in the province 18.5% (3) Local small millers 38.7%
Buying arrangement	Free delivery from sellers	Sometime have to pick up from sellers
Who set the price	(1) Rice millers 42% (2) Market price 58%	(1) Rice millers 32% (2) Sellers 20% Market price 48%
Method to contact suppliers	(1) Sellers go to mills 75% (2) Permanent clients 15% (3) Others 10%	(1) Sellers go to mills 44% (2) Permanent clients 38% (3) New clients 6% Others 12%
Mode of payment	100% in cash	Mostly in cash
Selling to	Domestic consumers + Private procurement + Wholesalers + Retailers	(1) Domestic 38% (2) Export 62% + Food companies + Procurement places + Long distance Assemblers
Selling arrangement	Traders come to buy	Traders come to buy and sometime have to deliver
Method to contact buyers	(1) Permanent buyers 30% (2) Buyers come to buy 55% (3) Others 15%	(1) Permanent buyers 64% (2) Buyers come to buy 30% (3) Others 6%
Who set the price	(1) Buyers 25% (2) Market price 75%	(1) Millers 10% (2) Buyers 10% (3) Market price 80%
Why the price is vary	(1) Quality of rice 32% (2) Wholesale 25% (3) Effect of market price 43%	(1) Quality of rice 40% (2) Effect of market price 54% (3) Others 6%
Mode of payment	100% in cash	Mostly in cash
Type of products	(1) 10% – 15% broken rice 40% (2) 20% – 25% broken rice 60%	(1) 5% broken rice 30% (2) 10% - 15% broken rice 34% (3) 20% - 25% broken rice 23% (4) 35% broken rice 13%
Promotion efforts	Mostly in terms of milling or polishing price (discount)	(1) Discount 27% (2) Credit supports18% Others (gifts) 55%

Source : From the Survey of 127 Farmers, 51 rice traders and 37 rice processing factories in Cantho and Tiengiang province, 1998 under JICA and SEBA, CTU Project, 1999

4) Processing and marketing costs

Marketing costs to millers and polishers are usually in terms of (1) procurement expense such as transportation, loading and unloading, taxes, depreciation... and (2) milling/polishing costs that included : fuels, labors, preparation and maintenance of equipment/machine, license, taxes, risks or storage loss...

The procurement expenses are computed based on the information from private and government procurement places. On average, it was about 11,000 dong/tons (11 dong/kg) for loading and unloading from/into the boat/truck or warehouse. The transportation costs around 120 km distance was 56,000 dong/tons (56 dong/kg).

From the data that were collected in this study, the average processing costs per tons of paddy/rice are computed for small and large scale of mills (see Table 14 and Table 15)

Table 14 : Average milling and polishing costs of small processing factories in Cantho and Tiengiang province, Mekong Delta, Viet Nam, 1998.

Unit : Dong/tons

Cost Items	Milling		Polishing	
	Costs	*%*	*Costs*	*%*
1. Fuel, electricity, materials	22,980	28.40	21,800	33.43
2. Labors	16,290	20.14	13,200	20.25
3. Prepare/maintenance equipment and machines	17,280	21.36	10,750	16.48
4. License and taxes	15,800	19.53	13,450	20.63
5. Loss/risks	3,600	4.45	2,450	3.76
6. Others	4,950	6.12	3,550	5.45
Total	**80,900**	**100.00**	**65,200**	**100.00**

Source : From the Survey of 127 Farmers, 51 rice traders and 37 rice processing factories in Cantho and Tiengiang province, 1998 under JICA and SEBA, CTU Project, 1999

Table 15 : Average milling costs of large processing factories in Cantho and Tiengiang province, Mekong Delta, Viet Nam, 1998.

Unit : Dong/tons

Cost Items	*Costs*	*%*
1. Electricity, water	28,890	23.24
2. Fuel, material	27,850	22.41
3. Labors	32,870	26.45
4. Depreciation	14,550	11.71
5. Prepare/maintenance equipment and machines	9,180	7.39
6. Overhead, managerial costs	3,290	2.65
7. Taxes and license	6,540	5.25
6. Others	1,130	0.90
Total	**124,300**	**100.00**

Source : From the Survey of 127 Farmers, 51 rice traders and 37 rice processing factories in Cantho and Tiengiang province, 1998 under JICA and SEBA, CTU Project, 1999

Table 14 and Table 15 shows that the large mills incurred higher milling costs (124,300 dong/tons compare with 80,900 dong/tons). The main reason of this problem is because large mills have to bear high managerial costs, taxes, license and also large expenses for storage and drying paddy before process. However, the finished products from large mills-"white rice"-are high quality products.

IV. Mekong Delta Storage Facilities and Transportation Systems

This section analyzes the current situation on storage facilities and transportation system.

1. The Current Situation of Storage Facilities

As is well known, because of specific characteristics in agricultural production, the output of paddy is dependent on many uncontrollable factors, such as weather, price fluctuations, floods, etc. Also, paddy and rice are seasonal and easily spoiled. Hence, the relationship between supply of and demand for them fluctuates each month in a year. Thus the necessity for storage aiming to balance this relationship.

The Mekong Delta has a unique characteristic relating to transportation. This characteristic is the many canals and rivers which flow through the delta. Paddy and rice are almost always transported by boat and this affects the cost of marketed paddy and rice. Studying the transportation system is important and is included in this report.

Who participate in the paddy-rice storage process?

Through surveys in two districts, O Mon (Çan Tho province) and Cai Be (Tien Giang province), it is recognized that the storage process is conducted mainly by food companies and state-farms. The information collected from the interviews reflects this situation.

- *For farm households*: there are three reasons why the number of farm households participating in storage is small.
  + 95% of farm households responding said that they have never stored paddy because they have to sell their product as soon as harvested in order to pay the debts for production materials as well as for paying bases and interest to banks and private lenders.
  + Some of them who were asked why they do not store paddy responded that because they do not have good storage facilities, it often leads to a loss because of spoilage.
  + When asked whether they store paddy with an expectation of increased prices, their responses were negative. The reason was that they lack price information. Hence, they do not want to store a product, which has a high risk.

- *For retailer*: there are three reasons why they are not willing to conduct storage.
  + *95% of the interviewed retailers complain that they lack capital for storage while they have to apply many kinds of promotions to attract customers, such as reducing prices, selling on credit, etc.*
  + Most retailers' say that the quantity of rice sold per retailer is decreasing day by day because the number of retailers is increasing much more,
  + The majority of retailers have to rent a place for selling, hence, they do not have enough space for storage even if they wanted too.

– *For wholesalers*: according to the respondents, storage capacity was largely built in the 1980s, but not much is being built now because the open market mechanism permits fast circulation. Storage has become unnecessary for them and is without profit, especially in a situation of high inflation. In addition, competition among them, as well as between them and other buying networks, such as food companies and state farms, has led to a decrease in their market share. As well, an increase in prices for paddy and rice has led to a decrease in profit from storage. As is well known, paddy-rice storage requires a large amount of capital while the capital sources for the wholesalers is less than that for the state farms and food companies. Furthermore, the capacity of the state farms and food companies to access capital from many other sources is greater and easier than for wholesalers. Another disadvantage of wholesalers, affecting the issue of storage, is that it is really difficult for them to directly export. Instead, they have to depend on rice-exporting companies, such as state-farms, food companies, and export-import companies. Finally, their storage facilities are relatively large, but the technical capacity to store is still low leading to a high cost for handling. Currently, storage of paddy and rice is mainly based on available contracts and they store only enough to deliver goods in a short time.

– *For retailers*: one of the characteristics of retailers is that they have little capital, so they are not into storage. They generally have one of two styles of operation.

+ Some use their own capital to buy paddy from farmers, and process it into rice. They then sell rice to millers or other retailers with a gross margin.
+ Others, regardless of their own capital, borrow or receive an advance payment from a miller to buy paddy from farmers. After milling they sell rice to the millers who give them an advance payment.

– *For state farms*: based on many previous researches on the system of state farms by students and master students belonging to the school of economics and business administration-Can Tho University and through the survey on Co Do state farm in Can Tho province, it is recognized that storage is almost always done by and on state farms. This is because their current business cycle is closed from production to export. Their source of paddy and rice is from both buying and self-production. Their storage facilities are modern and relatively large. In addition, their technical level of knowledge about storage is high, such as having enough facilities for drying paddy before storage, as well as for keeping a necessary level of humidity for paddy or rice in storage.

– *For food companies*: being a company in rice export and belonging to the system of state companies, they have functions not only in commerce, but also in supporting farm households' productive activities through supplying fertilize service. They almost seem to conduct storage aiming to completing the above functions. As a result, because demand for storage is high, their storage facilities are also better equipped and are larger and more modern than the four participants mentioned above.

Generally, mainly state farms conduct the current storage of paddy-rice in the Mekong Delta and food companies with a relative large system of storage facilities in spite of not big enough compared with storage demand. The issue of storage is, in fact, dependent on many factors, such as price, demand, customer, and storage facilities. These factors interact and have a direct affect to decision-making in storing. Hence, to analyze the current situation of storage facilities, it is important to analyze the following participants, Co Do state farm and Can Tho food company, who are mainly into storage.

What kinds of products do they store?

Currently, state farms and food companies store both paddy and rice, the storage structure of these two products is presented on the following table.

Table 16. The storage structure of paddy and rice of Co Do State farm and Can Tho food company in 1998

Indicator	Co Do state farm	Can Tho food company
Total quantity of storage paddy and rice (tons)	30000	45000
In which:		
- paddy (tons)	21000 (70%)	9000 (20%)
- rice (tons)	9000 (30%)	36000 (80%)

Source: From the survey data, under JICA and SEBA, CTU Project, 1999.

From the data in the above table, the storage modality among these two organizations is significantly different. While Co Do state farm stores mainly paddy (accounting for 70%), Can Tho Food Company stores mainly rice (accounting for 80%). To explain why they do that, we conducted an interview with these two companies, and the following information was obtained from these interviews.

– *For Co Do state farm*: when asked about why it favors storing paddy, it gave three reasons.

+ First, because the state farm invests some materials in farmers'productive activity in advance, it has to buy the paddy produced by the farmers who signed a production contract with the state farm before growing. This quantity of paddy sometimes either exceeds the selling ability of the state farm, or has not quantitative and qualitative enough to sell. For example, the quantity and quality of paddy from the autumn-summer rice crop are usually less than that from the spring-winter rice crop, hence, like any paddy-rice business organizations, the state farm always stores paddy in the spring-winter crop.
+ Secondly, on the technical base, storing paddy is likely to keep the quality higher than rice, because rice is more easily spoiled compared with paddy in the storage process. As a result, the state farm can store paddy for a longer duration leading to flexibility in facing the fluctuations of market prices.
+ Thirdly, although the state farm has a higher cost storing paddy compared with storing rice because of a higher demand for space, a higher cost for loading, etc. it can use

machines and equipment efficiently as well as decrease the cost of borrowing capital for storage because the price of paddy is cheaper than that of rice. In addition, if the state farm stores paddy instead of rice, it will get some benefit from sub-products of paddy, such as rice husk, bran, broken rice which can be used for husbandry development contributing in increasing farmers' income.

– *For Can Tho food company*: the same question was given to this food company, but an opposite reply was stated. According to this company, the reasons why the company is in favor of storing in rice instead of paddy are as follows.

+ Storing rice decreases the storage cost for them because it requires a smaller space compared with the space required to store paddy. As is known, after progressing 1 tonne of paddy becomes from 0.72 to 0.78 tonne of rice.

+ Because the demand for styles of rice from customers is very different, storing rice permits them to be more flexible in meeting these diversified demands. For example, they will use the stored quantity of rice usually under style of 5% broken rice from the spring-winter crop to mix with style of 25% broken rice from the autumn-summer crop aiming to making style of 10% broken rice.

Generally, the state farms and food companies participate in the storage process either in favor of paddy, or in favor of rice. This depends on not only their business points of view, but also on their own business characteristics, the fluctuation of market prices, and the consuming behaviors of customers.

When, How long, and how much they store?

One of the characteristics of agricultural production is its very high seasonal nature. Rice production is not, of course, an exception. Paddy-rice products are certainly dependent on the rice-crops structure. Currently, there are the two main modules of rice production in The Mekong delta, in general, and particularly in Can Tho and Cai Be provinces. These crop structures are represented in the table below.

Month Crop	1	2	3	4	5	6	7	8	9	10	11	12
1.Spring-Winter												
2.Winter-Summer												
3.Summer-Autumn												
4.Autumn-Winter												

Through the schedule for crops represented above and interviews of staff of Co Do state farms and Can Tho food company, it is recognized that.

– The storage process is happening mainly with the first crop because paddy in this crop has the best quality, and its yield is almost the highest leading to a cheap price, while the yield and quality of the remaining crops are lower. Besides, the weather in this crop-season is suitable for storage. Hence, storing paddy and rice from this crop leads to the following

advantages;

+ High profits because of the cheap price of paddy and rice and low storage costs.
+ Keep market share sustainable because of meeting the demand for rice by customers in both quantity and quality.

The quantity of paddy and rice stored from this crop is often the highest, accounting for 60% of the total amount of stored paddy and rice annually. In addition, the maximum storage duration of this crop is 3 months for rice and 8 months for paddy. However, in recent years the amount stored is smaller because of the following reasons.

+ Lack of capital for storage.
+ The growth of rice exported.
+ High costs of storing and maintaining.

Hence, in the recent years they have stored only based on available contracts plus a small amount bought with their own available capital. The paddy-rice quantity stored from the remaining crops is small mainly because either these products are in the process of waiting for collecting or progressing, or the state farm and the food company have not found an available contract. The maximum storage duration in these crops is 2 months. So, once they have made decisions for storage, such as what kinds of products, when, how long, and how much they store, how they store is another question needed to be analyzed, aiming to fully describe what is the current situation of storage facilities.

To make this analysis easier, a figure 6 of the storage process is set out below.

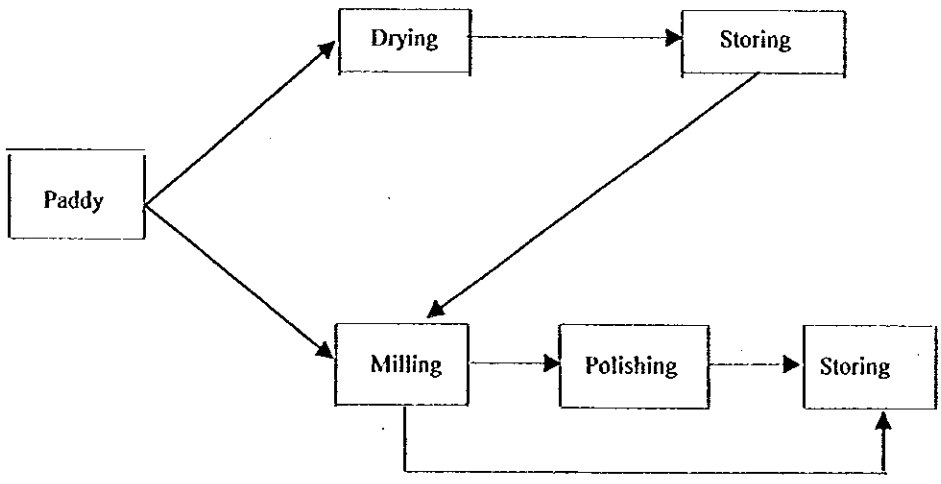

Figure 6. The storage process

Paddy, before being brought into storage houses is dried by dryers. In contrast, if they store rice, paddy is milled to become rice under styles of 20%-35% broken rice. And if they want to make the rice styles with a higher quality (5%-15% broken rice). They then either mix these styles together, or polish them one pass or two passes by polishers. After that, they put them into storage. To recognize how they store, it is necessary to evaluate the capacity of available equipment for storing at Co Do State farm and Can Tho food company (see the

below table).

Through the survey of staff of Co Do state farm and Can Tho food company, they said that the annual storage quantity of paddy and rice are some 30,000 tonnes and 45,000 tonnes, respectively. Hence, according to the below table, Co Do State farm has a lack of space for storage. As a result, in recent years the state farm has signed storage contracts with private households who have unused storage houses. According to these contracts, the state farm pays a money amount in advance to these households for buying paddy with a defined price that is usually lower than the market price at that time. Beside, these households are allowed to count a diminished quantity of 1.2%. The storage duration for these households is about 4 months.

Table 17. Equipment for storing at Co Do State Farm and Can Tho Food Company.

	Production Capacity							
	Milling		Polishing		Drying		Storing house	
	(unit)	(tons /hour)	(unit)	(tons /hour)	(unit)	(tons /hour)	(m^2)	(tons)
Co Do state farm								
1. Co Do factory	1	4	1	4	1	4		5,000
					9	9		
2. Cannel No 5 factory	1	10	0	0	0	0		0
3. Cai Rang factory	1	7	1	7	0	0		3,000
4. Rach Soi factory	0	0	0	0	0	0		1,000
5. Long My factory	0	0	0	0	0	0		1,000
6. Cannel No 4 factory	0	0	0	0	0	0		5,000
7. Cannel No 1 factory	0	0	0	0	0	0		6,000
8. Binh Thuy factory	0	0	0	0	0	0		1,000
Total	3	21	2	11	10	13		22,000
Can Tho food company								
1. Can Tho factory	5	8.8	7	18.6	4	26.0	14,168	22,700
2. Tra Noc factory	2	4.0	6	18.0	2	10.0	7, 475	8,550
3. Vi Thanh factory	2	3.5	5	15.0	3	9.0	4,721	8,000
4. Long My factory	1	2.0	6	15.0	3	16.0	4,811	9,500
Total	10	18.25	24	66.6	12	61.0	31,175	48,750

Source: From the survey data, under JICA and SEBA, CTU Project, 1999.

In general, the purposes and the ways for storing paddy-rice by agents in the paddy-rice business and production process are different. For farm households, they store paddy for the purpose of eating or husbandry with a simple storage means. Their storage duration is usually 3-4 months. For retailers and wholesalers, they seem not to store because of a lack of capital. A minority of them participate in storage with an expectation of an increase in price.

2. The Transportation System

The transportation system can be described based on the distribution channels of paddy-rice. Generally, most of the paddy-rice transportation is done by boat. Transportation by boat is cheaper than by any other means of transportation. The transportation cost by boat is from VND 20-30 per ton. In addition, because there are many rivers in the Mekong

Delta, it is very convenient to transport goods.

The paddy produced by farmers is bought by small retailers or buying teams of food companies, state farms, and other commercial companies which usually take boats, in this case, to every farm household to buy. After that they will either bring it into mills to process, or directly sell to bigger retailers or wholesalers. Both of these activities are conducted by boat. After collecting a certain amount of paddy and rice, these retailers and wholesalers bring it by boat to sell to state farms, food companies, or other commercial companies. Also, the companies in rice export, which are state farms, food companies, and other commercial companies bring it into the ports for export.

V. The Mutual Provision of Credit and Market Information Among Rice Traders And Farmers

This section focuses on the relation between traders and farmers in order to identify current situation on credit availability, frequency of visits to farmers by traders, availability of market information, etc.

1. Overview of the relationship between rice traders and farmers

The Mekong River Delta (MRD) has been considered the heart of rice production in Viet Nam. The network of warehouses, mills, polishers, processers, etc., facilitating rice export has been increasingly improved and developed. Currently, the country has a warehouse system with the capacity of 1,875,000 tonnes. Over the country, there are 626 state-owned milling factories and thousands of private factories with a total capacity of around 15 million tonnes per annum. Of this, the private sector shares 70%. In Can Tho, the storage capacity is 1 million tonnes of rice for export. In two studied districts , O Mon and Cai Be, there are about 300 enterprises participating in trading, milling and processing rice for export.

The market for trading and processing rice for export in the delta now is working busily. This increased activity partly comes from the mutual provision of credit and market information among rice traders and farmers. The relationship between traders and farmers will be discussed through information collected by the survey as follows.

Under the command economy, farming suffered from self-sufficiency, production was primarily aimed at home consumption, then to exchanging for other necessary goods. Rice production was not an exception. Thus, in the Mekong Delta, the formation of a market system connected closely with the formation of residential areas. At present, production has overcome self-sufficiency, rice yield has been increased, while rice for home consumption is decreasing relative to the total yield. The fact shows an increase in quantity of tradable rice.

Table 18. The average consumption of people in the Mekong Delta

Items	Unit	1995	1998	98/95 (%)
Total expenditure	Dong/head	144,637	181,164	125.25
Rice	Kg/month	12.73	11.04	86.72
Meat	Kg/month	1.01	1.63	161.39
Fish	Kg/month	1.00	2.75	275.00
Sugar	Kg/month	0.59	0.83	140.68
Clothes	M/year	4.76	3.94	82.77

Source : Saigon Tiep Thi, No.42, Oct. 24th, 98

The table shows that the average quantity of food consumption per head is decreasing, compared with the previous years (13.28%). While the number of agricultural households in the delta now is counted for 2.347 million, each household contains 5-6 persons, the volume of tradable rice is increasing. Thus, trading, nowadays, is different from the previous days, sole traders are decreasing with every passing day and are being replaced by larger middlemen. The procurement system in rice trading closely connects farmers with traders.

2 . The provision of market information among traders and farmers

The procurement system has brought traders and farmers together in providing each other with market information. The volume of paddy rice traded by months is presented in table 19.

Table 19. Information on rice market in Summer-Autumn crop, 1998

Month	Number of households selling	Volume (kg)	Average price (VND/kg)	Buyer		
				Private traders	Rice companies	Others
1	14	50,340	1,750	14	0	0
2	6	23,490	1,838	5	0	1
3	0	0	0	0	0	0
4	7	16,160	2,015	7	0	0
5	9	16,780	1,822	9	0	0
6	8	14,690	1,844	7	0	1
7	5	18,430	1,780	5	0	0
8	9	27,410	1,872	9	0	0
9	30	475,230	1,864	29	1	0
10	8	21,100	1,838	8	0	0
11	5	18,278	1,970	4	0	1
12	1	5,480	1,850	1	0	0

Source : survey data, 1999

As shown in the table, generally, today farmers recognize the storage of rice with the expectation of better price. The biggest volume traded occurs in September with the biggest number of attendances, 30 households and 475,370 kg of rice. Farmers mostly sell their products to private traders and a very few to others. The rice prices vary among months in year. The highest price is about VND2,015 per kg in April and the lowest is 1,750 in January.

33.1% of sampled households say they have already been either familiar with traders in advance or introduced by the neighbors. The remaining household say traders themselves look for sellers to purchase rice. Some farmers refuse to answer this question.

59.1% of sampled farmers sell their rice to local traders, the remaining to traders outside their provinces. Farmers sell to these persons, for the following reasons:

- They owe the buyers. This case accounts for a small portion, 1.57%.
- Reasonable prices account for a great part, 55.91%.
- Other reasons such as diseases, etc., account for 12.6%.

Thus, a great part of the volume traded is due to a close relationship with traders. The way the traders know where and what price to buy is explained through the answers of 50 households.

- They experience trading at the local areas, they are living at the same village with the sellers and so they know when and what price to buy. This case accounts for 24%.
- A few traders living at other locations specialize in trading and look for sellers everywhere with lower prices to get profits. This group is counted for 4%.
- A great part of big traders procure from other provinces to obtain huge quantities for reselling to rice companies in time. They account for 70% of sampled traders.
- 2% say no idea.

Regarding payment, cash is the most prevailing procedure since it is convenient. It occupies 96.08% of the total payment in trading. The remaining make payment after a few days, 3.92 %. This shows the fact that the relationship between the sellers and buyer is based on the fair agreement at each deal. They know each other through advance familiarity.

3. The provision of credit among rice traders and farmers

Generally, the farmers' gain of high yield and quality is partly supported by credit organizations. The credit organizations farmers can access are listed as follows: Bank for Agriculture and Rural Development, Bank for the Poor, the People's Credit Fund and familiar relations (table 20).

Table 20. The source of credit for farmers

Source of credit	Number of households borrowing	% of sampled households
Bank for the Poor	25	43,86
The People 's Credit Fund	15	26,32
Bank for Agriculture and Rural Development	10	17,54
Familiar relations	5	8,77
Other banks	2	3,51

Source: from the survey data, 1999

Farmers get access to credit mostly due to State policies on agricultural and rural credit.

For rice traders, their capital mainly comes from sources listed as follows.

- 27.45% of traders get loans from private sector. In 1998, each trader borrows an average amount of VND21,786,000 at an average interest rate of 4.75% per month.

- 25.49% of traders borrow from banking system, each household get an average amount of VND12,462,000 per month at the rate of 1.5% per month lower than that from the private sector about 3.25%.
- There are 9.8% borrowing from other social organizations with an average amount of 15.1 million dongs per month at an unidentified rate.
- The rest works on their owned capital.

Table 21. The sources of loans for rice traders in 1998

Sources	% of households borrowing	Amount (VND)	Interest rate (%)
Private sector	27.45	21,786,000	4,75
Banking system	25.49	12,426,000	1,50
Other sources	9.80	15,100,000	...
No borrow	37.26	.....	...

Source : from the survey data, 1999

As analyzed, the relationship between rice traders and farmers in providing credit and market information is that they agree with the payment procedure based on fair agreement of each deal as said previously. Thus, they do not affect each other. The case is not good since it has not created a closed process of rice production and trading in the Mekong Delta. Some remarks can be mentioned :

- The loosen the relationship between production and trading makes trouble for farmers because of uncertainty market.
- The traders have not used credit for payment in agricultural product procurement.

Derived from two above problems, selling by farmers in the Mekong Delta is entirely spontaneous and subjective, not based on any market theory. Once the Mekong Delta overcomes these problems, rice and agricultural production and trading will become more and more efficient and developed.

VI. Mass Organizations and Its Role in Marketing of Agricultural Products.

This section pays attention to mass organizations with an emphasis on its role in marketing of agricultural products. The research aims to identify the need for and the practical role of mass organizations such as Farmers' Groups and Cooperatives, Farmers' Club, Farmers' Union, Women s' Union and Extension Service Club, Veteran s' Union in marketing of agricultural products.

Developing the agricultural economy and rural areas is considered one of the core action programs in the economic development strategy of Viet Nam. To response to problems in the market economy is difficult, not only for producers in general, but also for agricultural producers in particular. Due to the long production cycle, the market arrangement for agricultural products is increasingly becoming important, since the market determines

investment in production.

This argument raises the question that agricultural business has to depend on the output market so as to determine the input factors as well as the investment in both short term and long term. In Viet Nam, over 90% of total agricultural output are produced by individual households, especially, for certain products, this number comes up to 99-100%. However, because of the constraints on the peasant economy, an individual household alone is not able to cover the whole production process. Derived from the desire for agricultural production cooperation, individual households need help from the government and the social community to solve the problems of small scale production. Other countries and Viet Nam have experienced that wherever the cooperatives perform well in association with the active performance of Farmers' Club, Extension Service Club, Women's Union, etc., the peasant economy strongly develops and so improves the standard of living of individual households.

Findings of the research are that the performance and the role of mass organizations in agricultural production and business, and rural areas are as follows:

1. The economics of cooperatives

Due to reform in agricultural and rural management, so far over 17% of the agricultural cooperatives and 90% of the farmers' groups have been dissolved. Of the remaining cooperatives, 10-15% transfer into new performance contents and procedures to become more efficient. In addition to the remaining cooperatives and groups, there exist new patterns of cooperatives for farmers, however, most of them are informally uncompleted cooperative organizations.

Recently, Resolution 10 of the Political Ministry has marked a turning-point in agriculture, rural development. Individual households are recognized as a self-managed economic agency, the agricultural self-sufficient economy has changed into a market economy. However, the peasant economy, although strongly developed, faces a great constraint in development. They themselves have to respond to complicated changes in the market economy that result in new problems in production and living. Production is characterized by small scale production that lacks capital and conditions for development and so results in the uncompetitiveness of agricultural products. This fact leads to a need for cooperation between individual households. In several places of the Mekong Delta, farmers have voluntarily established many organization forms like cooperatives but they are not actually economic agencies and hence, they have not created the capacity that an actual cooperative economy must have done.

In marketing agricultural products, it is evident that high prices require high product quality. In doing so, a series of questions about the improvement of breed, cultivation technology, crop, harvest, storage and processing have been raised in the context of a lack of capital, irrigation, etc. Thus, the need to develop the cooperative economy has been given

top priority in order to create a water resource, irrigation and dikes along fields. Farmers contribute money, labor and property to establish voluntary functional cooperatives such as: water resource groups, land preparation groups, input supply groups, drying groups, credit groups, etc. The desire to cooperate of farmers is presented in table 22.

Table 22. The necessity of cooperative

Grade of neccessity	Number of households	Percentage (%)
Very necessary	51	39.84
Necessary	24	18.75
No need	14	10.94
No idea	39	30.47
Total	128	100.00

Source: from the survey data, 1999

From table 22, farmers need cooperation, however, a great part of them are afraid of a repeat of previous cooperatives. The operation of farmers' organizations is disconnected and seasonal based on the functions of each farmers' group. There are only 7.03% of sampled households participating in cooperatives.

Table 23. Participation in cooperatives

Group	Number of households	Percentage (%)
Current participation	9	7.03
Expected participation	43	33.59
Former participation	36	28.13
Former and non-participation	12	9.38
No idea	28	21.87
Total	128	100.00

Source: from the survey data, 1999

33.59% of households say they will participate if and only if new cooperatives' operation is improved, different from former cooperatives and it actually helps them solve problems they face. Households who used to participate and now do not want to do so account for 28.13% and taken households with no idea and households with no participation in future together, the number comes up to 59.38%.

In practice, the performance of cooperatives and farmers' groups only occur at the input service stage such as: water pumping, land preparation, input supplies, and credit. These actions help individual farms gain technique and experience to do business, improve the production efficiency and facilitate credit access. However, the market for agricultural output still remains a big problem. Very few cooperatives take this function. The main action to improve the situation is to train the management staff. Due to the current operation of cooperatives, management staff with no skill of business management is not able to maintain effectively the cooperatives' performance.

2. *Other mass organizations*

1) Farmers' Union

The Farmers' Union is a social organization helping farmers solve problems in production, living and construction of rural area. The performance of the union at the survey sites seem to be less effective and inappropriate with the farmers' need and so it actually has not been attractive to farmers. The number of households participating in the union only accounts for 12.3%. The grade of necessity of the union is given in table 24.

Table 24. The necessary grade of Farmer Union

Grade	Number of households	Percentage (%)
Very necessary	39	30.47
Necessary	7	5.47
No idea	82	64.06
Total	128	100.00

Source : from the survey data, 1999

The figure shows that the effect and attractiveness of the union's performance is not effective. The recommendation of sample farmers to develop the union is focussed on the role of the leader. He or she is required to have management skills, and a good reputation in the community to undertake activities useful for members.

2) Women's Union

In agriculture, women account for 53.3% of the total labor. They play an active role in agricultural production and rural development and contribute about 60% of the total agricultural output.

According to the survey data, the union appears to be effective and brings practical benefit to its members. Through the operation of the union, women realize the performance of credit organizations such as: Bank of Agriculture and Rural Development, poverty alleviation programs, international and NGOs, etc. 87.25% of sampled farmers say they know organizations providing credit through activities of the union. Women who do not take part in community activities almost do not know about loan projects. However, the decision on borrowing loans mostly belongs to the men (77%). The remaining 23% occur in cases that the head of family is woman or their husbands are absent.

3) Extension service club

Extension service clubs have been organized from the provincial level to the village level in the rural areas. Their functions are to disseminate, instruct and assist farmers on farming technologies, new varieties, protection of pest incidence and then to decrease the cost of production and increase the incomes. The clubs also help farmers understand state regulations, agricultural and rural development policies. In addition, they help farmers with production,

living organization, efficient business accounting and access to the market economy. However, at survey sites, the performance of extension service clubs seems to be less effective. Even, some of sample households say they do not know these organizations. The number of households participating in these organizations counted for 24.9%. The clubs often operate in close relation with the woman Union, credit groups, farmer union, etc.

VII. Conclusion

Developing wholly sustainable and effective Vietnamese agriculture and rural areas based on household-managed farms requires the development of a market that is the measure of efficiency of the performance of production and business.

The farmers are the first link in the marketing chain. They harvest their rice crops and supply the products to the second agent. Acting as suppliers, the farmers could contact with Village merchants, Town merchants and State companies. The small size of farmers' rice production is one of the main factors, which affects farmers' decision making on marketing their rice. They marketed their rice individually. There was no cooperation in marketing among rice farmers that was observed in two surveyed areas.

Among rice traders, rice millers and wholesalers obtained the highest profit margin, 220 VND/kg and 98 VND/kg respectively. They also incurred the highest marketing cost, because they are the main intermediaries of the marketing system that provided very important services through out the marketing process-processing, storage and distributing rice to final consumers.

The purposes and the ways for storing paddy-rice by agents in the paddy-rice business and production process are different. For farm households, they store paddy for the purpose of eating or husbandry with a simple storage means. Their storage duration is usually 3-4 months. For retailers and wholesalers, they seem not to store because of a lack of capital. A minority of them participate in storage with an expectation of an increase in price. The state farms and food companies participate in the storage process either in favor of paddy, or in favor of rice. This depends on not only their business points of view, but also on their own business characteristics, the fluctuation of market prices, and the consuming behaviors of customers.

The research showed that it has not created a closed process of rice production and trading in the Mekong Delta. The loosen the relationship between production and trading makes trouble for farmers because of uncertainty market. The traders have not used credit for payment in agricultural product procurement.

Derived from above problems, selling by farmers in the Mekong Delta is entirely spontaneous

and subjective, not based on any market theory. Once the Mekong Delta overcomes these problems, rice and agricultural production and trading will become more and more efficient and developed. In addition, it is necessary to combine with the performance of farmers' organizations. Development policies, and solutions should be carried out systematically and synchronously in order to complement each other. Besides, the State should focus on the development of a cooperative economy to facilitate farmers extension service, especially to arrange market for agricultural products.