

Chapter 3

The Study Area / Field

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3.1 Rice Production

3.1.1 Overview

Cambodia's most important agricultural commodity, rice, accounted for nearly one-third of total agricultural output and about 13 % of total GDP in 1998. Also, it takes up nearly 90 % of total cultivated area.

There are serious problems, partly the result of three decades of war and civil strife. Displacement of farmers, land mines, abandoned fields, continuing insecurity and shortage of manpower have caused a significant decline in paddy area from 2.5 million ha in 1967 to 1.9 million ha in 1999/2000. Only a small fraction of the 234,000 ha of irrigated dry-season rice land is presently fully irrigated.

Major crop losses occur once every three to four years. Besides natural disasters, the subsistence nature of agriculture is another productivity-inhibiting factor. There is, for example, limited use of improved crop varieties and fertilizers.

Agricultural support services, especially input supply, research and extension, marketing and credit, are just being started from scratch with foreign assistance.

3.1.2 Rice Ecosystems and Cropping Patterns by Region

Rice ecosystems in Cambodia are diversified and can be classified into four (4) systems as follows:

(1) Rainfed Lowland Rice

This ecosystem is grown in banded fields that are almost completely dependent on rainfall and runoff water. The depth of floodwater can range from 0 to more than 25cm. However, depths of 50cm or more may be experienced for short periods.

Rainfed lowland rice is cultivated in all the provinces of Cambodia. However, the largest areas are around the Tonle Sap, the Tonle Bassac River, and the Mekong River. The farmers broadly classify rainfed lowland areas based on three varieties of mature rice groups, namely Early, Medium and Late-duration rice. Early-duration varieties are grown in 20 %, medium-duration in 41 % and late-duration in 39 %, of the rainfed lowland areas. The early varieties are grown in high fields, medium varieties in middle fields, and late varieties in low fields of the rainfed lowland areas. In general, the high fields are generally more drought prone while the low fields are more floods

prone.

In the early group grown on high fields, the rice consists of both photoperiod-sensitive and photoperiod-insensitive varieties. Generally, photoperiod-sensitive varieties are short day plants, and flower and mature at determinate periods of the year, while the photoperiod-insensitive varieties do not require short day to set flower; their maturity depends on specific period of time after they are sown. In medium and late groups, only photoperiod-sensitive varieties are grown.

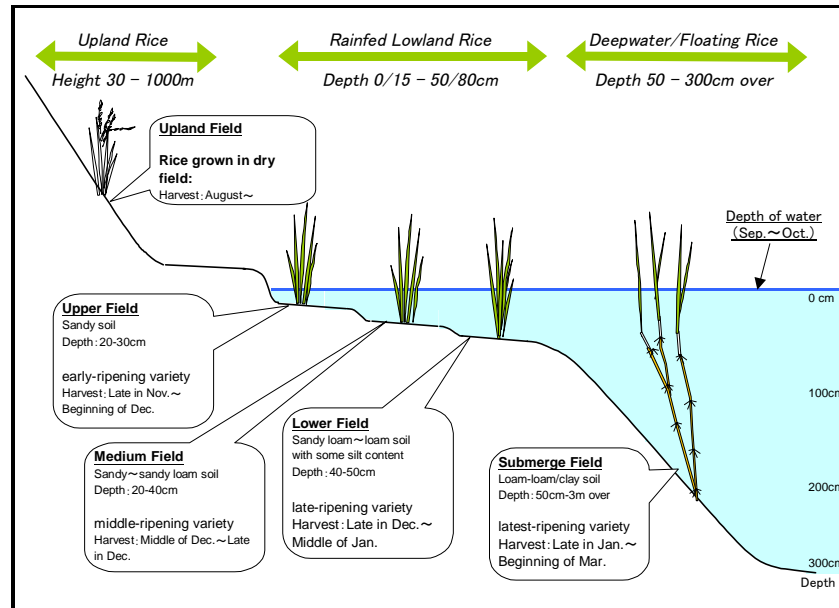
(2) Deepwater Rice (Floating Rice)

Deepwater rice is grown in low-lying areas and depressions that accumulate floodwater at a depth of 50cm or more and in some places the water depth can be as deep as 4 m. The floodwater comes from the Tonle Sap, the Mekong and Tonle Sap – Bassac rivers. Their tributaries flood the low-lying areas and depressions, a portion of which is planted with deepwater rice. Generally, the water rise in these areas is always intensified by local rainfall.

Production practices of deepwater rice are relatively simple and involve very minimal inputs. The farmers usually begin the cultivation with the burning of straw and stubble remaining in the fields. This practice takes place between February and early April. The unbunded field is ploughed once or twice, after which dry seeds are broadcasted. Seeding time in the southern provinces including Takaev, Prey Veang and Kandal is usually from late April to May, while in the northern provinces such as Bat Dambang, Banteay Mean Chey and Siem Reab, it is from May to mid June. In general, the lowest part of the sloping area is the first to be cultivated because it is the first to be flooded. Seeds may be incorporated into the soil by harrowing or ploughing. Early planting is always carried out so that the crop is more grown up when floodwater comes. Older plants sustain elongation to escape from water rise better than younger plants and are therefore flood resistant.

(3) Rainfed Upland Rice

Upland rice in Cambodia, also known as mountain rice, is grown in unbunded fields that are scattered in rolling lands, some of which are mountains. Upland rice depends entirely on rainfall. The upland rice area is a small portion of total rice land in Cambodia. The leading upland rice growing provinces are Rotanak Kiri, Kampong Cham and Siem Reab. Mondol Kiri, Kampong Thum, Kandal, Kaoh Kong, Preah Vihear, Stueng Traeng, and Kampot also grow upland rice with smaller areas. In Rotanak Kiri and Mondol Kiri, upland rice is the major rice ecosystem, and in Rotanak Kiri the upland rice area is more than twice the area for rainfed lowland rice.



Ecosystems of Wet Season Rice

(4) Dry Season Rice

Dry season rice in Cambodia represents about 8 % of the total cultivated rice area. It is fully or partially irrigated and most variable among all rice ecosystems in terms of cultivation time, cultivation method, topography and soil type. However, it is the most productive ecosystem. Its high productivity is associated with better water control, higher light intensity during crop growth, and the development and cultivation of fertilizer-responsive high yielding varieties.

Dry season rice is of two categories. The first category is the fully or partially irrigated second crop after the wet season of rainfed lowland rice production. There is diversity in the crop growing period from seedling bed establishment to harvesting. The most common is from late October to late March. This is called early dry season rice where the seedling and vegetative growth depends on late wet season rainfall and residual soil moisture; while the other stages depend on irrigation. Another cropping period is from December to early May. Crop establishment can start from early December to early January. This cropping period, which is called late dry season crop, involves the low fields, and the need for irrigation is greater than in the early dry season crop.

The second category of dry season rice is the partially irrigated flood recession rice. The areas are flooded for 3-5 months before water recession takes place. These are largely the flood receding areas of very deepwater lands around lakes, rivers, and water reservoirs that are not suitable for deepwater rice cultivation because the water rise is too rapid. Also included are some wet season deepwater rice areas that have been converted for dry season rice cultivation, because higher and more reliable yields can be expected. Flood recession fields are level paddies situated on sloping areas. Sequential cultivation is conducted as waters recede. The upper fields are the first to be cultivated and the lowest fields are the last. Sowing can start as early as late October and as late as

February. Harvesting is from mid-February to April. In some places, sowing is from late March to April and harvesting can be as late as the end of August.

Unlike the rainfed lowland ecosystem where field levels correspond to different maturity classes, the dry season crop involves only photoperiod insensitive varieties that mature not more than 120 days.

Activities of cropping pattern within each ecosystem are presented in following figure.

Rice Cropping Pattern in Each Ecosystem

	Month											
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Rainfed lowlands medium and long-duration, photoperiod-sensitive and nonphotoperiod-sensitive varieties												
Land preparation		←→	←→	←→	←→							
Seedbed			←→	←→	←→							
Transplanting			←→	←→	←→							
Harvesting									←→	←→	←→	
Rainfed lowland broadcast rice												
Land preparation		←→	←→	←→	←→							
Broadcasting			←→	←→	←→							
Harvesting									←→	←→	←→	
Rainfed lowland, supplementary irrigation (from Seeded to harvest)												
Early rice	←→	←→	←→	←→								
Medium rice					←→	←→	←→	←→	←→	←→	←→	
Recession rice												
Land preparation		←→	←→	←→	←→					←→	←→	
Seedbed	←→	←→	←→	←→	←→				←→	←→	←→	
Transplanting		←→	←→	←→	←→						←→	←→
Harvesting	←→	←→	←→	←→	←→	←→	←→	←→	←→	←→	←→	←→
Deepwater rice												
Land preparation	←→	←→	←→	←→	←→						←→	←→
Seeding	←→	←→	←→	←→	←→						←→	←→
Harvesting										←→	←→	←→
Upland rice												
Land preparation (slash & burn)	←→	←→	←→	←→	←→							←→
Seeding	←→	←→	←→	←→	←→							←→
Weeding			←→	←→	←→	←→	←→	←→	←→	←→	←→	←→
Harvesting					←→	←→	←→	←→	←→	←→	←→	←→

3.1.3 Production Technology and Yield

The discussion below is based on production practices in each rice ecosystem.

(1) Rainfed Lowland Rice

In this ecosystem, upper fields with standing water between 20-30 cm are planted with early varieties, and medium fields with standing water between 20-40 cm. Planted with medium to medium-late varieties, while lower fields with deepest standing water between 40-60 cm are planted with late varieties. Early varieties are subsistence rice with good volume expansion of cooked rice. Medium varieties offer best cooking quality and acquire best selling price, while late varieties also possess good cooking quality and good grain weight.

Nursery bed establishment:

This is a necessity for transplanting fields and is usually prepared near the home where good water control is possible. Plot size of nursery bed per ha rice field ranges from 0.1 to 0.2 ha, and seeding rate varies from 60 to 120 kg/ha, depending on germination rate of seeds.

Crop establishment for transplanted rice:

The field is ploughed twice and harrowed once or twice. Plowings aim to destroy weeds, and harrowing to prepare the land for transplanting that starts with uprooting of the seedlings in the nursery. Number of seedlings per hill is 2-3 for vigorous seedlings, and 5-6 or more for less vigorous seedlings. In general, there are more hills per m² when the soil is less fertile or when seedlings are less vigorous.

Crop establishment for broadcasted rice:

The seeds to be broadcasted may be dry seeds or pre-germinated seeds. Land preparation practices employed before broadcasting are similar to those done for transplanting fields. Broadcasting dry seeds, especially of late varieties, is common in the northern provinces where labor shortage exists.

(2) Deepwater rice

Production practices for deepwater rice are relatively simple and involve very minimal external inputs. The practice starts with the burning of straw and stubble remaining in the field after grazing by cattle. This takes place between February and early April. The unbunded field is ploughed once or twice before dry seeds are broadcasted. Seeding time in the southern provinces including Takaev, Prey Veang, and Kandal is from late April to May, while that in the northern provinces such as Bat Dambang, Banteay Mean Chey, and Siem Reab is from May to mid-June. In general, the lowest part of a sloping deepwater rice area is the first to be cultivated, being the first to be un-inundated.

The average rate of seeding ranges from 120 to more than 200 kg/ha. The higher rate is usually used when the soil is ploughed only once. However, the second plowing generates better soil structure for rice plant establishment and growth, and destroys weeds which remain after the first plowing. Seeds may be incorporated into the soil by harrowing or plowing which further improves soil structure and thus favor good root development. The resulting soil cover also protects the rice seeds from birds and rats. If soil moisture is sufficient, germination takes place a few days after sowing. It can be delayed for weeks, depending on rainfall.

Early planting is always desired so that the crop is more mature when the floodwaters come. Older plants sustain elongation better than younger plants and are, therefore, flood tolerant. Seedlings obtained from thickly populated section of the field may be transplanted in vacant spaces when water starts to accumulate in the field.

(3) Rainfed Upland Rice

Upland rice can be grown at elevation ranges from 200 to 1,000 m. At high elevation where daily temperatures are lower, varieties should possess some degree of cold tolerance. Some areas are favorable in term of water regime while others are drought-prone. The latter should require varieties with drought tolerance and good drought recovery.

Major upland rice cultivation practices in Cambodia, like in all its neighboring countries having upland rice cultivated on relatively high elevations, are associated with shifting cultivation or the slash and burn method, in which the forest is cleared and planted with rice for 2-3 years before farmers shift to a new area. The farmers often return to the old upland rice site after several years of fallow. This method is practiced in the north and northeastern provinces, and in hilly, forested areas of other provinces.

In the cultivation method, trees and other plants are cut, left to dry, and burned during the dry season of February to April. Seeding is between April and June. Without tilling the soil, seeds are simply drilled into the soil with the assistance of pointed sticks. The seeding rate ranges from 5 to 20 seeds per hill, and hill spacing can range from 20 to 40 cm. However, closer spacing is used in old fields which are less fertile and for a new field it is vice versa. Wider spacing is used in parts of the field where rice is mixed with other crops. The crop is totally dependent on the native fertility of the soil.

Only rainfed lowland rice and dry season rice fields receive care taken in terms of crop protection and fertilizer application after planting is done.

For crop protection, hand weeding is common, and the number of weeding depends on weed intensity. The thoroughness of land preparation as well as the frequency and duration of time when there is no standing water in the field determine weed intensity. Herbicides are seldom used.

Rats are usually controlled by digging their holes and killing by using sticks. Other control methods include chemicals, traps and mechanical barriers like plastic sheets. Crabs are a major source of food in the farm. They are commonly controlled by hand picking during the young stage of the rice plants. They are rarely controlled by chemicals and pesticides. Chemical control of insect pests is not common except in some fields.

For fertilizer, composted farmyard manure or manure composted with rice straw or dried leaves is the most common fertilizer used in the nurseries and fields. Chemical fertilizers may also be used in the fields. If fertilizers are applied, the high fields of early duration rice commonly receive more fertilizer than the lower fields.

Deepwater rice and upland rice rarely receive any post-planting application. For deepwater rice, it is deep standing water in the fields after flood water rises, that makes further cultivation practices difficult. Upland rice, on the other hand, is normally left dependent on natural conditions.

For harvesting, the operation is done solely by hand tools, or sickles. Rice is cut about 50 cm below the panicle and banded in bundles. In the wet season, bundles are sun dried a few hours in the field and then they are carried to the house and hand threshed after which the paddy grains may be dried for one or two days before putting in storage. In the wet season threshing machines are not commonly used, especially in southern provinces, for two main reasons. The first reason is that the farmers want to keep the straw for their animals. The straw from machine threshing is profoundly beaten and is too bulky to pile up and decay rapidly. Secondly, at harvesting time of wet season rice, the soil is still wet and many planted varieties do not mature at the same time. These make it difficult for the machine thresher to go into the field. However, in the dry season, machine threshing is common in most of the large rice production areas.

As for the yield, rainfed lowland rice usually produces between 1.0 - 1.2 ton/ha. Dry season rice is the most productive among all ecosystems and give average yields as high as 2.7 ton/ha. In deepwater rice, the average yield is 1.2 ton/ha, and in upland rice the average yield is less than 0.6 ton/ha.

(4) Dry season rice

The dry season rice, which is fully or partially irrigated, is the most variable among the rice ecosystems in term of cultivation time, method, and land topography. However, it is the most productive rice ecosystem in association with better water control, higher solar radiation during crop growth, and the development and cultivation of high fertilizer responsive modern varieties.

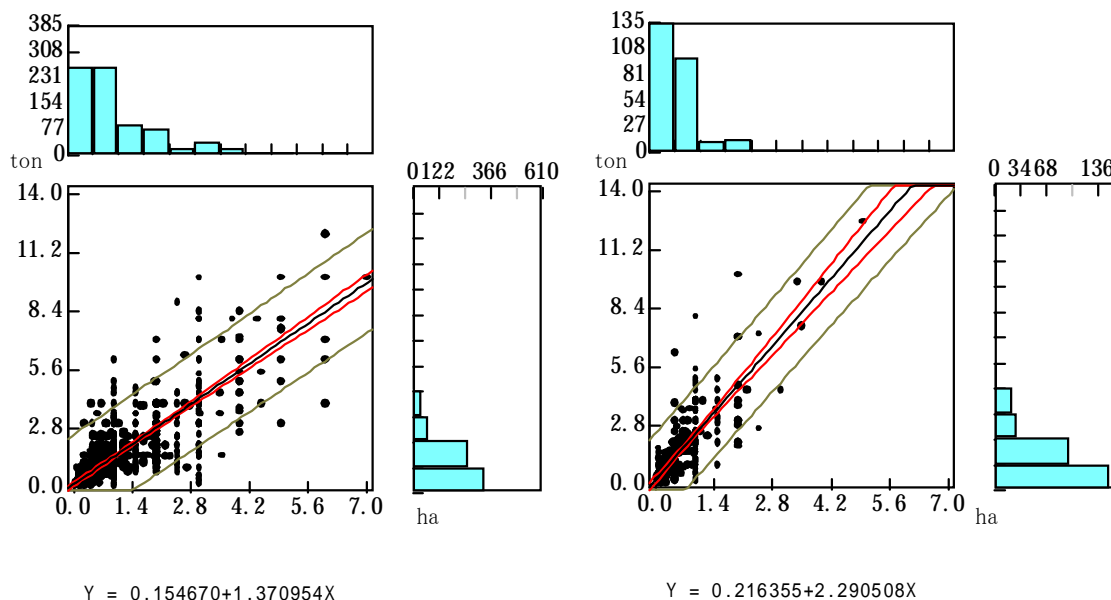
Several cultivation strategies and practices in the dry season rice production are similar to those of the rainfed lowland rice production. One major difference between the two ecosystems is the ability to control water in the dry season rice production.

Flood recession rice has the distinct characteristics of having short, staggered cultivation intervals. Sowing in the nursery bed is done several times within 5-10 days intervals. This is essential to obtain seedlings at the correct age for serial transplanting as the water recedes down the slope. Therefore, different stage of rice growth can be observed over a small area. In some flood recession areas, land preparation is done after harvest, before the floodwater rises. After the flood recedes, additional tillage may be done. In some areas, as in Siem Reab, where the flood water is clear, dry seeds are broadcasted in areas where the flood water is about to recede.

3.1.4 Cultivated Area and Yield of Farm Households

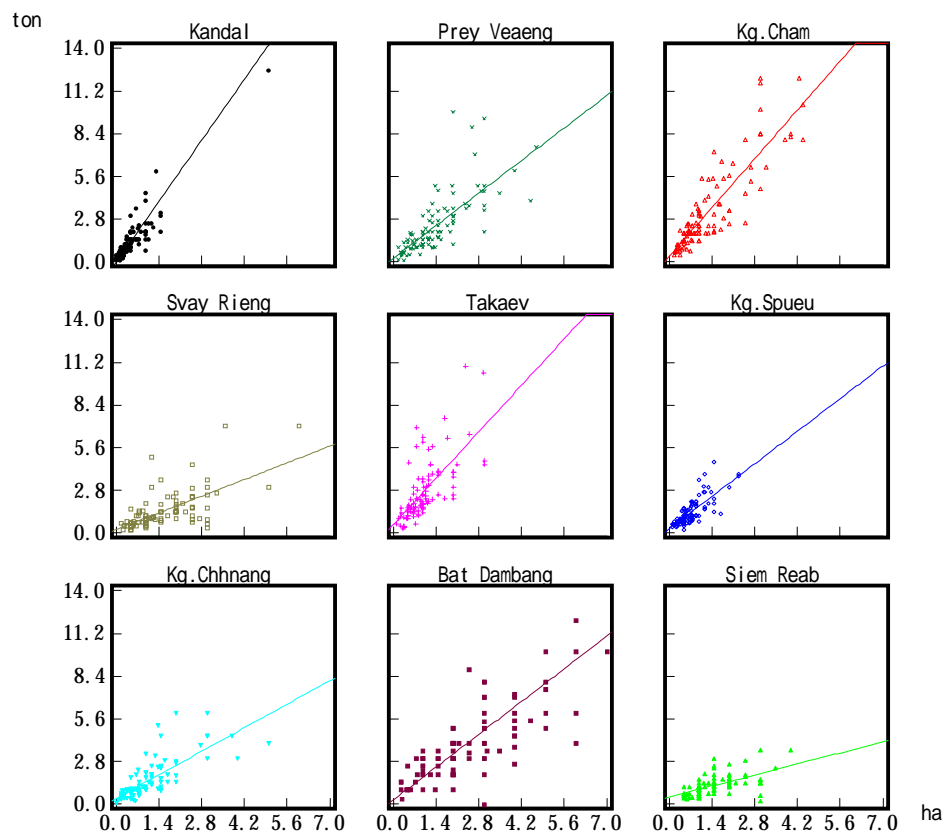
According to the farm village survey of this master plan study, yield of rainy season paddy was 1.5 ton/ha, that of dry season was 2.6 ton/ha. The most of rainy season paddy are the local breeds of Cambodia. On the other hand, dry season paddy are mainly IR varieties that spread as high yielding varieties.

The following charts are analysis of productivity of rainy season paddy and dry season paddy by observing the relation between size of cultivated area and amount of rice production at each farmhouse that were obtained by the farm village survey. The yields of rainy season paddy are more fluctuated than that of dry season paddy because the varieties of rainy season paddy include the various kind of traditional varieties. 360 varieties were recorded in the survey, although it is generally said that there are several thousands of rice varieties in Cambodia.



Cultivation Area and Production per Farmhouse
 (left: Rainy season, right: Dry season)

The next charts illustrates the cultivation area and production per farmhouse in each province. The productivity is high in Takaev province, Kandal province, Kampong Cham province where the most farmers plant the dry season rice (IR variety). Over 40% of farmers are planting both rainy season rice and dry season rice in Kampong Cham, this ratio is highest among the surveyed provinces. The farmers in Svay Rieng cultivate larger area of paddy field in comparison with the farmer in the other provinces but the productivity is low. It is because the land allotment was executed in inverse proportion to productivity in the 1980's. Besides, the input of the agricultural chemicals and fertilizer in Siem Reab province are less in comparison with the other province resulting in the low yield of paddy. As for Kampong Spueu province, the control of the water is difficult because of a slope in the land. Since the flood and drought are repeated, productivity per unit of land is low and average yield is 1.4 tons per farmhouse in accordance with the survey. As for Bat Dambang province, the allocation of the land is going on. There are wealthy farmers who obtained the large paddy field; some of them have 10 ha, where the landmine had been removed, deforested, and/or reclaimed. At the area close to Tonle Sap Lake, most farmers grow rainy season rice and the floating rice is produced. Half of the farmers produce 5 or more tons of paddy in a year so that they can afford to sell the surplus to the market.



Cultivation Area and Production per Farmhouse by provinces

3.1.5 Situation of Rice Crop Damage

Rice production is strongly influenced by changes of climatic conditions and the insect/disease, due to obsolete cultivation technology and poor agricultural production infrastructure without irrigation system and dyke system.

The destroyed ratio of wet season rice from 1995 to 2000 were 9%, 15%, 8%, 7%, and 4% in order as shown below. The destroyed ratios of dry season rice were lower than that of wet season rice. Average yields were stable between 1.6 ton/ha to 1.8 ton/ha for wet season rice and about 3.0 ton/ha for dry season rice.

Damage of Rice Production (estimation)

Wet Season Rice		1995/1996	1996/1997	1997/1998	1998/1999	1999/2000
Cultivated Area	ha	1,869,991	1,936,900	1,827,328	1,873,093	1,915,592
Destroyed Area	ha	160,950	287,900	142,422	127,697	69,150
Harvested Area	ha	1,709,041	1,649,000	1,684,906	1,745,396	1,846,442
Destroyed ratio	%	9%	15%	8%	7%	4%
Production	1000 ton	2,803	2,759	2,673	2,874	3,333
Yield	ton/ha	1.64	1.67	1.60	1.65	1.81

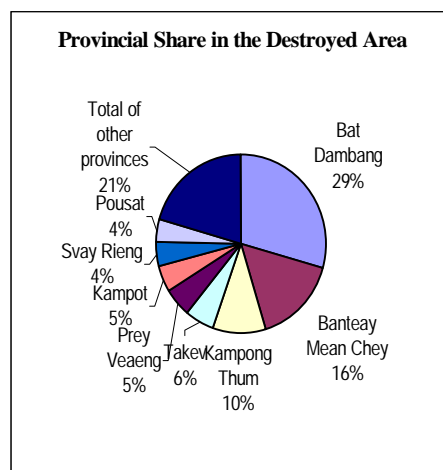
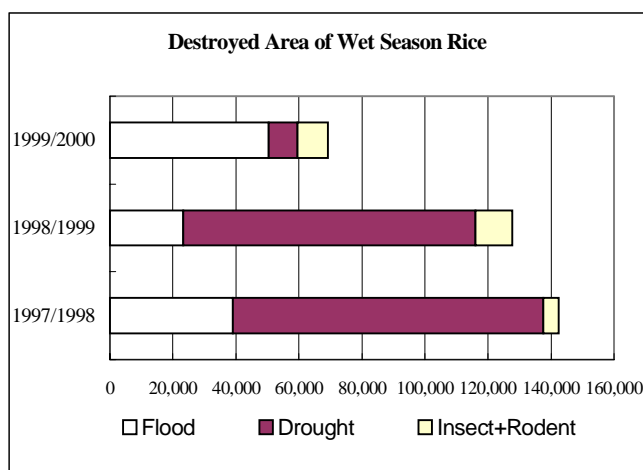
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Dry Season Rice		1995/1996	1996/1997	1997/1998	1998/1999	1999/2000
Cultivated Area	ha	216,000	234,000	248,683	230,920	242,000
Destroyed Area	ha	1,000	4,000	4,900	13,750	9,000
Harvested Area	ha	215,000	230,000	243,783	217,170	233,000
Destroyed ratio	%	0.5%	2%	2%	6%	4%
Production	1000 ton	645	699	742	636	708
Yield	ton/ha	3.00	3.04	3.05	2.93	3.04

Source : MAFF

The causes of destroyed wet season rice areas in 1997 - 1999 are shown in the following figure. For a country as a whole, it can be said that year 1997 and 1998 were drought years and year 1999 was a flood year. Provincial share (average for three years) of the national damage show that the damages were most serious in Bat Dambang province and Banteay Mean Chey province, main area of rice production in northwestern part of the country, occupying 45% of the total damage.

Following Kompong Thum province, Takeav province and Prey Veang province, another main rice production area in southeast part, are in the higher rank of the damage share, occupying 11% of the total damage.



The destroyed area and the cause are shown below for 5 provinces of upper rank. The cause of damage varies by areas. As mentioned above, year 1997 was a drought year when viewed nationally, but the flood was the main cause of damage in Kompong Thum province and Takeav province. Based on the data for the past three years, the damage by insect/rodent is increasing.

Cause of Damage

Province	Region	Bat Dambang	Banteay Mean Chey	Kampong Thum	Takev	Prey Veaeng
		Tonle S.	Tonle S.	Tonle S.	Plain	Plain
1997/1998	Flood	4%	0%	69%	67%	7%
	Drought	94%	100%	21%	33%	93%
	Insect+Rodent	2%	0%	10%	0%	0%
1998/1999	Flood	8%	47%	9%	0%	22%
	Drought	91%	44%	68%	100%	11%
	Insect+Rodent	2%	9%	23%	0%	67%
1999/2000	Flood	65%	78%	67%	39%	33%
	Drought	3%	20%	20%	39%	42%
	Insect+Rodent	32%	2%	13%	22%	26%

In year 2000, the lowland areas along the Mekong River including Cambodia were faced to the serious flood, which is said the worst in the past 40 years.

Water level exceeded the warning level (10.5 m) and reached to 11.2 m, starting overflow into the city, in September at Phnom Penh. Out of the area protected by dyke around Phnom Penh City, many people took refuge to the little higher places such as temple and road for several months. At every province along the Mekong River and Bassac River, the water level exceeded 1-2 m over the usual level, which brought great damage to houses, roads, bridges and paddy field.

The final estimated damage that the MAFF announced at the end of December in 2000 was as follows.

- 410,044 ha (20.7%) suffered damage by the flood, out of the planted area 1,979,458 ha.
- The damage area by the drought and the insect is estimated to be 7,731 ha, and the total damage of wet season rice is estimated to be 417,775 ha (21.1%).
- At the end of November, 5,200 ha were replanted after the recession of the flood. It is expected that the replanted area will reach 6,000 ha.

3.1.6 Supporting System for Rice Production

(1) Extension Services

The agricultural extension services to farmer from government organization have been stagnated in Cambodia. Direct technical extension activities to farmer are performed only in the technical seminars that are carried out in villages by supporting organization and in the agriculture related projects.

Although MAFF has a system to extend the technical guidance through the agricultural development centers and DAFFs, sufficient activity has not been performed due to the financial difficulties and the shortage of capable persons of DAFFs. There are only 5 agricultural development centers in the country, and the area that each center can cover is limited.

To improve the agricultural extension services, Cambodian-Australia Agricultural Extension Project (CAAEP) was implemented to the newly founded Department of Technique, Economics and Extension (DTEE) and provincial level offices with assistance of AusAID from 1996 to May-2000. The objectives of this project were construction of DTEE facility, training of the DTEE staff to be engaged in planning and implementing the technical extension programs, and training of extension officers. It was carried out in 6 provinces; Kampong Cham, Kompong Thum, Kandal, Takeo, Bat Dambang, and Banteay Mean Chey.

(2) Research Institute

Although the 75 research facilities existed under MAFF before 1975, only 7 research facilities (including one rice research institute) and 5 agricultural development centers are existing now. These facilities are scattered in the Southern provinces. At each province of Bat Dambang, Siem Reab, Stung Treng and Kompong Thum, there is a rice research center currently operated by DAFF.

However, research activity is carried out only at a few research facilities that have received assistance from the supporting organization. If there were no support from such supporting organization, any research activities cannot be carried out only by the Cambodian side.

Regarding the rice, Cambodia Agricultural Research and Development Institute (CARDI) is the only institute continuously carrying out the research and extension activities in Cambodia, where

the Cambodian-IRRI-Australia Project (CIAP) have been continuing since 1987 with the assistance of AusAID and IRRI.

(3) Seed multiplication and distribution

Presently, sustainable system of seed multiplication and distribution hardly exists in Cambodia. Same as the research activity previously mentioned, activities for developing new varieties, seed multiplication and distribution also are carried out under the foreign assistance. Cambodian side cannot carry out any activities independently.

CARDI, who have been receiving continuous assistance from AusAID and IRRI, is the only agent developing new varieties and multiplying the breeder seed and foundation seed in Cambodia. CARDI has released 34 varieties since 1990.

Among the 34 varieties released from CARDI, IR66 have widely spread to farmers and it occupies about 80 % of dry season rice. However, proper renewal of the seed is not practiced due to lack of stable/sustainable supply system of the new seed for periodical renewal and to lack of farmers' knowledge on seed quality.

Moreover, it is reported that a certified seed of IR varieties produced at the Bat Dambang research station does not meet the farmers' needs of the area and many certified seeds remained unsold, then it was sold out to the nearby rice millers for edible purpose.

Development of seed multiplication and distribution project, Agricultural Quality Improvement Project (AQUIP), is under implementation in southern part 4 provinces with assistance from AusAID. The objectives of the project are establishment of seed company, training of farmer's seed production groups, seed inspectors, etc.

3.1.7 Direction of Progress in the Agriculture Sector

(1) Policy Goals and Objectives

The government's policy goals and objectives for agriculture set out in the SEDP can be summarized as follows:

1. Improve food security through expansion and increase in rice production and other food crops.
2. Add value to crop and livestock production by developing agro-processing industries.
3. Increase income opportunities for farm households, particularly those headed by women, by diversifying crop production.
4. Strengthen the participation of rural communities.

5. Ensure sustainable agricultural production through improved management of natural resources.
6. Increase the availability of rural financial services.

(2) Policy Framework for Agriculture Sector Progress

There are 20 strategies in the policy framework for agriculture sector progress setup by the government. However, only six components relevant to crop improvement are discussed here, as follows.

1. **Basic strategy:** The government's strategy is geared towards promoting and strengthening competitive markets for the supply and distribution of good quality inputs. The government will continue to promote sector development by encouraging open access to domestic and international markets, as well as the provision of basic infrastructure such as rural roads, bridges, community water supply, flood control system, and other facilities to support the rural economy. The government will not intervene in the market except for regulation of standards, environment protection and management of emergency situations.
2. **Rural financing:** The severe lack of effective financial services in rural areas is one of the major constraints to agriculture growth and rural development. Micro finance operations of NGOs are almost the sole financial service, but their operations are limited to about only 11 % of rural households. The government will, therefore, support expansion of rural credit and saving services by encouraging the participation of private licensed micro-finance institutions and commercial banks, and by strengthening the Rural Development Bank. In addition, the government will continue to monitor credit activities of NGOs and encourage the transformation of successful NGO credit providers into micro-finance institutions.
3. **Expanding extension services:** The expansion of agricultural extension services is a key component in the strategy to boost agricultural productivity. A new Department of Extension was recently established in MAFF with the assistance of AusAID. Extension services previously provided by separate technical departments are now being coordinated to meet the specific needs of farmers. In addition, there are 14 functioning research stations focusing mainly on rice. These institutions suffer from shortage of funds, lack of equipment and qualified personnel resulting in inadequate research and extension. With assistance from the World Bank several are being rehabilitated and their personnel trained in areas of variety improvement and applied research. The Government will seek further external assistance to ensure the continuance of farmer training in the areas of integrated pest management techniques and distribution of new varieties of high quality rice seed developed by the International Rice Research Institute.
4. **Further land reform:** In spite of the introduction of land reform in 1989, disputes over land

are common. These conflicts arise from competitive possession claims, illegal land sales and forceful appropriation of land. In the medium term the Government will address this issue by enacting and implementing a revised land law, which will promote the resolution of land disputes and make provision for the changing value of land due to investment in infrastructure. The registration system envisaged will permit land to serve as collateral for rural credit and provide incentive for investment in land improvements.

- 5. Boosting rice production:** Introduction of new seeds, production techniques and increased fertilizer use has contributed to recent sustained increases in rice output. Production of rice accounts for nearly 90 % of the available cultivated area, contributing an estimated 12.5 % of GDP in 1998. Efforts to increase rice production are achieving success with production rising from two (2) million tons in 1995 to more than four (4) million tons in 2000. However, average yield is still 1.64 ton/ha comparing to 2.1 ton/ha in Thailand, 2.7 ton/ha in Philippines and 3.2 ton/ha in Viet Nam. Current efforts to accelerate the transfer of yield increasing technology and improve production practices and enhance management of soil and water resources will be maintained in order to achieve the target of an average yield of 2 ton/ha by 2003.
- 6. Strengthening input distribution:** Increase in access and better use of quality inputs is vital to increasing production of rice and other crops. At present fertilizer use by farmers is highly variable because it is often not available and the price is often prohibitive to them. This situation reflects lack of market information about the needs of farmers, which impede efficient distribution of fertilizer and other inputs. The considerable price differences between regions that cannot be explained by the cost of freight alone, reflect costs of illegal taxes and lack of competition among the traders. Thus, competition will be promoted by enforcement of legislation against illegal tax collectors. The issuing of an agricultural material law will provide legal standards for inputs including environment standards, and a monitoring and enforcement agency will be established to supervise its effectiveness.

3.2 Food Security

3.2.1 Food (Rice) Balance Situation

(1) Method for assessment of food balance

Based on the paddy production estimated by MAFF, food (rice) balance is derived from following assumptions. Data for the quantity of inventories and the quantity of exportation and importation are not grasped and not included in the rice balance. Moreover, the quantity of production of food crops other than rice is not taken into account.

Items	Assumptions
A Post-harvest losses	10 percent of production
B Seed use	5 percent of production
C Feed and other uses	2 percent of production
D Milling yield from paddy to rice	62 percent
E National population	Projected population from the general population census of March 1998 carried out by the National Institute of Statistics.
F Annual rice consumption per capita	151.2 kg.
Formula	$\{ \text{paddy production} - [\text{paddy production} \times (A + B + C)] \} \times D - (E \times F)$

Paddy Production

DAFF in each province survey and collects the data for cultivated/harvested area and yield, and estimate the district-wise paddy production. MAFF computes the national total.

Yield is assessed based on the Crop Cuts Survey conducted by DAFF/Agronomy Officer of each province. Following problems are pointed out in “A Review of Agricultural Data Collection Methods of Cambodia” (World Bank/APIP, July 2000) and it is presumed that the yield data is not highly reliable.

- Survey plots (2m x 2m) are intentionally selected.
- Subjected to very high measurement errors
- Very limited supervision by MAFF

Quantitative assessments of crop area and production are made by village heads based on old norm of land area, number of households in the village, assessment of crop acreage/cropping pattern, local knowledge of crop condition and assessment of crop yield. Despite the unknown degree of reliability, that is the best assessment available. In fact, there is no other data collecting method available expect the assessment by village chief who is most acquainted with the actual conditions of the village.

World Bank/APIP (Agricultural Productivity Improvement Project) has a component for improvement/establishment of the agricultural statistics system, providing technical and financial assistance for improving accuracy of data concerning paddy production.

Rice Consumption

Up to 1995, the Government made an allowance of rice consumption per capita/annum as 162 kg or 444 grams per capita/day, accounting for 73 percent of the energy requirement set at 2,200 Kcal per day. This 162 kg included not only rice but also the rice equivalent of subsidiary foods such as maize, beans, roots and tubers. The value has been amended to 151.2 kg in 1996, which is equivalent to 414 g per person/day or 68 percent of the energy requirement, but for rice only. WFP/FAO also adapt this value.

Considering the time lapse and changes in eating habits, it may be necessary to review it in near future.

Post-harvest Loss

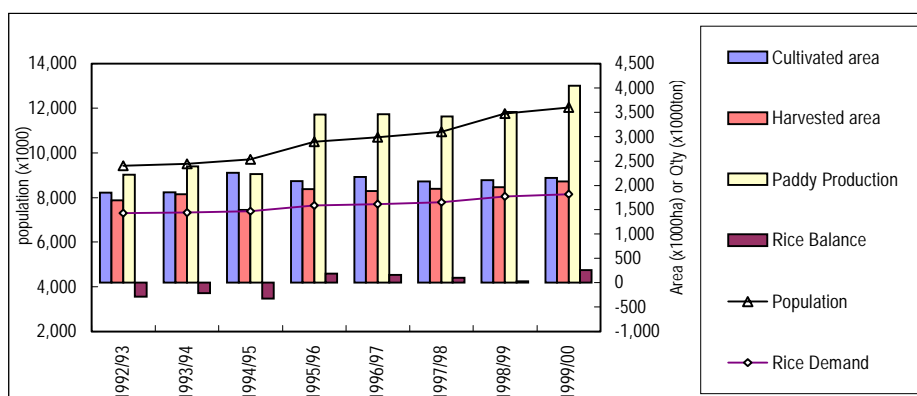
Up to 1995, the Government applied a rate of post-harvest loss at 5 % of paddy production. This rate has been amended to 10% in 1996 by the FAO/WFP Crop and Food Supply Assessment Mission.

(2) National food balance

Cambodian farmers have been growing rice, at least for as long as 2000 years. Its production has been through a series of impressive developments and setbacks over these years. Cambodia was once one of the major rice exporters of the world. This fact is confirmed by a remarkable increase in rice production by the end of the 1960's. In 1968, the area planted for rice was 2.47 million ha which produced 3.25 million tons, and the Cambodian government exported as much as 252,000 tons of milled rice. Cambodia achieved its highest rice production of 3.8 million tons in 1970 before the war. However, the years of war with its neighbors and its civil war had lasted for decades slumped the country into a period during which the vast majority of its population had little to eat.

Now, with the cessation of war, the advent of political stability after democratic elections, and the opening up of the economy to international investment, a great expansion in rice production is anticipated. In the year 2000, Cambodia produced as much as 4.04 million tons of paddy; its largest ever total. The demand for food in 2000, in terms of milled rice, is 1.82 million tons for 12.0 million people. Therefore, the surplus for the year is estimated to be 260 thousand tons. The recovery of the rice production after the civil war is due to the expansion of cultivation area and increase of yield.

Food (Rice) Balance Situation 1992 - 2000



Milling rate 62%, Per capita rice consumption 151.2 kg/annual, Loss/seed/feed reduction 17%
Source : MAFF, WFP/FAO

(3) Regional food balance

1) Province-wise balance

Nationwide self-sufficiency of rice has been achieved since 1995: however the regional rice-deficit is still remaining. The rice balance situation by Province 1999/2000 is given in the Table below. It shows that, of the 13 main rice-producing Provinces, which have paddy production more than 100,000 tons, four (4) are rice-deficit. The remaining nine (9) rice-producing Provinces are all rice-sufficient.

Province-wise Balance of Rice

Province	Region	Supply of Rice							Demand of Rice		Balance
		Paddy Production *3			Seed Req't	P.H. Loss	Availability		Population	Total Demand	
Area (ha)	Yield	Production	Paddy	Rice							
1 Phnom Penh	Plain	6,596	1.84	12,110	660	1,399	10,051	6,232	1,052,743	159,175	-152,943
2 Kandal	Plain	87,674	2.81	246,331	8,767	33,109	204,455	126,762	1,132,491	171,233	-44,471
3 Prey Veang	Plain	297,225	1.94	577,380	29,723	68,432	479,225	297,120	996,985	150,744	146,376
4 Kampong Cham	Plain	197,243	2.34	460,935	19,724	58,635	382,576	237,197	1,696,135	256,456	-19,258
5 Svay Rieng	Plain	171,318	1.56	266,877	17,132	28,237	221,508	137,335	504,331	76,255	61,080
6 Takev	Plain	231,131	2.40	554,890	23,113	71,218	460,559	285,546	833,039	125,955	159,591
7 Kampong Chhnang	Tonle S.	92,966	1.66	154,300	9,297	16,934	128,069	79,403	439,879	66,510	12,893
8 Bat Dambang	Tonle S.	169,771	2.11	357,860	16,977	43,859	297,024	184,155	835,410	126,314	57,841
9 Siem Reab	Tonle S.	191,080	1.36	260,404	19,108	25,161	216,135	134,004	805,888	121,850	12,154
10 Kampong Spueu	Plt/Mt.	85,303	1.82	155,388	8,530	17,886	128,972	79,963	630,917	95,395	-15,432
Sub-total (Study Area)		1,530,307	1.99	3,046,475	153,031	364,870	2,528,574	1,567,716	8,927,818	1,349,886	217,830
11 Kampong Thum	Tonle S.	100,964	1.52	153,070	10,096	15,926	127,048	78,770	599,643	90,666	-11,896
12 Banteay Mean Chey	Tonle S.	140,500	1.73	243,446	14,050	27,336	202,060	125,277	608,975	92,077	33,200
13 Pousat	Tonle S.	72,050	1.84	132,650	7,205	15,346	110,100	68,262	380,060	57,465	10,797
14 Otdar Mean Cgey	Tonle S.	-	-	-	-	-	-	-	-	-	-
15 Krong Pailin	Tonle S.	-	-	-	-	-	-	-	-	-	-
16 Krong Preah Sihanouk	Coastal	9,500	1.78	16,940	950	1,930	14,060	8,717	163,901	24,782	-16,065
17 Kampot	Coastal	135,607	2.28	308,795	13,561	38,934	256,300	158,906	556,869	84,199	74,707
18 Kaoh Kong	Coastal	7,272	1.30	9,460	727	881	7,852	4,868	139,149	21,039	-16,171
19 Krong Kaeb	Coastal	2,450	1.84	4,500	245	520	3,735	2,316	30,250	4,574	-2,258
20 Preah Vihear	Plt/Mt.	16,911	1.30	21,986	1,691	2,047	18,248	11,314	125,698	19,006	-7,692
21 Stueng Traeng	Plt/Mt.	13,466	1.40	18,852	1,347	1,858	15,647	9,701	85,421	12,916	-3,214
22 Rotanak Kiri	Plt/Mt.	17,618	1.30	22,905	1,762	2,132	19,011	11,787	99,356	15,023	-3,236
23 Mondol Kiri	Plt/Mt.	6,180	1.45	8,960	618	905	7,437	4,611	34,169	5,166	-556
24 Kracheh	Plt/Mt.	26,617	1.99	52,861	2,662	6,325	43,875	27,202	277,372	41,939	-14,736
Sub-total (Non Study Area)		549,135	1.81	994,425	54,914	114,139	825,373	511,731	3,100,863	468,850	42,881
Total		2,079,442	1.94	4,040,900	207,944	479,009	3,353,947	2,079,447	12,028,681	1,818,737	260,711

Note: *1 Deficit is probably supplied by Province of Siem Reab; *2 Deficit is probably supplied by Bat Dambang Province

*3 Crop assessment for Wet season rice 1999/2000 and Dry season rice 2000

Table does not include any provision for rice under so-called social safety nets such as the United Nations World Food Program (WFP) activities.

Considering the difficulty of access to the five (5) mountainous Provinces of Preah Vihear, Stueng Traeng, Rotanak Kiri, Mondol Kiri and Kracheh due to the poor condition of the national and provincial roads, movement of rice from the surplus areas to these provinces is unlikely under conditions of market economy. The physical difficulties and costs of transport, and the sparse population in these areas, make this flow of rice uneconomic. However, this deficit of calorie intake from rice seems to be met by other cereals and root crops. In this situation, the overall surplus might be increased to about 290 thousand tons.

When the balance analysis is carried out on the basis of per capita supply and demand, Takaev Province has the highest potential to supply rice of 192 kg per capita in the province, followed by Prey Veang 147 kg, Svay Rieng 121 kg, Kampot 134 kg and Bat Dambang 69 kg, each showing the same tendency in total surplus. The largest deficit is seen in Phnom Penh Province with 145 kg per person close to the per capita consumption of 151.2 kg, followed by Kaoh Kong 116 kg, Krong Preah Sihanouk 98 kg and Krong Kaeb 75 kg. The two provinces of Otdar Mean Chey and Krong Pailin show no data on paddy production due to its recent creation after ending political conflict.

2) District-wise balance

On the basis of the 1999/2000 agricultural statistics by MAFF and the 1999 WFP Commune Database, a district-wise rice balance study was carried out on the 10 provinces of the Study area with the same method adopted in the provincial rice balance analysis.

A result of the district-wise balance study indicates the overall surplus of about 218 thousand tons or 24 Kg per person in the Study area. Out of 102 districts in the Study area, 56 districts have an aggregate surplus of about 574 thousand tons equivalent to 123 Kg per person, 46 districts faces total deficit of about 356 thousand tons or 84 Kg per person. Only in Takaev province, which produces total surplus of 160 thousand tons, every district has a certain surplus of rice. In contrast, in the Phnom Penh municipality every district faces deficit with a total deficit of about 153 thousand tons.

Moung Russei district of Bat Dambang province produces maximum surplus amount of 35.2 thousand tons followed by Kampong Trabaek district of Prey Veang province with 32 thousand tons. On the deficit side, Chamkar Mon district of Phnom Penh province faces 30 thousand tons deficit followed by Siem Reab district of Siem Reab province with 16 thousand tons. On the surplus side, Bourei Cholsar district of Takaev province provides maximum surplus density of 926 Kg per person (with district population of 25,787) followed by 325 Kg in Kanhchriech district of Prey Veang province, while Chamkar Mon district and several other districts where there is no paddy production, face a deficit of 151.2 Kg per person.

It is remarkable that even in the big rice surplus province of Bat Dambang, six (6) districts face

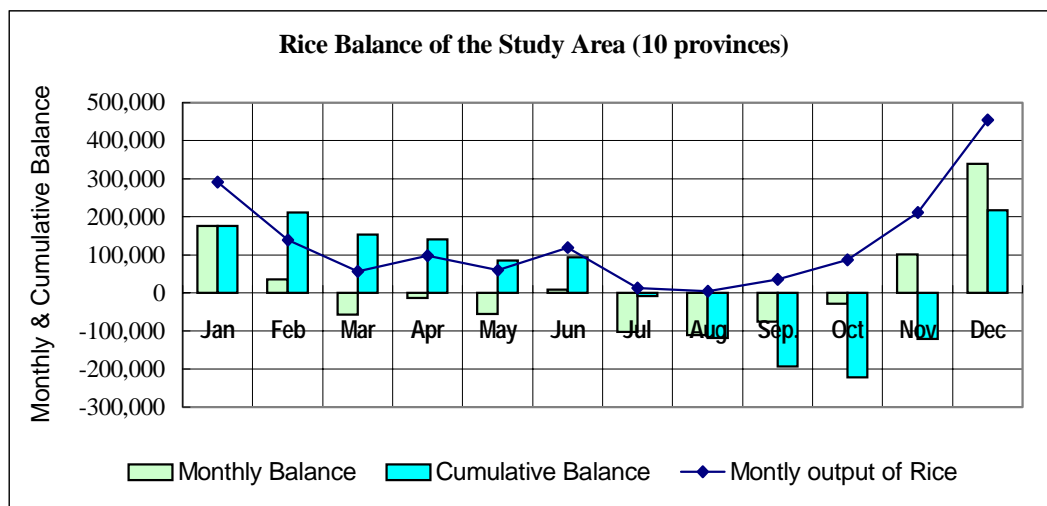
deficit conditions with a total amount of 32 thousand tons or 121 Kg per person. Furthermore, even in surplus district, there exist certain rice deficit communes, for which WFP provides food-aid once WFP identifies such commune as having a chronic food shortage.

The Cambodian government has no positive intention to intervene in the rice flow from the surplus district/province to the deficit ones due to lack of fund, for which market mechanism should basically function. Under the situation, it is rather difficult for those people who have no enough purchasing power (or income) to procure the required amount of rice. In this connection, chronically vulnerable people must rely on international assistance (food aid) through WFP and NGOs, until the government will obtain sufficient fund to provide such food aid. In some mountainous provinces facing rice shortage, people may take substitute food like maize, other cereals and root crops.

Surplus rice is supplied to rice-deficit regions through market mechanisms. However, the lack of purchasing power and/or lack of adequate road access (i.e. high cost of transportation) prevent sufficient supplies to rice-deficit places in remote areas.

(4) Seasonal Food Balance

The monthly supply-demand balance, on the condition of no stocks carry over and January as the beginning-of-period, is shown in the below. Harvest quantity is largest during the harvest peak of wet season crop in December and is smallest during wet/flood season in July and August. Monthly balance is in deficit situation in 7 months of the year. Although about 60% of the production is harvested during harvest season of wet season rice (November – January), harvesting is practiced almost throughout the year. Paddy cultivation is subject to water resources, and if irrigation system and flood control systems are installed, monthly harvest quantity can be equalized more throughout the year.



Note: 1) Monthly harvest amount is estimated based on rice cropping pattern of each rice-ecosystem. Assumption and formula being adapted in deriving the rice balance are same with MAFF's.

2) Cumulative balance is shown as an example, because it differs by setting of beginning month.

Base Data : MAFF, Crop assessment for wet season rice 1999/2000 and dry season rice 2000

3.2.2 A Future View on Rice Balance

(1) Rice production

Position and Target of Increasing Rice Production in the Agricultural Development Plan

The Agricultural Development Plan (2001-2005) has set a development target in conformity with its political line to assure food security and natural resource conservation. The target continues to focus the attention upon the food security, especially at community and family levels, and on reducing poverty because there is a large number of poor people in the agricultural sector. The Plan aims at accelerating and increasing food production, especially the rice crop and other alternative food crops.

The following table shows the rice production during 1996/97 – 2000/01 and the target for 2005/06.

Cultivation Result and Target for 2005/06

Description	Results				Estimation 2000/01	Plan to 2005/06
	1996/97	1997/98	1998/99	1999/00		
1. Total cultivated land *1	2,170,900	2,076,011	2,104,013	2,157,592	2,175,000	2,500,000
2. Damaged land *1	288,900	147,422	141,447	78,150	100,000	80,000
3. Harvested land *1	1,882,000	1,928,689	1,962,566	2,079,442	2,065,000	2,420,000
4. Yield (ton/ha)	1.84	1.77	1.79	1.94	1.87	2.00
5. Total output	3,458,000	3,414,918	3,509,871	4,040,900	3,800,000	4,800,000

*1: Refer to the data of Department of Agronomy. Source: MAFF

MAFF set up the target yield as 2.0 ton/ha and target harvest area as 2,420,000 ha in year 2005. This target yield is slightly higher than the estimated paddy yield in those years (about 1.8-1.9 ton/ha), and it is still in low level comparing with other Asian countries. Target harvest area is set as increase about 14% in wet season rice and about 24% increase in dry season rice. Damage/destroy area is set as corresponding to the actual result of 1999/00 in which the damage in wet season rice was least in recent years.

Each of these targets corresponds to the actual result in the past. These targets would surely be achieved if the removal of land-mines and the improvement in productivity through rehabilitation of irrigation system, increase in access and better use of quality input (seeds, fertilizers, pesticides) and modernization of agricultural technology are progressed.

(2) Food consumption

1) Anticipated population increase

The population of Cambodia is likely to increase from about 12.2 million in 1998 to 20.3 million in 2021. The percentage of urban population may increase from about 16% to 18% during the period of 2001-2021, based on the population census in 1998 by NIS.

The population growth rates of the nation are predicted as moderately declining; 2.4% during 2001 to 2006, 2.3% during 2006 to 2011, 2.1% during 2011 to 2016 and 1.9% during 2016 to 2021. The urban growth rate is predicted to decline steeper; from 3.1% during 2001 - 2006 to 2.3% for 2016 – 2021, a decline of more than 1% points.

Expected population

	1998 /1	2001	2006	2011	2016	2021
Cambodia	11,437,656	13,099,472	14,798,315	16,608,012	18,466,086	20,269,796
Urban	1,795,575	2,095,135	2,482,636	2,882,909	3,275,550	3,668,963
Rural	9,642,081	11,004,337	12,315,679	13,725,105	15,190,536	16,600,833

Source: General Population Census 1998, Analysis of Census Results, Report 6, NIS

/1 : Result of Census

2) Rice consumption

As stated in the previous section, per capita consumption of rice has been set at 151.2 kg since 1996 in the food balance calculations. From the result of limited scale of the survey (159 samples), amount of rice consumption was calculated as about 117 kg per person in Phnom Penh. At the same time, significant taste preference to the certain varieties/place of production was observed, especially at the central part of the city. In the rural area, collected data show the similar level of rice consumption per capita, 151.2 kg.

Staple cereals including rice have low-income elasticity and per capita consumption is expected to decline with the change of the eating habits in accordance with the economical development and the increase of income, from the examples of other Asian countries. However, it is hard to say that rapid economical development and change of eating habits will take place in Cambodia when present situations in rural villages are viewed. Therefore, it is appropriate to assume that present consumption level will continue for the time being.

(3) Post-harvest loss and Rice milling yield

Although the losses in post-harvest process is set at 10%, it was 7% in the result of the loss assessment survey conducted in the study. Similarly, the rice milling yield was set at 62% but the result of the survey showed is 64%.

(4) A future view on rice balance

1) Balance prediction for the year 2005/06

Based on the conditions set up considering the results of the Study, rice balance in 2005 is calculated as follows. For milling yield of paddy to rice and ratio of post-harvest loss, two conditions, CASE-1 and CASE-2, are set up.

Conditions of calculation

- Paddy production : Target value of MAFF for the year 2005/06
Rice consumption per capita/annual : 151.2 kg, same as the present assumption of MAFF
National population : 14,798,000, projected population from the general population census of 1998 (differ from figures used by MAFF)
Seed use : 5%, same as the present assumption of MAFF
Feed and other uses : 2%, same as the present assumption of MAFF

	<u>CASE-1</u> same as the present assumption of MAFF	<u>CASE-2</u> assumption based on the results of the Study
Milling yield of paddy to rice	: 62%	: 64%
Post harvest losses	: 10%	: 7%

Prediction of Rice Balance for the year 2005/06 (x 1000 tons)

Items	CASE-1		CASE-2	
	Result 1999/00	Plan to 2005/06	Result 1999/00	Plan to 2005/06
1. Paddy production	4,041	4,800	4,041	4,800
2. Post harvest losses	404	480	283	336
3. Seed, Feed and other uses	283	336	283	336
4. Available milled rice	2079	2,470	2,224	2,641
6. Demand of milled rice	1,819	2,238	1,819	2,238
7. Balance of milled rice	261	233	405	404

There is a difference of 134 ~ 171 thousand tons in the estimated surplus of milled rice calculated on the conventional conditions (milling yield 62% and post-harvest loss 10%) and on the conditions based on the result of the study.

2) Balance prediction for the year 2010/11

Since there is no target figure available on paddy production in 2010, calculation is made with following three assumed conditions. For milling yield of paddy to rice and ratio of post-harvest loss, CASE-1 and CASE-2 are set up same as above.

	Assumed condition 1	Assumed condition 2	Assumed condition 3
Harvest Area	2,420,000ha : No increase from year 2005/06 (same as the target value of MAFF for year 2005/06)	2,775,000ha : Increase 355,000ha, which is the increase area during 2001 ~ 2005 (target value of MAFF for year 2005/06 + 355,000ha)	2,800,000ha : Wet season rice : 2.5 million ha, which is equal to the production level of late 1960's. Dry season rice : No increase from year 2005/06
Yield	1.81 ton/ha for Wet season rice, 3.2 ton/ha for Dry season rice (same as the target value of MAFF for year 2005/06)	1.81 ton/ha for Wet season rice, 3.2 ton/ha for Dry season rice (same as the target value of MAFF for year 2005/06)	1.81 ton/ha for Wet season rice (same as the target value of MAFF for year 2005/06), 4.64 ton/ha for Dry season rice (80% of WS crop in adjoining land in Vietnam)

Prediction of Rice Balance for the year 2010/11 (x 1000 tons)

	Assumed condition 1	Assumed condition 2	Assumed condition 3
CASE-1	41	331	534
CASE-2	131	529	746

CASE-1 milling yield : 62%, post-harvest loss : 10%

CASE-2 milling yield : 64%, post-harvest loss : 7%

In case the rice production in 2010 remain stagnant with the level of 2005 and the population increase as estimated by NIS (assumed condition 1), estimated balance of milled rice calculated on the conventional conditions (milling yield 62% and post-harvest loss 10%) is in small deficit. However, calculation on the conditions based on the result of the study show 130 thousand tons of surplus.

3.2.3 Rice Reserve Policy

Food reserve policy has two aspects, namely, a disaster relief scheme and the ASEAN Food Security Reserve scheme. For the former scheme, only 1 billion Riels equivalent to about 1,200 tons of white rice is allocated for periodic flood damages as well as draught damages that occur annually, because of tight position in the government finance. At this moment, the Cambodian government has never allocated any budget for the ASEAN Food Security Reserve scheme.

ASEAN Food Security Reserve Agreement was concluded by 5 participating countries (Indonesia,

Malaysia, Philippines, Singapore, and Thailand) in 1980, and was started with a scale of 50,000 tons of milled rice in total. The stored quantity required for each country is a minimum safe level and attached to an earmarked quota. Each country maintains a National Food Reserve and reports its enforcement situation to the ASEAN Food Security Reserve Board. Since then the number of member nations have increased, and the scale of reserve for the year 2000 is shown below.

ASEAN Food Security Reserve

Country	Amount for Reserve (milled rice ton)	
	1979	2000
Indonesia	12,000	12,000
Malaysia	6,000	6,000
Philippines	12,000	12,000
Singapore	5,000	5,000
Thailand	15,000	15,000
Brunei Darussalam	---	3,000
Vietnam	---	14,000
Laos	---	3,000
Myanmar	---	14,000
Cambodia	---	3,000
Total	50,000	87,000

Source: Ministry of Economy and Finance

After its official participation in 1999, Cambodia is now obligated to allocate 3,000 tons of milled rice (about 5,000 tons of paddy) for the ASEAN Food Security Reserve. Green Trade Company (GTC) under the MOC is an exclusive agency for the rice reserve and responsible for the storage of 1,000 tons of paddy (about 600 tons of milled rice). But Cambodian government has never allocated any budget for the ASEAN Food Security Reserve scheme due to difficulty of national budget. The government considers that the paddy stocks of private rice mills in the country can correspond to the remaining of the obligate amount. But none of the preparation for emergency procurement such as selection/contract with rice mills has been made.

3.2.4 Food Distribution for the Vulnerable People

(1) World Food Programme (WFP)

WFP financially supported by international donors, procures rice from both external and internal sources. It then distributes this rice with other basic commodities to deficit and vulnerable areas. The following table shows the amount of rice procured and distributed by WFP in 1998 and 1999.

Year	Foreign procurement	Domestic Procurement	Total	Distribution
1998	16,352	19,673	36,025	28,828
1999	10,882	13,037	23,919	27,474

Source : WFP

Food-for-Work program accounts for 85 % of its activities. The contents of Food-for-Work are the system in which the villagers are provided with a food corresponding to their labors offered for making ponds, canals, dykes, roads, wells, land clearing and so on. WFP select the target places by surveying by themselves with staff of Ministry of Rural Development and Provincial Departments of Rural Development.

WFP is planning to continue Food Aid for Recovery and Rehabilitation in Cambodia from 2001 to 2003. The contents are income resource creation and employment increment as the society support activity, which would be conducted by Food-for-Work activities.

(2) The Disaster Relief Scheme

The National Committee for Disaster Management (NCfDM) under the Prime Minister's office is responsible to implement the disaster relief scheme, which was established in 1996. Recently, the NCfDM established its plan for the succeeding year with budget commitment, and procured white rice. In 2000, the plan should cover 18,000 households, with the allocated budget of 1 billion Riels with which they can supply only 1,272 tons of white rice. Actual transaction is being undertaken by GTC, who distributes white rice at the point to be designated by the NCfDM.

In 2000, suffering largest flood, food aid was increased greatly. The quantity supplied by NCfDM and domestic donors accounted for 16,520 tons for about 694 thousands families according to the record dated in November 29, 2000. Most of its aid was catered by the contribution from the private potentates. Other helps by International Federation Red Cross, WFP, Cambodian Red Cross, UN-OCHA (UN Office of Coordination Human Affairs) and NGOs were offered and the 231 thousands families received the benefit.

3.2.5 Food Reserve by GTC

GTC was established under the Sub-decree on November 23,1998, as the public enterprise by combining the Cambodia Food Company, the Material & Equipment Company and the Agricultural Products Company. GTC is an autonomous public organization that carries out both administrative and financial matters under the technical supervision by the Ministry of Commerce, and under financial supervision of Ministry of Economy and Finance. Although GTC is a public enterprise, it employs self-supporting accounting system. GTC performs profit-seeking activities such as trading, production, services and import-export like other private companies.

As stated above, GTC is an exclusive agency for the rice reserve and responsible for the storage of 1,000 tons of paddy (about 600 tons of milled rice) without budget from the national treasury.

The contents of activities for the past two years (1999 and 2000) are as follows. Scale of its activity is still very limited.

- (a) Paddy reservation for MOC : 1,000 tons (year 2000)
- (b) Rice reservation for NCfDM : About 1,270 tons (1 billion Riel) of each year
- (c) Purchasing and selling paddy : About 3,000 tons of each year
- (d) Supply rice to WFP : 2,700 tons (year 2000)

3.2.6 Problem and Direction of Development

Food security is an important issue needed to overcome in the national development policy, namely SEDP II and Agricultural Development Plan (2001- 2005). There are various views on food security, and it is treated in accordance with the social/economic situation of each country in the national policy. FAO set a target of food security as "All men's sustainable food security" that actually it has been the problem for the poor and the disaster victims.

The Food Control System under planned economy was abolished by introduction of a market economy policy. The production increase and achievement of self-sufficiency in rice can be considered as the result of a market economy policy. But still many poor people are in a difficult situation economically for food access. Food security for these poor people depend on what kind of social safety net shall be installed by the government. The present social safety net is composed with the activities of WFP, NCfDM, NGOs and etc.

The purposes of the study is in improvement of rice marketing system under the market economy, and social safety net for poor people and disaster victim is not taken as the direct purpose. Social safety net will be handled indirectly in the measures for attaining the smooth marketing by removal of the obstacles and for expanding the food reserve.

(1) Method for Assessment of Food Balance

Uncertain reliability of data collected by DAFF

It is necessary to improve the reliability of the Crop Cuts Survey and the assessment of harvest area by village chief which are used as the fundamental data for the assessment of rice balance.

Lack of export/import data

Although a lot of paddy is out-flowing to the neighboring countries, the amount of trade is not known due to the informal way of trading. Even the statistic for the formal export/import, data differs by source: i.e. MOC, Custom/MEF, Ports authority and Camcontrol. In addition, acquisition of available export/import data requires a lot of patients because the poor management of collected data and the lack of cooperative relationship among the government organizations.

First of all, cooperative relationship among government organizations, namely among MAFF, Custom/MEF and MOC should be established. Furthermore, it is necessary to promote a trade through the formal gates by legalizing the paddy border trading. Then, establish a statistic system for collecting/reporting the trade data by the custom and Camcontrol at each trade gate.

Lack of inventory data

Since the liberalization of rice marketing, the storage function is mainly shouldered by the private sector such as farmers, commercial rice mills and rice sellers. Only the police/army, WFP and GTC have significant capacity of warehouses in the government/international organizations.

The storage quantity by the government/international organization can be grasped. The essential point is how to collect these data. On the other hands, storage quantity by the private sector can be grasped only by presumption through the sample survey, requiring establishment of a method of survey and data analysis.

Rice consumption data

In the Socio-Economic Survey regularly conducted by NIS, quantity of rice consumption is surveyed in terms of money value. It included the consumption of self-produced rice, unfortunately it is not clarified what unit price was used for converting self-produced rice to money value. It is desired that in the future Socio-Economic Survey, consumption in terms of weight should be added to the rice consumption in terms of money value.

(2) Rice Reserve

Unclear policy on national rice reserve

Cambodia is now obligated to allocate 3,000 tons of milled rice (about 5,000 tons of paddy) for the ASEAN Food Security Reserve. But the government has never allocated any budget for this purpose, and only it has given GTC an order/responsibility to store 1,000 tons of paddy without budget. With this situation, it can be judged that the government has no clear policy on food reserve.

Although the rice/paddy prices tend to show the seasonal fluctuation, i.e. paddy price always fall in the harvesting time, it is impossible to predict the future price trend because the international market price influence on the domestic prices. Considering the severe financial situation of the country, realistic rice reserve policy and sustainable system for rice reserve need to be formed.

(3) Recommendation regarding the safety network

- WFP and NGO are performing the supporting activities to vulnerable people, such as poor

and disaster victims, instead of the Cambodia government. Considering the financial situation of the Cambodian government, the activity of WFP is supposed to continue for the time being. However, instead of WFP, the government itself should bear this supporting activity in the future, and should learn physical, economical and technical know-how for food aids from WFP to prepare it.

- NCFDM established in 1996 is performing food aid activities to disaster victims. Since government fund is being impending, most of food aids are actually dependent on the contribution from private potentates. Allocation of more budget by the government shall be necessary in the future. Moreover, the active cooperation between the government and the civilians/private sectors should be promoted.

- Although it may be cheaper to import rice from neighboring countries when the need arises, it would be desirable for donors, including WFP, to purchase local rice surplus for internal transfers to deficit areas. Apart from cost savings, this would help support prices in surplus areas in Cambodia.

3.3 Marketing System

3.3.1 Trade Flows

(1) Trade quantity

Since Cambodia achieved the rice self-sufficiency in 1995, annual paddy production has been in the range of 3.4 – 4.0 million tons. According to the 1999/2000 food balance data (MAFF Agricultural Statistic 1999/2000), the total of provincial surplus amount is 568,639 ton (milled rice), the total of provincial deficit is 307,928 ton, and the nation-surplus is 260,710 ton.

Due to lack of adequate statistical data on farmer's gross sale quantity, it is difficult to estimate the trade quantity of rice/paddy in the entire country. Because many rice-deficit communes/villages exist in the surplus Provinces, actual trade quantity of paddy/rice should be larger than the simple deficit quantity.

Although some import/export statistics are available from various agents such as FTD/MOC, Custom Dept./MEF, Port Authority and CAMCONTROL, each figure is based on different sources and has no reliability. There is no statistics for paddy export to neighboring countries because it is informal export.

Based on data obtained, the 1999/2000 rice supply-demand situation is roughly assumed as follows:

1999/2000 Rice supply-demand situation

Supply		Demand	
	X 1,000 ton		X 1,000 ton
Production (paddy)	4,041	Domestic consumption	1,819
Production (milled rice) *1	2,505		
Reduction for non-food use & postharvest loss (milled rice) *2	426		
Rice import *3	34	Rice export *3	3
Informal rice import from Thailand	5 - 10	Informal paddy export (milled rice base)	477 - 485 (296 – 301)
Opening stock	NA	End stock	NA
Total (Milled rice)	2,118 - 2,123	Total (Milled rice)	2,118 – 2,123

*1 : milling degree 62%

*2 : 17% (2% for animal feed, 5% for seed and 10% for loss)

*3 : Custom dept., MEF 1999 (Import figure includes 10,882 ton rice imported by WFP)

(2) Directions of flow

Rice/paddy trade flows vary depending on crop condition in different Provinces and on the prices in neighboring countries. Trade flows are generated not only by quantity imbalance but also by needs for specific rice variety and quality. Major trade flows are as follows:

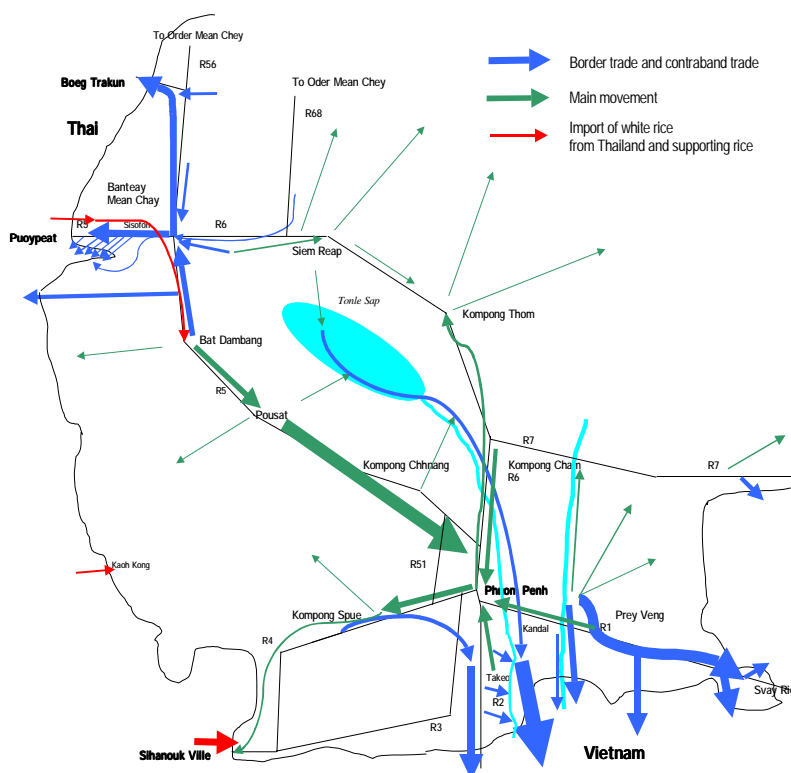
Major trade flows

From	To	Kinds / Major variety
Northwest main production area (Bat Dambang, Banteay Mean Chey)	Phnom Penh	Rice : Somely, Phaka Kagney, Neang Menh
	Thailand	Paddy : Somely, Domely
Southeast main production area (Takeav, Prey Veang)	Phnom Penh	Rice : IR, Phaka Kagney, Srov Krahome, Mixed-rice
	Vietnam	Paddy : IR

In addition, there are minor flows such as, flows from southeast production area to coastal area and mountainous area; and a flow of Thai broken rice through northwest boarder and then to Phnom Penh.

Phnom Penh is the largest rice-consuming center in the country. Various kinds, quality and price of rice flow into the City. As Phnom Penh is located at a hub of the national road network, wholesalers play a role in relaying the rice from northwest production area and import Thai broken rice to provincial towns in the southeast and coastal area.

Except the paddy flows to Thailand and Vietnam, paddy flows in the country are limited. Most paddy is milled in the province of origin or in a neighboring province.



Paddy and Rice Movement (1998/99)

Somely, Phaka Kagney & Neang Minh produced at the northwest production areas, have an established reputation for high quality (good taste) and are marketed widely to many urban areas - Phnom Penh, Sihanouk Ville and provincial towns of Takeav, Kandal, Siem Reap, Kg. Cham. Other local varieties are marketed only within the Province and/or to neighboring provinces.

Only specific varieties such as Somely, Phaka Kagney, Neang Minh, Srov Krahome, Srov Sor, IR and etc. are marketed variety-wise. Some thousands of other wet season varieties are marketed as mixture of varieties (called as 'Mixed-rice' in market) from the collection stage due to the small quantities produced.

3.3.2 Transport

(1) Mode of transport

Most paddy and rice is transported by road and physical distribution of rice/paddy is efficient as far as transport conditions permit. Regular use of water transport is limited to some areas in the southern provinces, such as paddy transport to the rice mills in Nhak Loeung in Prey Veang Province, paddy transport to Vietnam through the main/branch streams of the Bassac River and rice transport to Kratie from Kompong Cham town. The railway was a major mode of rice transportation from the Northwest Provinces to Phnom Penh during the 1960's. Now it is estimated that about 80% of rice are transported by heavy trucks through NR5. NR5 became impassable and heavy trucks were stacked up in mud during October-2000 due to high level of flood water, and many truck transport were shifted to railway transport to Phnom Penh.

For road transportation, various means are used depending on distance and road condition. Paddy transport in rural areas is most often by ox-cart for short distances and for the roughest roads within villages/communes (e.g. field to the farmer's house, farmer's house to rice mill/middleman's house). In Bat Dambang Province, the use of tractors and locally made trucks for paddy transportation is significant. For medium distances within districts (village to local town/rice mill), tractor and truck are used. For long distances (inter-district/inter-provincial transport mostly for rice), heavy trucks over 10 tons are used. 40-ton heavy trucks with trailers are widely used for rice transport from Bat Dambang to Phnom Penh. Transport of rice in town areas by traders is most often by truck and motorcycle. Most of paddy/rice traders including rice millers do not have their own transport. Both large and small-scale traders hire transportation.

200 – 300 ton boat transportation is available on demand between Siem Reap and Phnom Penh except during the dry season, but it is not much used to transport rice and paddy at present. In 1998, paddy/rice was transported to Siem Reap from Nhak Loeung to supply the army.

(2) Transport costs

Transport rates for the major destinations are consistent and well known to the users. Rates for short distance truck transport from surrounding areas to town market/rice mill is commonly around 10,000 Riel/ton. Rates for medium and long distances transport vary depending on the cases. High rates of over 300 Riel/ton-km are applied to poor condition roads. In contrast, cheapest rate is 55 Riel/ton-km on NR4. Rates for the major transport route, Bat Dambang – Phnom Penh – Sihanouk Ville, is relatively cheaper than that of other routes. A transport company expects 30-40% reduction in transport rate between Bat Dambang and Phnom Penh if the NR5 is rehabilitated.

It is currently reported that there are no illegal fee collection points along the trunk lines of national

roads except at town/city areas, border gates and port areas. It is mainly the police, military police and the army who operate illegal fee collections. This fee collection has become an accepted fact of life and a predictable cost that is routinely included in the calculation of transport costs.

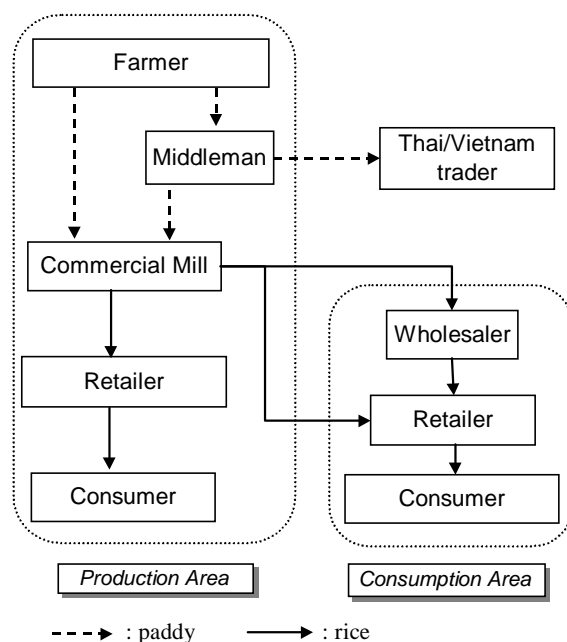
3.3.3 Marketing System

(1) Marketing channel

Under the market economic policy, rice/paddy marketing is entrusted entirely in the hand of the private sector. Currently, the government has no market intervention or market control system for the domestic marketing. Under this situation, farmer, middleman, commercial mill, wholesaler and retailer formulate various marketing channels. From the varieties of the channels, a trunk form is abstracted as shown in the figure.

All the marketing agents including farmers conduct business by utilizing all available resources. Marketing channels are generally short; as a channel shortcut, such as farmer's direct sale to rice mills and retailer's direct purchase from rice mills, is widely practiced. Also, channels are flexible to adapt quickly to new opportunities and change direction of trade flow.

Prices prevailing in their immediate area of operation are well known by all agents except farmers.



Trunk Form of Marketing Channel

(2) Marketing agents

1) Farmer

According to the questionnaire survey, only 40% of farmers sold rice, regardless of quantity, during the last 2 years. Average sales volume is 1.6 ton/year and maximum is about 3 ton/year. Thus, the number of farmers involved in the marketing system is limited. Farmers tend to sell part of the surplus paddy immediately to repay debts and store the rest until they need more money. Except for farmers who have easy access to rice mill/town, farmers sell surplus paddy to middleman in the village. Farmers always get cash payment immediately for sale of paddy. At present, no group marketing is carried out in Cambodia.

According to the results of the questionnaire survey, the methods of marketing paddy are shown in the table below. Most farmers (67%) sold paddy to middlemen. In Kandal province, selling to consumers (in the market or villagers) is one way of marketing paddy, as well as selling to middlemen. Compared to other provinces, more farmers sell to rice mills in Bat Dambang (45%) and Kg. Chhnang (34%).

Methods of marketing paddy by farmers

Province	Sell to middleman	Sell to mill	other
Kandal	34%	13%	53%
Prey Veang	70%	16%	14%
Kg. Cham	69%	19%	12%
Svay Rieng	59%	15%	26%
Takaev	81%	4%	15%
Kg. Spue	96%	4%	0%
Kg. Chhnang	61%	34%	5%
Bat Dambang	52%	45%	3%
Siem Reap	57%	29%	14%
Study Area	67%	20%	13%

Source: JICA Study Team, Questionnaire survey

2) Middleman (Paddy Collector)

Middlemen play an important role in the marketing of farmer's paddy, especially in remote areas far from rice mills, markets or towns. Large-scale middleman uses agents to visit individual farmers and buy paddy. The area for paddy collection is generally fixed within several districts. In areas of rough and poor road conditions, ox-cart is used for transport.

Many of rice mills have regular business relations with select middlemen. Rice millers order a specific variety of paddy to middleman when they receive a large or urgent order. The scale for paddy orders is 20 - 300 tons and the rice miller gives 30%-50%-70% advance payment.

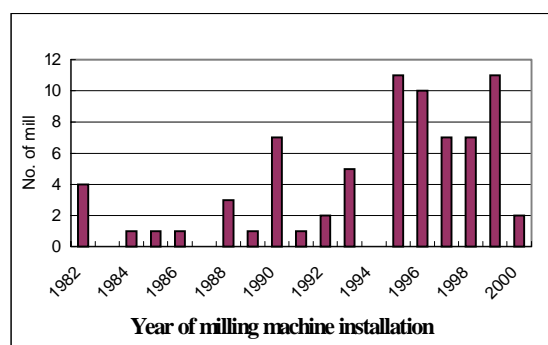
3) Commercial rice miller

Among the marketing agents, commercial rice millers have the largest business scale and play the role of financial supplier to other agents; making advance payments to middlemen and deferred payments to rice sellers. They also play an important role in paddy storage. Most commercial rice millers keep 300 – 1000 tons of paddy stock in July-August. In general, 50% of material paddy is purchased directly from farmers.

Scale of business varies from 200 ton/year to 10,000 ton/year in throughput. Some commercial millers have a combination function as custom mill. Except for a few commercial mills in Bat Dambang, which are formed as a company or partnership, almost all commercial mills are family run and categorized as Sole Proprietorship. It is presumed that the total number of commercial rice mills in the Study Area is more than 324. (number of mill which equip with power of over 24 HP in the Report on Working Activities 1999 /MIME)

It is to be noted that rice millers in Bat Dambang province have large shares in high-medium price markets in Phnom Penh with their established reputation for rice of good taste and good quality. Many of rice mills only in this province individually label their rice bags with the name of variety, rice mill, trademark and telephone number.

Figure on the right shows the year of milling machine installation. Most were installed after year 1995. Prior social upheavals clearly deterred the investment.



4) Rice trader (seller)

Except for Men Saron Company, who exclusively supplies rice to the police/army, all rice traders are small-scale businesses. Most rice shops in towns are owned and managed by housewives earning supplemental housekeeping money.

Combining the functions of retailer/wholesaler and direct purchase from rice millers is widely practiced by rice sellers. True ‘wholesaler’ who sell *only* to retailers are very few : and they are only in Phnom Penh and in a few provincial towns. The size of the urban population of each town restricts the number of rice sellers. Except Phnom Penh and Sihanouk Ville, the number of rice sellers in provincial towns is very limited.

Scale of Rice Sellers’ Business

	Retailer/ Market stall type	Retailer/Wholesaler Independent shop type	Wholesaler/ Independent shop type
Phnom Penh			
Sell	20 – 200 kg/day	0.2 – 2 ton/day	40 – 200 ton/month
Stock	1 – 3 tons	10 – 30 tons	30 – 400 tons
Buy	500 kg – 5 tons	4 – 40 ton/time	40 ton/time/miller
Siem Reap			
Sell	100 – 300 kg/day	8 – 15 ton/month	
Stock	0.2 – 3 tons	20 – 50 tons	
Buy	0.3 – 2 ton/time	2 – 5 ton/time/mill	
Kg. Cham			
Sell	50 – 150 kg/day	15 – 60 ton/month	
Stock	0.2 – 2 tons	10 – 30 tons	
Buy	0.3 – 2 ton/time	10 – 20 ton/time	

JICA Study team

Rice sellers can be divided into two types: i) stall shop type in the markets and ii) independent shop type. Stall shop type generally has more variety of commodities than independent shop type, such as bran and chips for animal feed. Low-income earners tend to use stall shop type.

Between rice miller - wholesaler – retailer, deferred payments are usual. It is common for retailers to settle payment when re-purchasing. The grace period is usually 1 to 2 weeks.

(3) Trade flows to provincial towns

Marketing channels to provincial/district towns from surrounding production areas are simple and have not much variation. Rice sellers in each town buy the locally produced rice directly from rice mills nearby. In addition to the local rice, sellers procure several kinds of rice according the needs (i.e. income level) of local consumers from rice mill/wholesaler in other provinces. Paddy does not flow through the markets in provincial towns.

Notable characteristic in rice supply to provincial towns are summarized as follows:

- No rice flow into the provincial towns of Bat Dambang and Banteay Meanchey from other provinces. Moreover, even though closest to Thailand, no Thai broken rice is marketed because both provinces are surrounded by production areas of high value varieties.
- Although Takeav province has the largest surplus in the country, rice from Bat Dambang (rice of good taste) flow into the provincial town to meet consumer needs.
- Only high-price rice (Bat Dambang rice and Thai rice) flows into Siem Reap because it has large tourist demands.
- Only the cheapest rice (IR rice) flow into Kratie town.
- The lowest rice price in each town is commonly 600-650 Riel/kg, with either IR or Mixed-rice.

(4) Trade flows to Phnom Penh

Phnom Penh has a population of about 1.1 million and is the largest market in the country. Rice of various kinds, quality and price is marketed here. All kinds of domestic rice is shipped directly from rice mills in production areas to wholesalers/retailer in Phnom Penh by national road network.

Phaka Kagney, N. Menh, N. Khon, Wet Season Mixed-rice, IR rice and Thai broken rice are popular rice varieties in Phnom Penh markets. There is a clear price order among those varieties/kinds of rice.

Retail shops and rice price in and out of Phnom Penh

Variety/kinds	In Phnom Penh /1		Out of Phnom Penh /2	
	Price (Riel/kg)	Shops selling	Price (Riel/kg)	Shops selling
Somely	1100 – 1560 *	21%	1500	3%
Phaka Kagney	900 - 1100	17%	900 - 1200	22.5%
Neang Khon	850 - 1000	13%	NA	0%
Neang Menh	750 - 900	17%	800 - 1000	17%
Srov Sar	800 - 850	3%	750 - 900	14%
Srov Krahome	750 - 900	3%	700 - 900	7%
IR & State rice	590 - 800	9%	500 - 800	17%

Variety/kinds	In Phnom Penh /1		Out of Phnom Penh /2	
	Price (Riel/kg)	Shops selling	Price (Riel/kg)	Shops selling
Other local varieties	780 - 1014	1%	600 - 1000	7%
Thai rice *	858 – 3500 *	16%	1000 – 1300 *	12.5%

/1 Rice shops near Railway Station and near Orussey market (sample 23 shops)

/2 Rice shops in Takmaho market, Kandal province (sample 15 shops)

Prices differ depending on the production area. * Include several different grades

High-medium priced rice such as Somaly, Phaka Kagney, N. Menh from Bat Dambang are the most common in the city center where residents have the highest income level in the country. In contrast, medium-low priced rice from surrounding provinces such as IR, Local variety and Mixed-rice are common in the outskirts of the city area where lower income earners live.

Rice from the northwest production areas, namely Bat Dambang, has an established reputation of good taste and good quality. It has large market share in high-medium price market in Phnom Penh. Now quality competition has started among rice mills in Bat Dambang seeking outlets in Phnom Penh, due to the market's limited size.

IR rice produced in the southern part of the country such as Takaev and Prey Veang is evaluated poor in taste and the cheapest rice in Cambodia. In Phnom Penh, IR rice is marketed mostly for factory lunch consumption and for low-income earners living in the outskirts of the city. IR rice is sold only at a few markets in the city center. Phaka Kagney produced in Takaev is 100 – 150 Riel/kg cheaper than the same produced in Bat Dambang, due to "hard taste".

The “look“ of rice is an important factor in determining price (quality) in the market. Therefore, foreign matter and colored grain are all removed before retailing. This practice is not applied to the Bat Dambang rice.

Thai Broken rice is sold at most rice shops in center of Phnom Penh. Consumers value this rice and considered as “It is soft and it maintain softness even when rice get cool”. In contrast, Cambodian rice is considered as “It becomes hard when it is cool”. Many local restaurants use Thai broken rice for blending with local rice to add fragrance and softness.

The number of rice sellers in the major markets is counted as around 150 - 200. As the registration system has not cover small-scale businesses, rice sellers outside of the markets are not known.

Wholesalers have business relations with 3 to 10 mills, and with 20 - 50 retailers. Their business is to replenish after selling and do not keep large stocks (300 tons of stock as maximum, ordinary is less 100 tons).

Stall shop owner in several markets expressed their concerns that: " It isn't possible to bring up a

family with a rice shop. Too many rice shops and too few sales this year”. Orussey market has shifted into a new building since the 3rd of August. Before shifting, there were about 90 shops but it decreased to about 30 shops because many sellers changed to selling other goods.

(5) Trade flows to Thailand and Vietnam

Main reason for the paddy flow to Vietnam is lack of a domestic market for irrigated early rice (specially IR variety). The main reason for the paddy flow to Thailand is physical difficulty and high costs of transporting commodities within the northwest region and/or higher profit. Due to this informal export, there is no trade data. This is a major hindrance to estimate the national food balance and to formulate policies and intervention measures.

1) Paddy flows to Thailand

Paddy flows to Thailand from Banteay Meanchey province, Bat Dambang province and Siem Reap province through ‘smuggling corridors’ along the northwest border. Among the three provinces, it is presumed that the flow from Banteay Meanchey province is the largest.

In Banteay Meanchey province, farmer’s scale of rice production is large, over 5 ha and grow high value variety such as Somaly and Domaly. But due to the unstable social conditions until recent year, commercial rice mills have not been established in this area. At present, there are only 2 commercial rice mills between Sisophon and Poipet, and no commercial rice mill in the north of Sisophon upto Thai border. The road conditions are also extremely poor. Reportedly, not only middlemen but many farmers also carry paddy by push cart/animal cart to Thailand.

In contrast to Banteay Meanchey province, Bat Dambang province has well-established commercial rice mills. Middlemen in Bavel district, a major surplus area in the province, regularly collect price information at the Thai border and rice mills along NR5 and ship the paddy at higher profit.

At districts close to the Thai border, ‘district to district level’ discussions about border trade are made with local authorities on the Thai side. As a result of this, regular, though very limited, paddy trade is conducted at a border gate in Banteay Meanchey province.

At present time, there is no public market facility for border trade in Cambodia. Besides this poor situation, modern market facility has already established or under-preparation in Thai side at major border gates in Bat Dambang and Banteay Meanchey province.

2) Paddy flow to Vietnam

In the border area with Vietnam, the population on the Cambodian side is thin. Though the figure is unknown, considerable area is leased to Vietnamese farmers for rice cultivation and all paddy

produced on the leased land is collected by Vietnamese paddy collectors. Large-scale export factories are located only 30-40 km across the border. Thus, this border area has the best access to export facility in Cambodia.

The majority of paddy flow to Vietnam is considered as IR variety. It was reported that due to low export price during Feb. - June in this year, few Vietnamese paddy collectors came to buy paddy in Takeav province and farmers were left with unsold stocks of paddy.

In Vietnam, paddy/rice is distributed by waterway in a dense network of irrigation/waterway canals. Thus the major mode of paddy transport to Vietnam is by waterways and Vietnamese traders come up the main/sub streams of the Bassac River and Mekong River. Several local ports in Takeav Province are used as loading places. NR2 and several byways through rice fields are also used to reach the border. In Kandal province, paddy is loaded along the banks of the Bassac River.

At Angkor Borei port in Takeav, a Cambodian paddy trader is stationed to purchase paddy and he waits for prices to rise in Vietnam. Trader carries paddy by boat to a place near the Bak Day border gate where he meets Vietnamese traders without preliminary contact. Vietnam's paddy prices are obtained from boats coming to Angkor Borei from Vietnam. Paddy trade at Angkor Borei begins in April and continues to November, with the peak times in June/July.

Several large-scale paddy traders are located at Neak Loeang (ferry station) in Prey Veang province. A trader estimates his annual trade at 10,000 tons of paddy, of which 60% is sold to Vietnam. This trader sells paddy to Vietnam traders through several Cambodian boarder traders. Vietnamese buyers come up to Neak Loeang in 30 – 50 ton boats together with a Cambodian boarder trader. The fee to pass through the boarder is estimated at 50 – 70 VND/kg including commission to the Cambodian boarder trader.

Other Cambodian border traders who deal with bean, maize and tobacco are stationed at Neak Loeang. They have regular contact with several Vietnamese traders and buy commodities after receiving orders from them.

Along the Vietnam border in Takeav province and Prey Veang province, there are local markets at opposite side of border (at opposite side of canal) but facilities are in poor condition. It should be noted that most of Vietnam border areas are inundated about three months every year.

3) Policy on paddy trade

General agreement on trade cooperation between respective country was made and promotion of bilateral trade and border trade is clearly stated in the agreements. But it seems that no definite (written) agreements about paddy border trade exists. Actual situation of paddy trade at border is described as follow:

Thai

Reportedly paddy trade is banned. Legislation stipulates the banning of paddy import has not yet confirmed. Thai local authority has some flexibility in border trade and admits the paddy import with a limitation of amount at a certain gate.

Vietnam

Vietnam government allows Vietnamese people residing permanently in border areas to trade goods at border. Also allows Cambodian people with legal permanent residence in border areas in Cambodian territory to conduct trade at border markets in Vietnam if they have border passes issued by the relevant Cambodian authority. The commodities worth less than VND 500,000 carried across the border to Vietnam will be exempted from tax once in a day (Decision 24/1999/QD-BTM, June 1999).

Rice imports need the permit from the Ministry of Trade (Document No.2860, June 1999). According to the hearing from Vietnam traders, paddy import is legalized with import tax, but rice import is banned in border trade.

Cambodia

Paddy export is not banned in Cambodia but it is required to get an export license. Practically it is impossible to get a license for small-scale paddy traders and farmers who live at the border area in their daily life, and they have to ship paddy to the market of neighboring countries with informal way. Moreover, it gives the chances to government official to collect illegal fees.

4) Fee collection at border area

Thai border

According to the hearing at a gate where paddy trade is admitted by both Thai and Cambodia local authorities with a limitation of amount, Cambodia authority collect Bath 10 – 8 /bag (100-120 kg), i.e. 10,000 - 6,700 Riel/ton. No data was obtained about formal/informal fee in Thai side.

Vietnam border

According to the hearing from Vietnamese traders, total of informal fees in Cambodia side is calculated as 6,570 – 9,500 Riel/ton and fee and tax in Vietnam side is about 31,000 VND/kg (8430 Riel/ton) including 34,000 VND/ton of tax collection on about 50% of the cargo value.

The profit of Vietnam trader is roughly estimated as 120 VND/kg. This is the usual level of profit for paddy collection in Mekong Delta in Vietnam.

(6) Rice procurement by the Police and Army

Reportedly, the total rice supply for the army and police was 70,000 tons in 1999. This accounts for 12% of the total of the provincial surplus amount (568,639 ton) in 1999/2000. As a result of demobilization, the number of the soldiers and police has decreased; and the amount of rice supplied

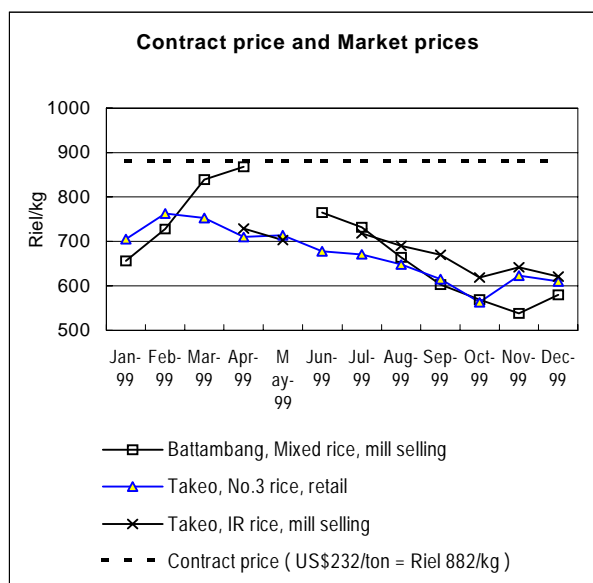
has also presumed to be decreased to 60,000 tons in 2000.

About the rice procurement by the police (staff of central/provincial/municipal governments under Ministry of Interior), the following information was obtained from Dept. of Logistics & Technical Material, Ministry of Interior.

Amount per capita : 0.75 kg/day/person
 Number of objective personnel : 63,726 officials (whole country, for year 2000)
 Quantity of rice : approx. 18,000 tons (include Local mission use)
 Contract price : Riel 1,270 /kg (for year 2000)
 Quality : 30% - 35% broken (No.2 Rice)
 Inspection : Compare with contract samples
 Delivery : Designated warehouses at each province
 Tender/Contract : Usually made in January

Thai Boon Rong Company was the supply agent during 1997 – 1998. It is reported they stopped supplying rice due to payment problem by the government. By taking over in 1999, Men Sarun Import & Export Co., Ltd is now the sole agent supplying rice to the army and police. Men Sarun Import & Export Co., Ltd. procures rice from rice mills directly. Past contracts were as follows;

Date of contract	20 Dec., 1999
Quantity	5445 ton
Unit price	US\$232/ton
Delivery period	25 Dec., 99 to 10 Oct., 00
Payment	35% in March 00 65% in year 2000



Although the payment is ‘long-term deferred payment’, the contract price is considered sufficiently high to cover the extra cost. Because the contract fixes the buying price a year in advance, it is assumed that the contract price will have significant influence on the market price.

(7) Rice procurement by the WFP

The amount of rice procured by WFP, from foreign countries/from domestic market, were 16,352 ton /19,673 ton in 1998 and 10,882 ton /13,037 ton in 1999. Domestic procurement accounts for 2.3 % of the total of the provincial surplus amount (568,639 ton) in 1999/2000.

WFP procures domestic rice from rice mills through tenders. WFP has at present 24 pre-selected suppliers who have had several years' experience in providing WFP with rice. Because the WFP carries out local tenders whenever it receives confirmation that funds have been made available for local purchase, it is difficult to schedule local purchase tenders. The specifications for rice procurement for the March-2000 tender is as follows:

- Broken : 35% broken white rice
- Crop : from the Dec. 1999 Wet season crop
- Moisture content : between 12 and 14 %
- Other : suitable for human consumption and free from bad smell and live insect infestation. Two 250g samples of the rice on offer must be submitted with the bid.
- Packing : new 50 kg (net) polypropylene bag, triple-stitched and marked on one side only
- Price : USD163.00 (Riel 620/kg) at Peam Ro warehouse, Prey Veng province
- Payment : Bank transfer, after each delivery
- Performance bond : 5% of contract value, 60 days after completion of the contract.

(8) Rice export

There is no restriction on rice export but exporter need to apply an export license from the government. Under the free trade system, private traders export small amounts of rice. Singapore is a major destination and it occupied 82% of total export and high quality rice was a major export.

Export amount & turnover

Year	Q'ty (M/T)	Turnover (USD)	Average FOB (USD/ton)
1996	16,310	4,314,070	265
1997	10,947	3,234,815	295
1998	3,080	808,840	263
1999	7,390	1,632,310	221
2000 (Jan. – Apr.)	600	154,000	257

Source : Foreign Trade Department/MOC

Note : Although several export-import data are available form Custom dept./MEF, FTD/MOC and Camcontrol, each data shows different figures because data sources are different from each other.

Export costs for dry cargo container (20 feet) is quoted at USD 20.9/ton by a forwarder. Informal fee payments for port procedures are included in the quotation and it makes custom/port clearance fee very costly.

Export costs from Phnom Penh to Sihanouk Ville

(Unit: USD)

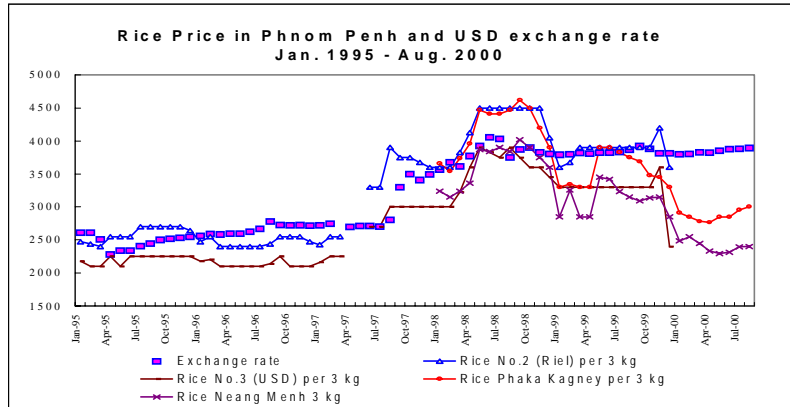
Item	Cost per 20 ft. container	Cost per ton
Inland truck fee (Phnom Penh to S. Ville)	170	7.7
Custom clearance and Port clearance	230	10.5
Loading fee on to vessel	25	1.1
Customs, Camcontrol, Police inspection	35	1.6
Total	460	20.9

Note : 22 tons rice/20 ft. container, Exchange rate : Riel 3,850/USD

3.3.4 Price Mechanism

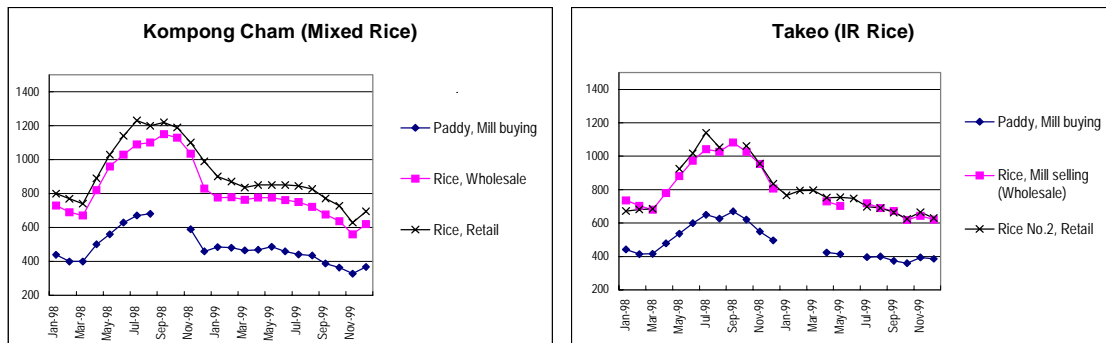
(1) Price trend

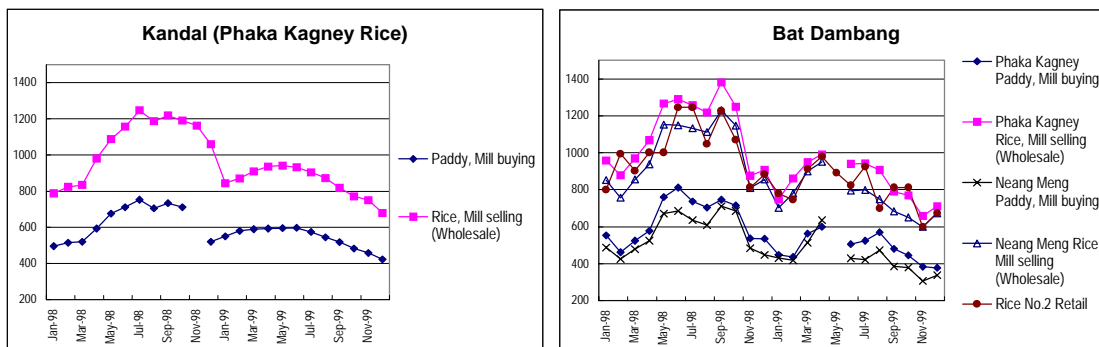
Retail price in Phnom Penh showed similar fluctuation with US\$ exchange rate until Sep - Oct. 1999. After sharp drop in the end of 1998, although it once recovered, rice prices remain low level and rice price in US\$ value during Jan. –August in year 2000 is about 25% less than that of during 1995.



Rice price tends to show a seasonal fluctuation pattern: decreasing during main harvest season (Nov. – Jan.) and increasing during off-season (flood season) although the range and pattern of fluctuation varies every year.

Paddy price and rice price fluctuates in parallel at each production area. Also, fluctuation of each area is in same pattern as shown in the figures below. Among the provinces, prices in Bat Dambang province show most frequent fluctuation.





Source : Bulletin of Retailing & Wholesale prices for Agr. Commodities 1998 - 1999, MAFF (Yearly Bulletin Series)

Paddy prices and rice prices of Cambodia, Thailand and Vietnam show similar fluctuation. According the analysis of correlation among these prices of three countries, Thailand prices and Vietnam prices have high correlation, and Vietnam paddy price has a significantly high correlation with IR rice price in Takeav. The correlation between Thai prices and Cambodia prices is less than that of between Vietnam prices and Cambodia prices.

Although the farmers hoped to sell their paddy about 350 to 380 Riel/kg, paddy price stayed lower than that during the Study period.

Farmer's Selling Prices

Year & Month	Province	Variety (Crop season)	Price of paddy (Riel/kg)
April to May 1999	Prey Veang	IR (dry)	310 to 360
Sep. to Oct. 2000	Prey Veang, Kandal	Mixed rice (wet), IR (dry)	290 to 310
Nov. to Dec. 2000	Prey Veang, Kandal	Mixed rice, Banla Phdau, other local varieties (wet)	260 to 300
Feb. 2001	Takeav, Bat Dambang	Mixed rice, other local varieties (wet)	250 to 290
May 2001	Whole Cambodia	IR (dry), Mixed rice, other local varieties (wet)	210 to 250

Source: Study Team

Note: Price information for May 2001 was obtained in the technology transfer seminar from commercial millers. Other information was collected from farmer and/or middleman. High value varieties such as Somaly were not included.

(2) Price differences between Provinces

In Cambodia, rice varieties being produced in each province are varied, and most local varieties are marketed only within the province and/or to neighboring provinces. Only the varieties of Somaly, Phaka Kagney, Neang Minh produced in northwest production areas are marketed to many provincial towns. Due to no accumulated price data in which variety and origin identical is available, clarify the price differences between provinces with the data being collected during the study periods at each provincial town.

Price differences between provinces of Somaly, Ph. Kagney and Neang Menh produced at Bat

Dambang are small. Prices of IR variety rice, which are always cheapest in the markets, are in the same level among several provinces. It is noteworthy that prices of Mixed-rice, which are mixture of minor wet season varieties and have different content of varieties depending on the province, also are in the same level (Riel 600- 700/kg) among all provincial towns in Cambodia.

(3) Price difference among variety/grade

There is a definite price order among major marketed varieties that is Somaly- Phaka Kagney- Neang Khon- Neang Menh- Mixed Rice – IR, and this order never change in the markets.

Retail price by variety				(Unit: Riel/kg)
Variety/Grade	Phnom Penh	Siem Reab Town	Bat Dambang Town	
	(origin)			
Somely	1300 - 1400 (BTD)	900 - 1000	1200 - 130	
Phaka Kagney	900 - 1100 (BTD)	1000 - 1100	900 -1000	
Kraya	NA	1200		
Neang Khon	900 - 1000 (BTD)	800 - 850	700	
Neang Menh	800 - 900 (BTD)	750 - 800	700	
Local (Mixed)	700 - 800 (PP, KS)	600 - 700	600 - 680	
IR	600 - 650 (TK)	NA	NA	
Thai broken rice	1000 - 1200 (Thai)	NA	NA	

Price data collected : Phnom Penh/Aug. 18, Siem Reab/July 9-13, Bat Dambang/July 14-18

BTD=Bat Dambang, PP=Phnom Penh, KS= Kg. Spueu, TK=Takaev

Source : JICA Study Team

The price difference between Phaka Kagney rice and Neang Menh rice is average 171 Riel/kg (1998) and 157 Reil/kg (1999) in Phnom Penh. The paddy price difference between those tow varieties is 68 Riel/kg (1998) and 58 Riel/kg (1999) in Bat Dambang.

In Phnom Penh, some wholesalers and retailers have different grade of rice, called as No.1 and No.2, in higher price variety such as Somaly and Phaka Kagney. The price difference between grades is normally 100-200 Riel/kg. Rice sellers explain the difference is: in appearance (clearness) which comes from different degrees of milling, broken rice ration, or production area (i.e. taste). Although it appears that some common scale/sense of quality evaluation exist among the traders, no numerical indicator is used for grading the rice quality in domestic trade.

(4) Cost & margin

Cost and margins, which is indicated with the difference of buying/selling prices, is larger in the higher priced varieties.

Difference of buying-selling price

(Unit: Riel/kg)

Place	Rice Mill *1					Wholesaler/Retailer *2			Retailer *2	
	Bat Dambang			Takaev	Kandal	Phnom Penh		S. Ville	S. Ville	K. Cham
Variety	Neang Meng	Phaka Kagney	Mixed	IR	Phaka Kagney	Neang Menh	Phaka Kagney	Neang Menh	Neang Menh	Mixed
Value *3	378	399	333	322	364	48	59	65	123	88
S.D.	77	120	67	56	82	6	20	20	54	24

*1 / Difference of paddy buying and rice selling price

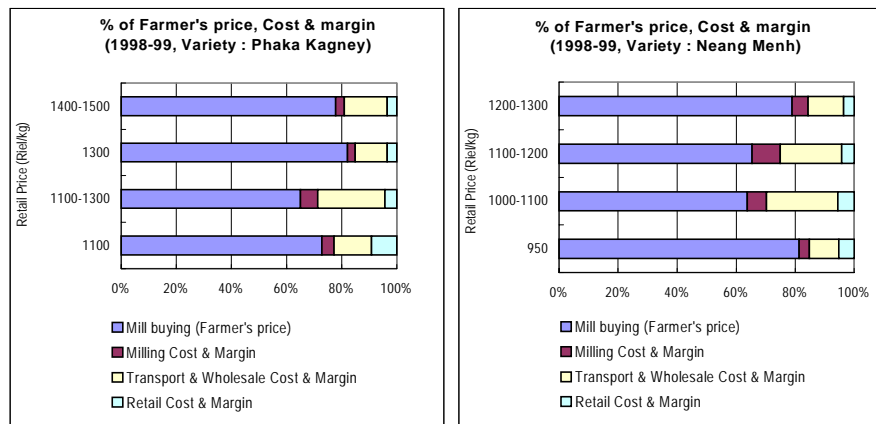
*2 / Difference of rice buying price and selling price

*3 / Riel/kg, Average of monthly price difference during 1998-1999

Source: Bulletin of Wholesale prices for Agr. Commodities 1998, 1999, MAFF (Yearly Bulletin Series)

Cost and margins at each stage are shown in the figure below:

The figure indicates that the farmers share account for 70 – 80% of the retail price. In accordance with the retail price level, the percentage of cost/margin at wholesale stage is altered from 12% to 24% for Ph.Kagney and 10% to 24% for N.Menh. It tends to become large once the retail price fluctuated and then it gradually decreases. The cost/margin at milling stage and retail stage is stable: both stages of cost/margin account for 6 – 13% for Ph.Kagney and 8 – 13% for N.Menh.



(5) Pricing mechanism

According to the results of price trend/correlation analysis, pricing mechanism in Cambodia is summarized as follows:

- Cambodian rice/paddy prices receive the influences of international market price through Vietnam at the southeast and through Thailand at northwest. Since the price of rice in both Thailand and Vietnam have a very similar fluctuation each other, paddy/rice prices in both the southwest and northeast production areas also shows similar fluctuation each other.
- Paddy price in Vietnam (i.e. export situation) has significant influence to the price of cheapest rice (IR variety) in Takeav and Prey Veang. With a definite price order among the varieties in domestic markets, fluctuation in IR variety shift the price of next cheapest rice (Mixed-rice) in the provinces.

- The highest priced rice (Somaly) is mainly produced at the northwest production areas, and it is reported that Thai traders buy Somaly/Domaly with higher price than other varieties. Thus, price in Thailand has influence to the price of highest priced rice.
- Rice price tends to show a seasonal fluctuation pattern: decreasing during main harvest season (Nov. – Jan.) and increasing during off-season (flood season), although the range and pattern of fluctuation are influenced by the international market price.
- As the result of price correlation analysis, the influence of Vietnamese prices on Phnom Penh prices is larger than that of Thai prices.

3.3.5 Market Information System of Rice

(1) MAFF

The current Market Information System (MIS) for agricultural commodities was set up through the FAO project providing technical assistance, training, equipment and a budget for general operating expenses. It started full-scale operations in August 1997. This MIS collects the rice/paddy prices of fixed varieties at 11 places in the country.

Collected price data is transmitted daily to the Agricultural Marketing Office of DPSC from the Provinces by fax or telephone. The following rice/paddy prices are disseminated through a daily radio program of National Radio Cambodia. Due to time limitation of the program, only selected information is broadcasted.

	Province/Variety	Type of price	
Paddy	Kandal / Phaka Kagney	Rice mill in Takmaho	Buying
	Takaev / IR	Rice mill	Buying
Rice	Phnom Penh / Phaka Kagney (BTD) Neang Menh (BTD)	Near Railway station	Buying & selling
	Kandal / Phaka Kagney Takaev / IR	Rice mill in Takmaho Rice mill	Selling Selling

In addition to this quick dissemination of price information, yearly bulletins are issued and provided to DOAs and other relevant institutions as well as IOs and NGOs.

Current Problems:

- Disconnected telephones: Sometimes due to delay in budget release and bill payments, the telephones are disconnected.
- Accuracy of collected information: difficulty in collecting the true market price from traders.
- Lack of appropriate trainers for staff training.
- Shortage of budget for monitoring MIS activity in the Provinces.
- Difficulties in negotiating with a private radio station.

Improvement Plan for year 2001

- Improve the broadcasts: Broadcast the local price information in each province through the local radio station. (Negotiations with radio stations are on-going in each province)
- *Training on marketing, data processing and data analysis
- *Micro-Crop Production Programming: Introduce the market-oriented production to farmers. Pilot cases with vegetable farmers are planned to start in the provinces of Kandal, Takeav, Kampot and Kampong Cham. Train DAFF staff to be marketing extension officers for introducing market-oriented production.
- *Improve comminations with provincial offices (introduction of HF Radio)
- *Strengthening field monitoring activities.

(2) MOC

The MOC has been collecting for wholesale prices of Rice No.1 and Rice No.2 together with 51 other commodities in 14 provinces. The information collected has never been disseminated with any urgency to the public. It is published as part of a weekly business roundup and provided to relevant institutions. The collected rice price data is hard to analyze because variety for Rice No.1 and Rice No.2 is not same among the provinces.

(3) EDC (Enterprise Development Cambodia)

EDC has been assisting the rice millers through the formation of the Rice Millers' Association (RMA) at provinces and Federation of RMA, exposure and awareness study tours to Thailand, Singapore and Vietnam to help build social capital for economic development. EDC have been providing international market information to RMAs periodically. EDC is setting up a communication and information network among RMAs, called RICENET, through the internet and is currently designing its homepage.

(4) Phnom Penh Municipality (Management offices at the Markets)

Market management offices at most of markets in Phnom Penh City collect the price information of commodities daily. The collected data is usually sent to district governor office. It has never been disseminated to the public.

3.3.6 Characteristic of Rice Consumption in Phnom Penh

(1) Consumer

A questionnaire-hearing survey was made to find out the purchasing behavior and the favorite of consumers and obtained 159 answers.

1) Quantity and frequency of purchase

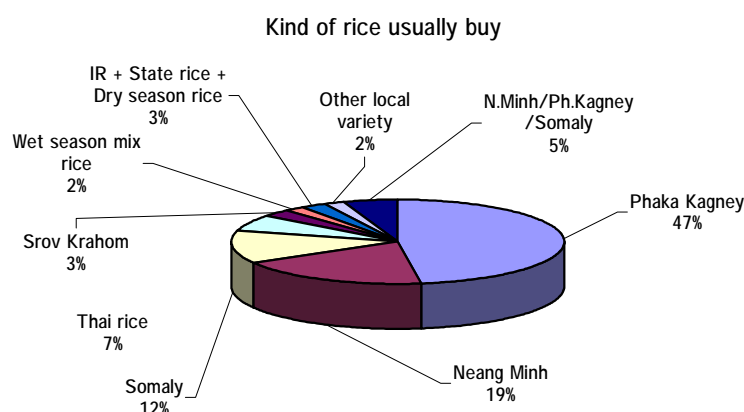
The average quantity purchased per time is 64 kg and about 60% of the respondents purchase one bag (50 kg) of rice at a time. 40% of respondents answered, “purchase once per month” and a total of 35% of respondents purchase at intervals longer than a month. Analyzing the answers for quantities purchased, frequency and household size, the per capita consumption of rice is calculated at 0.3195kg/day and 116.6 kg/year.

2) Criteria for choosing rice

The respondents gave higher value to ‘variety’, ‘fragrance’ and ‘price’ in choosing rice. Among the criteria, ‘broken rice percentage’ is the least important. This characteristic of the consumers (i.e. caring about the fragrance but not the broken rice) is reflected in the constant demand for Thai fragrant broken rice in Phnom Penh markets.

Consumer’s criteria for choosing rice

Criteria	Variety	Price	Fragrance	Whiteness (color)	Broken rice	Production place	Shop recommendation
Average score	1.596	3.396	2.324	3.917	6.042	4.917	5.729
Order	1	3	2	4	7	5	6



Of the rice varieties purchased by consumers, is Phaka Kagney, accounted for almost 50%. Somaly, Neang Minh and Thai rice come next. The total of the 3 higher-ranking varieties accounts for 84 %. These percentage results for each variety parallels the assortment of varieties in the rice shops in the city.

The criteria for choosing a certain variety depend on the individual. By analyzing the correlation among choice criteria of individuals, their favorite varieties and income levels, the following patterns can be seen.

- Consumers who choose Mixed-rice care about price and does not care about variety and broken percentage.
- Consumers who choose IR are sensitive to whiteness (color) but do not care about place of production.
- Consumers who give higher value to fragrance choose Somaly and Phaka Kagney.
- Consumers who choose Neang Minh and IR do not care about fragrance.

- The higher the income, the less they choose Neang Minh.

According to the result of analyzing the relations between ‘taste’ and ‘price’, softer rice is judged as high quality and high price. Next to it, ‘stickiness’ has influence over the price. With this result, it is confirmed that the feeling of chewing/eating is very important element for consumers in Phnom Penh.

The respondent who answered the ‘prefer new rice’ account for 45.2%, and ‘prefer old rice’ account for 54.8%.

(2) Restaurant

A questionnaire-hearing survey was conducted by visiting restaurants (mainly Khmer food) at 8 points in the city and obtained total of 40 answers.

1) Purchase behavior

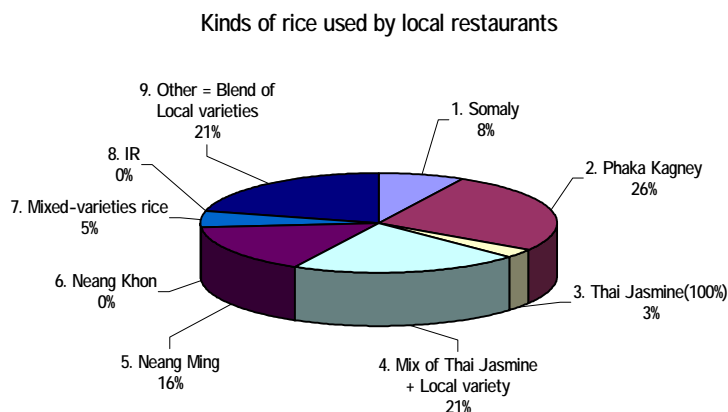
Almost all restaurants have a fixed place of purchase or seller. About 40% of respondents ‘go to the purchase place’ and other 60% ‘order by telephone’ or ‘the seller come to get the order’. The purchase places are: rice shops on the street 44 %, rice seller in the market 38 % and rice mills accounts for 10 %. In case of direct purchases from rice mills, most respondents have a relative who own/manages the rice mill. The quantity purchased varies depending on the size of the restaurant. The average quantity purchased per time was 364 kg and the maximum was 1500 kg. However, a small-scale restaurant purchases just enough quantities for a day’s operation at a market near by everyday.

2) Kinds of rice used

The kind of rice used at each restaurant is fixed. In almost all restaurants, their selection was based on good taste/customers’ choice, but not on price.

Phaka Kagney is most popularly used (26%). Compare to the consumer use, the major difference is in the use of blended rice.

A blend of Thai rice and local variety rice account for 21% and a blend of local varieties account for another 21%. Another difference is they so not use IR rice. A blend of Thai fragrant broken rice with various local varieties is made to add fragrance and to



increase softness. Wide use of this blended rice conforms to the outcomes of the above consumer survey: fragrance is an important criterion for choosing rice, and softer rice is judged highly in quality and price.

Few restaurants expressed complaints about rice quality. Several restaurants complained about the price rise due to the floods.

3.3.7 Development Constraints

There are constraints relative to the aspect of rice marketing, many of which are common across the regions, provinces, and to the marketing of other agricultural products.

Limited Capacity of Domestic Absorption of Incremental Production

Cambodia has been in rice-surplus situation over the past 5 years. Considering the present high level of cereal consumption, there is not much scope of greater domestic absorption of increment production. At present, absorption of the rice surplus is highly dependent on neighboring countries, although its export is carried out informally.

Poor Marketing Infrastructure

In Cambodia the basic infrastructure required for improved economic activity is underdevelopment. The very poor condition of roads, such as NR5, NR6 and farm-to-market roads, is a serious obstacle to more efficient trade. Even with rehabilitation efforts, about half the length of national roads needs major improvement. Most provincial and tertiary roads are broken and damaged, with many being impassible during the rainy season. In urban areas, the run-down condition of most markets in terms of cleanliness, drainage and truck access is another major obstacle to efficient trading activity.

Lack of nationwide telecommunication system also hinders efficient trade activity. Although several mobile-phone networks have been developed, communication is still limited to urban areas and costly. Larger traders such as rice millers and wholesalers are equipped with ICON for local communication. But small-scale traders and farmers, even government offices in remote areas, lack effective means of communicating with urban areas.

Poor Financial Service System

Even the basic banking services being required for most business operations are currently unavailable in the provinces. Settlement of accounts between rice millers in the provinces and rice sellers in Phnom Penh are mostly done face to face. In some cases, informal remittance services of gold shops are used to settle accounts between provinces.

Banks do not offer long term lending, and the maximum lending period is only 1 year. Although many NGOs provide minimum financial services in the countryside, no loan conditions meet the

requirements of rice millers for renovation of their facilities or for procuring paddy.

Illegal fee collection

With police and army heading the list, government officials collect illegal fees from the private sector. These illegal fees increase marketing costs in addition to the difficulties in transportation due to poor road conditions. Illegal fees are routinely collected at the following places/phases of rice marketing;

- Road fee collections at provincial towns, Phnom Penh city, Sihanouk Ville port and etc.
- Fee collections at border areas.
- Custom clearance and other exporting procedures

Informal Paddy Export

Physical difficulty and high costs of transporting commodities within Cambodia and the more accessible and better mills on the other side of the border, make markets in the border provinces integrate with those of the neighboring countries. Often it is more profitable to sell surplus paddy across the borders than to domestic markets.

Main reason for the paddy flow to Vietnam is lack of a domestic market for irrigated early rice (specially IR variety). The main reason for the paddy flow to Thailand is physical difficulty and high costs of transporting commodities within the northwest region and/or higher profit. Due to this informal export, there is no trade data. This is a major hindrance to estimate the national food balance and to formulate policies and intervention measures.

Informal Thai Rice Import

Thai fragrant broken rice is informally imported to Cambodia via the small corridors along the Thai border and via the formal gates without leaving a record, then it is marketed to Phnom Penh and other provincial towns to fulfill the need for high quality rice of urban residents. As with the above informal export of paddy, lack of trade data is a hindrance to estimate the national food balance.

Restricted opportunities for farmers to see better buyers

Farmers often have limited outlets for their paddy and are often bound to sell to middleman because of poor condition of farm-to-markets road, and may include an element of credit provision by the middleman. Opportunities for farmers to see better buyers are restricted. Such opportunities are further hindered by the small quantities produced by most farmers.

Weak bargaining power of farmers

Despite the definite price order existing among rice/paddy varieties, the price difference of high and low quality varieties in rice mill buying prices, specially in Bat Dambang, is relatively small compared to the price difference in urban markets. Price is always decided by negotiation, but the information resources available to farmers are limited. In most cases, a farmer gets price

information from neighbors or buyer. Also, no numerical indicator is applied in paddy quality evaluation except a few rice millers in Bat Dambang, and the farmer's capability to evaluate paddy quality is limited.

Weak marketing capability of rice millers

Northwest production areas such as Bat Dambang and Banteay Mean Chey have an established reputation for high quality (good taste) rice. It dominates the domestic high quality rice markets in Phnom Penh city and in some provincial towns. There are several other local varieties of high quality (good taste) in some other provinces around Phnom Penh. But the weak marketing capability of rice millers in these provinces hinder their expansion and outlets in Phnom Penh markets. This in turn limits the market for farmers.

Weak incentive for physical quality improvement

Based on income levels and buying power of consumers, the markets in urban and provincial towns have different needs. At lower buying power area such as Kompong Spue town, consumer needs are for cheap price. Therefore the physical quality is kept inferior level (high contents of small broken rice) deliberately to maintain a lower price for the consumer. On the other hands, in Phnom Penh, where consumers have the highest income levels in the country, consumer's first criteria for choosing rice is its variety and few complaints are raised about physical quality.

Constraints in Market Information Service

Difficulty in disseminating provincial information

Due to time limits of the MIS radio program, it is unable to disseminate all provincial information, and there exists a mismatch between what the farmers/traders want to know and the program content. Negotiations for 'free' broadcast with a private radio station in the provinces was attempted but so far none of them have successful.

Duplication of data-gathering activity

Beside the AMO/AMFF, several governmental institutes, including MOC, also collect the marketing information of agricultural commodities. But there is no cooperation in data collection/exchange at present time.

Scarce records for import and export

There are several export/import records available from the Custom Department/MEF, Foreign Trade Department/MOC, Camcontrol and Port Authority. All these records are based on different sources of information and have no consistency with each other. In addition to their unreliability, the lack of border trade data is the biggest hindrance to estimate the national food balance and to formulate policies and intervention measures.

Weak Institutional Capacity

The institutional capacity for supporting the private sector is weak. Beside the constraints in MIS activity mentioned above, the lack of capable and experienced staff remains the biggest constraint of AMO/MAFF in providing marketing support to farmers and traders. Worse situation is encountered in MOC.

Unfair dealing in State rice procurement

Reportedly there are unfair dealings in the government's rice procurement for the army and police supply, and collusion in the WFP rice tender. These large quantities of rice procurement may influence the market prices. The government should have a mechanism such as Fair Trade Commission to supervise such large transactions to maintain fairness and transparency.

Rice Import by WFP

Although it may be cheaper to import rice from neighboring countries when the need arises, it would be desirable for donors, including WFP, to purchase local rice surplus for internal transfers to deficit areas. Apart from cost savings, this would help support prices in surplus areas in Cambodia.

3.3.8 Direction of Development

With the yield growth and planted area expansion, the country achieved an overall rice "surplus" in 1995 and this have been sustained until now. It must be noted that attaining self-sufficiency despite weak infrastructure, low adaptation of modern technology, and a rapidly increasing population indicates considerable potential for further rice production. Needless to say, availability of food supply is a necessary condition for food security and a situation of steady supply is clearly preferred to stabilize food prices and improve real incomes of the poor. At present, absorption of the surplus rice is highly dependent on the informal paddy trade with neighboring countries.

Despite Cambodia being in a favorable situation of rice-surplus, the agricultural production system in Cambodia still remains highly vulnerable to weather shocks and pest damage. Stabilization and expansion of rice production remains an immediate problem to be solved. From the marketing aspect, it is essential to give incentives to farmers for increase production. One such is to improve farmer's income by strengthening their bargaining power and expanding markets.

Despite the large amount of paddy flowing out to the neighboring countries, there is no trade record due to informal export. To improve the paddy trade, it should be liberalized and legalized. By doing so, traders will pass through formal boarder gates, thus eliminating illegal fee collection at border areas, and it will also enable official recording of trade. Moreover, the bargaining power of Cambodian traders should be improved and the opportunity taken to promote the paddy trade to convert to a milled rice trade.

Domestic markets have different needs according to the buying power of residents in each area. Each production area shall attempt marketing to match the regional needs. In Phnom Penh, large amount of imported Thai fragrant broken rice is sold for blending with domestic rice to add fragrant. This imported Thai broken rice should be replaced with domestic rice by enhancing the production of fragrant variety.

Despite an overall “surplus” situation, many Cambodians lack access to food supply due to insufficient purchasing power, poor roads and due to more profitable markets to sell. These poor roads need to be rehabilitated to reduce the marketing cost and the distribution barrier to deficit areas, and to meet the potential demands. Another factor increasing marketing costs is the illegal fee collection by police, army and civil workers: this must be eliminated immediately.

Consumers do not care about some degree broken rice and are satisfied with the present quality of rice. Rice processed in Bat Dambang province has an established brand value and dominates the domestic high-quality rice markets in Phnom Penh and in some provincial towns. If the industry develop with foreign capital investment, it is expected that the demand for high-quality rice will increase as the incomes of city dwellers improve. Other production areas should consider introducing a fragrant/soft type of rice to fit the consumer’s taste. Another constraint to competing with Bat Dambang rice in Phnom Penh markets is the weak marketing capability of rice millers. Rice millers should take an initiative to formulate a vertical integration of rice production–processing-marketing with farmers for mutual benefit. Competition in high-quality markets among the provinces shall lead the overall quality improvement in the country, and then lead to further possibilities of entering the overseas markets.

Another problem in the marketing system is weak bargaining power of farmer’s. To give incentives to farmers for increasing production, creation of paddy markets, where many buyers and sellers gather for their paddy transaction, shall provide the more opportunities for farmers to see better buyers. Also, such markets shall form the open-index-price reflecting the supply-demand situation of the production area. By sending other production areas clear price signals regarding quantities and varieties required, it will also facilitate spatial distribution to fill the price gaps among provinces and reduce the price fluctuation in provinces.

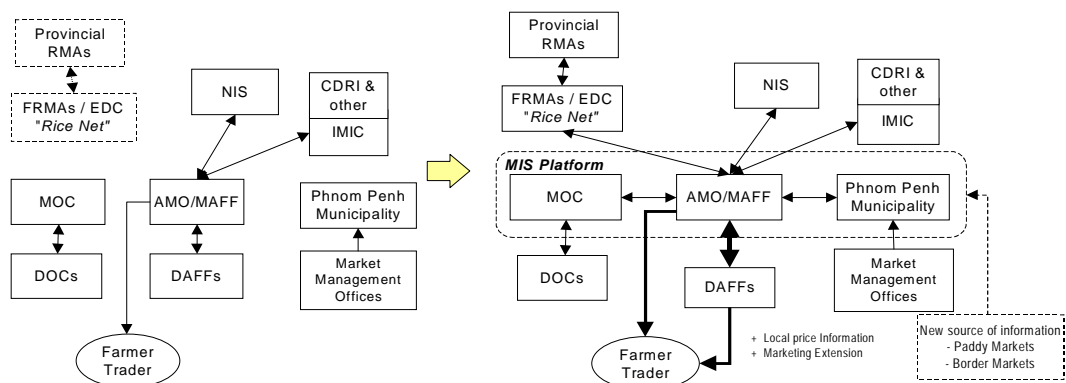
The government shall strengthen the supporting services to the private sectors through creating a better business environment, more efficient and fair. First, illegal acts by government officials should be cracked down on immediately. Legislation and regulations relating to private businesses such as registrations/permissions for business, tax system, market fees and etc. should be clearly made known to the public to reduce the chances for illegal fee collection. As emerging Traders Associations grows, there might be possibility for price-fixing arrangements in the market. A supervisory system by government to secure fair competition shall be necessary in future.

Except Men Saron Company who exclusively supplies rice to police/army, almost all rice traders in the country are small-scale private businesses, including most rice millers.

Most rice shops are managed by housewives to earn supplemental housekeeping money. In the center of Phnom Penh City, it is observed that too many rice sellers have resulted in sales decline in certain markets. Rice mills also are in over crowded situations in the country. From the viewpoint of promoting efficiency, relocation and/or streamlining may be needed. However, considering the nature of those small-scale businesses, relocation and/or streamlining shall not be a focus in the Study.

As an immediate task, present MIS (market information service) needs to be strengthened by making the cooperative scheme/system among the concern agencies in the government and in the non-government sectors. For this activity, an initiative of MAFF/AMO is desired. The conceptual figure of MIS is shown below.

Proposed Concept for Future MIS



Collection and dissemination of market price information is just a part of MIS. As future task, MIS should cover the activity of analysis of historical data and market researches to provide the marketing advisory services to the private sector, especially to farmers to promote the market-oriented production.

As it is apparent in Thailand and Vietnam, there is no social need for mechanization of commodity handling in physical distribution, given the availability of cheap labour. Considering the employment opportunities in the marketing industry, mechanization of commodity handling shall not to a focus in the Study.