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Agricultural Trade in the Greater Mekong Sub-region: The Case of Cassava and Rubber in Cambodia

HING Vutha with THUN Vathana

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Abbreviations and Acronyms

ASEAN	Association of Southeast Asian Nations
DTIS	Diagnostic Trade Integration Study
FAO	Food and Agriculture Organization
FTA	Free Trade Agreement
GMS	Greater Mekong Sub-region
MAFF	Ministry of Agriculture, Forestry and Fisheries
MoC	Ministry of Commerce
RGC	Royal Government of Cambodia
UNDP	United Nations Development Programme
WTO	World Trade Organization

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Chapter 1. Introduction

Cambodia's agricultural sector accounted for 27 percent of gross domestic product in 2007 and employed approximately 56 percent of the total labour force, especially the poor (International Monetary Fund, 2009). However, the sector has grown at a sluggish pace, an average of 3.3 percent per year, over the last decade, and trade in this sector has not contributed significantly to the country's total trade. In 2007, total agricultural exports reached USD106.3 million or 2.6 percent of total exports, while agricultural imports amounted to USD282.1 million or 5.2 percent of total imports (WTO, 2009). Cambodia's agricultural exports to other countries within the Greater Mekong Sub-region (GMS) represented about 22 percent of the country's total agricultural exports, while agricultural imports from the GMS accounted for 62 percent of total agricultural imports. Thailand has been Cambodia's largest trading partner in agricultural products, followed by China (second largest source of imports and third largest export destination) and Vietnam[1].

Cambodia's agricultural trade with countries in the GMS is governed by the ASEAN Free Trade Agreement-Common Effective Preferential Tariff for ASEAN members and the Early Harvest Programme, and agreement on trade in goods under the ASEAN-China Free Trade Agreement for China. These agreements require Cambodia to reduce and eliminate tariff and non-tariff barriers on agricultural products in exchange for wider market access for agricultural exports in its partners' markets (the "principle of reciprocity"). In principle, this will stimulate more movement of agricultural goods within the region and thus lead to specialisation according to countries' resources. Although Cambodia has a potential competitive advantage in the primary sector due to its abundance of cultivable land, it is short of skills (Toshiyasu et al. 1998[2]). Even with comparable competitiveness in certain agricultural goods such as maize, soybeans and cassava, Cambodia's agricultural exports are limited. This could mean that the country has yet to fully exploit the benefits from trade arrangements. The major factors leading to this outcome include limited supply capacity, weak infrastructure connecting production centres with export gates, lack of marketing information and trade services and high cost of trade facilitation.

Having recognised the importance of agricultural trade development in boosting economic growth and reducing poverty, the government of Cambodia's approach has been to enhance agricultural exports while developing the sector. Under the leadership of the Ministry of Commerce and with support from UNDP and other donors, the government launched a trade strategy known as the Diagnostic Trade Integration Study (DTIS) 2007 in mid-2006 to develop a more strategic view of trade development. The specific objectives of DTIS 2007 are: to identify possible priority products or services as a basis for strengthening and diversifying exports; to identify bottlenecks; and to serve as a basis for formulating trade development priorities. Of the 19 products identified in DTIS 2007 as potential exports, nine are agricultural

1 UN ComTrade 2008 accessible at http://comtrade.un.org/

2 These writers investigated the determinants of comparative advantage of selected ASEAN countries based on empirical evidence from a cross-country study by Wood (1994).

goods: cashew nuts, cassava, maize, fish, livestock, rice, rubber, soybeans and fruits and vegetables.

The DTIS 2007 involved an in-depth analysis of export performance, demands from world markets, domestic supply conditions and human development implications as well as trade-related legal and institutional action plans for 19 potential exports, intended to strengthen the business and investment environment for exports. However, it did not touch upon other important aspects such as comparative production costs of selected agricultural goods, marketing chains, challenges and opportunities for agricultural production and marketing and regional market flows. Since no study has focused on these issues with a view to enhancing agricultural trade in the GMS, this study is designed to fill this gap. The overall objective is to examine how agricultural trade in the region can be promoted in a manner that will optimise the benefits and minimise the negative impacts. The study selected cassava and rubber for in-depth analysis for two reasons: (1) they have not been significantly studied in the past, and (2) their potential importance for employment creation and poverty reduction.

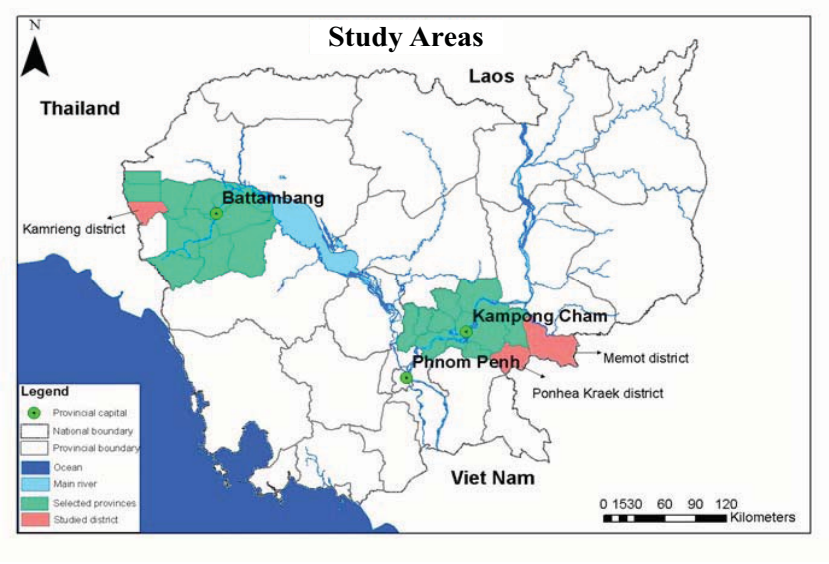
This report is structured into five chapters. Chapter 1 provides an introduction to agricultural production and trade. Chapter 2 discusses research methods used in the study. Chapter 3 looks at production components for cassava and rubber with emphasis on production practices, costs, challenges and opportunities. Chapter 4 examines cassava and rubber trade in cassava focusing on trade flows, trade costs and margins and marketing challenges and opportunities. Chapter 5 presents policy recommendations and conclusions.

Chapter 2. Methodology

The study used a combination of two approaches: desk research and field survey. The desk research included reviewing policy documents, literature reviews and an overview of statistical data. The field survey consisted of a farmer survey, trader survey and interviews with village and district chiefs, district agricultural officials and representatives of processing companies. Field surveys were conducted in May 2007 in two provinces, Battambang and Kompong Cham, where the commodities under study are produced and significant cross-border trade with neighbouring countries occurs. Kompong Cham is located in the east, while Battambang is located in the western part of the country. Memut and Ponhea Kraek districts of Kompong Cham were chosen as study sites for both rubber and cassava, while Kamrieng district of Battambang was selected for the cassava survey.

The farmer survey was conducted to collect information on production processes and costs, production challenges, pricing and margins. For cassava, 37 farmers in Battambang were randomly selected and 32 in Kompong Cham. For rubber, the survey was made only in Kompong Cham, and 39 farmers were selected.

Figure 2.1: Map of Study Site



The trader survey was used to collect information on marketing chains, trade flows and associated costs and margins. Structured questions were asked to capture certain common issues while not revealing the whole story. To compensate for this weakness, the study also conducted in-depth interviews with traders to learn their activities and understand the overall picture of commodity trade in their regions.

Several in-depth interviews were conducted with village chiefs, district chiefs and agricultural officials in order to understand the overall situation and conditions of agricultural production and trade in their villages and districts. The research team also conducted interviews with representatives of cassava and rubber processing factories in Kompong Cham to understand their sourcing and selling.

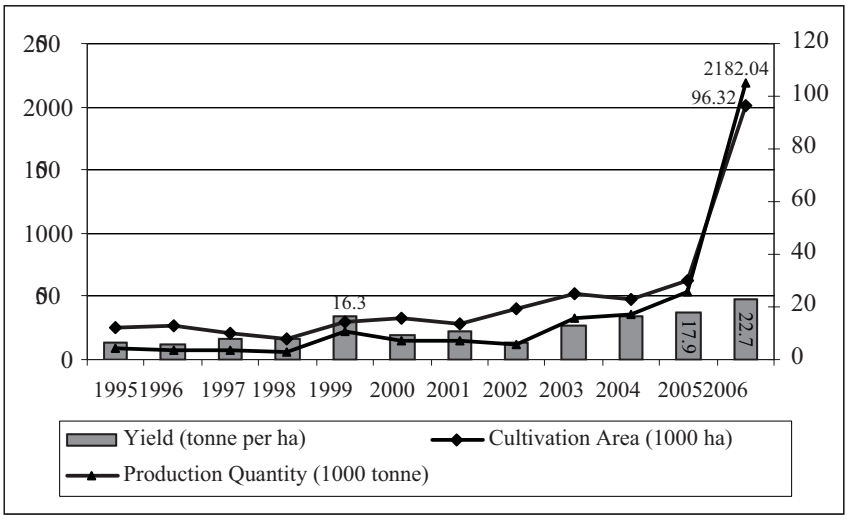
Chapter 3. Production

3.1. Cassava

3.1.1. Overview

Figure 3.1 illustrates the historical development of cassava production in Cambodia. The graph suggests that cassava production experienced rapid expansion between 2005 and 2006. Total production reached 2.19 million tonnes in 2006, up from 0.54 million tonnes in 2005 and 0.18 million tonnes in 2000. The jump was attributable to a rapid increase in cultivated area and higher productivity. The total cultivated area reached 96,324 ha in 2006, about four times larger the area in 2005 and seven times larger than the area in 2000. The average yield in 2006 was 22.65 tonnes per ha, compared to 17.87 tonnes in 2005 and 10.47 tonnes in 2001.

Figure 3.1: Cassava Production in Cambodia



Source: FAOSTAT | FAO Statistics Division 2008 | 10 July 2008

Kompong Cham was the largest production centre in 2005, with a cultivated area of 11,719 ha and production of 244,605 tonnes; the average yield in this province was the second highest at 20.9 tonnes per ha. Kompong Speu was the second largest cassava producer, followed by Siem Reap, Kompong Thom, Battambang and Preah Vihear (more details in Table 3.1). The cultivated area in the top five provinces represented about 78 percent of the total while their production accounted for 92 percent of national production.

Productivity varies significantly across provinces, the highest yield being 27 tonnes per ha and the lowest 2.5 tonnes in 2005. Battambang had the highest productivity, followed by Kompong Cham, Koh Kong (19 tonnes per ha), and Kompong Speu. The lowest productivity was in

Pursat, followed by Kompong Chhnang (3.2 tonnes per ha), Kampot (3.7 tonnes), Stung Treng (4.0 tonnes), and Svay Rieng (4.5 tonnes).

Table 3.1: Cassava Production of Selected Provinces, 2001 and 2005

	2005			2001		
	Cultivation area (ha)	Yield (tonne/ ha)	Production (tonne)	Cultivation area (ha)	Yield (tonne/ ha)	Production (tonne)
Kompong Cham	11,719	20.9	244,605	4,639	11.97	55,520
Kompong Speu	3,269	14.7	47,698	1,200	6.8	8,160
Siem Reap	1,182	11.6	13,698	1,222	8.59	8,118
Kompong Thom	895	7	6,009	1,927	6.52	10,295
Battambang	770	27	20,813	1,148	12	13,775
Preah Vihear	681	10	6,810	93	10	900
Takeo	582	6	3,499	695	8.98	6,179
Others	3,651	-	18,918	5,355	-	44,816
TOTAL	22,749	16.08	362,050	16,279	9.61	147,763

Source: MAFF 2001 and MAFF 2005

3.1.2. Cultivation Practices

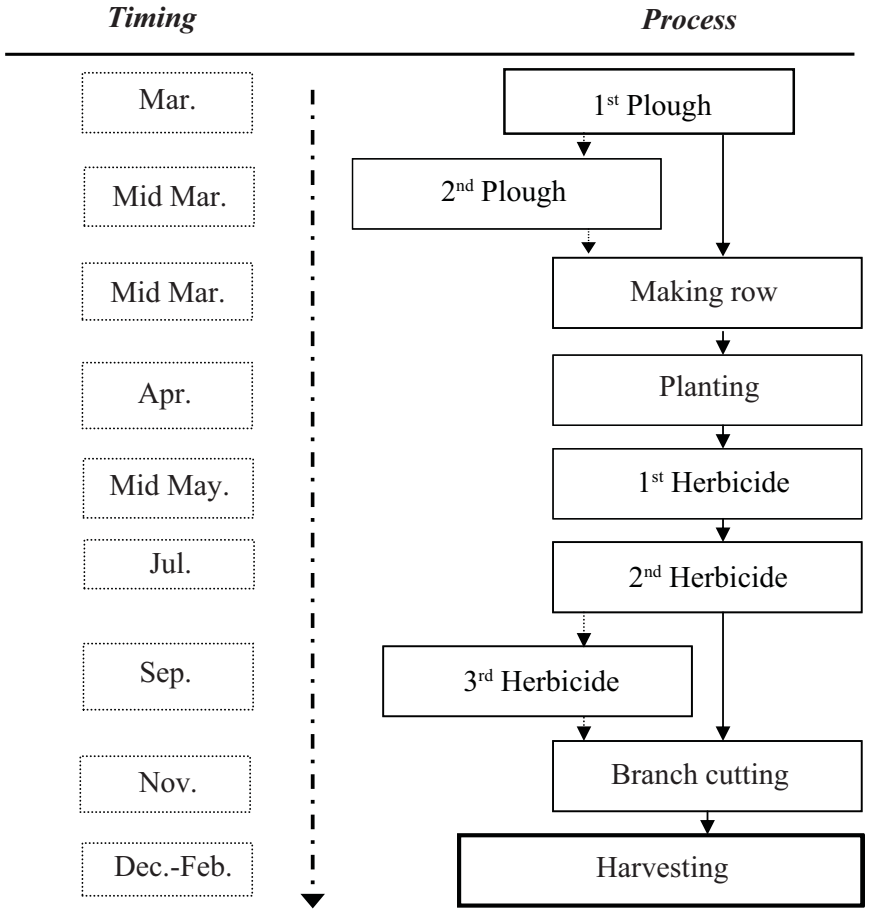
Cassava is adaptable to diverse climates and can be grown in soil with low fertility. It is planted either as a single crop or intercropped with maize, legumes, vegetables, rubber or other plants. Cassava is normally planted during February–April and harvested in eight to 12 months depending on market price and the availability of labour for harvesting. Cultivation practices in western and eastern Cambodia are similar, with a few notable differences due to different soil and climate conditions.

In Kamrieng district of Battambang, cassava is mono-cropped and usually planted in March; the earliest planting is in February and the latest in April. The first ploughing starts in early March before the forecast rain, followed by a second ploughing and row making in the middle of March. Most farmers hire a local tractor owner to plough and hire labourers to make rows for planting. Most have their land ploughed twice, which results in a greater yield, while about 5 percent do it only once due to lack of financial resources.

Planting seeds usually takes place in March. The majority of farmers use their own cassava seeds from the previous harvest. Herbicide is necessary in Kamrieng and needs to be applied at least twice because weeds grow high and thick. The first application is made in the middle of May and the second a month and a half later. A third application of herbicide might be made, depending on weed conditions and farmers' financial resources. Finally, some branches are normally cut a month or so before harvesting to admit enough sunlight for the root to grow bigger.

Cassava production in Memut district is very similar. Cassava is mostly planted with other crops, especially rubber, during April–May and harvested in December–January. Farmers mostly use more labour instead of a tractor for land preparation in order not to disturb the other crops. Unlike farmers in western areas, farmers in Memut use minimal amounts of herbicide. This saves considerable amounts of money and lowers production costs.

Figure 3.2: Cassava Cultivation



3.1.3. Production Costs

The costs of cassava production include land rent, land preparation, labour and credit. Production cost differed considerably between the two study sites.

Western Cambodia

Expenditures are grouped into two categories: imputed cost of family inputs and cost of purchased inputs. Almost all farmers (99 percent) grow cassava on their own land. Although this does not cost them rent, the imputed expense in 2007 is estimated at USD119.95 per ha based on the market price of land rental.

Land preparation involves expenses for ploughing and row making, for which farmers usually hire a local tractor owner. On average, the first ploughing cost USD48.53 per ha, while the second cost USD41.75 per ha in 2007. Herbicide and seeds are the only major inputs for cassava production, and their total cost in 2007 was USD85.52 per ha, the former costing USD46.16 and the latter USD39.36.

The intensive labour required is also a significant production expense. In addition to family workers, farmers hire labourers for the whole production process. A shortage of labour is common, and thus its costs is rather high at USD2.77 per person per day on average or USD 89.25 per ha in total. Another emerging expense is credit. About 78 percent of farmers borrow from private lenders to pay production expenses. This informal credit has a very high interest rate, averaging 3.42 percent per month, and cost USD60.80 per ha in 2007.

The total expenditure for cassava production in Kamrieng in 2007 was USD464.80 per ha, of which 26 percent went for land (imputed), 19 percent for land preparation, 18 percent for inputs, 19 percent for labour and 13 percent for loans. The imputed cost of family inputs at market price represented 36 percent of total production costs, while the cost of purchased inputs accounted for the majority of input costs in 2007. Table 3.2 sets out the costs in more detail.

Table 3.2: Cost of Cassava Production in Kamrieng District, Battambang, 2007

Itemized Costs	Unit	Imputed Family Inputs			Purchased Inputs			Total
		Quantity	*Unit Price*	*Value*	*Quantity*	*Unit Price*	*Value*	***Value USD***
A. Cost of land	USD	-	-	**119.95**	-	-	**2.03**	**121.98**
B. Cost of land preparation	USD	-	-	0	-	-	**90.28**	**90.28**
1st ploughing	USD	-	-	0	-	-	48.53	48.53
2nd ploughing	USD	-	-	0	-	-	41.75	41.75
C. Cost of Inputs	USD	-	-	**26.24**	-	-	**59.28**	**85.52**
Plants / seeds	-	-	-	26.24	-	-	13.12	39.36
Herbicide	can	0	0	0	37.8	1.22	46.16	46.16
D. Labour Cost	person-day	8	2.77	**20.89**	25	2.77	**68.4**	**89.29**
Land preparation	person-day	1	2.77	3.19	0	2.77	0.27	3.46
Planting	person-day	2	2.54	6.09	10	2.54	25.98	32.07
Weeding	person-day	4	2.89	10.13	8	2.89	22.91	33.04
Branch cutting	person-day	1	2.77	1.48	7	2.77	19.24	20.72
E. Cost of loans	% per month	-	-	0	-	3.42	**60.80**	**60.80**
F. Other costs	USD	-	-	0	-	-	**16.91**	**16.91**
GRAND TOTAL	USD	**-**	**-**	**167.1**	**-**	**-**	**297.7**	**464.80**

Source: author's calculation based on data from CDRI cassava farmer survey, 2008

Eastern Cambodia

Table 3.3 summarises the cost of cassava production in Memut district in 2007. The grand total was USD329.10 per ha, significantly lower than in Kamrieng. Land costs were the largest expenditure at USD131.78 per ha, followed by labour at USD113.62 per ha in 2007. Input costs constituted the third biggest expense at USD46.32 per ha, followed by land preparation at USD22.54 and loan interest at USD7.58 per ha in the same year.

Farmers in Memut use herbicide much less than those in Kamrieng; thus, the cost on this item is significantly lower (USD8.29 vs USD46.16 per ha). Only 8 percent of farmers in the east, compared to 78 percent in the west, borrowed from private money lenders to finance cassava production, making the total cost of loans lower.

Imputed family inputs were about 62 percent of total production costs in 2007. This was the reverse of the expenditure pattern in Kamrieng and thus one of the major differences between the two areas.

Table 3.3: Cost of Cassava Production in Memut District, Kompong Cham, 2007

Itemized Costs	Unit	Imputed Family Inputs			Purchased Inputs			Total
		Quantity	*Unit Price*	*Value*	*Quantity*	*Unit Price*	*Value*	***Value USD***
A. Cost of land	USD	-	-	**117.25**	-	-	**14.53**	**131.78**
B. Cost of land preparation	USD	-	-	0	-	-	**22.54**	**22.54**
1st ploughing	USD	-	-	0	-	-	14.38	**14.38**
2nd ploughing	USD	-	-	0	-	-	8.16	**8.16**
C. Cost of Inputs	USD	-	-	**22.82**	-	-	**23.5**	**46.32**
Plants / Seeds	-	-	-	22.82	-	-	15.21	**38.03**
Fertiliser	Kg	-	-	0	82	0.0072	0.59	**0.59**
Herbicide	can	-	-	0	3	3.25	8.29	**8.29**
D. Labour Cost	person-day	30	-	**64.92**	22.4	-	**48.7**	**113.62**
Land preparation	person-day	8	2.13	16.12	3	2.13	5.94	**22.06**
Planting	person-day	7	2.17	14.5	6	2.17	13.10	**27.60**
Weeding	person-day	16	2.18	34.3	14	2.18	29.66	**63.96**
E. Cost of loans	% per month	-	-	0	-	5.43	**7.58**	**7.58**
F. Other costs	USD	-	-	0	-	-	**7.22**	**7.22**
GRAND TOTAL	USD	**-**	**-**	**205.00**	**-**	**-**	**124.10**	**329.10**

Source: author's calculation based on data from CDRI cassava farmer survey, 2008

3.1.4. Challenges and Opportunities

Challenges

Although cassava is an increasingly attractive cash crop for farmers, it faces several challenges. The most important difficulty farmers complain of is the rise in labour cost and prices of agricultural inputs and services brought about by high inflation. There is a shortage of labour, especially in the west, where many people opt to migrate to work in Thailand. This increasing expenditure forces a majority of farmers, especially in the west, to borrow from private moneylenders at high interest rates to finance production. The high cost of credit considerably reduces farmers' post-harvest profits.

Another challenge is lack of support for introducing more productive seed varieties. There are neither extension services to help farmers address technical issues nor sufficient information about cassava prices in regional and national markets. In most circumstances, farmers are price takers and traders are price setters. As a result, farm gate prices are lower and farmers' margins smaller. Other constraints on farmers include great dependence on rainfall, a shortage of land preparation service providers, unpredictable closure of border gates and limited access to microfinance at reasonable interest rates.

Opportunities

Several opportunities are emerging for cassava farmers. First, productivity could be raised further if good seed varieties were introduced and critical production problems such as limited understanding of herbicide use and rising prices of agricultural inputs were better addressed.

Second, extension services could boost cassava productivity. Extension service is currently non-existent; farmers cultivate cassava based on knowledge learned from an older generation and from one another. Dissemination of better cultivation practices could be done relatively easily by the government and NGOs. This would be very useful to increase productivity and quality.

Third, there is considerable idle land that could used to expand the cultivated area, as observed by the study team. New areas are more fertile, promising higher yields.

Lastly, closer cooperation among GMS countries in cassava production and trade would be good for Cambodian farmers. For instance, it would be beneficial to deepen cooperation with Thailand and Vietnam, the region's largest cassava exporters, on selection of varieties and better cultivation.

3.2. Rubber

3.2.1. Overview

Rubber has long been a major commercial crop and export earner for Cambodia and, as a labour-intensive crop, has the potential to contribute to poverty alleviation through rural employment. The gross value added of rubber in 2006 was estimated at USD103.61 million, or about 5 percent of agricultural sector production (MAFF, 2008).

Rubber production started in Cambodia in 1910 on 150 hectares owned by a Frenchman named Bouillard, with a low yield of around 200 kg/ha. Large-scale rubber planting was started in 1921 by big French companies. Both production and productivity have increased since then, reaching their peak in the mid-1960s with 50,000 ha of cultivated land and a yield of almost 1.5 tonnes/ha. The prolonged civil war hampered expansion, and, with little care or investment, productivity went down to less than one tonne per hectare. The yield has gradually increased since late 1990s, in part due to removal of old trees and planting of young trees.

The main rubber producing provinces in Cambodia are Kompong Cham, Kratie, Kompong Thom and Ratanakiri. According to MAFF (2007), rubber is grown on about 70,000 hectares, of which 44,850 are owned by the state or private companies, while 25,150 hectares are smallholder plantations. Cambodia had seven state-owned plantations covering about 80 percent of total plantation areas. However, the government's policy of privatising rubber plantations through divestment has increased the area owned by private companies and smallholders[3]. According to General Directorate of Rubber Plantations of Ministry of Agriculture, Forestry and Fisheries, as of November 2008, six of the state-owned rubber plantations (Peam Cheang, Krek, Memut, Snuol, Chamkar Ondoung and Boeng Ket) had been privatised.

Rubber plantations under smallholders have increased rapidly largely due to the government policy of providing parts of state-owned plantations to farmers employed by the government. With financial support from the Agence Francaise de Development, smallholder rubber production projects have been developed in Kompong Cham, the province with the largest share of total rubber production. The project started in 1999 with 349 participating farmers and more than 887 hectares. In 2007, smallholder plantations increased to about 10,000 hectares. However, according to the General Directorate of Rubber Plantations of MAFF, smallholder plantation in and outside the project totalled 30,000 hectares in 2007.

Most rubber smallholders have plantations of one or two plots, averaging 2.8 ha in size. Households in Ponhea Kraek district have more land than those in Memut (Table 3.4). The survey revealed that farmers obtained their land in four different ways: distribution by the state (22 percent); clearing forest (6 percent); purchase from others (39 percent); and from parents and relatives (33 percent). At the time of the survey, 14 percent of the farmers had land titles, 38 percent had papers or receipts issued by different authorities, 6 percent were applying for land title and 42 percent had no document at all.

3 A sub-decree on creating a national permanent commission for coordinating the privatization and promotion of rubber plantations was issued in September 1994.

Table 3.4: Household Ownership of Rubber Land

Description		Ponhea Kraek	Memut
Land Size (ha)	Minimum	0.8	0.7
	Maximum	12.0	8.0
	Standard Diviation	3.2	2.6
	Average	3.5	2.1
No. of land plot	1	9	10
	2	7	7
	3	3	1
	≥ 4	1	1

Source: CDRI rubber farmer survey, 2008

3.2.2. Cultivation Practices

Life Cycle and Land Use

Rubber plants take six to seven years to start yielding. Tapping starts in the fifth to seventh year after planting and continues for 25 to 30 years. After 30 years, a decline in latex makes further tapping uneconomic. The trees are then removed and replaced with new seedlings (Mead 2001). The older the tree, the more concentrated is the latex produced. The time comes when the rubber tree is so old that the latex is too concentrated to flow.

In order to sustain long-term productivity and efficiency of land use, a planting arrangement known as the hedgerow avenue planting pattern was introduced to allow high light penetration throughout the economic life of the trees. A spacing of tree rows at 18 to 25 meters maintains a density of 400 to 500 trees/ha and provides a better long-term environment for increasing crop diversity. This method seems to affect slightly the growth and yield of the inter-row (IRRDB, 2001).

At an early stage when rubber trees do not have so many leaves, allowing sunlight to penetrate, farmers plant short-term cash crops between the trees. In some cases when rubber farmers cannot afford to grow subsidiary crops, they allow villagers to do so. In exchange, villagers pay land rent of around USD50 per hectare per year. They have only oral agreements that usually depend on trust, mutual interest and sympathy of plantation owners for poor landless families. The crop most commonly grown on rubber land in 2007 was cassava. This was expected to happen again in 2008 due to the good prospects for cassava.

The cultivation of other crops in rubber plantations cannot be extended to more than three to four years before the trees start to shade most of the area. Although revenue from non-rubber cultivation is small, it helps offset ongoing expenditures. According to focus group discussions with farmers, when food prices increased, that attracted more people to use of young rubber land to grow cash crops.

Farm Inputs

Several rubber varieties were planted in the study sites. Introduced to Cambodia long ago, GT1 is the most popular variety, followed by PBM. About half of rubber smallholders buy seedlings from companies, while the other half cannot afford to do so and thus depend on using a mixture of different seeds collected from other farms. The latter practice costs less but provides a lower yield.

Table 3.5: Varieties of Rubber Used

	GT1	PB260	RA 4	RA 5	PBM	*	**Total**
No. of plots	29	1	1	1	3	34	69
Percent	42.0	1.4	1.4	1.4	4.3	49.3	100

* Type could not be specified by farmers because they mixed different types of seeds. Usually they are poor farmers who cannot afford to buy pure seeds from a company.

Source: CDRI rubber farmer survey, 2008

In general, family workers are used for production, from land preparation to planting and tapping. Hiring labourers for harvesting is also practised, especially by households that have an insufficient family workforce. Farmers use chemical fertilisers more than organic fertilisers, and fertiliser is often applied when seedlings are planted and again a year before tapping.

The main equipment for tapping is bowls or cups, a few large containers of 30 litres and special knives or chisels, used to incise the bark so as to open the resin canals without damaging the cambium. Most of those employed for tapping are paid monthly and only a few paid daily. In addition to their pay, hired workers can also collect rubber left over in the cups.

Tapping

Weather in the plantation changes every two to three months, affecting the trees' latex concentration and yield. When there is little rainfall, the bark is hard and holds only a small amount of water. This results in a high concentration of latex, which slows down the flow.

When there is more rain, the bark becomes soft and the concentration of latex decreases, the latex flows longer and thus yields increase. When the rain subsides and cold winds arrive, the latex coagulates more slowly, causing it to flow longer.

At the end of the rainy season, the soil starts to dry and the rubber leaves start to shed, causing more sunlight to reach the ground and the temperature in the plantation to rise. Such weather conditions cause latex to flow more slowly and thus reduce the yield.

The temperature affects the yield because latex does not flow when the temperature is high. In high temperature regions, low concentration trees are less affected than high concentration trees. Workers should tap in early morning, when the soil is cool, to obtain more latex. In general, trees can produce more latex in regions where there is a long cold season and short dry season.

Usually, farmers collect only once from one cut. When the price of rubber increases, farmers collect twice from two cuts. However, the survey found that only 30 percent of farmers made double collection in response to a rise in the rubber price. In general, rubber trees are tapped every two to three days, but a good price attracts farmers to tap more often. During the survey, when the rubber price was high, the majority (64 percent) tapped at an interval of two to three days, while the rest tried to tap daily.

3.2.3. Production Costs

Rubber requires several years of continuous investment without financial returns until tapping starts. Financial returns before tapping are mainly from cash crop production or rent of the land to cash crop farmers. These returns are not included in the study's cost calculations but can be by allowing USD50 per hectare per year. An important phenomenon of recent years was the rapid increase in land prices. Most rubber lands, especially those connected to main roads, were valued at around USD20,000 per hectare, while the rest were valued at USD5000–15,000 per hectare.

The main inputs in rubber production are land, labour and capital. The labour cost is increasing, reaching USD2–2.5 per person per day, about a third higher than a few years ago. This is due to increasing employment opportunities for villagers both inside and outside the studied areas. In early 2008, when it was time for the cassava harvest, high competition for labour pushed the cost higher. High inflation also contributed to a consistent demand for higher wages.

Labour is the main cost item; it varies from the first year to the tapping period. It is used intensively for land preparation and planting as well as tapping. According to the farmer survey, the cost of labour accounts for about 70 percent of total production costs.

A shortage of skilled tapers is considered a serious problem and could result in significant losses due to untapped blocks. Use of unskilled tapers results in damage to the cambium and high bark consumption rates. These cause poor bark renewal. When poorly renewed bark is tapped, there is a decline in yield.

Traditionally, the sap is collected in latex cups. Latex can be sold on the day of collection from the cups. In plantations that are far from markets, farmers coagulate the sap and wait for buyers to come to collect it. The polylump method reduces the frequency of collection to about once a week, depending on the amount of latex harvested in each area. Labour costs could be reduced and productivity increased by employing proper methods of latex collection combined with larger task sizes, appropriate use of latex stimulants and use of rain guarding devices.

Buying seeds is the highest cost in year one. Input material costs would have been higher if all rubber farmers had to buy seedlings from companies. According to the survey, the total cost of rubber is USD439 per hectare in year one and gradually decreases to USD209 in year six. The cost for year seven during which harvesting will start increases to USD580 . Total production cost is estimated at USD1714 dollars per hectare from years one to six, before the trees produce latex.

Table 3.6: Cost of Rubber Production in Memut and Ponhea Kraek, 2007 (USD per ha)

	Year I	Year II	Year III	Year IV	Year V	Year VI	Year VII
Land preparation	245	152	121	85	115	42	46
Caring	49	36	81	72	74	71	87
Harvesting	-	-	-	-	-	-	379
Inputs	132	74	74	116	49	95	63
Others	13	15	-	-	-	-	5
Total	439	277	277	273	238	209	580

Note: Rent or cost of land is not included in calculation

Source: CDRI rubber farmer survey, 2008

With high-yielding trees being widely planted and more effective methods of yield stimulation, a much larger duration of latex flow is expected, especially in low frequency tapping areas. In some areas, double collection should be carried out due to longer latex flow. Especially before cutting down the trees, farmers will apply chemicals to accelerate production. Some plantation owners want to practise double collection and yield stimulation when they can receive good prices. They realise that this method can exhaust their trees faster.

3.2.4. Potential and Policies

Cambodia's economic integration has been deepened by its entry into ASEAN in 1999 and its commitments under other regional trade agreements and the global trading system. As of July 2008, Cambodia had concluded three FTAs and was negotiating five more (ADB 2008). Its first was AFTA, implemented after ASEAN membership in 1999. Later FTAs have been or are being negotiated by ASEAN with China, South Korea, Japan, India, Australia and New Zealand.

These agreements give Cambodia preferential access to major markets for its rubber exports. China, for example, is one of the largest market for rubber. Lower tariffs on rubber products under the ASEAN-China FTA will stimulate greater export from Cambodia and thus increase domestic rubber production. Cambodia should improve the quality of rubber processing to meet the demands of China's market and provide competitive prices.

3.2.5. Constraints and Opportunities

According to Burger and Smith (2001), the economies of key buyers and sellers in the natural rubber market were severely affected by the Asian financial crisis. The crisis caused turbulence in the natural rubber market until 2000. Until recent rises, farmers were discouraged by low rubber prices. Rubber plantations need long investments, and since Cambodian farmers are price takers, smallholders especially are vulnerable to price fluctuations.

Even though Cambodia is open to trade and foreign direct investment, some businesses (both domestic and foreign) have reported being at a disadvantage vis-à-vis rivals who engage in acts of corruption or tax evasion, or take advantage of Cambodia's poorly enforced regulations. This situation could result in some large firms taking control of the rubber industry.

According to the theory of demand and supply, a higher yield should enable Cambodia to offer agricultural commodities at lower prices. However, this is not the case because Cambodia's trade openness and facilitation have linked domestic prices to regional and international prices, especially in early 2008, when prices skyrocketed. A high price of fuel also makes difficult synthetic rubber production. And because the prices of all agricultural commodities remain relatively high together with the demand for rubber for tire production, the future looks bright for rubber producers for at least a few more years.

Supporting services or interventions from ministries have so far not been provided. Research and extension activities are more efficient and effective with the involvement of the private sector, resulting in changes in farming techniques. Marketing has been less problematic due to the high demand for agricultural commodities, improvement of infrastructure and trade facilitation.

Cambodian agriculture faces both the potential to increase production and the opportunity to expand sales. The backbone of rural development and poverty reduction, it unfortunately experienced fluctuations in the past due to floods, droughts, disease and insects. However, climate conditions in recent years have been more favourable. Provinces such as Kompong Speu, Svay Rieng, Prey Veng and Kompong Thom, which usually experience drought in the middle or end of rainy season, would be better off growing rubber rather than crops.

There is little or no discrimination against foreign investors either at the time of investment or afterward. Cambodia's 1994 Law on Investment established an open and liberal regime that allows Cambodian and foreign citizens freely to enter and exit all sectors of the economy. Full foreign ownership is permitted in most sectors, except land; Article 44 of the Constitution provides that only Cambodian citizens and legal entities have the right to own land. The country's liberal investment policy should attract more foreign investment in the future.

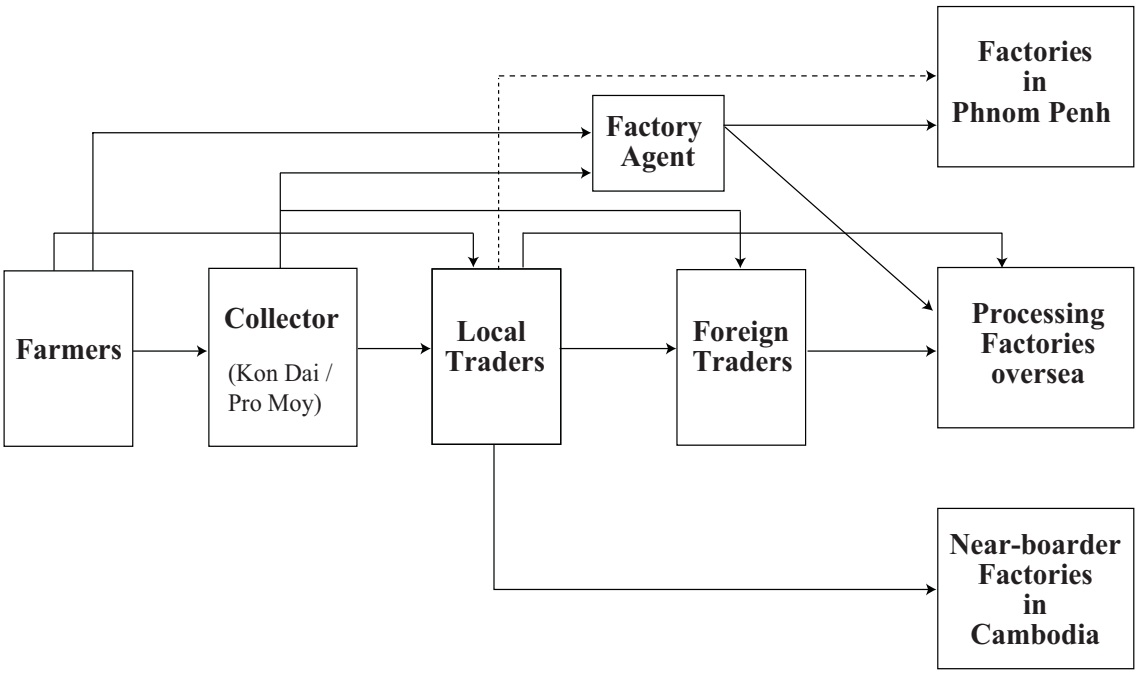
Chapter 4. Trade

4.1. Cassava

4.1.1. Marketing Chains

The cassava trade in Cambodia involves farmers, collectors, traders, factory agents and processing factories. As illustrated in Figure 4.1, the cassava marketing chain has many layers, with the collectors and traders serving as the main intermediaries between farmers and processing factories. Foreign traders also play a key role, purchasing large amount of cassava for sale to foreign processing factories. Because the research team encountered some difficulties in gaining access to local processing factories and foreign traders, the following analysis focuses on farmers, collectors and traders.

Figure 4.1: Cassava Trade Flowchart



Farmers

Cassava farmers have few options in selling their outputs. Their decision is based on factors such as anticipated revenue, associated costs and availability of resources. Sale practices vary between the western and eastern parts of the country and are summarised below. Figures cited are from the 2007 survey.

Practices in the West

Most farmers sell raw cassava to traders (Option 1). The traders pay all associated costs, including harvesting and transport. At an average price of USD33.75 per tonne and output of 24.01 tonnes per ha, farmers' revenue from this option was USD810.34 per ha.

Another option (2) is to take raw cassava to the storehouse of factory agents. Under Option 2, the costs of harvesting and transport are the farmer's responsibility. At an average price of USD42.50 per tonne and average output of 24.01 tonnes per ha, farmers' revenue from this sale option was USD1020.43 per ha. Given a shortage of harvesting labour and increasing cost of transport, farmers are not so attracted by this option.

The last practice, Option 3, involves farmers selling dried cassava to traders. Farmers pay for harvesting, while transport is the traders' responsibility. At an average price of USD90.83 per tonne and average output of 24.01 tonne per ha and approximately 55 kg of dried cassava from 100 kg of raw cassava, farmers' revenue from this option was USD1199.46 per ha.

Table 4.1: Gross Revenue from Cassava Sales in Kamrieng District, Battambang, 2007 (USD)

	Option 1 (raw cassava)	**Option 2** (raw cassava)	**Option 3** (dry cassava)
Price	33.75	42.5	90.83
Average output	24.01	24.01	24.01
Gross revenue per ha	810.3	1020.43	1199.39

Source: author's calculation based on data from cassava farmer survey, 2008

Practices in the East

One interesting difference between the west and the east is that sales in the latter region are not based on the exact weight of cassava but on an offered lump sum per ha. Traders visit the farm to estimate the output and offer a total payment (Option 1). The costs of harvesting and transport are the traders' responsibility. About 31 percent of farmers in the east sold their output this way at an average payment of USD667.47 per ha.

About 48 percent of farmers in the east choose to sell raw cassava to traders (Option 2). In this case, farmers bear the cost of harvesting, while transport costs are borne by the traders. At an average price of USD58.28 per tonne and average output of 13.28 tonne per ha, farmer's revenue from this option was USD773.96 per ha.

The sale of dried cassava to a trader, with the farmers shouldering the harvesting and transport costs, is Option 3. About 20 percent of farmers sold their output this way, at an average price of USD149.10 per tonne. At an average output of 13.28 tonne per ha and approximately 50 kg of dried cassava from 100 kg of raw cassava, revenue from this option was USD990.03 per ha.

Almost all farmers have no prior sales contract with traders or factory agents. Traders try to lower the farm gate price as much as possible, and farmers, being price takers, are at a disadvantage in negotiations. About 86 percent of farmers in the west thought that the price they got was fair, while 14 percent believed it was below the market price. Of farmers in the east, 43 percent thought they sold based on market price, while 38 percent thought they received less than the market price.

Table 4.2: Gross Revenue from Cassava Sales in Kompong Cham, 2007 (USD)

	Option 1 (lump sum)	**Option 2** (raw cassava)	**Option 3** (dry cassava)
Price	-	58.28	149.1
Average output	-	13.28	13.28
Gross revenue per ha	667.47	773.96	990.03

Source: author's calculation based on data from cassava farmer survey, 2008

Collectors

Collectors are the major agents in the cassava marketing chain. They are independent agents of traders and receive commissions based on the amount of cassava purchased. According to the collector survey, a collector in Kamrieng who represents Thai traders gets a commission of USD1.25 per tonne. Some collectors work for local traders who later sell to Thai traders on either a commission or margin basis. These collectors get USD0.50–0.75 per tonne.

Local Traders

Few wealthy local people in the study sites are in the cassava trading business. It is a fairly lucrative business but requires financial resources, facilities (e.g. storehouse), good communications and the confidence of farmers. Local traders sometimes act as collectors for foreign traders and receive a commission of USD1.25 per tonne. In some circumstances, local traders compete with foreign traders in buying cassava from farmers for resale to foreign traders.

Traders in the west bought raw cassava at an average price of USD32.50 per tonne and sold it to Thai traders at USD41.25 on average. After they paid harvesting costs of about USD5 per tonne (transport was paid by the Thai traders), the local traders' margin was USD3.75 per tonne. They bought dried cassava at an average USD90 per tonne and sold at an average USD105. With harvesting and loading costs around USD6.50 per tonne, local traders gained USD8.50 per tonne. Table 4.3 summarises trading options and margins. Traders' decisions depended on communications and connections with foreign traders, availability of labour and financial reserves.

Table 4.3: Margin of Local Traders in Kamrieng District, Battambang 2007 (USD per tonne)

	Option 1	Option 2 (raw cassava)	Option 3 (dried cassava)
Farm gate price	32.50	32.50	90
Harvesting costs	0	5	6.5
Sale price	32.50	41.25	105
Margin	**1.25 (commission)**	**3.75**	**8.5**

Source: author's calculation based on data from cassava farmer survey, 2008

4.1.2. Costs and Margins

Margins vary according to how cassava is sold as well as whether imputed family inputs are included in the cost of production. Since there are three options by which farmers can opt to sell, the margin analysis is disaggregated into three cases and in each case a distinction is made between two scenarios. Under Scenario 1, production cost includes imputed family inputs; under Scenario 2, production cost excludes family inputs. Figures are based on the 2007 survey.

Farmers' Margins in the West

Table 4.4 shows the margins of farmers in Kamrieng district under the three different sales options. Option 1, the most common practice in the region, generated revenue of USD810.30 per ha. Given that harvesting and transportation costs are the trader's responsibility, the average margin for farmers under this option was USD512.60 per ha if family inputs and labour are not considered in the cost calculation, and USD345.50 per ha if imputed family inputs are included.

Under Scenario 2, the revenues from Option 2 and option 3 were greater but were partly offset by the harvesting and transportation costs. If family inputs and labour were not imputed in production cost, farmers had a margin of USD529.69 per ha from Option 3 and USD521.2 per ha from Option 2. Table 4.4 also suggests that the margins vary only slightly among the three options and the differences are not significant enough for farmers to give up the current common sales practice, which is the most convenient for them in terms of time consumed.

This confirms the qualitative information from in-depth interviews with farmers that the majority prefer Option 1 because other options involve them in many other activities including harvesting, cutting roots and drying and collecting cassava chips. The difference in margin is not big enough for them to try other options. If family inputs are imputed in production cost (Scenario 1), the margin variations among options are again not significant.

Table 4.4: Margin from Cassava Production in Kamrieng, Battambang, 2007 (USD)

	Option 1		Option 2		Option 3	
	Scenario 1	*Scenario 2*	*Scenario 1*	*Scenario 2*	*Scenario 1*	*Scenario 2*
A. Gross Revenue	810.30	810.30	1020.43	1020.43	1199.39	1199.39
B. Total Cost	464.80	297.70	666.33	499.23	836.80	669.70
Production Cost	464.80	297.70	464.80	297.70	464.80	297.70
Harvesting Cost	0	0	160	160	372	372
Transportation Cost	0	0	41.53	41.53	0	0
C. Margin	**345.5**	**512.6**	**354.1**	**521.2**	**362.59**	**529.69**

Source: author's calculation based on data from cassava farmer survey, 2008

Farmers' Margins in East

In Memut district, Table 4.5 shows that if family inputs and labour are not included in the cost calculation (Scenario 2), the margin was USD542.37 per ha for Option 1, USD620.48 for Option 2 and USD779.47 for Option 3. These results suggest that the differences are significant. However, not all farmers are able to choose Option 3. Only a small group of wealthier farmers who own small trucks can obtain this bigger margin from cassava sale, and these farmers also acts as middlemen between farmers and foreign traders.

If imputed family inputs are included in production cost (Scenario 1), the margin dropped to USD337.37 per ha for Option 1, USD399.74 for Option 2 and USD550.86 for Option 3. As in Scenario 2, the difference between Option 3 and the other options is significant.

Table 4.5: Margin from Cassava Production in Memut, Kompong Cham, 2007 (USD)

	Option 1		Option 2		Option 3	
	Scenario 1	*Scenario 2*	*Scenario 1*	*Scenario 2*	*Scenario 1*	*Scenario 2*
A. Gross Revenue	666.47	666.47	774	774	990.03	990.03
B. Total Cost	329.10	124.10	374.26	153.52	439.17	210.56
Production Cost	329.10	124.10	329.10	124.10	329.10	124.10
Harvesting Cost	0	0	45.16	29.42	67.74	44.13
Transportation Cost	0	0	0	0	42.33	42.33
C. Margin	**337.37**	**542.37**	**399.74**	**620.48**	**550.86**	**779.47**

Source: author's calculation based on data from cassava farmer survey, 2008

4.1.3. Challenges and Opportunities

Challenges

Constraints in cassava market chains are several. First is the lack of market information, especially among farmers. The price of cassava keeps increasing, and this is known by foreign

traders, who are mostly price setters. Given the farmers' limited knowledge of prices, farm gate prices are usually pressed far below current market prices.

The second constraint is poor infrastructure. Roads connecting main cassava production centres to main urban areas and border checkpoints are very poor. This makes transport and transaction costs high. Bad roads also hinder processing factories in urban areas from competing with foreign traders in purchasing cassava because they have the disadvantage of a higher cost of access to the place of production. Consequently, farmers have little choice of whom to sell to and little power in setting the price.

Third, the value added along cassava value chains is very limited. Most cassava in the study sites is exported to Thailand and Vietnam, where it is processed for export to third countries. There is a limited number of processing factories in main cities or near production centres, and the cost of processing, including materials, fuel and electricity, is very high. Unlike the garment industry, cassava trade and processing have received minimal support. In its absence, cassava does not generate significant value added.

The fourth problem is border issues. Traders complain about high fees for cross-border trade. In Kamrieng district, for example, traders pay USD100–150 to both Cambodian and Thai officers for transporting cassava across the border. The fee impacts directly on traders' margins and indirectly on farmers' margins. A related issue is unpredictable border closures, which occasionally happen on the border with Thailand. It is even worse if temporary closure takes place during the harvesting period because it makes farm gate prices decline. From our in-depth interview with village chiefs, farmers, especially those who need money urgently to repay loans, are badly affected by border closures.

Opportunities

The first emerging opportunity is the continual increase in international price of cassava, which has risen over the last seven years at an average rate of 12 percent per year. According to FAO's International Commodity Prices[4], the f.o.b. Bangkok price of tapioca (hard pellets) was USD113.25 per tonne in 2007, up from USD78.04 in 2004 and USD55 in 2000. The f.o.b. Bangkok price of tapioca starch was USD250.50 per tonne in 2007 compared to USD157.42 per tonne in 2000. Given the increasing global and regional demand for cassava, its price is likely to rise further.

A second emerging opportunity is export development and market diversification. Cassava is among the 19 priority exports included in the DTIS 2007. Although its current export is limited, cassava is considered to have high export potential due to high world market demand and good domestic supply capacity. Cambodia's cassava exports receive tariff preferences from ASEAN, the EU and China through either free trade agreements or the Generalised System of Preferences.

The third opportunity is expansion of value added. Since cassava has many uses and can be processed into a variety of products, the industry could be localised to attract investment into food processing, medicine, bio-fuels, animal feed and liquor (Ministry of Commerce 2007).

4 http://www.fao.org/es/esc/prices/PricesServlet.jsp?lang=en

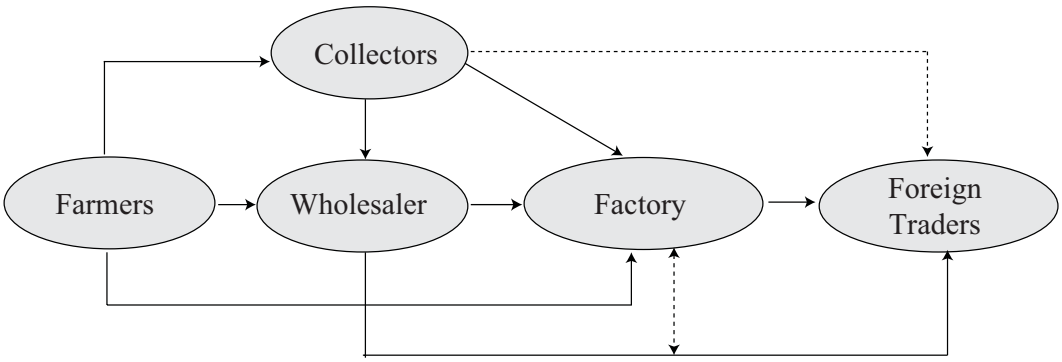
Growth of these ago-industries would have big implications for cassava production and farmers' livelihoods.

4.2. Rubber

4.2.1. Marketing Chains

Significant players from farm to export are shown in Figure 4.2. Rubber farmers close to the factory sell their product in the form of latex, while those far from the factory convert latex into a solid form before selling: farmers simply pour latex into a hollow space in the ground and keep it for a few days before buyers come to collect it.

Figure 4.2: Flow Chart of Rubber Products in Cambodia



Farmers at present have more choices of buyers for their produces. This is a result of the free market economy, which allows many traders and enterprises to buy products. According to the survey, 63 percent of farmers sell to wholesalers. Thirty percent (mainly those whose farms are close to the factory) sell directly to a factory. Another 7 percent sell to different collectors.

Table 4.6: Rubber Markets for Farmers

Buyers	***Percent***
Processors or factory	30
Collectors	7
Wholesalers	63

Source: CDRI rubber farmers survey, 2007

Wholesalers buy latex from smallholders for sale or transport to the factory for processing and export. Small collectors buy latex from farmers and sell it to wholesalers or factories in their areas. However, some collectors buy rubber for sale to Vietnam, although this is illegal. They transport rubber on motorbikes that can carry up to 300 kg. One wholesaler can buy between 10 and 20 tonnes a day, but the volume can be reduced to around 10 tonnes when small collectors are active.

Cambodia exports an unrecorded amount of rice and other agricultural products to Thailand and Vietnam. Natural rubber is no exception. In 2004, Cambodia recorded USD39 million of rubber exports, while an estimated USD76 million went unrecorded (US Commercial Services). While the gap has been reduced in recent years, it remains high. According to the study's estimates, the unrecorded amount now is equal to the recorded amount.

4.2.2. Processing

So far, rubber is produced in Cambodia only for export, due to a lack of capacity and investment in processing. Only semi-processed (dry) rubber, not latex, is allowed to be exported and this leaves rubber smallholders little choice but to sell their collected latex to state-owned or private enterprises for processing and export. All state-owned enterprises have rubber processing factories. There is also local processing of rubber trees into furniture. However, most rubber trees are exported to Vietnam to be made into furniture.

Cambodia produces and exports mostly TSR5 and TSR5L, which represented about 80 percent of total export volume in 2005 (EIC, 2007). However, the share of these two types is only about 5 percent of total world demand. To capture more markets in the future, Cambodia should consider producing other types (e.g. TSR10 and TSR20) that are in high world demand for tire production.

4.2.3. Costs and Margins

According to the farmer survey, rubber farmers can sell their latex at around USD1750 per tonne of dry rubber content at the farm gate. Middlemen or wholesalers buy latex and transport it to storage. Collection of latex from farm, transport, drying and storage cost about USD125 per tonne of dry rubber content.

Processing into dry rubber (rubber blocks) costs about USD100 per tonne. The cost was higher several years ago at USD125 per tonne. The lower cost is a result of competition among factories and the availability of cheaper electricity from Vietnam.

Officially, only semi-processed rubber blocks are allowed to be exported. However, illegal raw solid rubber exports to Vietnam continue, and it was estimated that 500 kg of solid rubber were sold to Vietnam daily during the harvesting season.

The sale price in 2005 was at USD1391/tonne, up from USD1175/tonne in the previous year. The price increased to USD2330/tonne during the time of the survey. Exported rubber is subjected to export duty at a rate of 10 percent. Usually, exporters use big trucks to transport

rubber blocks to Vietnam. The transport cost on paved road is estimated at USD3–4 per tonne over 10 kilometres.

4.2.4. Constraints and Opportunities

The demand for rubber was high in 2007 and 2008. According to the interviews with traders, the strong demand is due to high demand from China. Rubber from large Cambodian companies is exported to China or Malaysia through Vietnam. Rubber from small companies is bought by Vietnamese companies for export to China.

Chapter 5. Policy Recommendations and Conclusions

5.1. Cassava

In the DTIS 2007, cassava is identified as having high export potential and considerable impact on human development. But there are severe limitations and challenges that constrain Cambodia from fully achieving the potential of cassava. These are summarised as follows:

Absence of a clear policy and institutional framework: While Cambodia has built basic structure for development, there is a lack of a clear policy framework for agriculture and rural development (RGC, 2001 & 2006). Investment strategies have not been developed for resource- and technology-based production system, including agro-industries. There is neither a solid legal framework nor clear regulatory guidelines to govern the allocation, protection and management of resources. Furthermore, the interpretation and enforcement of regulations are not consistent and predictable, and export procedures are complicated and troublesome (World Bank, 2004). While cassava exports need to comply with importing countries' hygiene requirements, obtaining certification is time-consuming, costly and difficult for enterprises. This is primarily because of limited capacity and facilities of the responsible supporting institutions.

Institutional and financial constraints: There are serious gaps and overlaps in the mandates of institutions supporting agriculture and rural development. Public institutions also confront a shortage of technical skills, financial resources to implement agricultural development plans and facilities for agricultural research and development.

Inadequate extension services: Mechanisms for delivering agricultural support services such as extension programmes are either not in place or are inadequate (RGC, 2001 & 2006). It is widely recognised that agricultural extension services are very weak, and a fully functioning system for support services—and, more importantly, spreading technology—to the rural population has yet to be established. Technical information is mainly conveyed through informal channels, which include neighbouring farmers, non-government organisations, agricultural technicians and distributors of farm inputs. Farmers have very limited access to improved technologies because extension services are unsupported by R&D. State institutions are unable to deliver on a timely basis essential services and functions in support of productive, intensive and diversified farming.

Absence of an efficient marketing system: Agricultural market mechanisms (both domestic and international) do not function well (Hing and Nou, 2006). Farmers have less bargaining power than middlemen, and their products are priced much lower than they would be if market competition existed. At present, there is no national marketing institution. Only the Market Information Service under MAFF, which receives assistance from the Food and Agriculture Organisation, is undertaking marketing development.

Poor infrastructure: A lack of basic infrastructure such as irrigation systems, roads and transport is a major impediment to increasing farm productivity, facilitating trade flows and providing easier access to production centres. This results in higher transaction costs, unequal access to processing factories and foreign traders and greater informal cross-border trade at lower value added.

The government has recognised these challenges, as clearly articulated in various socio-economic development plans and trade strategies. Its policies have proposed clear priorities and strategies aimed at developing and promoting agriculture in the context of regional and global trading systems. Priority agendas include development of a comprehensive strategy for agriculture, increasing public investment in the sector, encouraging and facilitating private involvement in agriculture and agro-processing, expanding extension services and improving basic infrastructure. Priorities for agricultural export development are improving market access and maximising benefits from preferential trade, better trade facilitation and building up a regulatory framework and institutional capacity to implement trade policy.

Experience suggests that the government had very good and fairly comprehensive policies pinpointing critical problems, but paid little attention to implementation. Although the government has made good progress on many priority actions and reform programmes, the outcome would be much better if they were implemented more effectively. This is an appropriate time for the government to pay serious attention to the efficiency and effectiveness of policy implementation. Three major elements are raised for the government to consider.

Strong leadership: This is a critical element of successful regulation enforcement and reform programmes.

Clear institutional framework: There should be clear guidelines on the mandates and responsibilities of institutions in supporting and coordinating the implementation of policies.

Sufficient financial and human resources: Resource mobilisation needs to be strengthened. This can be done through either increasing government funding or seeking more development assistance from donors.

In conclusion, cassava has good prospects for production expansion and exports, which will in turn help raise farmers' incomes and improve the country's human development. The crop's potential can be fully achieved only with concise and comprehensive policies that address the major constraints and challenges and with strong leadership and capable institutions that implement the strategies more efficiently and effectively.

5.2. Rubber

The rubber industry is identified in DTIS 2007 as having high export potential. Domestic supply conditions are good, with the following strengths and opportunities: comparable quality of raw rubber; high potential for expansion of planted areas; potential future development of value added; and trends toward full privatisation of state-owned enterprises (Ministry of Commerce, 2007). Notwithstanding the priority actions suggested in DTIS 2007, several recommendations are raised here to address critical problems and challenges for rubber farmers and exporters.

One major problem that this study, together with other relevant publications such as EIC (2007) and MoC (2007), has identified is productivity. The average yield of rubber in Cambodia is low compared to major rubber producing countries in the region. This is largely attributable to the existence of rubber trees over 25 years old and use of low-yield seed. The latter often happens with smallholders. According to the study, about half of rubber smallholders could not afford to buy commercial seeds but used a mixture of different types collected from other farms. This costs less but provides lower yields.

Two possible policies could address the problem of low productivity. One is to provide high-yield rubber varieties to smallholders. That could be done through government or donor assistance or provision of low-interest credit for rubber farmers who lack resources. A second policy is research and development in rubber varieties and cultivation. The government needs to enhance research through strong funding support for the Rubber Research Institute of Cambodia and to promote the application of new rubber types in both smallholder and private estates.

Another critical issue is marketing chains and export costs. The study suggests that although farmers have more choices in selling their latex, they are essentially price takers. Farm gate prices are usually squeezed by collectors and traders. Mirroring the priority action suggested in DTIS 2007, this study also recommends the creation and strengthening of a professional farmers' organisation. Assistance at an early stage is needed to help the organisation to become an independent and self-supporting institution. A farmers' organisation could better address issues relating to the market and marketing information as well as cultivation and management.

Rubber exporters also face challenges that need policy emphasis. First, the quality of latex varies, that collected from smallholders in particular being of lower quality. Second, rubber processing has not been fully operational. Third, the cost of exporting remains high and therefore competitiveness low. Transportation costs, customs clearance and logistic efficiency remain critical challenges. Albeit improved, the performance of Cambodia's rubber sector tends to remain poorer than that of major producing countries in the region. Fourth, a considerable proportion of the Cambodian rubber export price goes to hidden expenses, domestic sales tax and export tax, regardless of customs efficiency and logistics competence. Natural rubber is exported through Sihanoukville and the Vietnamese border. Hidden costs

incurred through both channels and represent about 5 percent of the total f.o.b. value. (Kakada et al. 2008:19–20).

Enhancing the quality of processed rubber must be a priority. Recent admission of the Association of Rubber Development of Cambodia to the International Rubber Association is a good starting point for quality improvement and facilitation of rubber trade. But much remains to be done for Cambodian Rubber Research Institute to gain international accreditation.

Reducing exports cost must be included in the priority policy agenda to promote rubber exports. Cambodia's rubber competitiveness is low compared to Vietnam and Thailand. High export cost is one of the major contributors to weak performance. There has been notable achievement in the government's efforts on trade facilitation. Yet critical issues such as eliminating hidden costs, improving logistics and enhancing transportation cooperation with neighbouring countries should be priority actions for promoting exports in general and for raising rubber competitiveness and realising rubber export potential in particular.

References

ADB (2008), "FTA by Country", http://www.aric.adb.org/FTAbyCountryAll.php (accessed 1 August 2008)

Royal Government of Cambodia (1994), "Sub-decree on the Creation of a National Permanent Commission for Coordinating the Privatization and the Promotion of Rubber Plantations" (Phnom Penh: Royal Government of Cambodia)

Burger, K. & H.P. Smith (2001), "Economic Growth and the Future of Natural Rubber", paper presented to International Conference on the Future of Perennial Crops, 5–9 November, Yamoussoukro, Cote d'lvoire

CDRI (2008), *Annual Development Review 2007–08* (Phnom Penh: Cambodia Development Resource Institute).

Economic Institute of Cambodia (2007), *Export Diversification and Value Addition for Human Development* (Phnom Penh: Economic Institute of Cambodia)

Food and Agriculture Organisation, "International Commodity Prices", http://www.fao.org/es/esc/prices/PricesServlet.jsp?lang=en.

Hing Vutha & Nou Keosothea (2006), *The Early Harvest Programme: Implications for Cambodian Agriculture* (Phnom Penh: Cambodia Development Resource Institute)

International Monetary Fund (2007), *Cambodia: Selected Issues and Statistical Appendix,* Country Report No. 07/291 (Washington DC: International Monetary Fund)

International Monetary Fund (2009), *Cambodia: Selected Issues and Statistical Appendix.* Country Report No. 09/48 (Washington DC: International Monetary Fund)

International Rubber Research and Development Board (IRRDB) (2001), *Annual Report for 2001* (Kuala Lumpur: International Rubber Research and Development Board)

Kingdom of Cambodia, "Constitution", as amended (English version of the Constitution with amendments as of 2001 is available at http://cambodia.ohchr.org/klc_pages/KLC_files/section_001/section_01_01_ENG.pdf)

Khun Kakada, Chhe Pitou & Hun Kimsan (2008), *Quality Standards and Returns for Natural Rubber Export,* Trade Analysis and Reform Project, AusAID.

MAFF (2001), *Agricultural Statistics 2000–2001* (Phnom Penh: Ministry of Agriculture, Forestry and Fisheries)

MAFF (2005), *Agricultural Statistics 2004–2005* (Phnom Penh: Ministry of Agriculture, Forestry and Fisheries)

MAFF (2008), *Annual Report 2007–2008* (Phnom Penh: Ministry of Agriculture, Forestry and Fisheries)

Mead, D.J. (ed.) (2001), *Non-forest Tree Plantations,* Working Paper FP/6 (Rome: Food and Agriculture Organisation)

Ministry of Commerce (2006), *Cambodia National Export Strategy 2006–2008* (Phnom Penh: Ministry of Commerce)

Ministry of Commerce (2007), *Cambodia's Updated Trade Integration Strategy: DTIS 2007* (Phnom Penh: Ministry of Commerce)

Royal Government of Cambodia (RGC) (1997), *First Socio-Economic Development Plan 1996–2000,* (Phnom Penh: Ministry of Planning)

Royal Government of Cambodia (RGC) (2001), *Second Socio-Economic Development Plan 2001–2005* (Phnom Penh: Ministry of Planning)

Royal Government of Cambodia (RGC) (2006), *National Strategic Development Plan 2006–2010* (Phnom Penh: Ministry of Planning)

Toshiyasu, K., Chan Sophal & Long Vou Piseth (1998) *Regional Economic Integration for Sustainable Development in Cambodia,* Working Paper 5 (Phnom Penh: CDRI)

United Nations Commodity Trade Statistics Database, http://comtrade.un.org/

US Commercial Service (no date). *Country Commercial Guide for Cambodia FY 2006.* http://cambodia.usembassy.gov/

Wood, A. (1994), *Skills, Land and Trade: A Simple Analytical Framework. IDS working paper 1* (Brightonne: Institute of Development Studies)

World Bank(2004), *Seizing the Global Opportunity: Investment Climate Assessment & Reform Strategy,* Prepared for the Royal Cambodian Government by the World Bank Group. (Phnom Penh: World Bank)

WTO (2009), International Trade Statistics 2008 (Geneva: World Trade Organization)

Appendices

Questionnaire for Farmers Survey

Cassava Commodity

This survey is primarily designed to understand the cost structure of growing cassava in Cambodia. The destined samples are both small-scale and big-scale cassava farmers. All information collected in this survey is strictly confidential and will be used for statistical purposes only.

Ordinal Number of Questionnaire .....

Code of Village: .....

Village's name..... commune..... district..... province.....

Interview Record

Interviewee's name: .....

Interviewer's name: .....

Signature:..... Date of interview: 2007

Time started:..... Time completed the interview:..... Total interview time:.....mins

Remarks:.....

Quality Control Record

Survey Team Leader's Name: ..... Signature: .....

Date: ..... / ..... / 2007

Remarks:.....

Questions for which survey team leader ordered call back: .....

Supervision by CDRI Researcher
CDRI researcher checking the questionnaire: ..... Date: ...…/…..../ 2007
Questions that were classified: .....
Questions that need called back: .....

I. Household Information

1.1 Sex of household head: 1. Male 2. Female
1.2 Age of household head: …….years old
1.3 Education of household head: ……years
1.4 Members of household aged under 14: ……..persons
1.5 Members of household aged over 14 (including household head): ……..persons
1.6 Membership in farmer association: 1. Yes 2. No
1.7 How would you rank your household well-being by this community's standards?
1. Poor
2. Non-poor

II. Cassava Production and Costs

2.1 When do you grow cassava? Month: ……
2.2 When do you harvest cassava? Month: ……

	Plot 1 (A)	Plot 2 (B)	Plot 3 (C)	Plot 4 (D)
2.3 Cultivation areas (on household own land)	…… ha	…… ha	…… ha	……. ha
2.4 Cultivation areas (on rental land)	…… ha	…… ha	…… ha	……. ha

2.5 How do you grow cassava (growing technique)?
1. Growing cassava alone
2. Growing mixed with other crops
3. Growing in the interval of rubber trees

Costs and Expenditures	**Quantity (A)**	**Unit Cost (B)**	**Total Cost (C) = (A) x (B)**
Land Cost			
2.6 Household own land cost (converted)	……..... ha	…..... riel/ha	……..... riels
2.7 Cost of land rental	……..... ha	…..... riel/ha	……. riels

Land Preparation Cost			
2.8 Cost of land preparation (hire other to plough including his/her tractor and labour)	…..... ha	…..... riels/ha	…….. riels
2.9 Cost of land preparation (own labour but rent tractor plus gasoline cost)	…..... ha	…..... riels/ha	……. riels
Cost of inputs			
2.10 Cost of seed or plant	…… seed/plant	……..... riels/plant	……. riels
2.11 Cost of chemical fertiliser	……..... Kg	……..... riels/ Kg	……. riels
2.12 Cost of natural fertiliser	……..... Kg	……..... riels/ Kg	……. riels
2.13 Cost of pesticide	……..... can	……..... riels/can	……. riels
2.14 Cost of herbicide	……..... can	……..... riels/can	……. riels
Labour Cost			
2.15 Cost of labour hired for planting	…… person-day*	……..... riels/day	……. riels
2.16 Cost of family labour working for planting (converted)	…… person-day	……. riels/day	……. riels
2.17 Cost of labour hired for weeding	…… person-day	……. riels/day	……. riels
2.18 Cost of family labour for weeding (converted)	…… person-day	……. riels/day	……. riels
2.19 Cost of labour hired for harvesting	…… person-day	……. riels/day	……. riels
2.20 Cost of family labour for harvesting (converted)	…… person-day	…… riels/day	……. riels
Other costs			
2.21 Interest if borrowing money from others for cassava production			…….. riels
2.22 Other expenses if any (specify)			…….. riels

* Number of adult multiplied by total days equals person-days.

III. Post-Harvest Sales

	Plot 1 (A)	Plot 2 (B)	Plot 3 (C)	Plot 4 (D)
3.1 Cultivation area	…… ha	…… ha	…… ha	…… ha
3.2 Yield/output	…… tonne	…… tonne	…… tonne	…… tonne

3.3 Quantity of sales:……tonne
3.4 Sale price:……..riels/tonne

If farmer sells cassava for lump sum, price at which they sell:

	Plot 1 (A)	Plot 2 (B)	Plot 3 (C)	Plot 4(D)
3.5 Sale price per plot	…....riels/plot	…….riels/plot	…….riels/plot	……..riels/plot

3.6. How is the sale price determined?
1. It is determined by farmers based on market price (no bargain)
2. It is determined by traders (no bargain)
3. It is determined by either farmers or traders, but bargainable.

3.7 What do you think about the price at which you sold?
1. Fair price (market price)
2. Below market price
3. Above market price
4. Not sure

3.8 To whom you usually sell your cassava: (Please note the contact address of the purchaser)
1. Domestic collector
2. Foreign collector (comes to collect)
3. Exporter
4. Wholesaler/processing factory
5. Farmer association
6. Others (specify)…….

3.9 Do you have prior sale contract with any of above traders?
1. Yes
2. No

3.10 What is the mode of delivery?
1. Traders come to pick up at their cost (If the answer is No.1, pls go to Q3.14)
2. Farmers transport at their cost

3.11 If answer No.2, how far is it transported:…….km
3.12 If answer No.2, what quantity:…….tonne

3.13 If answer No.2, how much is total transportation cost:…….riels

3.14 Do you know price of cassava?

1. No I don't (If the answer is No.1, pls go to Q4.1)
2. Yes I do, but little bit
3. Yes I know quite well

3.15 If yes, how do you get that information?

1. Through farmers in same village/commune
2. Through farmer association
3. Through traders
4. Through information disseminated by relevant government offices
5. Others (specify)……..

IV. Farmers' Difficulties or Challenges

4.1 How does income from growing cassava compare to other cash crops e.g. soybeans, maize?

1. Much better
2. Slightly better
3. About the same
4. Slightly worse
5. Much worse

4.2 What are the THREE major constraints/difficulties in cassava production?

1. Lack of knowledge of production techniques
2. Unfertile/sandy land
3. Higher land prices, which make it hard to expand cultivation areas
4. Higher price of inputs (fertiliser, seed, pesticide, gasoline, renting tractor,…)
5. Higher fees for labour
6. No support from provincial/district agricultural department
7. Others (specify)…….

4.3 What are the THREE major constraints/difficulties after harvest?

1. Lack of knowledge about pricing
2. High price fluctuation
3. Not so many traders/collectors makes the price not competitive
4. Loss from failure to satisfy desired quality
5. Less profit margin
6. Others (specify)…….

4.4 What would you recommend to improve cassava production and income?

……
……
…….....

THANKS !

Questionnaire for Trader Survey

Cassava

Definition: Traders here refers to those who either buy cassava from farmers or buy cassava from collectors for sale or export. They include collectors, wholesalers and exporters.

Ordinal Number of Questionnaire .....

Code of Village: .....

Village's name..... commune..... district..... province.....

Interview Record

Interviewee's name: .....

Interviewer's name: .....

Signature: ..... Date of interview: 2007

Time started:..... Time completed the interview:..... Total interview time:.....mins

Remarks:.....

Quality Control Record

Survey Team Leader's Name: ..... Signature: .....

Date: ..... / ..... / 2007

Remarks:.....

Questions for which survey team leader ordered call back: .....

Supervision by CDRI Researcher

CDRI researcher checking the questionnaire: ..... Date: ..…... /..…... / 2007

Questions that were clarified: .....

Questions that need call back: .....

I. Trader Information

1.1 Sex of trader: 1. Male 2. Female
1.2 Age of trader: …….years old
1.3 Education of trader:……years
1.4 How long have you been in this business?.....years
1.5 Where do you live?
1. This village/commune
2. Nearby village/commune
3. Village/commune next to border
4. Town
5. Neighbouring country
6. Others (specify)……..

II. Purchase and Sale

2.1 Are you a sole/exclusive collector/trader of cassava in this village/commune?
1. Yes (if yes, go to Q2.3) 2. No

2.2 If not, how competitive is this business?
1. Very competitive
2. Moderately competitive
3. Less competitive
4. Not competitive

2.3. From whom do you buy cassava?
1. Farmer
2. Farmer association
3. Collector
4. Wholesaler
5. Others (specify)……

2.4. At what price:……moeun riels/tonne
2.5. Why do they sell cassava to you instead of other traders?
1. Because I offer them a better price
2. Because we had a prior contract
3. Because I offer them credit
4. Because they have no choice
5. Because I am their long-time business partner
6. Others (specify)……..

2.6 To whom do you sell cassava?
1. Domestic collector
2. Foreign collector
3. Wholesaler
4. Exporter
5. Processing factory
6. Others (specify)……..

2.7. At what price:…… moeun riels/tonne

III. Cost of Transaction and Business Climate

Transaction Cost (From purchasing to resale)	**When Purchase (A)**	**When Sale (B)**
3.1 Transportation cost	……... moeun riels	……... moeun riels
3.2 Loading cost	……... moeun riels	……... moeun riels
3.3 Storage cost	……... moeun riels	……... moeun riels
3.4 Commission	……... moeun riels	……... moeun riels
3.5 Export tax (applicable for exporter)	……... moeun riels	……. moeun riels/cont.
3.6. Other official payment	……... moeun riels	……... moeun riels
3.7 Informal fee	……... moeun riels	……... moeun riels
3.8 Others (specify)……	……... moeun riels	……... moeun riels

3.9 What are THREE major good things about this business?

1. Strong demand
2. Easy to collect and supply
3. Relatively high profit margin
4. Easy to store, maintain and fulfil product standard requirement
5. Not so many traders in this business
6. Others (specify)……..

3.10 What are THREE major bad things about this business?

1. Too many collectors/traders
2. Price fluctuates
3. Farmers don't respect sales contract
4. High transaction costs (incl. transportation, informal fee,….)
5. Difficulty in getting information about prices and markets
6. Demand fluctuates
7. Others (specify)……..

3.11 What would you recommend to improve cassava trading?

……
……
……
……
……..

THANKS !

Questionnaire for Farmers

Rubber

CONFIDENTIAL

All information collected in this survey is strictly confidential and will be used for statistical purposes only.

Ordinal Number of Questionnaire .....

Code of Village: .....

Village's name..... commune..... district..... province.....

Interview Record

Interviewee's name: .....

Interviewee ethnicity: 1. Khmer 2. Cham 3. Laotian 4. Vietnamese
5. Others .....

Interviewer's name: .....

Signature: ..... Date of interview: 2007

Time started:..... Time completed the interview:..... Total interview time:..... mins

Remarks:.....

Quality Control Record

Survey Team Leader's Name: ..... Signature: .....

Date: ..... / ..... / 2007

Remarks:.....

Questions for which survey team leader ordered call back: .....

Supervision by CDRI Researcher
CDRI researcher checking the questionnaire: ..... Date: ...…/..…../ 2007
Questions that were clarified: .....
Questions that need call back: .....

I. General information

1.1. How many people are in the household? ..... (total)
1.2. How many household members are below 15 years old? .....
1.3. How many household members are from 15 to 54 years? .....
1.4. How many household members are above 54 years old? .....
1.5. How many household members work for their rubber plantation?

Household member		Occupation (work for their rubber plantation)	
Labour (number)	Non-labour (number)		

1.6. Do you own the rubber plantation?
1. Yes (continue to Q1.7) 2. No (stop asking)

1.7. When did you start growing rubber? .....(year)
1.8. How many plots of rubber do you have?..... plots
1.9. Complete the table with size, age, production of each plot

Plot	**Size (ha)**	**Age of rubber tree (years)**	**Production (tonnes)**	**Remarks**
Plot 1				
Plot 2				
Plot 3				
Plot 4				
Plot 5				
Total				

II. Cost Components

2.1 Production Costs (riels or dollars)

Year of Rubber Trees	**Plot 1**		**Plot 2**		**Plot 3**		**Plot 4**		**Plot 5**	
	P.I.*	F.I.**	P.I.	F.I.	P.I.	F.I.	P.I.	F.I.	P.I.	F.I.
1. Land cost										
2.Land preparation										
3. Transplanting										
4. Seedlings										
5. Fertiliser										
6. Pesticide										
7.										
8.										
9.										
10.										
11.										
12.										
13. Others (specify.....)										
Total from 1 - 13										

Note:

**P.I. : Purchased Input*

***F.I. : Family Input (converted at market price)*

2.2 Harvesting Costs

2.2.1 How many people work for your plantation? .....persons

2.2.2 Do you hire them or only your household members?

1. Hire (go to Q2.2.3) 2. Only household members (go to Q2.2.6)

2.2.3 How many people do you hire? .....persons

2.2.4 If you hire them, how much do you have to pay for 1 worker per day?

.....riels or $/day

2.2.5 How many day do you hire them? .....days

2.2.6 How far is the distance from farm gate to the next buyer? .....km

2.2.7 How much is your loading cost and unloading cost?

1. Loading cost.....riels or $/t
2. Unloading cost.....riels or $/t

2.2.8 How much is your transporting cost for 100km? .....riels or $/t

2.2.9 Other (specify if any)..... .....riels or $

III. Income Components

3.1 How much rubber do you get per year? .....t/year/ha

1. Latex .....t
2. Dry latex .....t

3.2 How many hectares do you have for growing rubber? .....ha

3.3 What is your selling price currently? .....$/kg

IV. Marketing Information

4.1 To whom do you sell your products? at where?

1. Collectors.....
2. Wholesalers.....
3. Processors.....
4. Thai traders.....
5. Vietnamese traders.....

4.2 Who do you sell your products to? and where do they live? inside your village or commune?

Buyers: .....

Places : .....

4.3 What are the most challenges or difficulties in your business?

(***Rank from 1 to 5, 1: the most difficult, 2: the second difficult, 3: the third difficult, 4: the fourth difficult, 5: the fifth difficult***)

- Low selling price .....
- Price instability .....
- Lack of market information about price .....
- Lack of capital to circulate .....

- High unofficial payment .....
- Poor road quality (transportation) .....
- Low demand .....
- Lack of planting skills (technology) .....
- Lack of equipment .....
- Lack of support from the government .....
- Others (specify) .....

4.4 What strategic response do you have to improve your business?

.....
.....
.....

THANKS !

CDRI Working Papers

1) Kannan, K.P. (November 1995), *Construction of a Consumer Price Index for Cambodia: A Review of Current Practices and Suggestions for Improvement*.

2) McAndrew, John P. (January 1996), *Aid Infusions, Aid Illusions: Bilateral and Multilateral Emergency and Development Assistance in Cambodia.* 1992-1995.

3) Kannan, K.P. (January 1997), *Economic Reform, Structural Adjustment and Development in Cambodia.*

4) Chim Charya, Srun Pithou, So Sovannarith, John McAndrew, Nguon Sokunthea, Pon Dorina & Robin Biddulph (June 1998), *Learning from Rural Development Programmes in Cambodia.*

5) Kato, Toshiyasu, Chan Sophal & Long Vou Piseth (September 1998), *Regional Economic Integration for Sustainable Development in Cambodia.*

6) Murshid, K.A.S. (December 1998), *Food Security in an Asian Transitional Economy: The Cambodian Experience.*

7) McAndrew, John P. (December 1998), *Interdependence in Household Livelihood Strategies in Two Cambodian Villages.*

8) Chan Sophal, Martin Godfrey, Toshiyasu Kato, Long Vou Piseth, Nina Orlova, Per Ronnås & Tia Savora (January 1999), *Cambodia: The Challenge of Productive Employment Creation.*

9) Teng You Ky, Pon Dorina, So Sovannarith & John McAndrew (April 1999), *The UNICEF/Community Action for Social Development Experience—Learning from Rural Development Programmes in Cambodia.*

10) Gorman, Siobhan, with Pon Dorina & Sok Kheng (June 1999), *Gender and Development in Cambodia: An Overview.*

11) Chan Sophal & So Sovannarith (June 1999), *Cambodian Labour Migration to Thailand: A Preliminary Assessment.*

12) Chan Sophal, Toshiyasu Kato, Long Vou Piseth, So Sovannarith, Tia Savora, Hang Chuon Naron, Kao Kim Hourn & Chea Vuthna (September 1999), *Impact of the Asian Financial Crisis on the SEATEs: The Cambodian Perspective.*

13) Ung Bunleng, (January 2000), *Seasonality in the Cambodian Consumer Price Index.*

14) Toshiyasu Kato, Jeffrey A. Kaplan, Chan Sophal & Real Sopheap (May 2000), *Enhancing Governance for Sustainable Development.*

15) Godfrey, Martin, Chan Sophal, Toshiyasu Kato, Long Vou Piseth, Pon Dorina, Tep Saravy, Tia Savara & So Sovannarith (August 2000), *Technical Assistance and Capacity Development in an Aid-dependent Economy: the Experience of Cambodia.*

16) Sik Boreak, (September 2000), *Land Ownership, Sales and Concentration in Cambodia.*

17) Chan Sophal, & So Sovannarith, with Pon Dorina (December 2000), *Technical Assistance and Capacity Development at the School of Agriculture Prek Leap.*

18) Godfrey, Martin, So Sovannarith, Tep Saravy, Pon Dorina, Claude Katz, Sarthi Acharya, Sisowath D. Chanto & Hing Thoraxy (August 2001), *A Study of the Cambodian Labour Market: Reference to Poverty Reduction, Growth and Adjustment to Crisis.*

19) Chan Sophal, Tep Saravy & Sarthi Acharya (October 2001), *Land Tenure in Cambodia: a Data Update.*

20) So Sovannarith, Real Sopheap, Uch Utey, Sy Rathmony, Brett Ballard & Sarthi Acharya (November 2001), *Social Assessment of Land in Cambodia: A Field Study.*

21) Bhargavi Ramamurthy, Sik Boreak, Per Ronnås and Sok Hach (December 2001), *Cambodia 1999-2000: Land, Labour and Rural Livelihood in Focus.*

22) Chan Sophal & Sarthi Acharya (July 2002), *Land Transactions in Cambodia: An Analysis of Transfers and Transaction Records.*

23) McKenney, Bruce & Prom Tola. (July 2002), *Natural Resources and Rural Livelihoods in Cambodia.*

24) Kim Sedara, Chan Sophal & Sarthi Acharya (July 2002), *Land, Rural Livelihoods and Food Security in Cambodia.*

25) Chan Sophal & Sarthi Acharya (December 2002), *Facing the Challenge of Rural Livelihoods: A Perspective from Nine Villages in Cambodia.*

26) Sarthi Acharya, Kim Sedara, Chap Sotharith & Meach Yady (February 2003), *Off-farm and Non-farm Employment: A Perspective on Job Creation in Cambodia.*

27) Yim Chea & Bruce McKenney (October 2003), *Fish Exports from the Great Lake to Thailand: An Analysis of Trade Constraints, Governance, and the Climate for Growth.*

28) Prom Tola & Bruce McKenney (November 2003), *Trading Forest Products in Cambodia: Challenges, Threats, and Opportunities for Resin.*

29) Yim Chea & Bruce McKenney (November 2003), *Domestic Fish Trade: A Case Study of Fish Marketing from the Great Lake to Phnom Penh.*

30) Hughes, Caroline & Kim Sedara with the assistance of Ann Sovatha (February 2004), *The Evolution of Democratic Process and Conflict Management in Cambodia: A Comparative Study of Three Cambodian Elections.*

31) Oberndorf, Robert B. (May 2004), *Law Harmonisation in Relation to the Decentralisation Process in Cambodia.*

32) Murshid, K.A.S. & Tuot Sokphally (April 2005), *The Cross Border Economy of Cambodia: An Exploratory Study.*

33) Hansen, Kasper K. & Neth Top (December 2006), *Natural Forest Benefits and Economic Analysis of Natural Forest Conversion in Cambodia.*

34) Pak Kimchoeun, Horng Vuthy, Eng Netra, Ann Sovatha, Kim Sedara, Jenny Knowles & David Craig (March 2007), *Accountability and Neo-patrimonialism in Cambodia: A Critical Literature Review*.

35) Kim Sedara & Joakim Öjendal with the assistance of Ann Sovatha (May 2007), *Where Decentralisation Meets Democracy: Civil Society, Local Government, and Accountability in Cambodia*.

36) Lim Sovannara (November 2007), *Youth Migration and Urbanisation in Cambodia*.

37) Chem Phalla *et al.* (May 2008), *Framing Research on Water Resources Management and Governance in Cambodia: A Literature Review*.

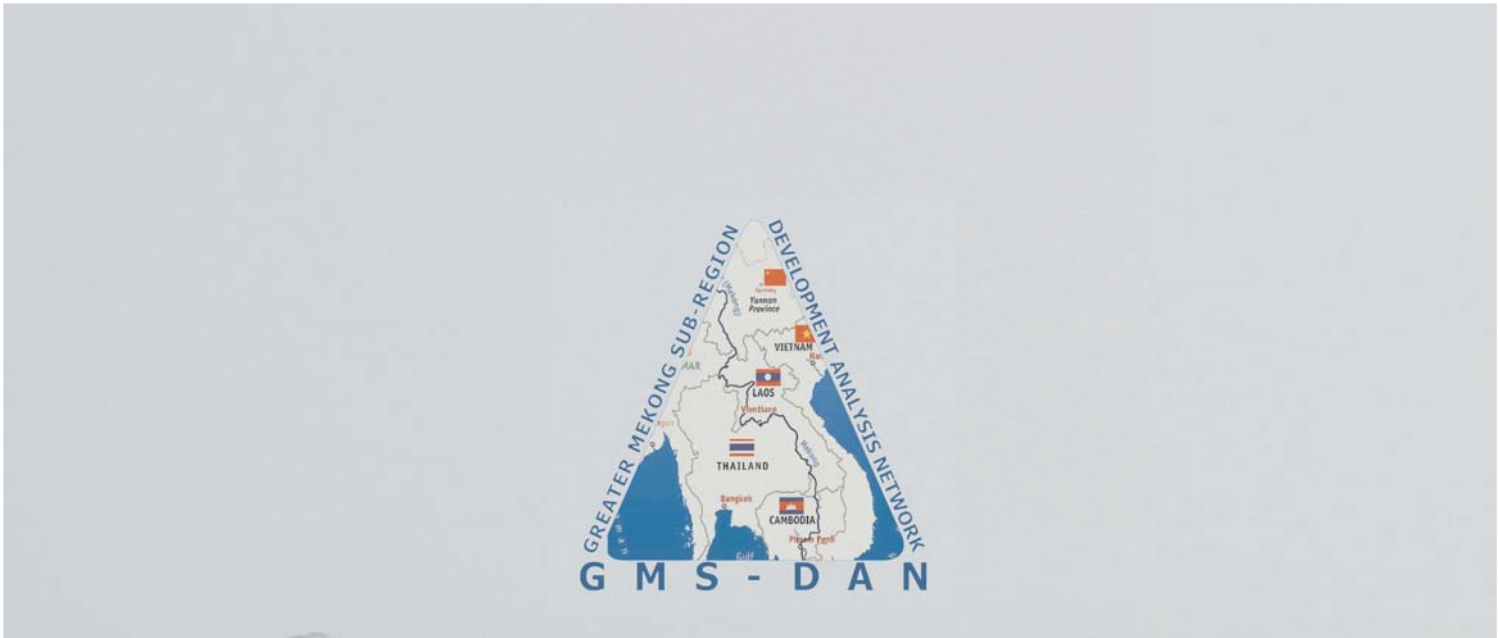
38) Pak Kimchoeun and David Craig (July 2008), *Accountability and Public Expenditure Management in Decentralised Cambodia.*

39) Horng Vuthy and David Craig (July 2008), *Accountability and Planning in Decentralised Cambodia.*

40) ENG Netra and David CRAIG (March 2009), *Accountability and Human Resource Management in Decentralised Cambodia*.

41) Hing Vutha and Hossein Jalilian (April 2009), *The Environmental Impacts of the ASEAN-China Free Trade Agreement for Countries in the Greater Mekong Sub-region*.

42) Thon Vimealea, Ou Sivhuoch, Eng Netra and Ly Tem (October 2009), *Leadership in Local Politics of Cambodia: A Study of Leaders in Three Communes of Three Provinces*.



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