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VEGETABLE MARKET FLOWS AND CHAINS IN PHNOM PENH

Chhean Sokhen, Diep Kanika (MRD)
Paule Moustier (CIRAD)
November 2004

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c/o: Vien Nghien cuu Rau qua – Trau Quy – Gia Lam – Hanoi – Vietnam
Tel: 844-876 82 87 – Fax: 84 4-827 61 48 – Email: susper@vnn.vn
Website: www.avrdc.org/susper

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CONTENTS

SUMMARY.....	7
INTRODUCTION	10
I SURVEY METHOD	10
A) Target population	10
B) Nature of questions	12
C) Periodicity of the survey	12
D) Pre-survey	12
E) Census of traders	12
F) Sampling	12
G) Selected products	12
H) Methodological problems encountered	13
II BACKGROUND INFORMATION	13
A) Presentation of wholesale and retail markets	13
1. Wholesale markets.....	13
2. Retail market	14
3. Problems with the markets	15
B) Vegetable production in Cambodia	15
1. Production calendar	15
2. The production areas	15
C) Main results of literature review on consumption and marketing	17
III ORIGINS OF PRODUCTS	19
A) Imports and local sources by vegetable	19
B) Seasonal variations	23
C) Districts supplying Phnom Penh.....	28
IV TRADERS' CHARACTERISTICS	31
A) Typology of traders	31
B) Place and time of sale	31
C) Place of origin of traders	32
D) Transportation used	32
E) Average amount of vegetables sold by each type of actor	32
F) Seasonal variations in business	33

V	MARKETING CHAINS	35
A)	The customers and the suppliers of the interviewed traders.....	35
B)	Organisation of marketing chains.....	36
1.	For the eight selected vegetables	36
2.	For tomato.....	39
3.	For kangkong	41
VI	RETAIL PRICES IN 2003.....	43
VII	CONCLUSION	45
A)	The importance of imports	45
B)	Importance of Kandal province in the supply of local products	45
C)	The importance of Phnom Penh municipality for kangkong.....	45
D)	Possibilities for local production to substitute for imports.....	45
E)	Additional data required	46
	Appendix 1 – Questionnaire	47
	Appendix 2 – Survey sample	49

LIST OF TABLES

Table 1 - Information on Phnom Penh markets in 2000	11
Table 2 - Calendar of vegetable production.....	15
Table 3 - Typology of vegetables according to their origin	20
Table 4 - Amount of daily vegetable transactions by origin in the 3 selected markets (average for the three periods in 2002).....	20
Table 5 - Amount of daily vegetable transactions by origin in the 3 selected markets (Average for the four periods in 2003)	21
Table 6 - Amount of daily vegetable transactions by origin in the 3 selected markets (kg) .	24
Table 7 - Amount of daily vegetable transactions by origin in the 3 selected markets in 2003 (kg)	25
Table 8 – Variation of quantities between the three periods in 2002	25
Table 9 - Variation of quantities of each vegetable between the three periods in 2002	26
Table 10 – Variation of quantities between the three periods in 2003	26
Table 11 - Variation of quantities for each vegetable between the three periods in 2003 ...	26
Table 12 - Origin of vegetables from district of Kandal province in 2002-2003	29
Table 13 - Origin of vegetables from districts of Phnom Penh peri urban area in 2002-2003	29
Table 14 – Place of sale of the different actors (percentage)	31
Table 15 – Traders’ transportation means	32
Table 16 - Quantities sold per actor for the eight selected vegetables	33
Table 17 - Reasons for periodically stopping vegetable sales	33
Table 18 - Seasonal calendar of sales.....	34
Table 19 - Customers of the interviewed traders in 2002	35
Table 20 - Suppliers of the interviewed traders in 2002.....	35
Table 21 - Suppliers of the interviewed traders in 2003.....	35
Table 22 - Share of the different types of suppliers for different actors (as a % of quantities)	36
Table 23 - Share of the different types of suppliers for different tomato sellers (as a % of quantities)	39
Table 24 - Share of the different types of suppliers for different actors (as a % of quantities)	42
Table 25 - Resale prices of vegetables in 2003.....	43

LIST OF FIGURES

Figure 1 - Origin of the 8 selected vegetables supplying Phnom Penh (2002-2003).....	22
Figure 2 – Variation in tomato transactions	27
Figure 3 - Variation in cabbage transactions	27
Figure 4 - Variation in the Chinese cabbage transactions	28
Figure 5 – Variation in the transactions of kangkong, lettuce and yard long bean	28
Figure 6 – Origin of different vegetables from Kandal province (2002-2003)	29
Figure 7 – Origin of different vegetables from Phnom Penh (2002-2003)	30
Figure 8 – Origin of different vegetables from Kampong Speu (2002-2003)	30
Figure 9 - Marketing chains for the 8 selected vegetables in 2002.....	37
Figure 10 - Marketing chains for 8 selected vegetables in 2003.....	38
Figure 11 - Marketing chain of tomato in 2002	40
Figure 12 - Marketing chain of tomato in 2003	41
Figure 13 – Marketing chains of kang kong for the three periods in 2002	42
Figure 14 – Marketing chains of kang kong in 2003	43
Figure 15 – Retail prices in 2003	44

LIST OF MAPS

Map 1 – Location of selected markets	14
Map 2 – Location of the main vegetable producing districts around Phnom Penh	16

SUMMARY

The main objectives of the research are: (i) to understand the organisation of the market in terms of geography of flows and stakeholders' functions; (ii) to appraise market performance in terms of import competition and supply variations (iii) to set the basis of an information system on origins and quantities.

To reach these objectives, some review of the available data was conducted. Then rapid market surveys were implemented to investigate market flows and chains. The surveys were conducted on around one out of five traders in the three largest markets selling vegetables: Oresey (retail market), Dumkor and Chaba Ampou (wholesale and retail markets). Questions mostly related to origin of supply, function of intermediaries, calendar of supply, quantities sold. Eight commodities were selected according to their importance in consumption and in peri-urban agriculture: tomato, cabbage, choysum, Chinese cabbage, lettuce, cucumber, long green bean, water convolvulus (kangkong). The surveys were conducted three times in 2002: April, July and October; and four times in 2003: January, April, July and October. Compared to previous surveys carried out in the market (including FAO and Agrisud), the survey aimed at quantifying origins and flows of vegetables available in the market, although difficulties in getting data on quantities are manifold (especially the fact that a lot of wholesale transactions take place in the night and traders are reluctant to answer).

From the survey results, vegetables can be categorised into the following categories according to their origin (the distance between production and markets is related to the characteristics of products, with most perishable vegetables originating from closest areas; the origin is also related to climatic constraints and land availability):

Imported vegetables

- These vegetables mostly come from Vietnam : this is the case of tomato which comes from Vietnam for 91% or more of transactions in 2002 (100% in April, 94% in July and 80% in October) and 60% or more transactions in 2003, except in January (25% in January, 73% in April, 94% in July and 93% in October); the rest originating from Kandal, Phnom Penh (Chamcarmon) and Kampong Speu province in October 2002 ; cabbage originated from Vietnam for 86% or more transactions in 2002 (100% from Vietnam in April and October, 95% from Vietnam in July and 5% from Kandal), in 2003 (77% from Vietnam in January, 97% in April, 99% in July and 99% in October), the rest derived from Kandal and Kampong Cham; Chinese cabbage : 100% from Vietnam at the three periods in 2002 and in 2003 it is from Vietnam 99% and from Kandal 1% in January and April, and 100% as well as from Vietnam in July and October.

Local vegetables

- Vegetables that only come from Phnom Penh municipality (maximum of 20 kilometers from centre) : this is the case of kang kong : 53% from Dangkor district, 43% from Mean Chey district, 3% from Chamkamon and 1% from Russeikao in 2002. And 46% from Dangkor, 52% from Meanchey, 1% from Chamkarmon and 1% from Russeikao in 2003.
- Vegetables that mostly come from Kandal province (20-40 kilometers from center) for more than 98% in 2002 and 99% in 2003 of transactions (the rest from Phnom Penh municipality): this is the case of choy sum (Kandal province: Saang, Takhmao Mokampoul, Kandal Stung, Ponhealeu and Kien Svay district, Phnom Penh: russeikao and Chamkarmon district), lettuce (Saang, Kien Svay Takhmao, Mokampoul, Lek Dek and Bakheng), yard longbean (Saang, Kien Svay, Takhmao, Mokampoul, Kandal Stung, Pnhealeu, Banteidek and Lek Dek).
- Vegetables that come from Kandal, Kampong Speu, Kampong Chhnang, Takao and Phnom Penh (beyond 50 kilometers from Phnom Penh: this is the case of cucumber (99% from Kandal in April, 60% in July, 23% in October in 2002 and 2003: 77% in January, 100% in April, 73% in July and 62% in October from Kandal), the rest is from Kampong Speu (27% in July and 34% in October) and Kampong Chhnang (1% in January).

The classical result that the longest the distance between production area and the market, the more numerous the intermediaries is shown by the survey results : more than half retailers get kangkong directly from producers, as this vegetable is produced around Phnom Penh, while vegetables from Kandal and Vietnam usually go through collectors and wholesalers (and the wholesaler's stage is more frequent in the case of vegetables from

Vietnam than in the case of vegetables from Kandal, which may go directly from collectors or producers to retailers). Transport takes place by motorbike in half the cases, the other means of transport are by foot or by truck. 70% of traders sell all year round. The main reasons for stops in the activity are the floods during the rainy season, as well as ceremonies in January and April.

The surveys provide information for the selection of project sites relative to their importance in the vegetable supply: Phnom Penh municipality for work on kangkong; Saang district for work on the other vegetables. They stress the importance of increasing the scale of production and assembling in the present periods of shortage for the local supply to be competitive with respect to imports. Vegetable imports mostly correspond to the deficit in local production due to heavy rainfall and high temperatures in the rainy season (from May to October, with floods mostly from August to October) and also to water deficits in the dry season (especially from February to May). When available at the same time, the prices of local and imported products are similar, or lower for local products. It is conspicuous that in January 2003, tomato imports dropped to 25% of the total supply thanks to favorable climatic conditions. Hence there is some margin of manoeuvre for local production to substitute for imports if the water availability is improved during the dry season and if innovations are promoted to grow tomato, cabbage and Chinese cabbage in the rainy season.

INTRODUCTION

The general objective of component 2 of Susper project, called market development of peri-urban food commodities, is to help harmonize peri-urban production with urban consumption in terms of quantity, quantity and regularity of supply. For this purpose, research is conducted to provide a more accurate picture of the functional and spatial organization of vegetable market, through an in-depth study of the organization of the vegetable marketing chain including the main actors and their respective roles, and the origin of the different vegetable commodities. The next step will be to determine how information can be efficiently spread among the actors of the market in order to reach as many people as possible (e.g., find out when to spread it where and through which means).

In this perspective, the first activity of Component 2, called “investigation of market flows and chains”, includes surveys focusing on the origin and quantity of the vegetable sold in Phnom Penh throughout the year. The main objectives of activity 1 are:

- To identify market flows of product from production and import areas to distribution areas
- To determine the actors of the marketing chains and their functions
- To appraise market performance in terms of import competition and supply variations.
- To set the basis of an information system on origin and quantity

I SURVEY METHOD

A) Target population

The survey focused on the different actors participating in Phnom Penh’s main vegetable markets, selling wholesale or retail, i. e, producers, collectors, wholesalers, and retailers. In this perspective, the three main wholesale and retail markets were surveyed, i.e., Chaba Ampou and Dumkor (wholesale market and retail market at the same time) and Oresey (retail market). The reasons for the selection of these markets are indicated below:

- Chaba Ampou and Dumkor are the only two wholesale vegetable markets in Phnom Penh. In Psa Kandal (near the Royal Palace) there is some wholesale vegetable trade also, but it is in small quantities and not diversified (mostly cucumber, watermelon, potatoes, wax gourd, that can be stored for a long time)
- Oresey is the biggest retail market in Phnom Penh among the 24 retail markets recorded by the trade department (5577 vendors according to the trade department, including 155 vegetable vendors, that is 23% of the total number of vegetable vendors – see Table 1). This market has a diversified clientele in terms of purchasing power. According to the statistics of the trade department, the Central market is the second largest retail market (148 vegetable traders). Yet we did not consider it in the sample because its clientele is mostly a wealthy one.

Chaba Ampou and Dumkor markets combine wholesale and retail functions, while Oresey is a retail market. In Chaba Ampou and Dumkor, wholesale takes place all day and all night, but mostly from 7 p.m. till early morning. Chaba Ampou is located at the East of Tonlebassa river along national road 1 in Mean Chey district. Doemkor market is located in Toul Kork district. Oresey market is located in the 7 Makara district. It gets its supply from Dumkor and Chaba Ampou markets.

Table 1 - Information on Phnom Penh markets in 2000

Name of districts	Name of market	Number of veg stalls	Total number of stalls
Prampi Makara	Oresei	155	5577
	Seireiphap		124
Daun Penh	Psa Thmei	147	2829
	Psa Kandal	5	850
	Psa Chas	4	564
	Psa Soriya		420
	Psa Sileap	19	94
Chamcamon	Olympic	46	3764
	Tuol Tumpuung	70	1224
	Beng Keng Kang	90	1416
	Psa Kap Ko	8	186
Toul Kork	Samaki	60	628
	Depo	22	260
	Dumkor	57	722
Meanchey	Chaba Ampou		969
	Kbal Tnal	14	197
	Stung Meanchey	8	166
	Beng Tumpoun		222
	Total	>705 <875	18477

Source: Trade office in Phnom Penh

(Notes: these do not include Russey Keo and Dangkor; with these two districts, the total number of markets is 24; the data only include fixed retail stalls, not retail on the ground. In 2000, Agrisud estimated the total number of vegetable stalls in Dumkor at 190, which is much higher than the trade office data).

As there are some missing data for the number of vegetable stalls for some markets, we estimated the total number of vegetable stalls as intermediate between the total number of vegetable stalls without the markets with missing data, and this number plus an estimation of maximum vegetable stall number in markets with missing data as 10% of total number of stalls.

B) Nature of questions

The main questions relate to the nature of suppliers and customers, the origin of commodities sold, the quantity sold per day (maximum and minimum), the time variation in the business – see questionnaire in Appendix 1.

C) Periodicity of the survey

In order to have a better idea of the variation in the origin and quantity in the sources of supply and the marketing chains that occur within the year, the surveys were carried out at three times of the year 2002 corresponding to (1) end of dry season (April – from the 3rd to 13th) (2) rainy season (July – from the 3rd to the 12th) and (3) end of rainy season (October – from 9th to 19th), and four times of the years 2003 : January - from the 1st to the 13th (dry season), April - from the 1st to the 11th (dry season), July - from the 2th to the 14th (rainy season), September-October - from the September, 29 to October, 8 (end of rainy season).

D) Pre-survey

In 2002, a pre-survey was carried out at the beginning of the wet season and after Khmer New Year (on April) on two wholesale-retail markets and a retail market of Phnom Penh, during one day (around 5 interviews). The pre-survey was not aimed at gathering information, but rather at making sure that the surveyors understood the questions and were able to carry out the survey. It also aimed at assessing the duration of the survey.

E) Census of traders

Before each round of the survey in order to sample the total number of vegetable traders and the total number of each vegetable trader by types of merchant, we observed and counted the number of traders.

F) Sampling

We tried to get a minimum of 20% (one out of five) of the total number of traders, with at least 1 trader for each kind of vegetable, each category of function (producer, collector, wholesaler, retailer), and business diversification (first category : more than 20 species; second category : 10 to 20 species; third category : less than 10 species). The sample size for each period is indicated in Appendix 2. The traders were interviewed after systematic linear walking (example: stopping at every five traders for retailers).

G) Selected products

The study is focused on 8 vegetables: tomato, cabbage, choysum, Chinese cabbage, lettuce, cucumber, yard long bean, and Kang Kong. The reasons for the choice of these vegetables are as follows:

- Importance in consumption. Cucumber, tomato, cabbage, kangkong and Chinese cabbage are among the seven most consumed vegetables in Cambodia¹. Among the seven mostly consumed vegetables, we find also wax gourd and eggplant but we did not consider them because they are not typical of the peri-urban area, they are produced all over the country.
- We considered choysum as it is a leafy-vegetable which is common for the poor consumers, is easy to produce, generate quick output (after 40 days) and is cultivated in the three countries of Susper project. Lettuce is also a leafy-vegetable which is frequent in the peri-urban area.

From our survey (see section on survey results), we estimated that the quantities traded in the market for these 8 vegetables amounts to approximately 90 tons a day, that is around 40% of total vegetable consumption, estimated at 216 tons in 2000².

H) Methodological problems encountered

Most wholesale activity is made during the night. This makes the surveys quite tiresome. It is difficult to meet traders and to identify their functions as many of them combine several functions at the same time. Finally, a lot of traders give the excuse of being busy to avoid answering the questions. The main time of market investigation was 9 a.m. to 2 pm, when the traders (including farmers and collectors, just before they leave the market).are not too busy and are more ready to answer questions.

II BACKGROUND INFORMATION

A) Presentation of wholesale and retail markets

1. Wholesale markets

Chaba Ampou and Dumkor are markets combining wholesale and retail, where most of wholesale vegetable marketing takes place in Phnom Penh. In the day time, the markets operate as retail markets. Chaba Ampou market is located in the East of Tonle Sap River, along the national road N^o1 in Meanchey district (see Map). Vegetables of all origins, coming by river and road are sold there, mostly from Viet Nam, Kandal, Prey Veng, and Svay Rieng province. Dumkor market is located in Tuol kork district (middle of Phnom Penh). The sources of vegetables are from Vietnam and all provinces in the kingdom of Cambodia, but the most important one is Saang district in Kandal province.

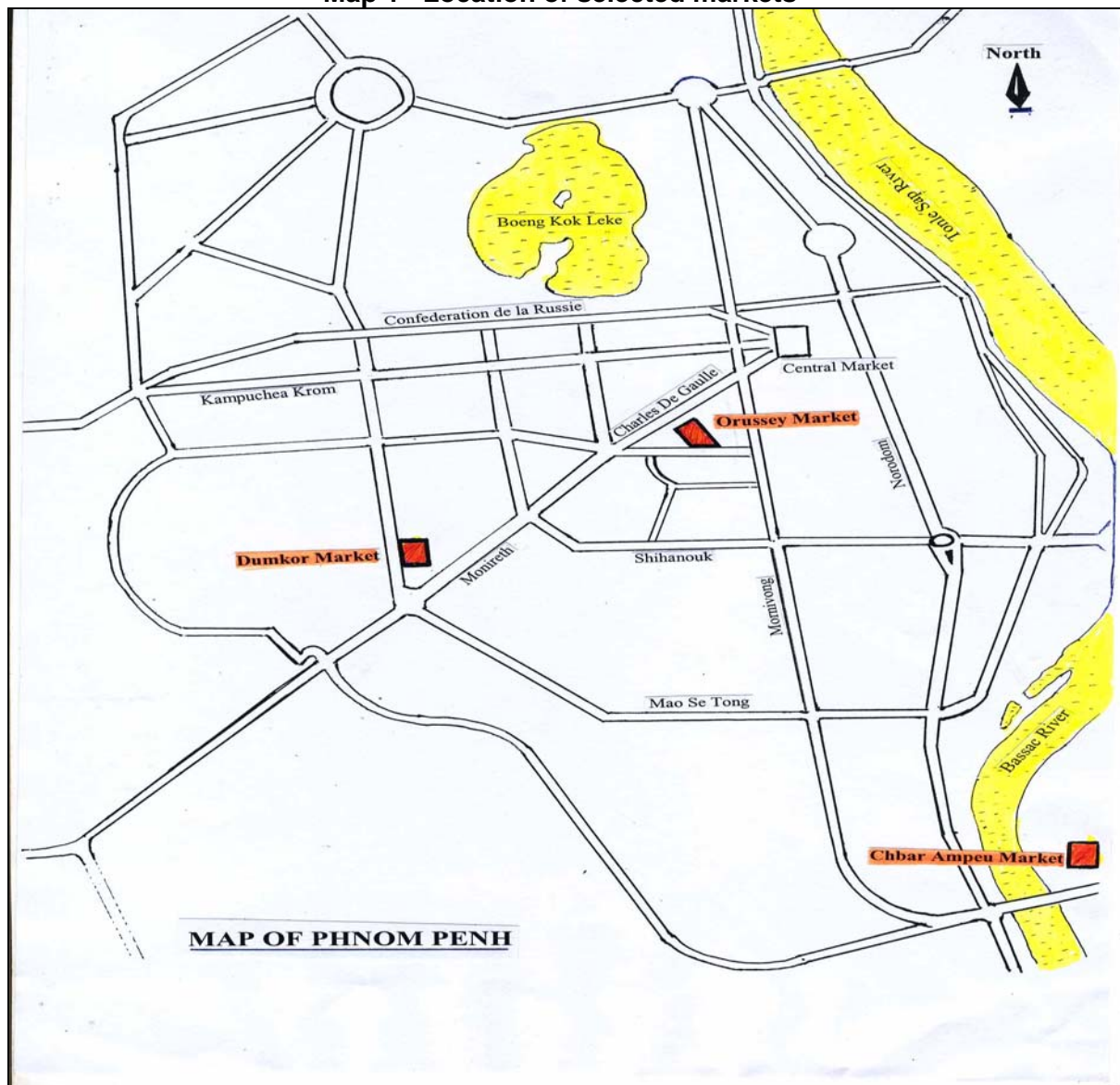
¹ Abedullah, Srun Sokhom and Umar Farooq. Kingdom of Cambodia. In : Mubarik Ali (ed.), 2002. The vegetable sector in Indochina countries. Taiwan, AVRDC, pp. 31-73.

² Abedullah, Srun Sokhom and Umar Farooq. Kingdom of Cambodia (op. cit.)

2. Retail market

Oresey market is located in 7 Makara district (middle of Phnom Penh, near Dumkor market.) The sources of supply are mostly Dumkor and Chaba Ampou markets but the most important one is Dumkor market.

Map 1– Location of selected markets



Source : Map prepared by Chan Sipana

3. Problems with the markets

The three markets are held since 1979 under the management of the municipality of Phnom Penh. The current market places are narrow and crowded. With the population growth and the increase of poverty, everyone looks for employment and the number of vendors gradually increases. Numerous vendors run their business on the road surrounding the market, it affects the traffic and hygiene.

B) Vegetable production in Cambodia

1. Production calendar

In Cambodia, two main seasons can be distinguished: the dry season from November to May and the rainy season from May to November.

In the early dry season, vegetables are easy to grow and give high yield because of favorable cropping conditions: the good climate, wet soil, lack of pests, easy access to water sources. But at the end of the dry season, when water is no more available, the yields decrease, especially for temperate vegetables like tomato, cabbage and Chinese cabbage which require a lot a water.

In the rainy season, vegetables are difficult to grow and give low yield, the climate is warmer, the ponds and lakes suffer from water shortage and some areas are flooded. During the rainy season, some vegetables such as tomato, cabbage and Chinese cabbage, cannot be grown to meet the market needs. At this time (as well as in the late dry season), the imported vegetable quantity increases and comes in addition to local production. The calendar of vegetable production is summarized in Table 2.

Table 2- Calendar of vegetable production

Description	Dry season						Rainy season					
	N	D	J	J	M	A	M	J	J	A	S	O
Period when easy to grow												
Period when difficult to grow												
Flooding period												
Hottest weather												
Heaviest rain												

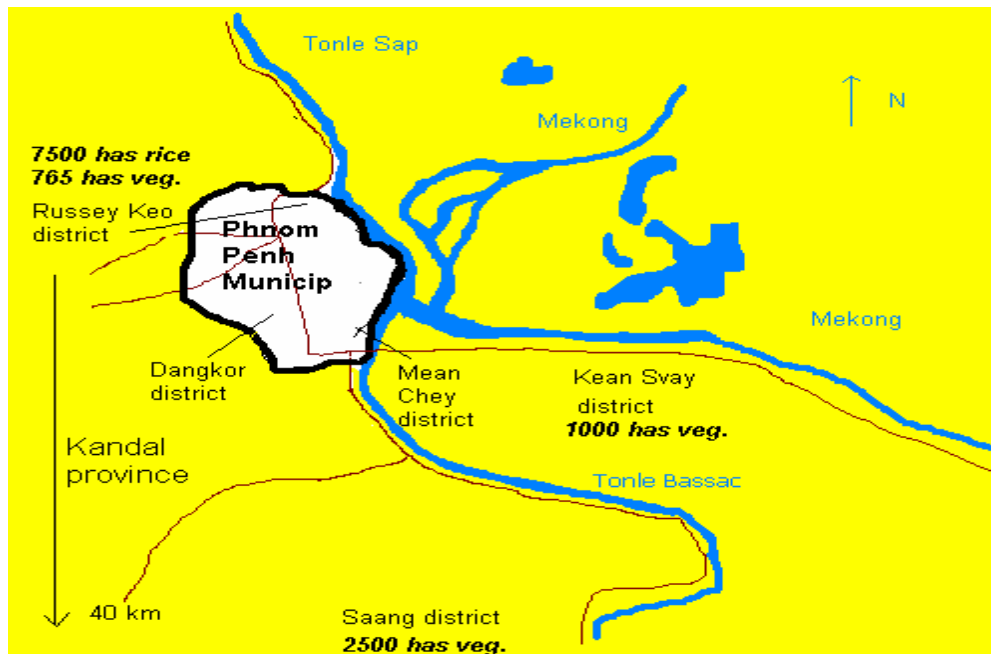
2. The production areas

Among the 24 provinces of Cambodia, there are 6 provinces which supply vegetables to Phnom Penh: Kandal, Phnom Penh, Kampong Speu, Takao, Kampong Cham and Kampong Chhnang. Kandal province is located at the periphery of Phnom Penh and includes three rivers (Mekong, Bassac and TonleySap). The population located along these rivers is growing vegetables since ancient time, especially the population of Saang district. Vegetables also originate from the suburban area of Phnom Penh, where they are grown in the area situated along Mekong River and near the lakes.

We consider as urban production the production inside Phnom Penh municipality, the boundaries of which extend from 15 to 20 kilometers of Phnom Penh center³. Peri-urban production mostly corresponds to Kandal Province which provides the bulk of Phnom Penh supply. According to the statistics of the ministry of agriculture, the total area cultivated in Phnom Penh municipality in 2001 is 7500 hectares of rice and 765 hectares of vegetables. In the rainy season, the vegetable cultivated area is 465 hectares only, including 122 hectares of leafy vegetables, 83 hectares of watermelon, 71 hectares of cucumber, 12 hectares of tomato. Kohkloung island (Chamcar Maun District) is a big production area with 73 hectares of specialized vegetable production, employing 200 families but this is mostly outside the rainy season which extends from May to October. The three most important districts producing vegetables in all seasons are by order of importance: Dangkor (South), Russey Keo (North), Mean Chey (South). Kandal Province is the most important area in terms of the vegetable market supply. The largest district in terms of vegetable production is Saang district (2500 hectares), located around 40 kilometers from Phnom Penh. The second one is Kien Svay (1000 hectares of vegetables), located 25 kilometers from the city.

In Mean Chey district there is a specific production of 35 hectares of water spinach in the wastewater basin (Boeung Tumpon). 838 families of fishermen work them. Water spinach is harvested every 15 days, total production is estimated at 18 tons/day⁴.

Map 2 – Location of the main vegetable producing districts around Phnom Penh



Source: data from Department of Agriculture, Phnom Penh (map done by P. Moustier, SUSPER)

³ The following information is drawn from : Paule Moustier, 2002, Periurban production systems in Phnom Penh, baseline information. AVRDC/CIRAD SUSPER project, Hanoi, RIFAV, 2 p.

⁴ Source : Phat Leng's personal communication (head of Agro-industry department, MAFF)

In the peri-urban area of Phnom Penh, the vegetable cropping systems can be roughly divided into two types⁵:

- Vegetable production in the *chamcar* (that is the back of the bank strips) or near the houses, on non-flooded land, that can take place both in rainy and in dry season
- Vegetable production in the lowland, taking place in the beginning of the dry season (rice being cultivated in the lowland in the rainy season).

In Kandal province, the production systems are very diversified, with the current combination of the following crops : on bank strips, fruits (banana, coconut, jackfruit, mango); at the top of *chamcar*, vegetables : Chinese kale, Chinese cabbage, cabbage, chives, salad, mustards, chillies, ginger; at the bottom of the *chamcar* : sweet potato, sugar cane, mungo bean, maize, groundnut, ginger, yam, taro ; in the lowland : rice (in the rainy or dry season), maize, beans. 30% of families have beef which are used for ploughing and manure. Pigs are fed with farm and home residues and are used as savings. The topography and location with respect to the canals (*preks*) are essential to understand the calendar of flooding and the cropping systems. The lowest areas are the ones cultivated the longest with rice, and they also correspond to the poorest families⁶.

Compared to production systems in Kandal province, the exploratory farmers' interviews indicate the following trends⁷ :

- Less diversified production systems, with larger share of vegetables and lower share of cereals
- Higher share of leafy vegetables in the cropping systems
- Smaller plots
- Longer period of vegetable cultivation
- More diverse modes of access to water

C) Main results of literature review on consumption and marketing

The population of Phnom Penh was estimated at 1 500 000 heads in 2000, growing at 3.5% per year. From Agrisud data⁸, in 2000, the amount of food expenses reflects the poverty of the population, as the average is 1564 riels/head per day (that is around \$0,4), and 95% of households spend less than \$1 per head and per day on food. Food expenses are distributed as follows: 30% on animal products, 20% on cereals, 18% on fish, 10% on vegetables, 10% on fruits. The poorer households, who spend less than 1000 Riels/day on food and represent 27% of the total, eat more vegetables (water convolvulus, cabbage,

⁵ Agrisud, 2000. Approvisionnement et consommation des ménages en produits alimentaires à Phnom Penh. Agrisud international, Bordeaux, 45p.

⁶ Paule Moustier, 2002, Periurban production systems in Phnom Penh, baseline information. AVRDC/CIRAD SUSPER project, Hanoi, RIFAV, 2 p., quoting P. Constant, I. Diedhou, N. Layaida, P.M. Mapongmetsem, A. Wereme. Contraintes et opportunités de l'agriculture péri-urbaine de Phnom Penh au Cambodge. Cas de la province de Kandal (district de Saang). Montpellier, ICRA, Bordeaux, Agrisud International, 2000, 130 p.

⁷ Paule Moustier, op. cit.

⁸ Agrisud, 2000. Approvisionnement et consommation des ménages en produits alimentaires à Phnom Penh. Agrisud international, Bordeaux, 45p.

cucumber) and less meat than the richer households. Vegetable imports (from Vietnam and Thailand) account for 23% of vegetable consumption, and 37% of vegetable expenses.

As regards marketing, the available data include the study on agricultural marketing in Cambodia by the ministry of agriculture and forestry with FAO⁹, plus Agrisud data. The MAFF/FAO report emphasizes the lack of specialised wholesale function and that the market seems « disorganised and chaotic » with frequent combination of functions, and small quantities of produce sold by individual traders. The data from FAO and Agrisud describe the organisation of marketing chains in terms of functions and origin (Phnom Penh municipality, Kandal province, Vietnam), but some quantification is lacking (in particular the percentage of supplying areas provided by Agrisud is based on frequencies of sale by traders, not on quantities sold for the different origins), and does not provide the detail in terms of districts. This data plus exploratory interviews suggest that the same wholesalers may sell products from local origin or from imports depending and time of the year and availability of local product, but that in general products imported from Vietnam are praised on their more regular availability and the ability to develop long-term relationships with suppliers.

⁹ Ministry of agriculture, forestry and fisheries. 1997. Report of agricultural marketing in Cambodia. Phnom Penh, Agricultural marketing office, Department of Planning, Statistics and International, MAFF, 77 p.

III ORIGINS OF PRODUCTS

A) Imports and local sources by vegetable

In Cambodia, there is a clear differentiation of the sources of vegetables according to the type of vegetables, some vegetables are nearly entirely imported (tomato, cabbage, Chinese cabbage) while some other are entirely local (including leafy-vegetables). Among the local vegetables, a further distinction relates to vegetables originating from Phnom Penh (water convolvulus) and from Kandal, e.g. choysum. These results are detailed below (see Table 3, Table 4, Table 5, Table 6, Table 7).

Vegetables can be categorized into the following categories according to their origin (the more perishable the vegetable, the closer its production area; the origin is also related to climatic constraints and land availability):

Imported vegetables

- These vegetables mostly come from Vietnam : this is the case of tomato which comes from Vietnam for 91%¹⁰ of transactions in 2002 and 60% of transactions in 2003; the rest originating from Kandal, Phnom Penh (Chamcarmon) and Kampong Speu province; cabbage originating from Vietnam for 99% of transactions in 2002 and 86% in 2003, the rest coming from Kandal and Kampong Cham, Chinese cabbage : 100% from Vietnam in 2002 and 2003 (with a marginal quantity – 75 kg/day, originating from Kandal in 2003)
- Cucumber is also partly imported, but on a small scale only (2% in 2002, 7% in 2003), so that it is classified as a local vegetable.

Local vegetables

- Vegetables that mostly come from Phnom Penh municipality (maximum of 20 kilometers from centre): this is the case of kang kong (100% in 2002; 98% in 2003 with 2% coming from Kandal province).
- Vegetables that mostly come from Kandal province (20-40 kilometers from center) for more than 98% of transactions in 2002 and 2003 (the rest from Phnom Penh municipality): this is the case of choysum, lettuce, and yard long bean
- Vegetables that come from Kandal, Kampong Speu, Kampong Chhnang, Takao and Phnom Penh (beyond 50 kilometers from Phnom Penh: this is the case of cucumber : 68% from Kandal in 2002, 73% in 2003; 24% from Kampongspeu in 2002, 20% in 2003; 6% from Takao in 2002; 2% from Vietnam in 2002 (7% in 2003).

¹⁰ The percentage have been calculated on the sum of total transactions, wholesale and retail, taking place in the selected markets (most of vegetables are sold to Phnom Penh retailers, but some also are sold to provincial traders). Hence the quantities displayed in the tables should not be used to estimate the quantities of vegetables available to Phnom Penh consumers, but rather the relative share of the different origins.

Table 3 - Typology of vegetables according to their origin

- Origin representing more than 90% of flows in 2002 and 2003

Phnom Penh vegetables	Kandal vegetables	Vietnam vegetables
0 to 20 kilometers	20 to 40 kilometers	400 kilometers
Kangkong	Choysum Lettuce Yard longbean	Tomato (*) Cabbage Chinese cabbage

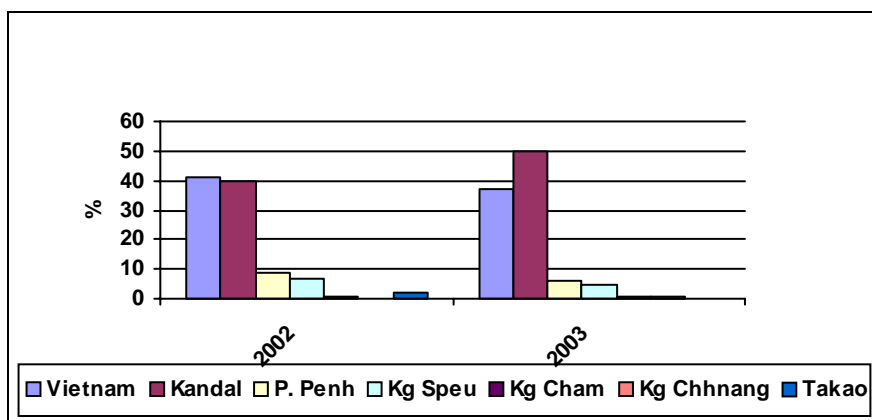
Table 4-Amount of daily vegetable transactions by origin in the 3 selected markets (average for the three periods in 2002)

Vegetables	Imports(kg)	Local (kg)					Total
	Vietnam	Kandal	P. Penh	Kg Speu	Takao	Kg Cham	
Imported vegetables							
Tomato	7759	191	103	447			8500
	91%	2%	1%	5%			
Cabbage	24947	234					25181
	99%	1%					
C. cabbage	4124						4124
	100%						
Local vegetables							
Kang kong			8100				8100
			100%				
Choysum		10721	183				10904
		98%	2%				
Lettuce		3850					3850
		100%					
Y Long bean		4401					4401
		100%					
Cucumber	463	17225	29	6001	1479	173	25370
	2%	68%		24%	6%		
Total	37293	36623	8415	6448	1479	173	90430
	41.5%	40.5%	9%	7%	2%		

Table 5- Amount of daily vegetable transactions by origin in the 3 selected markets (Average for the four periods in 2003)

Vegetables	Imports	Local					Total
		Kandal	P. Penh	Kg Speu	Kg Cham	Kg Chhnang	
Imported vegetables							
Tomato	5115	3176	173				8464
	60%	38%	2%				
Cabbage	16586	1460	7		1279		19332
	86%	7%			7%		
C. cabbage	11399	75					11474
	100%						
Local vegetables							
Kang kong		120	5713				5833
		2%	98%				
Choysum		10624	7				10631
		100%					
Lettuce		6241					6241
		100%					
Y Long bean		5968	118				6086
		98%	2%				
Cucumber	1763	19445		5296		66	26570
	7%	73%		20%			
Total	34863	47109	6018	5296	66	1279	94630
	37%	50%	6%	6%		1%	

On the whole, the share between local and imported products is as follows (see Figure 1): in 2002, 41.5% of imports, and 58.5% for local production (including 69% from Kandal; 15.5% from Phnom Penh; 12% from Kompong Speu and 3.5% from Takao); in 2003, 37% of imports and 63% of local production (including 79% from Kandal, 9.5% from Phnom Penh, 9.5% from Kompong Speu and 2% from Kompong Chhnang) .

Figure 1-Origin of the 8 selected vegetables supplying Phnom Penh (2002-2003)

The volume of the 4 crops supplied from Vietnam is similar (with only 1% of difference) to the quantity of the 6 local products from Kandal province. The other 4 provinces supply only half of Kandal (19%).

Among the 8 selected vegetables, 4 vegetables represent more than 70% of the traded quantities: cucumber, choysum, Chinese cabbage and cabbage. 3 of them are imported: Chinese cabbage and cabbage (for more than 90% of the supply) and cucumber (for 2% of the supply).

Cambodian farmers are unable to grow some vegetables to meet the market requirement, especially for vegetables of temperate origin. We also observe that the main Cambodian supplying area is Kandal province, close to Phnom Penh, and crossed by 3 rivers. These conditions make it easy to grow and transport vegetables to Phnom Penh. Kandal is not only the most important supplier in quantity, but it also contributes to the diversity of vegetable. As regards Phnom Penh province, it mostly provides leafy vegetables, especially Kangkong. Kampong Speu, Takao and Kampong Cham supply few vegetables, in the end of the rainy season, to supplement the supply of peri-urban areas when the produced quantities decrease because of the floods.

There are few differences between the supply of the market between 2002 and 2003. The main difference relates to the decrease in percentage of imports (41.5% of imports in 2002, 37% in 2003) and higher share of supply from Kandal (40.5% in 2002, 50% in 2003). This is mostly due to more favourable climatic conditions (weather less hot in the dry season 2003 than in 2002, less heavy rains).

B) Seasonal variations

When considering the variations in the origin of vegetables between the five times of surveys, the following results are found (see Table 8, Table 9, Table 10, Table 11, Figure 2, Figure 3, Figure 4, Figure 5).

The imports of tomato were particularly low in January 2003 (25% of total), which is due to a more favorable dry season in Cambodia than in 2002. The imports of cabbage were also lower in January 2003 than in the other months of surveys. Some Chinese cabbage was produced in the dry season 2003, while none was supplied to Phnom Penh in 2002, nor in July and October 2003. As for cucumber, the times of imports are : October 2002 and 2003 (middle of rainy season), as well as January 2003 – which corresponds to difficulties in planting cucumber at the end of the rainy season with negative impact on the production in the beginning of the dry season. In the rainy season, the decrease of production in Kandal is compensated by more production originating from Kampong Speu where cucumber is grown near the houses.

As regards choysum, the quantities diminish from January to April, from April to July, and from July to October. This is due to: (i) the lack of water (in April) and the rains (from April to October) preventing the growing of vegetables; (ii) consumers turning to wild vegetables (water lily, amaranth, bamboo shoots, ivy gourd...) and fish during the rainy season. Apart from choysum, it is difficult to draw any definitive conclusion on the trends in the quantities supplied from one month to the other. It must be reminded that in Cambodia the excess and surplus in water are crucial in explaining the quantities available, and both factors are highly irregular from one year to the other.

Compared with 2003, the quantity of kangkong from Cambodia (which is mostly supplied by Phnom Penh) is higher in July 2002 (11 600 kg/day) than in July 2003 (5200 kg/day). On the other hand the quantity of yard long bean is higher in July 2003 (8100 kg/day) than in July 2002 (3900 kg/day). The conditions of the rainy season in 2003 were more favorable for vegetable production than in 2002 (lower temperature and lower intensity and rainfall), so consumers were able to increase their consumption of other vegetables than kangkong. Variations in the quantities of supplied vegetables from one year to the next may also be explained by farmers' cultivating less of a crop the year following excess supply and low prices in a vegetable.

Apart from climatic reasons, patterns of consumption also explain changes in quantities available to the market. This is especially true for cabbage, tomato, Chinese cabbage and choysum, which are more consumed in the Chinese new year (during January), while kangkong is less consumed during this period. Even though local production was higher in January 2003 than in the other months of the year, the imports of cabbage and Chinese cabbage were higher also during this period due to higher demand (see graph). On the other hand, the imports of tomato substantially decreased as local supply was much higher than the other times of surveys. This shows that local production is able to substitute for imports when significantly increased.

Table 6 -Amount of daily vegetable transactions by origin in the 3 selected markets (kg)

Commodity	Vietnam			Kandal			Phnom Penh			Kampong Speu		
	A	J	O	A	J	O	A	J	O	A	J	O
Tomato	7214	9426	6638		252	322		308				1340
	100%	94%	80%		3%	4%		3%				16%
Cabbage	48838	12181	13821									
	100%	95%	100%									
C.cabbage	2412	4528	5431									
	100%	100%	100%									
Kang kong							4906	11579	7821			
							100%	100%	100%			
Choysum				13801	10577	7787	125	423				
				99%	96%	100%	1%	4%				
Lettuce				3608	3989	3954						
Cucumber			1388	27480	21240	2957			88	385	14370	3248
			11%	99%	60%	23%			1%	1%	40%	26%
Y long bean				4878	3877	4448						
				100%	100%	100%						
Total	58464	26135	27278	49766	40638	19467	5030	12310	7908	385	14370	4588

Commodity	Takao			Kg Cham			Total		
	A	J	O	A	J	O	A	J	O
Tomato							7214	9986	8300
Cabbage							48838	12884	13821
C.cabbage							2412	4528	5431
Kang kong							4905	11579	7821
Choysum							13926	11001	7787
Lettuce							3608	3989	3954
Cucumber			4436			520	27865	35610	12637
			35%						
Y long bean							4878	3877	4448
Total			4436			520	113646	93454	64199

Table 7 - Amount of daily vegetable transactions by origin in the 3 selected markets in 2003 (kg)

Month	Vietnam				Kandal				Phnom Penh			
	J	A	J	O	J	A	J	O	J	A	J	O
Tomato	3502	5869	5668	5421	10026	2627	163	387	494		197	
	25%	73%	94%	93%	72%	27%	3%	7%	4%		3%	
Cabbage	36128	11430	8832	9954	5362	335	75	68	28			
	77%	97%	99%	99%	11%	3%	1%	1%	1%			
C.cabbage	27608	8106	4843	5038	255	48						
	99%	99%	100%	100%	1%	1%						
Kang kong						127	354		4958	5435	4899	7559
						2%	7%		100%	98%	93%	100%
Choysum					13493	12921	8318	7763				30
					100%	100%	100%	100%				
Lettuce					6186	6910	4439	7429				
					100%	100%	100%	100%				
Y long bean					5117	4693	8160	5901			473	
					100%	100%	95%	100%			5%	
Cucumber	5093			1959	17986	13961	20795	25039				
	22%			5%	77%	100%	73%	62%				
Total	72331	25405	19343	22371	58425	41122	42304		5480	5435	5569	7589

Month	Kg Speu		Kg Cham	Kg Chhnang	Total			
	July	O	January	January	J	A	J	O
Tomato					14022	7996	6028	5808
Cabbage			5117		46635	11765	8907	10022
C.cabbage					27863	8154	4843	5038
Kang kong					4958	5562	5253	7559
Choysum					13493	12921	8318	7793
Lettuce					6186	6910	4439	7429
Y long bean					5117	4693	8633	5901
Cucumber	7525	13658		262	23341	13961	28320	40656
	27%	33%		1%				
Total	7525	13658	5117	262	141615	71962	74741	90202

Table 8– Variation of quantities between the three periods in 2002

Origin	Quantity sold a day (kg)			Variation		
	April	July	October	April/July	July/Oct	April/Oct
Imported	58464	26135	27278	-55	4	-53
Local	55188	67318	36918	22	-45	-33
Total	113652	93453	64196	-18	-31	-44

Table 9-Variation of quantities of each vegetable between the three periods in 2002

Vegetables	Quantity sold a day (kg)			Variation		
	April	July	October	April/July	July/Oct	April/Oct
Choysum	13926	11000	7787	-21	-29	-44
Lettuce	3608	3989	3954	11	-1	10
Kang kong	4906	11579	7818	136	-32	59
Tomato	7214	9986	8300	38	-17	15
Cucumber	27865	35610	12637	28	-65	-55
Y long bean	4878	3877	4448	-21	15	-9
Cabbage	48838	12884	13821	-74	7	-72
C.cabbage	2412	4528	5432	88	20	125
Total	113647	93453	64197	-18	-31	-44

Table 10-Variation of quantities between the three periods in 2003

Origin	Quantity sold a day Kg)				Variation (%)			
	January	April	July	October	Jan/April	April/July	July/Oct	Jan/Oct
Imported	72332	25405	19343	22371	-65	-24	16	-69
Local	69283	46557	55400	67831	-33	19	22	-2
Total	141615	71962	74743	90202	-49	4	21	-36

Table 11- Variation of quantities for each vegetable between the three periods in 2003

	Quantity sold a day Kg)				Variation (%)			
	January	April	July	October	Jan/April	April/July	July/Oct	Jan/Oct
Choysum	13493	12921	8318	7793	-4	-36	-6	-42
Lettuce	6186	6910	4439	7429	12	-38	67	20
Kang kong	4958	5562	5253	7559	12	-6	44	52
Tomato	14022	7996	6028	5808	-43	-25	-4	-59
Cucumber	23341	13961	28320	40656	-40	103	44	74
Y long bean	5117	4693	8633	5901	-8	84	-32	15
Cabbage	46635	11765	8907	10022	-75	-24	13	-79
C.cabbage	27863	8154	4843	5038	-71	-41	4	-82
Total	141615	71962	74741	90202	-49	4	21	-36

Figure 2– Variation in tomato transactions
in the 3 selected Phnom Penh markets (kg/day)

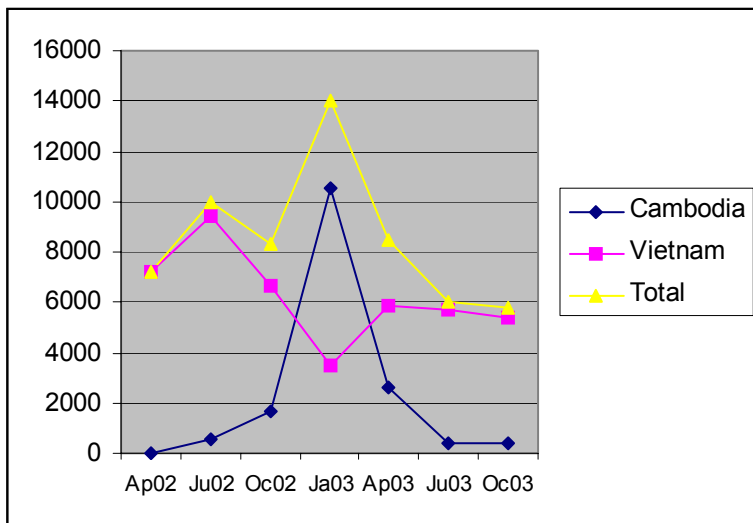


Figure 3 Variation in cabbage transactions
in the 3 selected Phnom Penh markets (kg/day)

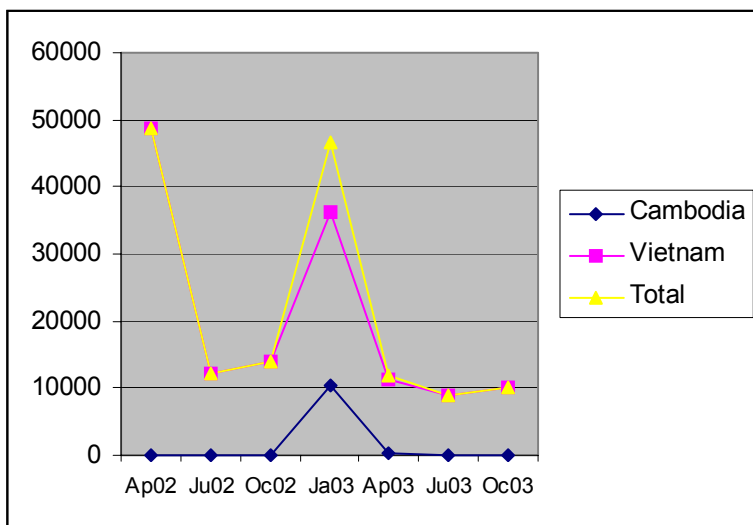


Figure 4 - Variation in the Chinese cabbage transactions
in the 3 selected Phnom Penh markets (kg/day)

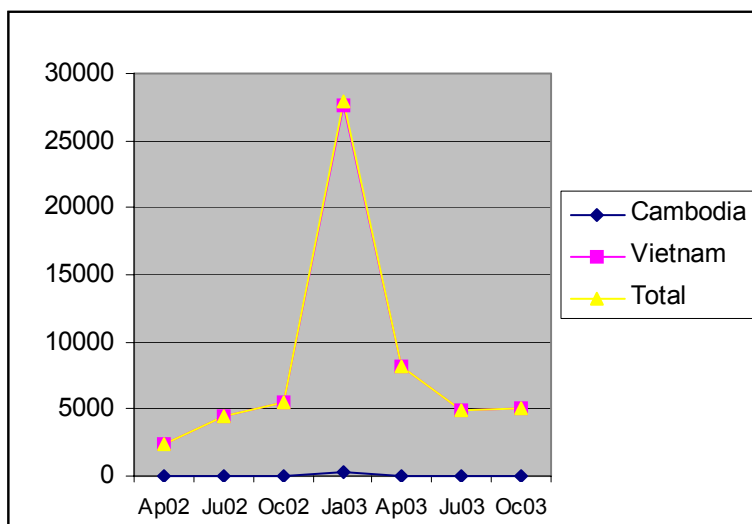
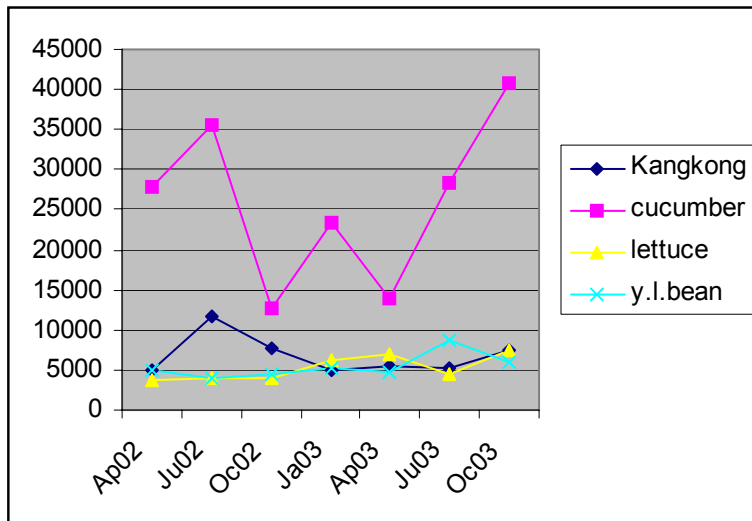


Figure 5— Variation in the transactions of kangkong, lettuce and yard long bean in the 3 selected Phnom Penh markets (kg/day)



C) Districts supplying Phnom Penh

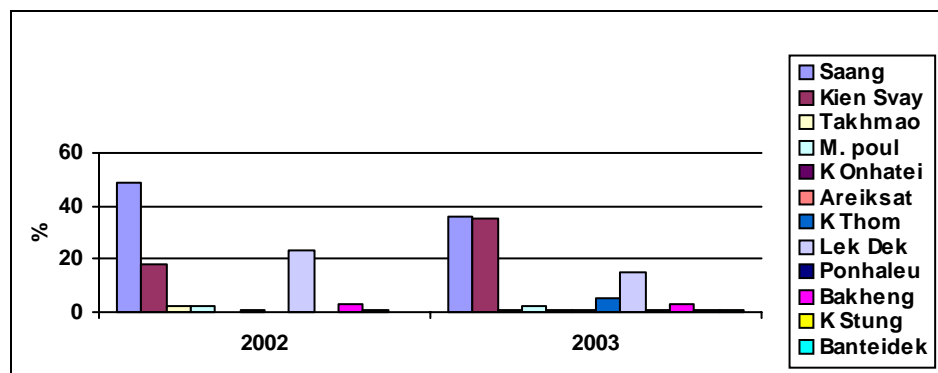
In Cambodia, the following provinces and districts supply vegetables to Phnom Penh:

Kandal province, with 12 supplying districts: Saang, Kien Svay, Lek Dek, Bakheng, Koh Thom, Mokampoul, Areiksat, Takhmao, Kandal Stung, Koh Onhatei and Banteidek (by order of importance) (see Table 12 and Figure 6).

Table 12- Origin of vegetables from district of Kandal province in 2002-2003

Month	Percentage of supply in Kandal province							Average
	2002			2003				
	Ap	Ju	Oc	Ja	Ap	Ju	Oc	
Saang	46	47	62	31	44	32	41	43,3
Kien Svay	1	42	16	41	31	47	19	28,1
Lek Dek	46	1	14	14	12	12	20	17,0
Bakheng	2	3	4	3	5	2	2	3,0
Koh Thom	0	0	0	3	0	0	15	2,6
Mokampoul	3	1	1	2	3	2	0	1,7
Areiksat	2	0	0	0	0	2	0	0,6
Takhmao	2	3	2	0	2	1	0	1,4
Kandal stung	0	3	1	0	0	0	0	0,6
Koh Onhatei	0	0	0	3	0	0	0	0,4
Banteidek	0	0	0	0	2	0	0	0,3

Saang is the most important district in Kandal Province for vegetable supply (between 30 and 60% for all the surveyed months, 43% on average). Kien Svay is also important especially in July (42% in 2002, 47% in 2003). Lek Dek made an important share of the Province supply (46%) in April 2002.

Figure 6– Origin of different vegetables from Kandal province (2002-2003)

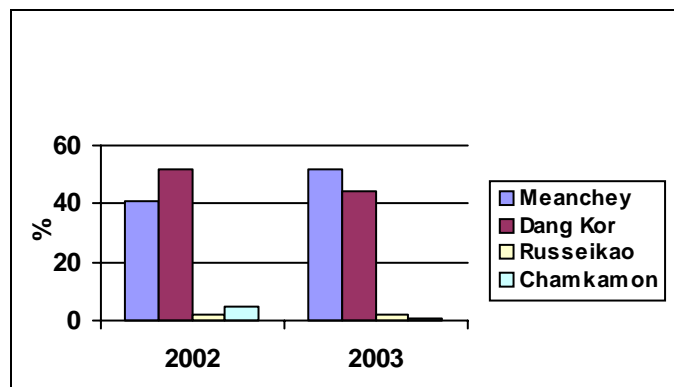
- Phnom Penh province: Dangkor, Meanchey, Russeikao, and Chamcarmon districts (by order of importance in the supply) – see Table 13 and Figure 7.

Table 13- Origin of vegetables from districts of Phnom Penh peri urban area in 2002-2003

Month	A	J	O	J	A	J	O	Average
Dang kor	75	42	51	19	63	59	38	50
Meanchey	19	46	49	71	34	39	60	45
Russeikao	6	1	0	8	3	0	0	3
Chamcarmon	0	11	0	2	0	2	2	2

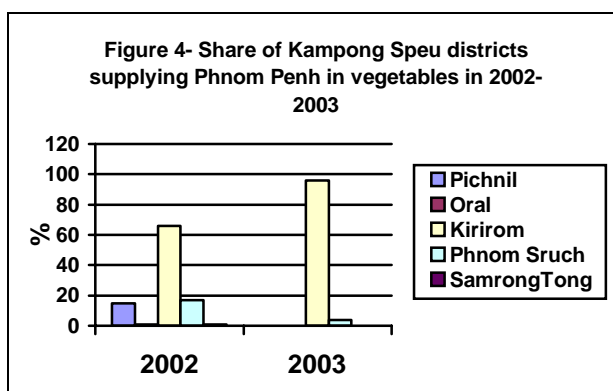
In Phnom Penh province, the most important districts in the vegetable supply are Dangkor (50%) and Meanchey (45%).

Figure 7– Origin of different vegetables from Phnom Penh (2002-2003)



- Kampong Speu province: Samrong Toung, Pichnil, Oral, Kirirom and Phnom Sruch districts (see Figure 8).

Figure 8– Origin of different vegetables from Kampong Speu (2002-2003)



- Takao province: Kirivong and Samrong districts
- Kampong Cham province: Kang Meas and Kampong Cham districts
- The vegetables from Vietnam originate from Dalat (Lam Dong province).

IV TRADERS' CHARACTERISTICS

A) Typology of traders

In the three markets we observe 4 main types of traders: producers, collectors, wholesalers and retailers.

There are two categories of producers: (a) producers bringing their personal vegetables only and selling them wholesale to collectors, wholesalers, retailers at the market (they represent 14% of producers present in the market; and (b) producers bringing their personal vegetables and buying vegetables from other farmers to the market, in this case they act as collectors : they represent 86% of producers selling in the market (including 72% whose production represent less than half of the sales, 10.5% around half, and 17.5% more than half), and are included in the category termed as “collectors” in the rest of the report.

Collectors include two categories of actors: (1) collectors moving from the village (called mobile collectors) to sell at the market. Mobile collectors buy vegetables from producers (Cambodian or Vietnamese); (2) collectors based in the market (called fixed collectors), buying from producers and mobile collectors in the market and reselling to the different types of traders in the market. Fixed collectors are less numerous than mobile collectors (they represent about 20% of the total number of collectors). Fixed and mobile collectors, resell to Phnom Penh traders and also to traders based in the provinces (mostly collectors, wholesalers and retailers). Mobile collectors can be local collectors or overseas collectors. We were not able to meet mobile collectors because: 1-they transport vegetables to Phnom Penh markets on an irregular basis; 2- they are very busy running their business; 3- they run their business mostly at night.

Wholesalers buy vegetables from producers or collectors and resell them to retailers. Retailers are located in the market, they buy vegetables from wholesalers, collectors, or producers and sell to consumers.

B) Place and time of sale

A large number of vendors sell with precarious conditions (see Table 14): 39 % of vendors sell on the ground (including mostly retailers and collectors), 28 % in shops, 18% on stalls (mostly wholesalers), 7 % from motorbike, 7 % from baskets and 1 % from a truck. Hence 46 % of vendors have fixed places while 54 % sell on the roadside, which causes difficulties in terms of hygiene and traffic.

Table 14 – Place of sale of the different actors (percentage)

	Producers	Collectors	Wholesalers	Retailers	Average
On the ground	26.2%	30.2%	36.4%	42.4%	38.6%
In shops		9.5%	41.3%	31.5%	28.3%
On table		4.8%	16.5%	22.7%	17.7%
From motorbike	50.8%	20.6%	0.8%		6.9%
From baskets	18%	27%	5%	3.4%	7.4%
From trucks	16.6%	18.5%			1.2%

- Total may exceed 100% as traders may have different places of sale-

While retailing occurs during the day until 7 p.m. at the latest, wholesale vegetable transactions take place during 24 hours, daytime and nighttime.

C) Place of origin of traders

78 % of retailers originate from Phnom Penh and 22% from Kandal, wholesalers originate from Phnom Penh (74%), Kandal (23%), and Kampong Speu (3%). Producers and collectors mostly originate from Kandal (73% and 59% respectively), the rest from Phnom Penh (22% and 39%) and from Kampong Speu (5% and 2%). Cambodian people usually run their business close from their living area.

D) Transportation used

Transport means include truck, motorbike, cyclo or motor-driven carts (see Table 15).

Table 15 – Traders' transportation means

	Producers	Collectors	Wholesalers	Retailers	Average
By motorbike	91%	68%	11%	51%	47%
By truck	6%	18%	20%		7%
By foot			5%	24%	15%
By cyclo or carts	3%	4%	25%	24%	21%
On-spot delivery		7%	40%	1%	10%

91% of producer and 68% of collectors transport vegetables from farm to Phnom Penh market by motorcycle, in general at day time, and 6% of producers and 18% of collectors use truck at nighttime. 40% of wholesalers use no transport because they are delivered on the spot and the rest uses trucks, cyclo, carts, motorbikes or feet. 51% of retailers use motorbike, these are mostly retailers of Oresei market because they have to buy vegetables from Chaba Ampou and Dumkor Market.

On the whole transport takes place by motorbike in approximately half the cases (47 %), by foot for 15 % of transactions and by truck for 7% of transactions. The rest mostly corresponds to delivery on the spot. Vegetables are mostly transported by truck from Phnom Penh markets to provinces. Transporting vegetables from one market to the other in Phnom Penh is preferentially done by motorbike and cyclo because of traffic jams and high fees for trucks.

E) Average amount of vegetables sold by each type of actor

The estimated quantities sold by the different types of actors for the eight selected vegetables are indicated in Table 16. Wholesalers sell around 200 kg/day in 2002 and 2003, while retailers sell around 15 kg/day, collectors between 300 and 360 kg/day, and producers between 150 and 210 kg/day. These figures are less than the estimation of total

quantities sold by the different actors by Mrs Sipana¹¹ - around 25% of Sipana's figures for retailers and wholesalers, as the selected vegetables only represent a part of what is sold by retailers and wholesalers.

Table 16- Quantities sold per actor for the eight selected vegetables

	Quantity sold per actor (kg)
2002	
Producers	209
Collectors	359
Wholesalers	202
Retailers	15
2003	
Producers	153
Collectors	285
Wholesalers	201
Retailers	13

F) Seasonal variations in business

As regards changes in traders' activities during the year, 67% of all sellers at the market sell all year-round, and 33% of sellers stop selling vegetables during some times of the year. This is mostly the case of producers and collectors in the rainy season: 79 % of producers, 51% of collectors; the percentages are lower for wholesalers and retailers: 23% of wholesalers and 26% of retailers. Reasons for stopping selling vegetables are low prices, slow business, lack of products to sell (see Table 17).

Table 17- Reasons for periodically stopping vegetable sales

Actors	Reasons for stopping selling (%)			
	Too low prices	Not enough products to sell	Business is slow	Other
Producers	10%	78%	4%	8%
Collectors	16%	45%	5%	34%
Wholesalers	6%	41%		53%
Retailers	9%	38%	1%	52%
Average	10%	49%	3%	38%

¹¹ Chan Sipana and Paule Moustier, Socio-economic strategies of vegetable traders in Phnom Penh. SUSPER project sery, Hanoi, p. (<http://www.avrdc.org/susper>), 45p.

The periods of sale stops are: on April, May, June, September, October and November at these periods, that is the beginning and the end of dry and wet seasons.

By contrast, the periods of big sales for traders are: January, February (Chinese New Year), April (Khmer New Year), September, October, November and December as they are times of festival (see Table 18). But for farmers, the period of September to November is a period of low sales because of the difficulties in local production. At this time of the year, producers and collectors may be involved in employment in the city, or fishing. The busiest month is November, because it is the time of festival (Water festival) and there are a lot of people coming to Phnom Penh. Wholesalers and retailers rather stop their business in January and February, at the time of big quantities of vegetables in the market, low prices, as well as festivals.

Table 18- Seasonal calendar of sales

	Dry season						Rainy season						
	N	D	J	F	M	A	M	J	J	A	S	O	
Local vegetable time		■								■			
Local vegetable scarcity	■						■					■	
Stop selling time for producers	■					■					■		
Big sale time for traders	■					■					■		

Besides this, all traders stop selling during three to seven days on February, April, September and November because it is the time of various ceremonies (Chinese New Year, Khmer New Year, Water festival ...).

V MARKETING CHAINS

A) The customers and the suppliers of the interviewed traders

The customers and suppliers of the interviewed traders are indicated in Table 20, Table 21 and Table 21.

Table 19- Customers of the interviewed traders in 2002

Actors	Customers (% of actors)				
	Retailers	Restaurants/hotels	Final consumers	Wholesalers	Others
Producers	38	4	10	26	22
Fixed collectors	30	11	12	25	22
Wholesalers	48	25	26	1	
Retailers	4	12	82	1	1
	25	15	50	5	5

Producers and collectors sell to retailers, final consumers, restaurant/hotel and wholesalers. Wholesalers sell to retailers, restaurant or hotel owners. Producers, collectors and wholesalers usually sell vegetables wholesale but they also sell some vegetables retail (to final consumers) when they have a little vegetables left, or, in the case of producers, when they produce and sell small quantities (this is the case of farmers in Phnom Penh districts).

Collectors are supplied by producers mostly and by other collectors; wholesalers are supplied by mobile collectors mostly and by producers; retailers are supplied by wholesalers mostly, and also by fixed collectors and producers.

Table 20- Suppliers of the interviewed traders in 2002

	Producers	Collectors	Wholesalers
Collectors	93%	7%	
Wholesalers	28%	72%	
Retailers	18%	22%	60%

Table 21- Suppliers of the interviewed traders in 2003

	Producers	Collectors	Wholesalers
Collectors	99%	1%	
Wholesalers	35%	65%	
Retailers	18%	32%	50%

Around 60% (in 2002) and 71% (in 2003) of wholesalers sell only imported vegetables and 40% (in 2002) and 29% (in 2003) of them sell local and imported vegetables. For local products, the orders are made by direct contacts; phone calls are rare because collectors bring products directly to their customers (wholesalers or retailers), mostly during the night. The relation between Cambodian wholesalers and Vietnamese suppliers is made through orders, directly through Vietnamese collectors present in the market or by orders by phone call, after that, goods are transported in two days.

The share of imported versus local products depends on the availability of Cambodian products, the Cambodian generally like eating local vegetables rather than imported ones because they think the local vegetables are fresh, have low price, have the reputation not to contain a lot of chemicals¹². When the local vegetables are abundant the imported vegetables tend to decrease.

Details on nature of suppliers and purchasers for tomato and water convolvulus are provided in the following section.

B) Organisation of marketing chains

1. For the eight selected vegetables

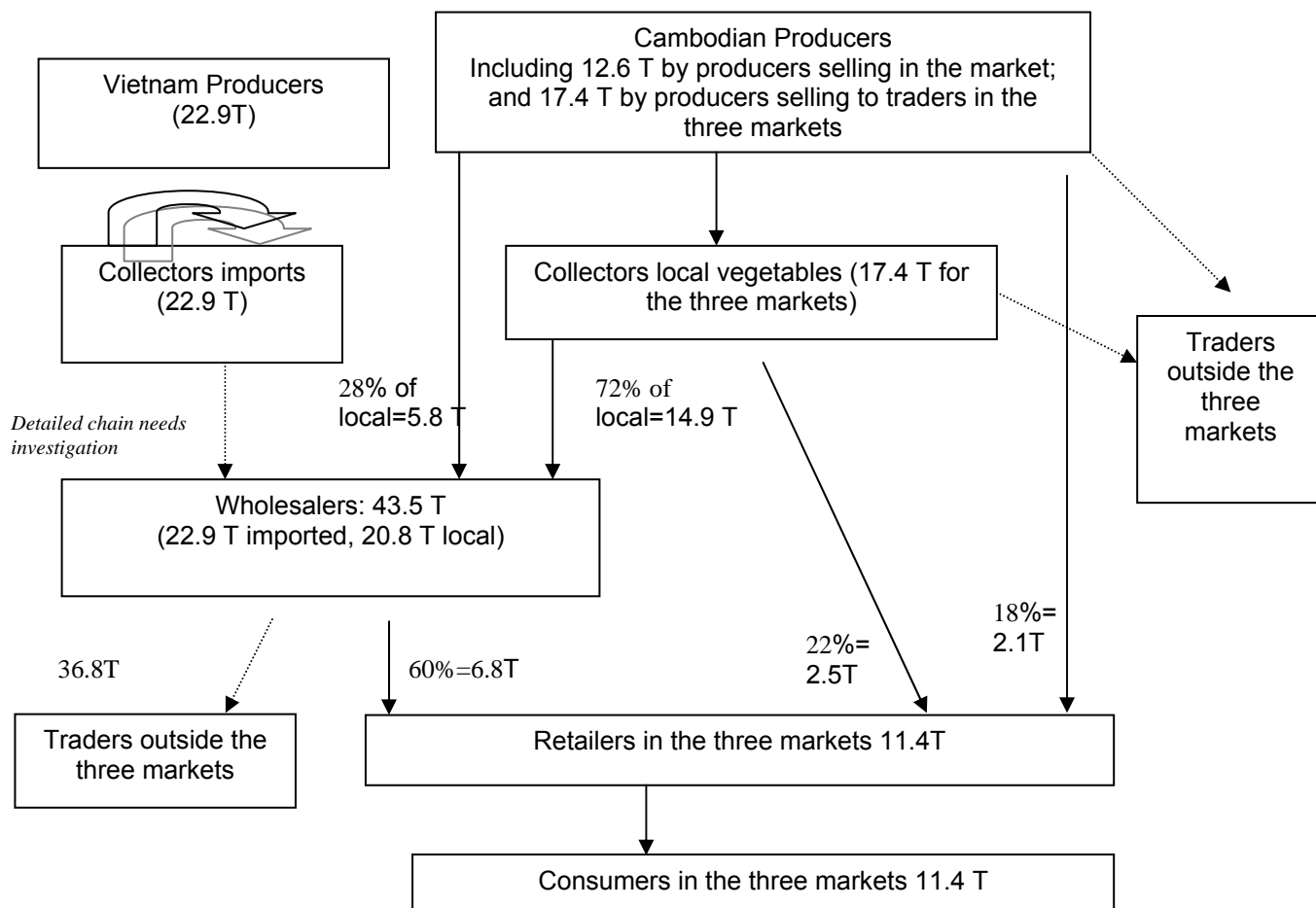
The share of the different types of suppliers for different actors (as a % of quantities) is indicated in Table 22, Figure 9 and Figure 10.

Table 22-Share of the different types of suppliers for different actors (as a % of quantities)

	From wholesalers	From producers	From collectors of local products	From collectors of imports	Total
2002					
Producers at the market					12,6T
Collectors		93% (11,4T)		7% (0,9T)	12 ,3T
Wholesalers (local vegetables)		28% (5,8T)	72% (14,9 T)		20,7 T
Wholesalers (imported vegetables)				100% (22,9 T)	22,9 T
Retailers	60% (6,8T)	18% (2 T)	22% (2,5T)		11,4 T
2003					
Producers at the market					15,9 T
Collectors		99% (24,9 T)		1% (1,2T)	25,1 T
Wholesalers (local vegetables)		35% (4,5 T)		65% (8,4 T)	12,9 T
Wholesalers (imported vegetables)				100%	32 T
Retailers	50% (4,3 T)	18% (1,6 T)	32% (2,8 T)		8,7 T

¹² See Chan Sipana and Paule Moustier. Socio-economic strategies of vegetable traders in Phnom Penh. SUSPER project sery, Hanoi, RIFAV.

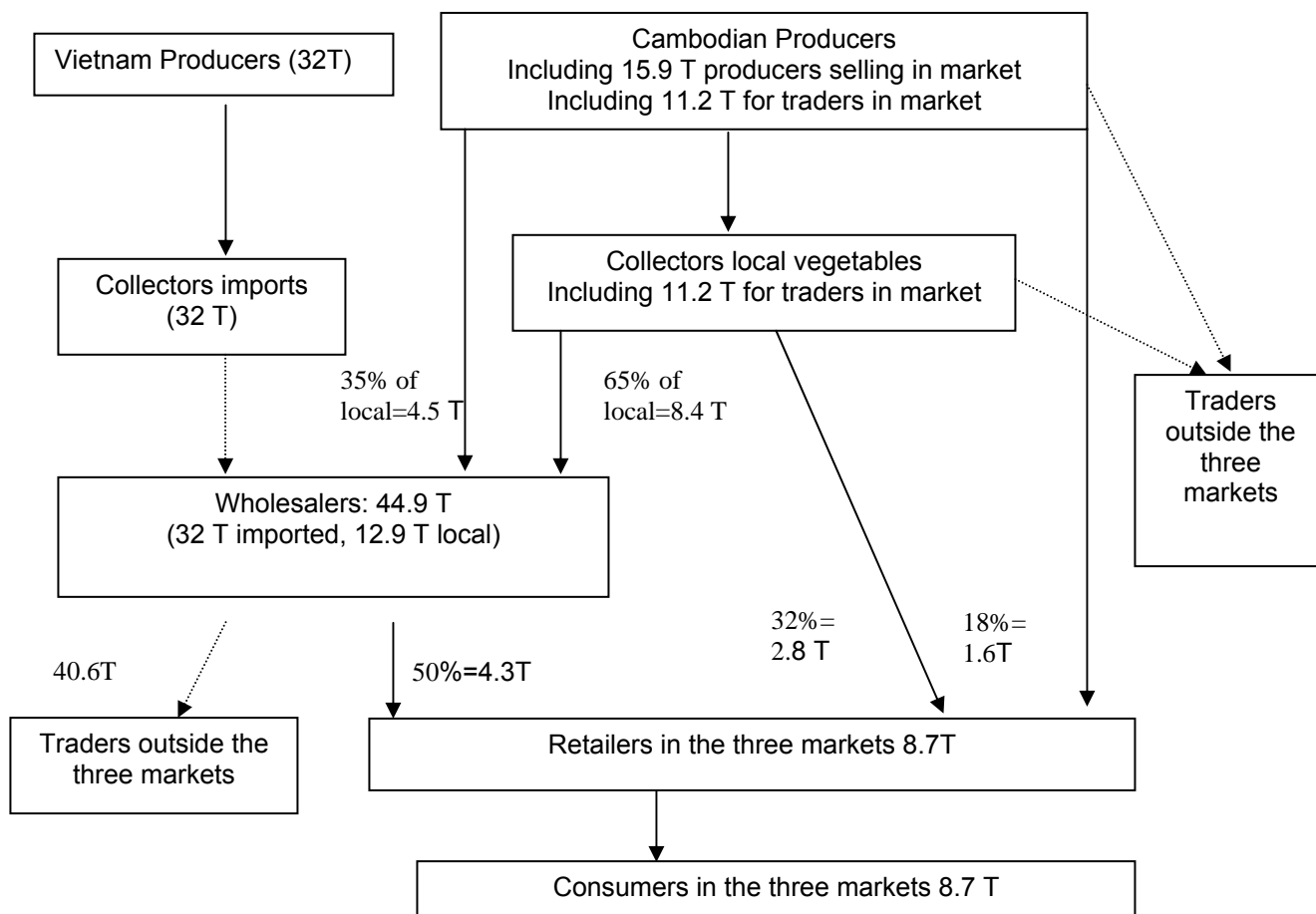
Figure 9- Marketing chains for the 8 selected vegetables in 2002



- Percentages correspond to the supply of the actor purchasing the product –

The typical chain involves retailers being supplied by collectors for local vegetables, and by wholesalers for imports.

Figure 10- Marketing chains for 8 selected vegetables in 2003



2. For tomato

Most tomato goes through collectors and wholesalers before reaching the retail stage in Phnom Penh (see Table 23, Figure 11, Figure 12). Wholesalers are nearly entirely supplied by trans-border collectors. Cambodian production is mostly traded directly from farmers to retailers, or from collectors to retailers. In 2003, the percentage of wholesalers getting their supply from Cambodian producers is higher than in 2002; the percentage of retailers getting their supply from Cambodian producers and collectors is also higher.

Table 23-Share of the different types of suppliers for different tomato sellers (as a % of quantities)

	From wholesalers	From producers	From collectors	Total
2002				
Producers at the market				0,05 T
Collectors				
Wholesalers (imports)			7,18 T	7,18 T
Wholesalers (local)		2%	98% (0,28T)	0,28 T
Retailers	91% (0,86T)	7% (0,06T)	2% (0,02T)	0,94 T
2003				
Producers at the market				0,7 T
Collectors				
Wholesalers (local)		9% (0,08T)	91% (0,77T)	0,85 T
Wholesalers (imports)			4,6 T	4,6 T
Retailers	61% (0,68T)	25% (0,28 T)	14% (0,16T)	1,12 T

Figure 11 - Marketing chain of tomato in 2002

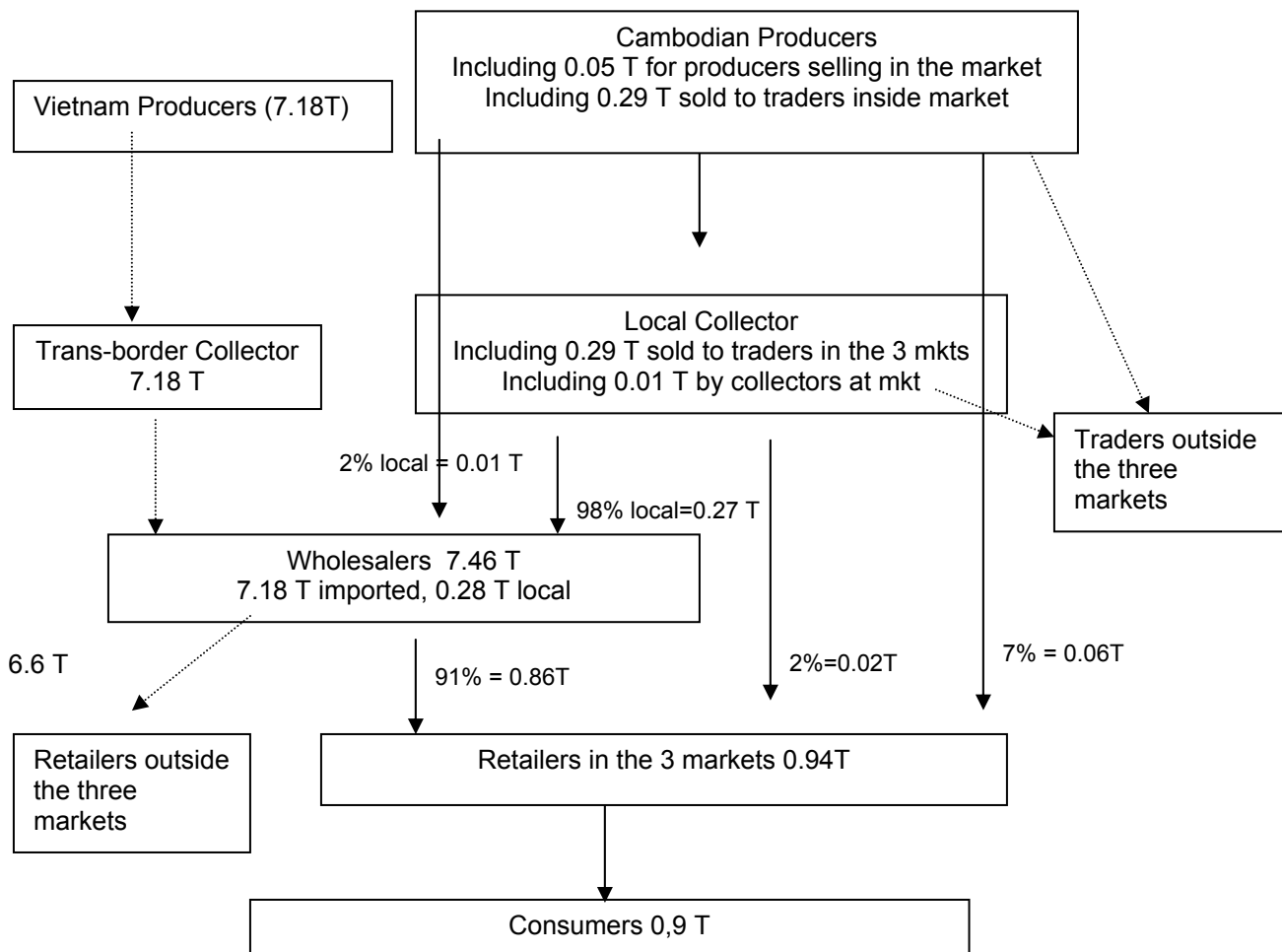
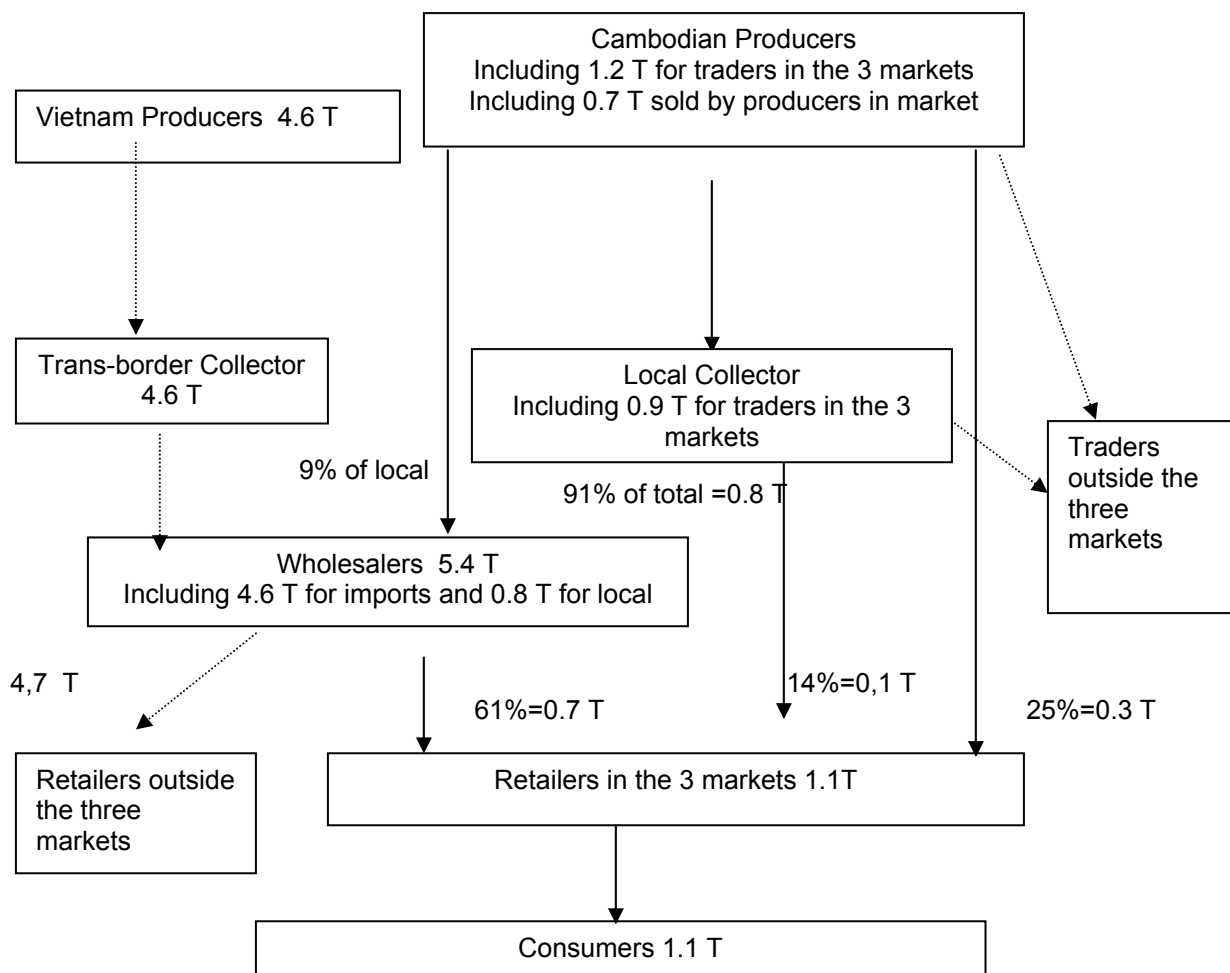


Figure 12-Marketing chain of tomato in 2003

3. For kangkong

For kangkong, which is produced in Phnom Penh province, retailers are mostly supplied directly from producers, and also from wholesalers, themselves supplied by wholesalers or collectors (see Table 24 and Figure 13– Marketing chains of kang kong for the three periods in 2002).

Table 24 -Share of the different types of suppliers for different actors (as a % of quantities)

	From wholesalers	From producers	From collectors	Total
2002				
Producers at the market				0.8 T
Collectors at market				1.4 T
Wholesalers		63% (0.8T)	37% (1.4 T)	2 T
Retailers	17% (0.66T)	57% (2.22 T)	26% (1.01 T)	3.9 T
2003				
Producers at the market				1,2 T
Collectors at market				1.4 T
Wholesalers		82% (1.3T)	18% (0.3 T)	1.6 T
Retailers	29% (0.5T)	58% (1 T)	13% (0.2T)	1.7 T

Figure 13– Marketing chains of kang kong for the three periods in 2002

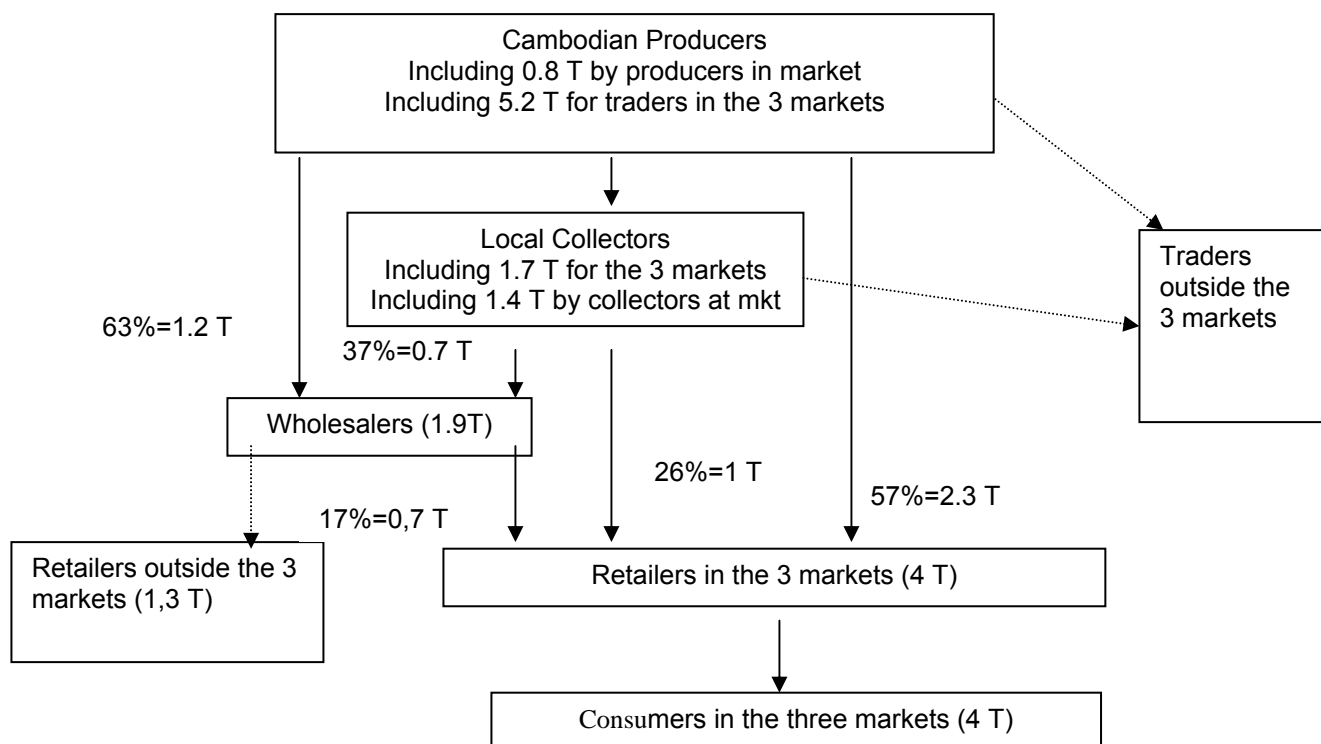
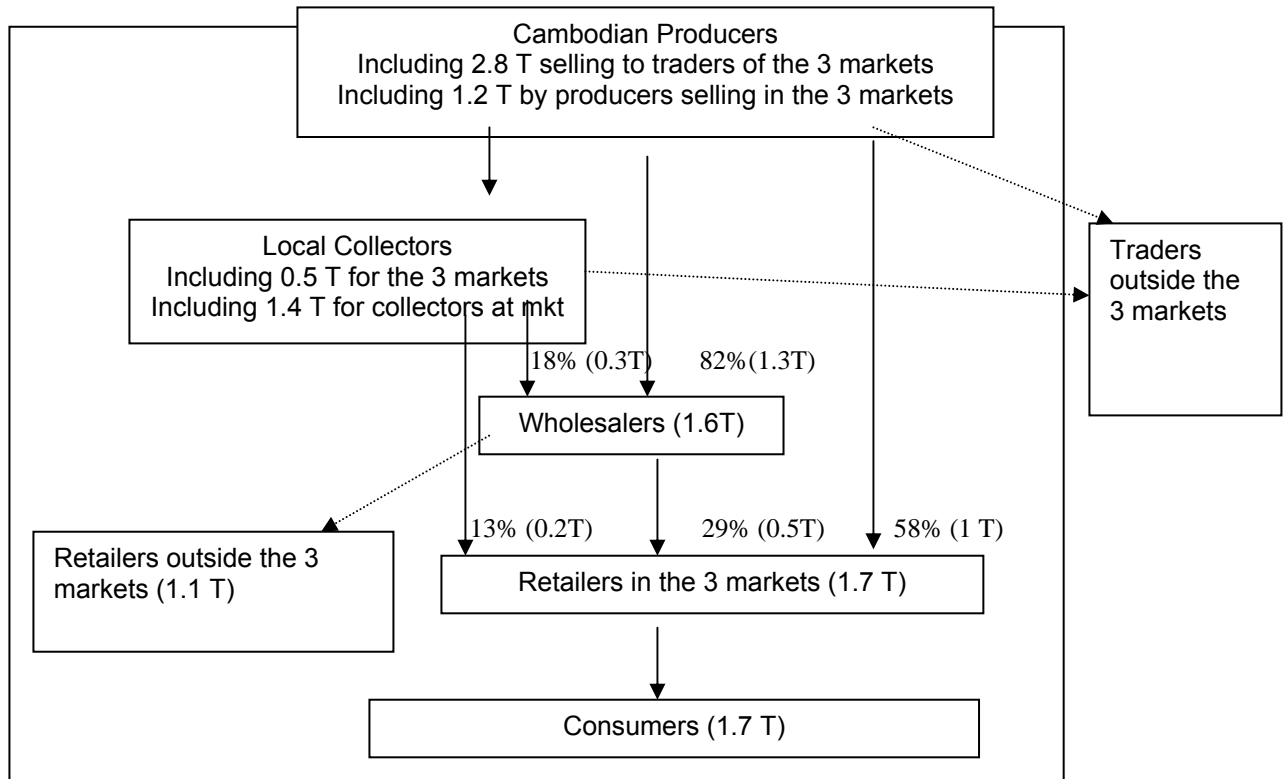


Figure 14– Marketing chains of kang kong in 2003

VI RETAIL PRICES IN 2003

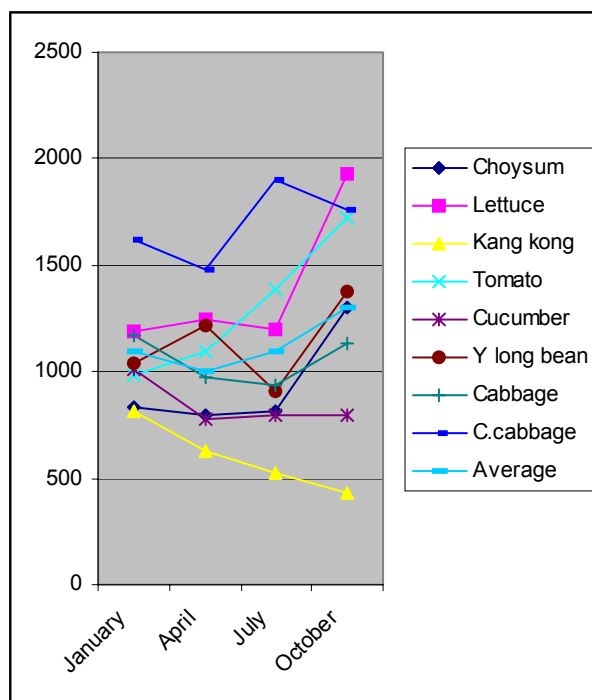
In 2003, the retail prices were collected for the eight selected vegetables. The price variations are presented in Table 25 and Figure 15– Retail prices in 2003¹³.

Table 25 -Resale prices of vegetables in 2003

	Average resale price of vegetables in Riel/kg				
	January	April	July	October	Average
Choysum	830	800	810	1300	940
Lettuce	1190	1250	1200	1930	1390
Kang kong	810	630	520	430	590
Tomato	980	1100	1390	1720	1300
Cucumber	1010	780	800	800	800
Y long bean	1040	1220	910	1380	1140
Cabbage	1170	970	940	1130	1050
C.cabbage	1620	1480	1900	1760	1690
Average	1100	1000	1100	1300	1100

¹³ Comparing with the price data collected by ministry of agriculture shows some slight differences which may be due in differences in the type or quality of vegetable considered.

Figure 15– Retail prices in 2003



Choysum, lettuce, tomato and yard long bean have their highest prices in October (middle of the rainy season): the difference between the October price and the average price is 40% for choysum and lettuce, 30% for tomato, 20% for yard long bean. October is also the time of the lowest quantities available in the market, except for lettuce (see Figure). Kangkong has its lowest price in October (30% less than average), and its highest price in January (35% more than on average) this is the time if the lowest quantities for this vegetable. January (middle of dry season) is the time of lowest price for lettuce (15% less than average) and tomato (25% less than average) – this is the time of the highest available quantities for these vegetables (see Figure 2 and Figure 5). The most stable prices are observed for cucumber, cabbage and Chinese cabbage, which are the vegetables which are traded in the biggest quantities.

As for the comparison between local and imported vegetables, we were not able to do it for a representative sample of traders, but we could compare them for around 10 traders: it gives a difference of 30% for tomato and cabbage (lower price for local tomato), and of 20% for Chinese cabbage (lower price for local product).

VII CONCLUSION

A) The importance of imports

The origin of vegetable in Phnom Penh is from Vietnam and Cambodia provinces. The provinces supplying vegetables to Phnom Penh markets are Kandal, Phnom Penh, Kampong Speu, Takao, Kampong Cham and Kampong Chhnang. In 2002 and 2003, 4 vegetables were imported from Vietnam: tomato, cabbage, Chinese cabbage and cucumber, during all seasons (except for cucumber, which is present at the beginning and at the end of the year in small quantities). Tomato, cabbage and Chinese cabbage are imported at more than 90% at almost all periods of survey (a conspicuous exception is January 2003 where imports only represented 25% of the supply due to favorable climatic conditions). Imports represent a large, if not dominant share of the vegetable supply (41% in 2002 and 37% in 2003).

B) Importance of Kandal province in the supply of local products

The study indicates Kandal is most important Cambodian area supplying vegetables to Phnom Penh: in 2002 Kandal province represents about 40% of the supply; in 2003, 50%. All year-round, it supplies a diversity of vegetables to Phnom Penh markets, but with some changes according to the season. The most important supplying district of Kandal province is Saang, about 30 km south of Phnom Penh, which produces all kind the studied vegetables. It represents about 48% in 2002 and 41% in 2003 of Kandal supply.

C) The importance of Phnom Penh municipality for kangkong

Kangkong, which is a vegetable important in the consumption of the poor is entirely supplied by Phnom Penh municipality (Dangkor and Meanchey districts). This point should be taken into account in the urban planning of Phnom Penh. The potential safety risks of kangkong grown in polluted water should also be investigated.

D) Possibilities for local production to substitute for imports

Presently, Cambodia farmers face a lot of difficulties relative two main problems: (1) water constraints to produce vegetables in the dry and in the rainy season, some areas have not enough water and some are flooded and (2) the market problem: among the traders in the wholesale and retail markets, only 14% are producers. Most producers sell the products in their village at low prices, as they get more than 60% of marketing margin when they sell in the markets, but only 42% when they sell in the village (data originating from Agrisud, 2000, rapport de l'observatoire économique, Phnom Penh, Agrisud office).

The classical result that the longest the distance between production area and the market, the more numerous the intermediaries is shown by the survey results : more than half retailers get kangkong directly from producers, as this vegetable is produced around Phnom Penh, while vegetables from Kandal and Vietnam usually go through collectors and wholesalers (and the wholesaler's stage is more frequent in the case of vegetables from Vietnam than in the case of vegetables from Kandal, which may go directly from collectors

or producers to retailers). Wholesalers may be supplied with imported vegetables or with local vegetables according to their respective availability: it is conspicuous that in January 2003, tomato imports dropped to 25% of the total supply thanks to favourable climatic conditions. Hence there is some margin of manoeuvre for local production to substitute for imports if the water availability is improved during the dry season and if innovations are promoted to grow tomato, cabbage and Chinese cabbage in the rainy season.

E) Additional data required

The trends in the quantities and prices of vegetables are quite irregular, as they are influenced by supply as well as demand factors; data on quantities in the market should be combined with data on local production and data on consumption, at regular periods (ideally, on a monthly basis), in order to better appraise the times of deficits and surplus of local production. Surveys on consumption would also help to estimate what the data collected on the three markets represent relative to total consumption (including purchases and self-consumption).

The flows of products from Phnom Penh markets to other markets, located outside Phnom Penh provinces, should also be measured.

Finally, a thorough analysis of selected commodity chains, in terms of quantities, price and income deconstruction, from farmers to consumers, should be carried out to better appraise the competitiveness of local commodity chains respective to Vietnam ones : at the moment our surveys have focused in Phnom Penh markets, where we could not interview most of collectors and farmers.

Appendix 1 – Questionnaire

1 Date /...../...../...../
 2 Hour: /...../...../...../
 3 Identification number: /...../...../...../
 4 Name of the market:

5 Type of merchant: Producer Collector Wholesaler Retailer

6 If the trader is also the producer, what share of products comes from his farm?

Less than one half One half More than one half

7 Type of location:

On the ground In a shop From a truck

On a table From a motorcycle From baskets

8 How many vegetables do you sell this season? Where do they come from?

	Vegetables	Quantity(kg/day)		Frequency	Area of production		Supplier	Place of purchase	
		Min	Max		Province	District		market	on farm
#1	Tomato								
#2	Cabbage								
#3	Choysum								
#4	Chinese cabbage								
#5	Lettuce								
#6	Cucumber								
#7	Yard long bean								
#8	Kang kong								

9 Are there some changes in your sources of supply the rest of the year?

	Vegetables	Quantity		Frequency	Area of production		Supplier	Place of purchase	
		Minimum	Maximum		Province	District		Market	On farm
#1	Tomato								
#2	Cabbage								
#3	Choysum								
#4	Chinese cabbage								
#5	Lettuce								
#6	Cucumber								
#7	Yard long bean								
#8	Kang kong								

10 Who are your customers?

Wholesaler Retailer Restaurant Final consumer Other (detail)

11 How do you transport the produce to the market?

By bicycle By truck No transport (delivery on the spot)

By motorcycle By foot Other

12 Do you ever stop selling vegetables?

Yes No

13 If yes why so?

The prices are too low I have problems storing vegetables Business is slow

I do not have enough products to sell I have too much work at the farm Other (detail)

14 When does this happen?

.....to.....

15 When do you sell most?

.....to

Remarks concerning the questions.....

Appendix 2 – Survey sample

Table 1– Size of market population and sample size (April 2002)

	Producers	Collectors	Wholesalers	Retailers	Total
Total number	47	39	241	575	902
Sample number	23	19	53	113	208
Percentage	49%	49%	22%	20%	23%

Table 2– Size of population of the three markets and sample size (July 2002)

	Producers	Collectors	Wholesalers	Retailers	Total
Total number	48	56	188	1207	1499
Sample number	20	20	45	126	211
Percentage	42%	36%	24%	10%	14%

Table 3 – Size of market population and sample size (October 2002)

	Producers	Collectors	Wholesalers	Retailers	Total
Total number	54	49	203	643	949
Sample number	20	20	53	136	229
Percentage	37%	41%	26%	21%	24%

Table 4 – Size of market population and sample size (total for the three surveys 2002)

	Producers	Collectors	Wholesalers	Retailers	Total
Total number	149	144	632	2425	3350
Sample number	63	59	151	375	648
Percentage	42%	41%	24%	15%	19%
Average total number	50	48	211	808	
Average sample number	21	20	50	125	

Table 5– Size of population of the three markets and sample size (January 2003)

	Producers	Collectors	Wholesalers	Retailers	Total
Total number	95	84	239	847	1265
Sample number	41	40	54	174	309
Percentage	43 %	48%	23%	20%	24%

Table 6– Size of market population and sample size (April 2003)

	Producers	Collectors	Wholesalers	Retailers	Total
Total number	79	89	217	713	1098
Sample number	35	38	53	152	278
Percentage	44%	43%	24%	21%	25%

Table 7 – Size of market population and sample size (July 2003)

	Producers	Collectors	Wholesalers	Retailers	Total
Total number	95	107	208	611	1021
Sample number	37	38	49	133	257
Percentage	39%	35%	24%	22%	25%

Table 8 – Size of market population and sample size (October 2003)

	Producers	Collectors	Wholesalers	Retailers	Total
Total number	111	97	192	646	1046
Sample number	37	35	48	144	264
Percentage	33%	36%	25%	22%	25%

Table 9 – Size of market population and sample size (total for the three surveys 2003)

	Producers	Collectors	Wholesalers	Retailers	Total
Total number	380	373	856	2855	4430
Sample number	150	149	195	574	1108
Percentage	39%	40%	23%	20%	25%
Average total number	95	94	214	704	
Average sample number	37	38	51	151	