

# **CHAPTER 1**

## **INTRODUCTION**

# CHAPTER 1

## INTRODUCTION

### 1.1 BACKGROUND

The transport infrastructure in the Kingdom of Cambodia is in a serious state of disrepair. In particular, the Phnom Penh metropolitan area, as the capital city of the kingdom, is experiencing serious transport problems caused by inadequate transport facilities and management system set against a background of rapid growth of population and socio-economic activities. This growth is causing a sprawling phenomenon especially in the newly developing zones surrounding the built-up area.

Recently, the population of Phnom Penh has reached nearly one million under stable domestic conditions following the end of the civil war in 1992. The urbanized area of the capital city, which is about 290 square kilometers, has rapidly expanded to the surrounding areas. Additionally, motor vehicles show a remarkable increase in terms of the number of registered vehicles with a total of approximately 295,000 motorized vehicles of which 247,000 are motorcycles, and 48,000 are passenger cars.

Linked with international routes No. 1 and No. 11 of the Asian Highway Network, Phnom Penh has historically been the core city of land transportation in the area. At present, the poor and deteriorated road network is causing an increase of traffic concentration in the urbanized areas of the city. This network is by far insufficient and is expected to contribute to the appearance of informal activities and slums in the city. The traffic congestion also adversely affects the living environment of the city with increased emission of noxious gases and noise.

The traffic flows concentrate into the built-up area and traffic congestion occurs on the arterial roads during morning and evening peak hours. Traffic management facilities such as traffic signals, signs and road markings are nearly non-existent. These poor management conditions coupled with shortage of traffic safety facilities and traffic safety education contribute to an increase in traffic accidents. In addition, most of the public transport is served by motorcycle-taxi (motodop), and ordinary bus services are operated under quite restricted conditions. The facilities of public transport are deteriorated due to poor management and maintenance as well as inadequate improvement.

It can be stated that the transportation system of Phnom Penh metropolitan area is lacking proper planning as well as facilities and it depends comprehensively on motorcycles as the most predominant mode for transportation. With the rapid growth in population, urbanization and motorization in the city, the problem of traffic congestion has imposed itself to be a major issue for concerned authorities. These concerned authorities have decided that in order to solve the transport problems, a comprehensive master plan covering the areas of road network improvement, public transport and traffic management should be developed with a time horizon of 2015.

In lieu of the situation described above, the Government of the Kingdom of Cambodia requested the Government of Japan to conduct a study on the urban transport master plan in May 1997.

In response to this request of the Government of the Kingdom of Cambodia, the Government of Japan has decided to conduct “the Study on the Transport Master Plan of the Phnom Penh Metropolitan Area in the Kingdom of Cambodia” (hereinafter referred to as the Study), in accordance with the relevant laws and regulations in force in Japan.

The Government of Japan has entrusted the Study to the Japan International Cooperation Agency (JICA), the official agency responsible for the implementation of technical cooperation programs of the Government of Japan, to undertake it in close cooperation with the authorities concerned of the Government of Cambodia. JICA has organized and dispatched a Study Team consisting of the experts of Katahira & Engineers International to Cambodia to commence the study in April 2000. The Final

Report is submitted to the Government of Cambodia in November 2001.

The formulated urban transport master plan is composed of a road network plan, traffic management plan, public transport plan and initial environmental examination on both social and natural impacts of project implementation. It also includes plans for institutional strengthening including organizational responsibilities, funding sources and regulatory framework, as well as a staged implementation plan. During the Master Plan stage, high priority projects were selected from the urgent projects proposed to be implemented in the first 5-year term. Such projects include a bus service implementation project, a traffic control project and an urban street improvement project, on which feasibility studies were conducted.

Other activities of the Study include a Traffic Campaign that was carried out, in the period from January 27 to February 4, 2001, for the purpose of education in traffic safety knowledge and principals as well as traffic rules and manners for the citizens and vehicle drivers. In addition, a public experiment for bus services was carried out during the month of June 2001. For this public experiment, the following preparatory works were executed:

- Pavement rehabilitation/improvement of two (2) collector streets
- Installation of bus stops along public bus experiment routes.

Technology transfer to the Cambodian Counterpart Team, as one of the objectives of the Study, was sought in every aspect of the Study. The main subjects of the training given include the following:

- Traffic modeling and assignment using the JICA STRADA Program
- Planning and implementation of traffic campaign
- Planning and implementation of public experiment
- Road, public transport and traffic management planning
- Procedures and components of feasibility studies
- Computer skills, especially concerning Excel and AutoCAD operation

As a part of the effort of technology transfer, two separate counterpart training sessions in Japan were conducted; one in September-November, 2000 and another in September 2001. Total two (2) persons (one for each course) of the counterpart were selected and participated in these training sessions.

The Study covers the Municipality of Phnom Penh and adjoining area surrounded by the proposed outer ring road. The Flow Chart of the Study is presented in Figure 1.1-1.

## **1.2 OBJECTIVES**

The objectives of the Study are:

1. To formulate an Urban Transport Master Plan for the Municipality of Phnom Penh to the year 2015, in order to solve various transport problems and to support sustainable urban development;
2. To conduct Feasibility Studies for priority projects identified under the Master Plan; and
3. To carry out technology transfer to the Cambodian counterpart personnel through the implementation of the Study.

## **1.3 ORGANIZATION OF THE STUDY**

The Steering Committee, which was established by the Municipality of Phnom Penh to discuss major polices on the Study with the Study Team, consists of the following members:

H.E. Chea Sophara	Governor, Municipality of Phnom Penh (MPP)	Chairperson
H.E. Chev Kim Heng	Vice Governor, MPP	Vice Chairperson

H.E. Trac Thai Sieng	Vice Governor, MPP	Vice Chairperson
Mr. Tiv Kimpiseth	Deputy Chief of Cabinet, MPP	Member
Mr. Nhem Saran	Director, Dept of Public Works and Transport, MPP	Member
Mr. Nget Chaddaoy	Director, Dept. of Economics and Finance, MPP	Member
Mdm. Mom Sadap	Director, Dept. of Planning, MPP	Member
Mr. Chiep Sivorn	Director, Dept of Environment, MPP	Member
Mr. Chhay Rithisen	Director, Bureau of Urban Affairs, MPP	Member
Mr. Sin Sok	Director, Dept. of Land Management, Urban Planning and Construction, MPP	Member
Mr. Sun Seng Huot	Director, Dept. of Industry, MPP	Member
Dr. Yit Bunna	Director, Public Works Research Center, Ministry of Public Works and Transport	Member
Mr. Sreng Heang	Dept. of Investment, Ministry of Economy and Finance	Member
Mdm. Heng Sokun	Director, Council for the Development of Cambodia	Member
Mr. Kim Vathana Sopaorn		
	Representative of Ministry of Interior	Member
Mr. Hok Pengser	Representative of Council of Ministers	Member
Mr. Hus Sereithung	Representative of Ministry of Foreign Affairs	Member
Mr. Pao Chhieng An	Representative of Ministry of Water Resources and River Meteorology	Member
Mr. Khieu Muth	Director General., Ministry of Environment	Member
Mr. Oum Borith	Director General., Ministry of Land Use, Cadastre and Construction	Member
Mr. Em Bun Thoeum	Director, Dept. of Engineering, Ministry of Water Resources and Meteorology	Member
Mr. Nak Tanavuth	Director, Bureau of International Relations, MPP	Member
Mr. Sar Nal	Chief of Road, Central Region, MPP	Secretary

The Counterpart Team was formed to assist the Study Team as well as to play a role of the direct recipient of the technology transfer that are coordinated by executive officers in DPWT.

The Coordinators consist of the following executive officers:

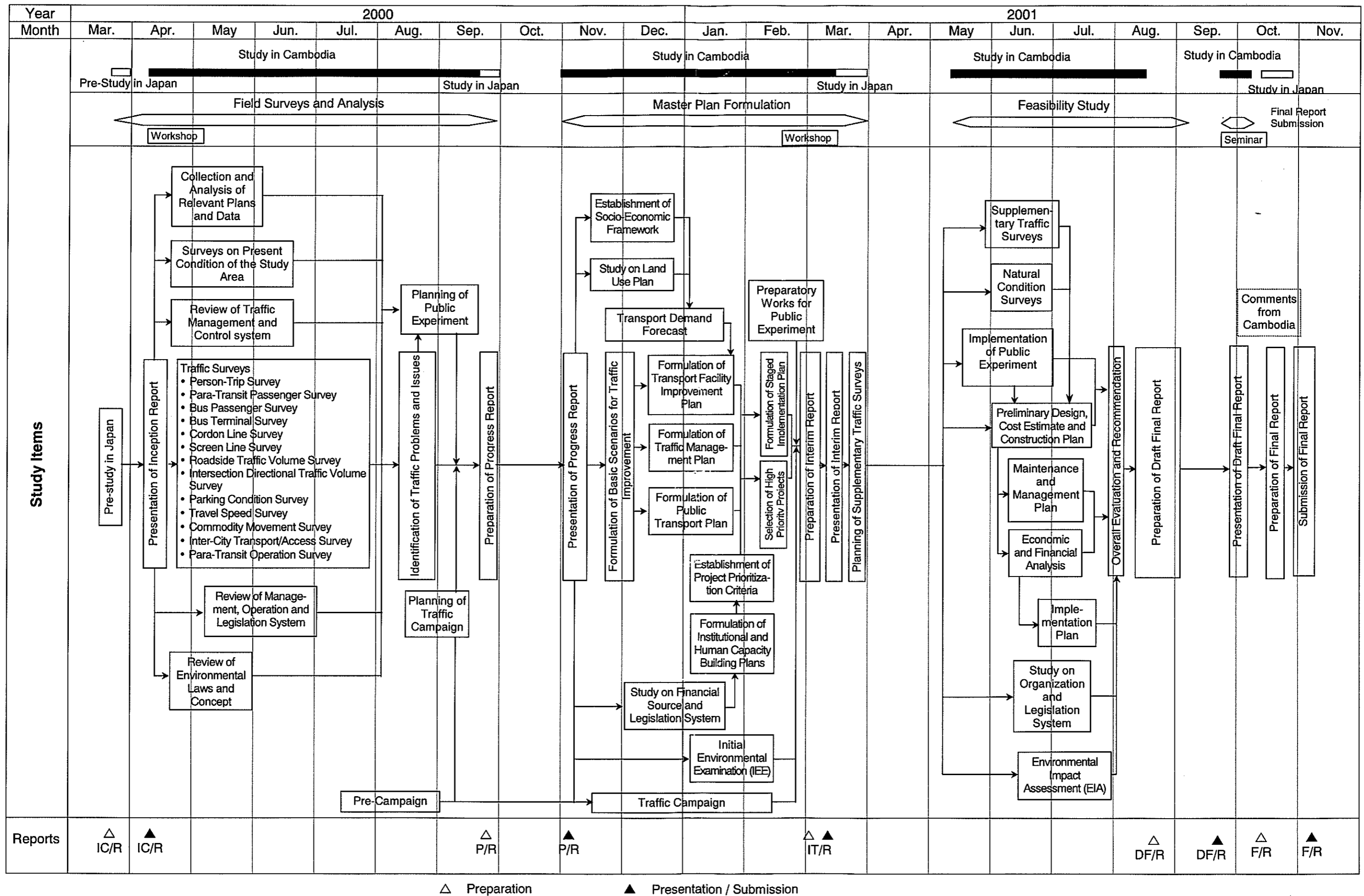
Mr. EAN Narin	Deputy Director, Department of Public Works and Transport, MPP
Mr. MOEUNG Sophan	Chief, International Relation and Public Works Office, DPWT, MPP

The Counterpart Team consists of the following members:

Mr. Heng Nguon	Chief, Road and Bridge Section, DPWT, MPP
Mr. Top Sovannarith	Staff, Technical Office, DPWT, MPP
Mr. Chea Vantha	Staff, Technical Office, DPWT, MPP
Mr. Khun Sovannarith	Staff, Road and Bridge Section, DPWT, MPP
Mr. Ou Thonsal	Staff, Road and Bridge Section, DPWT, MPP
Mr. Lauv Nicovathana	Staff, Road and Bridge Section, DPWT, MPP
Mr. Im Vibol	Staff, Technical Office, DPWT, MPP

The JICA Study Team is composed of the following experts:

Mr. BEKKI Tsuneo	Team Leader
Dr. RYU Yoshiko	Deputy Team Leader/Urban Planner
Mr. KURAUCHI Katsumi	Deputy Team Leader/Urban Planner
Mr. SAWANO Kunihiko	Deputy Team Leader/Urban Planner
Mr. SAKURAI Tatsuyuki	Deputy Team Leader/Road Planner
Mr. KOTO Masato	Public Transport Planner
Mr. ISOMOTO Kenji	Traffic Survey/Forecast Expert
Mr. CHIDA Nobutsugu	Facility Design/Cost Estimate Expert
Mr. TAKARA Shigeru	Facility Design/Cost Estimate Expert
Mr. YUMITA Kazuo	Transport Economist
Mr. NABESHIMA Yasuo	Traffic Management Planner
Dr. ABDEL-HALIM Hani	Environment Planner
Mr. KOKUBO Shin	Implementation/Operation Planner
Mr. NISHIDA Takashi	Institution/Organization/Legislation Expert
Mr. YASHIRO Shuichi	Traffic Survey/Forecast Expert



△ Preparation      ▲ Presentation / Submission

Figure 1.1-1 Study Flow Diagram

Guidance for the Study is realized through JICA Advisory Committee consisting of the following Japanese Government Officials:

Prof. Dr. YAI Tetsuo	Chairman, JICA Advisory Committee Tokyo Institute of Technology
Mr. KONO Toshiro	Urban Transport Planner, JICA Advisory Committee Ministry of Transport, Land and Infrastructure
Mr. HIMUKAI Hiromoto	Public Transport Planner, JICA Advisory Committee Ministry of Transport, Land and Infrastructure

The Organization Chart of the Study is presented in Figure 1.3-1.

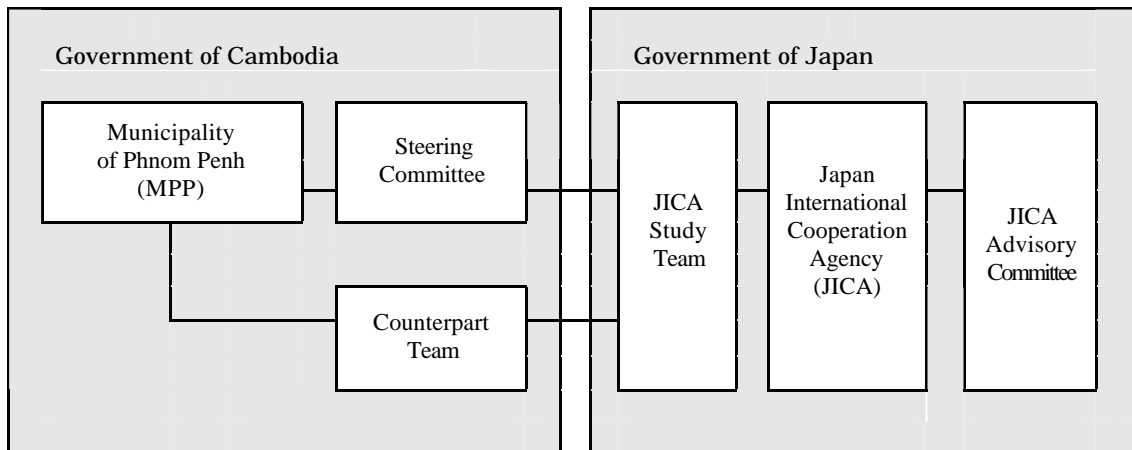


Figure 1.3-1 Organization Chart

*PART I*

*PRESENT SITUATION*

## **CHAPTER 2**

# **RELEVANT DEVELOPMENT STUDIES AND PLANS**



## CHAPTER 2

### RELEVANT DEVELOPMENT STUDIES AND PLANS

A transport master plan needs to be formulated based on a clear picture of traffic situation. A clear picture of traffic situation, in turn, needs to be drawn up based on such socioeconomic data as magnitude and distribution of population, magnitudes and types and distribution of industries and income level. A transport master plan of a city or region also needs to be in conformity with the development plans of higher level such as national development plan, national transport master plan and national master plans for the subsectors of transport. In case of this study, however, some of the desired information such as national transport master plan, master plans for the subsectors of transport and national development plan were not available. This chapter describes the main relevant development plans and studies that have been available to the Study Team for its review<sup>1</sup>.

#### 2.1 SOCIOECONOMIC DEVELOPMENT

Data of socioeconomic development are particularly important to establish future socioeconomic framework, which, in turn, is necessary to establish basic conditions/assumptions for the traffic demand forecast. It is also expected that the perspective of the Government on the fund/budget for the development of transport be shown in the economic development plans.

- (1) First Socioeconomic Development Plan (SEDP) 1996 – 2000, Ministry of Planning, February 1996

This is the first five-year plan which was prepared within the context of a market-oriented economy which establishes the framework for the medium-term development of the country of both the broad macroeconomic objectives and the specific, but interdependent, sectoral strategies and policies. The plan consists of the following three parts:

- Part 1: analyses the present status of key issues and sets out their long-term development objectives and strategies. The issues covered in this part are; poverty reduction and human resources development, employment generation through private sector, increasing domestic self-reliance, strengthening of absorptive capacity and regional cooperation.
- Part 2: reviews recent macroeconomic progress to provide the context and the framework for the public investment program for 1996 to 2000 and indicate domestic and external financing requirements.
- Part 3: states sectoral strategies with proposed sectoral development programs. The sectors covered in this part are; agriculture, manufacturing and mining, tourism, transport and communications, water and electricity, education, health, and culture, religious affairs and information.

SEDP specifies Phnom Penh and Sihanoukville as “Growth Centers”, and states that “export processing zones” and “dry port” be developed in Phnom Penh, while harbor facilities be developed in Sihanoukville.

As for the road subsector, it estimates that a total of US\$264million is required to be invested on rehabilitation/reconstruction of the National Roads, bridges, and ferries. SEDP estimates that US\$10 million, spread over the period of 1996 ~ 1999, is required to be invested in the

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<sup>1</sup> Many useful information and data were provided to the Study Team by the relevant agencies throughout the Study. These information/data are referred to in the pertinent sections of this report but not necessarily listed in this Chapter.

rehabilitation of the urban streets in Phnom Penh. As for inland waterways, SEDP allocates US\$ 15 million for upgrading of Phnom Penh Port. In the area of railroads, SEDP addresses the national, or entire railroad system and does not specifically focus on the railroads in Phnom Penh area. As for the airport, it is stated that renovation/upgrading of Pochentong Airport is to be implemented under BOT Scheme, which is currently progressing.

SEDP assumes an economic growth of 5 % per annum for the period of 1996 ~ 2000.

The data of economic of SEDP were used as the basic data in establishing the socioeconomic framework as described in Chapter 10.

The target period of SEDP is already expired, and the Royal Government is currently preparing the Second Socioeconomic Development Plan.

(2) Public Investment Program (PIP) 2000 ~ 2002, Ministry of Planning, August 1999

This is the most up-to date edition of a series of three-year rolling programs of public investment for government projects. The series is reviewed and revised every year, and the fifth rolling PIP covers the period of 2000 to 2002. PIP points out three (3) “development challenges”, namely, the restoration of economic growth, reduction of poverty and acceleration of the completion of the reform agenda. PIP sets out four (4) priority areas; improvement in public resource management, public administration reform, demobilization of military personnel and aggrandizement of spending on social development. Then, PIP analyses the present status and problems, and states priority programs for each sector. The covered sectors are; agriculture, transport, communications, energy, industry and trade, water resources, water supply and sanitation, education and training, health, environment and conservation, and others.

As for the transport sector, PIP allocates nearly US\$ 237 million to be invested over the period of 2000 – 2002 period, out of which about US\$ 190 million is to be spent on the road subsector. PIP recognizes the importance of maintenance and establishment of maintenance fund for road. It does not mention road projects in Phnom Penh. Also for other transport subsectors, namely, waterways, railway and civil aviation, PIP discusses the inter-city and international traffic, and does not mention urban transport.

PIP expects economic growth of 7 % per annum and above from for the period 2000 to 2002.

The data of PIP were used as the basic information to estimate the available fund as described in Chapter 21.

(3) Socio-Economic Development Requirements and Proposals (SEDRP), Ministry of Economy and Finance, April 2000,

This document was prepared to be presented at the Consultative Group Meeting for Cambodia held in Tokyo, Japan in May 2000. It analyses the present status and requirements of the socioeconomic conditions of Cambodia. Although it is not explicitly mentioned, SEDRP points out the problems and lists the priority development areas same to those stated in SEDP and PIP. And then SEDRP proposes programs for development of each sector.

The total amount of the fund required for the proposed programs for the period 2000 – 2002 is estimated to be US\$ 1,574 million, out of which US\$ 1,429 is expected to be financed by donor countries. For the transport infrastructure, the proposed programs cover roads, railroads, inland waterways and civil aviation, including technical cooperation, with a required fund of about US\$ 425 million for the period 1998 to 2004. For the period 2000 to 2002, the estimated fund required is about US\$ 226 million.

SEDRP states that the road sector is given the highest priority among the transport infrastructures, and lists the strategically important National Roads to be rehabilitated and/or improved. The length to be improved/rehabilitated is not stated.

There is no mentioning on the policy/strategy for urban transport. It emphasizes the necessity of establishing cost recovery mechanism for road development and road maintenance fund, quoting such sources as vehicle registration charge, toll, international transit fees and fuel revenues.

As for economic growth, SEDRP estimates a real GDP growth of 4.3 % in 1999 and projects 5.5 % GDP growth for the year 2000.

The data of SEDRP were used as the basic data to estimate the available fund as described in Chapter 21.

- (4) Cambodia: Enhancing Governance for Sustainable Development (EGSD), Working Paper 14 Cambodia Development Resource Institute, May 2000

This paper was prepared under the sponsorship of ADB. This paper emphasizes the importance of governance and reform of the Government of Cambodia.

Under the heading of “Economical Implications of Reform”, EGSD describes the economic advantages of promoting “Reform Scenario” and disadvantage of the “No Reform Scenario”. The main points of the advantages and disadvantages are summarized below.

#### ***Reform Scenario***

- Revenue raising capacity: Revenue of direct tax increase from 16% in 2000 to 40% in 2005, and slowly to 50% from 2006 to 2020. Indirect tax revenue increases from 28% in 2000 to 60% in 2020.
- Official grants: Increase from \$215 million in 2000 to \$220 million in 2005; continue at \$170 million from 2006 to 2020.
- Official loans: Increase from \$96 million in 2000 to \$296 million in 2005; and increase at slower rates from \$296 million in 2005 to \$876 million in 2020.
- Foreign direct investment: Increase from \$180 million in 2000 to \$780 million in 2020.
- GDP growth (2000 ~ 2015): GDP of 2015 will be 5.3 times of 2000.

#### ***No Reform Scenario***

- Revenue raising capacity: Revenue of direct tax increase from 16% in 2000 to 36% in 2020. Indirect tax revenue increase from 28% in 2000 to 48% in 2020.
- Official grants: Decline from \$215 million in 2000 to \$140 million in 2005; decline to \$70 million from 2006 to 2020.
- Official loans: Decrease from \$96 million in 2000 to \$63 million in 2005; decrease at faster rates from \$63 million in 2005 to \$1 million in 2020.
- Foreign direct investment: Remain flat at \$160 million from 2000 to 2020.
- GDP growth (2000 ~ 2015): GDP of 2015 will be only 1.3 times of 2000.

These information was used as the basis for estimating the available fund as described in Chapter 21.

- (5) General Population Census of Cambodia 1998, Ministry of Planning, 1998

This is the report on the population census conducted by UNDP. Although this is not a development plan, it provides useful data for estimating future socioeconomic framework of the Study. The following data were particularly useful for estimating the future population:

- Present and past data of population of Cambodia, Phnom Penh and provinces.
- Distribution of population by age group.

## 2.2 URBAN DEVELOPMENT/LAND USE

Information on urban development/land use is important to draw a future vision of the city. They are also important for drawing a clear picture on distribution of population and industries, which, in turn, are important to estimate future traffic demand.

- (1) Study on Drainage Improvement and Flood Control in the Municipality of Phnom Penh, JICA, August 1999

This is the most up-to date study on the infrastructure in Phnom Penh focusing on drainage and flood control. Present and future land use of Phnom Penh are discussed in the study. This study provides the starting point for the review of land use and urban planning in this Study (of Transport Master Plan). After reviewing the present and future land use presented in the report, it was felt that a different approach from that of the Drainage and Flood Control Study is needed in the Transport Master Plan Study.

- (2) Satellite City Plan

The letter from The Council of Ministers dated 20 June 2000 advised to take the Satellite City Plan into consideration in the Study. Among the relevant agencies and officials, the Satellite City is assumed to be planned within 30 km radius from the center of Phnom Penh. However, the exact location and outline of the Satellite City including size of population, type and magnitude of industry and schedule of construction were not clear to the Study Team. Extensive discussions were held between the Study Team, Bureau of Urban Affairs (BAU) and other relevant agencies/officials on this plan, and the plan was incorporated in the Study.

- (3) Project of Phnom Penh Skeleton for 2020

BAU proposed the Project of Phnom Penh Skeleton for 2020, which includes a development plan for the present suburban area to the west of the present urbanized area of Phnom Penh. This plan is called “ The Extension Concept Plan of Phnom Penh”. The development plan shows new international airport, river port, industrial-estate development and distribution center. A new international airport was proposed by the Ministry of Land Management, Urban Plan and Construction (MLUPC), and agreed by BAU. However, the basic scheme for these development projects, such as location, type and magnitude of industry and implementation schedule had not been fixed. Extensive discussion was held between the Study Team, BAU and the relevant agencies, and broad scheme for these projects were agreed. On this basis, this plan was incorporated in the Study.

- (4) The Development Program in Action

BAU prepared the program and submitted to MLUPC. The main idea was generated by the City Hall. The plan contains four (4) developments in the city; Development of Russey Kaev (500 ha), Front of Bassac (70 ha), Economic Development Zone of Dang Kao and Mean Chey (700 ha), and Economic Development Zone of Boeng Salang (100 ha).

- (5) Technical Cooperation on Urban Development by French Consultant Team

Based on the agreement between MPP and City of Paris, France, a French consultant team is working in BAU under a technical cooperation program titled “Phnom Penh Urban Management, Development and Urban Rehabilitation”. The French consultant team is proposing a regulation on building height. This regulation was incorporated in the estimation of future population distribution described in Chapter 10.

(6) Renovation of Olympic Stadium and New Development of the Surrounding Area

This is a plan to renovate the existing Olympic Stadium and develop the surrounding area as a hotel/shopping mall complex. The original basic concept of the development was once shown one time to the Study Team, but no detailed information was available. Should this development be implemented as planned, it would substantially influence the traffic situation around this area.

However, since there have been no specific, concrete data nor information of this development plan made available to the Study Team, no specific consideration could be given to this project in the Study. The project was reported to start in year 2000 and the area has been enclosed by fence. However, up to the time of preparation of the Draft Final Report, no works seem to have been started.

## 2.3 ROAD DEVELOPMENT/IMPROVEMENT

No comprehensive development plan/study of the transport sector was available except the following study and plan.

(1) Urban Infrastructure Rehabilitation and Management Project, World Bank, May 1996

This study reviewed the existing conditions of roads and drainage systems in three major cities in Cambodia; Phnom Penh, Siem Reap and Sihanoukville.

In Phnom Penh, surveys on the traffic volume, pavement condition, sub-base condition and vehicle axle load were carried out on the major roads. Based on the results of these surveys, a three-year program of the pavement rehabilitation for the major roads, with a total length of 47 km, was proposed. Also, rehabilitation of drainage was proposed to be implemented together with the pavement. The total cost was estimated to be about US\$ 7.2 million. These projects concentrated on the arterial streets and collector streets, and no local streets were included.

The road rehabilitation projects have not been implemented yet. According to MPWT, the World Bank has agreed to finance the pavement rehabilitation of Monireth/Charles de Gaulle Blvd as “the pilot project for improving the capacity of Cambodian contractors”. The expected timing of implementation will be sometime after the completion of installation of water supply pipes which are currently being executed under ADB loan.

It is noted that the estimated road users’ benefits of the improvement programs of the three years varied 25 to 59 % of the improvement cost, and were lower than the improvement cost. This relatively small road users’ benefit was attributed to the “relatively lower importance of the roads”.

(2) 5-Year (2001~2005) Road Rehabilitation Plan by DPWT, MPP

This is the plan to rehabilitate the roads in the urban area for the period 2001 to 2005. This plan consists of thirty-six (36) urgent projects covering 70 km of pavement rehabilitation of 80,000 m<sup>2</sup> of pothole repairs and 48,000 m<sup>2</sup> of renewal of pavement markings. The total cost is estimated to be US\$ 7.7 million. DPWT had been requesting allocation of the budget for this plan, but the budget had not been allocated. In early 2001, MPP could obtain a special fund which was obtained by selling land property of “Youth and Sports Club” to US as the site of the US Embassy. This special fund was allocated it to road rehabilitation. Some of the streets, which are being rehabilitated, or to be rehabilitated coincide with those which are listed as high-priority streets in the Study.

## **CHAPTER 3**

# **PRESENT URBAN AND SOCIOECONOMIC PROFILE**

## CHAPTER 3

### PRESENT URBAN AND SOCIOECONOMIC PROFILE

#### 3.1 PHYSICAL PROFILE

The Kingdom of Cambodia extends over an area of 181,000 km<sup>2</sup> while the total area of the city of Phnom Penh is 374 km<sup>2</sup>. The city of Phnom Penh lies on the west side of juncture of three rivers, Tonle Sap River, Mekong River and Bassac River. Many large lakes and swamps are located in the northern and the southern area of the city. Historically, the city of Phnom Penh has been developed by constructing dikes and reclaiming the land inside the dikes, as presented in Appendix 3-1.

Since the city has been constructed on the flat swampy hinterland of Mekong and other rivers, topography of the Study Area is generally flat. The highest area of the city is the area around the Royal Palace in Daun Penh District with elevation of 11 m above sea level with the datum plane at Ha Tieng in Vietnam. The highest elevation of the river bank is 11.2m and the average elevation in the urbanized area is in between 5.5m to 8m. The elevation of the northern district, Russey Kaev and the southern districts, Mean Chey are lower than the rest of urban area. Conversely, Dang Kao District is higher toward the west side of city border. Because of this low elevation relative to the water level of Mekong and other rivers, the city is threatened by flooding every year during the season of high water level of these rivers.

The geological features of the Study Area are:

- The city lies on flat alluvial plain at the confluence of the Mekong River, Tonle Sap River and Bassac River.
- The geology of the riverbank is composed of sand, silt and clay.
- The urbanized area has been constructed on reclaimed land using sedimentation from the river.
- The swampy areas in and around the city function as retarding basins during the flood season.

These physical features result in the general tendency of urban development and transport as summarized below:

- The soils underlying the urbanized area are generally soft and their bearing capacities are relatively low. Accordingly, construction of high-rise building requires large-scale foundation works. Poor bearing capacity of the subsoil also results in shorter life period of pavement.
- It needs a careful hydrological consideration to reclaim the lakes and swampy areas in and around the city because it may result in unfavorable effect on the flooding and/or inundation.
- Development of the city is directed towards west; the eastside of the present urbanized area is bounded by Mekong and other rivers. The ground elevation in the western suburbs is generally higher, and the area has less chance of flooding.

Administratively, the city is composed of seven (7) Districts, which consist of seventy-six (76) Communes. Four (4) Districts (Chamkar Mon, Daun Penh, Prampi Makkara and Tuol Kork) are located in the center of the city which have been developed progressively and now form the urbanized area. The other three (3) Districts (Dang Kao, Mean Chey, Russey Kaev) are suburban areas surrounding the four (4) Districts where less development has taken place.

The Study Area includes two areas beyond the city boundary; one on the northeast side of Russey Kaev District which belongs to Kandal Province and the other on the south of Mean Chey District which is Kandal District, Kandal Province.

## 3.2 URBAN DEVELOPMENT PLANS AND LAND USE

### 3.2.1 Existing Urban Development Plans

The relevant agencies have their own development plans, but little coordination has been made among the agencies. The department of Land Management, Urban Plan and Construction (DLUPC), the Bureau of Urban Affairs (BAU), the Ministry of Public Works and Transport (MPWT), the Ministry of Land Management, Urban Plan and Construction (MLUPC), and Inter-Ministries Meetings prepared the draft for the future land use and infrastructure plan. Description of the main development plans is presented in Chapter 2.

Details of these plans, such as location, magnitude of area, estimated cost and implementation schedule were not clear. Extensive discussion was held between the Study Team and the officials of MLUPC, BAU, Municipality and other relevant agencies in attempt to specify and consolidate these plans. The aspects of the plans considered include (i) consensus or acceptance among the relevant agencies, (ii) official or unofficial authorization by the higher authority (such as Council of Ministers), and (iii) maturity of the plan. Figure 3.2-1 shows the consolidated plan that was incorporated in the Study.

### 3.2.2 Urban Structure By Land Use

#### (1) Present Land Use

Figure 3.3-2 shows the present land use which was compiled based on the field survey conducted by the Study Team. The Study Area can be classified into two areas in accordance with the types of land use. One is the area enclosed by the Inner Ring Road (hereinafter referred to as “**the urbanized area**”), and the other is outside of the urbanized area (hereinafter referred to as “**the suburban area**”). Administratively, the center four (4) Districts coincide with the urbanized area while other three (3) Districts and parts of Kandal Province constitute the suburban area. Population, industrial accumulation and large-scale urban facilities are mostly located in the concentrated zones in the urbanized area. Some industrial factories are located in the suburban area along the radial trunk roads.

#### (2) Change in Urban Structure

New commercial activities, new construction of buildings and renovation of old large estates in the city center has been taking place and changing the urban structure as well as the landscape of the city. New public market, private supermarkets, hotels and office buildings have been, and are being, built in the city center. The large public market called Orussey Market, which is located in between Samdach Monireth Blvd., and Preah Monivong Blvd. close to the Central Market is newly opened. Large-scale hotels have sprouted up along the riverside, near Wat Phnom and along Mao Tse Toung Blvd.

Typical existing buildings in the urbanized area are three-storied buildings called “Chinese Compartment”<sup>\*,\*</sup>. The ground floor of these buildings is used for shops and people live in the upper floors. While typically the units on the ground floor of these units are often fully occupied for commercial use, the upper floors of a number of units are still vacant. Many old estates in the central city are also vacant. Renovation of large residential houses are taking place in Prampi Makara District and Daun Penh District. All these factors indicate the possibility of population growth in the near future.

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\* This type of architecture is commonly seen in, and characterizes, “old town” area in Southeastern Asian cities such as Jakarta and Bangkok. These buildings cannot be extended upwards because of their structural strength, and therefore, extension of floor area is limited.



Figure 3.2-1 Development Plan in Phnom Penh

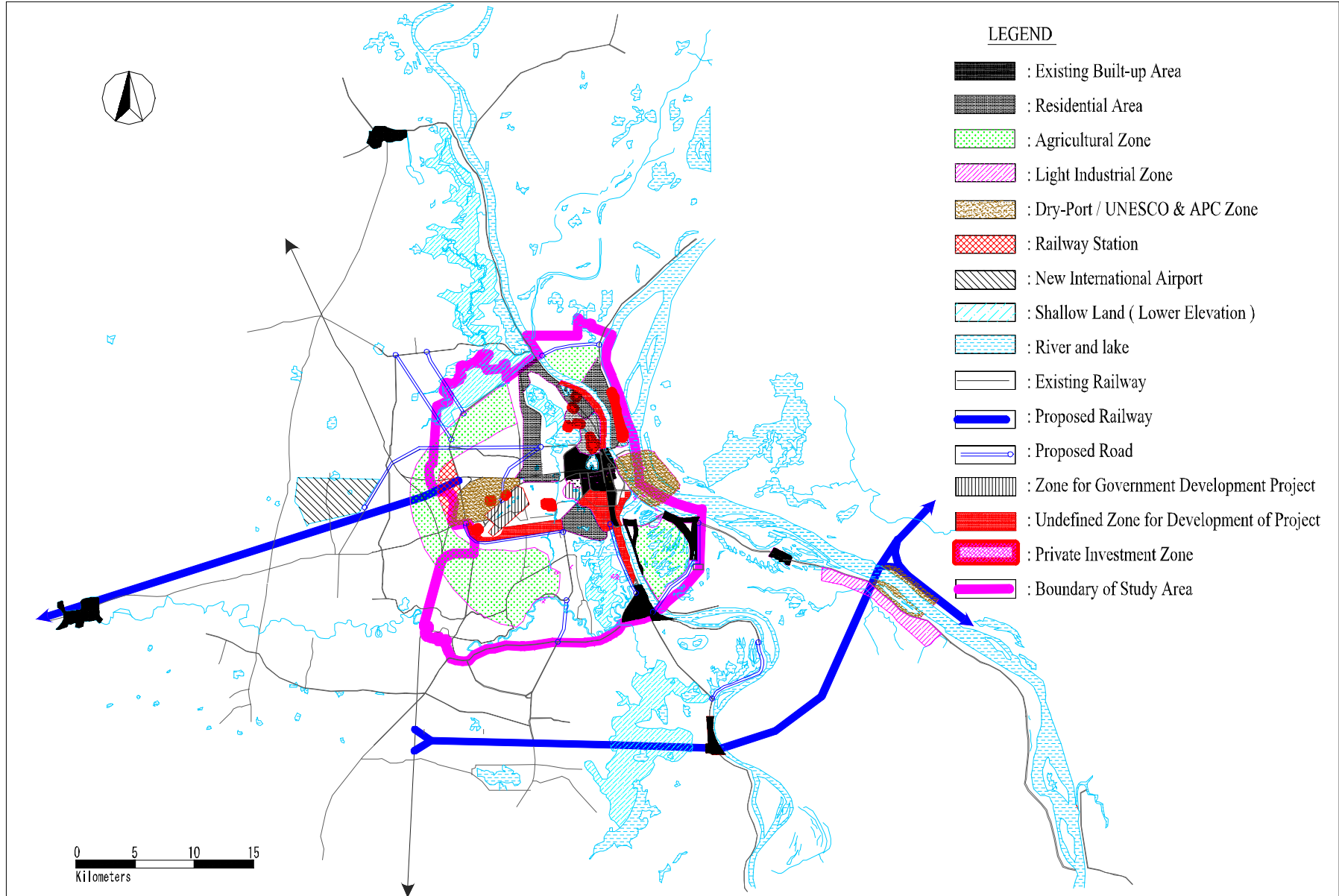


Figure 3.2-1 Development Plan in Phnom Penh

### (3) Tourist Attractions

Tourism is one of the most important and promising industries for Phnom Penh as well as other parts of Cambodia. The Royal Government of Cambodia adopted the policy called "Open Sky Policy" to promote the tourism. In addition to this policy, the Municipality of Phnom Penh is planning various project for the promotion of tourism including the following.

- Development of Wat Phnom area: An open-air theater for traditional music and dance in the north side; a permanent exhibition building for crafts and paintings in the south side, and gardens for children in the west and the east side of Wat Phnom.
- Improvement 15 km-long section of the road from the city to Boeng Cheang with the rest houses.
- Developing the west side of Chhroloang Mlou as a zoo.
- Horse racing field in the south side of the city in Bake area.
- Extension of the Hun Sen Park, along Bassac River from the Russian Embassy to Monivong Bridge.
- Development of a fishing village in the east side of Mekong River 2km downstream from the city.
- New tour program for a sunset cruise trip on all three rivers.
- The plan for a Sunday market located along the banks of Tonle Sap River between Wat Phnom and the Royal Palace.

Existence of numerous religious buildings including 85 pagodas, 165 Wats, 13 Moslem mosques and 45 Chinese and Vietnamese Pagoda, with their historical background, characterizes the city and have potential to become tourist attraction.

### (4) Urban Greenery and Amenity

One of the characteristics of Phnom Penh is widespread greenery. The main streets are planted with tropical trees which bloom. Typical trees are flamboyant, crepe myrtle and plumeria which are planted not only as roadside tree but also garden tree. The scenery of trees, blossoms and their fragrance provide a rich enchantment to the life in the city.

## **3.3 SOCIOECONOMIC PROFILE**

### **3.3.1 Economic Framework**

#### (1) Overall Economy

The economic developments of Cambodia showed an average annual GDP growth in real terms of over 7 % from 1992 to 1996 (Table 3.3-1). In 1997 and 1998, GDP contracted to approximately 1 % due to domestic political crisis and the Asian financial crisis.

The establishment of political stability has lifted the economic activities, as reflected in the projection of growth rate of about 4 % in 1999 as presented in Table 3.3-1. GDP in real terms is projected to grow at an average annual rate of over 6 % in years 2001 and 2002. This projection is based on a stable economic environment with an inflation rate of 4 % and an exchange rate of Riel 3,800 to US\$ 1.0. Growth in the current account is dependent upon the increase in garment exports while that of capital account depends on the increase in foreign direct investment.

The projection for year 2002 shows services will contribute 40% to the increase in real GDP with agriculture and industry contributing 40 and 20 %, respectively. The major contribution to the growth of the services sector is projected to be by the wholesale and retail trade while the major stimuli to the growth of agriculture is projected to be by paddy and livestock. The major contributor to the real economic growth of industry is construction.

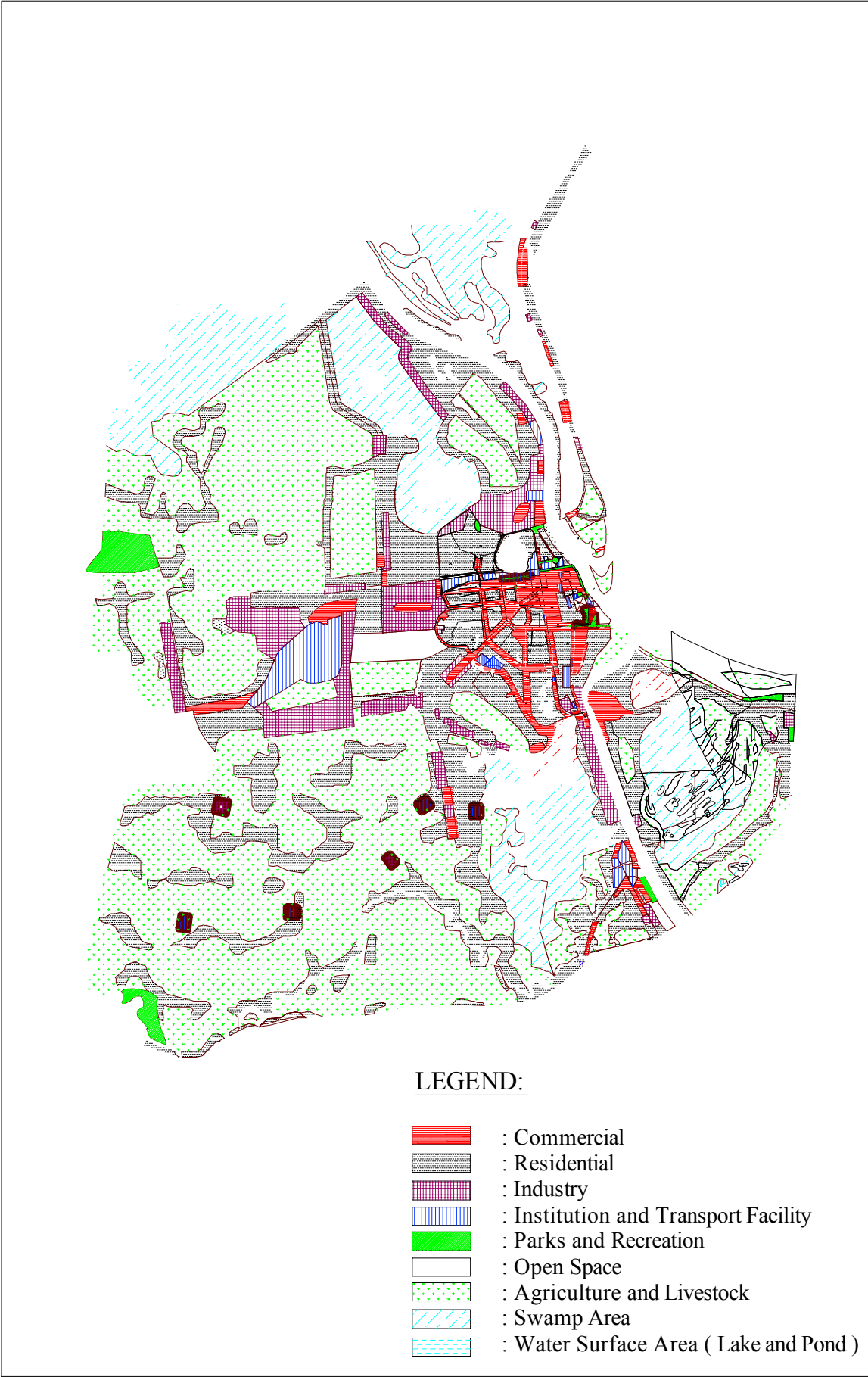


Figure 3.2-2 Present Land Use

Table 3.3-1 GDP Composition and Annual Growth Rate

ITEM	1995	1996	1997	1998	1999 (Est)	2000 (Pro)	2001* (Pro)	2002* (Pro)
Nominal GDP (Riel. Bill.)	7,200	8,250	9,100	10,900	11,960	13,030	15,306	17,210
% of GDP								
Agriculture	43.2	40.3	41.1	39.3	37.0	35.8	41.4	40.4
Industry	16.3	18.2	17.7	19.5	19.8	21.0	18.8	19.8
Services	40.5	41.5	41.2	41.2	43.2	43.2	39.8	39.8
Annual Growth Rates								
Real GDP Growth (%)*	7.6	7.0	1.0	1.0	4.3	5.5	7.4	7.7
Agriculture*	7.5	2.2	0.1	1.2	5.0	4.3	5.0	5.1
Industry*	20.2	11.7	31.8	9.2	1.4	14.6	12.6	13.1
Services*	4.2	4.8	6.1	0.3	4.1	6.6	7.4	7.5

Note: Est: Estimated, Pro: Projected

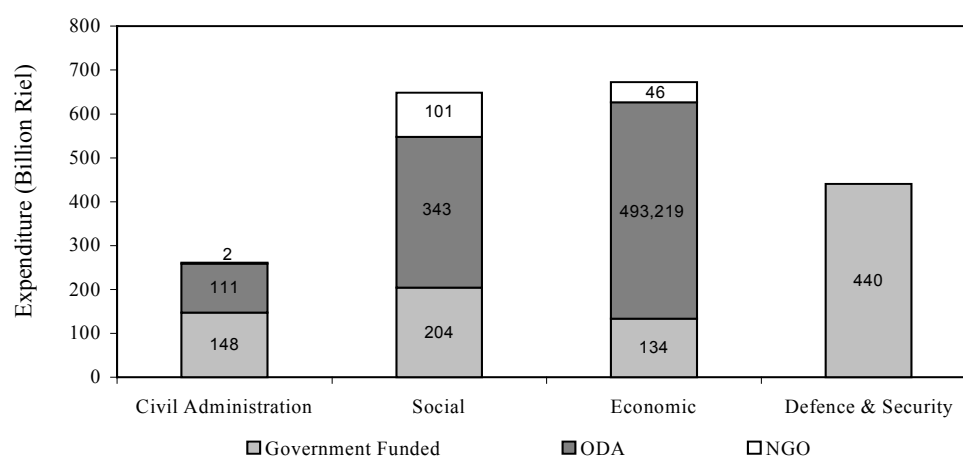
Source: 1. Socioeconomic Development Requirements and Proposals, Ministry of Economy and Finance

2. Public Investment Programme 2000-2002 (with \* mark)

## (2) Financial Condition

The Government's economic reform programme is used as a key instrument to strengthen the role of the budget. The fiscal policy has restructured the tax system to broaden the revenue base, and maintain expenditure within an acceptable range and fully mobilize revenue through the improvement of tax and revenue collection measures. The Government is making an effort to expand its revenue base including the transfer of non-tax proceeds from management of forests and other public resources to the budget. More than half of the increased taxation revenue is projected to come from the increases in profit turnover and consumption tax collection.

However, the fact is that the public expenditure by sector in 1997 shows that the Government budget funded only 57% of the civil administration sector, 32% of the social sector, and 20% of the economic sector. The Government met 100% of the defence and security sector budget. ODA support to the civil administration sector, social sector and economic sector was 43%, 53% and 73%, respectively. The rest was supported by NGO as shown in Figure 3.3-1.



Source: The World Bank 1999, Cambodia: Public Expenditure Review

Figure 3.3-1 Public Expenditure by Sector, 1997

**3.3.2 Population**

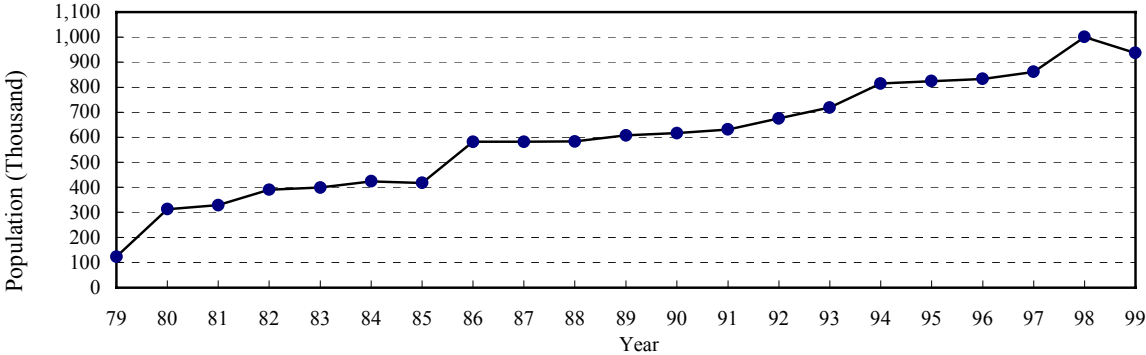
(1) Trend of Population

**General Trend**

The annual growth rate of the population of Cambodia during the period 1981 to 1986 was 2.6%. Population growth for the period 1986 to 1996 was 2.8% and for the period 1996 to 1998, the growth rate was 3.1%. The annual growth of population is increasing every year. The average annual growth rate of the population of Phnom Penh was 6.7% for the period 1980 to 1985, 9.5% for the period 1985 to 1990, 6.7% for the period 1990 to 1995 and 2.7% for the period 1995 to 1999.

In recent years, the annual growth rate of population shows steady increase; 3% in 1997 and 4% in 1999. The first population census undertaken in 1998 indicated a population growth of 11.6% in 1998. The difference between the natural population growth indicated above and the census result is about 7.6%. This suggests that the actual population could be about 10% more than the indicated data, including both the people subject to the population survey and others, such as illegal resident, refugees and boat people.

As shown in Figure 3.3-2, the population in the city is growing faster than that of Cambodia. This result suggests that migration or people returning to the city have been increasing significantly.



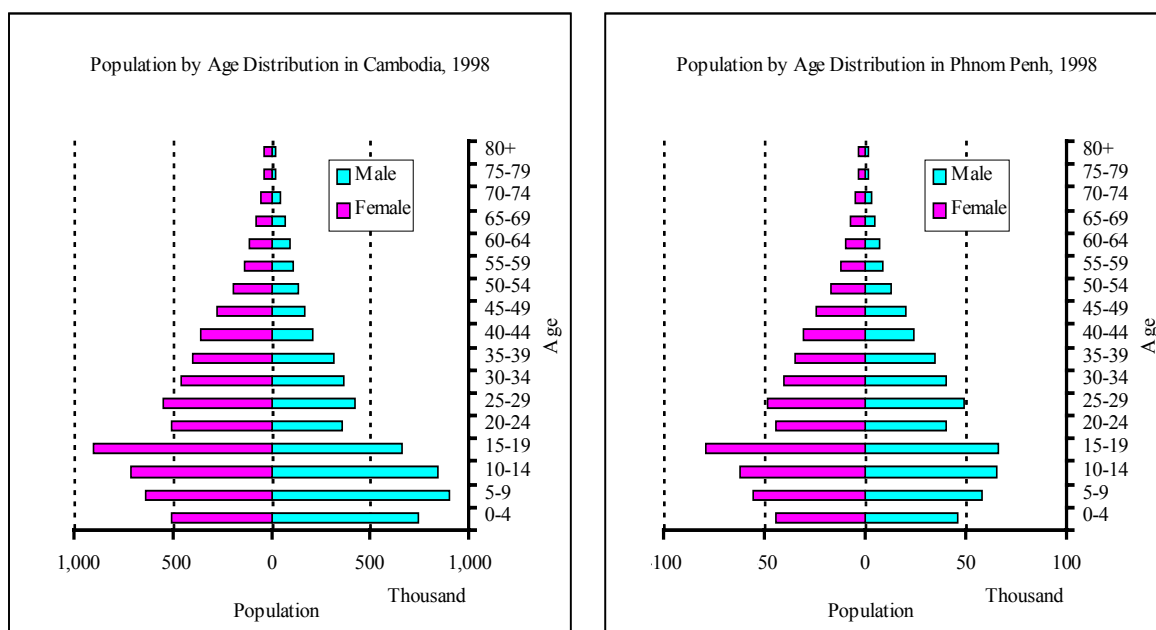
Source: Ministry of Planning, Department of Planning of Phnom Penh, Welcome to new Millennium Year 2000

Figure 3.3-2 Population in Phnom Penh

**Composition by Age Group and Gender**

The composition of age structure in Cambodia shows the age group of 5 to 9 years old is the largest cohort followed by the age group of 10 to 14 years old. This might be attributed to a baby boom reported in the early 1980s and high fertility in the following years of the decade for both gender and age structure. The proportion of the age group of 0 to 4 years old is far less than that of the age group of 5 to 9 years old. The population in each five-year age group over 25 declines substantially as age increases.

Approximately 40% of the population of Cambodia are children below the age of 15 years. The percentage is lower in Phnom Penh where 32.6% are under the age of 15 years. The proportion of female children of 40.4% is less than that of male children of 45.4%. The economically productive age group of 15 to 64 years forms 53.7% and the elderly group of 65 years and over forms 3.5% of the population. People of ages of 18 years and over constitutes nearly 50% of the total population, as shown in Figure 3.3-3.



Source: General Population Census of Cambodia 1998, Ministry of Planning

Figure 3.3-3 Distribution of Population by Age Group and Gender

### ***Households***

According to the General Population Census 1998, there are 2,188,663 households in Cambodia. Of these, 2,162,086 are regular households excluding institutional, homeless, boat and transient population. The number of households in the urban areas is 322,246 while that in the rural area is 1,866,417. The average household size in Cambodia is 5.3 persons per family. It is higher in urban area (5.5 persons) than in rural areas (5.1 persons). Among the provinces, Phnom Penh is the highest in average household size with 5.7 persons. The household size for the suburban area is 5.6 persons and that for the Central Districts is 5.8 persons.

### ***Production Sector***

The share of paid employment for the whole Cambodia is still small portion; about 15 % of the total employment (Ministry of Planning, Cambodia Socioeconomic Survey, 1999). On the other hand, the percentage of paid employees is about 53.4% in Phnom Penh, which is more than three (3) times of the national average. As shown in Table 3.3-2, approximately 76.3% of employees are engaged in the agriculture sector in Cambodia as a whole compared to only 8.2% in Phnom Penh. 70.2% of the employee are working in the service sector in Phnom Penh compared to 17.3% in Cambodia as a whole. The percentage of employees engaged in the industrial sector for Cambodia as a whole and Phnom Penh are 6.4% and 21.6%, respectively.

Table 3.3-2 Percentage of Employed Population by Industry Group, 1999

Major Industry Group	Cambodia			Phnom Penh		
	Both	Male	Female	Both	Male	Female
Agriculture	76.5	73.7	79.0	8.3	6.7	10.2
Agriculture, Forestry	74.6	70.9	78.0	7.8	6.1	9.8
Fishing	1.9	2.8	1.0	0.5	0.6	0.4
Industry	6.4	6.3	6.5	21.4	17.2	26.3
Manufacturing	4.8	3.4	6.0	17.1	10.7	24.5
Construction	1.6	2.9	0.5	4.3	6.5	1.8
Services	17.3	19.9	14.6	70.3	76.1	63.5
Retailer	7.3	3.9	10.4	24.5	12.0	38.9
Hotel, Restaurants	0.5	0.4	0.5	3.4	2.8	4.1
Transport, Communication	2.2	4.3	0.3	9.2	16.6	0.7
Financial, Real Estate	0.3	0.4	0.2	1.7	2.1	1.4
Public Adm., Defense	3.4	6.4	0.5	17.4	28.4	4.8
Education, Health	2.1	2.7	1.4	4.9	5.2	4.4
Others	1.5	1.8	1.3	9.2	9.0	9.2
Total	100.0	100.0	100.0	100.0	100.0	100.0
Total Employed Population	5,508	2,626	2,882	389	207	182

Source: Ministry of Planning, Cambodia Socioeconomic Survey 1999

### ***Trend of Migration***

The number of people who have migrated from their place of birth constitute 26.8% of the total population. The percentage of lifetime migrants to the total population is 56.6% in urban areas which is substantially higher than the percentage of migrants in rural areas of 21.2%. The highest proportion of migrants have migrated due to the reason of “family moved” for both Cambodia as a whole (37% of migrants) and Phnom Penh in particular (50% of migrants), as shown in Figure 3.3-4. This reason causes the higher proportion of female migrants. The percentage of migrants who have moved “in search for employment” and “for marriage” is higher among males. This trend of migration to the city has been reflected in a high population growth in Phnom Penh.



Figure 3.3-4 Migration Reasons

(2) Population by Commune and Density Distribution

Using the census in 1998<sup>1</sup> and the Landsat data map<sup>2</sup>, the population and density by district and commune in the city are calculated. The overall density of the country is 63 persons/km<sup>2</sup>, with 2,980 persons/km<sup>2</sup> in Phnom Penh and with 23,167 persons/km<sup>2</sup> in the central four (4) Districts. The population is concentrated in particular in the communes of city core (Table 3.3-3, Figure 3.3-5).

Table 3.3-3 Population in Phnom Penh

Districts/Communes	Area (Km <sup>2</sup> )		Population	Density on Land (Km <sup>2</sup> )	Districts/Communes	Area (Km <sup>2</sup> )		Population	Density on Land (Km <sup>2</sup> )
	Total	Land				Total	Land		
Chamkar Mon	9.59	9.26	187,082	20,203	Dangkao	187.91	181.69	92,461	509
Tonle Basak	3.16	2.83	44,513	15,729	Dangkao	13.83	11.97	10,547	881
Boeng Keng Kang Muoy	1.00	1.00	14,405	14,405	Trapeang Krasang	9.05	9.05	3,013	333
Boeng Keng Kang Pir	0.34	0.34	12,055	35,456	Kouk Roka	32.67	30.40	5,153	170
Boeng Keng Kang Bei	0.64	0.64	22,700	35,469	Phleung Chheh Rotch	9.63	9.61	3,640	379
Oulampik	0.30	0.30	9,799	32,663	Chaom Chau	22.60	22.60	19,740	873
Tuol Svay Prey Muoy	0.56	0.56	13,575	24,241	Kakab	8.88	8.88	17,679	1,991
Tuol Svay Prey Pir	0.38	0.38	11,589	30,497	Pong Tuck	11.14	11.14	5,561	499
Tumnob Tuek	0.82	0.82	13,720	16,732	Prey Veaeang	9.07	9.02	3,013	334
Tuol Tumpung Pir	0.45	0.45	8,594	19,098	Samraong Kraom	12.19	12.19	4,211	345
Tuol Tumpung Muoy	0.59	0.59	10,422	17,664	Prey Sa	13.23	13.15	4,221	321
Boeng Traback	0.49	0.49	9,452	19,290	Krang Thnong	6.60	6.60	2,983	452
Phsar Daem Thkov	0.86	0.86	16,258	18,905	Krang Pongro	6.96	6.53	2,016	309
Daun Penh	7.34	5.39	131,913	24,474	Prateah Lang	8.42	8.32	3,594	432
Phsar Thmei Muoy	0.18	0.18	7,447	41,372	Sak Sampov	5.86	5.61	1,920	342
Phsar Thmei Pir	0.11	0.11	7,771	70,645	Cheung Ack	13.24	12.08	5,170	428
Phsar Thmei Bei	0.34	0.34	13,154	38,688	(Airport Area)	4.54	4.54	-	-
Boeng Reang	0.38	0.38	7,714	20,300	Mean Chey	50.86	40.18	157,112	3,910
Phsar Kandal Muoy	0.41	0.27	11,223	41,567	Strueng Mean Chey	12.00	11.65	31,740	2,724
Phsar Kandal Pir	0.15	0.15	7,954	53,027	Boeng Tumpun	4.43	4.04	29,037	7,187
Chakto Mukh	1.11	0.86	12,501	14,536	Preack Pra	8.39	6.46	11,346	1,756
Chey Chumneah	0.77	0.50	12,980	25,960	Chbar Ampov Muoy	0.49	0.41	10,378	25,312
Phsar Chas	0.10	0.10	8,287	82,870	Chbar Ampov Pir	1.32	0.90	24,227	26,919
Srash Chak	3.15	1.95	34,115	17,495	Chak Angae Leu	3.09	1.99	16,599	8,341
Voat Phnom	0.64	0.55	8,767	15,940	Chak Angae Kraom	9.53	6.78	19,814	2,922
Prampir Makkara	2.20	2.14	96,192	44,950	Nirouth	11.61	7.95	13,971	1,757
Ou Ruessey Muoy	0.08	0.08	9,120	114,000	Ruessey Kaev	107.88	88.33	180,076	2,039
Ou Ruessey Pir	0.08	0.08	10,722	134,025	Khmuonh	19.91	18.69	5,987	320
Ou Ruessey Bei	0.05	0.05	8,519	170,380	Toul Sankae	2.76	2.52	27,244	10,811
Ou Ruessey Buon	0.10	0.10	9,123	91,230	Svay Pak	3.97	0.74	12,197	16,482
Monourom	0.16	0.16	12,981	81,131	Kiloumaetr Lekh Prammuoy	5.64	4.92	13,372	2,718
Mittapheap	0.40	0.40	12,323	30,808	Phnom Penh Thmei	20.55	18.58	17,731	945
Veal Vong	0.96	0.91	21,394	23,510	Ruessey Kaev	5.18	3.99	18,742	4,697
Boeng Prohit	0.37	0.36	12,010	33,361	Tuek Thla	6.74	6.74	33,139	4,917
Tuol Kork	7.95	7.82	154,968	19,817	Praek Lieab	11.96	8.56	10,617	1,240
Phsar Depou Muoy	0.32	0.32	10,398	32,494	Praek Ta Sek	15.11	12.79	4,936	386
Phsar Depou Pir	0.20	0.20	10,236	51,180	Chrouy Changva	9.62	5.14	16,427	3,196
Phsar Depou Bei	0.30	0.30	10,038	33,460	Chrang Chamreh Muoy	2.30	1.88	7,233	3,847
Tuck L'ak Muoy	0.91	0.89	13,401	15,057	Chrang Chamreh Pir	4.14	3.78	12,451	3,294
Tuck L'ak Pir	0.44	0.44	11,247	25,561	<b>Total</b>	<b>346.65</b>	<b>310.20</b>	<b>429,649</b>	<b>1,385</b>
Tuck L'ak Bei	1.13	1.11	17,282	15,569	<b>Grand Total</b>	<b>373.73</b>	<b>334.81</b>	<b>99,804</b>	<b>2,986</b>
Boeng Kak Mouy	1.60	1.60	16,423	10,264	<b>7 Districts (76 Communes)</b>				
Boeng Kak Pir	1.69	1.69	25,177	14,898					
Phsar Daeum Kor	0.47	0.47	15,998	34,038					
Boeng Salang	0.89	0.80	24,768	30,960					
<b>Total</b>	<b>27.08</b>	<b>24.61</b>	<b>570,155</b>	<b>23,168</b>					

Source : (1) National Institute of Statistics, Ministry of Planning, General Population Census of Cambodia 1998,  
(2) Land Use/Cover for Topographical Map, MPWT, 1996



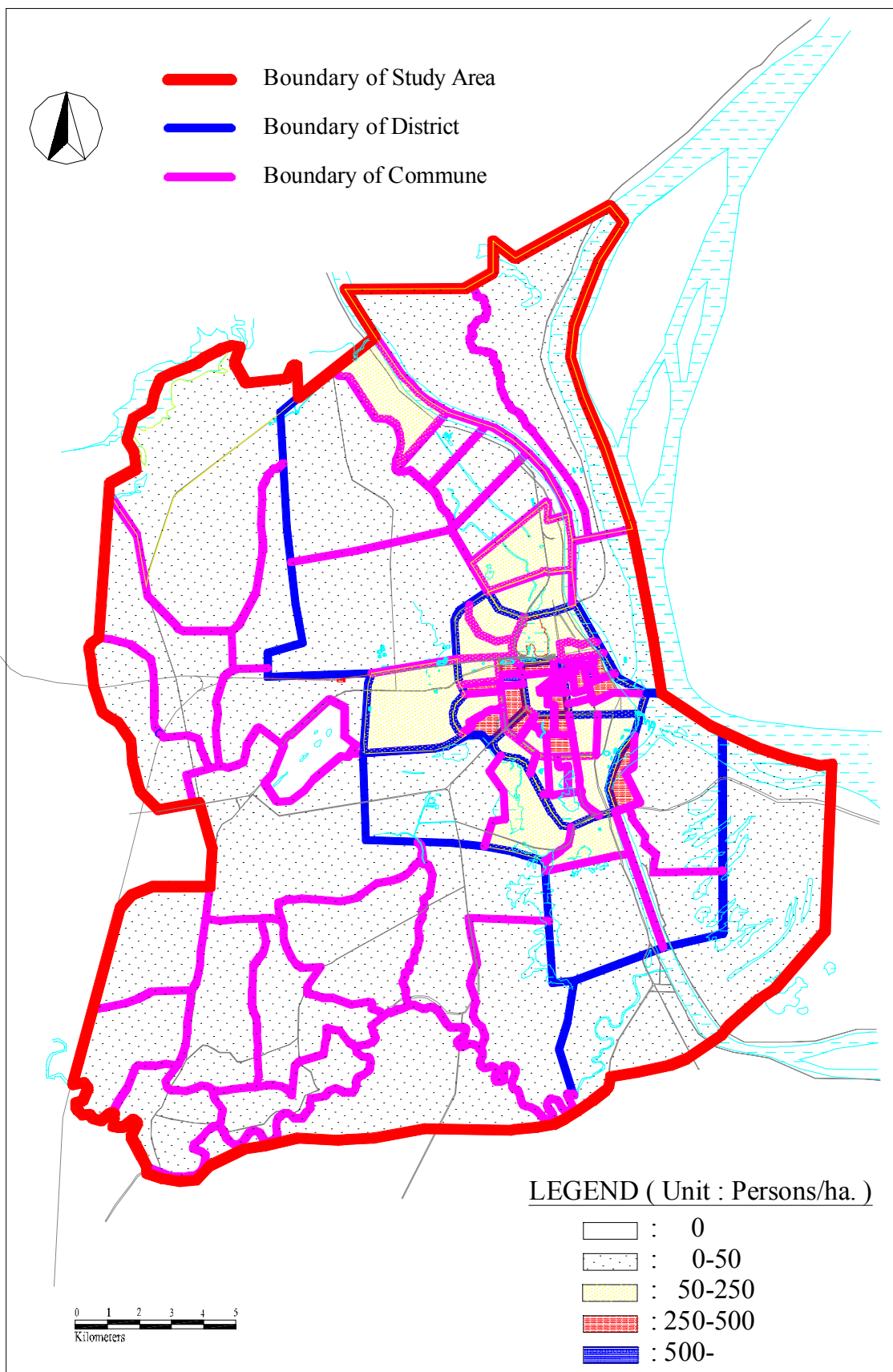


Figure 3.3-5 Population Density by Commune

### 3.4 EMPLOYMENT

The number of economically active people of age of 7 years and above in Phnom Penh is 423,747 of which 45.3 % are females. The crude activity rates are higher for males, while the unemployment rates are higher for females. The unemployment rate in rural areas is higher than that in urban areas. The unemployment rate of females is higher in urban areas than rural areas. The unemployment rate in Phnom Penh is two-times of the national rate. Tables 3.4-1 and 3.4-2 present the crude activity and unemployment rates in Cambodia and Phnom Penh, respectively.

The activity rates of both urban and rural population increase initially with age. The activity rates peak at the ages of 30 to 50 years and decline as age increases above 50. For the elderly people of 65 years old and over, more than 60 % of men and more than one-third of the women are economically active. Approximately 9.9 % of employed persons are engaged in the primary sector. The secondary and tertiary sectors account for 22.2 % and 67.9 % of employed persons, respectively.

Table 3.4-1 Crude Activity Rates and Unemployment Rates in Cambodia

	Crude Activity Rate			Unemployment Rate		
	Both Sexes	Males	Females	Both Sexes	Males	Females
Total	55.5	56.5	54.6	5.3	4.7	5.9
Urban	49.3	55.6	43.4	9.2	6.7	12.2
Rural	56.7	56.6	56.7	4.7	4.3	5.0

Source: Ministry of Planning, General Population Census of Cambodia 1998

Table 3.4-2 Crude Activity Rates and Unemployment Rates in Phnom Penh

	Crude Activity Rate			Unemployment Rate		
	Both Sexes	Males	Females	Both Sexes	Males	Females
Total	49.1	56.3	42.5	12.6	8.9	17.0
Urban	47.8	56.5	39.7	12.9	8.7	18.5
Rural	50.9	56.0	46.4	12.2	9.2	15.3

Source: Ministry of Planning, General Population Census of Cambodia 1998

### 3.5 CONSIDERATION ON FUTURE URBAN DEVELOPMENT

Based on the observation described above, the following issues shall be considered in planning of the master plan.

- (i) The urbanization of the Study Area tends to progress towards west because of the topography of the Study Area.
- (ii) Population in the Study Area has been increasing at a rate higher than that of the country. It is expected that population in the Study Area continue to grow in the future.
- (iii) The present population is concentrated mainly in the central four (4) Districts, while the population density in the suburban area is relatively low.