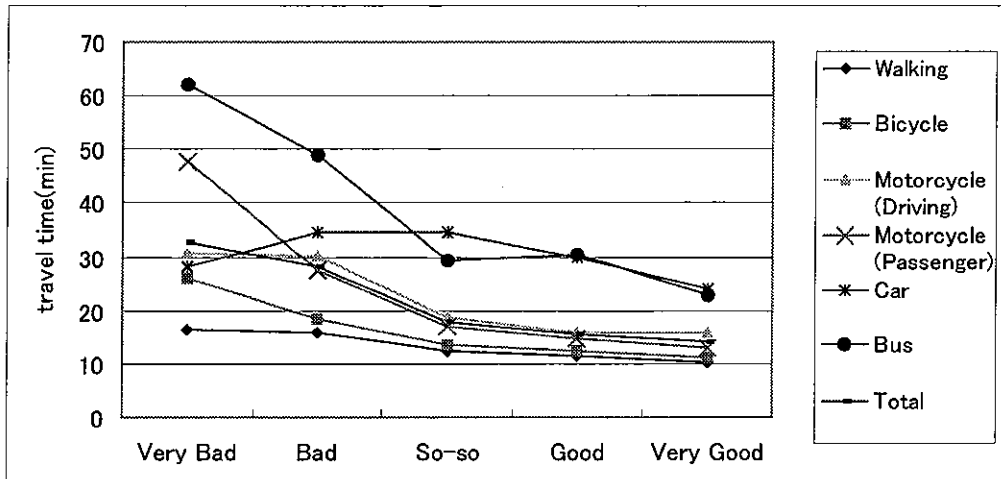


4) People's Perception

People's Satisfaction on Daily Trips: The average score of the trips made by the HIS respondents was 3.3; more than 90% of the trips were evaluated as "so-so" or "good". Travel conditions were generally rated as "not so bad". However, trips made by buses or cars were rated lower than other modes. A clear correlation between travel time and trip evaluation was thus implied (refer to Figure 2.3.15).

Figure 2.3.15 Average Travel Time by Evaluation of Trip and Transport Mode



Source: HOUTRANS HIS

Assessment of Motorcycle Mobility and Safety: As described earlier, motorcycle ownership rapidly increased, making it the predominant mode in HCMC. The results from the HIS showed that people's assessment of the convenience of motorcycles was high.

However, motorcycle safety has become a serious concern. Among five aspects, namely: convenience, speed, freedom, safety, and comfort, more than 45% of respondents chose "safety" as the most important aspect on motorcycle mobility. In addition, "safety" was also assessed as having worsened compared to five years earlier, while the other four aspects remained the same.

People's Concerns on Urban Issues: Assessment of eight urban issues which included security and safety, economic development, and environmental protection, highlighted concerns on transport issues (refer to Figure 2.3.16).

- (1) People in the study area were seriously concerned with transportation, assessing it as most important and requiring further improvement.
- (2) They assessed environmental protection and public administration capacity as yet to be improved.
- (3) They were satisfied with economic development and poverty alleviation, which may be a result of the recent rapid economic development.

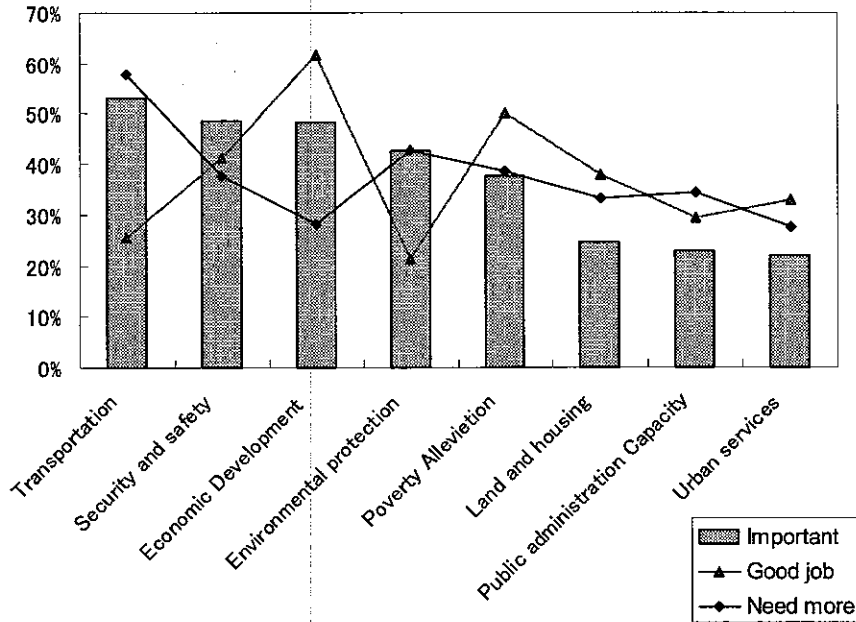
People's Concerns on Urban Services: Assessment of urban services also showed high interest on the transport sector (refer to Figure 2.3.17).

- (1) Transport aspects, such as public transport, road infrastructure and facilities and traffic management, were also serious concerns. They were assessed as important and yet

to be improved.

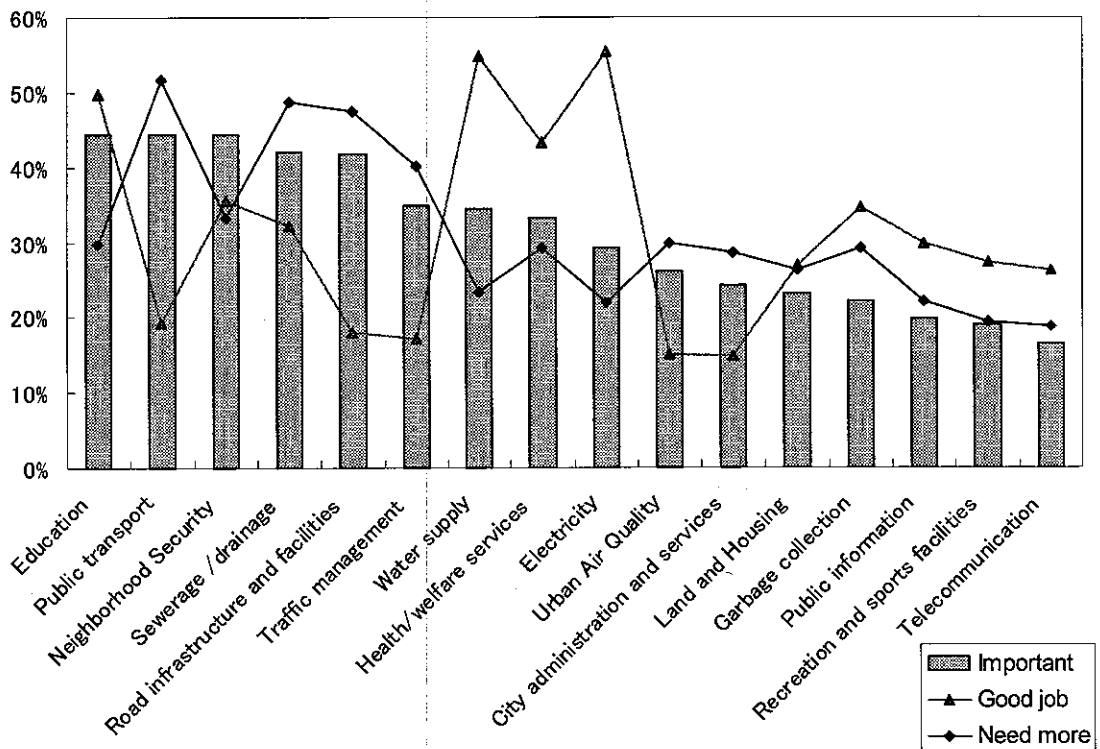
- (2) They were satisfied with basic urban infrastructure, such as water supply, electricity, and basic social services such as education and health care/welfare services.
- (3) They gave low ratings to air quality, city administration and services; they were not serious concerns.

Figure 2.3.16 People's Concerns on and Assessment of Urban Issues



Source: HOUTRANS HIS

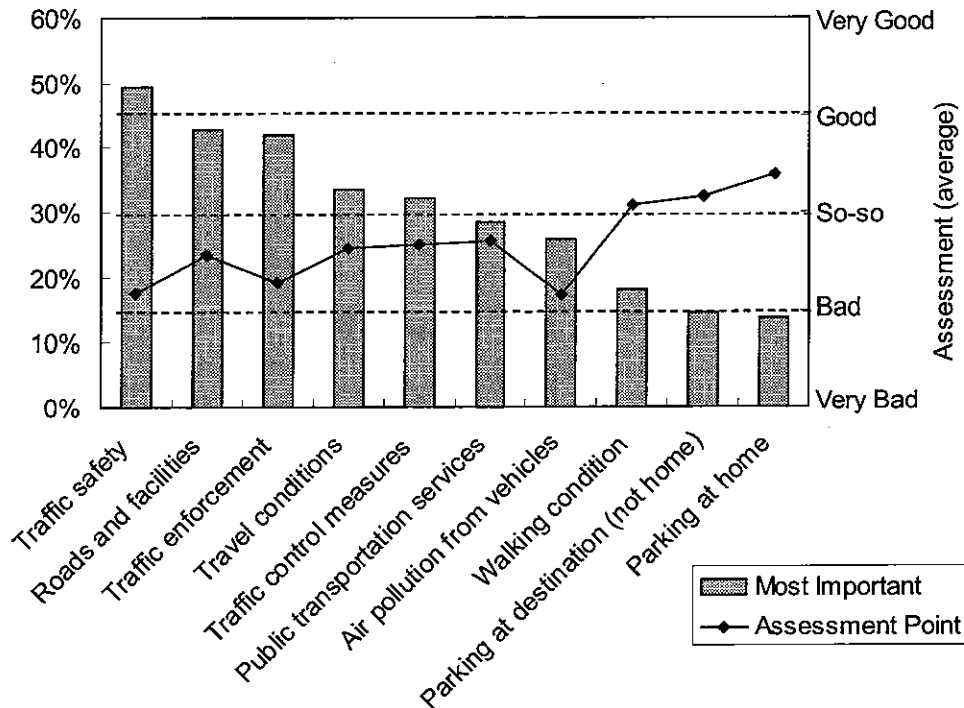
Figure 2.3.17 People's Concerns on and Assessment of Urban Services



Source: HOUTRANS HIS

People’s Concerns on Urban Transport Services: The people considered traffic safety, road and facilities, traffic enforcement, travel conditions and traffic control measures as important aspects of urban transport services. In fact, nearly half of them thought traffic safety was one of the most important aspects. They gave these aspects a comparatively low assessment (refer to Figure 2.3.18).

Figure 2.3.18 People’s Concerns on and Assessment of Urban Transport Services



Source: HOUTRANS HIS

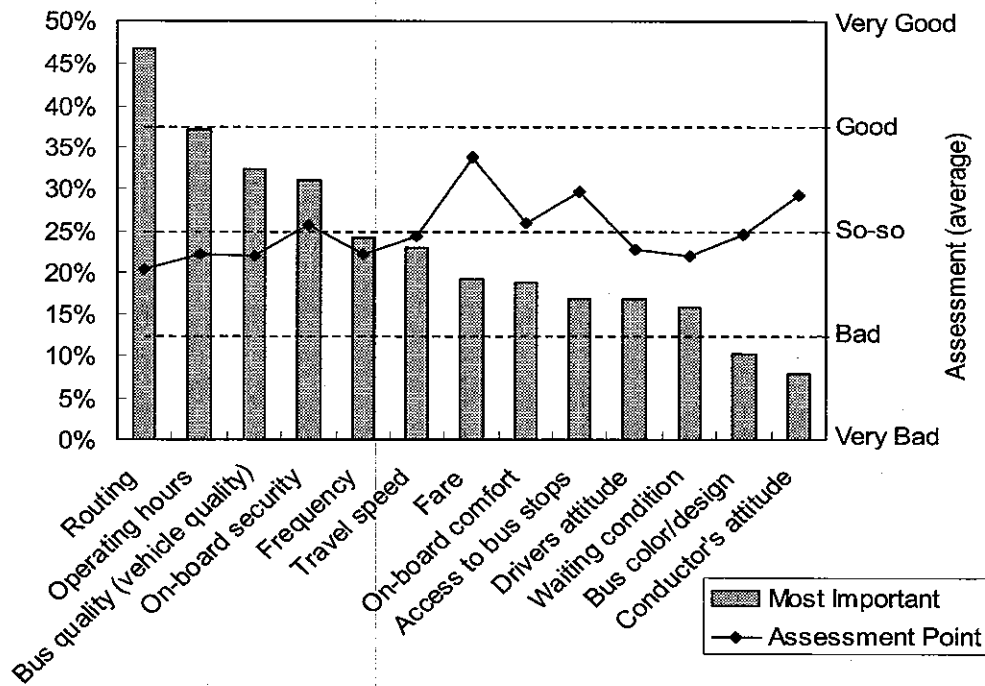
People’s Assessment of Bus Services: The people in the study area assessed the existing bus services as not attractive except for the fare values. The top five important factors in bus services for the people are (refer to Figure 2.3.19):

- (1) **Routing:** Extensive coverage and good connection between home and destinations.
- (2) **Operating hours:** Buses should be operated for sufficient hours to support peoples’ activities.
- (3) **Bus quality:** Bus fleets should be clean, safe and attractive.
- (4) **On-board security:** Bus riding should be safe.
- (5) **Frequency:** Buses should be operated frequently to reduce passengers’ waiting time.

Users’ Assessment of Public Transport Services: The interview survey of public transport users (including bus, taxi, cyclo, and xe om) showed that commuters were satisfied with the fare levels. Bus users were satisfied with operational services, including ticketing, driver’s skills, and staff behavior. Operating coverage, such as the number of bus stops, travel speed, and waiting time were assessed relatively lower (refer to Figure 2.3.20).

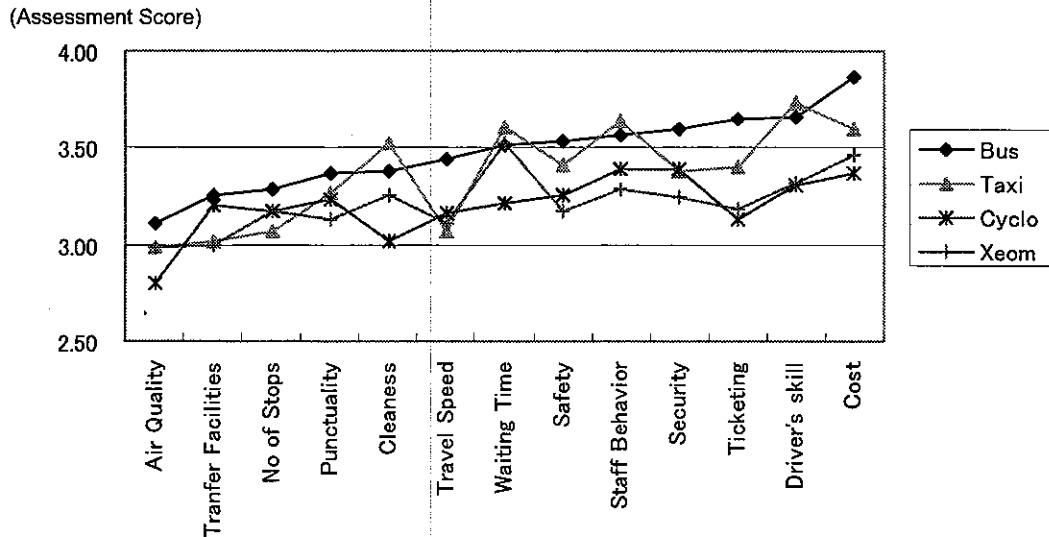
On the other hand, comfort, including air quality and cleanliness, were assessed at a low level except by taxi passengers. Moreover, commuters expected better services with air-conditioned bus and implied their willingness to pay about 3,000 VND (refer to Table 2.3.14).

Figure 2.3.19 People's Concerns on and Assessment of Bus Services



Source: HOUTRANS HIS

Figure 2.3.20 Users Assessment of Public Transport Services



Source: HOUTRANS Public Transport Users Interview Survey

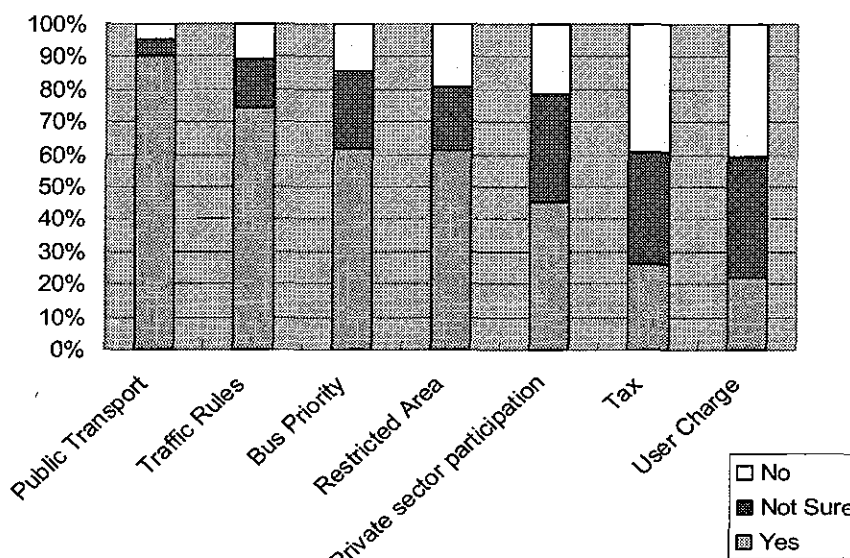
Table 2.3.14 Willingness to Pay for Using Air-conditioned Buses

		Bus Users		Taxi Users		Cyclo Users		Xeom Users	
Willingness to pay for air-con?	Yes	677	67.8%	220	74.3%	39	59.1%	139	57.2%
	No	322	32.2%	76	25.7%	27	40.9%	104	42.8%
How much? (VND)		3,293		3,017		3,705		3,263	

Source: HOUTRANS Public Transport User Interview Survey

People's Opinion on Future Transport Policy Direction: Ninety-five percent (95%) of the respondents said that HCMC should be directed towards a public-transport-oriented city. Ninety percent (90%) said ownership and use of motorcycles should be controlled. People supported a more regulated urban transport policy, although 20-25% did not want to shoulder additional costs (refer to Figure 2.3.21).

Figure 2.3.21 People's Opinion on Future Transport Policy Direction



Source: HOUTRANS HIS

On the other hand, users interviewed in each mode, including private mode (motorcycles, bicycles, cars) and public mode (buses, taxis, cyclos, and xe oms) showed differences on expectations on buses. Bus users and other public transport users expected more from the buses, while private mode users, especially car users, did not have high expectations on bus transport or public transport.

Table 2.3.15 Expectation of Future Public Transport

Mode		Bus		Taxi		Cyclo		Xeom		Motorcycle		Bicycle		Car	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Favor of More Buses?	Yes	972	94.6%	301	88.3%	49	94.2%	218	80.4%	718	66.4%	118	74.2%	159	44.4%
	No	55	5.4%	40	11.7%	3	5.8%	53	19.6%	364	33.6%	41	25.8%	199	55.6%
Favor of LRT?	Yes	909	89.6%	304	89.1%	42	82.4%	226	83.1%	866	81.2%	141	89.8%	248	69.5%
	No	106	10.4%	37	10.9%	9	17.6%	46	16.9%	200	18.8%	16	10.2%	109	30.5%

Source: HOUTRANS Public Transport User and Private Mode Users Interview Survey

2.3.2 Safety

Traffic Accidents and Safety in Vietnam

According to the MOT's "National Traffic Safety Program (NTSP) for the Period 2001-2005", about 145,760 traffic accidents were reported all around the country from 1990 to 1999. These accidents killed 48,436 and wounded 155,649 (excluding victims of maritime and air traffic accidents). It was also reported that the total economic loss caused by traffic accidents is about US\$ 200 million per year. In 2000, around 23,300 traffic accidents occurred, killing 7,924 and injuring 25,693. Table 2.3.16 shows traffic accidents by mode.

Table 2.3.16 Traffic Accident by Mode in Vietnam, 2000

Mode	No. of Accidents	%	Fatalities	%	Injuries	%
Road	22486	96.39	7500	94.65	25400	98.86
Rail	336	1.44	151	1.91	213	0.83
Waterway	385	1.65	261	3.29	67	0.26
Maritime	120	0.51	12	0.15	13	0.05
Total	23327	100.00	7924	100.00	25693	100.00

Source: National Traffic Safety Program (NTSP) for the Period 2001-2005, MOT

The figures clearly show that most traffic accidents are road-related. About 95% of the fatalities happened on the road. Compared with other countries in the ASEAN, the accident rate in Vietnam is very high (Table 2.3.17).

Table 2.3.17 Road Traffic Accidents

Country	Accident Rate (fatalities/million veh)
Malaysia	597
Philippines	274
Singapore	290
Thailand ¹⁾	610
Vietnam	1,102

Source: 1st GRSP ASEAN Seminar 2001; NTSP

¹⁾ Data for Thailand- 2000; others 1999.

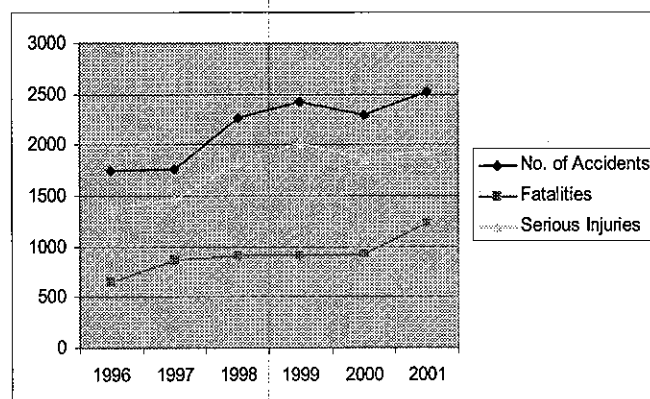
The MOT's *Report on Strengthening Traffic Order and Safety for the Period 2001-2005* released in April 2000 stated that the main reason for traffic accidents is clear violation of traffic laws. According to 1998 statistics, about 80% of the road accidents were caused by traffic users, with speeding (34%) and improper overtaking (42%) as the most common types of violation.

Traffic Accidents and Safety in Ho Chi Minh City

Data from the Traffic Police showing the number of traffic accidents which occurred in HCMC in 1996-2001 is shown in Table 2.3.18. The number of fatalities doubled in five years and now is alarmingly high considering the size of the city and the number of registered motor vehicles. Figure 2.3.22 shows the trend of accidents over this period.

The highest number of fatal and serious accidents commonly occurred on Sundays. The worst hours recorded would start from 20:00 and peaked from 21:00 to 23:00. This indicates that most of the accidents occurred during social rather than working time. The influence of alcohol could have a significant impact on these accidents.

Figure 2.3.22 Trend of Traffic Accidents in HCMC



Source: Traffic Police, HCMC

Table 2.3.18 Accident Record

Year	Total No. of Accidents	Fatal
1996	1,749	653
1997	1,765	871
1998	2,259	910
1999	2,418	912
2000	2,299	929
2001	2,519	1,224

Source: Traffic Police, HCMC

The number of accidents and injuries was, on the other hand, not high. It was assumed that not all accidents were reported to authorities if there was no fatality or serious injury.

Existing Traffic Accident Reporting System

Traffic accident recording and processing is done manually. About five years ago, computerization of traffic accident data through the development of a database was initiated for Ho Chi Minh City. During the MVA project, the Microcomputer Accident Analysis Package (MAAP) version 5 was even translated to Vietnamese and was used for a demonstration project. A training program on the use of the software was conducted for the staff of the Police, the TUPWS and the TDSI South. Unfortunately, at present nobody is handling the database.

Causes of Traffic Accidents

The reported causes of traffic accident in HCMC are given in Table 2.3.19.

More than 92% of road accidents were attributed to drivers' error. But this can be seen as mere violation of traffic rules and regulations. Two major violations are identified:

- a) Speeding and/or lack of control of speed. There is a very strong correlation between drunk driving and lack of control of speed.
- b) Encroachment on opposing lane. Accidents due to this were oftentimes more severe because of direct head-on collision between opposing vehicles

Table 2.3.19 Causes of Traffic Accidents (HIS)

Cause	%
Motor vehicle drivers	92.88
- Speeding	
- Not giving way	
- Driving on wrong lane	
- Encroaching on opposite lane	
- Not keeping a safe distance	
- Careless turning	
- Entering prohibited roads, driving in wrong direction	
- Drunk driving	
- Driving without license	
- Self-caused accident	
- Others	
Unsafe vehicles	0.71
Non-motor vehicle drivers	3.36
Pedestrians	2.99
Roads	0.05
Others	0.02
Total	100.00 Total

Source: Traffic Police, HCMC

Traffic Safety Campaign

The Police conduct traffic safety campaign every year through the media (newspaper, TV, etc.) and actual campaign. November is declared as a 'Traffic Safety Month'. During this period, the visibility of police with the assistance from youth volunteers is quite noticeable. The Police have a TV program on traffic enforcement and safety aired every Tuesday. The program starts at 21:00. Unfortunately, there are doubts on the effective viewership of this program since by that hour many people are often enjoying the cool outside air in parks or are having family motorcycle rides.

Government Policy

The rapid motorization (particularly of motorcycles) has led to the overwhelming increase in traffic accidents. The increase in motorcycle population can be traced back to the policies formulated by the government in the latter years of the 90s as shown in Table 2.3.20.

The report by the Department of Investment, Ministry of Trade, during the HCMC Traffic Safety Section-Laborer Newspaper Seminar on 14 November 2002, stated:

'In developing countries where the people's income is still low and transport network capacity is limited, motorcycles have become an important means of transport to support production and daily activities.'

Alongside with this policy, the government had no control on the licensing of the drivers who would use them. From the preliminary results of the HIS, about 70% of young drivers (17 years old and below) own motorcycles but do not possess a driver's license. It is no wonder then that the population of motorcycles has tremendously increased during the last years. Together with the boom of motorized vehicles, unfortunately, there is a corresponding increase in the number of traffic accidents.

Table 2.3.20 Government's Policy on Motorcycles

Policy	Year							
	97	98	99	00	01	02	03	04
Allow enterprises to import completed motorcycles at given volume each year	←							
Set up motorcycle manufacturing industry in Vietnam with proper <i>domestic- foreign sharing</i> plan	←							
Regulated importation of completed motorcycles and components (CKD) but encouraged importation of IKD components		→						
Only importation of IKD allowed			→					
1.8 million sets of motorcycle components were imported				—				
2.5 million sets of components were imported					—			
<i>Government puts limit to 1.5 million sets per year</i>						→		
Discontinue granting new investment licenses for production and assembly of motorcycles							→	
Imposition of 100% tax (minimum) on importation of motorcycles and completed engines; current tax rate on components maintained							→	
Setting technical standards for motorcycles and motorcycle components						→		
ISO 9001 certification for motorcycle production								→

Source: Study Team

People's Awareness of Traffic Safety and Accidents

The HIS showed that about 17% of the respondents figured in traffic accidents. Among these respondents, 68% and 32% were victims and offenders, respectively. In terms of mode, the motorcycle was involved in more than 87% of the accidents. A motorcycle hitting/colliding with another accounted for more than 50% of the total number of accidents (see Table 2.3.21 and Table 2.3.22). Pedestrians and cyclists were more likely the victims.

Table 2.3.21 Types of Vehicles Involved in Accidents (Victims)

		Mode of Other Party						Total
		Truck/bus	Car	M/C	Bicycle	Walk	Others	
Model of Respondent	Truck/bus	0.2	0.2	0.3	0.0	0.2	0.0	0.9
	Car	0.5	0.4	0.8	0.0	0.2	0.2	2.1
	Motorcycle	1.4	4.9	53.7	0.6	3.8	2.0	66.4
	Bicycle	0.2	0.2	6.6	0.1	3.5	0.2	10.8
	Walk	0.2	0.5	13.8	0.2	2.4	0.3	17.3
	Other	0.1	0.0	1.2	0.0	0.2	1.0	2.4
	Total	1.5	6.3	76.5	1.0	10.2	3.6	100.0

Source: HOUTRANS HIS

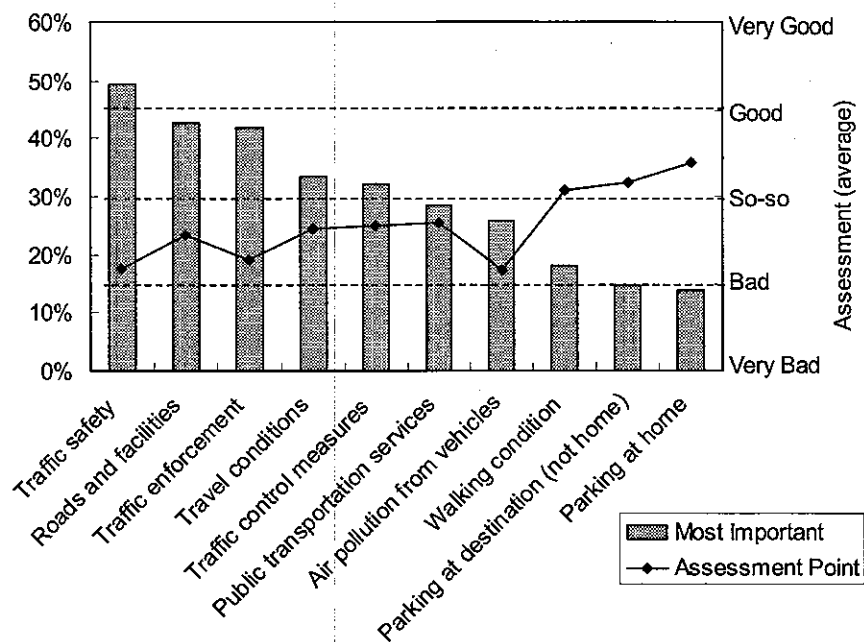
Table 2.3.22 Types of Vehicles Involved in Accidents (Offenders)

		Mode of Other Party						Total
		Truck/bus	Car	M/C	Bicycle	Walk	Others	
Model of Respondent	Truck/bus	0.1	0.1	0.9	0.0	0.1	0.0	1.3
	Car	0.1	0.3	1.6	0.1	0.7	0.1	3.1
	Motorcycle	0.8	1.2	39.2	6.0	29.1	1.8	78.1
	Bicycle	0.0	0.0	1.2	0.0	0.5	0.0	1.6
	Walk	0.9	0.1	3.6	2.6	7.4	0.5	15.1
	Other	0.0	0.1	0.2	0.1	0.1	0.5	0.9
	Total	2.0	1.9	46.6	8.8	37.8	2.9	100.0

Source: HOUTRANS HIS

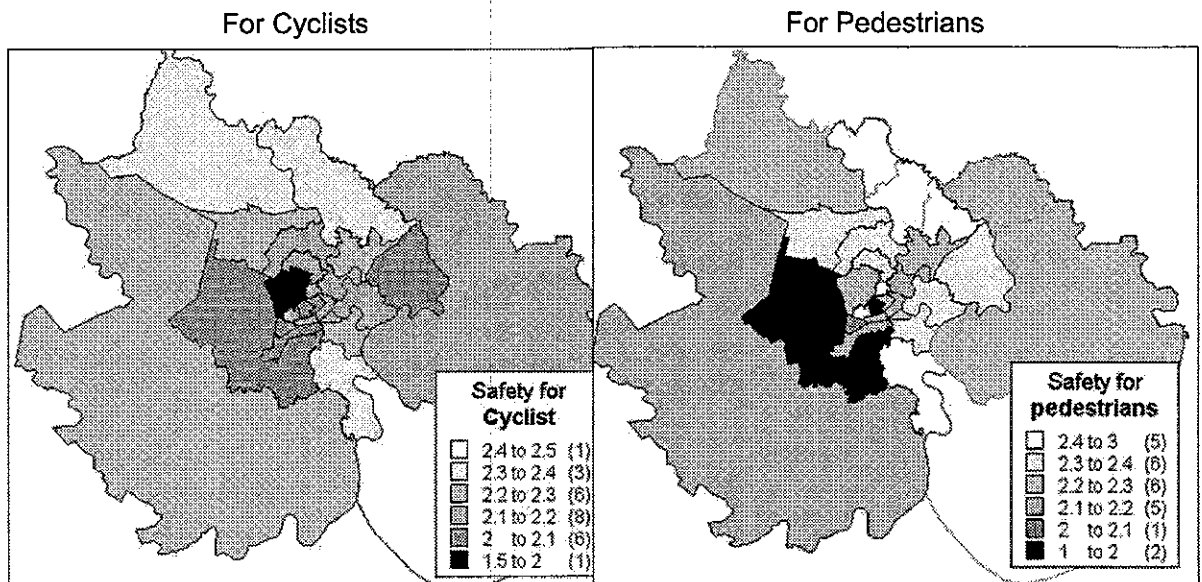
The HIS also identified that people in the study area considered traffic safety as very important and serious among various transport aspects as shown in Figure 2.3.23. In terms of safety for cyclists and pedestrians, assessment was lower in the urban central area than in the suburban areas in general.

Figure 2.3.23 People's Concerns on and Assessment of Urban Transport Services



Source: HOUTRANS HIS

Figure 2.3.24 People's Assessment of Safety of Cyclists and Pedestrians in the Community



Source: HOUTRANS HIS

Corridor Audit

A site survey was conducted along Bus Route 14, which runs between Mien Tay Bus Terminal in the southwest area of HCMC and Mien Dong Bus Terminal in the northeast. The bus route runs along the streets of Hong Bang, Ba Thang Hai, Ly Thai To, Nguyen Thi Minh Khai, and Xo Viet Nghe Tinh. The sections covered by the survey were approximately between Bar Thang Hai / Han Hai Nguyen intersection on the west side and Xo Viet Nghe Tinh / Nguyen Van Lac intersection on the east side. The following sections summarize current conditions and traffic management problems identified during the survey.

(1) Current Conditions

a) Physical Condition of Roads: The sections surveyed has one or two lanes for each direction with a varying carriage width of eight to 18 meters. A sidewalk is provided on both sides but its width varies as well from the narrow sidewalk of about 1 meter to the wide sidewalk of more than 5 meters. The sidewalk in some sections is used as motorcycle parking area, leaving a narrow space, or none at all, for pedestrians to walk on.

The roadway is generally in good condition with AC pavement. No potholes or damaged pavement are found.

b) Traffic Signals: Traffic signals are provided at the following intersections (west to east):

<u>No.</u>	<u>Main Street</u>	<u>Street Crossings</u>
1	Bar Thang Hai	Han Hai Nguyen
2	Bar Thang Hai	Nguyen Thi Nho
3	Bar Thang Hai	Ta Uyen/Ton That
4	Bar Thang Hai	Le Dai Hanh
5	Bar Thang Hai	Ly Thuong Kiet
6	Bar Thang Hai	Nguyen Tri Phuong
7	Ly Thai To	Su Van Hanh
8	Ly Thai To	Nguyen Dinh Chhieu
9	Nguyen Thi Minh Khai	Cong Quynh
10	Nguyen Thi Minh Khai	Ton Th Tung
11	Nguyen Thi Minh Khai	Cach Mang Thang Tam
12	Nguyen Thi Minh Khai	Trung Dinh
13	Nguyen Thi Minh Khai	Nguyen Tran Cong Chua
14	Nguyen Thi Minh Khai	Nam Ky Khoi Nghia
15	Nguyen Thi Minh Khai	Pasteur
16	Nguyen Thi Minh Khai	Pham Ngoc Thach
17	Nguyen Thi Minh Khai	Hai Bar Trung
18	Nguyen Thi Minh Khai	Mac Dinh Chi
19	Nguyen Thi Minh Khai	Dinh Tien Hoang
20	Nguyen Thi Minh Khai	Hoang Sa
21	Xo Viet Nghe Tinh	Pham Van Han
22	Xo Viet Nghe Tinh	Nguyen Van Lac

Two types of signal pole and head were observed. One type has vertically arranged vehicle signal heads (lanterns) of 200mm diameter on top of a straight pole. Another and newer type is a mast arm type with three sets of vehicle lanterns at the end of the mast arm, top section of the straight pole and lower part of the straight pole. The signal head of the first type uses incandescent lamp, while that of the second type has LED as light source. The visibility of the latter is not ideal. The signal head at the top of straight pole cannot adjust its angle and faces parallel to the road so that drivers see it at an oblique angle.

Likewise, there were two types of pedestrian signal -- an incandescent type, which seems to have been imported from Japan more than 25 years ago, and another of LED type -- are used.

All of these signals had outdated fixed-time isolated controller with only one timing pattern applied throughout the day. All the signals operated with two (2) phases. No separate left turn phase was used even when a left turn phase was warranted at some intersections. To complement the inflexibility of the existing signal controller, some signals were operated

manually by the Traffic Police during morning and afternoon peak hours.

Some of the signals listed above were expected to be replaced with a new ATC system signal under the WB-funded VUTIP within a year.

c) Pavement Markings: Various pavement markings were found at the surveyed section. There are three kinds of center line (double white line, single white line, and single broken line), two kinds of yellow curb line (solid and broken), pedestrian crossing with different spacing, lane line and stop line. It is not sure if the different kinds of marking were properly understood by drivers. The quality of lane marking materials does not conform to international standards in terms of whiteness and amount of glass beads.

Some of the marking layout was not adequate. The stop line was far away from the intersection (for example, at the intersection of Nguyen Thi Minh Khai / Trung Dinh). When a crossing road connects to a main road at an oblique angle, pedestrian crossing and stop line are drawn not parallel to the main road but at right angles to the crossing road leaving a wide space in front of them. This resulted in vehicles ignoring these markings.

Pedestrian crossings were provided at relatively short intervals as most crossing roads and alleys had pedestrian crossing at the intersection. Such arrangement was convenient for crossing pedestrians. But drivers did not pay much attention if there were several pedestrian crossings in short distances. No stop line was provided before pedestrian crossings at mid block.

d) Traffic Signs: Various traffic signs were installed along the route. They included: "no stopping," "no parking," "alternate day parking," "no entry," "no entry of cyclo," "no entry of truck," "no left or right turn (due to one-way system)," "stop," "minor road," "obstruction ahead," and "roundabout ahead." No speed limit sign was found.

Traffic signs were generally well installed and maintained but their number was not sufficient. Some questionable signs were also found.

e) Parking Control: The entire section can be divided into three types in terms of curb parking control: no parking section, alternate day parking section, and the section where parking is allowed anytime. Alternate day parking prohibits parking on odd or even days. When parking is prohibited on odd days on one side of a street, parking on the other side is prohibited on even days allowing parking on one side of the street only in a given day.

To supplement parking control, a yellow curb line is drawn along the section where no parking or alternate day parking is applied. It seemed a solid yellow line indicated no parking all the time, while broken yellow line meant alternate day parking. Contradictory traffic signs and pavement markings are, however, found along Ly Thai To.

f) Bus Stop: There are two types of bus stop: bus stops indicated by inner illuminated bus stop sign and bus stops with a shelter. In addition, a yellow box was drawn on the pavement showing the place where buses were expected to stop. However, most of the yellow box markings were faded and ineffective in indicating bus stop locations. Moreover, some bus stop signs were broken, making it very difficult to locate bus stops.

About half of bus stops were placed facing the bus stops for the opposite direction on the opposite side of the street. Others, however, did not form pairs. Another problem was the bus stop located inside a T-shaped intersection (Bar Thang Hai / Ha Ton Quyen

intersection) and the bus stop too close to the intersection (eastbound bus stop near Bar Thang Hai / Han Hai Nguyen intersection).

(2) Traffic Management

a) Operation: Traffic Police and youth volunteers are deployed at critical intersections during morning (6:00 – 8:00) and afternoon (16:00 – 18:00) peak hours. The Traffic Police is responsible for enforcing traffic regulations. It was observed that when the Traffic Police was present at an intersection, drivers tended to follow traffic regulations and violations were seldom committed. Youth volunteers are also deployed to assist the Traffic Police in performing their duties. They would stand on the sidewalk at the end of stop lines with a red flag and see to it that all motorcycles and vehicles do not cross the stop line.

b) Current Practice and Problems: On sections where there were two lanes in one direction, four-wheeled vehicles and motorcycles were segregated; the former took the inner lane (center-line side) and the latter the outer lane (curb-side lane). Generally, the rule was well observed by four-wheeled vehicles but motorcycles tended to encroach onto the inner lane when the motorcycle volume became larger.

One of the problems with such a scheme was in the turning movement at intersections. Right-turning four-wheeled vehicles had to cross the flow of motorcycles at intersections as swerving to the right lane at intersection approaches is practically not allowed. Right-turning movement under the right-hand side driving system is a difficult task as there is a dead angle that driver cannot see with his side mirror. As a result, right-turning vehicles had to proceed very slowly to avoid colliding with motorcycles, and this reduced intersection capacity.

On the other hand, left-turning motorcycles proceeded more freely due to their high maneuverability. They swerved to the inner lane or even crossed the center line before reaching the intersection. The way motorcycles turned left is a serious concern for traffic safety.

A left-turning movement is not disciplined in HCMC. Although there is a rule that through movements have a higher priority than turning movements, an intersection is operated on a first-in first-served basis, where both left-turning vehicles and motorcycles and through vehicles and motorcycles compete for the ROW creating an unsafe condition and reducing intersection capacity.

At two-lane sections (one lane each direction) between Nguyen Thi Minh Khai / Nguyen Tran Cong Chua and Nguyen Thi Minh Khai / Dinh Tien Hoang, four-wheeled vehicles and motorcycles were mixed up in one lane. As a result, both vehicles and motorcycles disrupted each other's movement. Running speed on this section was thus lower than a four-lane section due to the friction between four-wheeled vehicles and motorcycles. Such a situation was particularly apparent on the narrow two-lane section of Nguyen Thi Minh Khai between Nam Ky Khoi Nghia and Hai Ba Trung.

No left-turn bay was found even at the intersection where left turn volume was high and the approach had sufficient width for an additional left turn lane. A lack of knowledge on controlling traffic flow separately by movement (left turn and through plus right turn movements) seemed to be the background of such intersection design.

(3) Bus Operation

As the frequency of bus service was not high, no significant observation of bus operation was made during the site survey. One noted finding was that most intra-urban buses carried bicycles on their rooftop. Whenever a passenger with a bicycle boarded a bus, one bus conductor climbed up to the bus rooftop and another bus conductor on behalf of the passenger lifted the bicycle for the first conductor to place it on the bus roof.

It was observed during the site survey that buses had 60 to 100% occupancy rate along the route.

(4) Summary of Problems

The current conditions and traffic management problems along Bus Route No. 14 described above can be summarized as follows:

- Uncontrolled and unsafe left turn movement, particularly by motorcycles.
- Inadequate signal phasing and inflexible signal timing.
- Inadequate pavement marking layout and substandard pavement marking material.
- Inconsistent parking restriction measures.
- Different types of bus stop and damaged or worn-out facility (bus stop sign and yellow box marking) at some bus stops.
- Pedestrian crossing at short interval.

(5) Applicable Measures

Various measures can help lessen the problems described above. They must all be small-scale improvements and ensure a smooth and safe traffic flow along the bus route. No additional ROW is required and no substantial capital investment is necessary to implement these measures. None of the measures are intended to promote or discourage the use of specific types of vehicles except the measure that bans entry and left turn of motorcycles. All types of vehicles, including buses and motorcycles, will benefit from the measures. Measures that favor public transport will be introduced at the next step.

- No left turn for all types of vehicles (both four-wheeled and motorcycle).
- No left turn for motorcycles.
- No entry section of motorcycles.
- Provision of left turn lanes/bays.
- Re-design and re-application of pavement markings with good materials.
- Provision of bus waiting shelters and conspicuous pavement markings to all bus stops.

(6) Current Issues on Traffic Safety

Unfriendly Environment for Pedestrians: The importance of pedestrian environment was not properly recognized. There were wide sidewalks with trees providing pleasant paths for pedestrians. But there were also sidewalks that were very narrow, occupied by vendors or obstructions, or used as parking spaces for shops fronting it. To encourage walking as the most convenient mode of transport, sidewalks must be kept in good condition and free from disturbance.

Lack of Accident Database: The present situation indicates a very high frequency of accidents along road sections, not at intersections. This is due to the defined influence area of intersections, which is up to the pedestrian crossings only. There is also a lot of useful information for planners and engineers which could not be revealed with the current practice of manually processing accident data.

Undisciplined Behavior of Drivers and Pedestrians: The problem on road safety has reached a very alarming stage as shown by the number of deaths and serious injuries. While the HIS result showed that people were seriously concerned about traffic safety, the level of awareness of road safety was still very low. Many drivers particularly motorcycle drivers were not well disciplined and tended to ignore traffic rules and manner. No priority rule was followed between conflicting movements at intersections. On congested roads, encroaching on the opposite lane was a common practice. Contra-flow of motorcycle was often seen. Pedestrians were not respected and even threatened when they crossed the streets at pedestrian crossings. On the other hand, pedestrians were also not disciplined and jaywalking was commonplace.

Weak Enforcement of Traffic Rules: The country has enough rules and regulations to ensure road safety. However, enforcement of such regulations is very weak. In particular, those regulations that could spell the difference between life and death are partially enforced or not at all.

(a) Wearing of Helmets: The helmet law was supposedly intended for all motorcycle users. However, drivers are now only required to put on helmet when traveling along high-speed roads outside the city. The reasons cited were rather shallow. Drivers found helmets inconvenient especially when making short trips. Lady drivers found them uncomfortable and 'not fashionable'. The people recognize the necessity of wearing helmets for safety but putting it into practice is a different matter. It should be noted that most Southeast Asian countries have managed to introduce compulsory helmet wearing.

(b) Speeding: Speeding is only checked on highways outside the city using speed guns. Similar to the issue of wearing helmets, this is based on the premise that high speeds cannot be attained on city roads. However, statistics show that most accidents occur within inner urban roads.

(c) Drunk Driving: One of the main causes of lack of control over speed is drunkenness. Enforcement was carried out before but is no longer practiced due to lack of apparatus.

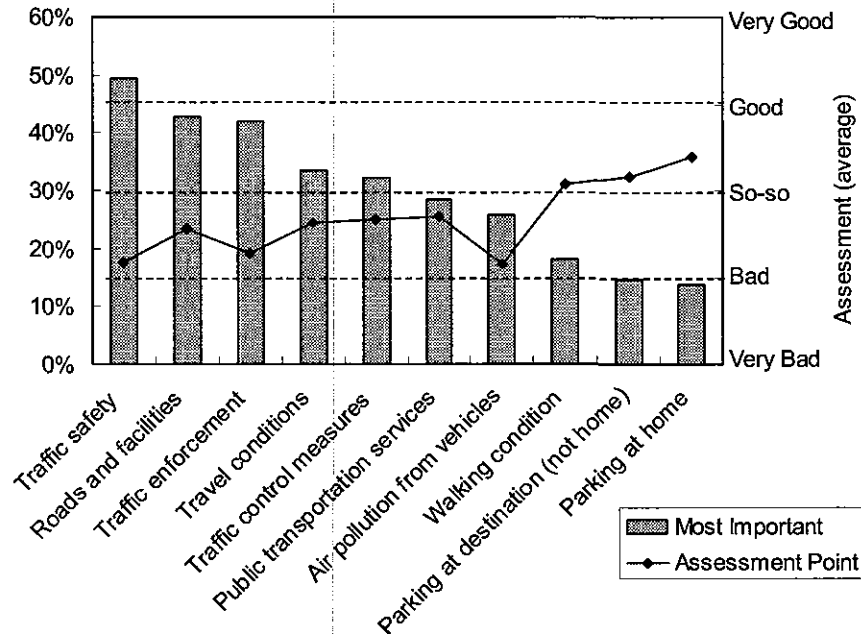
- Reduction in the number of pedestrian crossings and provision of additional street lighting at pedestrian crossings.
- Installation of additional traffic signs.
- Painting of curbs in appropriate colors indicating parking restrictions.

Existing Traffic Accident Reporting System: Traffic accident recording and processing are done manually. About five years ago, computerization of traffic accident data through the development of a database was initiated for Ho Chi Minh City. During the MVA project, Microcomputer Accident Analysis Package (MAAP) version 5 was even translated to Vietnamese and was used for a demonstration project. A training program on the use of the software was conducted for Police, TUPWS and TDSI South personnel. Unfortunately, nobody is handling the database at present.

People's Awareness of Traffic Safety and Accidents: The HIS results showed that about 17% of the respondents figured in traffic accidents. Among these respondents, 68% and 32% were victims and offenders, respectively. In terms of mode, motorcycles were involved in more than 87% of the accidents. A motorcycle hitting/colliding with another accounted for more than 50% of the total accident number. Pedestrians and cyclists were the more likely victims.

The results also revealed that the people in the study area considered traffic safety as very important and serious among various transport aspects as shown in Figure 2.3.25. In terms of safety for cyclists and pedestrians, the assessment was lower in central urban areas than in suburban areas in general.

Figure 2.3.25 People's Concerns on and Assessment of Urban Transport Services



Source: HOUTRANS HIS

2.3.3 Environment

1) Institutional Framework for Environmental Protection

Environmental Administration: The Department of Natural Resources and Environment (DONRE) and the district environmental management units are in charge of ensuring that establishments comply with environmental preservation laws through business registration; resolution of claims of residents and inspection; organization of training in treatment technology for enterprises; and implementation of pilot projects in the industry, together with awareness-raising activities.

At present, there is insufficient implementation of the State's management responsibilities for environmental preservation from the central, local, city, and district level, which has resulted in less incentives for enterprises to consider environmental preservation as a legal responsibility. Greater cooperation between departments is critical in improving the environment in HCMC.

Laws and Regulations on Environmental Protection: On 27 December 1993, the Environmental Protection Law was passed by the National Assembly and the President's

Decision No. 29L/CTN put it into effect on 10 January 1994.

Article 17 and 18 of that law states that all organizations and individuals are obliged to prepare their respective environmental impact assessment (EIA) reports on their establishments and submit them to national environmental management agencies before they can receive their EIA Appraisal Decision.

After they receive the EIA Appraisal Decision or certificate proving compliance with environmental standards, they must then apply pollution control measures to meet environmental standards issued by the Ministry of Science and Technology (MOSTE) or other issuances by the Provincial PC and the Ministry of Health which, in effect, are stricter than the environmental standards issued by the MOSTE.

Monitoring System: In 1992, the HCMC's DOSTE established and operated the manual discontinuous air quality monitoring network in HCMC. The network includes four ambient air monitoring and three road stations, of which the obtained data was not sufficient and could be used only for making preliminary assessment of air pollution. New monitoring networks are necessary to get an accurate data to better manage the air quality in HCMC. The city has been a recipient of air quality programs: the first was funded by the Danish government under the framework of the United Nations Development Programme (UNDP)-assisted project, VIE/96/023, implemented in 1998-2001; the second, started in 2000, is being funded by the Norwegian government through the ADB.

2) Analysis of Existing Air Quality

Air Monitoring Data: Ambient air pollution monitoring in HCMC has been carried out by the DOSTE since 1996 and was expanded under the UNDP project. It is essential that monitoring and use of data to identify the main trends, priorities and changes required in the strategy is continued.

Ambient monitoring has shown that air pollution is a major environmental concern in HCMC and is likely to be causing significant health problems.

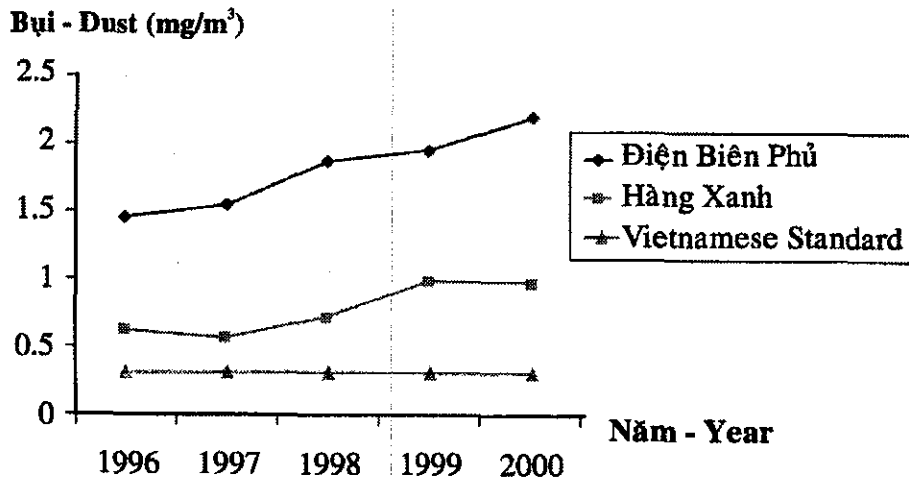
More detailed examination of the monitoring data at different locations will help identify key pollution sources. Figures 2.3.26 and 2.3.27 show results of ambient monitoring of particulates at two locations – one location near to the main roads and one location away from the main roads.

Current Levels of Air Quality: The current levels of air quality obtained from the ambient monitoring data of DOSTE are as follows:

a) Particulate matter (PM), Lead and CO

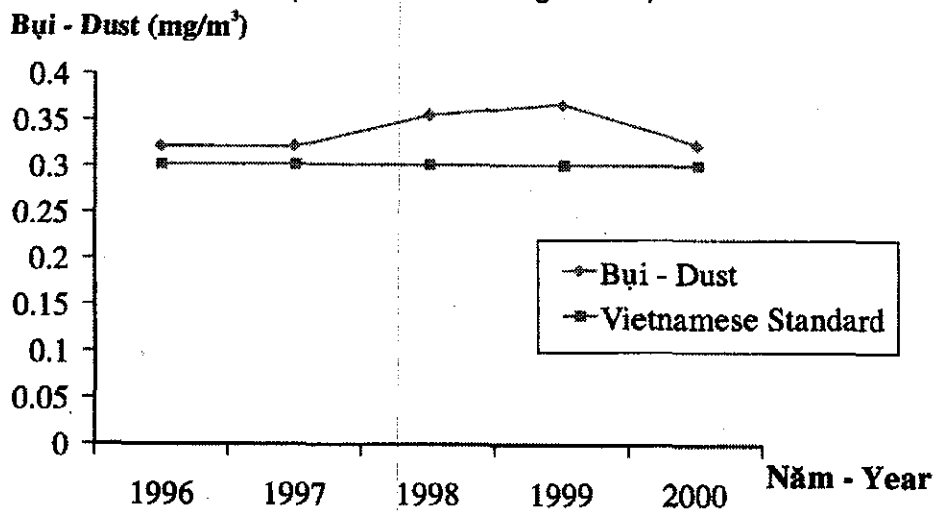
- PM levels monitored in Hang Xanh during 1996-2000 were often 2-3 times higher than the standards.
- PM levels monitored in Dien Bien Phu Street during 1996-2000 were often 5-7 times higher than the standards.
- Lead levels monitored in Hang Xanh and Dien Bien Phu during 1996-2000 were lower than Vietnam standard, but 2-3 times higher than WHO standards.
- 1hr-average CO levels monitored in Tan Binh, DOSTE, Hong Bang stations, were often 1.5-2.5 times higher than the standards.

Figure 2.3.26 Ambient Annual Average Particulate Concentration near to Major Roads
 (Dien Bien Phu and Hang Xanh Monitoring Stations)



Source: DOSTE

Figure 2.3.27 Ambient Annual Average Particulate Concentration near to Minor Roads
 (Thu Duc Monitoring Station)



Source: DOSTE

Ambient monitoring indicated that pollution near major roads in HCMC was the main problem. Near minor roads the ambient levels were lower and the pollution was less serious. This implies that traffic is the key pollution source.

Main pollution sources were old vehicles and poor road quality. Large industries outside industrial zones and small and medium enterprises (SMEs) outside industrial zones were significant sources and were likely to be causing significant localized exposure.

Although ambient levels of lead were fairly high, in the near future the concentration of lead will decrease gradually since leaded gasoline has not been available in Vietnam since July 2001.

b) Sulfur Dioxide (SO₂)

Concentrations of SO₂ in the areas surrounding an oil-fired power plants, H₂SO₄ plant, industrial combustion sources (e.g. boilers) were higher than standards. High concentrations of SO₂ can cause localized pollution problems (vegetation, crop damage, health risks).

Ambient SO₂ concentrations measured a long way from these main sources were lower than the standards (about 0.2-0.4 of standard). Therefore, SO₂ is considered an important pollutant, but lower priority than particulates and CO.

c) Nitrogen Oxide (NOx): Generally, measurements met ambient standards

Existing Air Pollution Sources: Main pollution sources are as follows:

a) Motor Vehicle Emissions: Ambient monitoring indicates that vehicles are the major source of pollution in HCMC. The number of motor vehicles registered in HCMC has rapidly increased from 939,000 in 1993 to about 1,900,000 in 1999 (Figure 3). This represents an annual average growth rate of 13.7%. This increase was believed to have contributed largely to the recent increase in air pollution in HCMC. Per capita vehicle ownership in HCMC is estimated at approximately 340 vehicles per thousand residents. Nearly 90% of the vehicles in HCMC are motorcycles, which cause the highest PM, CO, and hydrocarbon emissions.

Traffic congestion in HCMC is exacerbated by insufficient roads and the development of residential and business properties concentrated along road networks without proper planning and control. Vehicle congestion increases emissions of PM, CO, and lead from motor vehicles.

Emissions from vehicles of PM, CO, and hydrocarbons, including PAHs, cause the most concern.

The estimated emission loads in 2000 of air pollutants from vehicles in HCMC are as follows: 400 tons suspended PM (SPM), 770 tons SO₂, 2,600 tons NO₂, 39,000 tons CO, and 3,900 tons hydrocarbons.

b) Industrial Emissions: Based on industry statistics (from the General Statistic Department of HCMC) and WHO emission factors, it was estimated that air pollution loads emitted from specific industrial sectors are as follows.

Table 2.3.23 Estimated Emissions of Major Industry Pollutants

Pollution Source	Pollution Load (tons/year)		
	SPM	SO ₂	CO
Oil-fired Power Plants	650	55,000	2,000
Industrial Furnaces	580	78	84
Metal Refining and Grinding Plant	1,800	470	19,000
Cement Plant	12,793	624	153
Industrial Park	560	6,500	730

Source: Study Team

The implications from the estimated emissions are:

- Oil-fired power plants are likely to be the major sources of SO₂.
- Along with vehicles, cement plants are significant sources of particulates and the

strategy should address this source. However, it is likely that emissions of PM from cement plants only cause localized exposure, whereas emissions from vehicles cause widespread exposure.

- Some other industries cause significant releases of PM, and should be treated as a medium priority, after vehicles and cement plant.

c) Domestic Air Emissions: The main sources of pollution from domestic activities relate to burning from cooking in and outside houses. This is likely to release significant quantities of particulates and hydrocarbons, including PAHs.

The estimated results show that the 2000 domestic emission load in HCMC was 250 tons of SPM, 620 tons of SO₂, 400 tons of NO₂, 930 tons of CO, and 460 tons of hydrocarbons. Although total domestic emissions were lower than many other sources, this emission source is important as it leads to significant exposure.

Key Areas of Attention: Based mainly on ambient monitoring, but also on estimates of emissions, the priority problems for the strategy to address are therefore:

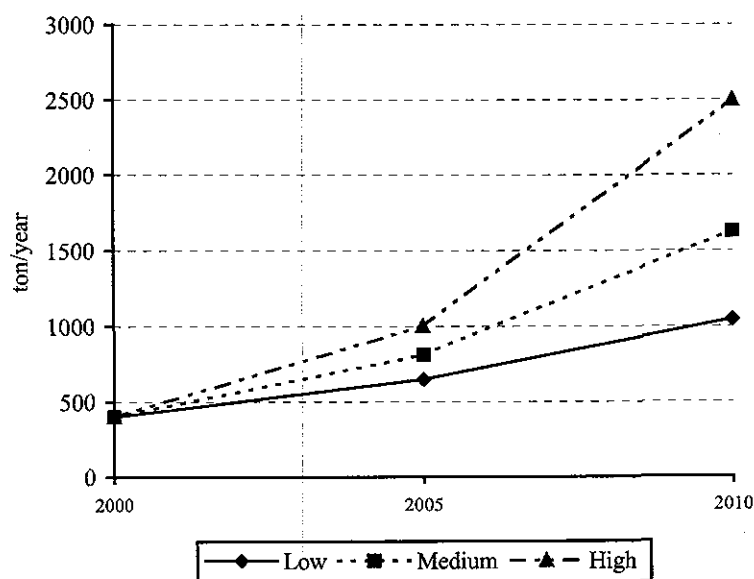
- PM and CO from vehicles
- PM from cement plants
- SO₂ from oil-fired power plants
- PM from some other industries

However, it is important for the strategy to take into account the likely future trends in emissions.

Future Air Quality Problems in HCMC in 2010:

a) Motor vehicle emissions: Based on forecast traffic growth of 10-20%/year, the total load of traffic emissions (ton/year) predicted for 2005 and 2010 years is presented in Figure 2.3.28.

Figure 2.3.28 Forecast Emissions of PM from Traffic in HCMC

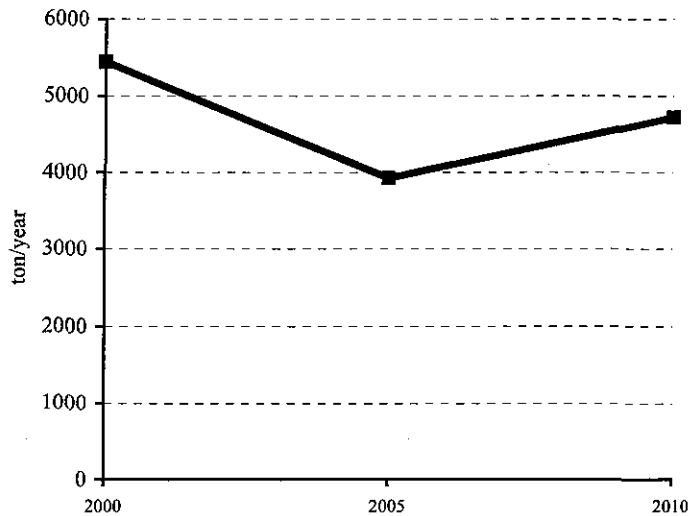


Source: Study Team

b) Industrial Emissions

Cement Plant Emissions: The forecast emissions from cement plants are given in Figure 2.3.29. Although the figures give a good indication of the likely trends, it should be noted that there is significant uncertainty associated with the estimates.

Figure 2.3.29 Forecast Emissions of PM from Cement Plants in HCMC (Medium Growth)



Source: Study Team

The estimated forecasts of emissions from cement plants were based on the following assumptions:

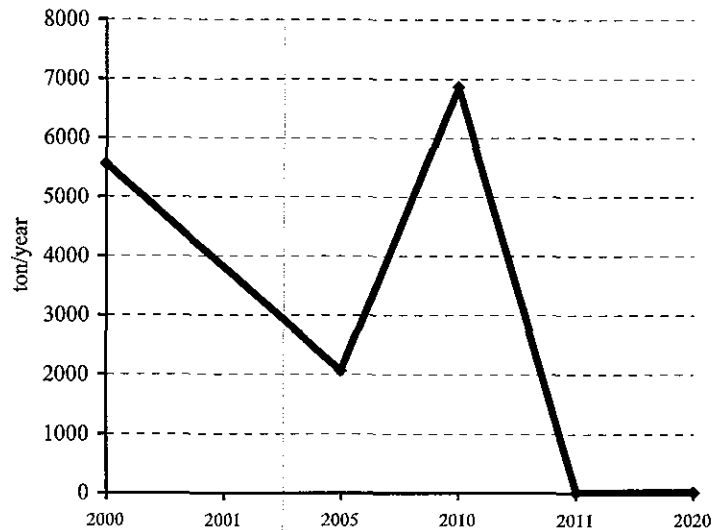
- Ha Tien remains at current operating production for the next 10 years.
- Nghi Son packing plant increases production, as planned, by nearly doubling by 2005.
- Thang Long and Ha Long grinding plants will still be operating by 2005.
- Growth in production from 2005-2010 is 11% except at Ha Tien.
- Ha Tien plant is spending significant resources to improve environmental performance and it is assumed that emissions of PM from this plant will reduce by 50% by 2005.
- Various emission factors have been assumed (WHO) for the different plant types, ranging from 90% to 99.5% efficiency.

Power Plants: The forecast emissions of SO₂ from power plants are given in Figure 2.3.30. It should be noted again that there is significant uncertainty associated with the estimates.

The estimated forecasts of emissions from power plant were based on the following assumptions:

- Hiep Phuoc power plant (oil-fired) is currently using 3% sulfur fuel, but will reduce this to 1.7% by 2005. Its capacity will increase from 375MW to 1250MW between 2005 and 2010. After 2010 it will convert to gas.
- Thu Duc power plant (oil-fired), currently running at 165MW, will convert to gas by 2005.
- Cho Quan power plant, which is a smaller oil-fired plant running at 33MW, closed in 2001.

Figure 2.3.30 Forecast Total Emissions of SO₂ from Power Plants in HCMC



Source: Study Team

Population growth and urbanization in a condition of weak and overloaded infrastructure poses serious air pollution problems, traffic jams, unstable environmental hygiene, etc. This is the main reason for the serious pollution in cities in general in Vietnam and in HCMC in particular. Vietnam should act now to implement air pollution reduction measures or it will grow into an extremely heavily polluted city in the same way as other major cities in Southeast Asia did.

It is clear from the forecasts, and from current ambient monitoring data, that the greatest air pollution impact on the population of HCMC is a result of PM and CO emissions from vehicles, and vehicles. However, PM emissions from key industries, in particular cement plants, and SO₂ emissions from power plants are important problems which should be controlled in the short term.

c) Key Air Pollution Issues in HCMC

The main air pollution problems of HCMC are related to emissions from motor vehicles, and seriously polluting large-scale and small-scale industries within residential areas, such as construction material factories.

Based on the ambient monitoring data, estimated inventory and forecasts, the following key issues must be addressed in the strategy:

Table 2.3.24 Summary of Key Issues

Issue	Summary of Problems	Priority
1. Particulate matter	Traffic	High
	Industry (particularly production of construction materials)	Medium
2. Carbon Monoxide	Traffic	High
3. Sulfur Dioxide	Oil-fired power plants	Medium
4. Odor	Canals, solid waste; Small-scale industries within residential areas	Medium

Source: Study Team

For PM, the production of construction materials has a lower priority than vehicles because there is greater exposure to the population of HCMC from vehicle emissions of PM, as demonstrated by the ambient monitoring data.

Existing Air Quality Protection Measures/Programs

The existing air quality program in HCMC is being, and will continue to be, implemented through two phases. The first phase of the program is funded by the Danish Government in the framework of the UNDP project, VIE/96/023, and the second one will be funded by the Norwegian Government through the ADB project. Many of the activities are relevant to this strategy, particularly the monitoring activities (based on the monitoring results the priorities of the strategy were identified). A summary of other relevant existing strategies, projects and activities, is given below.

Table 2.3.25 Relevant Existing Strategies, Projects and Activities

Existing Strategy/ Project	Summary	Responsible agency
Program to remove the polluting industries from residential areas.	Establishing new industrial zones for relocating polluting industries, and gaining the benefits of greater environmental control when the industries are located at the same site (e.g. shared treatment plants).	HCMC DONRE
	Establishing supporting funds for industrial relocation.	Department of Industry HIFU (Housing Fund Unit) Management Board of industrial parks (IPs) and EPZs
Motor vehicle pollution reduction	Checking motor vehicle emissions	Department of Transport and Public Works
	Planning traffic routes.	Department of Public Security
	Regulating on time schedule for motor vehicles going to the city	Police
	Reducing traffic congestion	JICA
Industrial Pollution Reduction Programme	Preparing list of seriously polluting industries ("Black Book")	DONRE,
	Establishing revolving funds and supporting funds for industrial pollution reduction.	Department of Industry Department of Planning and Investment, HIFU
	Implementing cleaner production demonstration projects	Some international agencies (UNDP, ADB, JICA, etc.).
	EIA, Registering to secure environmental standards, environmental monitoring, environmental license	

Source: Study Team

3) Other Environmental Concerns in the Study Area

Solid Waste Disposal: Based on its urban population (4.8 million people) and a waste discharge quantity of 0.66 kg waste/person/day, the annual volume of waste from people's activities in HCMC is estimated at 1,155,116 tons.

In 2010, when HCMC's population is estimated to be 7.9 million, the waste volume from people's activities will be 7,900 tons/day or 2,883,500 tons/year. The volume of solid waste from industrial zones will be 120,586 tons per year, including 7,341 tons of hazardous industrial wastes.

Biodiversity and Ecosystem: In January 2000, the Can Gio Mangrove Biosphere Reserve, which has a total area of 33,000ha, became the first biosphere reserve in Vietnam declared by the UNESCO. It is located in the southern part of Can Gio, a coastal district southeast of HCMC.

The ecosystem of the Can Gio mangrove forest has a high biodiversity, and its resources have high economic values. A master plan for its protection and rehabilitation should be formulated since the reserve has deteriorated both in quality and quantity due to industrialization, urbanization, and uncontrolled exploitation of its natural resources.

4) Environmental Considerations on Urban Transport Development

Key Air Pollution Issues in HCMC: The major air pollution problems in HCMC are from emissions from motor vehicles as well as small- and large-scale industries within residential areas, such as construction materials production.

Current Air Quality Protection Measures/Program: Relevant existing strategies, projects and activities are being conducted in HCMC, including (i) a program by the DOSTE removing polluting industries from residential areas, (ii) motor vehicle pollution reduction by the TUPWS and the Department of Public Security Police, and (iii) industrial pollution reduction program by the DOSTE.

Measures against Air Pollution by Motor Vehicles: A number of measures have to be applied to mitigate air pollution caused by the transport sector, which should be aimed not only at exhaust gas emission control but also at the improvement of fuel quality and engine specifications, implementation of in-use vehicle inspection and maintenance programs, public transport improvement through mass transit systems, and the improvement of traffic condition through better traffic management.

2.3.4 Congestion

In mega cities in developing countries, reduction in traffic congestion often becomes one of the most challenging policy issues, as economic loss due to congestion reportedly reaches 2-3% of GDP. Moreover, traffic congestion affects the poor more seriously, posing social and economic problems. Congestion is considered to have negative impacts on people's health due to the deterioration of air quality. In HCMC, traffic congestion is still limited geographically and in terms of duration. Average travel time is short with a relatively high travel speed. More road users were satisfied or feeling "so-so" about this situation (Figure 2.3.31 and Table 2.3.26). Although motorcycle accounted for a major part of the traffic, its impact on congestion was not much different from that of other transport modes because of different PCU values – motorcycle shared only 60% of the traffic, while four-wheeled vehicles and bicycle shared 20% each.

Table 2.3.26 Average Travel Time and Users' Assessment

Type of trip	Trips/day		Ave. Trip Length (km)	Ave. Travel Time (min)	Ave. Travel Speed (kph)	Assessment (%)		
	000	%				Good & V. Good	So-so	Bad & V. Bad
A. Interdistrict Trips								
To work trips	1,602	7.0	8.8	27.8	19.0	25.4	67.8	6.9
To School trips	532	2.3	7.3	23.9	18.5	27.3	67.1	5.6
Other trips	5,157	22.5	8.5	26.5	19.3	26.4	67.0	6.6
B. Intradistrict Trips								
To work trips	2,267	9.9	3.2	12.9	14.8	33.0	63.2	3.8
To School trips	1,470	6.4	2.5	12.1	12.6	34.7	62.1	3.1
Other trips	11,878	51.9	2.7	11.9	13.7	36.0	61.0	3.0

Source: HOUTRANS HIS

Photo 2.3.1 Traffic during Morning Peak Hours



Source: Taken by the Study Team

Figure 2.3.31 Estimated Traffic Volume and Volume Capacity Ratio in the Study Area¹⁾



Source: Study Team

¹⁾ Estimated based on traffic assignment of present demand.

2.3.5 Transport Sector Institutions and Administration

1) Institutional Framework

Responsibilities and economic activities are allocated vertically among the national, provincial, municipal, and city government units as well as horizontally among organizational units within a city or municipality. In the economic sphere, there are also divisions between activities devolved or left to private enterprises and individuals and those within the mandate of the government.

Due to its historical roots and socialist ideology, Vietnam is primarily centralized and unitary, where central government policy largely governs lower-level echelons, which also holds true in the economic sphere. The central government is responsible for policy making, standards setting and development, in general. The provincial and local governments are responsible for the actual implementation of policies and investment programs, from construction, supervision, to operation and maintenance (O&M). The State has always been more pervasive than the private sector.

But, in recent years, the Vietnamese Government has undertaken reforms towards decentralization (i.e. central government delegates tasks and responsibilities to lower-level political units) and devolution (i.e. government withdraws and transfers responsibilities to the private sector) which has resulted in a more proactive provincial and local government participation in the management of investments.

The main sectors at central government level are the MOT, the MPI, and the MOF. There are sub-agencies under the control of the MOT which are directly involved in the development of urban transport within HCMC, such as PMU No 1, PMU My Thuan, Road Management Unit No.7, and the TDSI South.

As Vietnam's largest metropolis, HCMC, like the capital city Hanoi, is accorded with special status within the national urban system. It has a degree of political and fiscal autonomy in urban transport and other sectors not enjoyed by other cities. The chairperson of its PC has the rank of minister and directly reports to the Prime Minister. Thus, the influence of city-level institutions is far more significant now in urban transport than those of national bodies.

Institutions at City Level

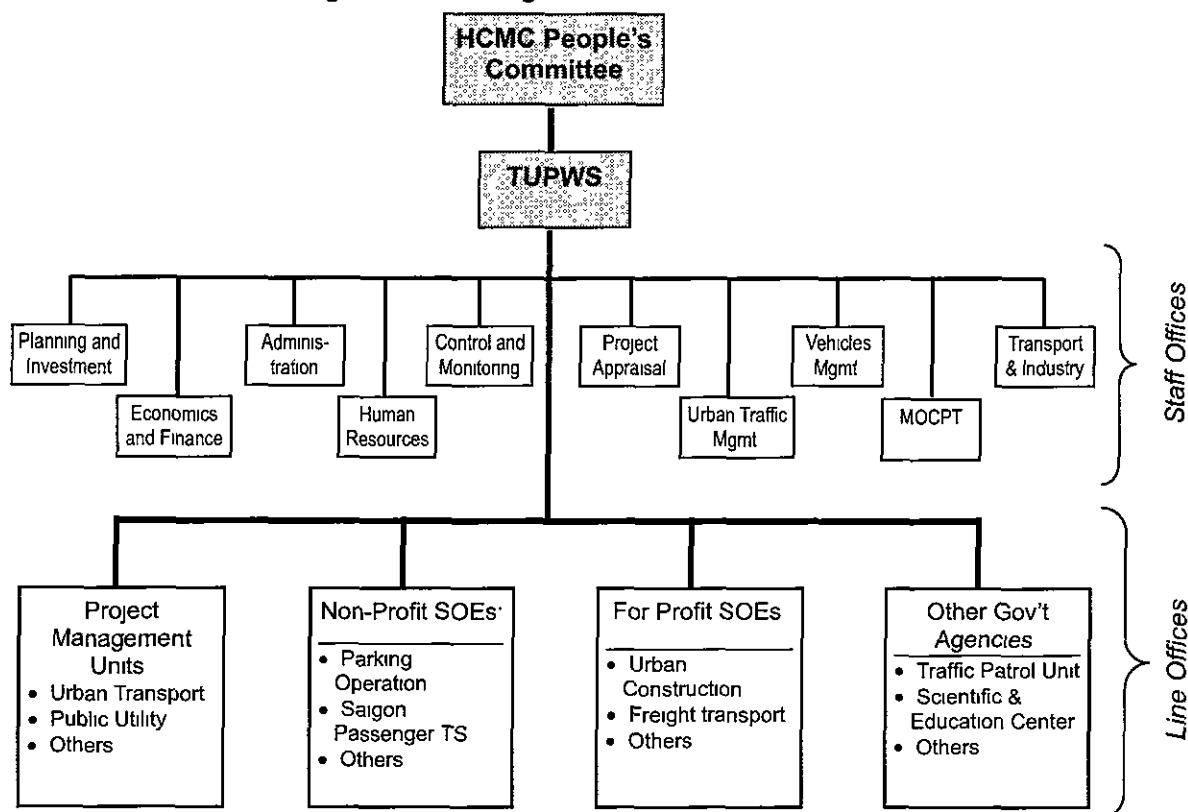
The main sector institutions at the city level are the Department of Transport and Urban Public Works (DTUPW), Department of Planning and Investment (DPI) and Chief Architect Office (CAO). Other important city government-level agencies are the Department of Land and Housing (DLH), the Institute of Economic Research (IER), and some public benefit service companies (PBSCs). In some aspects of governance, the city (through its People's Committee) has gained joint supervision over a number of national government agencies such as the Police, Taxation and Post Office.

This chapter reviews the functions of some major agencies which are directly involved in urban transport system in the HCM metropolitan area.

(1) Transport and Urban Public Works Service (TUPWS): The key question in urban transport administration is which government agency is responsible for transport infrastructure (i.e. roads) and the conveyances (e.g. buses, private cars, motorcycles, etc.)

that use the infrastructure. For HCMC, this mandate belongs to the TUPWS, which reports directly to the Chairman of the HCMC-PC. TUPWS is headed by a director and supported by five vice directors. It is responsible for the public transport sector in the city as well as other major aspects of city infrastructure such as roads, drainage system, water supply and sewerage, electricity, parks, and green areas. It is also responsible for establishing technical procedures and standards, appraising designs and construction of physical works and for inspection (refer to Figure 2.3.32).

Figure 2.3.32 Organizational Chart of TUPWS



Source: TUPWS

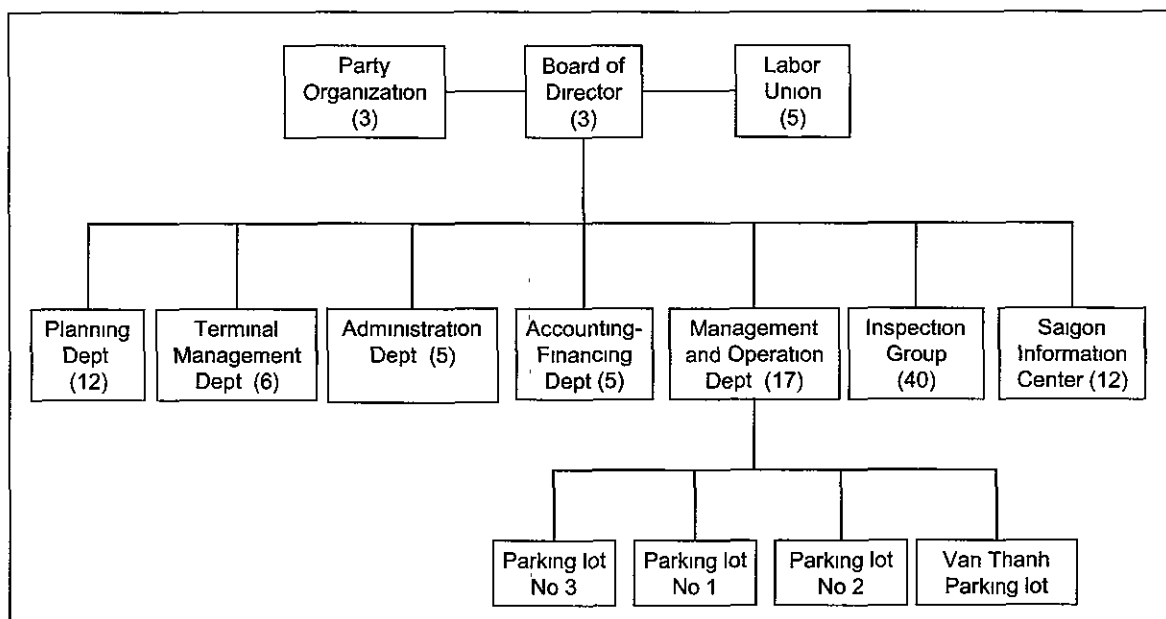
(2) Management and Operation Center for Public Transport (MOCPT): One of the units under the direct control of the TUPWS is the MOCPT, which was created by virtue of Decision No.355/1998/QD-UB-NC issued on 19 January 1998 by the HCMC-PC. It is tasked with the following responsibilities (refer to 4.1.2):

- a) **Public Transport Planning and Coordination:** This includes the conduct of studies on required infrastructure and technologies for mass transport, identification and design of public transport routes on land and inland waterways, formulation of short-, medium-, and long-term plans for public transport developments; and coordination with other government agencies.
- b) **Planning and Management of Public Transport Infrastructure:** This includes the management of city bus terminals, excluding interprovincial facilities under the SOEs and the construction, rehabilitation and/or replacement of public transport parking areas, bus stops, and waiting sheds.
- c) **Regulation of Public Transport Services:** This includes issuing franchises and signing contracts for the delivery of passenger transport services; monitoring the

performance of transport operators vis-à-vis their contracts; suspending or penalizing operators for violations or non-compliance with their contract terms; and giving recommendations for the revocation or cancellation of franchises.

- d) **Public Transport Policy Formulation and Recommendation:** This includes the conduct of studies and proposal of policies such as tax exemption, price subsidy, fares, parking charges, and the like to the HCMC-PC; conduct of activities that will promote the use of public transport (e.g. issuance of monthly tickets) as well as conduct of information and education campaigns; and dissemination of the modern techniques of public transport management.

Figure 2.3.33 Structure and Staffing of MOCPT (HCMC)



Source MOCPT

(3) Urban Traffic Management Unit (TMU): The Urban TMU is a newly established unit under the TUPWS last July/August 2002 which is integrated with the whole transport-related agencies under the TUPWS. Although planned to be composed of 42 staff, the TMU currently has only nine personnel, six of whom are engineers.

The main functions of the TMU are to formulate plans on, manage investment for, and control all urban transport infrastructures which include (i) roads, (ii) bridges, (iii) public lights (traffic light and street light), (iv) drainage, (v) environmental protection, (vi) ferries, and (vii) parks. In addition, it is responsible for traffic management activities within HCMC.

The TMU consists of eight divisions namely. (i) Administration, (ii) Planning & Investment, (iii) Accounting & Financing, (iv) Construction & Quality Management, (v) Transport Management Division, (vi) Land Acquisition, (vii) Transport Maintenance, and (viii) Project Management Unit.

In addition to the TMU, there are some social benefit companies, under the control of HCMC-PC which are responsible for specific sectors. For example, the Saigon Traffic Management Company is responsible for road construction and maintenance and the Public Lighting Company is responsible for the design, construction and maintenance of traffic lights, the operation of which is the responsibility of the Traffic Police.

(4) Department of Planning and Investment (DPI): The DPI is one of the most important agencies in terms of urban development and economic investment. It is responsible for overall management of investment and development projects within HCMC. The basic functions of this agency are described as follows:

- a) To formulate socio-economic development plan (short and long terms), in coordination with other relevant agencies and for submission to HCMC-PC, consisting of prioritized projects, which shall include both domestic and foreign investments as well as foreign-assisted projects.
- b) To formulate the budget in cooperation with the Department of Finance and Pricing for submission to HCMC-PC.
- c) To provide guidance and assistance to domestic and foreign investors on project formulation relevant to the city's socio-economic development plan.
- d) To approve and issue required licenses for investment and business in accordance with the Enterprise Law.
- e) To supervise and monitor business operations and development projects in HCMC in accordance with socio-economic development plans.
- f) To collect and manage data to forecast future socio-economic conditions in HCMC.

(5) Chief Architect Office (CAO)¹⁴: The CAO is another major agency at the city level which is directly involved in the study since urban structure and urban transport network are closely related. Urban transport network may govern the future direction of urban development. On the other hand, urban development has significant impacts on urban transport systems.

The major functions of CAO, which are provided for in No.91/CP dated 17 August 1994, are summarized as follows:

- a) To formulate an urban construction plan that includes a general plan for the whole urban areas and development for each part, which shall be the legal basis of urban management and implementation of annual investment and infrastructure construction.
- b) To review and revise the urban construction plan in accordance with actual urban development situation every five years or on shorter intervals, when necessary.
- c) To issue licenses for construction, repair or improvement of urban facilities and structures.
- d) To protect the urban landscape and environment during construction, repair or improvement of urban facilities and structure.

2) Legal Framework

The body of laws/regulations in Vietnam is extensive and has been rapidly changing in recent years in response to the devolution and decentralization shifts and the country's reorientation towards a market economy. This section reviews various transport and transport-related legislations within a number of key areas of particular relevance to the

¹⁴ CAO has been renamed to Architecture Planning Department this year

study, including: (i) investment and construction management (including the role of public-private partnership), (ii) transport business regulations, (iii) road transport and traffic law (including vehicle licensing and vehicle registration), (iv) transport safety law and environmental regulations, and (v) pricing regulations and tariff control.

(1) Investment and Construction Management: The basis for Investment and Construction Management is given in Decree No. 52/CP/1999 dated 8 July 1999, although there are many pertinent decrees issued by MPI during the period 1999-2002 particularly on BOT principles, Foreign Participation in Investment projects, etc.

Decree No. 52 applies across all sectors of the economy and gives responsibility for allocating resources in terms of three levels of investment. In the urban sector, the categories are as follows:

- a) Group A: Projects establishing and building new industrial park infrastructures (with unlimited capital), projects on major traffic projects¹⁵ (worth over 400 billion VND) and other projects related to traffic and water supply and drainage post and telecommunication, domestic BOT, construction of living quarter, intra-city roads in urban areas worth over VND 200 billion.
- b) Group B Major traffic projects (as mentioned above) worth over VND 30 billion but below the levels of Group A and other projects related to traffic and water supply and drainage post and telecommunication, construction of living quarter, intra-city roads in urban areas worth from VND 20 to 200 billion.
- c) Group C: Major traffic projects (as mentioned above) under VND 30 billion and other projects related to traffic and water supply and drainage post and telecommunication, construction of living quarter, intra-city roads in urban areas worth below VND 20 billion.

The deciding authority on the investment projects funded by State budget is decided as follows:

- a) Group A: Shall be decided by the Prime Minister or through his authorized representative
- b) Groups B and C: Shall be decided by the ministers, the heads of ministry-level agencies, agencies attached to the government, and the presidents of the Provincial PCs.
- c) Group C: May be decided by the general directors of general departments under the ministries and who are authorized by the ministers.
- d) The presidents of the Hanoi-PC and HCMC-PC may authorize the directors of the municipal DPI to decide the investment in projects with capital requirement of less than VND 2 billion.
- e) The presidents of Provincial PCs in other provinces may authorize the directors of the municipal DPI to decide the investment in projects with capital requirement of less VND than 500 million

(2) Transport Business Regulations: The principal law for transport business

¹⁵ Bridges, seaports, river ports, airports, railways, and national roads

regulations is the Law on Enterprises 13/1999. This has been supplemented by many subsector regulations on licensing for road transport subsectors. Some of the regulations are newly implemented, while some are merely updates of old legislations. For example, transport licensing regulations for road transport have often in the past defined precise routes for particular vehicles, rather than specifying categories of routes built to appropriate minimum technical specifications for particular types of vehicles. This has inhibited the efficient use of transport equipment.

The legal framework for the bus business was not well established. Many business regulations in the past have been extremely vague and have allowed considerable discretion in their interpretation. The actual interval of licenses has often been too short, less than the maximum given in the regulation. As expected, operators have complained about excessive amount of time spent on getting and renewing licenses.

Many detailed regulations on transport prices have been applied, which would normally not be enforced within a market economy. These are likely to cause distortions such as cross-subsidies and inadequate supply of transport for some services, which seems designed mainly for SOEs. (RIDA¹⁶)

However, the Vietnamese Government scrapped all the old transport business licenses under Decree No. 19 dated 3 February 2000. Any future licenses will be approved by the government in accordance with Article 6 of the Law on Enterprises (Law No. 13/1999/QH10).

(3) Road Transport and Traffic Law including Vehicle Licensing and Vehicle Registration: The Road Traffic Law is the principal law with regard to road traffic. This covers almost all aspects of road traffic that includes (i) road traffic regulation, (ii) road transport infrastructure, (iii) road vehicles, (iv) road traffic vehicle driver, (v) road transport, and (vi) state management of road traffic. This Act is supplemented with a very extensive body of licensing regulations for road traffic, vehicles, traffic management, etc.

(4) Transport Safety Law and Environmental Regulations: The principal law with regard to transport safety and environmental regulations is the Road Act 26/2001, supplemented by a very extensive body of safety regulations for road and rail modes such as those on air quality /noise standards.

However, there are some other overlapping regulations such as Decree No. 36/CP/2001, dated 10 July 1995 which is the basis for regulating road safety, and Decree No. 80-CP/1996 dated 5 December 1996, which defines the organization and operation of transport inspection activities. These said regulations have many clauses which are the same or similar to the clauses in the Road Act.

The size of investment project determines the level of EIA required, which are decided in Decree No. 175/CP. The vehicle emission and noise standards, however, appear low by international standards.

3) Transport Sector Funding

Transport project financing is sourced from a combination of city budget, national budget, and foreign and local borrowings. Since 1994, foreign funding from ODA sources has

¹⁶ Urban Transportation Improvement Study RIDA & HCMC Bus System Improvement Study World Bank

significantly increased in Vietnam. Private sector participation (PSP) is still at its infancy in Vietnam, with one BOT road project apparently completed but with heavy involvement of SOEs.

Dynamics of Resource Allocation

Under the current centralized system, the autonomous power of planning and financing in the local government of HCMC is still considerably limited, but at present is growing gradually. Planning and implementation of most capital formation-type projects are controlled and managed by the central government. Since the central government intends to allocate its financial resources over the nation to mitigate the regional income disparity, the appropriated budget for HCMC is likely to be too small to meet the demands, compared to the magnitude of economic activities and revenue generation. Moreover, the planning administration is not well coordinated among relevant departments even within HCMC.

Decree No. 42 decides on the vertical allocation of resources as well as the capable agencies, i.e. which projects are funded from the national treasury and which ones are left to the city's own resources.

The responsibility for integrating and coordinating almost all capital formation-type projects in HCMC relies with the DPI. Final approval rests with the PC which has several standing subcommittees that includes one which focuses on planning and investment. Investment planning and budgeting is initiated by the TUPWS and coordinated with the DPI and the Department of Finance and Pricing. This mirrors the set-up at the national level, where the MPI reviews annual proposals for capital expenditures, but recurrent expenditures go through the MOF.

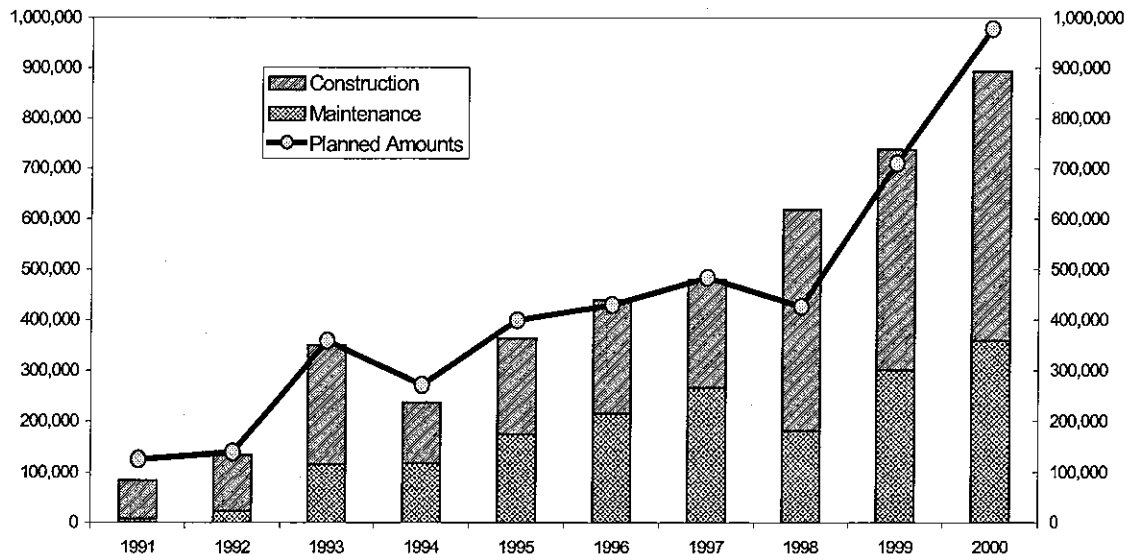
Level of Funding

The annual budget recorded by the TUPWS (i.e. funding from city's resources) over the last 10 years is shown in Figure 2.3.34. It covered expense items for construction and maintenance. Also, it should be noted that these amounts included non-transport projects which were estimated to have eaten up more than 60% of the total budget. Thus, less than 40% flowed into transport projects.

Apparently, the approval of the budget is not a constraint to start construction works since there were a number of projects that somehow managed to proceed with construction and were subsequently reimbursed from the city budget. Examples of this financing scheme is the Nguyen Tri Phuong Bridge (1st stage) and the Nguyen Van Cu Bridge which were implemented with funds advanced by State construction companies.

The average level of expenditures for construction during the last three years (1998-2000) was about VND 470 billion. Assuming 50% of it went into transport projects, this implies an expenditure level of VND 235 billion. On the other hand, the average annual requirements for priority transport projects lined up for the years 2001 to 2005 is VND 2,806 billion (refer to Table 2.3.27), which is approximately 10 times more than the actual level of expenditures. This means that funds will not be available to implement all of the projects on the list, and that substantial support from the national budget would be necessary.

Figure 2.3.34 Planned and Actual Expenditure, 1991-2000
 (Transport & Other Public Works Sector Budget for TUPWS)



Source: TUPWS

Table 2.3.27 Planned Projects for the Medium Term

(in VND billion)

Project Name	Project Cost	2001	2002	2003	2004	2005	Total 01-05
1 East-West Highway	8,100	100	2,000	2,000	2,000	2,000	8,100
2 Binh Thuan - Hiep Phuoc IP Road	150	35	103	0	0	0	138
3 Kinh Te Bridge - Binh Thuan Road	200	80	120	0	0	0	200
4 Nguyen Tri Phuong Bridge	213	65	30	30	30	30	185
5 Expansion of Cong Hoa Road	110	86	24	0	0	0	110
6 Rehab + Widening Truong Chinh	525	0	365	150	0	0	515
7 Binh Trieu 2 Bridge (Phase 2)	340	58	141	141	0	0	340
8 Binh Trieu 2 Bridge (Phase 1)	66,272		66				66
9 Sideroad Nhieu Loc-Thi Nghe	80,085	0	50	30	0	0	80
10 Nguyen Van Troi - Nam Ky Khoi Nghia	1,062	0	662	200	200	0	1,062
11 Nguyen Van Cu Passage Bridge	240	12	108	120	0	0	240
12 Tan Son Nhat- Binh Loi Bridge)	500	125	125	125	125	0	500
13 Tan Thuan 2 Bridge	150						0
14 Phu My Bridge (over Saigon river)	2,030	0	507	508	507	508	2,030
15 Eastern Ring Road (Phu My-Hanoi Highway	364	0	255	109	0	0	364
16 Rach Chiec Bridge	68	2	33	33	0	0	68
17 Thien Duong 2 Bridge	66	20	11	0	0	0	31
Total		458	4,601	3,446	2,862	2,663	14,030

Source: TUPWS

4) Project Implementation

Nationally funded projects are implemented by the MOT through its designated PMUs. Projects funded by the ADB and the WB generally have their respective PMUs. Of significance to HCMC is PMU South.

City-funded projects are implemented by the TUPWS, either by its relevant divisions or through its own PMUs. For example, a PMU was formed to handle a WB urban transport management project in HCMC.

Usually, a legal basis for the organizational unit is required from the PC. In some instances, however, the enactment gets delayed. In either case, guidance documents are issued for most administrative tasks and for every stage of the project: from identification, planning, evaluation, construction, to completion. It is not uncommon for projects to encounter delays due to unclear lines of authority and reporting, non-specific guidelines, bureaucratic procedures, and/or unqualified staff.

Transport studies and design activities are undertaken or implemented by a number of national (TDSI-South and TEDI-South) and city (DPI, TUPWS) agencies.

It is instructive to note that the implementation of the Bus Modernization project was assigned to a city-owned enterprise, the Saigon Passenger Transport Company, under the control of HCMC-PC through the TUPWS.

3 TRANSPORT POLICY FOR METROPOLITAN HCM

1) Historical Context

Like many old cities, HCMC started as a settlement on the banks of a river. At that time (circa 1650s), the dominant form of transport was water-based and the built-up area tended to follow the contours of the Saigon River and its tributaries. It became a fortified city in the 18th century and grew to become an important trading post (with Cho Lon as the urban center) during the imperial reign. The French colonization in the 19th century changed the physical characteristics of the city – many of the legacies of that era can still be discerned in the HCMC of today. The grand boulevard concept of urban planning that characterized Paris was grafted into the city, where tree-lined avenues and rotundas became common features of the city plan. The colonizers introduced the railroad by the turn of the 20th century, not as an internal means of urban transport, but as a tool to link and bring the hinterlands under control. Horse-drawn carriages, as well as steam boats and non-motorized boats, were the principal means of mobility within the city throughout the French occupation.

Motorization occurred slowly in the last 50 years, partly because of the dislocations caused by the Indochina wars followed by a brief period of economic isolation. Amidst these difficulties, the bicycle emerged as the most viable form of transport in the city. Motorized bicycles and four-wheeled cars were simply beyond the reach of most households in the 1970s and 1980s. The re-integration of Vietnam into the world economy and the concomitant shift to market economy affected HCMC much earlier than other parts of the country. It became Vietnam's gateway to international commerce. A shift in national policies, therefore, triggered dramatic transformations.

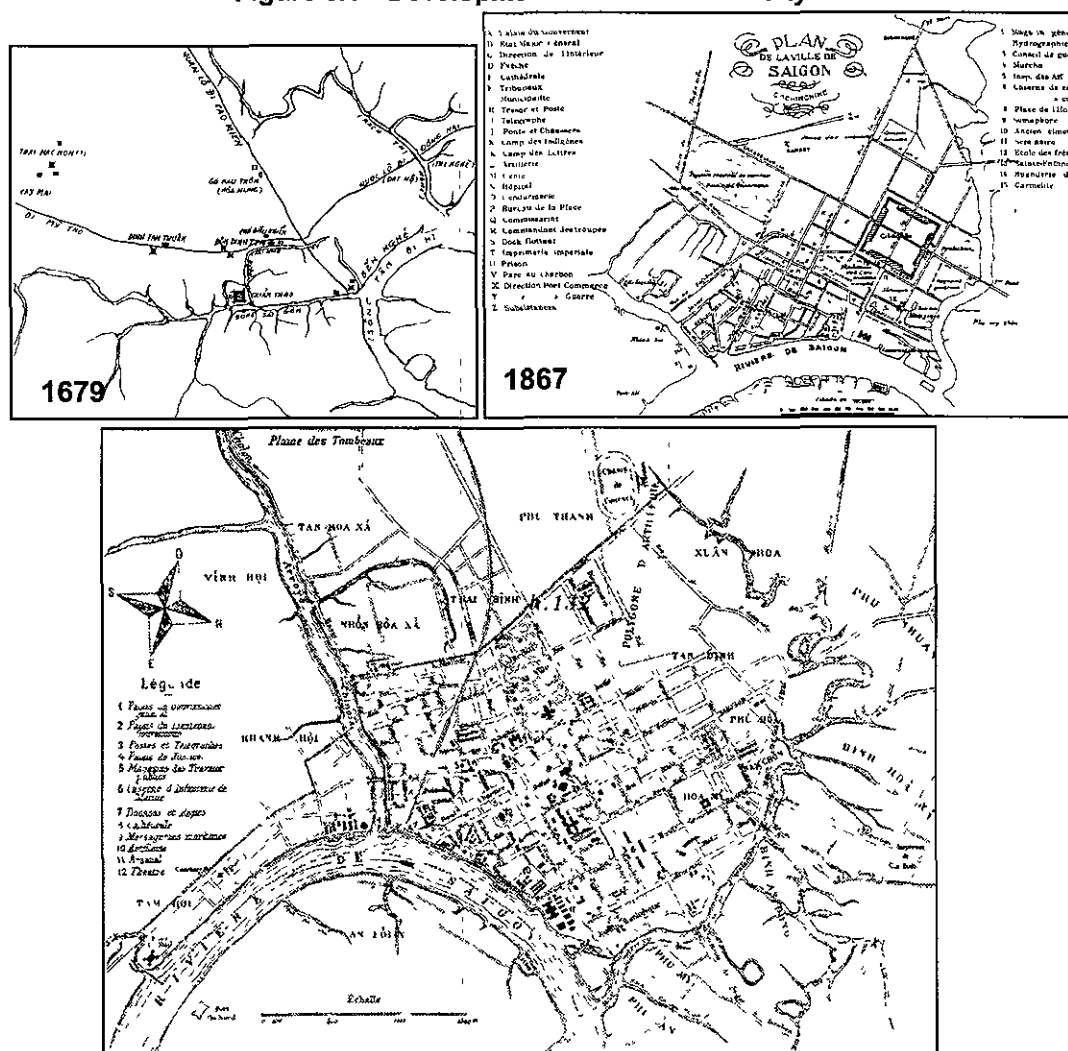
Of particular relevance was the Doi Moi reform in 1992, which also led to major restructuring also in the transport sector. The HCMC Bus Company was dissolved (i.e. privatized) and the majority of its assets turned over to five cooperatives including its original owners. Before the collectivization that followed national re-unification in 1975, the city's public transport system had been essentially under private sector. The re-privatization effectively removed any state subsidy to urban transport, except to the remaining state-owned Saigon Bus. The sudden removal of support without concomitant changes in regulatory policy stymied bus operators. With no access to foreign or domestic capital, investment in fleet expansion and rehabilitation was also constricted. Denied access to adequate public transport and in a generally liberated environment, urban commuters shifted to motorcycles.

The historical perspective is also instructive in understanding the effectiveness of 'master plans' in shaping the city. In the old days and before the 1970s, a master plan partakes of a blueprint that must be rigorously followed. Hence, it must have enough details for faithful execution by all stakeholders. This idea finds resonance in a centrally planned economy. Under a market-based economy, which Vietnam is now pursuing, such a rigid concept is no longer tenable. In the modern sense, a master plan becomes more of a general framework to guide individual actions of stakeholders in the public and private sectors. In such a role, the plan should create the policies and conditions under which stakeholders can make their own optimal choices and decisions. The complex dynamics of a metropolis

make it impossible for old planning philosophy to work.

However, the changes in planning philosophy as well as transport technologies have not yet been fully played out. The influence of the old order, although declining, is still present. Thus, of the several transport studies conducted in the last 10 years, the dominant theme is still "about railways" as the modern solution to problems on transport congestion – rather than just one option among many. A similar longing for inland waterways persist, despite its loss of market share in intra-city trips where speed is of the essence. State ownership and state control of transport services still have many believers, although in many parts of the world – socialist or capitalist – this has been reduced considerably. Internationally, however, there is now also a growing understanding that market forces alone in a deregulated environment will not always produce the city that one desires. There is a need for government guidelines and monitoring. The challenge for HCMC today is to find a constructive balance between the public sector and the private sector that can lead to the development of an economically efficient yet liveable city.

Figure 3.1 Development of Ho Chi Minh City



Source: Tu Lieu & Hinh Anh, Saigon Gia Dinh Xua, 1996

2) Prospects for the Metropolis

City growth – in terms of population, size of the built-up areas, complexity of economic activities, and household income levels – has been rapid in HCMC. It is unlikely to slow down due to the unique position of the city as the economic dynamo of southern Vietnam. The population in the study area will more than double to 13.5 million (of which 10 million will be in HCMC). A large part of this growth will be accounted by in-migration, as rural population gets attracted into the city by expanding job opportunities and prospects of better lives. Per capita GDP is expected to reach US\$5,000, or about 3 times current levels. As a consequence, some of the dramatic changes that will ensue are:

- Expanded urban boundaries: Although the central areas will retain their density, suburbanization will occur through a mushrooming of medium- to low-density residential areas as households with higher incomes seek larger living spaces, better environment, and car ownership. The adjoining provinces will become closely intertwined with the city's social and economic activities.
- Prolonged trip lengths: Average trip lengths will increase from the current 6.6km to about 10km.¹ This will increase travel-related stress for commuters using motorcycles and bicycles.
- Worsening living conditions for low-income groups in the central areas: Urban redevelopment will accelerate in the central areas for business and commercial activities, therefore exerting pressures on property values and on low-income households to relocate.

As other cities in developed and developing countries have experienced, such a scale of urban growth will entail painful adjustments – on the organs of the State as well as on the residents of the city. Undisciplined and unbridled use of motorcycles and private cars can not be permitted to persist in a much larger urban context of more than 10 million people. An ageing urban population will also need a different form of transport services.

HCMC and its adjoining areas would continue to be the main link of Vietnam to the global economy. The country's global competitiveness will therefore rely on the efficiency of transport system in the greater metropolitan Saigon.

3) Government Objectives

The city's future should be livable as well as competitive and its transport sector should support and facilitate this objective. The overall goal of urban transport is to:

“Ensure mobility and accessibility to needed urban services for its people and society, through safety, amenity and equity – towards the development of a public-transport-based city with a 50% share in the total urban transport demand.”

Seven specific objectives in the master plan were identified to meet the preceding goal:

- Promotion of social understanding about urban transport problems and issues
- Effective management of urban growth and development
- Promotion and development of attractive public transport
- Effective management of traffic and travel demand

¹ Excluding intrazonal trips.

- Comprehensive development of transport space and environment
- Enhancement of traffic safety
- Strengthening of urban transport administrative and management capacities so as to better utilize available resources in a most effective way

4) Sector Constraints

The biggest constraint is funding. There is simply no way for HCMC to buy itself out of its existing and emerging problems. Hence, it must turn more and more to the private sector – especially in the provision of transport services, rather than for the government to assume sole responsibilities. Even if it has unlimited resources, the city cannot continuously expand the provision of roads without destroying the fabric of the city nor overcoming ROW obstacles in an expeditious manner. Besides, as shown by other cities, adding more roads only leads to a vicious cycle of more cars and more congestion.

Getting more commuters on public transport is a must. However, the city is constrained by the fact that it is starting from a low base of public transport users. Unlike many developing cities which struggled against the eroding high share of public transport, HCMC must do battle in the opposite direction – enticing commuters to take the bus (and not their motorcycles) to work and to school. Old habits are difficult to break, and residents of HCMC have gotten used to individualized modes of transport. Without government involvement, change is unlikely.

A third constraint is weak institutional capability to cope with urban and transport challenges under a shifting policy environment. One way to overcome the lack of funds is to improve government's ability to harmonize land use with transport development. This, however, entails expertise and processes that are also scarce in the public sector.

5) On-going Initiatives

Even before the completion of the overall master plan, a feasibility study for two priority lines of a proposed metro rail system was initiated and completed. This major project has strategic and long-term implications – not only to the master plan, but also to the city's future.

Another ongoing initiative is the relocation of major ports along the Saigon River. Apparently, this was already decided by the city as well as by the MOT. The timing and speed of execution would alter the competitive standing of many industries in the study area – both in a negative or positive manner. It may have the salutary benefit of reducing truck traffic in the inner core, but if done too soon, the revenue base of HCMC would decline and consequently affect its future ability to fund infrastructure investments.

A bus leasing project (to add/replace old buses with 1,318 new units) was also launched in 2002; its implementation is expected to stretch to 2005. It represents the abandonment of the "hands-off" policy of the 1990s to one of active state intervention. The future of mass transit in HCMC hinges on the success of this initiative.

6) New Policy Directions

With a long-term historical perspective and a deep awareness of sector constraints, the need for new policy directions becomes clear.

A key feature of this new direction is greater reliance on the private sector – if not in the provision of transport infrastructure, at least in the operation and management of transport services. This is also consistent with the national policy towards a market-based economy. Vietnam has already enacted a law (Decree 62-98-NDCP) towards this end, but such a law is not sufficient by itself to attract private sector investments. It has to be accompanied by various reforms in the public sector – such as in the method of procuring infrastructure projects, price regulation, and in the operation of SOEs. In many instances, this may need to be triggered by privatizing existing SOEs – whether profitable or not – that are undertaking activities that should be left to the private sector. This may also entail the deliberate curtailing of public sector activities. A level playing field has to be created – between private and public entities, between foreign and local companies. HCMC should take the lead, and embrace the private sector participation (PSP) concept more fully and speedily than other cities in Vietnam. There are evidences that it is moving in this direction, albeit slowly. A number of roads has reportedly been constructed via the BOT route; these need to be reviewed critically as to whether funding and market risks have really been transferred to the private sector or merely enlarged government's contingent liabilities. In modernizing its bus fleet, HCMC has taken the more arduous (but more rewarding) option of giving private bus operators a greater role. It has to maintain this course and complement it with reforms of the regulatory regime and maximization of user charges at every opportunity. For infrastructure projects, HCMC has to be pro-active – by conducting feasibility studies to establish the business case for PSP, by defining the level of government support required in each and every project, and by marketing these to the private sector. A laidback approach will not do.

Urban controls need to focus more on preservation of the ROW (specifically, alignment and width) of future roads, rather than on neat and elegant arrangement of land uses per se. This approach will provide a clear signal to the private sector on where future growth shall be, and mold strategically the future shape of the metropolis. It is also consistent with the policy concept of the State being at the “steering wheel: and the private sector doing the “rowing” or “propelling”. In the past, both roles were assumed by the government. Tax and other incentives would do more to encourage this kind of developments outside the city core, rather than relying on the traditional instruments of administrative controls (such as grant or denial of building permits). This new policy direction will entail, among others, the following: (a) Adoption or promulgation by law of the future road network in undeveloped areas, in a flexible rather than rigid sense, that will allow minor changes in alignment without altering the overall topology. (b) Removing these future roads, at least the primary or major arterials, from the land market. (c) Preparation of a new urban plan for HCMC, preferably on a GIS foundation.

Inter-city collaboration will become necessary. As the urban areas spread outside the political boundary of HCMC and spill over to the adjoining areas, solutions to transport problems will entail a wider geographical scope. For one, a hierarchy of roads would have to be built across several local government units. Relocation of a port may be a loss to one of the districts, but a gain to another. An international airport maybe located in one city, but its benefits and catchments areas would be wider than its boundary. A metropolitan-type of institution needs to be seriously studied. Initially, an informal coordinating forum or council should be established among HCMC, Binh Duong, Dong Nai, and Long An authorities.

The eventual form of metropolitan cooperation should be discussed among them.

Aside from the aforementioned three policy directions, a number of issues could also emerge to affect future policies. These are: sustainability, resettlement, and environmental issues. All of them require a long-term outlook. Aside from economic and technical viability, a transport project would have to be planned for sustainability (maintained, operated, and supported with funds over its life), minimum dislocation (with built-in a priori provisions for resettlement of affected households), and environmental soundness (minimize air and noise pollution, or with protective measures to affected households). The implication of sustainability to a metro project, for example, is to identify and secure sources of future subsidy or to consider privatizing operation and maintenance.

4 URBAN LAND USE / TRANSPORT DEVELOPMENT SCENARIO

4.1 Methodology

Urban development in HCMC has progressed rapidly. The increase in urban population associated with economic growth and motorization has led to an expansion of the urban areas. While the population of HCMC is expected to grow from 5.4 million in 2002 to 10 million in 2020, its impact on urban development will continue to be significant. How to manage the future growth of urban areas is one of the most fundamental and critical issues for the city to address.

HCMC has its own future spatial plan in its "HCMC Urban Development Master Plan up to 2020" (M/P 2020) which was approved by the Prime Minister in 1998. The plan indicates the future urban structure and land use and is supported with a socio-economic framework. The plan intends to encourage a polycentric urban structure moving toward all directions from the existing CBD. However, the actual urban developments that have been taking place are quite different from those expected in M/P 2020. The developments have been largely in the peripheries of the existing built-up areas and toward the northeast, northwest and north of the city along the existing primary roads. Further densification of the existing built-up areas is also notable.

It is known that transport and land use are closely interactive. It is particularly the case in developing cities where land use control is lax and urban development direction and pattern are greatly affected by the availability of transport infrastructure, especially roads. An aim of this study is to assist the city to manage its future growth more effectively through an integrated planning of the transport network and urban development. The study area has started to face this trend and needs to establish a pragmatic strategy to manage urban growth. The analytical framework is illustrated in Figure 4.1.1 and briefly explained as follows:

(1) Current Urban Development Trends and Patterns: On the basis of available data, urban development trends were studied. The overall development patterns which have been taking place in urban peripheries and suburban areas have been observed by a group comprising members of the Study Team and city authorities using aerial surveys.

(2) Assessment of Development Conditions of Urban Lands: On the basis of available GIS data and other studies on flood control and soil condition, the physical condition of existing urban lands were assessed to preliminarily identify suitable areas for development.

(3) Review of Land-use and Development Plans: M/P 2020 and other key development plans of the city were analyzed to identify development constraints and determine land suitability.

(4) Assessment of Institutional Capacity to Control and Manage Urban Developments: The institutional framework and capacity to control urban development were likewise looked into.

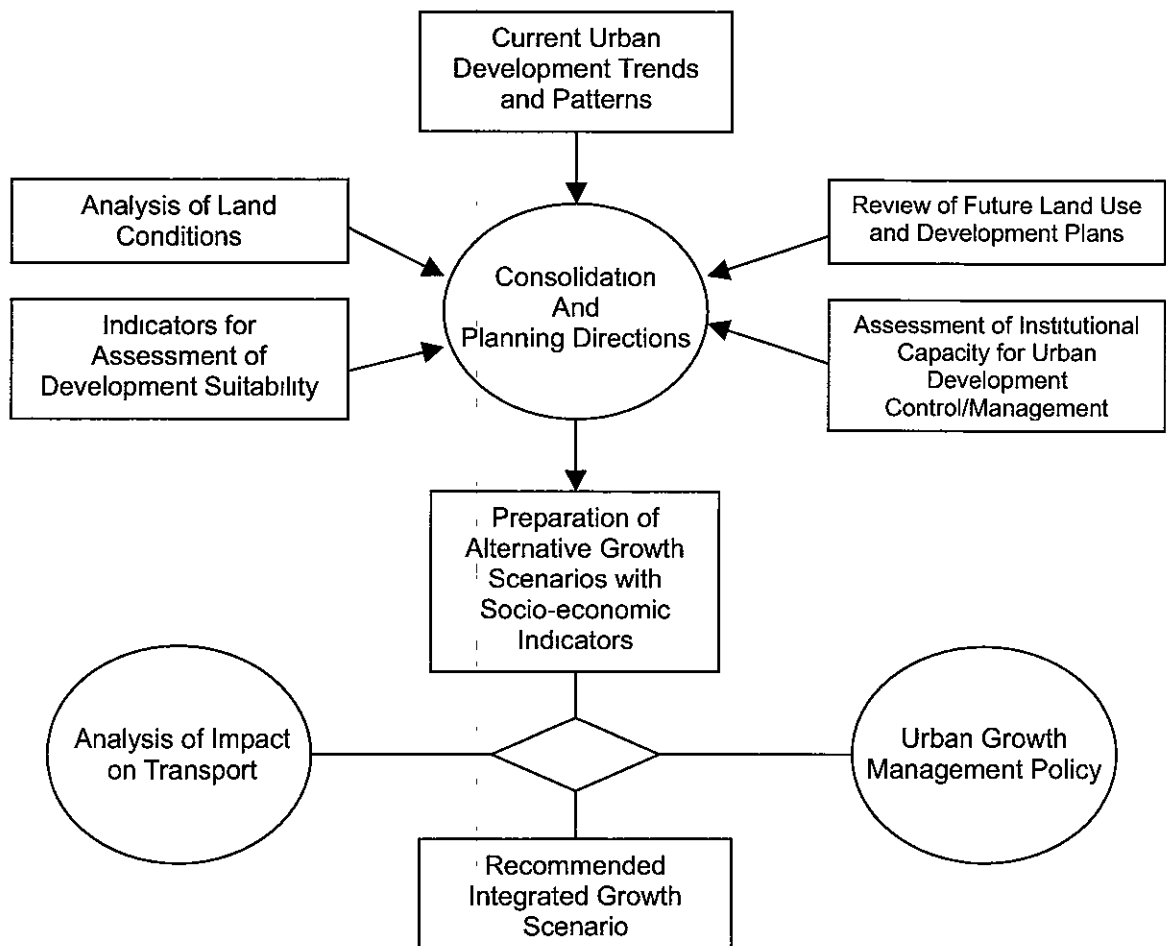
(5) Formulation of Planning Directions and Alternative Scenarios: By consolidating the above factors, the planning direction to prepare alternative growth scenarios was determined. Alternative scenarios initially prepared include:

- Growth scenario based on current development trend.
- Growth scenario predicated on M/P 2020.
- Growth scenario integrating the first two.

(6) Analysis of Impact of Urban Growth Pattern on Transport Network: On the basis of the assumed growth scenario and socio-economic indicators on population, employment, and school enrolment, the future traffic volume and distribution pattern were estimated and assigned on the future transport network. The performance of the network under different growth scenarios was assessed to provide further planning direction to modify the urban development pattern in a way that network performance is improved.

(7) Recommended Growth Scenario: A recommended scenario was worked out based on the exercise on transport network performance and basic urban growth strategy of the authorities. The process was discussed in a series of meetings and workshops to solicit the opinions and suggestions of concerned agencies. Moreover, a Task Force was organized in cooperation with HCMC’s Architecture and Planning Department (APD) and Urban Planning Institute (UPI) which have been working on adjustments on the existing Urban Master Plan.

Figure 4.1.1 Analytical Framework for Urban Growth Management



Source: Study Team

4.2 Current Urban Development Characteristics and Trends

1) Overall Urban Development Pattern

The core of HCMC is densely populated, while its peripheries and suburbs are scarcely inhabited. In general, the urban area of HCMC is still very compact. The urbanized area with high population density is formed in HCMC's 12 inner-city districts (with an area of 142km²), which is the core of the HCM metropolitan area. In particular, administrative, business, and commercial facilities are established in HCMC's eight inner-city districts (with an area of 44km²), creating an area of high population density (more than 400 persons/ha on average) with a population of more than 1.8 million. In contrast, the population density of HCMC's other areas is less than 40 persons/ha on the average, except in the fringes of the inner-city districts. Most of the areas in the adjacent provinces had a low density with an average of 10 persons/ha, with the exception of several areas in Binh Duong and Dong Nai provinces (see Table 4.2.1, Figures 4.2.1 and 4.2.2).

As for population growth, population rapidly increased in the fringe areas of the inner-city districts of HCMC particularly in the northeast and northwest of the city core (see Figure 4.2.3). Here, urban growth was mainly attributed to residential projects and industrial facilities sprouting in the areas. While on the average, the population increase of adjacent provinces was moderate, the population of Thuan An and Di An districts located along the corridor between HCMC and Bien Hoa City rapidly increased, accompanying the establishment of manufacturing facilities.

When analyzed by study zone, population growth differed. In several zones of HCMC's inner city, for example, population decreased. And in districts experiencing rapid population growth, there were still zones where the population decreased (see Figure 4.2.4). The zones with rapid population increase are located mainly along NH1A and around the south of the inner city.

Figure 4.2.5 illustrates the population growth rate from 1996 to 2002 and the population density in 2002. Judging from this figure, it was predicted that the population of high-density areas would decrease.

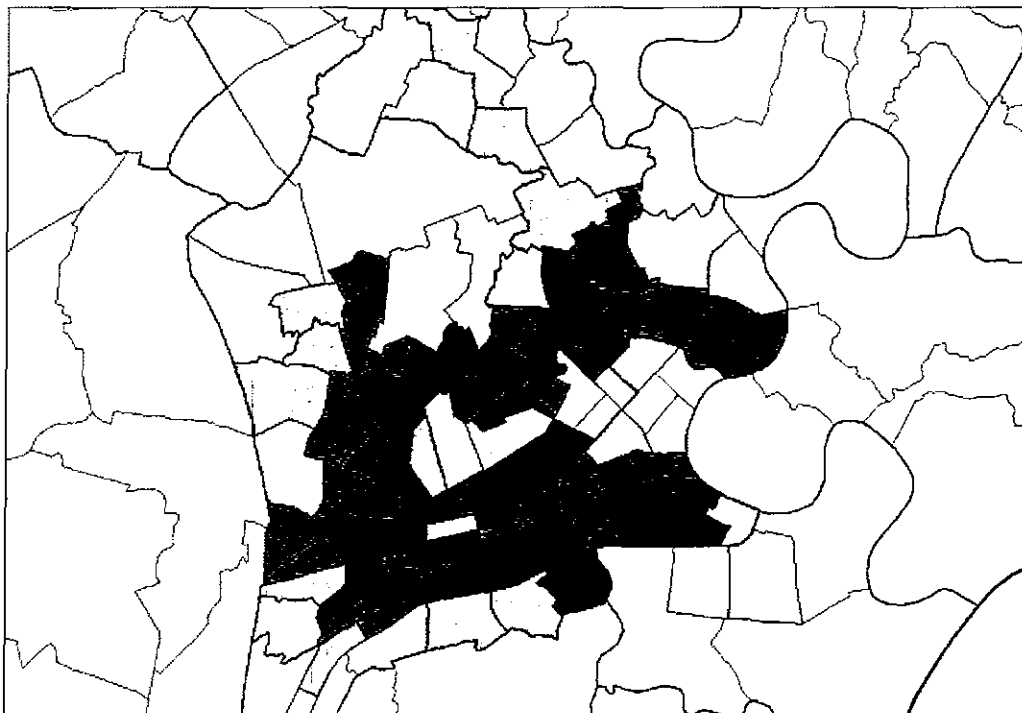
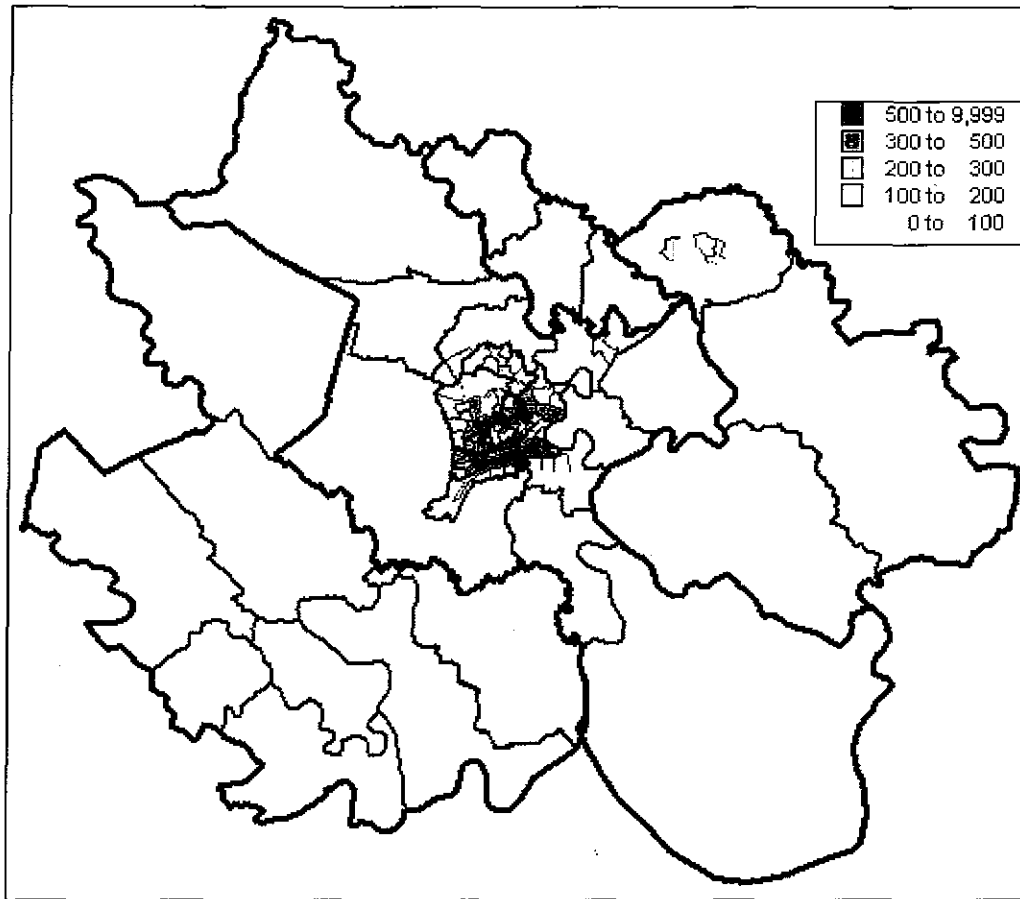
Table 4.2.1 Socio-economic Conditions of the Study Area

District		Population (000)		Population Growth (%/year)	Area (ha)		Population Density, 2001 (persons/ha)		
		1997	2001		Gross	Net ¹⁾	Gross	Net ¹⁾	
HCMC	1	District 1	221	228	0.8	773	718	295	317
	2	District 3	217	224	0.8	492	474	455	472
	3	District 4	185	198	1.6	418	353	473	561
	4	District 5	203	211	1.0	427	420	494	503
	5	District 6	247	262	1.5	719	665	365	394
	6	District 10	233	246	1.4	572	584	430	421
	7	District 11	230	244	1.5	514	516	475	473
	8	Phu Nhuan	178	184	0.9	488	470	378	392
	9	District 8	320	342	1.7	1,918	1,706	178	201
	10	Binh Thanh	390	408	1.1	2,076	1,785	196	229
	11	Tan Binh	560	635	3.2	3,845	3,818	165	166
	12	Go Vap	299	345	3.6	1,974	1,963	175	176
	13	Thu Duc	202	224	2.6	4,776	4,582	47	49
	14	District 12	163	193	4.4	5,278	5,028	37	38
	15	Binh Chanh	304	366	4.7	30,457	30,418	12	12
	16	District 2	98	108	2.5	4,974	4,175	22	26
	17	District 7	108	117	2.1	3,569	2,125	33	55
	18	District 9	144	157	2.2	11,400	9,037	14	17
	19	Hoc Mon	194	210	2.0	10,918	10,541	19	20
	20	Nha Be	60	67	2.7	10,041	7,771	7	9
	21	Cu Chi	242	256	1.4	43,450	42,414	6	6
	22	Can Gio	55	60	2.2	70,422	46,797	1	1
Binh Duong	23	Thu Dau Mot Town	134	152	3.2	8,788	8,347	17	18
	26	Thuan An	107	122	3.3	8,426	8,100	14	15
	27	Di An	94	107	3.2	6,030	5,793	18	18
Dong Nai	24	Bien Hoa City	448	495	2.5	15,473	14,127	32	35
	28	Long Thanh	182	197	2.1	53,833	52,971	4	4
	29	Nhon Trach	102	111	2.3	40,917	33,513	3	3
Long An	25	Tan An Town	111	117	1.2	7,786	8,570	14	14
	30	Can Giuoc	148	157	1.4	19,606	21,319	8	7
	31	Can Duoc	157	165	1.3	20,550	20,662	8	8
	32	Chau Thanh	95	100	1.4	15,274	15,461	7	6
	33	Thu Thua	82	87	1.4	28,594	27,003	3	3
	34	Ben Luc	121	127	1.3	21,506	26,490	6	5
	35	Duc Hoa	185	194	1.3	41,180	40,106	5	5
36	Tan Tru	58	61	1.5	10,581	9,651	6	6	
Total Study area		6,876	7,478	2.1	508,045	468,473	15	16	
HCMC	Urban Districts (12)		3,283	3,527	1.8	14,216	13,472	248	262
	Suburban Districts (8)		1,273	1,442	3.2	81,413	73,677	18	20
	Rural Districts (2)		297	316	1.6	113,872	89,212	3	4
	HCMC Total		4,853	5,285	2.2	209,501	176,361	25	30
Adjoining Districts	Binh Duong (3)		335	381	3.2	23,244	22,240	16	17
	Dong Nai (3)		731	803	2.4	110,223	100,611	7	8
	Long An (8)		957	1,009	1.3	165,077	169,261	6	6

Source: Statistical Yearbooks of HCMC, Binh Duong, Dong Nai, and Long An

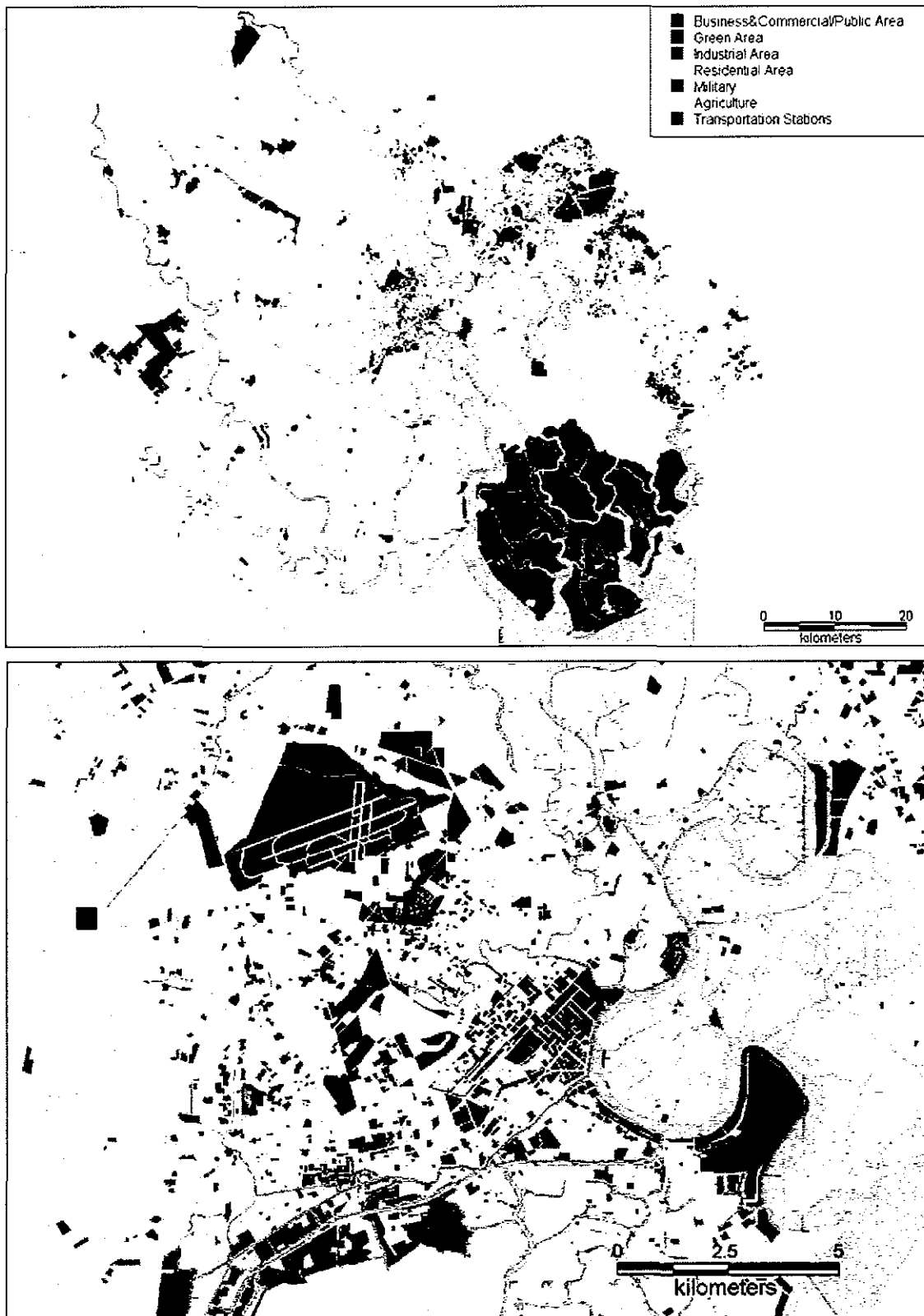
¹⁾ Study Team's GIS data excluding river areas

Figure 4.2.1 Population Density by Zone



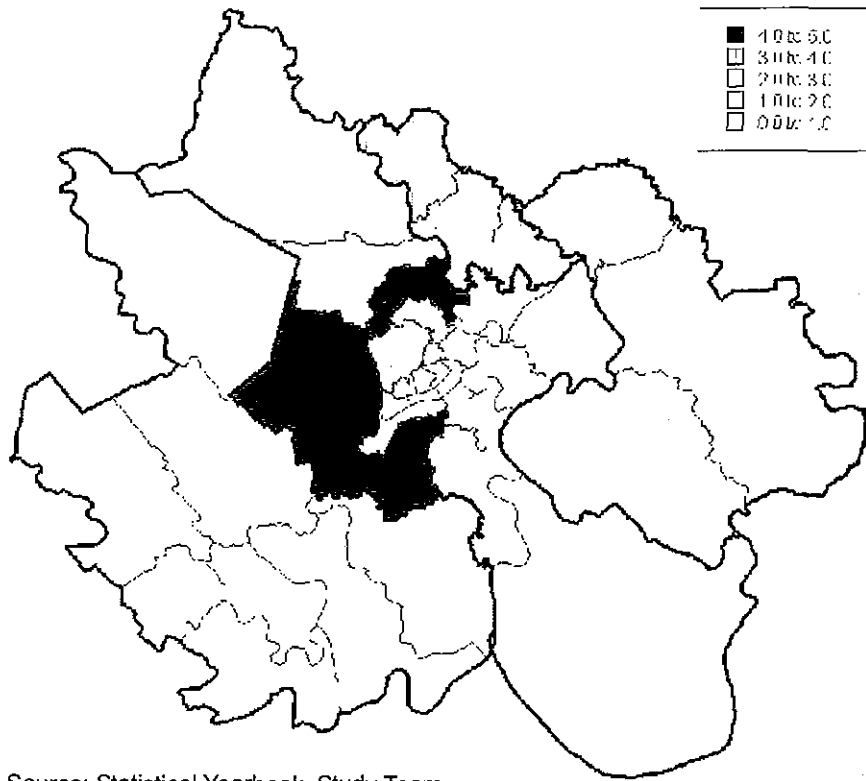
Source: Study Team

Figure 4.2.2 Current Land Uses in the Study Area



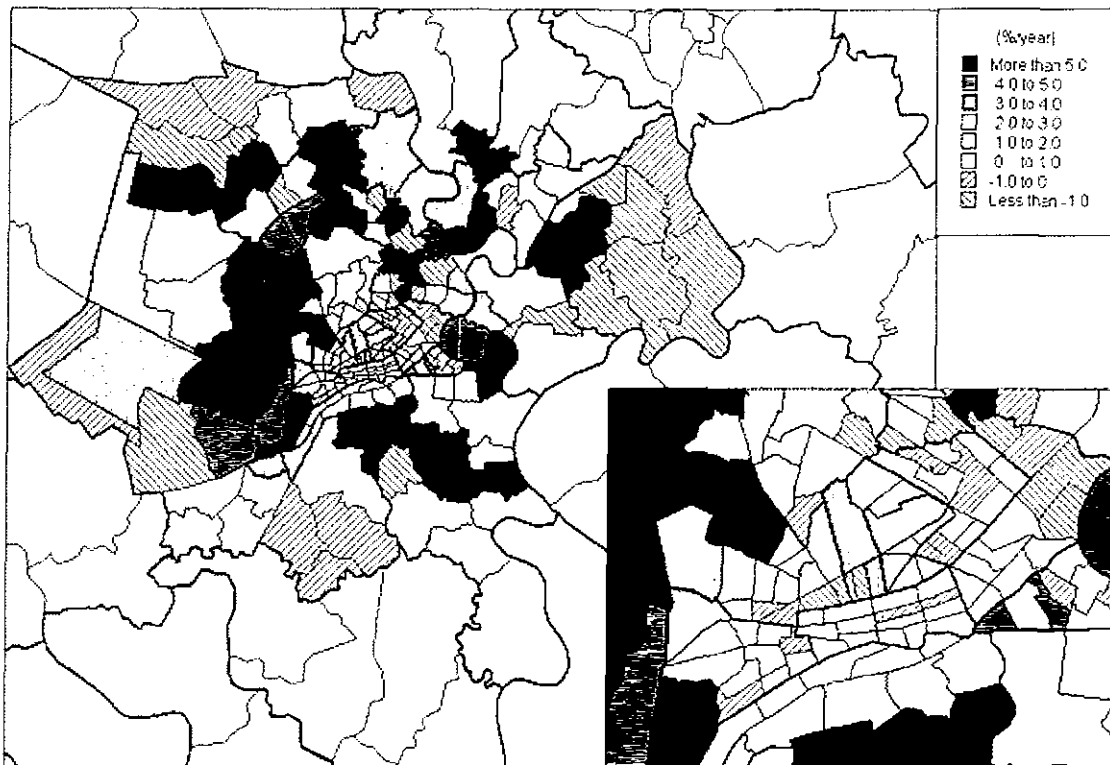
Source: UPI

Figure 4.2.3 Population Growth Rate by District, 1997-2001



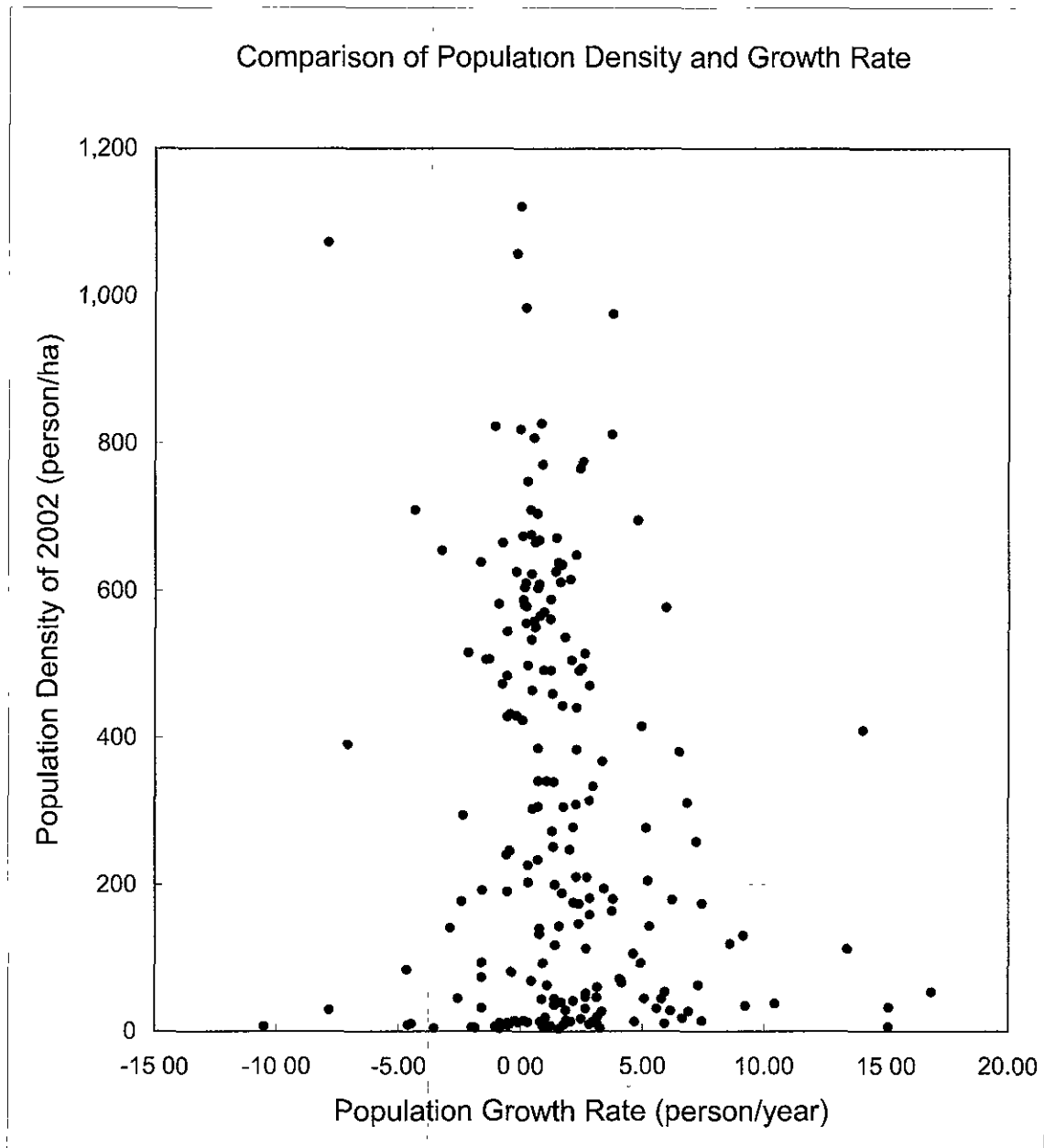
Source: Statistical Yearbook, Study Team

Figure 4.2.4 Population Growth Rate by Zone, 1996-2002



Source: MVA Study (1996), Study Team

**Figure 4.2.5 Distribution of Population Growth Rate (1996-2002)
and Population Density of 2002**



Source: MVA Study (1996), Study Team

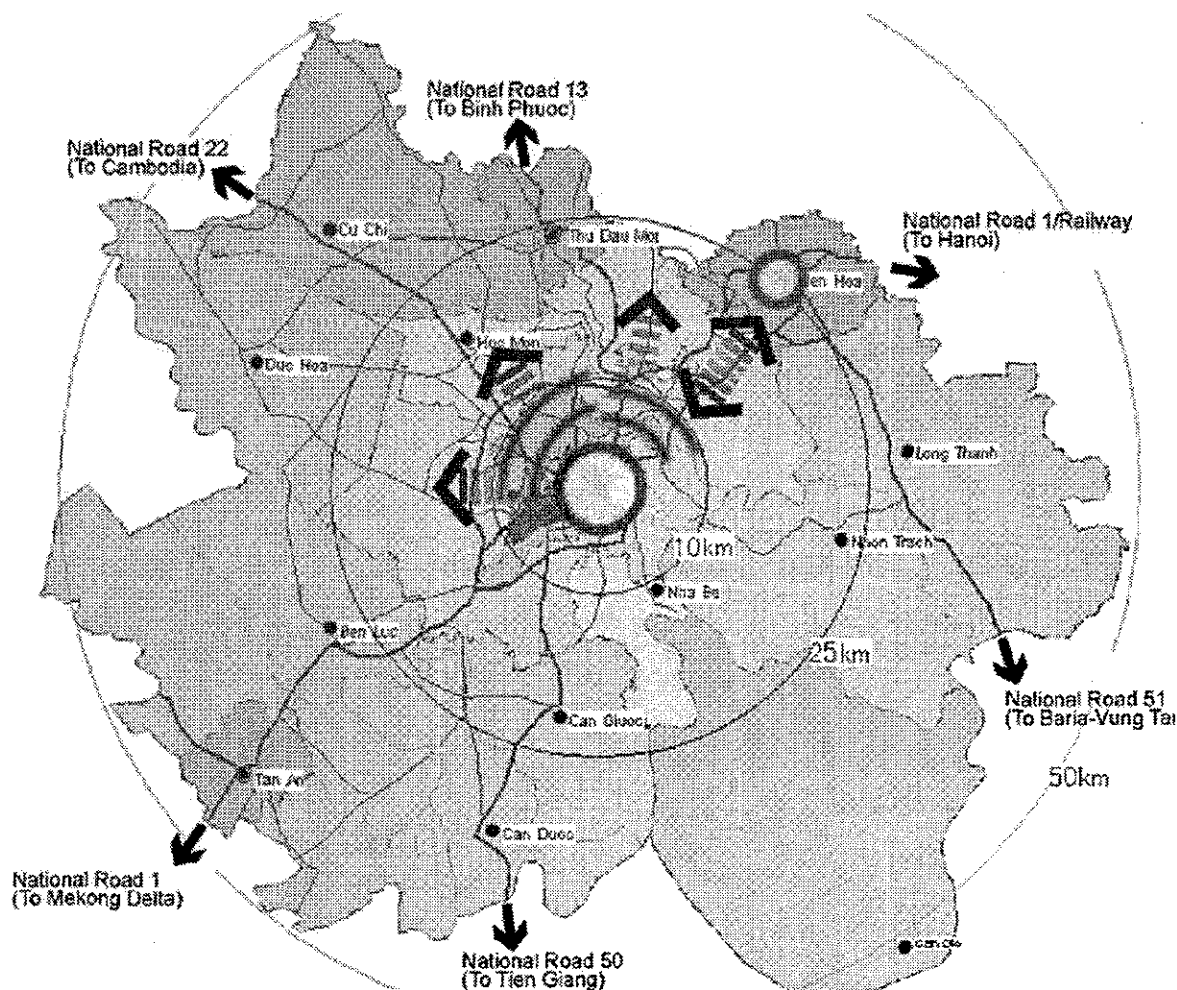
2) Main Development Directions

Rapid urbanization is currently occurring in the following four directions and areas, as follows (see Figure 4.2.6):

- (1) Fringe areas of HCMC's inner-city area: The population has been increasing rapidly accompanied by extensive residential developments particularly in and around Tan Binh and Go Vap districts.
- (2) Northeast corridor between HCMC and Bien Hoa: The area along Hanoi Highway between HCMC's inner-city area and Bien Hoa City where residential and manufacturing facilities have been established such as the districts of Thu Duc, 2, and 9 in HCMC and the districts of Thuan An and Di An in Binh Duong province.

- (3) Northwestward from HCMC's inner city: The area in the northwest direction from HCMC's inner-city area where residential and manufacturing facilities have been established mainly in and around District 12.
- (4) Westward from HCMC's inner city: The area in the west direction from HCMC's inner-city area where residential and manufacturing facilities have been established along NH1A and in and around Binh Chanh District.

Figure 4.2.6 Current Urban Development Directions



Source: Study Team

3) Housing Development

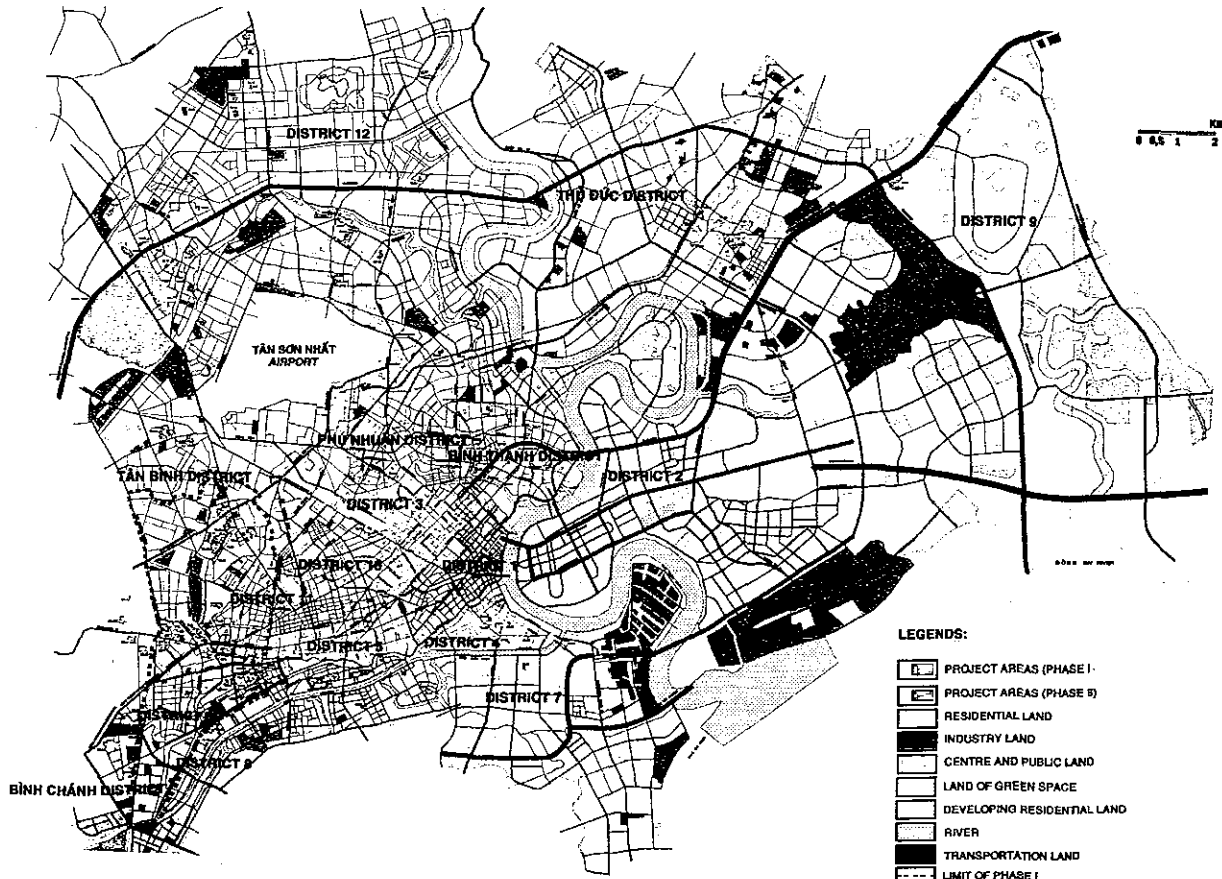
In the current urbanizing areas stated above, many unlicensed development activities are being carried out. Those that are licensed are being developed differently from the scale or function for which they were approved. According to the study by the HCMC Department of Construction, during the past three years, 66.7% of buildings within the city were constructed illegally (see Table 4.2.2 and Figure 4.2.7). Illegal development activities occurred in the inner-fringe districts of HCMC in the 1990s particularly in Tan Binh and Go Vap districts. After 2000, illegal development activities spread to the emerging peripheries toward the northwest and west such as the districts of Binh Chanh and 12. Photo 4.2.1 shows the typical situations in rapidly urbanizing areas where sprawling and ribbon-development along roads occur.

Table 4.2.2 Illegal Housing Construction in HCMC

Location		From 1993 - 1999		2000 - 2002					
				Total		In which			
		No. of Housing Units	Lot Area (000 m ²)	No. of Housing Units	Lot Area (000 m ²)	Violation in Construction		Illegal Construction	
						No. of Housing Units	Lot Area (m ²)	No. of Housing Unit	Lot Area (m ²)
Inner Core	District 1			1,223	82	773	39	450	42
	District 3			1,616	106	1,099	54	517	51
	District 4	700	42	679	58	194	9	485	48
	District 5	513	30	596	32	541	27	55	5
	District 6	2,100	126	1,579	122	709	35	870	87
	District 10	2,150	129	926	78	285	14	641	64
	District 11	670	40	2,131	154	1,165	58	966	96
	Phu Nhuan Dist	1,995	119	794	56	466	23	328	32
	Subtotal	8,128	487	9,544	691	5,232	262	4,312	428
Inner Fringe	District 8	4,167	250	3,250	307	358	17	2,892	289
	Binh Thanh Dist	6,420	385	3,618	300	1,233	61	2,385	238
	Tan Binh Dist	7,250	435	3,338	298	709	35	2,629	262
	Go Vap Dist.	5,000	300	1,883	183	100	5	1,783	178
	Subtotal	22,837	1,370	12,089	1,088	2,400	120	9,689	968
Emerging Peripheral	Thu Duc Dist	5,227	313	1,028	100	41	2	987	98
	District 12	7,600	456	7,647	762	49	2	7,598	759
	Binh Chanh Dist	9,417	565	21,372	2	0	0	21,372	2,137
	District 2	4,833	350	2,361	231	90	4	2,271	227
	District 7	6,167	370	4,823	472	205	10	4,618	461
	District 9	6,667	400	2,754	273	32	1	2,722	272
	Subtotal	40,911	2,454	39,985	3,977	417	20	39,568	3,956
Suburban	Hoc Mon Dist	5,227	313	12	600	12	600	0	0
	Nha Be Dist	4,167	250	184	17	11	550	173	17
	Subtotal	9,394	563	196	18	23	1	173	17
Rural	Cu Chi Dist	2,120	127	578	56	27	1	551	55
	Can Gio Dist.	5,200	312	291	28	17	0	274	27
	Subtotal	7,320	439	869	84	44	2	825	82
HCMC Total		88,588	5,315	63,782	5,916	9,215	461	54,567	5,454

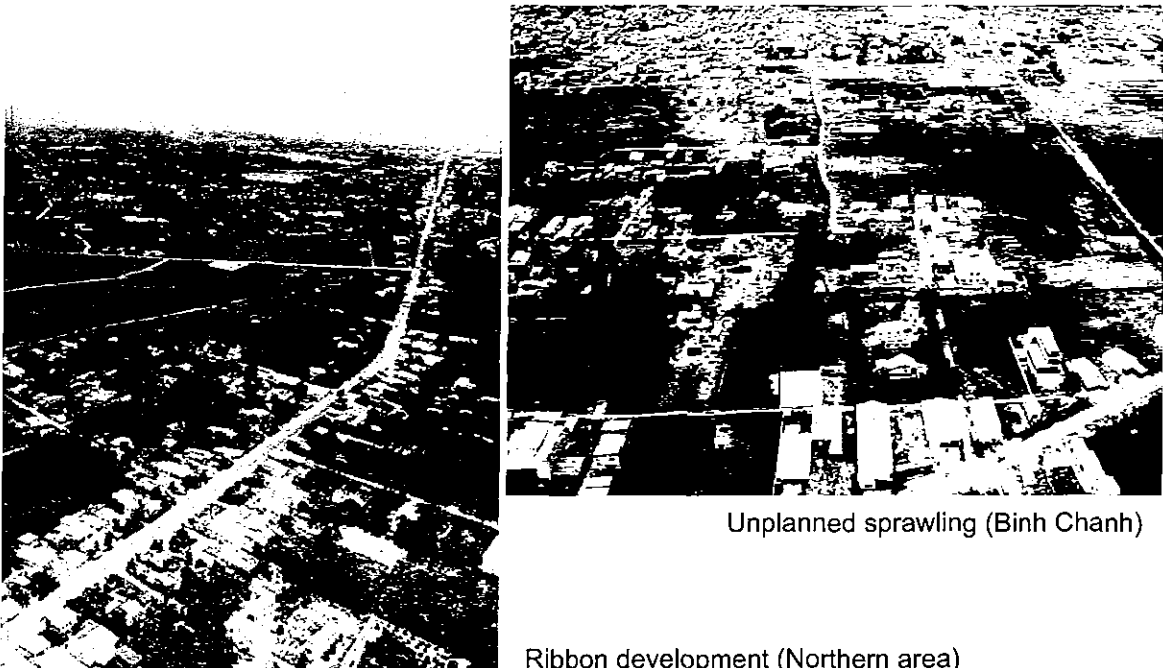
Source: HOUTRANS Survey

Figure 4.2.7 Illegal Settlements Map in Inner Area of HCMC



Source: VUUP (World Bank)

Photo 4.2.1 Typical Urban Development Patterns in Rapidly Urbanizing Areas



Unplanned sprawling (Binh Chanh)

Ribbon development (Northern area)

Source: Taken by the Study Team

4) Classification of Existing Urban Areas

The existing urban areas were assessed and broadly classified into six types with more or less homogeneous socio-economic and land use characteristics (see Figure 4.2.8 and Table 4.2.3), as follows.

(1) Inner Core: The core area of the metropolis has high population density (average of more than 400 persons/ha), low growth rate, and mixed land use for administrative, business, commercial, and residential facilities. Urban infrastructure is well developed with almost all available land already occupied. There is overcrowding in residential areas.

(2) Inner Fringe: Developing fringe areas of the inner city have modest population density (average of about 180 persons/ha) and high growth rate. Urbanization has rapidly progressed in the form of low-rise residential developments. Community level commercial facilities have been established along arterial roads. However, areas without urban infrastructure (e.g. narrow and unpaved roads) remain. Many illegal buildings have been constructed.

(3) Emerging Peripheral: Newly developing areas surrounding the inner fringe, emerging peripheries have low population density (average of about 20 persons/ha) and high growth rate. Such areas have experienced unplanned sprawling and ribbon development of residential and industrial facilities along arterial roads. Many illegal buildings (particularly in Binh Chanh District) have been constructed.

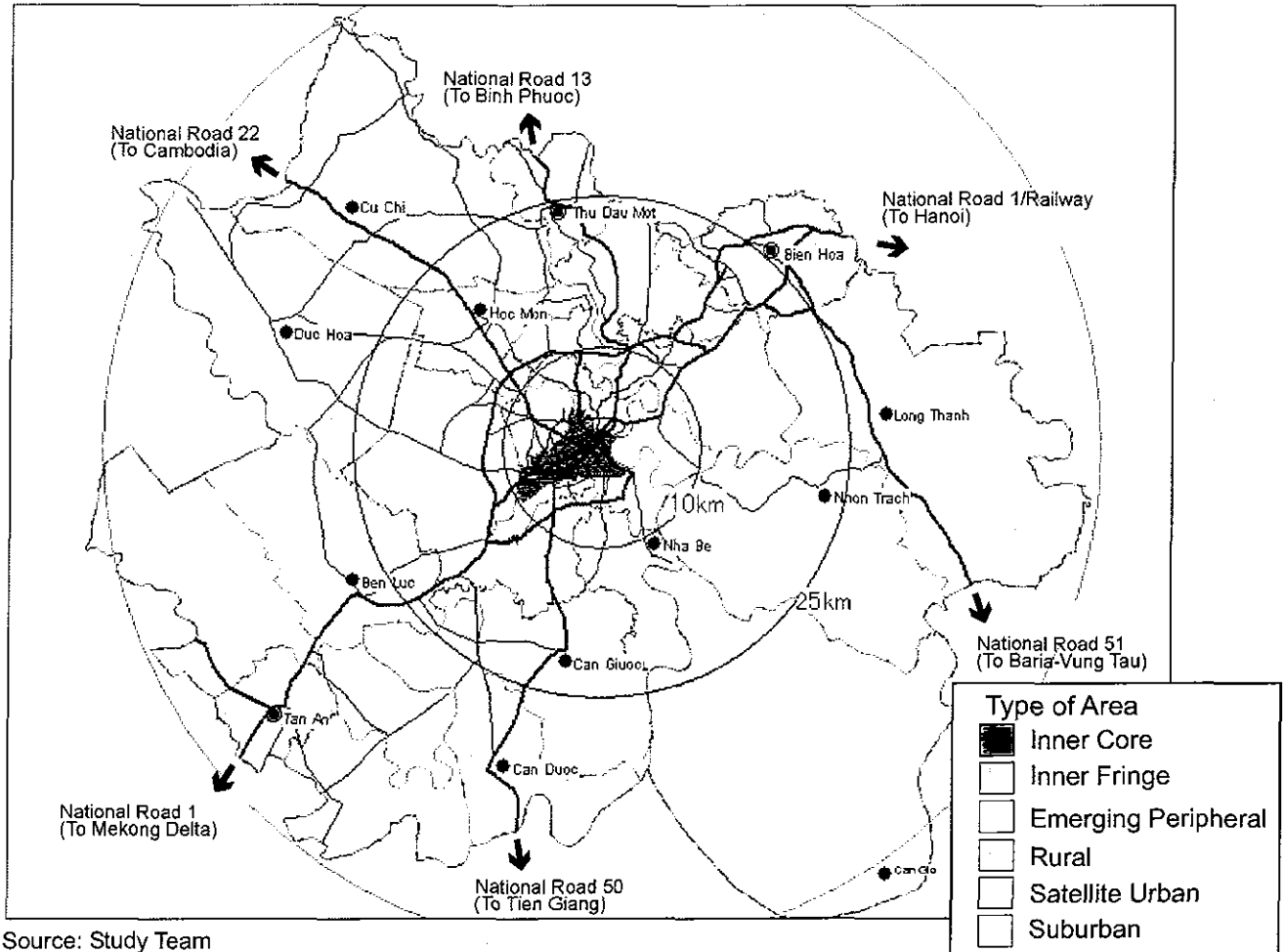
(4) Suburban: Newly developing suburbs in the metropolis have low population density (about 13 persons/ha in HCMC and 16 persons/ha in provinces on average) and high growth rate. In sites with good land condition, residential and industrial developments have emerged. Urbanization speed is modest and settlements are dispersed.

(5) Satellite Urban: Provincial core areas have low population density (average of about 23 persons/ha) and modest growth rate. Administrative, business and commercial functions have already developed as an independent regional core.

(6) Rural: Rural areas are mainly agricultural and forest areas with low population density (average of about 1.6-1.7 persons/ha) and low growth rate. Residential and industrial development has not yet fully progressed. Small, low-density settlements are dispersed.

The typical households in the study area by type of urban area have been described in Table 4.2.4.

Figure 4.2.8 Classification of Urban Areas



Source: Study Team

Table 4.2.3 Profile of Study Area by Area Type

Type of Area		District/TP/Town	Area (km ²)	Pop. Density (person/ha)	Population	
					2001	Growth (%/yr)
HCMC	Inner Core	1, 3, 4, 5, 6, 10, 11, Phu Nhuan	44	408	1,797	1.4
	Inner Fringe	8, Binh Thanh, Tan Binh, Go Vap	98	176	1,730	2.4
	Emerging Peripheral	12, Thu Duc, Binh Chanh, 2, 7, 9	605	19	1,165	3.2
	Suburban	Hoc Mon, Nha Be	210	13	277	2.2
	Rural	Cu Chi, Can Gio	1138	3	316	1.7
Adjoining Areas	Satellite Urban	Thu Dau Mot, Bien Hoa, Tan An	321	24	764	2.3
	Suburban	Thuan An, Di An	145	16	229	6.5
	Rural	Long Thanh, Nhon Trach, Duc Hoa, Ben Luc, Thu Thua, Chau Thanh, Tan Tru, Can Duoc, Can Giuoc	2,520	5	1,201	1.6
Total			5,080	15	7,478	2.1

Source: Statistical Yearbooks of HCMC, Binh Duong, Dong Nai, and Long An

Table 4.2.4 Living Environment and Household Image by Type of Urban Area

Area		2002	
		Land Use/Settlement	Typical Household Image
HCMC	Inner Core	Five- to six-storey buildings are constructed on small lots along roadsides. Inside small streets, two-storey shophouses are very common. Urban renewal has started.	Most households live for more than 20 years and their composition is diversified. For most couples, both are professionally employed and belong to higher-income brackets. On the other hand, there are many single earners and poor households.
	Inner Fringe	Housing is provided thru low-rise apartments.	Household composition is similar to that in the inner core. However, unlike households in the inner core, most have fewer children and there are more housewives.
	Emerging Peripheral	Ribbon-type development is in progress along corridors. There are many small-scale developments along NH1A. The areas accept many newcomers from other areas.	More than half of households have double income earners but household income is less than that earned by inner fringe households. In addition, they are engaged in less skilled occupation. Some households are relatively new residents. Have fewer commuting residents to the CBD as compared with those from the inner fringe.
	Suburban	People live mainly along the corridors.	Although there are two-generation households, household income is generally low. Fewer residents commute to the CBD. Many households are poor.
	Rural	There are many villages. There is no large agglomeration except for Cu Chi City.	The center of Cu Chi has a similar household composition as the inner core. Households in other areas are typical farming households.
Adjoining Provinces	Satellite Urban	There exist many urban agglomerations. New industrial location is in progress.	Recently developing area. Although there are many double income earners in households, income level is low. Many of the households have just recently moved in.
	Suburban	People live along the corridors.	Have similar household structure as the satellite urban areas, but there are more people living here. There are many households with members from several generations.
	Rural	There is no large-scale urban agglomeration.	There are many farming households. Very limited income opportunity from non-agricultural sector.

Source: Analysis of HOUTRANS HIS data.

5) Urban Characteristics and Issues

The main characteristics and issues of urbanized areas in the study area are summarized below:

- Population is concentrated in the small portion of HCMC's inner city. In the inner city's 12 districts (7% of the city area or 142km²), in particular, about 70% of the city's population (3.5 million) live in high-density areas.
- Land uses in HCMC's inner city are mixed, with some used for residential, business, commercial, industrial, etc.
- Due to the highly compact urbanized area, accessibility to work and school is good where the average commuting time is 15-20 minutes on average.
- In the fringe areas of HCMC's inner-city districts, illegal development activities have repeatedly occurred; effective infrastructure provision will not be made because of disordered sprawling.
- Many factories causing air and water pollution are located in HCMC's inner-city districts, thus negatively affecting its living environment.