

## **1 INTRODUCTION**

### **1.1 BACKGROUND**

Jabodetabek, a large-scale metropolitan area with a population of 21 million, consists of DKI Jakarta, the capital city of Indonesia, which is the center of politics, economy and social activities, and 7 local governments in the surrounding areas. Its gross regional domestic product amounted to Rp. 351,000 billion in 2002, or 22% of the national gross domestic product; thus Jabodetabek is strategically the most important region of the nation.

To alleviate the negative impacts caused by the economic and financial crisis, a safety net program and other countermeasures have been undertaken and urgent programs have been almost completed. From now on the focus should be on sustainable economic development to deal with economic deterioration such as the continuing unemployment problem. To promote economic development in the region, domestic and foreign direct investments should be revitalized. However, it has been pointed out that chronic traffic congestion and inefficient accessibility to the port for cargo movement, among other things, have made the region less attractive for investors. It is urgently needed to develop an efficient and reliable transportation network to recall investments to the region.

Traffic congestion is a chronic problem faced in the Jabodetabek region and the situation is expected to worsen should there be no improvement of any kind made on the existing transportation system. At present, the economic loss caused by traffic congestion in the region could be as much as Rp. 3,000 billion for vehicle operating costs and Rp. 2,500 billion for travel time. That makes for a total of Rp. 5,500 billion of economic loss!

Furthermore, should there be no improvement undertaken in the period up to the year 2020, compared to the case in that the proposed transportation system development is implemented according to the Master Plan, accumulated economic loss would amount to Rp. 65,000 billion which consists of Rp. 28,100 billion for additional vehicle operating costs and Rp. 36,900 billion for longer travel times at the present value discounted by 12%.

It seems difficult to foresee investments in large-scale transportation infrastructure development projects by the public sector considering their present difficult financial situation—a situation expected to continue in the near future. Besides securing the necessary costs for operation and maintenance for the existing transportation facilities, the way to develop the transportation system should be carefully examined to make utmost use of the remaining funds for development.

Although rapid growth of car and motorcycle registration has been hampered by the

economic crisis, the number of cars and motorcycles has again been increasing in recent years. It can be attributable to deterioration of the service level of public transportation. After the region's economy has recovered, real household income would increase again in the coming few years; it is anticipated that motorization will be further accelerated. If many residents use private modes of transportation, then traffic woes would be worsened and environmental pollution would be more serious than at present.

The Study addresses the question of how to deal with those aforementioned problems and examines the desirable future transportation system by identifying and understanding the present transportation problems through investigation of the current travel demand as well as service level provided by the existing transportation system.

## **1.2 STRUCTURE AND CONTENTS OF THE FINAL REPORT**

The Final Report comprises three volumes:

- Summary Report
- Main Report Volume 1: Master Plan
- Main Report Volume 2: Pre-Feasibility Study

Summary Report presents all the tasks in the Phase 2 Study and recommendation on the integrated transportation master plan as well as major findings of the four pre-feasibility studies.

Volume 1 of Main Report reveals the findings obtained through data collection, site reconnaissance, results of transport survey execution and analyses on the present conditions in the Study area. Based on an understanding of the present urban transportation problems and issues, urban transportation policies and strategies are presented. Then policy measures to achieve goals for urban transportation system development have been proposed in the context of the Jabodetabek region. Among the variety of policy measures, several measures have then been selected as components of an integrated transportation master plan.

Volume 2 of the Main Report aims to examine the viability of four priority projects; namely, 1) Busway extension, 2) Transportation Demand Management (TDM) Scheme in CBD, 3) Railway Serpong Line double tracking, access improvement and integrated land development, and 4) Outer-outer ring road.

Detail description for each sector is given in the Technical Reports, comprising the following reports:

- Technical Report Vol. 1 Travel Behavior Analysis
- Technical Report Vol. 2 Transportation Models and Demand Forecast
- Technical Report Vol. 3 Urban and Regional Development

- Technical Report Vol. 4 Road Network
- Technical Report Vol. 5 Railway Transportation
- Technical Report Vol. 6 Bus Transportation
- Technical Report Vol. 7 Traffic Control, Management and Safety
- Technical Report Vol. 8 Environmental Improvement
- Technical Report Vol. 9 Master Plan Development Policies and Strategies
- Technical Report Vol. 10 Master Plan Evaluation
- Technical Report Vol. 11 Funding Capacity Improvement
- Technical Report Vol. 12 Institutional Reform and Human Resource Development
- Technical Report Vol. 13 Participatory Approach

### **1.3 STUDY APPROACH**

First of all, the past trend and the existing socio-economic situation were analyzed and the existing land use and urban structure were identified through the analyses on the data obtained from comprehensive surveys. In the Study various kinds of transportation surveys have been conducted to understand the real situation of transportation. The existing transportation facilities and services were assessed, and the current urban transportation problems were pointed out. The major findings are exhibited in Chapter 2.

In Chapter 3, based on the review of the regional development plans and the development policy of the Jabodetabek region, the future socio-economic framework was predicted. Transportation demand has been projected and anticipated performance of the transportation system leads to identification of urban transportation issues.

In Chapter 4, four goals for transportation system development were acknowledged from the viewpoint of regional development as well as urban transportation. The strategies for regional trunk transportation system development were proposed based on the understanding of transportation planning issues in the Jabodetabek region. Then four urban transport policies to achieve the goals and corresponding strategies were proposed in the context of urban transportation. The four urban transportation policies are composed of 1) public transportation use promotion policy, 2) traffic congestion alleviation policy, 3) air pollution and traffic noise reduction policy and 4) safety and security improvement policy.

For each urban transportation policy, outcomes of the policy, strategies, relation with the other policies and performance goal were discussed in Chapter 5 to Chapter 8. Then projects and programs for each urban transportation policy have been listed and explained with time framework in Chapter 9.

Necessary institutional set-up and fund raising scheme to implement the transportation

master plan were argued in Chapter 10. Importance of public involvement in developing transportation system is also emphasized.

Finally, in Chapter 11, the recommendation regarding the integrated transportation master plan for Jabodetabek was presented.

## 2 TRANSPORTATION ISSUES

### 2.1 PROBLEMS IN THE REGIONAL DEVELOPMENT CONTEXT

#### (1) Concentration of Economic Activities in Jakarta

The development of urban centers in Bodetabek has been emphasized for a long time. Although the populations in Kotas and Kabupatens have been increasing rapidly, the functions of urban centers are still limited to merely serving the neighborhood population. The centers provide neither sufficient job opportunities nor urban services for the residents. On any given day, around 700,000 people are on the road from Bodetabek to Jakarta. If this trend of relying on Jakarta continues, coupled with an increase in private car use, road development will not be able to catch up with the increasing traffic demand.

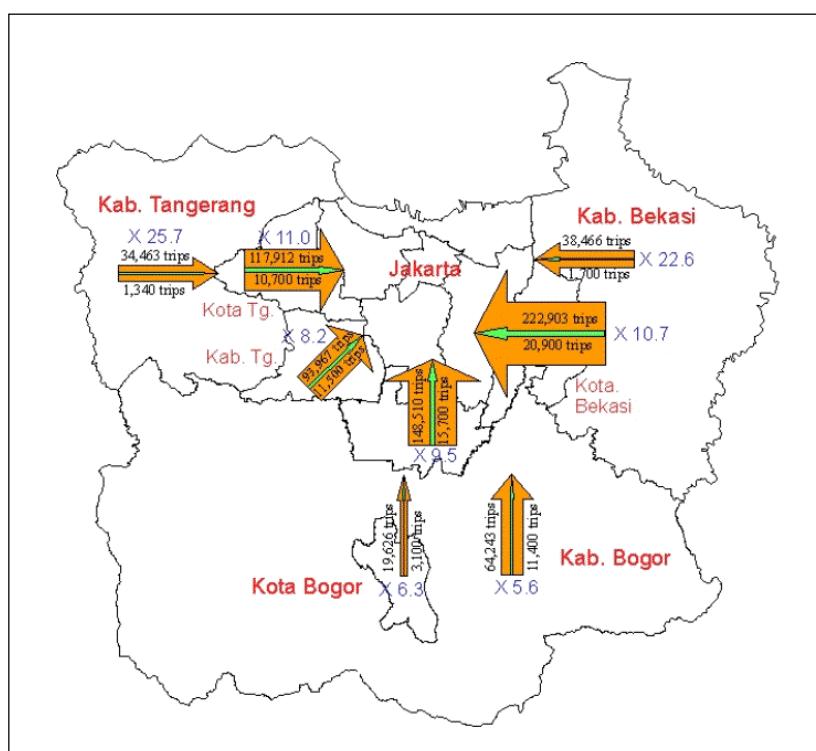


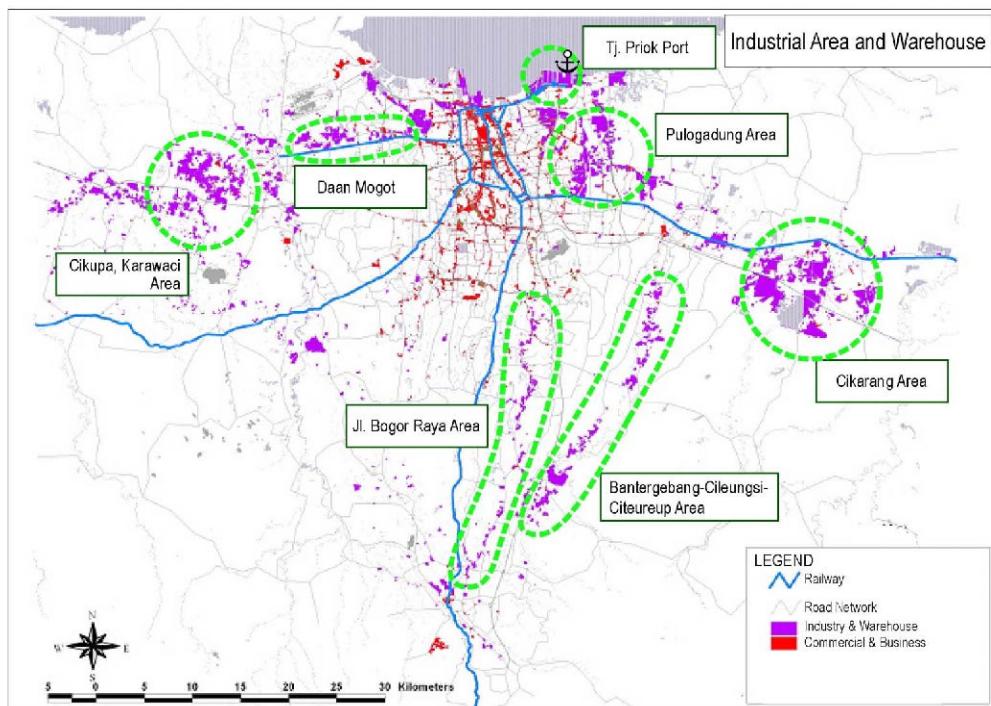
Figure 2.1 Increase of Commuting Trips to Jakarta from Surrounding Areas: 1985-2002<sup>1</sup>

#### (2) Poor Access to the Tanjung Priok Port

The Tanjung Priok Port is an international gateway for import and export commodities not merely from the region but also from neighboring provinces. At present access to the port takes such a long time due to traffic congestion on the roads and this causes delay of transporting products and spare parts. The timely arrival of goods is of great importance for manufacturers for their production. The delays result in reducing product

<sup>1</sup> Refer to Technical Report Volume 1: Travel Behavior Analysis.

competitiveness in the international market and contribute to the deterioration of economic growth of the region.



**Figure 2.2 Present Industrial Area Distribution in the Jabodetabek Region**

### **(3) Lack of Alternate Route to the Soekarno-Hatta International Airport**

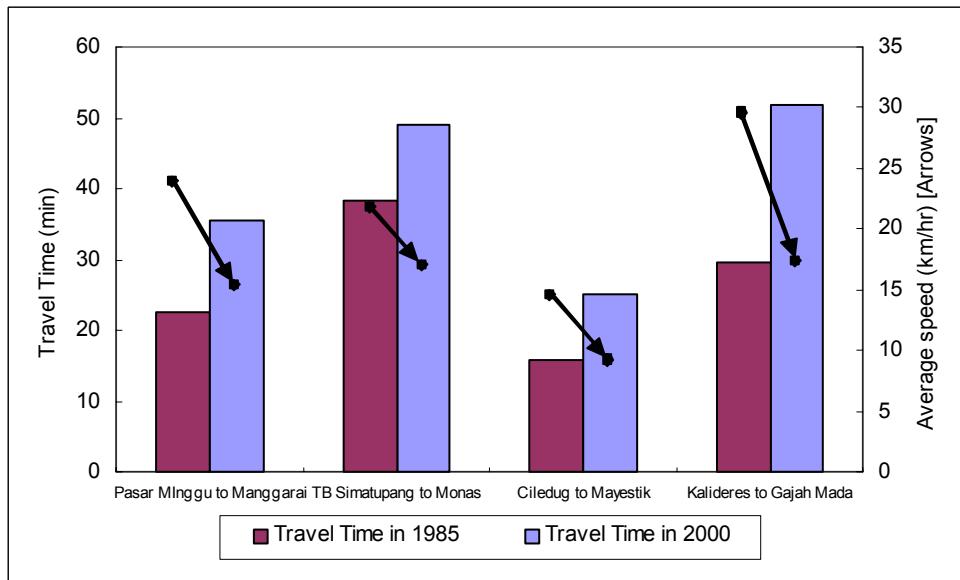
The Soekarno-Hatta International Airport is a gateway of business passengers and tourists to the region as well as the nation. In January 2002, the toll road access to the airport was cut off by flood and the approach to the airport was made difficult because of the absence of an alternative route.

## **2.2 URBAN TRANSPORTATION CONTEXT**

The expansion of social and economic activities and subsequent growth of travel demand in Jabodetabek have inevitably brought about various urban transport problems, which have become increasingly serious in recent years.

### **(1) Low Mobility due to Traffic Congestion**

Severe traffic congestion is often seen in the central area of Jakarta and the radial highways every morning and afternoon. The increasing traffic demand has brought about traffic congestion resulting in longer travel times on roads. This implies that mobility in the region has gone down and, with it, efficiency in the performance of economic activities.



**Figure 2.3 Increasing Travel Time: 1985 – 2000**

## (2) Low Level of Service of Public Transportation

Railway transportation provides low level of service, such as low passenger transportation capacity, low frequency, delayed schedules, damaged and uncomfortable train cars, poor station facilities, insufficient station plazas and access roads.

The level of bus service at present is also low in many aspects. Not on time, unexpected stoppage of operation, long waiting time, sense of insecurity on board by passengers, unsanitary condition inside buses—these are just some of its many deficiencies.

## (3) Increasing Motorcycle Use

Recently the number of motorcycles has been increasing rapidly. Motorcycle registrations has increased by 60% from 1,528 thousand in 1998 to 2,446 thousand in 2002. This increase can be attributed partly to deterioration of public transportation services and reduced motorcycle price. At present 22% of motorized trips are made by motorcycles, in particular, this is a popular mode of transportation for the middle-income class. Motorcycles are however often involved in traffic accidents: motorcycles are involved in as much as 34% of all the traffic accidents. Protection of motorcyclists is an important issue in traffic safety. Motorcycle users, on the other hand, can be regarded as potential car users, thus improvement of public transportation is another issue.

## (4) Air Pollution Caused by Traffic

Air pollution in Jabodetabek was an occasional annoyance in the past, but Jabodetabek

has suffered the disgrace of being in the category of cities with the worst air quality worldwide and it has become a new chronic issue as a threat to the health of the urban people. PM10 exceeded the air quality standard at 27 locations out of 33 survey stations. The stationary sources, namely, factories and power plants, are considered to emit the majority (57.1%) of PM10 rather than automobiles (40.2%). However, high concentrations at roadsides, monitored by SITRAMP, indicate that automobiles should be the major source in the bottom layer of areas adjacent to heavily congested roads which are closely linked with people's urban life. The health impacts from PM10 in Jabodetabek could be valued at Rp. 2,815 billion in 2002, according to estimates by the Study Team.

The seriousness of the noise pollution problem is supported by the fact that all noise levels monitored in daytime were far above the preferred levels. Especially heavy-duty buses and trucks in Jabodetabek are mostly dilapidated, roaring past with horns blowing. Persons who are often exposed in this kind of environment everyday such as street vendors and policemen face greater possibility of hearing impairment.

## **(5) Road Traffic Accidents and Railway Accidents**

The number of road traffic accident victims in 1998 decreased significantly to one-third of those in 1986. However, the number of lives lost in traffic accidents has not been decreased; the annual fatality toll was around 500 for the same period. Similar to non-toll roads, the rate of traffic accidents on toll roads has been gradually decreasing but the fatality rate is still high compared to developed countries.

Railway is widely considered as a safe mode of transport compared with road transport but this is not true in the case of Jabotabek railway. During the period of 2000-2002, 174 accidents were reported including serious train collisions and crash accidents.

## **(6) Lack of Traffic Signals**

Traffic signals are often useful for pedestrians to safely cross the street. In DKI Jakarta, however, the ratio of signalized intersections to all the intersections in the major road network is about 42%, which is quite low for an urban area. The situation is even worse in Bodetabek; the ratio is as low as 21%.

## **(7) Insecurity on Public Transportation**

Jakarta has seen its security situation worsen considerably after the economic crisis in 1997. Many crimes occur in public spaces. According to police data, the number of cars stolen in 2001 increased to 6,466 from only 2,593 in the previous year. Due to the worsening security concerns, people are afraid of using public facilities such as public phones, ATMs, restrooms, pedestrian overpasses and even using public transportation.

## **(8) Low Accessibility of Poor Households**

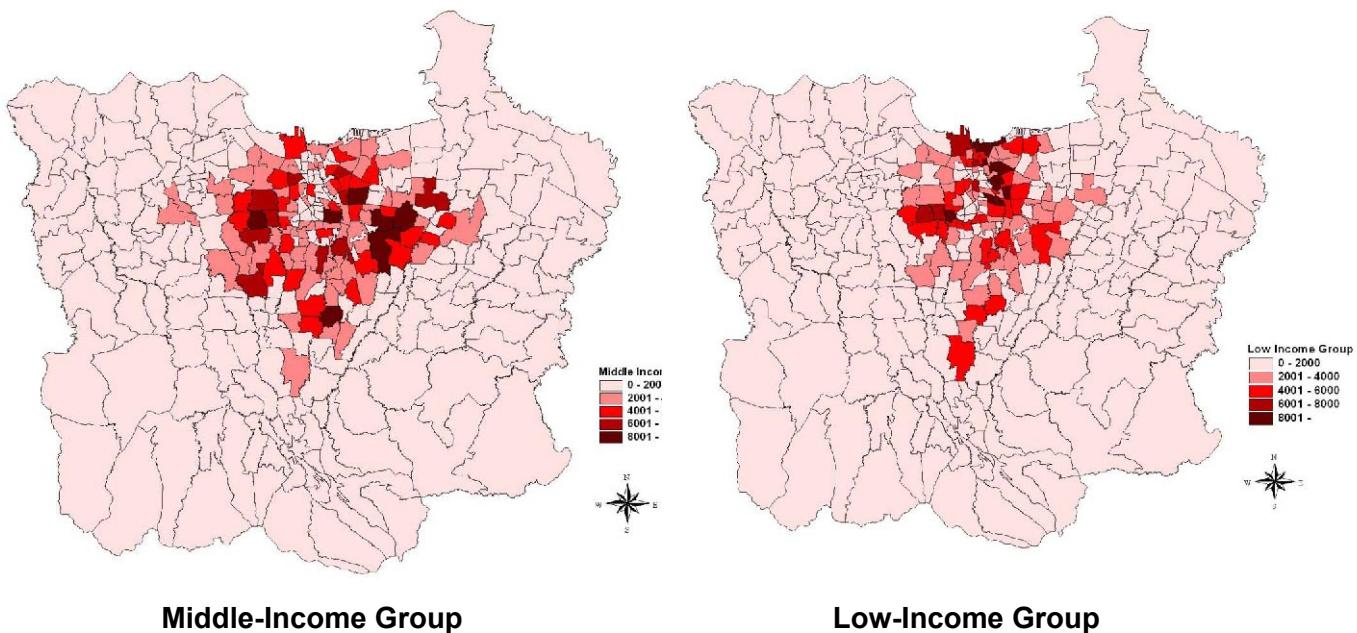
Poor people travel less than higher income people and their travel distance is much shorter. For the poor, the lack of affordable access deprives them of the ability to take advantage of economic opportunities as well as basic social services. The access problem of the poor in urban areas arises mainly due to shortage of household income for paying transportation fare. Isolation is a key characteristic of poverty, which leads to people being cut off from facilities, services, supplies, networking and participation in a wider socio-political life.

**Table 2.1 Transportation Cost in Household Expenditure<sup>2</sup>**

Expense Group	Public transport cost		Motor vehicle cost		All transport cost	
	Rp (a)	% of total expense	Rp (b)	% of total expense	Rp (c) = (a) + (b)	% of total expense
Low	91,078	14.2%	19,995	3.1%	111,073	17.3%
Middle	189,265	13.7%	89,582	6.5%	278,847	20.1%
High	367,368	10.9%	271,750	8.1%	639,118	19.0%

Source: SITRAMP, Social Survey, 2002

With nearly 20% of the total household expenditure spent for transportation, low-income office workers are obliged to live relatively close to their workplace, that is, near CBD in most cases; therefore, only in the densely-populated areas in DKI can they afford a residence which is as small as around 35m<sup>2</sup> as an average.

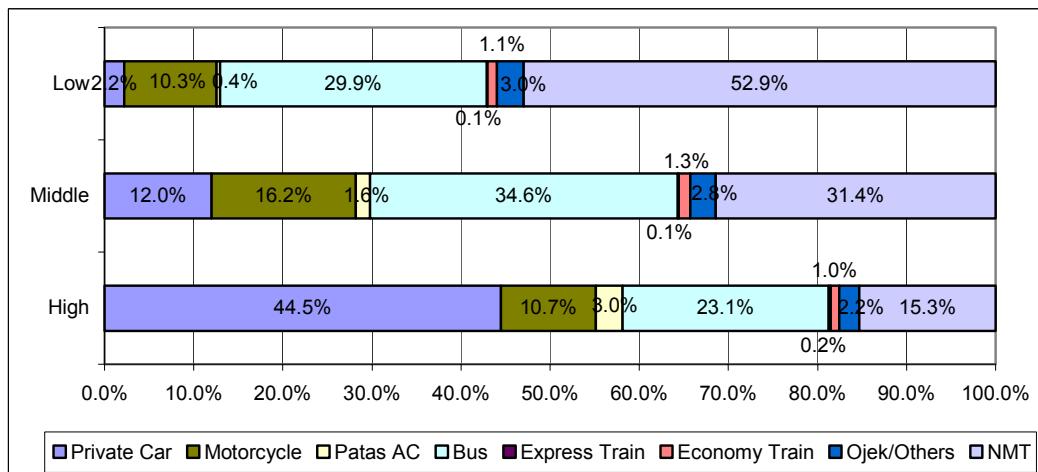


**Figure 2.4 Current Residential Distribution of Workers Commuting to CBD**

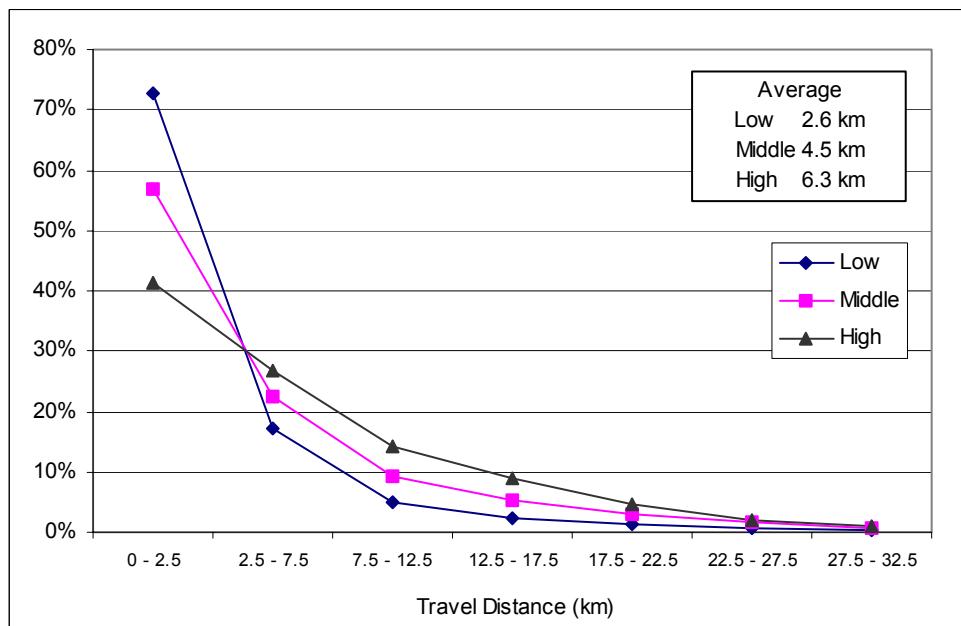
<sup>2</sup> Refer to Technical Report Volume 3: Urban and Regional Development.

For the low-income group, the main mode of transport is non-motorized transport (NMT), which in most cases means on foot. Bus is also the major mode of transport for the low-income group as well as middle-income group. On the other hand, the main mode of transport for the high-income group is private car. All the income groups use motorcycles but the middle-income group uses them most frequently.

Due to the lack of affordable access modes, average travel distance of the low-income group is much shorter than that of middle- or high-income group. High-income group travels a longer distance with a variety of alternative modes of affordable transport.



**Figure 2.5 Modal Share by Income Group<sup>3</sup>**



**Figure 2.6 Average Trip Distance by Income Group<sup>3</sup>**

<sup>3</sup> Refer to Technical Report Volume 1: Travel Behavior Analysis.

## (9) Rejection of Students Boarding on Buses

Students are sometimes rejected for boarding on buses by bus crews because their fare is half of that for ordinary people. This unfair treatment is partly caused by bus rental system since bus drivers should get sufficient fare revenue to cover the rental fee, fuel cost, and other operational expense.

## (10) Lack of Transportation Facilities for the Physically Challenged

Not much attention has been paid on transportation facilities for the physically challenged such as the elderly and the disabled. Elevators or escalators are not available at almost all railway stations, and sidewalks to bus stops are often damaged, thus those people find it difficult to use public transportation.



Photo 2.1 Narrow and Damaged Sidewalk

## 2.3 CAUSES OF TRANSPORTATION PROBLEMS

### (1) Concentration of Commuting Travel Demand into CBD in the Morning Peak Period

Concentration of travel demand in the CBD causes traffic congestion on the road network as well as overcrowding of buses and train. Trip attraction of “to work” is concentrated in the central area enclosed by the railway semi-loop line, the newly developed “Sudirman-Kuningan Golden triangle” area and areas along the Cawang – Grogol – Pluit toll road.

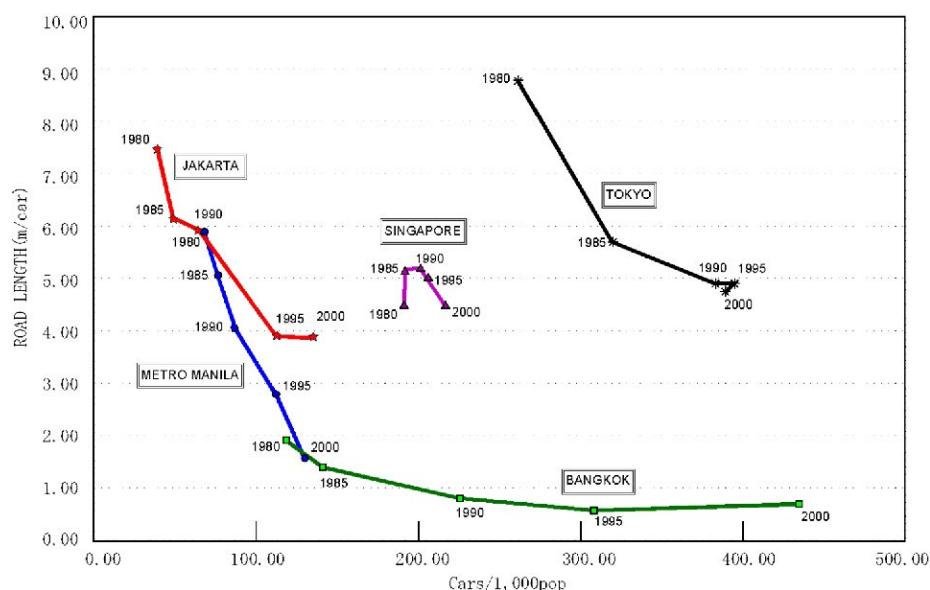
### (2) Slow Road Development against Increasing Traffic Demand

Although Jabodetabek's urban structure is changing rapidly and dynamically, the road network serving Jakarta and the surrounding areas has not been extended in a way that keeps pace with urban development growth.

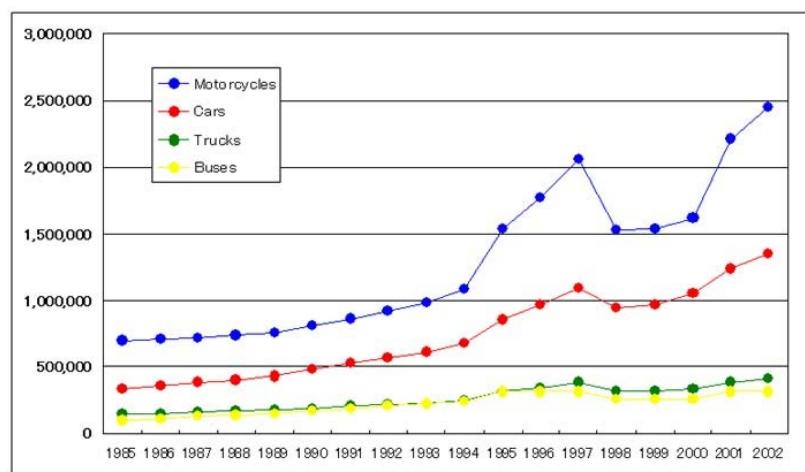
The remarkable feature of the road network in Jakarta is that several wide arterial streets exist but the network is short of collector streets, which connect arterial streets and local streets, thus a road network hierarchy has not been well developed.

The road network in Bodetabek area, on the other hand, is not well established compared to DKI Jakarta's. Radial primary roads and regional expressways are the major components of the road network in Bodetabek. The road density in Bodetabek is much lower than in Jakarta and the areas with relatively high road density are located along the major radial arterial roads. Thus traffic generated in the residential or industrial area concentrates on these roads. Another difficulty in developing arterial roads in suburban areas is due to the fact that many housing complexes have been developed without reference to the road network development plan.

Almost all the Asian megacities except Singapore have not been able to develop their road networks to catch up with increasing traffic demand caused by rapid motorization. The chart below illustrates that road length per car decreases as car ownership increases in the selected Asian cities.



**Figure 2.7 Car Ownership and Road Development in Selected Asian Cities**



Source: Polda Metro Jaya

**Figure 2.8 Increasing Number of Vehicles Registered**

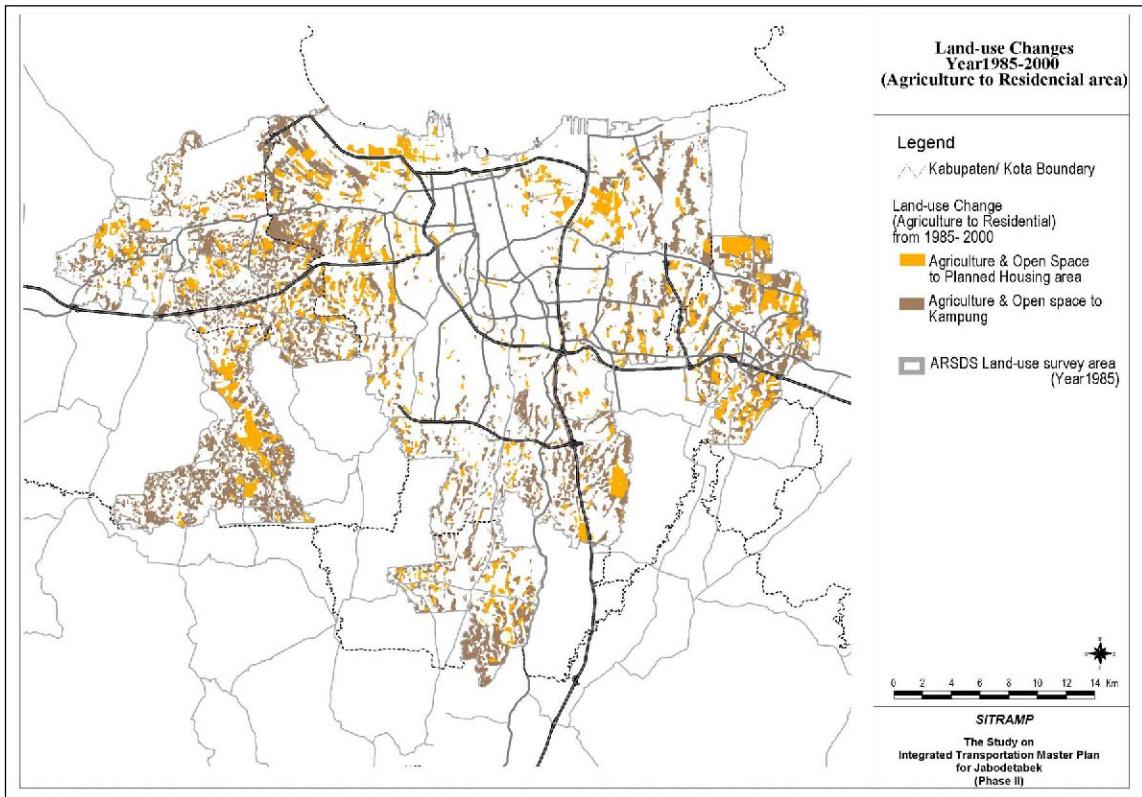


Figure 2.9 Residential Area Deployment: 1985 to 2000<sup>4</sup>

### (3) Causes of Traffic Congestion

There are numerous locations in Jabodetabek where traffic congestion is a daily occurrence. These locations are shown in Figure 2.10. Various root causes of congestion are described below. Often congestion is caused by multiple reasons.

#### (a) Physical bottleneck due to inconsistent carriageway width

Most arterial and collector road carriageways in Jabodetabek consist of only two lanes per direction and there is often an inconsistent capacity along some roads in terms of the number of lanes, which leads to unstable traffic flow. If the road width becomes narrower than the upstream section, congestion is unavoidable.

#### (b) Intersections

An intersection is a place where conflicting movements have to share the same space, and the right-of-way is given to movements either alternatively or sequentially. Because of this fact, intersection capacity is much smaller than that of road section. Most of the congested areas are in fact intersections.

<sup>4</sup> Refer to Technical Report Volume 3: Urban and Regional Development.

### (c) Illegal occupants on the road and inadequate use of the road

Street markets and street vendors illegally occupy the road space blocking the passage of vehicles. Buses occupy a lane while they load and unload passengers, which then reduces road capacity and causes congestion. This is often seen in front of many large shopping malls and markets as well as bus terminals.

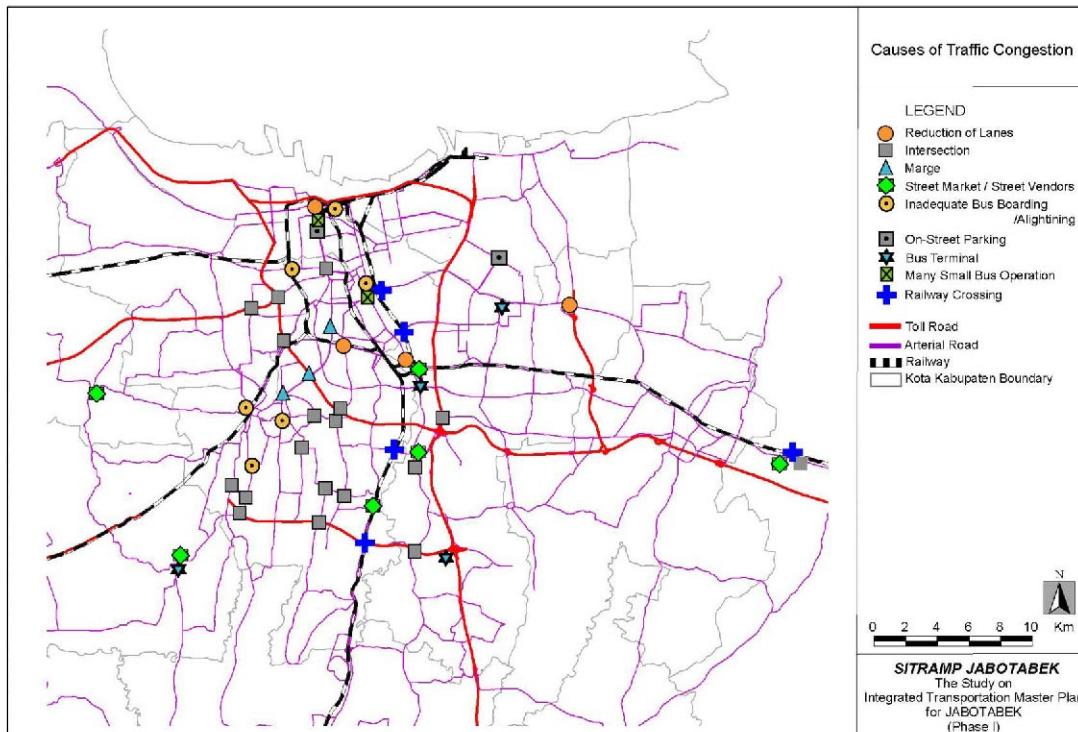


Figure 2.10 Location of Traffic Congestion<sup>5</sup>



Photo 2.2 Illegal Occupants on the Road

<sup>5</sup> Refer to Technical Report Volume 7: Traffic Control, Management and Safety.

**(d) Other factors**

Congestion is created also by other causes such as U-turn, railway crossing, weaving, bad pavement, flooding, and the like.

**(4) Less Effective Traffic Demand Management**

Currently, in DKI Jakarta, a 3-in-1 scheme is applied on Jl. Thamrin, Jl. Sudirman and a part of Jl. Gatot Subroto from 6:30 a.m. to 10:00 a.m., from Mondays through Fridays. During the restricted time, only vehicles with three or more passengers are allowed to enter the restricted road sections. The scheme is generally observed and the measure is effective in reducing the number of vehicles entering the restricted zone resulting in a smooth traffic flow during the restricted time. But the scheme has the following drawbacks:

- 1) Traffic demand on the parallel streets increases during the restricted hours and decreases the travel speed significantly. Therefore, it is questionable whether traffic restriction on one road can achieve efficiency for the whole network.
- 2) Picking up temporary passengers called jockeys for a fee of some thousand Rupiah reduces the effectiveness of the traffic restraint policy by interfering with one of the objectives of reducing vehicular traffic on restricted roads.
- 3) Other drawback of the 3-in-1 is inflexibility. The current minimum requirement of three passengers cannot be raised for stricter restriction nor eased for more lenient restriction.
- 4) No revenue is collected for the Local Government, while cost is incurred by the traffic police for enforcement.

**(5) Shortage of Funds for Road Development**

Slow development of road network can be attributed primarily to shortage of funds. Even the existing roads are not being well maintained especially after the Economic Crisis.

DKI Jakarta has allocated a significant amount of budget at Rp. 453 billion, accounting for 4.8% of the total expenditure in 2002, for the transportation sector, which includes the cost for rehabilitation and maintenance, betterment and replacement and new development for roads, bridges and land transport facility. Although the local governments of Bodetabek have allocated more share of the budget on transport sector development, the budget amount is small from Rp. 15 billion to Rp. 80 billion in each government. It is prevailingly understood that an absolute amount of transport development fund is not at a sufficient level to provide sound public services.

**Table 2.2 Budget Expenditure for Transportation Sector in Jabodetabek in FY 2002<sup>6</sup>**

		Transportation expenditure (Rp. billion)	GRDP share
Central government	Kimpraswil	144	0.08%
	DG of Land Transportation	122	
Local government	West Java and Banten province	118	0.28%
	DKI Jakarta	453	
	Total of 7 local governments in Bodetabek	427	
	Sub-total	998	
Total Transportation Expenditure		1,264	0.36%
GRDP of Jabodetabek in 2002		351,000	

Source: SITRAMP

Note 1: The figures of 7 local governments (Kota/ Kabupaten) in the Bodetabek are actual allocation.

Note 2: The GRDP of the Jabodetabek region in 2002 is estimated by SITRAMP based on the GDP growth rate in 2002.

The required maintenance cost for the existing roads and bridges is preliminarily estimated based on the current condition of roads and bridges in Jabodetabek. Table 2.4 below summarizes the annual maintenance cost including rehabilitation and maintenance work; betterment and replacement work; and initial reconstruction for currently badly damaged roads.

Comparing the required road maintenance cost with actual allocation to the transportation expenditure, an average share is 99%; however, it varies from 34% in Kota Depok to 225% in Kota Bogor. It is noted that the current transportation budget includes development cost as well as maintenance cost for roads and land transportation. Some local governments cannot afford even the maintenance cost required for existing roads and bridges in the current budget allocation to the transportation expenditure. Others can afford the required maintenance costs but they cannot provide additional fund for new transportation development.

<sup>6</sup> Refer to Technical Report Volume 11: Funding Capacity Improvement.

**Table 2.3 Transportation Expenditure of Local Governments in Jabodetabek in FY 2002 Budget<sup>6</sup>**

Local government	Total expenditure (Rp. billion )	Transportation expenditure (Rp. billion )	Share of total expenditure	GRDP Share
DKI Jakarta	9,346	453.0	4.8%	0.18%
Kota Bekasi	396	44.3	11.2%	0.37%
Kota Depok	286	49.8	17.4%	1.07%
Kota Bogor	245	15.0	6.1%	0.49%
Kabupaten Bekasi	474	50.9	10.7%	0.24%
Kabupaten Bogor	716	78.6	11.0%	0.54%
Kota Tangerang	378	59.5	15.7%	0.24%
Kabupaten Tangerang	589	42.2	7.2%	0.26%
Jabodetabek Total	12,430	793.3	6.4%	0.23%

Source: Ministry of Finance

**Table 2.4 Annual Required Maintenance Cost for Existing Roads and Bridges<sup>7</sup>**

Local government	Annual required road maintenance cost (A) (Rp. billion )	Transportation expenditure in FY 2002 budget (B) (Rp. billion )	Share to transportation expenditure budget (A)/(B) (%)
DKI Jakarta	467.7	453.0	103%
Kota Bekasi	43.6	44.3	98%
Kota Depok	16.9	49.8	34%
Kota Bogor	33.8	15.0	225%
Kabupaten Bekasi	69.0	50.9	136%
Kabupaten Bogor	74.5	78.6	95%
Kota Tangerang	25.9	59.5	44%
Kabupaten Tangerang	56.2	42.2	133%
Jabodetabek Total	787.6	793.3	99%

Source: SITRAMP

## **(6) Land Acquisition Problem**

Land acquisition always involves difficult social problems and is very costly in most cases.

Major problems include:

- Land price distortion between private sector development and public sector development.
- External loan condition: a budget for land acquisition has to be prepared prior to a loan commitment; however, the prepared budget tends to become insufficient than required after commencement of the project.
- Less practical procedures are prepared for solving social problems associated with land acquisition such as preparation of compensation land.

## **(7) Lack of Passenger Capacity of Public Transportation**

Both the number of buses and train cars has been decreasing especially after the

<sup>7</sup> Refer to Technical Report Volume 4: Road Network.

economic crisis, consequently buses and train cars are overcrowded due to shortage of operational bus fleets and train cars.

#### **(8) Inadequate Bus Operation Regime**

One of the root causes of unreliable and uncomfortable bus operation has been found in the bus rental system known as "Setoran", or "WAP". Bus drivers and conductors are inevitably seeking the fare revenues to cover the bus rental fee, which they should pay to the bus company or bus owners, and fuel cost and other charges. Therefore, they should get as many passengers as possible before they depart from a bus terminal ignoring inconvenience of bus passengers. After leaving the terminal the bus crew rushes to the next bus shelters to collect passengers in rather dangerous driving manner.

#### **(9) Weak Monitoring and Control Capability on Bus Operation**

The agency responsible for bus operation has not sufficient capability in bus route planning since reliable passenger demand data are not available. The agency has also been facing difficulty in monitoring and control on bus operations since there are too many bus operators.

#### **(10) Bus Route Structure**

Currently there are some 850 bus routes in operation in Jabodetabek. More than 70 routes ply on the busiest streets, Jl. Sudirman and Jl. Thamrin, and carry bus passengers to various destinations. The present bus operation is characterized as many routes with low frequency for each route. The route structure is complicated and many routes are overlapped.

#### **(11) Inefficient Railway Management**

The revenue from the current railway operation cannot pay for the operation and maintenance costs. Despite the efforts of PT. KA, free riders have not been decreased significantly and are estimated at some 30%. Railway management should be improved to understand the current financial situation of the operation.

#### **(12) Different System Configuration in Jabotabek Railway**

Voltage for railway operation is different in the Jabotabek railway. The eastern line, the central line, the western line, and the Bekasi line utilize 1800 volts; Serpong line and Tangerang line uses 1650 volts. This discrepancy of voltage makes direct operation from one line to another difficult.

#### **(13) Failure in Coordination in Planning and Project Implementation**

Failures in the context of project planning and implementation are observed from the following five aspects:

- Failures in planning process and development fund raising: Although the respective governments authorized the plans, necessary development budgets were not allocated for the implementation.
- Failures in planning coordination between different transportation sub-sectors: Less attention has been paid to develop good inter-modality such as a railway station plaza with good access roads, a bus terminal and a taxi bay for convenience of rail users.
- Failures in planning coordination between the central and local governments: In the past, local governments had not been much involved in project planning, resulting in less coordination in local developments such as access roads.
- Failures in planning coordination between transportation sector and other development sectors: For example, very limited numbers of housing estate have been developed near rail stations in suburban areas and less intensive (dense) land use has been realized in central part of the region.
- Failures in planning coordination in a region-wide context: It has been suggested to institute an organization with a strong power for authorization of region-wide plans that covers multiple local governments, supported by sufficient technical staff and funds.