Japan International Cooperation Agency (JICA)
Ministry of Transport, Socialist Republic of Vietnam (MOT)
Transport Development and Strategy Institute (TDSI)

THE STUDY ON THE NATIONAL TRANSPORT DEVELOPMENT STRATEGY IN THE SOCIALIST REPUBLIC OF VIETNAM (VITRANSS)

Final Report

MAIN TEXT

Volume 3

TRANSPORT SECTOR STRATEGY AND MASTER PLAN

July 2000

ALMEC CORPORATION
PACIFIC CONSULTANTS INTERNATIONAL

PREFACE

In response to a request from the Government of the Socialist Republic of Vietnam, the Government of Japan decided to conduct the Study on the National Transport Development Strategy in Vietnam and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA dispatched a study team headed by Dr. Shizuo Iwata of ALMEC between January 1999 and June 2000.

Besides, JICA established an Advisory Committee headed by Prof. Dr. Shigeru Morichi, University of Tokyo, to advice the Team technically.

The Study Team conducted the study with the Vietnam Counterpart Team and held a series of discussion with the officials concerned of the Government of Vietnam. After the Team returned back to Japan, further studies were made and then the report was finally completed.

I hope that this report will contribute transport sector in Vietnam.

I wish to express my sincere appreciation to the officials concerned of the Government of Vietnam for their close cooperation extended to the Study Team.

July 2000

Kimio Fujita
President
Japan International Cooperation Agency

July 2000

Mr. Kimio Fujita
President
JAPAN INTERNATIONAL COOPERATION AGENCY
Tokyo

Letter of Transmittal

Dear Sir,

We are pleased to formally submit herewith the final report of the "The Study on the National Transport Development Strategy in the Socialist Republic of Vietnam (VITRANSS) ".

This report compiles the result of the Study which was undertaken both in the Vietnam and Japan from January 1999 to June 2000 by the Study Team, composed of ALMEC Corporation and Pacific Consultants International.

We owe a lot to many people for the accomplishment of this report. First, we would like to express our sincere appreciation and deep gratitude to all those who extended their kind assistance and cooperation to the Study Team, in particular the Ministry of Transport, the Transport Development and Strategy Institute and other government agencies of the Vietnam.

We also acknowledge the officials of your agency, the JICA Advisory Committee, and the Embassy of Japan in the Vietnam.

We wish the report would be able to continue significantly to Vietnam's transport sector development.

Very truly yours,

Shizuo Iwata
Team Leader,
THE STUDY ON THE NATIONAL TRANSPORT DEVELOPMENT STRATEGY
IN THE SOCIALIST REPUBLIC OF VIETNAM (VITRANSS)

THE STUDY ON THE
NATIONAL TRANSPORT DEVELOPMENT STRATEGY
IN THE SOCIALIST REPUBLIC OF VIETNAM
(VITRANSS)

Final Report

MAIN TEXT - Volume 3

Table of Contents

Appendices

List of Tables

List of Figures

Glossary

ACC	Area Control Center
ADB	Asian Development Bank
AFTA	ASEAN Free Trade Area
AFTN	Aeronautical Fixed Telecommunications Network
ASEAN	Association of Southeast Asian Nations
ATC	Air Traffic Control
ATN	Aid to Navigation
AWOS	Automatic Weather Observation Stations
BOT	Build - Operation -Transfer
CAAV	Civil Aviation Administration of Vietnam
CATCV	Civil Aviation Training Center of Vietnam
CNS/ATM	Communication, Navigation and Surveillance/Air Traffic Management
CTC	Centralized Train Control
DSI	Development Strategy Institute
DWT	Dead Weight Tonnage
EDI	Electronic Data Interchange
EI	Economic Indicator
EIA	Environmental Impact Assessment
EIRR	Economic Internal Rate of Return
FILP	Fiscal Investment and Loan Program
FIRR	Financial Internal Rate of Return
GDMSC	General Department of State Capital
GDP	Gross Domestic Product
GMS	Greater Mekong Subregion
GOV	Government of Vietnam
GRDP	Gross Regional Domestic Product
HCMC	Ho Chi Minh City
ICD	Inland Container Depot
ICAO	International Civil Aviation Organization
IHCM	Indonesian Highway Capacity Manual
ISM Code	International Safety Management Code
IWT	Inland Waterway Transport
JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency
Laos PDR	Laos People Democratic Republic
MOT	Ministry of Transport
MPI	Ministry of Planning and Investment
MTO	Multimodal Transport Operator
MTTS	Maritime Technical & Training School
NAA	Northern Airports Authority
NDB	Non-directional Radio Beacon
NH	National Highway
NTSC	National Traffic Safety Committee
OD	Origination and Destination
ODA	Official Development Assistance
PCU	Passenger Car Unit
PPC	Provincial People's Committee
PTA	Provincial Transport Authority
ROW	Right of Way
SAA	Southern Airports Authority

SAR	Search and Rescue
S/C	Steering Committee
SOE	State-owned Enterprise
SOLAS	Safety of Life at Sea
STCW	International Convention on Standards for Training, Certification and Watch-keeping for Seafarers
TDSI	Transport Development and Strategy Institute
TUPWS	Transport and Urban Public Works Service
VAC	Vietnam Airlines Corporation
VATM	Vietnam Air Traffic Management
VICT	Vietnam International Container Terminal
VIWA	Vietnam Inland Waterway Administration
VIMARU	Vietnam Maritime University
VINALINES	Vietnam National Shipping Lines
VINAMARINE	Vietnam National Maritime Bureau
VINASHIN	Vietnam Shipbuilding Industry Corporation
VITRANSS	Vietnam National Transport Development Strategy Study
VND	Vietnam Dong
VR	Vietnam Railways
VRA	Vietnam Road Administration
WB	World Bank
WTO	World Trade Organization

1 INTRODUCTION

1.1 Background

There is currently an active investment program in transport infrastructure, especially in rehabilitation and upgrading (of all modes). This program includes urban and rural transport infrastructure. At present there are 42 transport projects that are either ongoing or committed at a total cost of US$ 5.7 billion. Many are expected to be completed by 2000-2003. Of this amount, 72% is for roads followed by air (12%), port (6%), rail (2%), inland waterway (2%), rural transport (3%), and urban transport (3%). With past and ongoing investments, transport infrastructure is expected to improve considerably.

However, while individual infrastructure projects are implemented relatively smoothly and the basic transport infrastructure is improving, there are still many areas which need attention: infrastructure is still needed to fill current gaps and to meet growing demand in many locations. Institutional arrangements and regulatory framework for transport services need to be further improved to facilitate the smooth flow of goods and people under a competitive environment. There is also a growing concern among the government and donors on how to maximize the effects of these investments to strengthen the transport sector, as well as how to establish a mechanism to facilitate sustainable transport sector development. Whereas many of these transport issues have been identified and well documented in past studies and VITRANSS reports, the success in tackling these issues is largely dependent on the political will of the government.

1.2 Purpose of the Report

This volume explains the outputs of the Study with particular emphasis on long-term transport sector strategies, the Master Plan and short-term plan.

Chapter 2: This chapter explains the approach taken in formulating transport sector strategies and the Master Plan from the technical and operational viewpoints.

Chapter 3: This chapter gives a brief context of the transport sector with regard to regional development policy framework, an overview of present and future transport demand, balance of demand between modes, funding capabilities, and environmental considerations. This intends to provide an umbrella framework and a broad policy direction to which the transport sector must comply or contribute.

Chapter 4: This chapter explains the long-term transport strategies of Vietnam's transport sector. Discussed and analyzed here are transport sector goals and objectives; strategies for each subsector and for the sector as a whole; the balance of investment between transport modes; overall interprovincial transport network, defining network hierarchy and integration; constraints, opportunities and strategies to develop transport infrastructure for classified transport corridors; ways to establish

a competitive environment for transport services; strategies for strengthening transport sector management; and constraints and opportunities to fund transport sector investments.

Chapter 5: This chapter is the core of the expected output of the Study. Goals and objectives to be targeted in the Master Plan are further defined. First, a long list of transport projects is prepared based on long-term strategies. They are screened and the candidate projects are selected for inclusion to the Master Plan. The candidate projects are then evaluated from economic viewpoint and other aspects such as network integration, international linkage, cost recovery, social equity, poverty alleviation, environmental impact and resettlement/land acquisition. Then the Master Plan program is formulated wherein funding requirements for other transport subsectors outside the VITRANSS scope, such as urban and rural transport and minor projects, are considered.

Chapter 6: This chapter explains the prepared short-term plan which was based on the priorities of the subsector strategies and Master Plan projects. The prioritized projects fall within the likely range of the budget envelope.

Chapter 7: This chapter describes the recommendations on policies and institutional changes to support and accelerate the improvement of the transport sector.

Appendices: Additional information and technical notes, which support the discussions in this volume, are included here.

2 APPROACH

2.1 VITRANSS in the National Development Context

National Development Goals

The transport sector is a key component of national development and a strategic means to support and facilitate socio-economic development at different levels, from the national to the local, that is, the community. Thus the transport sector should be an integral part of the national development framework and strategies which are the starting points of the VITRANSS. The current national development goals are briefly as follows:

1) Economic Growth: Lessons from past experiences of the country as well as those of others explicitly indicate that sustainable economic growth is the most critical basis of a country's socio-economic development. Achieving a high, sustainable rate of economic growth with increasing economic efficiency is thus targeted.
2) Industrialization and Modernization: Sustainable economic growth is achievable only when the multisectoral market economy is continuously developed in association with further industrialization and modernization of industries and economies and the resultant increase in productivity.
3) Poverty Alleviation: The incidence of poverty in the country is still high and will not decline quickly in spite of the significant economic growth expected in the future. Poverty in Vietnam is much more significant in rural, especially remote, areas than in the cities.
4) Equity: Since major infrastructures are concentrated in a few locations, mostly the south and north growth areas and partly in the central region, promoting the harmonious economic development of all regions is a primary policy issue of the government.
5) Financial Sustainability: At present, many development projects rely on ODA for funding due to the lack of local financing capability. Market mechanism is yet to function efficiently, and costs of services and products are often not properly paid by users or beneficiaries. National savings have to be increased to set the preconditions for a more sustainable and rapid development in the next era.

Environment in the National Development Process

Vietnam in the process of development will encounter drastic internal and external changes. Urbanization[1] will accelerate as the economy grows and diversifies. Constraints in the increase in agricultural productivity will drive urban migration. Globalization of the economy and information and socio-cultural exchanges will not be avoided. Their impact will be significant and advantageous to the country, if adequately managed. Technological development which has been taking place will affect both the economic and industrial sectors in many ways. Motorization can be an

[1] Urbanization level (% of urban population to total population) of Vietnam is still very low (23.3%) compared to other countries in southeast Asia.

opportunity or a potential threat to Vietnam's transport sector depending on how it is met by policies. Whereas current motorization shows a shift from bicycle to motorcycle, the anticipated trend is the rapid growth in car ownership and utilization, especially in Hanoi and HCMC. Urban and rural transport issues will also become more and more critical and must be resolved adequately.

2.2 VITRANSS Approach

Technical Approach

The national development goals and plans being the starting point of transport sector planning have been translated into a planning framework which estimates the future transport demand level quantitatively and provides broad guidelines to direct the transport sector's development. The future planning framework includes the forecast of population, GDP, urbanization level, vehicle ownership, industrial outputs, foreign trade, production and consumption of major commodities, containerization, and others. These are explained in detail in subsequent sections of the report.

Vietnam's transport sector planning seriously lacks necessary updated data, and this weakens the basis of policy formulation, affects sound decision-making and inevitably results in unrealistic project proposals. The establishment of reliable database was thus considered as one of the important tasks in the VITRANSS. Although available time was limited, the Study Team, in close coordination and joint work with the Counterpart Team, was able to conduct a series of surveys especially on transport demand and operation.

Transport demand forecast has been given an emphasis in the Study[2] to provide a solid basis of planning for VITRANSS as well as for other studies and projects being undertaken by the government and subsector agencies. Future demand in the Study has been estimated under two different scenarios on future GDP (high growth and low growth cases).[3]

On the basis of the future regional development perspective, demand forecast was made on interprovincial movements[4] of passengers and goods, the latter categorized into 13 major commodity groups. The results are expressed in the form of origin-destination (OD) matrices for each commodity group and passenger by province of which Vietnam has 61. The estimated interprovincial transport demands were then assigned on different transport networks assumed for planning purposes. This traffic assignment process is an important step in network planning for which specially designed computer software has been utilized.[5]

[2] Volume 3 of the draft final report deals with the details of demand forecast.

[3] The scenario has been set in consultation with MPI/DSI. The high case assumes the average annual growth rates of 7.6%, 7.9% and 6.7% between 2000-2005, 2005-2010 and 2011-2020, respectively, while the low case assumes 6.4%, 6.6% and 5.2% during the same periods.

[4] Traffic movements within provinces are excluded from the demand forecast.

[5] The assignment process has also been described in detail in Volume 3 of the report. A series of training sessions were conducted for selected counterpart members of TDSI during the course of the Study.

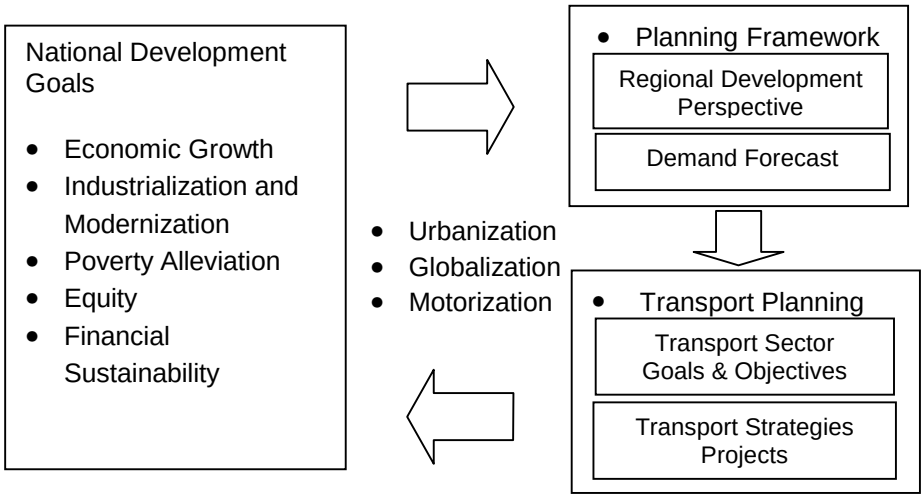
Parallel to the demand forecast, a series of studies and analyses were made for each of the major transport subsector – road, railway, inland waterways, port and shipping, air, rural transport, cross-border transport, and multimodal transport. Existing conditions and problems facing the transport sector were analyzed and issues were identified. Long-term transport sector goals and objectives were defined, and interactive subsector strategies were formulated in a coordinated manner. Strategies cover operation/management infrastructure, institutional framework and funding for the transport sector as a whole or for specific subsector.

In compliance with the sector objective and strategies, projects were identified, formulated and included in a long list. The projects were evaluated preliminarily but comprehensively involving not only the economic[6] aspect but also other factors such as social equity/poverty, environment, cost recovery, network integration, international linkages, and resettlement/ROW acquisition requirements. Since the VITRANSS focus is on projects of national and regional importance, economic aspects were given the heaviest consideration in prioritizing the projects.[7] These projects were also evaluated by subsector to delineate broad policy priority in transport sector investment.

The future budget envelope for the transport sector was estimated based on different scenarios[8] which show the funding capacity levels of the government. Candidate projects were further screened and selected in a way that their required funding will fall more or less within the estimated available budget.

The above process is conceptually shown below.

Figure 2.2.1
Concept of VITRANSS Approach



[6] Economic Internal Rate of Return (EIRR) was estimated for most of the infrastructure projects to clarify the relative importance of each of them.

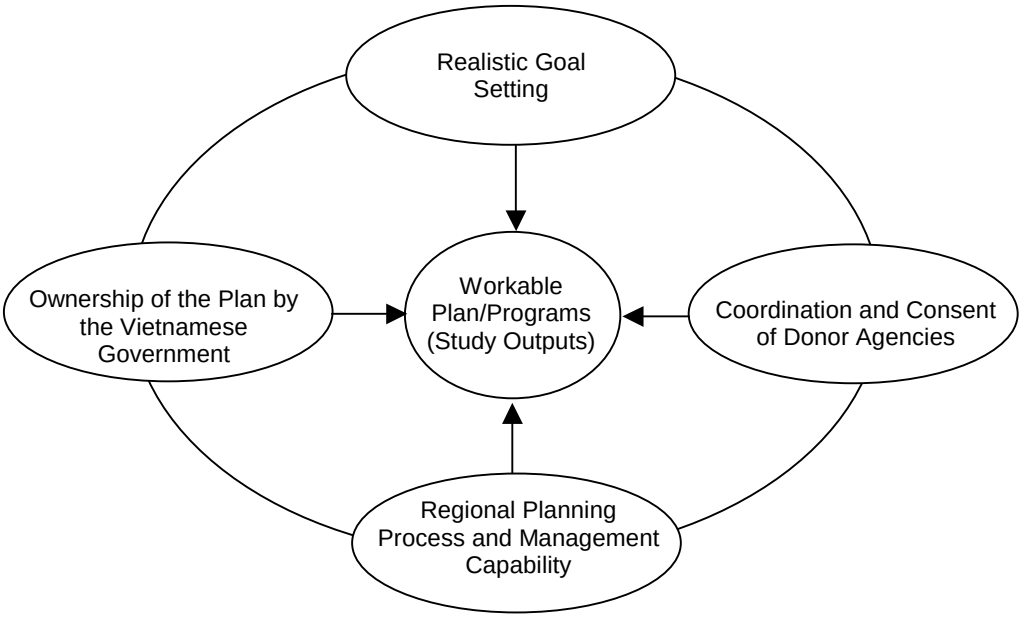
[7] The government's priority for rural, urban and minor transport projects necessary for good housekeeping which are outside the VITRANSS has been considered in the allocation of future funds that would be available to the transport sector.

[8] GDP growth and potential funding sources are considered.

Operational Approach

An emphasis in conducting the VITRANSS was given on “coordination” and “technology transfer”. Vietnam‘s transport sector involves a wide range of stakeholders from various subsectors under diffferent administrative bodies and institutions, not to mention a good number of donors involved in developing it. For the VITRANSS to contribute significantly to the government’s national transport plan, effective working arrangements became critical during the course of the Study to facilitate ownership of the plan by the Vietnamese government, capability building of the counterpart agency, coordination with donor agencies, and realistic goal setting based on which workable plans and programs can be developed (see Figure 2.2.2).

Figure 2.2.2
Key Elements of the Study



On this basis, the following arrangements were made during the Study:

1) A multisectoral Steering Committee (S/C) headed by the Vice Minister of the MOT was organized which includes senior representatives of other agencies such as MPI, MOT, VR, VIWA, VRA, VINAMARINE, CAAV, and TDSI. A total of five S/C meetings were held.

2) A joint working team comprising the JICA Study Team and Vietnamese Counterpart Team (TDSI) was established.

3) A Task Force comprising senior officials of subsector agencies was also organized to provide consultation on various issues arising during the course of the Study. A total of four Task Force meetings were held.

4) A series of workshops were conducted to disseminate the major outputs of the Study and consult with other stakeholders. A total of six major seminars and seven subsector workshops were held.

5) A series of learning sessions and training courses were held for the Counterpart Team to facilitate technology transfer on key aspects of the Study. A total of 12 learning sessions and two one-week training courses were held.

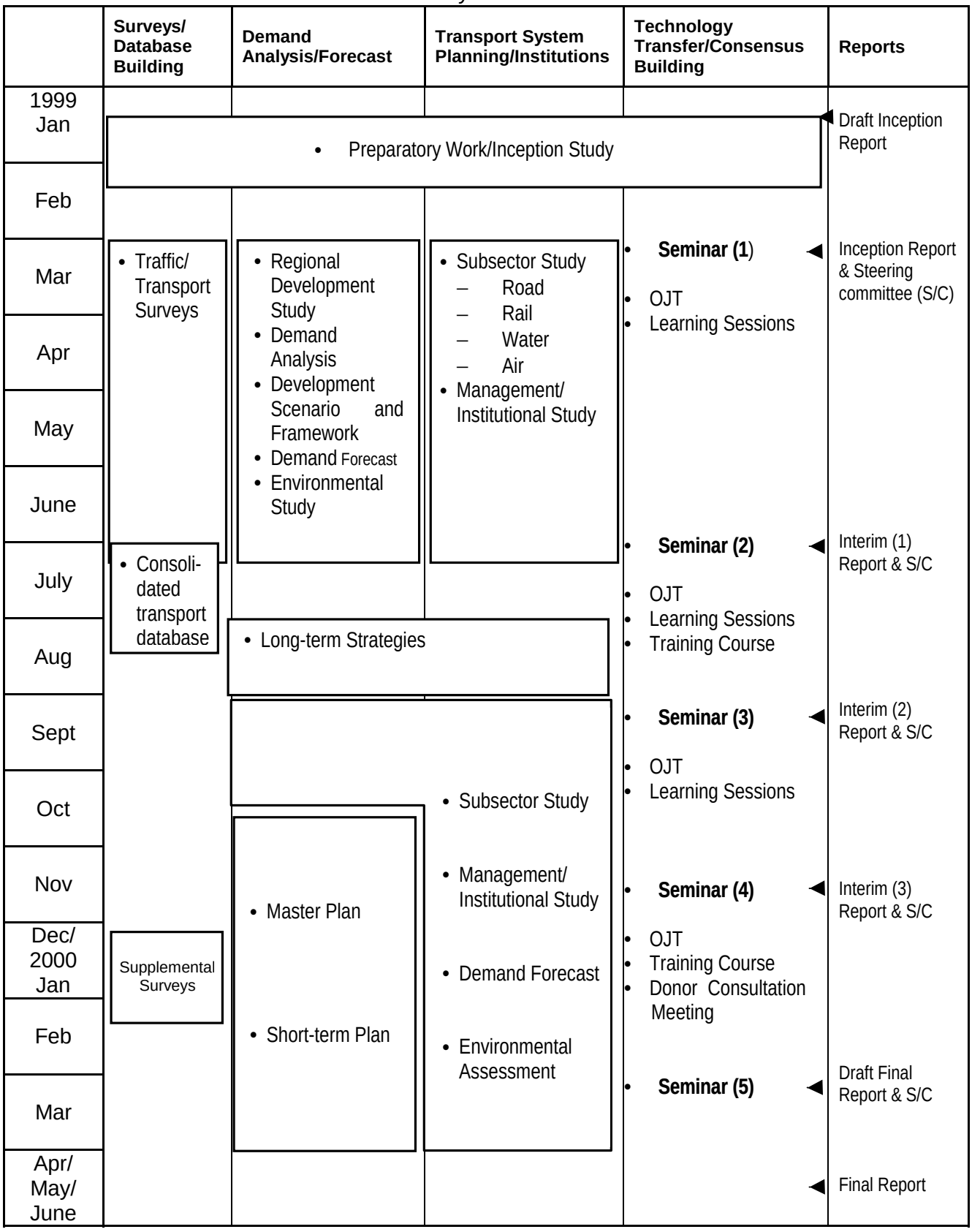
6) Donors were consulted through workshops and separate consultation meetings.

2.3 Study Implementation

The study commenced in January 1999. The Draft Final Report was prepared in March 2000.

The overall study framework is shown in Figure 2.3.1.

Figure 2.3.1
Overall Study Framework



3 CONTEXT OF THE TRANSPORT SECTOR

3.1 Regional Development Policy Framework

Regional Development Trend and Policy

The economic growth of the country differs by region. The south is the fastest growing, followed by the north and then central Vietnam. This trend has continued for more than a decade. Regional disparities have not been narrowed; it has even increased between urban and rural areas. Consequently, the disparity between urban areas of fast-growing regions and rural areas of mountainous regions has widened.

To bridge this gap and to meet the long-term development goals of industrialization and modernization the government's five-year plan (1996 – 2000) has laid out a number of broad objectives. These are:

- To achieve a high and sustainable rate of economic growth with increasing economic efficiency;
- To continue the development of a multisectoral market economy under a socialist state;
- To tackle serious social problems, thereby substantially reducing poverty and generally improving living standards;
- To promote a harmonious economic development of all regions; and,
- To increase national savings and create the preconditions for a more sustainable, rapid development in the next era.

Industrialization and urbanization are expected to be at the forefront of the development process. The agricultural sector is expected to grow. With increasing mechanization, the sector is expected to require less labor. Displaced workers can then be reemployed in the secondary and tertiary sectors. The plan's targets require the mobilization of domestic and foreign savings and are conditioned on major achievements in human resource development to provide a workforce with the necessary skills to meet the demands of an industrializing economy.

Regional Development Perspective and Framework for the VITRANSS

The national and regional development policy has been interpreted in terms of population, urbanization level and gross regional domestic product (GRDP) and its sectoral composition and industrial outputs by major commodity groups at regional and provincial levels. This regional development perspective provides a basis for projecting transport demand and developing a transport plan (see Table 3.1.1 and Table 3.1.2).

The significance of the socio-economic development in Vietnam during the next two decades (1998/9 – 2020) is summarized as follows:

- Population will increase from 76 million to 110 million (1.4 times).
- Gross domestic product (GDP) will increase from VND 264 trillion to VND 885-1.144 trillion (3.4-4.3 times).
- Per capita GDP will increase from VND 3.2 million to VND 8.0 million - 10.4 million (2.5 - 3.2 times).
- The percentage of urban population will increase from 23.3% to 32.5%.
- Industrialization will make further progress and industrial outputs, such as steel, cement, fertilizer, and manufacturing goods, will increase significantly (5.1 times).
- Foreign trade will increase substantially (2.5 to 3 times).

These overall changes will affect the entire country. It is expected that regional development objectives, with special attention to narrowing regional disparity and alleviating poverty in rural areas, will be properly attended to in the process. In this context, the VITRANSS briefly describes the future traffic scenario, thus:

1) Social and economic expansion will considerably intensify traffic demand throughout the country and probably spawn various traffic services. Under constant urbanization trends, traffic demand will further increase. Seasonal traffic fluctuations will become less significant unlike in agriculture-based societies. Passengers will require faster and more comfortable transport services in line with increasing incomes.

2) The government's decentralization policy aims at equitable growth and balanced urbanization among the regions. While it is expected that the number of large cities with more than 500,000 people will increase from four to 10 by 2020, it is an important strategy that subordinate urban centers are developed in a hierarchical and integral manner to support rural development. The development of strategic growth belts, including Ha Long-Hai Phong-Hanoi-Vin, Hue-Danang, and Vung Tau-Bien Hoa-HCMC-Can Tho, will be accelerated. However, the benefits from these developments must be felt by the rest of the country.

3) In spite of the expected growth, poverty will remain. In 1990 urban incomes on average were five times higher than rural incomes, rising to eight times in 1997. In order not to widen such urban-rural disparity, rural transport should be strengthened to ensure market access, enhance agricultural productivity and encourage off-farming activities.[1]

4) Industrial powerhouses will be scattered all over the country, reflecting Vietnam's extensive reservoir of rich mineral resources and some political decisions on the choice of their locations. For example, coal and refined oil products will be transported mostly from Quang Ninh coalfields and Dung Quat oil refinery plant, respectively, to consumption places nationwide. Cement and fertilizer products will

[1] According to the World Bank's analysis, in Vietnam about 90% of the poor live in rural areas and only 30% of them depend solely on farming for their livelihood. It also indicates that those who have access to all-weather roads have relatively higher living standards than those who have none.

mainly be produced in the north due to the area's rich mineral resources, while large urban economies will supply diverse manufacturing goods. To connect production and consumption areas, long-distance haulage will inevitably be needed. If these transport services cannot be provided sufficiently at economical prices, imported goods may easily be substituted for local ones.

Table 3.1.1
Growth of Population and GDP

		1999	2010	2020
Population	Million (Index)	76.3 (100)	94.5 (123)	109.5 (143)
GDP (VND trillion at 1994 price)	High Case (Index)	264	598 (227)	1144 (433)
	Low Case (Index)	(100)	531 (201)	885 (335)

Table 3.1.2
VITRANSS Regional Development Perspective

Region	Target Year	Demographic Framework			Per Capita GDP	GDP Composition by Sector			Major Industrial Output ('000 tons)			
		Population ('000)	Population Density (/km2)	Urbanization Rate (%)	(VND Million at 1994 Constant Prices)	Primary	Secondary	Tertiary	Steel	Cement	Fertilizer	Manufactu-ring Goods
1	Present	14,800	1,182	21.1	2.87	22.2	42.5	35.2	250	3,749	232	1,006
Red River	2010	17,699	1,414	27.7	6.95	12.1	44.1	43.8	1,390	10,050	290	3,543
Delta	2020	20,024	1,600	36.5	11.72	7.5	44.4	48.1	1,390	11,959	590	6,175
2	Present	10,861	162	16.0	1.79	33.0	30.1	36.9	279	226	790	378
Northeast	2010	13,616	203	20.7	3.87	28.2	35.8	36.0	880	3,027	1,640	1,207
	2020	15,613	233	26.0	6.24	23.2	39.1	37.7	880	3,027	2,460	2,227
3	Present	2,228	62	13.0	1.37	49.1	27.1	23.8	0	113	0	33
Northwest	2010	2,764	77	18.2	3.11	43.8	33.1	23.1	0	563	0	181
	2020	3,158	88	20.7	4.96	39.0	36.4	24.6	0	563	0	335
4	Present	10,007	196	12.3	1.88	32.9	23.8	43.3	0	1,419	50	275
North Central	2010	12,294	240	14.8	4.26	28.0	23.5	48.5	0	3,718	50	802
Coast	2020	13,740	268	19.8	7.01	21.8	24.0	54.2	2,000	12,218	100	1,390
5	Present	6,526	193	26.6	2.70	27.4	24.0	48.6	9	131	182	290
South Central	2010	7,887	234	29.4	6.03	22.5	25.6	51.9	1,010	1,151	420	801
Coast	2020	8,893	263	35.1	9.95	17.3	27.6	55.1	1,010	3,551	770	1,451
6	Present	3,062	67	18.6	2.60	40.6	14.0	45.4	0	39	0	66
Central	2010	3,422	74	21.9	6.20	34.6	20.2	45.2	0	39	0	254
Highlands	2020	4,203	91	25.0	9.56	29.8	23.0	47.2	0	39	0	504
7	Present	12,709	282	50.1	6.60	9.3	46.5	44.3	507	1,378	287	2,901
Northeast	2010	15,810	351	55.0	15.45	6.5	53.5	40.0	1,730	1,628	1,150	7,940
South	2020	18,971	421	59.9	24.39	4.6	57.1	38.4	1,730	4,028	2,000	14,762
8	Present	16,132	408	17.1	3.42	34.3	18.5	47.3	0	964	20	550
Mekong River	2010	21,057	532	18.7	7.61	28.5	22.9	48.6	0	2,964	30	2,338
Delta	2020	24,919	630	21.3	12.10	22.2	26.3	51.5	0	3,164	80	4,496
	Present	76,325	231	23.3	3.23	23.7	33.5	42.8	1,045	8,019	1,561	5,499
Whole Country	2010	94,549	286	27.2	7.44	18.1	38.1	43.8	5,010	23,140	3,580	17,066
	2020	109,521	331	32.5	12.10	13.7	40.8	45.4	7,010	38,549	6,000	31,340

3.2 Transport Demand – Present and Future

Transport Demand Growth

In 1999 interprovincial passenger transport demand was about 219 million passengers (0.6 million a day) or 58.4 billion passenger-km (160 million a day) and is projected to grow by 1.8 times and 3.3 times in 2010 and 2020, respectively. The total volume of interprovincial cargo estimated at 241,000 tons daily will grow by 1.8 times and 3.0 times in 2010 and 2020, respectively. Since average transport distance will increase, cargo transport demand will become nearly three times more in 2010 in terms of ton-km. Major cargo items currently transported are rice/paddy, construction materials, coal, petroleum, and manufactured goods. In the future, demand will significantly increase for rice/paddy, steel, cement, fertilizer, petroleum, and manufactured goods.

Figure 3.2.1
Growth of Future Transport Demand

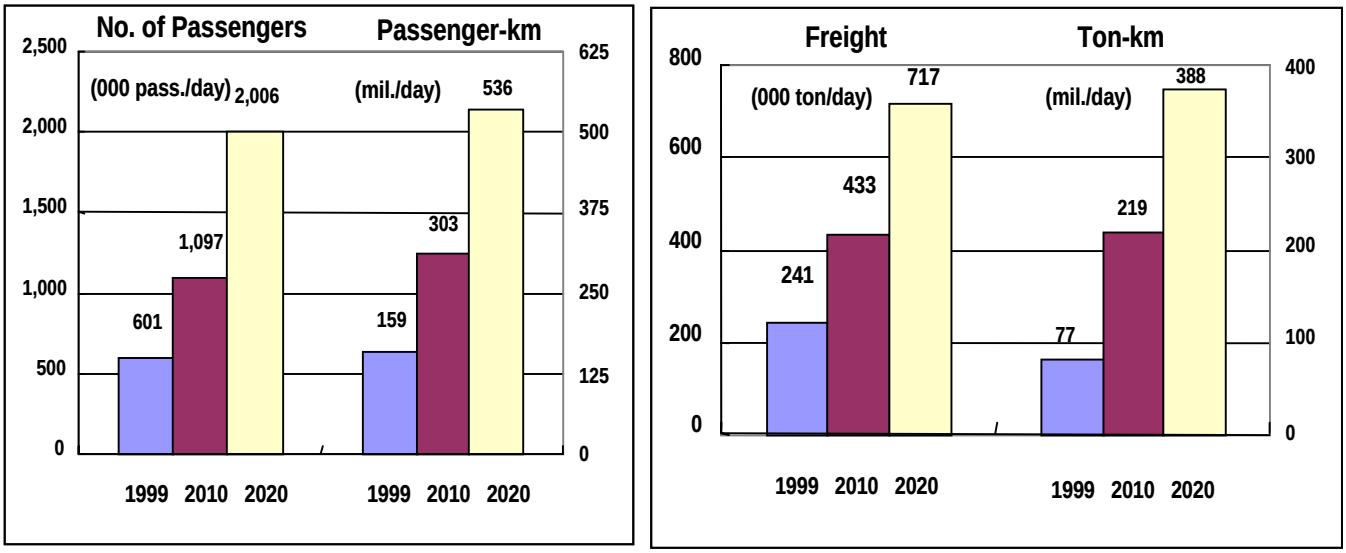
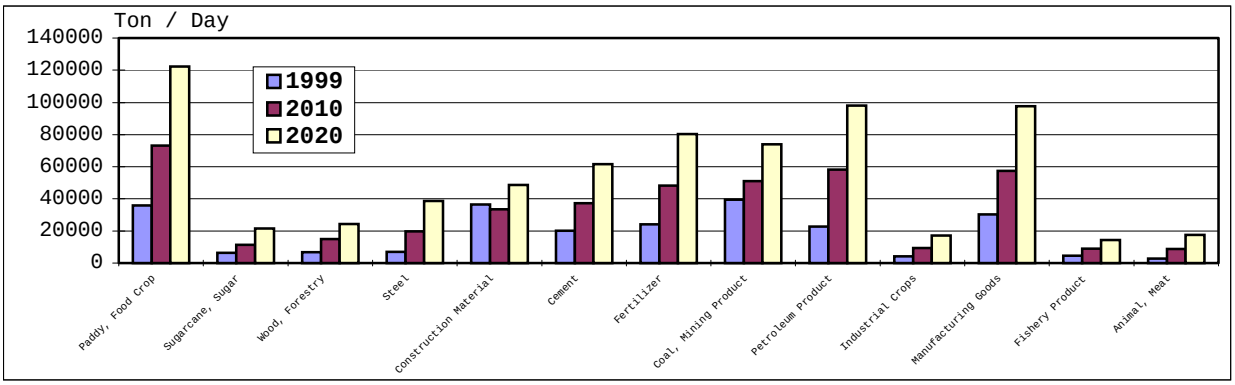


Figure 3.2.2
Growth of Cargo Transport Demand by Type



Transport Demand on the Network

At present, traffic movement is significant in radial directions centering on HCMC and Hanoi within the delta areas. However, the north-south movement between HCMC and Hanoi will become significant in the future. In the case of cargo, the inland trunk road NH14, will also contribute to this north-south growth since it would serve as an ancillary axis to the coastline (NH1, railway and coastal shipping). Since the transport distance of cargo will increase in the future, the share of coastal shipping, mainly for bulk cargo, will significantly increase. Railway will likewise become more important in cargo transport. As road development progresses, inland waterway transport will cater more to local transport needs.

Figure 3.2.3
Passenger Flow by Surface Mode

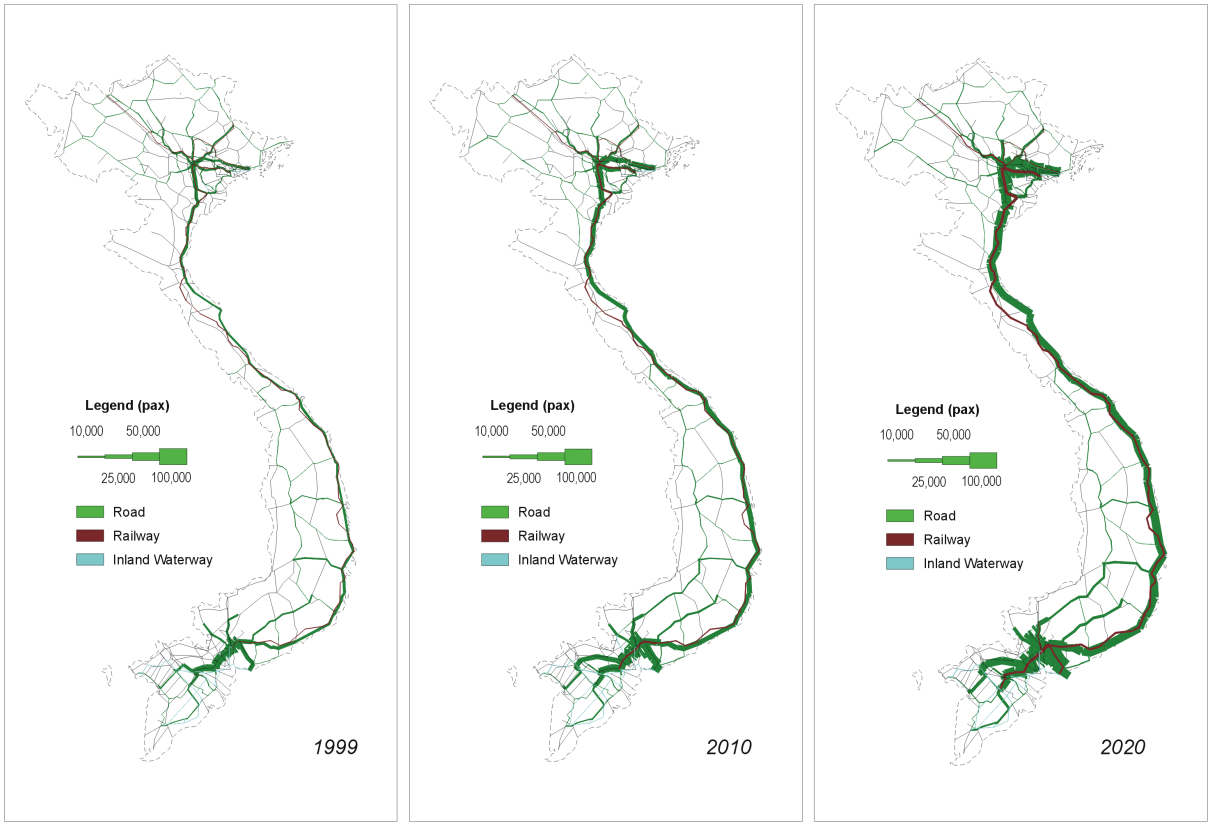


Figure 3.2.4
Cargo Transport by Road

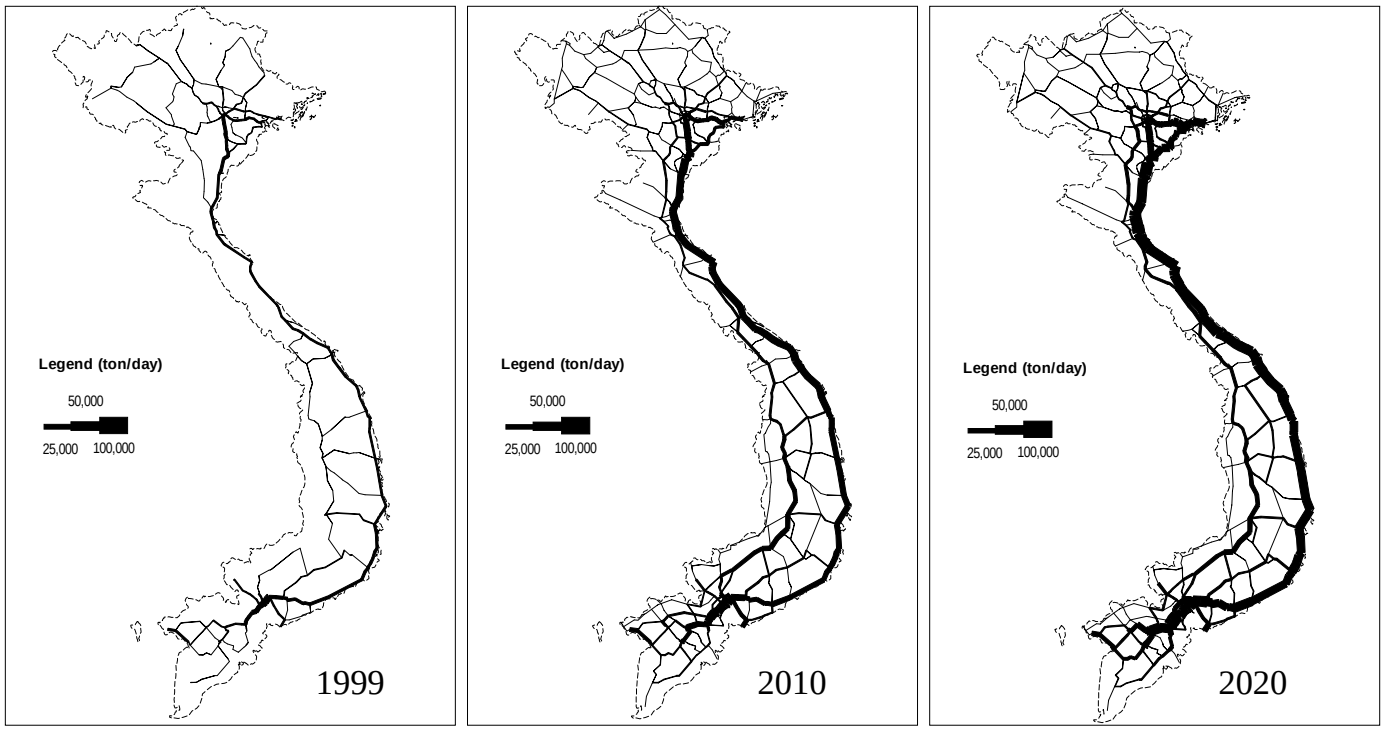
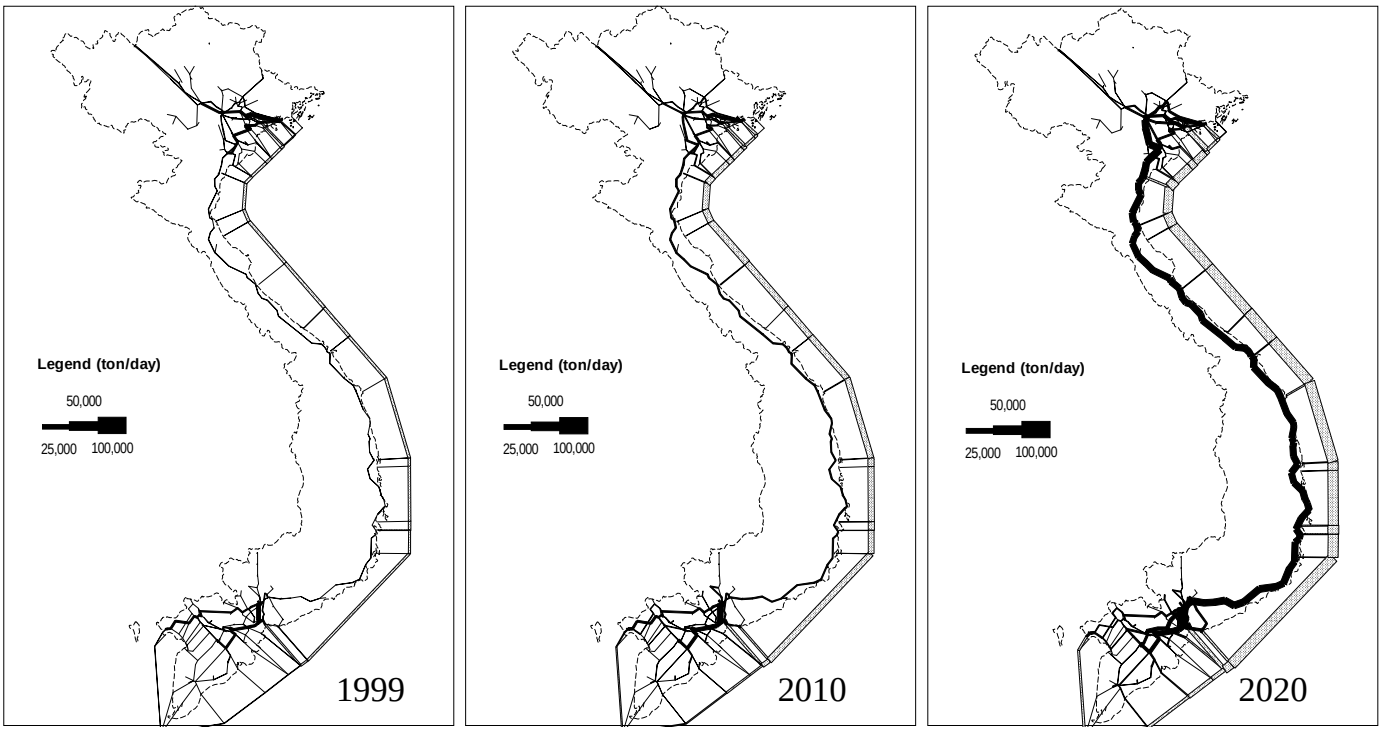


Figure 3.2.5
Cargo Transport by Rail, Inland Waterway and Coastal Shipping



3.3 Modal Balance

Summary of Demand Forecast

Tables 3.3.1 and 3.3.2 summarize the results of transport demand forecast which are described in detail in Volume 2. Since economic optimization process is incorporated in the methodology of traffic assignment, the results presented here are consistent with the future direction of transport development. The major general features of demand forecast are:

- In passenger transport, the share of passenger car, railway and air will increase while that of bus and inland waterway will decrease.
- In cargo transport, the share of railway and shipping will increase while that of inland waterway will decrease and that of truck will remain more or less the same.
- However, all transport modes should be strengthened because transport demand will increase for all modes in absolute terms.

Table 3.3.1
Summary of Passenger Transport Demand Forecast

		Domestic Interprovincial Flow			International Flow		
		1999	2010	2020	1999	2010	2020
No. of Passengers (000/year)		219,433 (100)	400,873 (183)	733,377 (334)	23,882 (100)	34,462 – 35,822 (144 – 150)	51,315 – 55,614 (215 – 233)
Modal Share in No. of Passengers (%)	Car	9	17	18	90	77-80	71-77
	Bus	86	73	72			
	Inland waterway	1	1	0			
	Railway	4	8	8			
	Air	1	1	1	10	20 - 23	23 - 29

Table 3.3.2
Summary of Cargo Transport Demand Forecast

(000 tons/year, +: export, -: import)

Commodity Type		Domestic Interprovincial Flow			National Trade Balance		
		1999	2010	2020	1997	2010	2020
	1. Rice and Other Food Crops	13,146	26,655	44,562	+3,575	+5,000	+6,000
	2. Sugar	2,356	4,139	7,353	-70	0	+36 ~ +470
	3. Wood	2,519	4,481	6,025	+75	-1,100	0
	4. Industrial Crops	1,545	3,511	6,732	+611	+2,130	+4,430
	5. Fishery Products	1,658	3,330	5,184	+259	+860	+970 ~ +1,236
	6. Animal Meat	1,081	3,387	5,882	+32	+62	+61 ~ +71
	7. Steel	2,679	7,623	14,769	-1,401	-1,532 ~ -1,751	-4,066 ~ -6,779
	8. Construction Materials	13,444	12,434	18,308	-144	0	0
	9. Cement, Clinker	7,325	13,603	22,895	-1,740	+3,139 ~ +4,486	+5,548 ~ + 6,027
	10. Fertilizer	8,796	17,669	29,711	-2,680	-4,576 ~ -4,655	- 4,599 ~ -5,913
	11. Coal and Other Mining	14,551	18,672	23,448	+3,574	+4,900 ~ +5,000	+5,300 ~ +5,500
	12. Crude Oil and Refined Oil	8,268	35,100	51,714	+9,670 -6,101	+3,470 -1,235 ~ -2,951	+3,470 -11,024 ~ -17,823
	13. Manufacturing Goods	11,190	21,345	36,644	+2,630 -2,737	+7,608 ~ +8,157 -7,917 ~ -8,489	+13,440 ~ +14,987 -13,987~ -15,596
Other Miscellaneous Goods		-	-	-	+756 -2,412	+2,566 ~ +2,782 -3,434 ~ -4,462	+6,357 ~ +8,342 -8,082 ~ -13,833
Export Subtotal		-	-	-	21,182	30,600 ~31,082	46,091 ~ 50,054
Import Subtotal		-	-	-	17,285	18,694 ~ 22,308	41,758 ~ 59,944
Transit/Transshipment		-	-	-	3,151	5,251 ~ 5,767	7,654 ~ 9,306
Total		88,559 (100)	171,951 (194)	273,228 (309)	41,618 (100)	55,027 ~ 58,674 (132 ~141)	95,054 ~ 119,305 (229 ~ 287)

Modal Share in Tonnage carried (%)	Truck	54	61	56	18	20	23
	Inland Waterway	31	22	20	0	0	0
	Railway	6	6	10	0	0	0
	Shipping	8	11	14	82	80	77
	Air	0	0	0	0	0	0

3.4 Available Resources

Background

Investment in the transport sector has been about one-fourth of public investment in the last several years or about 1.8% of GDP. Although it has been advocated that transport sector investment should be 3% of GDP[2], this is quite unrealistic, since most investments in transport infrastructure have been funded so far by official development assistance (ODA). It is unlikely that ODA will grow further, partly due to the economic situation of donor countries themselves and partly in the expectation that self-financing would be strengthened in Vietnam.

Estimate of Possible Investment Amount

Based on the GDP projected by the VITRANSS, the possible investment amount was estimated for the following cases:

Case 1: 1.8% of GDP is continuously invested in the transport sector
Case 2: 2.5% of GDP is continuously invested in the transport sector
Case 3: 3.0% of GDP is continuously invested in the transport sector

The estimated amount likely available for the transport sector from the government ranges between US$ 23 billion and US$ 45 billion for the next two decades (see Table 3.4.1). For the VITRANSS, Case 2 is assumed to be the most likely case which indicates that about US$ 12 billion will be available for the Master Plan period.

Table 3.4.1
Estimate of Possible Investment in the Transport Sector

US$ billion

Period	Case 1 (1.8% of GDP)		Case 2 (2.5% of GDP)		Case 3 (3.0% of GDP)	
	High	Low	High	Low	High	Low
2001-2005	3.7	3.5	5.1	4.9	6.2	5.9
2006-2010	5.4	4.9	7.5	6.8	8.9	8.1
Subtotal 2001-2010	9.1	8.4	12.6	11.7	15.1	14.0
2011-2020	18.0	14.7	25.0	20.5	30.0	24.5
Total	27.1	23.1	37.6	32.2	45.1	38.5

[2] The scale of public funding in terms of GDP spent on the transport sector in 1996 is as follows: Brunei Darussalam (2.9%), Malaysia (2.4%), Myanmar (2.3%), Philippines (2.0%), and Thailand (7.3%) (ASEAN Secretariat).

3.5 Environment

Environmental issues are becoming more and more critical in economic and social development. In the VITRANSS, these issues are assessed by each transport subsector from the viewpoint of natural and social environments.

Overview on Environmentally Critical Areas

A number of environmentally critical areas are located throughout Vietnam, as shown in Figure 3.5.1. In preparing infrastructure projects in the VITRANSS, the following points should be paid attention to:

- Landslide-prone areas are widely distributed in hilly and mountainous regions of Vietnam. Particularly in the northern mountainous provinces, careful assessment is needed before implementation of projects because of the presence of many faults that may be activated when earthquakes occur.
- Flood-prone areas are Red River delta, Mekong delta and some coastal areas. The latter also becomes seriously affected sometimes by storm surges. Transport infrastructure in these areas must not be damaged by water. At the same time, it must not hinder water flow. Particularly in the deltas, road projects need to be integrated to flood protection projects.
- Along the coastline of Vietnam, lagoons and tidal marshes are widely distributed. These areas, which often include mangroves, are ecologically precious. Transport projects, particularly ports, should not adversely impact on these areas. Hence, a proper assessment must be conducted prior to implementation.
- Areas of natural and historical importance, such as those identified as World Heritage sites (Ha Long Bay, Hue, My Son, and Hoi An), and the ancestral domain of cultural communities should likewise be protected and conserved.

Framework for Environmental Consideration

The Study examined its impact on the social, natural and living environments. The social environment includes resettlement of inhabitants, economic activities, traffic and public facilities, community disorganization, historical and cultural property, water rights and commons, public health, wastes and hazards. The natural environment includes topography and geology, soil erosion, underground water, hydrological situation, coastal zone, flora and fauna, meteorology and landscape. Living environment concerns air pollution, water quality, soil contamination, noise and vibration, and land subsidence, among others. The results of the preliminary environmental examination of transport projects are summarized in Table 3.5.1, Table 3.5.2 and Table 3.5.3.

Figure 3.5.1
Environmentally Critical Areas in Vietnam

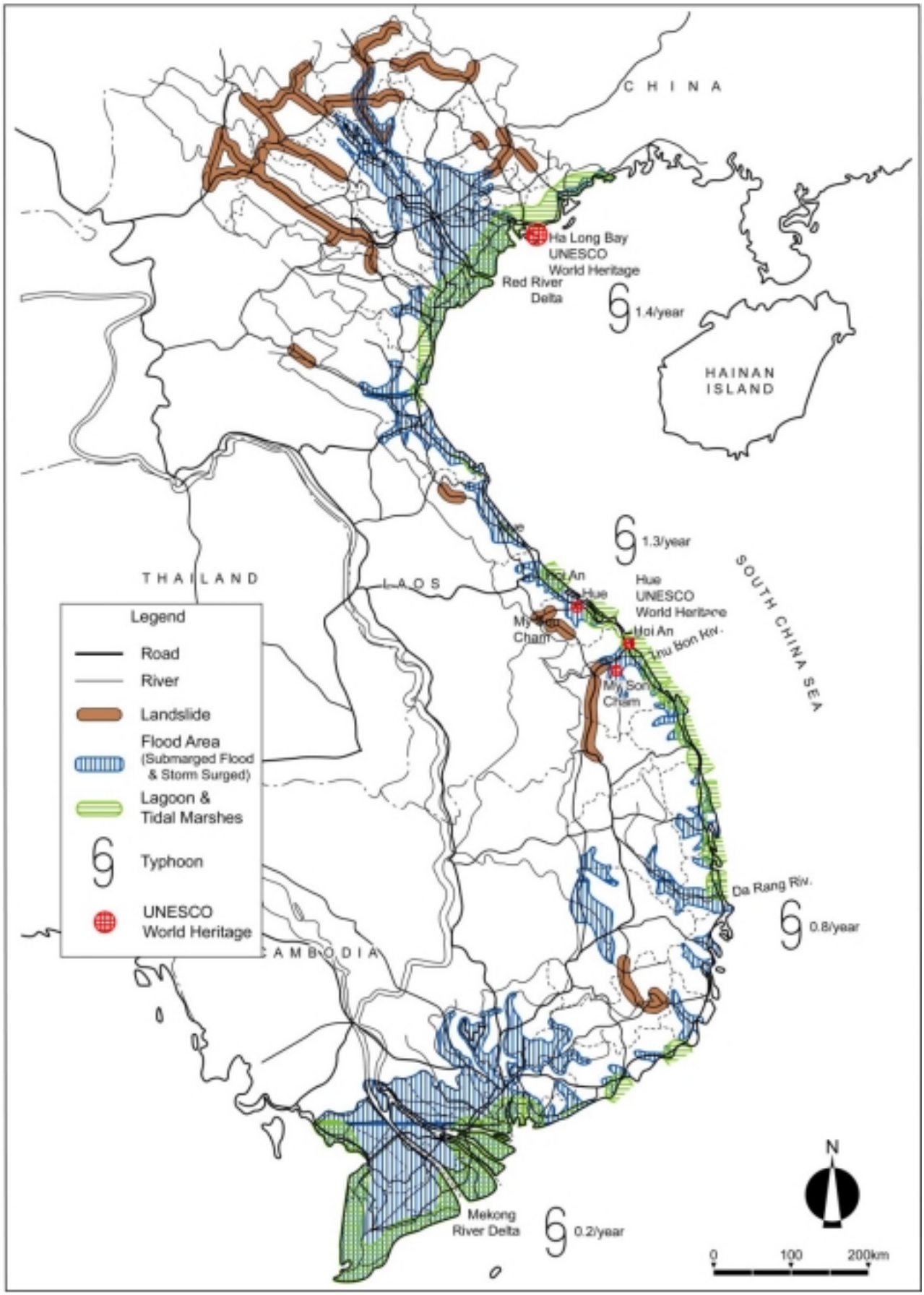


Table 3.5.1
Impact of Transport Projects on the Social Environment

Aspect	Definition	Possible Level of Impact				
		Road	Rail	Air	IWT	Maritime
• Resettlement of Inhabitants	Resettlement due to site occupation (transfer of rights of residence and land use)	B-C	B	B-C	A-B	B-C new port
• Economic Activities	Loss of land or other livelihood opportunities	Positive Impact	Positive Impact	Positive Impact	Positive Impact	Positive Impact
• Traffic, Public Facilities	Impact of traffic congestion and accidents on traffic condition, schools and hospitals, etc.	B-C	B	B-C noise	A	B
• Community Disorganiz-ation	Divisions in local society due to traffic obstructions	B	B	B-C	A-B	A
• Historical & Cultural Property	Damage to and loss/depreciation of shrines, temples, cultural properties, etc.	B	B	B-C	A	B-C
• Water Right & Common	Obstruction of fishing rights, right of water usage, forested mountain commonage	A-B	A-B	B-C	B	C
• Public Health	Deterioration of public health due to waste and vermin outbreaks	B	B	B	A	B
• Waste	Proliferation of construction waste, waste dust & solid wastes	C	C	C	B	C
• Hazards	Increase in accidents from landslides, floods & cave-in	C	C	C	B	B

A: No negative impact is anticipated (not requiring IEE/EIA).
B: Some impacts are anticipated (requiring IEE/EIA and countermeasures).
C: Impacts are anticipated (requiring IEE/EIA and adequate countermeasures, project itself should be duly considered).

Table 3.5.2
Impact of Transport Projects on the Natural Environment

Aspects	Definition	Possible Level of Impacts				
		Road	Rail	Air	IWT	Maritime
• Topography & Geology	Re-formation of valuable topographical and geological areas because of excavation or soil subsidence	B-C	B	B-C	A-B	C
• Soil erosion	Erosion of surface soil by rain after land reclamation and deforestation	B-C	B	B-C	B	C
• Underground Water	Deterioration of water quality due to construction and decrease of underground water caused by excessive pumping	C tunnel	C tunnel	B-C construction stage	A	B
• Hydrological situation	Changes in flow volume and river beds due to land reclamation or its drainage flow	A-B	A-B	B	A	C
• Coastal Zone	Erosion of coastal areas and decrease in coastal biodiversity due to land reclamation or change of sea current	C	A-B	C	B	C
• Flora and Fauna	Breeding problems and extinction of species due to a change in their habitats	C	A-B	C	B	C
• Meteorology	Changes in temperature and wind due to large-scale reclamation	A	A	A	A	A
• Landscape	Topographical changes due to reclamation and obstruction of landscape due to bridge	B Bridge	A	B	A	B

A: No negative impact is anticipated (not requiring IEE/EIA).
B: Some impacts are anticipated (requiring IEE/EIA and countermeasures).
C: Impacts are anticipated (requiring IEE/EIA and adequate countermeasures, project itself should be duly considered).

Table 3.5.3
Considerations on Living Environment due to Implementation of Transport Projects

Aspects	Definition	Possible Level of Impacts				
		Road	Rail	Air	IWT	Maritime
• Air Pollution	Degradation of Air Pollution due to harmful exhaust gases from vehicles, shipping and airplane	C	A Positive Impact	B	B	B
• Water Quality	Degradation of Water Quality due to inflow of soil and wasted water on construction and operation stage	B-C construction stage	B construction stage	B-C construction stage	B	C
• Soil Contami-nation	Contamination due to coarse dust and asphalt emulsion etc. on construction and operation stage	B construction stage	B construction stage	B construction stage	A	B
• Noise and Vibration	Noise and vibration generated by vehicles facilities on construction and operation stage	C	B	C	A	B construction stage
• Land Sub-sidence	Sinking of land surface accompanying geological changes or a drop in ground water level	A	A	B	A	B
• Odor	Production of exhaust gases and malodorous substances	B	A	A	A	B

A: No negative impact is anticipated (not requiring IEE/EIA).
B: Some impacts are anticipated (requiring IEE/EIA and countermeasures).
C: Impacts are anticipated (requiring IEE/EIA and adequate countermeasures, project itself should be duly considered).

Major Environmental Concerns of Subsectors

Road: Major road projects, particularly new construction, affect the natural environment by causing (1) damage to flora, fauna and historical/cultural areas, (2) air pollution, noise and vibration, (3) soil erosion and siltation, and (4) damage to the landscape. The VITRANSS-proposed projects, about one-third of which need an environmental impact assessment (EIA), should give due consideration to the following:

- Tunnels and bridges (excluding ongoing projects), including the Hai Van Pass Tunnel, My Thuan Bridge, Can Tho Bridge, Bai Chay Bridge, and Binh Bridge,

need a full-scale EIA due to the inevitable re-formation of land and possible encroachment on precious ecology.

- Road development projects, such as National Road No. 21 Upgrading, also need careful environmental investigation due to possible landslides.
- Road development projects in the Mekong delta, including HCMC-My Tho, Can Tho-Ha Tien and Can Tho-Ca Mau, should be assessed for their impact on water, flora and fauna.

In general, road development has positive social impact. All the road projects proposed in rural or mountainous areas would give poor farmers access to markets. However, the negative effects, particularly the relocation of residents, traffic accidents, air pollution, noise, vibration, and impact on cultural communities, of projects proposed in populated areas should be assessed carefully.

Railway: Railway is generally energy-efficient and environmentally friendly compared to road. Its energy efficiency is reported to be double that of road transport. However, the following railway projects proposed in the VITRANSS are believed to impact negatively on the natural environment and therefore need an EIA:

- The Hue-Danang Improvement Project including Hai Van Pass Tunnel needs a full-scale EIA due to land re-formation and possible damage on the area's ecology.
- Construction of new lines (long-term projects) will have significant impact on the natural environment such as land re-formation, damage on hydrology and encroachment on precious natural reserves.

From the social point of view, the proposed projects, such as large-scale freight stations and new railway lines, will pose a risk and cause noise/vibration. Although expected positive impacts will be in terms of employment generation and economic growth, EIAs will still be needed for these projects.

Inland Waterway: The effects of inland waterway development on the natural environment include riverbank erosion, floods and loss of wildlife and riverine vegetation. In the VITRANSS-proposed projects, waterway improvement projects in the Red River delta should require an EIA due to their possible adverse impact on flood control and flora/fauna.

From the social point of view, no major negative impact is expected from the proposed projects which are mostly improvement of existing facilities. However, the Hanoi – Lao Cai Waterway Improvement Project needs a full-scale EIA because of its economic and cultural impact on socially vulnerable people.

Port and Shipping: Port development will inevitably impact on the natural environment due to dredging, waste disposal, shoreline development, and increased maritime and terrestrial traffic.

- In the VITRANSS-proposed projects, particular attention must be paid to the Cai Lan Port Development Project, because it is located in a UNESCO World Heritage site, Ha Long Bay. In addition to the possible damage on the landscape, water pollution may become serious due to waste disposal and oil spills. Although the project is ongoing, an alternative deep-sea port should preferably be chosen for large-scale development.
- Most of the other port projects also need EIAs due to land re-formation, hydrological impact and possible damage on seashore ecology.

Some of the port projects need EIAs from the social point of view, although there are favorable effects on employment and economy. Major aspects to be examined are resettlement of local residents, waste disposal and water pollution.

Air: Airport construction projects require EIAs because of their expected impact on the natural environment while improvement and rehabilitation projects do not. In particular, the natural conditions, including topography, geology, water, flora, and fauna, at sites of proposed local airports in Cao Bang, Lao Cai, Chu Lai, etc., should be studied carefully.

From the social point of view, airport construction and reopening (rehabilitation) of unused airports need to be examined in terms of the possible relocation of residents, waste disposal, noise, etc.

4 LONG-TERM TRANSPORT STRATEGIES

4.1 Transport Sector Goals and Objectives

The goal of transport sector development is to contribute to the realization of the national development goals of economic growth, poverty reduction, safety enhancement, environmental protection, and human resource development. Transport sector policy should cover economic (ensuring GDP increase and consumer satisfaction), developmental (supporting balanced developments), social (providing services to the poor), and environmental (protecting and conserving the environment) aspects which must be considered in formulating a transport strategy. In addition to meeting the above-mentioned national objectives, the transport sector of Vietnam aims at strengthening regional integration within ASEAN as well with China. Vietnam has entered into a number of bilateral and multilateral agreements with these countries to facilitate the transport of goods and people across borders.[1]

In addressing long-term strategies, the starting point is to define Vietnam's future policy environment in which the transport sector will function. In view of the aforementioned objectives of transport sector development, the focus will thus shift from public sector management and funding to private sector skills and resources and public sector facilitation and procurement. The forms of intervention will change from investment in projects to capacity building/institutional restructuring, policy reforms to create competitive markets and investment in strategic projects. Many policy-makers are all too aware of this and are trying to remedy the situation. But it is recognized that the current implementation of needed reforms is not satisfactory.

Ideally, the policy goals and objectives of the transport sector should transform the sector into one that should:

- be economical, wherein transport costs are minimized at the same time keeping transport users and consumers satisfied.
- be supportive of a balanced development across the country.
- ensure adequate accessibility to support socio-economic activities of the poor, especially in rural areas.
- not adversely affect natural and socio-cultural environments and provide appropriate countermeasures when and where necessary to protect and enhance these environments.
- facilitate regional integration envisioned and currently being promoted in international societies, especially ASEAN and GMS.

Of the wide range of sector development objectives, the most critical aspect is to meet the economic and social needs of the society. The key objectives of transport sector development is thus summarized in the phrase,

"Competitive Transport with Social Equity"

[1] The ASEAN Transport Cooperation Framework Plan is the accepted transport planning framework in ASEAN, and the GMS is a mechanism to promote and coordinate transport projects and issues in the region.

4.2 Strategies

Transport Sector Objectives and Strategies

The transport sector objectives and strategies need to be developed in a way that is consistent with overall macro-economic policies and constraints.

The major issues, policies and strategies that need to be addressed for the transport sector in Vietnam can be categorized into four aspects, namely: (1) operation and management, (2) infrastructure, (3) institutional/competitive framework, and (4) funding. The strategies required to meet the policy goals and objectives described above are summarized as follows:

Operations/Management

Objectives :
- To meet the needs of transport users at minimum cost
- To provide accessible, safe and affordable transport services, especially for the poor
- To reduce transport accidents and adverse environmental impacts
- To modernize transport technology and operating techniques

Strategies :
- Equitize operator SOEs and increase efficiency of remaining SOEs to foster competition
- Facilitate entry by new (private sector) operators and use of modern technology/operating techniques
- Provide training in business skills for transport sector industries

Infrastructure

Objectives :
- To establish a competitive and efficient national primary/ secondary transport network with links to rural areas and international gateways
- To establish an effective tertiary/rural road network to provide access to the main network

Strategies :
- Complete rehabilitation programs of the main transport network and tackle maintenance backlog
- Upgrade the main network in a hierarchical and integrated manner
- Improve rural transport infrastructure where economically/ socially beneficial
- Construct new expressways and strategic links/nodes where justifiable

Institutional/Competitive Framework

Objectives :
- To establish a regulatory framework to give a level playing field, with adequate safety and environmental safeguards
- To establish the sector's administrative capacity at national/local

levels, especially for infrastructure management
- To promote private sector capacity building and participation

Strategies :
- Implement legal framework with clear, justifiable, enforceable rules
- Develop and implement economic pricing and cost recovery policies
- Develop justifiable safety and environmental programs, and means for their enforcement
- Remove unnecessary barriers to competition
- Strengthen infrastructure management systems to promote decentralization, to divest commercial functions and to strengthen human resource development
- Define human resource development policies and strategies for the transport sector (based on increasing training incentives and opportunities) and implement them
- Provide training in key management and technical fields
- Improve construction services by raising standards and improving competition

Funding

Objectives :
- To establish a sustainable funding mechanism for infrastructure (especially for maintenance) that is supported by transport users

Strategies :
- Develop sustainable funding for infrastructure maintenance (improved budgeting systems and dedicated funds)
- Provide domestic credit sources for the private sector
- Sustain/expand ODA funding
- Develop own fund sources

Subsector Strategies

For each subsector, more specific long-term objectives and strategies are defined based on the overall transport sector objectives and strategies for each of the four aspects: operation/management, infrastructure, institutional/competitive framework and funding.

< Road Subsector Objectives and Strategies >

Operations/Management

Objectives :
- To promote competitive and affordable transport services
- To provide minimum accessibility levels for the poor
- To reduce the number and cost of road accidents

Strategies :
- Equitize bus and truck SOEs to foster competition
- Promote higher professional standards and training of bus and truck operators through voluntary accreditation schemes
- Develop and implement road safety programs

Infrastructure

Objectives :
- To establish a reliable national backbone network of main roads

- To improve/develop the rural road network
- To establish an effective provincial road network connecting national and rural road networks

Strategies :
- Complete rehabilitation of main/secondary network
- Complete the primary/secondary network
- Accelerate tertiary/local road development
- Prepare appropriate design standards and construction methods

Institutional/Competitive Framework

Objectives :
- To strengthen road administration capacity at national/ local levels
- To establish a competitive environment to promote efficient and high quality services
- To set and enforce justifiable minimum safety and environmental standards

Strategies :
- Implement legal framework with clear, enforceable minimum standards without other regulatory obstacles
- Strengthen national/local road planning and maintenance systems
- Provide training in road maintenance management systems, contracting and other business skills
- Set higher standards and improve competition in the construction industry

Funding

Objectives :
- To establish a sustainable funding mechanism for road maintenance and development that is supported by road users

Strategies :
- Sustainable funding for road maintenance (better budgeting and road fund)
- Sustain ODA funding
- Expand and facilitate access to credit sources by the private sector
- Develop own fund sources

< Railway Subsector Objectives and Strategies >

Operations/Management

Objectives :
- To increase efficiency and service level for core traffic (bulk)
- To develop new markets (such as container services)

Strategies :
- Rehabilitation and replacement of rolling stock to sustain the carrying capacity for core traffic
- Acquire improved rolling stock where required for new services
- Improve railway operation, facilities and equipment as well as human resources

Infrastructure

Objectives :
- To sustain the main lines as part of the backbone of the overall transport network
- To extend the network to integrate with main ports/traffic generators, where justified
- To clear bottlenecks in urban areas

Strategies :
- Continue to rehabilitate critical infrastructure to sustain operations
- Rehabilitate/improve the main network in accordance with economic priority
- Rehabilitate secondary lines where justified
- Improve critical sections in Hanoi and HCMC
- Develop main freight stations and other infrastructure

Institutional/Competitive Framework

Objectives :
- To commercialize the railway and make it more market-oriented
- To increase competition within the railway and the transport sector

Strategies :
- Establish railway as a business corporation, divesting itself of peripheral units
- Prepare realistic business plans for passenger and freight businesses
- Implement management systems (especially information systems, costing and bases for payment of infrastructure and workshop services)
- Provide training in modern railway management methods
- Establish railway inspectorate in the MOT to oversee railway safety and implement the railway act/regulations

Funding

Objectives :
- To establish incentives for increased management performance and self-finance except for specific subsidies

Strategies :
- Establish a performance agreement between railway and government giving clear rights and obligations with a predictable financing mechanism
- Agree to long-term plans for performance and investment
- Encourage increased ODA funding

< Inland Waterway Subsector Objectives and Strategies >

Operations/Management

Objectives :
- To promote competitive and affordable transport and port

services
- To improve productivity in transport and port operations
- Reduce number and cost of accidents

Strategies :
- Equitize inland waterway transport SOEs to foster competition and investment in larger, modern vessels
- Commercialize port management
- Implement modern services including container service
- Develop and implement safety programs

Infrastructure

Objectives :
- To establish a clearly defined international/interprovincial waterway network
- To establish a sustainable secondary and local waterway networks integrated with the main transport network

Strategies :
- Complete rehabilitation of main rivers
- Rehabilitate the rural network

Institutional/Competitive Framework

Objectives :
- To establish inland waterway transportation administration capacity at national/local level
- To encourage a more active participation of the private sector
- Ensure safe navigation particularly along major routes

Strategies :
- Implement legal framework (including enactment of IWT act), improve vessel inspection and remove regulatory obstacles
- Strengthen national/local waterway planning/maintenance system with clear separation of responsibilities for inland water and maritime transport
- Provide training in maintenance management, contracting and other business skills
- Complete equitization of construction/maintenance SOEs and improve contracting procedures
- Establish a mechanism for dialogue with the private sector such as a Lighters Association

Funding

Objectives :
- To establish a sustainable funding mechanism for waterway maintenance and development, supported by waterway users

Strategies :
- To develop sustainable maintenance fund with cost-effective revenue collection
- Encourage private funding of container port facilities

- Sustain ODA funding
- Develop own fund sources

< Maritime Subsector Objectives and Strategies >

Operations/Management

Objectives :
- To promote a competitive, efficient Vietnamese shipping industry
- To improve efficiency and services of ports and support services
- To reduce number/cost of accidents and risk of oil spills and other adverse environmental impacts

Strategies :
- Commercialize and, eventually, equitize coastal shipping SOEs to foster competition
- Corporatize ports as independent entities, with increased local representation on management boards, to increase competition within and between ports
- Improve general/specialized cargo handling
- Expand and improve port facilities and international/domestic container liner shipping for container transport
- Promote multimodal and specialized transport (bulk)
- Commercialize and equitize shipbuilding and repair yards
- Provide training in business skills and modern methods of cargo handling
- Develop and implement safety and environmental programs

Infrastructure

Objectives :
- To develop the port system in a hierarchical manner to provide adequate capacity
- To develop competitive gateway ports to strengthen port linkages with the global market

Strategies :
- Increase capacity utilization of existing ports through rehabilitation, upgrading and more efficient handling methods/equipment/management
- Develop new port capacity in accordance with demand including 3 gateway ports in the north, central and south and 8 major general ports

Institutional/Competitive Framework

Objectives :
- To strengthen administrative capacity to plan, to manage infrastructure and to set and enforce safety and environmental standards
- To introduce a market-based port regulatory system that encourages efficiency and private sector participation

Strategies :
- Strengthen VINAMARINE's capacity to monitor the subsector (capacity utilization, competition and infrastructure plans based on user needs and overall development costs)
- Strengthen VINAMARINE's capacity to monitor infrastructure condition and plan infrastructure maintenance, based on clear separation between inland water and maritime responsibilities
- Strengthen the roles of the Vietnam Ports Association and

Vietnam Shipowners Association

- Divest VINAMARINE of the remaining ports and other commercial functions
- More port autonomy (port charges) subject to strict financial and performance targets
- Continue to incorporate international agreements into maritime law
- Improve port state control inspection standards
- Provide training in infrastructure management methods and regulatory techniques.

Funding

Objectives :

- To broaden the options for port funding by tapping private and other sources
- To develop a seaworthy and competitive Vietnamese fleet

Strategies :

- Encourage private funding of container port facilities and operations
- Provide financial support to facilitate fleet modernization and expansion
- Sustain ODA funding and develop own fund sources

<Aviation Subsector Objectives and Strategies >

Operations/Management

Objectives :

- To strengthen Vietnamese airlines and make them competitive under a more liberalized environment
- To improve efficiency of airports and support services

Strategies :

- Promote increased independence of VAC member airlines
- Commercialize and corporatize airports to encourage delivery of better services
- Promote increased competition in the supply of support services
- Provide training in business skills

Infrastructure

Objectives :

- To develop the airport system in a hierarchical manner to provide adequate capacity
- To develop the air traffic control system using modern technology that meets international requirements

Strategies :

- Increase the capacity of and rehabilitate main airports
- Encourage coordination of military and civil airport planning
- Develop air traffic control system in priority areas
- Install new CNS/ATM equipment
- Develop capacity of secondary airports, where economically justifiable

Institutional/Competitive Framework

Objectives :
- To strengthen administrative capacity to plan, manage the infrastructure and regulate the subsector
- To enhance air traffic safety and environmental standards
- To establish a more liberalized fare system to balance supply and demand effectively

Strategies :
- Strengthen CAAV capacity to plan and evaluate infrastructure development based on user needs
- Divest commercial functions of CAAV, giving more autonomy to airports in setting airport charges but stricter performance targets
- Review international technical and regulatory standards and incorporate these into Vietnamese practice
- Remove fare control and give greater freedom to airlines to develop market-based fares
- Provide training in planning and use of modern technology

Funding

Objectives :
- To broaden the options for airport funding by tapping private and other sources
- To promote Vietnamese/foreign partnerships to increase finance and transfer of know-how

Strategies :
- Ensure full cost recovery (including full financing costs) from user charges and remove discounts to Vietnamese airlines
- Allow foreign funding of airline businesses
- Encourage private funding of airport terminals/facilities
- Develop own fund sources

< Multimodal Transport Subsector Objectives and Strategies >

Operations/Management

Objectives :
- To provide shippers with high-quality, door-to-door transport services required for future distribution systems

Strategies :
- Develop freight forwarders, warehousing agents and other intermediaries/consolidators
- Foster a shippers' council and operator associations
- Introduce guaranteed scheduled services for small consignments using larger specialized vehicles/vessels
- Introduce cargo information management systems
- Provide training in business skills and logistics methods

Infrastructure

Objectives :
- To remove bottlenecks in distribution systems which prevent reliable and timely services at low costs

Strategies :
- Introduce modern cargo-handling methods at ports, terminals and warehouses for smooth intermodal transfers
- Improve access links to ports and productions sites (especially container movement)
- Develop new specialized port facilities

Institutional/Competitive Framework

Objectives :
- To establish the legal framework for multimodal operations and management
- To complete the legal framework for each mode
- To remove legal obstacles affecting transport services

Strategies :
- Establish the legal framework for freight carriage (limits of liability, legal basis for multimodal transport operators or MTOs, and freight forwarders to act as principal carriers rather than mere agents) based on international standards
- Reform customs regulations to allow modern clearance systems using clearing agents in ports and at authorized inland depots
- Accede to major international agreements on trade and transport and incorporate these into Vietnamese law
- Provide training in multimodal operations and regulations
- Remove restrictions on foreign investment in transport

Funding

Objectives :
- To broaden the options for port funding by tapping private and other sources

Strategies :
- Encourage private funding of container ports and inland depots by providing support infrastructure such as land and good access links

4.3 Evaluation of Modal Balance

While the transport sector in Vietnam consists of the full range of transport modes, a critical planning issue is finding the appropriate balance among these modes. This is not an easy task because the ability and performance of transport modes are affected by a number of parameters including infrastructure, equipment, operation, etc. Nevertheless, an exercise was conducted to test relative changes in overall

transport costs by analyzing various scenarios of the future modal composition of the national transport network.

In the analysis the total transport cost was calculated as the sum of the operating cost of transport equipment, time cost of passenger and cargo, loading/unloading and transshipment of cargo, and construction and maintenance cost of transport infrastructure. The cases applied for the exercise are as follows:

1) **Present**: Actual 1999 traffic demand on the existing network.
2) **Do-nothing**: 2020 demand on the existing (1999) network.
3) **Most Economical**: 2020 demand, 100% on the most economical mode (route).
4) **Economic**: 2020 demand, assigned in inverse proportion of cost to available modes (routes).
5) **Base**: 2020 demand, assigned according to present shares by OD pair.
6) **Target**: 2020 demand, mixture of 1/2 Economic Case and 1/2 Base Case.
7) **Road Only**: 2020 demand, the same as the Economic Case limiting new investments to roads only
8) **Inland Waterway Only**: 2020 demand, limiting new investments to inland waterway only.
9) **Rail Only**: 2020 demand, limiting new investments to rail only.
10) **Coastal Shipping Only**: 2020 demand, limiting new investments to coastal shipping only.

Table 4.3.1 showing the results of the analysis indicates that transport cost will vary significantly depending on the transport policies that Vietnam will adopt. The most important conclusions are:

- Infrastructure investment is indispensable to the future transport sector of Vietnam. If no investment is made, additional costs to government will reach to about US$ 10 to 18 billion a year up to 2020.
- No single mode can effectively meet the future transport demand. If investment is made in only one transport subsector, it will lead to an ineffective and unbalanced transport system. Investment in a reasonable combination of transport modes is essential.
- Vietnam has enormous scope to improve its transport system economically.

Table 4.3.1
Estimated Overall Transport Costs and Modal Shares (Freight) by Case

Case	Year	Annualized Overall Transport Cost[1/]		Modal Share in Cargo Transport by Ton-Km (%)				
		(US$ billion)	Index (Economic) = 100	Road	Inland Waterway	Rail	Coastal Shipping	Air
1. Present	1999	5.0	-	43	18	6	33	0
2. Do-nothing	2020	27.3	229	43	7	13	36	1
3. Most Economical	2020	9.7	82	13	11	12	64	0
4. Economic	2020	11.9	100	24	9	19	48	0
5. Base	2020	16.8	141	71	6	6	17	0
6. Target	2020	14.5	122	48	7	12	33	0
7. Road Only	2020	18.5	155	57	3	7	32	1
8. Inland Water Only	2020	21.5	181	34	11	11	42	2
9. Rail Only	2020	21.7	182	30	6	36	27	1
10. Coastal Shipping Only	2020	21.1	177	34	7	9	49	1

1/ Construction cost is estimated yearly over 30 years at 12% p.a.

Recommended Strategy

The results of the analysis, though based on assumptions, indicate that if the current trend in modal split continues, the overall transport network would not be economical. From the economic viewpoint, the availability of competitive services in coastal shipping, railway and inland waterway is critical. However, this does not mean unlimited expansion of such modes but suggests the adequate balance of the three modes. The recommended strategy is to facilitate the shift from road. However, the role of inland waterway in interprovincial transport will be less significant in the future, though remaining important for intraprovincial transport.

4.4 Overall Network Development

Planning Considerations

A long-term transport network plan provides a useful basis to guide infrastructure investments in a coordinated and integrated manner. The overall network structure has been worked out based primarily on the estimated demand and with due consideration of the following (see Figure 4.4.1):

1) All growth centers, production areas, communities, and other activity centers should be provided with adequate transport infrastructure and services.
2) To maximize infrastructure capacity, the transport network should be planned with a clear hierarchy, making use of the existing network and facilities to meet future demand effectively and economically.
3) Intermodal connection should be assured through infrastructure and institutional arrangements to facilitate the smooth transport of goods and people.

4) International linkages with global markets and adjoining countries should be strengthened.
5) Growth belts in the north, south and central part of Vietnam should be provided with strategic transport infrastructures.
6) Other factors, such as environment and geographical characteristics, should be properly incorporated into the plan.

The overall network would be composed of core transport nodes and links of roads, rail, inland waterway, ports, and airports which are classified in the VITRANSS as "primary" or "secondary". With this network, the country would be interconnected down to district level.

Hierarchy of Transport Network

The expected roles of transport modes at different levels of the hierarchy are briefly explained as follows:

International Gateways: Airports and ports will function as major international gateways for passenger and goods movement, whereas railways, roads and inland waterways will provide international transport linkages with neighboring countries to a lesser extent. Three ports and airports in the north, center and south will function as international gateways. Minor cross-border corridors will also supplement international transport.

North-South Backbone: How to establish/strengthen the north-south transport corridor is the next key concern in planning. The four modes of air, maritime, rail, and road will share the responsibility of strengthening this transport backbone.

Links with Strategic Transport Nodes/Traffic-generating Sources: Road, rail and inland water links should be integrated with international airports, ports, goods distribution centers, railway terminals, etc.

Interface between Inter-city and Intra-urban Network: Expanding and growing metropolitan areas, particularly in Ho Chi Minh City and Hanoi, require an effective and integrated inter-urban and intra-urban networks especially rail and road.

Secondary Network: The above primary network should be further supplemented and strengthened with strategically configured secondary network. A general guideline at this level of transport network is to link at least the provincial capitals and other strategic provincial centers with primary roads.

Tertiary Network: Although this level is not fully considered in the VITRANSS, the needed function and planning guidelines will be studied based on a case study of selected provinces.

Table 4.4.1
Expected Roles of Transport Modes in Vietnam

Hierarchy	Air	Maritime	Rail	Road	Inland water
International	✓✓✓	✓✓✓	✓	✓	✓
Interregional	✓✓✓	✓✓✓	✓✓✓	✓✓	-
Interprovincial	✓✓	✓✓	✓✓✓	✓✓✓	✓
Provincial	-	✓	✓	✓✓✓	✓✓
Local	-	-	-	✓✓✓	✓

Note: ✓ indicates importance

Conceptual Long-term Transport Network Plan

On the basis of the foregoing discussion, a conceptual long-term transport network plan has been formulated as shown in Figure 4.4.1. The network for transport modes is basically classified into three levels: primary, secondary and tertiary. The primary level is of national importance, whereas the secondary level integrates provincial growth centers with the primary level. The tertiary level on the other hand provides adequate accessibility to/from the remaining areas. There is a need for network integration both among primaries nodes/links of different modes, and among primary, secondary and tertiary networks. The integrated network is composed of the following:

Port and Shipping

Primary: Three port systems in the north (Quang Ninh-Hai Phong), the central (Danang Bay) and the south (Saigon-Vung Tau) to function as international gateways
Secondary: Other ports under the MOT, including Cua Lo, Qui Nhon, Nha Trang, Can Tho, My Thoi, and My Tho, to serve the regional movement of goods and passengers
Tertiary: Other local ports to serve local needs

Aviation

Primary: Three international gateways in the north (Noi Bai), the central (Da Nang) and the south (Tan Son Nhat) to link major foreign destinations
Secondary: Domestic/international airports with regional importance such as Hai Phong, Hue, Can Tho, Lao Cai
Tertiary: Other local airports to serve various socio-economic and administrative needs

Railway

Primary: North-south axis (Hanoi-HCMC), major international links and the lines to connect primary ports
Secondary: Lines to integrate major cities, secondary ports/airports
Tertiary: Other local lines

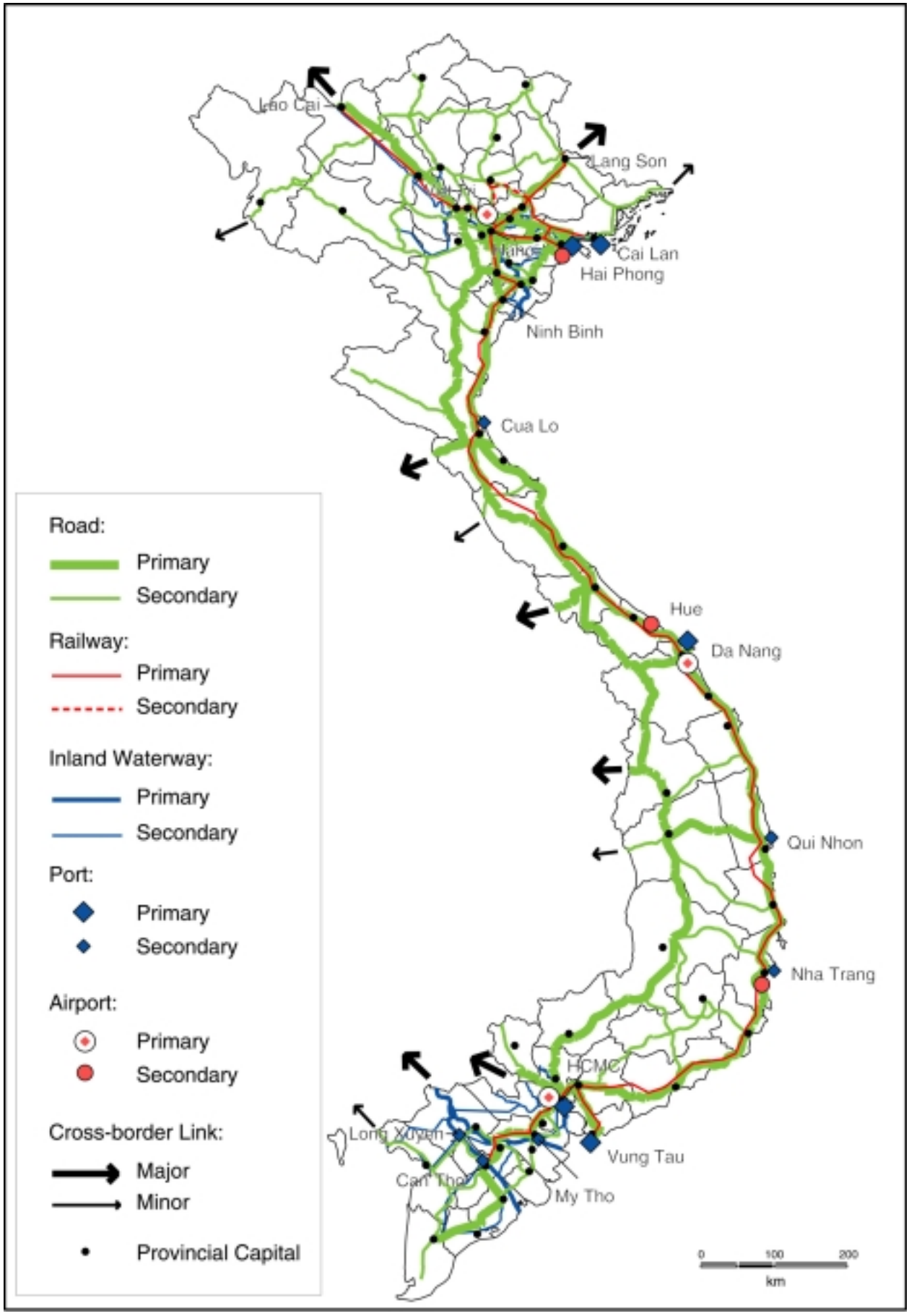
Inland Waterway

Primary: Waterways along the international rivers and directly related river ports
Secondary: Waterways of regional importance and directly related river ports
Tertiary: Other local waterways and related river ports

Road

Primary: North-south national backbone, access to primary ports/airports, strategic centers and major cross-border roads
Secondary: Roads linking primary roads with provincial capitals, major ports/airports, activity centers, other transport terminals, other cross-border roads, etc.
Tertiary: Roads which link district centers and other equivalent growth centers with primary and secondary networks
Local: Other local roads which link communes

Figure 4.4.1
Long-term Transport Network



4.5 Corridor Analysis

General

The overall future transport network for the country was preliminarily planned based on future demand, taking into account the network hierarchy and regional/international integration. The primary purpose of this section is to look into the characteristics, constraints and potentials of selected major corridors to define needed projects and policy recommendations that will facilitate the smooth movement of people and goods along the corridors and promote the effective use of infrastructure.

A total of 27 transport corridors have been identified for assessment with due consideration to the following factors (see Figure 4.5.1):

- The corridors are already recognized as primary transport routes.
- The corridors have strategic importance from national and regional development perspectives and supported by existing government policies; and
- The corridor would have greater development potentials if their accessibility were improved.

For the identified corridors, existing conditions are described, future demand analyzed, constraints and opportunities assessed and development strategies identified, forming the basis of the projects that will be formulated (refer to Appendix 4-B).

Identification of Priority Corridors

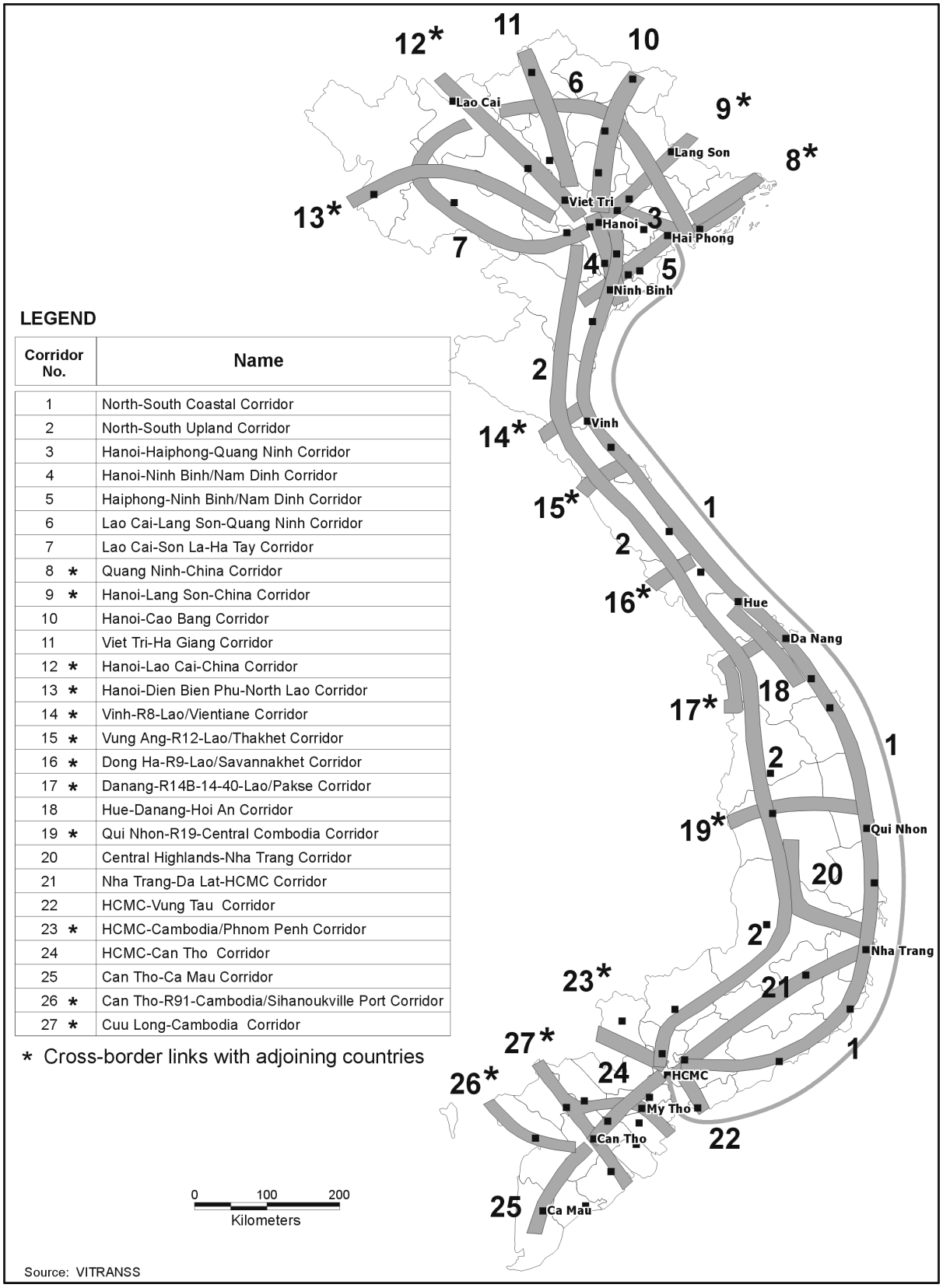
The selected corridors have been initially assessed based on network analysis using the traffic assignment model. This involved an estimation of the number of road lanes needed to meet additional transport demand of interprovincial passengers and goods. Although the analysis is made on a number of assumptions, the results will give anticipated capacity constraints of and relative importance to the corridors. Moreover, even though all the identified corridors are important, the following deserve priority attention:

1) North South Coastal Corridor (Hanoi-HCMC)
2) Hanoi-Hai Phong-Quang Ninh Corridor
3) Hanoi-Ninh Binh/Nam Dinh Corridor
4) Hue-Danang-Hoi An Corridor
5) Nha Trang-Da Lat-HCMC Corridor
6) HCMC-Vung Tau Corridor
7) HCMC-Can Tho Corridor

In addition to the analysis by corridor, two growth zones in the north and south are separately discussed by combining related corridors.

Figure 4.5.1
Identified Major Transport Corridors

.



LEGEND

Corridor No.	Name
1	North-South Coastal Corridor
2	North-South Upland Corridor
3	Hanoi-Haiphong-Quang Ninh Corridor
4	Hanoi-Ninh Binh/Nam Dinh Corridor
5	Haiphong-Ninh Binh/Nam Dinh Corridor
6	Lao Cai-Lang Son-Quang Ninh Corridor
7	Lao Cai-Son La-Ha Tay Corridor
8 *	Quang Ninh-China Corridor
9 *	Hanoi-Lang Son-China Corridor
10	Hanoi-Cao Bang Corridor
11	Viet Tri-Ha Giang Corridor
12 *	Hanoi-Lao Cai-China Corridor
13 *	Hanoi-Dien Bien Phu-North Lao Corridor
14 *	Vinh-R8-Lao/Vientiane Corridor
15 *	Vung Ang-R12-Lao/Thakhet Corridor
16 *	Dong Ha-R9-Lao/Savannakhet Corridor
17 *	Danang-R14B-14-40-Lao/Pakse Corridor
18	Hue-Danang-Hoi An Corridor
19 *	Qui Nhon-R19-Central Combodia Corridor
20	Central Highlands-Nha Trang Corridor
21	Nha Trang-Da Lat-HCMC Corridor
22	HCMC-Vung Tau Corridor
23 *	HCMC-Cambodia/Phnom Penh Corridor
24	HCMC-Can Tho Corridor
25	Can Tho-Ca Mau Corridor
26 *	Can Tho-R91-Cambodia/Sihanoukville Port Corridor
27 *	Cuu Long-Cambodia Corridor

* Cross-border links with adjoining countries

Goals and Strategies of Priority Corridors

1) North-South Coastal Corridor (Hanoi-HCMC)

A long-term goal for this corridor is to develop it into an efficient and competitive corridor with a balanced modal share of various transport modes that will support national economic activities and ensure north-south integration.

Various strategies have been set forth for the north-south coastal corridor. These are as follows:

Long-term Strategies: The corridor should always be ready for modification in response to the growing transport demand. Some adjustments include the widening of NH No. 1, the construction of an urban bypass, upgrading of the railway infrastructure and operations, and the improvement and modernization of ports and coastal shipping. The capacity of the air transport system has to be improved accordingly.

Intermodal coordination and integration should be carefully designed since four major transport modes, namely, road, rail, shipping and air, operate in this urbanized and densely developed corridor. The roles of each mode should be defined in accordance with their service and target markets to ensure complementary operation. This is exemplified in the situation of railway where the demand forecast indicates that there is a potential for expansion as long as it can provide competitive fare and quality service.

The competitiveness of the transport sector also becomes critical at the international level particularly within the context of globalization as well as regional (ASEAN) and subregional (i.e., Greater Mekong Subregion, GMS) economic integration.

Short to Medium-term Strategies: In order to address current issues in line with long-term strategies, short to medium-term strategies have also been laid out as follows:

(1) Enhancement of road safety and orderly road traffic
(2) Rehabilitation of railway system
(3) Expansion of major general ports (mainly Hai Phong, Tien Sa and Saigon River Ports)
(4) Expansion of primary airports (Noi Bai, Danang and Tan Son Nhat)
(5) Development of urban bypass at critical city sections
(6) Improvement of railway operation
(7) Expansion of major secondary ports (mainly Cua Lo, Qui Nhon and Nha Trang)
(8) Expansion of secondary airports (Cat Bi, Phu Bai and Nha Trang)

2) Hanoi-Hai Phong-Quang Ninh Corridor

The corridor should be more efficient and competitive to serve urban/suburban traffic as well as international traffic linked with shipping and air gateways. This corridor will have to deal with different types of traffic, i.e., efficient multimodal transport, economical bulk transport, inter-city passenger traffic, tourist traffic and urban transport. The proposed corridor development strategy is to modernize railway, inland waterways and roads with minimum infrastructure investment to cope with the dense and varied corridor traffic. An adequate modal composition will be necessary to meet different traffic needs. Railway will serve inter-city passengers and urban (to a limited extent) and multimodal transport. Inland waterways, on the other hand, will serve container or bulk transport and, to a certain extent, multimodal transport.

Roads will serve urban transport, inter-city passenger traffic, tourist traffic, multimodal transport, and other short and small-consignment freight transport.

Long-term strategies involve the provision of internationally competitive transport services that will further support industrial and urban development along the corridor. Environmental impacts along coastal areas should be seriously considered. Short and medium-term strategies would be as follows:

(1) Completion of ongoing road and bridge projects
(2) Enhancement of orderly traffic flow and road safety
(3) Rehabilitation of the existing two railway lines
(4) Expansion of gateway ports
(5) Expansion of river ports and improvement of inland waterways
(6) Capacity expansion of the Hai Phong Line by double tracking and electrification
(7) Promotion of multimodal transport mainly through roads and rail together with gateway ports expansion and ICD construction

3) Hanoi-Ninh Binh/Nam Dinh Corridor

The corridor should be able to provide efficient and viable urban/suburban transportation services of various modes that will support industrial activities. The long-term strategy is to meet the growing demand for high-quality road and rail services. Short to medium-term strategies are as follows:

(1) Rehabilitation of railway particularly the section between Hanoi and Phu Ly
(2) Expansion of river ports
(3) Improvement of inland waterways along Day and Red rivers and construction of DNC (Day-Ninh Co) Canal
(4) Enhancement of traffic management and traffic safety
(5) Widening NH1 from 2-lane to 4-lane
(6) Improvement of intermodal connection

4) Hue-Danang-Hoi An Corridor

The development goal for the corridor is threefold. One is to integrate two separate urban areas and strengthen the foundation for further socio-economic development in the central region. Another is to offer attractive international transport gateways through competitive shipping and air transport services. The third is to facilitate the strengthening of the north-south integration.

Long-term strategies should therefore include the removal of capacity constraints at Hai Van Pass both through the provision of roads and rail tunnels, strengthening of gateway ports and airport service and promotion of east-west land link with neighboring countries. Short to medium-term strategies include:

(1) Construction of shorter road tunnel in Hai Van Pass
(2) Expansion of Tien Sa Port with better road access
(3) Expansion of Danang Airport to meet increasing demand
(4) Rehabilitation of railway
(5) Development of tourism road network in the area
(6) Construction of Lien Chieu Port

5) Nha Trang-Da Lat-HCMC Corridor

This corridor is expected to provide smooth land transport between HCMC and the highlands, at the same time serve as an alternative to NH No. 1. Due to the corridor's rough terrain, it will be difficult to meet its future demand only through road development. Moreover, since the corridor should be efficiently integrated with the north-south coastal corridor to share the demand between them more effectively, the expansion of air service via Da Lat and Nha Trang and shipping service, including containerized goods transport, via Nha Trang is necessary. Short to medium-term strategies include the following:

(1) Rehabilitation and upgrading of existing roads
(2) Rehabilitation and improvement of existing airports
(3) Expansion of Nha Trang Port
(4) Modernization of goods transport

6) HCMC-Vung Tau Corridor

The role of this transport corridor is very important. The city plan of HCMC intends to expand the future urban area across Saigon River, in which case the corridor would be more integrated with the total urban system. Developments have been taking place along Thi Vai River and a new gateway port is also to be located in Vung Tau and/or Thi Vai. The long-term plan to develop a new international airport at Long Thanh is also being considered. Moreover, it is likely that within a couple of decades HCMC will become a mega city with a population of 10 million including those residing in adjoining localities. Under the

circumstances, the efficiency of industrial and urban activities in the area would be directly affected by the quality and efficiency of transport infrastructure and services which are duly addressed in the long-term strategies for the corridor. The provision of modern gateway ports and airports integrated with road, expressway, rail, and inland waterway services through containerization and multimodal transport and supported with information technology and institutional facilitation measures is a concept to be targeted. Short to medium-term strategies include the following:

(1) Strengthening of linkages between HCMC, particularly Saigon River ports and industrial estates in Dong Nai and Vung Tau
(2) Opening of a new canal between Thi Vai River and Mekong delta bypassing Saigon River ports
(3) Railway capacity expansion in the HCMC-Bien Hoa section by double tracking and electrification
(4) Commencement of a new deep-sea port construction with an ICD

7) HCMC-Can Tho Corridor

Modal balance is the key to solve future capacity constraints in the corridor. The potential role of inland waterway for goods transport is highly important. Its potential capacity should be tapped to the maximum to ease the corridor's load.

This highly urbanized corridor generates large volumes of both interprovincial and intra-provincial passenger traffic which cannot be met by inland waterway but by roads. However, widening and construction of new roads in the corridor may encounter difficulties in acquiring right-of-way. Road expansion and expressway construction are inevitable, and even extension of the railway from HCMC to My Tho and farther to Can Tho, should not be excluded from future options. Short to medium-term strategies are as follows:

(1) Construction of two bridges (My Thuan and Can Tho) to ensure smooth road traffic
(2) Modernization of inland waterways and river ports
(3) Road capacity expansion (NH50 improvement, expressway construction between HCMC and My Tho)
(4) Promotion of reefer/container transport

Development Strategies of Other Corridors

1) North-South Upland Corridor (Hanoi-HCMC)

Although the project is strategically important from the national development viewpoint, traffic demand forecast shows that immediate capacity expansion is not necessary. In the long run, the corridor will be an alternative to road users particularly long-distance trucks which may select this corridor to avoid traffic

congestion on the coastal corridor. Network integration with east-west links and with NH1 is an important strategy. Short to medium-term strategies include the following:

(1) Rehabilitation at impassable sections
(2) Preparation of full-scale rehabilitation and upgrading works
(3) Networking with east-west corridors

2) Hai Phong-Ninh Binh/Nam Dinh Corridor

Development of efficient and economical means of cargo transport is the development target for which upgrading of inland waterways and roads as well as transport safety enhancement are the strategies to be employed.

3) Lao Cai-Lang Son-Quang Ninh Corridor

The objective is to assure an all-weather road passable in any season of the year, providing farm-to-market access for rural people and business opportunities for urban industries. Strategies include rehabilitation of existing roads to all-weather condition and upgrading of existing roads to connect mountain provinces with each other and to facilitate cross-border trade with China where there is sufficient demand to justify the investment.

4) Lao Cai-Son La-Ha Tay Corridor

The objective is to provide an all-weather road passable in any season of the year, providing farm-to-market access for rural people and business opportunities for urban industries. Tourism can be carefully incorporated into the development. Strategies include rehabilitation of existing roads to all-weather condition and upgrading of existing roads to connect mountain provinces with each other and to facilitate cross-border trade with China and Lao PDR in accordance with the demand.

5) Quang Ninh-China Corridor

The objective is to develop a road corridor providing Chinese tourists good access to Ha Long and supporting cross-border trade. Strategies include improvement and beautification of existing roads and upgrading of existing roads to international standard.

6) Hanoi-Lang Son-China Border

The strategy to take for the corridor is to use the existing infrastructure and facilities effectively through rehabilitation, minor improvement, implementation of traffic safety measures, and improved operation of railway.

7) Hanoi-Cao Bang Corridor

The objective is to improve the corridor in accordance with demand. All-weather passable roads should be assured throughout the year. Integration with rural roads is also an important strategy to enhance the effects of the investment. Attention must be paid to landslides, soil erosion, precious ecology and the vulnerable people living in rural areas.

8) Viet Tri-Ha Giang Corridor

This corridor is an important radial corridor in the north, linking hinterland provinces with the capital region. To ensure an all-weather passable road condition is the minimum requirement. Further upgrading will be in accordance with the demand. To maximize the investment, networking with tertiary and rural roads should be incorporated.

9) Hanoi-Lao Cai-China Corridor

In view of the high cost of road improvements, the corridor needs a balanced development among the available modes, especially road and rail.

10) Hanoi-Dien Bien Phu-North Lao PDR Corridor

The objective is to ensure an all-weather road passable in any season of the year, providing secondary international linkage with Lao PDR and rural access to mountainous provinces. Strategies include rehabilitation of existing roads to all-weather condition and upgrading of roads to improve rural access and to facilitate cross-border movement with Lao PDR.

11) Vinh-R8-Lao/Vientiane Corridor

Strategies include rehabilitation and upgrading of existing roads to improve rural access and facilitate cross-border movement, rehabilitation and modernization of the existing port and introduction of transport services of international standard.

12) Vung Ang-R12-Lao/Tha Khet Corridor

The objective is to ensure an all-weather road passable in any season of the year, providing secondary international linkage with Lao PDR and rural access to mountainous provinces. The terrain is highly mountainous at the border with Lao PDR. In addition to the difficulties in construction works and environmental protection, the intended Vung Ang Port for this corridor is yet to be developed. The advantage of this corridor is that the road improvement project is already ongoing. Strategies include rehabilitation of existing roads to improve rural access and to facilitate cross-border movement and upgrading of existing roads, depending on regional development.

13) Dong Ha-R9-Lao/Savanakhet Corridor

Strategies include rehabilitation and upgrading of existing roads to promote cross-border trade and provide rural access to mountain areas, upgrading of existing ports and introduction of internationally competitive transport services.

14) Danang-R 14B-14-40-Lao/Pakse Corridor

Strategies include rehabilitation of existing roads to improve rural access and facilitate cross-border movement, rehabilitation or upgrading of existing gateway ports at Danang and upgrading of existing roads to introduce competitive transport services.

15) Quy Nhon-R19-Central Cambodia Corridor

Strategies include rehabilitation of existing transport infrastructure to improve rural access and promote cross-border trade and upgrading of roads in accordance with regional development.

16) Central Highlands-Nha Trang Corridor

The objective is to provide an efficient, all-weather road to serve vast agricultural areas planted to industrial crops and link them with Nha Trang Port. Strategies include rehabilitation of existing transport infrastructure and upgrading of transport infrastructure.

17) Ho Chi Minh City-Cambodia/ Phnom Penh Corridor

The objective is to provide a multimodal, upgraded international transport corridor comprising roads and IWT. Strategies include rehabilitation and upgrading of existing roads and river ways, improvement of institutional arrangement for cross-border movement and internationally competitive transport service.

18) Can Tho-Ca Mau Corridor

The objective is to provide safe, stable and efficient service by developing an all-weather, flood-proof transport system. Strategies include rehabilitation of existing roads and waterways, rehabilitation/improvement of ports (both for river and sea vessels), improvement/upgrading of roads and ports, and intermodal integration.

19) Can Tho-R 9-Cambodia/Sihavoukville Port Corridor

The objective is to promote rural development and cross-border trade between Vietnam and Cambodia by providing an all-weather transport corridor. Strategies include rehabilitation of existing transport infrastructure and improvement of roads and waterways.

20) Cuu Long-Cambodia Corridor

The objective is to develop an international waterway providing safe, stable and economical transport of goods. Strategies include rehabilitation and improvement of major river ports and waterways, upgrading of ports and waterways according to demand and institutional arrangements, and development of river ports as a point for modal integration.

Corridor Network Strategies for North and South Growth Zones

Corridor approach has been further expanded for the growth zones in the north and the south. For these areas, it is expected that exploitation of possibilities for interaction between corridors will enhance their development potentials, as explained below.

Northern Growth Zone

At present, the growth triangle refers to the area enclosed by Hanoi, Hai Phong and Quang Ninh. However, there is another growth corridor toward Ninh Binh/Nam Dinh areas. By strengthening the link between Ninh Binh/Nam Dinh and Hai Phong/Quang Ninh, the area of the growth triangle will expand (see Figure 4.5.2). The growth zone will be provided with multimodal transport including roads, rail, inland waterway, coastal shipping, maritime shipping, and air transport. Among the critical factors affecting zone competitiveness, is the availability of a deep-water port with efficient port services and intermodal connection.

Southern Growth Zone

Similar to the north's traditional concept of growth triangle is the area bordered by HCMC-Bien Hoa and Ba Ria-Vung Tau. HCMC-Can Tho corridor is regarded as a separate growth area. However, this triangular development is likely to accelerate the heavy concentration of development in HCMC. Therefore, it is desirable to redefine the growth triangle in a larger scale by strengthening the linkage between Can Tho-My Tho and Ba Ria-Vung Tau where a future strategic gateway port will be located (see Figure 4.5.3).

Figure 4.5.2
Northern Growth Corridor Network Development Concept (Long-term Plan)

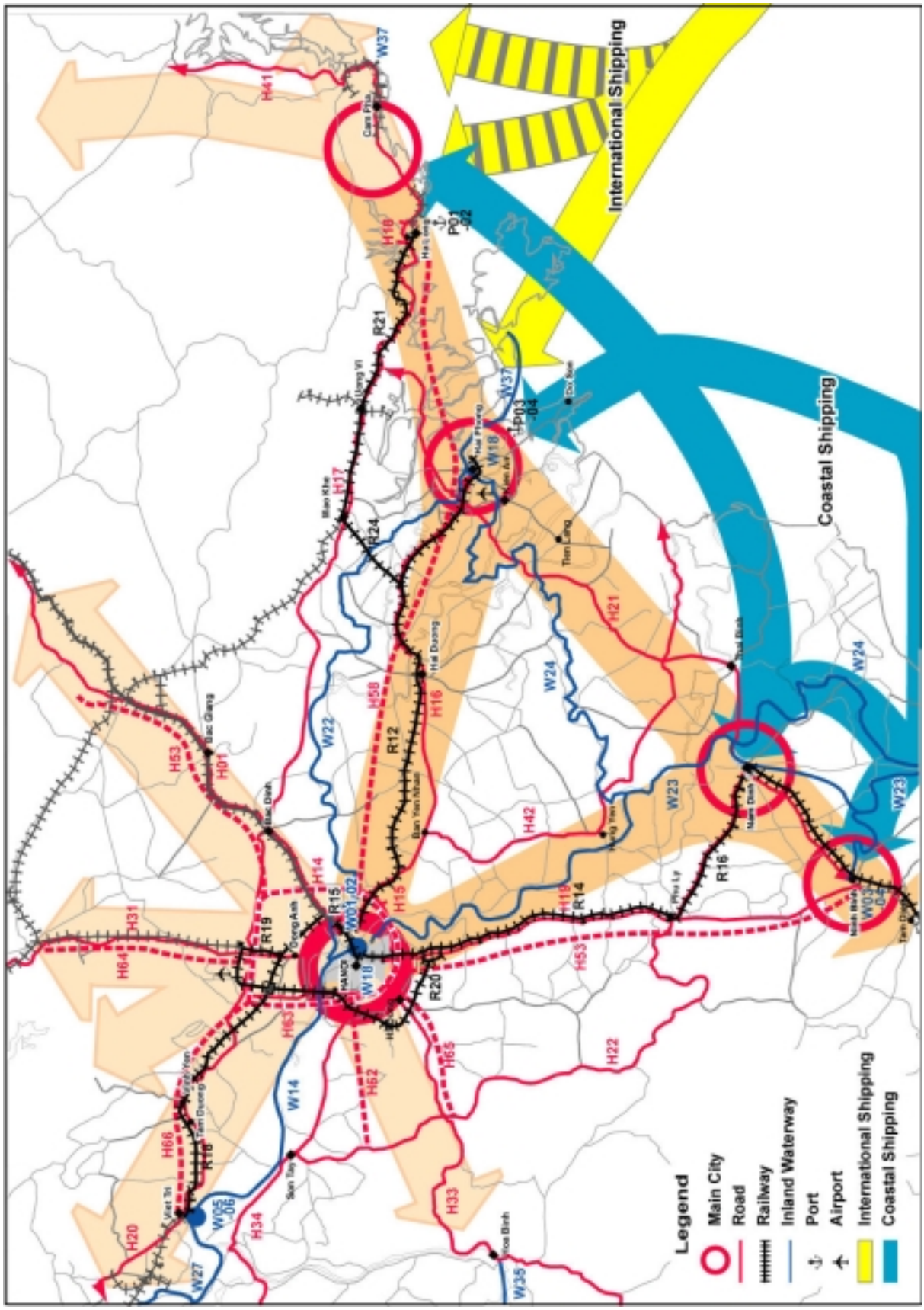
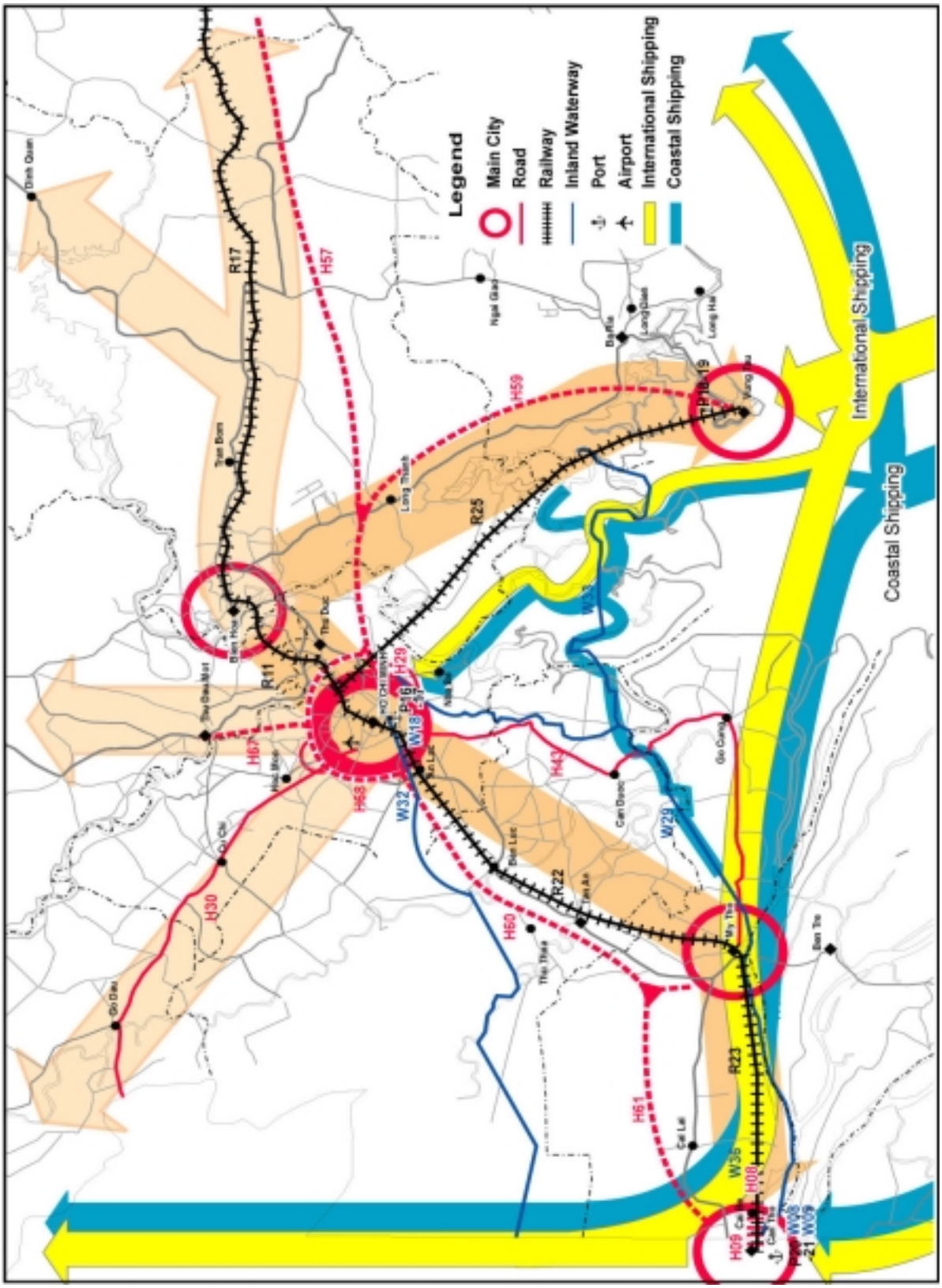


Figure 4.5.3
Southern Growth Corridor Network Development Concept (Long-term Plan)



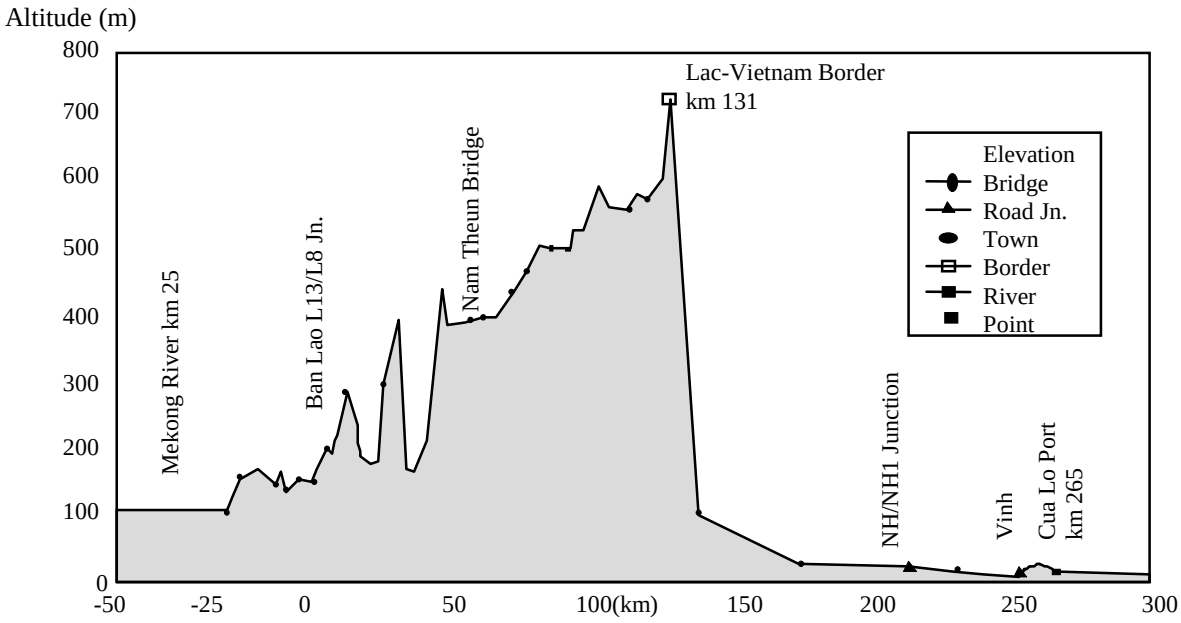
Summary of Cross-border Corridors

There are 12 cross-border corridors out of which seven are primary and five are secondary. For all of these cross-border corridors, transport demand will not be so large as to require a road of more than two lanes although there are uncertainties and opportunities with regard to cross-border arrangements with neighboring countries. However, for the primary cross-border corridors, improved transport service and rehabilitated transport infrastructure should be provided to promote cross-border movement in line with Vietnam's integration to the region. For the secondary routes, upgrading of existing roads to all-weather condition is required to improve rural access (see Table 4.5.1 and Figure 4.5.4).

Table 4.5.1
Transport Development Strategies for Cross-border Corridors

	Corridor	Class		Mode			Development target	
		Primary	Secondary	Road	Rail	IWT	Upgrade to All-weather Road	Improvement of Transport Service
8	Quang Ninh-China		✓	✓			✓	
9	Hanoi-Lang Son-China	✓		✓	✓		✓	✓
12	Hanoi-Lao Cai-China	✓		✓	✓	✓	✓	
13	Hanoi-Dien Bien Phu-Northern Lao		✓	✓			✓	
14	Vinh-R8-Lao/Vientiane	✓		✓			✓	✓
15	Vung Ang-R12-Lao/Thakhet		✓	✓			✓	
16	Dong Ha-R9-lao/Savannakhet	✓		✓			✓	✓
17	Danang-R14B-14-40-Lao/Pakse	✓		✓			✓	✓
19	Qui Nhon-R19-Central Cambodia		✓	✓			✓	
23	HCMC-Cambodia/ Phnom Penh	✓		✓		✓	✓	✓
26	Can Tho-R91-Cambodia/ Sihanoukville Port		✓	✓		✓	✓	
27	Cuu Long-Cambodia Water	✓		✓		✓	✓	✓

Figure 4.5.4
Ground Elevation of Vinh-R8-Lao/Vientiane Corridor



4.6 Competitive Environment for Transport Services

To put in place a regulatory framework which promotes efficient and affordable transport services and balanced traffic between modes, while meeting safety and environmental concerns, requires a three-point strategy as follows:

1) Foster competition and entry of new operators into the sector, subject to justifiable minimum safety and environmental standards

   Greater competition is needed in the supply of transport services to offer better services to customers at least cost. This requires high priority to be given to developing and implementing the legal framework in accordance with economic principles of market regulation (including modal acts in road, inland water and rail transport, plus implementing regulations).

   Most transport subsectors are inherently competitive, so the legal framework should be developed and implemented based on the principles of limiting entry barriers to those justified on safety/environmental grounds and removal of price controls. This requires clear rules and simple licensing procedures, avoiding unjustifiable or discretionary license conditions and transport price controls. Safety standards should be reviewed to achieve cost-effectiveness in safety programs. In the case of potential monopolistic situations in urban bus transport, ports, bus terminals, and other fixed facilities, the competitive situation should be monitored and appropriate price or franchising controls applied, if needed.

2) Adopt economically sound pricing and cost recovery policies

In accordance with government policy, the price of transport should reflect its underlying cost except where this is to be subsidized for social or other reason.

Based on a principle of minimum level of cost recovery (which reflects current government policies), for non revenue-generating infrastructure such as roads and waterways:

- users should pay through taxes or charges at least the variable costs of operation and maintenance and make a contribution toward fixed costs, with government paying the balance,
- investment should be funded from the state budget and financed from either general revenue or infrastructure-specific revenue.

Similarly for the railway, ports and airports:

- users should pay through charges at least the variable costs and make a specific contribution to fixed costs, with government paying the balance,
- investment should in principle be funded internally or, if state assistance is necessary, from reimbursable state credits (not from the budget).

In the long run, because of the shortage of investment funds, it is necessary to seek ways to make each mode of transport self-financing through using available funds more effectively (giving priority to financing maintenance rather than new construction, and improving management of infrastructure) and setting appropriate user charges. Support for higher users charges can be gained by involving users in policy-making and implementation (for example by consultation over ways of funding roads).

For roads, in parallel with management improvements, this is estimated by the World Bank to require (a) increasing, in a step-by-step manner, the fuel levy, and (b) introducing an axle load charge (amounting to between about US$ 120 for a medium truck and US$ 490 for a large truck-trailer) to reflect the costs of wear and tear of pavements by heavy vehicles. In the long-term, to improve road conditions, the amount of fuel levy used for road maintenance would have to be increased from about VND 250 at present to about VND 500 (for diesel and gasoline). Since diesel is mostly used by nonroad purposes, compensation schemes would have to be considered for diesel used in agriculture, industry, railway transport, and other purposes.

A similar approach is recommended for inland water transport, using the fuel levy, vessel registration and water channel fees to achieve full cost recovery. At present, revenue from these charges covers infrastructure maintenance costs along rivers mainly used by inland water transport (all those except the sea-cum-river ways to the three main ports of Hai Phong, Saigon and Can Tho). According to VITRANSS estimates, future revenue will cover the future increased infrastructure maintenance costs if the fuel levy is increased as suggested above for roads.

Maintenance of waterways used mainly by maritime shipping should be financed fully from tonnage, maritime safety and procedure fees. To avoid increasing these to unacceptable levels in the future, coastal shipping should pay the same charges as ocean-going ships.

Port and airport charges should be based on costs at each port and investment financed through loans on commercial terms. Airlines should be subject to the same financing terms and allowed to develop market-based fare structures.

There are doubts about the viability of rail services. Higher transport tariffs will be needed to cover future investment. To put railway on a sound financial and competitive basis, a realistic business plan must be prepared to identify commercially viable services and justifiable investments. Potential services and lines needing subsidy should be identified. To sustain railway services, the government and railway should enter into a business contract specifying the basis for government subsidy plus any public service obligations placed on the railway.

3) Accelerate equitization of transport SOEs and complete commercialization of remaining enterprises to foster competition

There is no economic case for keeping most transport operations in state hands, so the current equitization program should be accelerated. Meanwhile, competition can be promoted by (a) giving the SOEs greater autonomy and performance incentives (especially reorganizing the railway along lines-of-business and establishing ports as independent corporations with clearly defined roles to act as landlord and developer of state assets), and (b) reforming large state corporations to act less as management conglomerates (or even abolishing these corporations and vest state ownership interests in a specialized agency in the General Department for Management of State Capital (GDMSC)).

In the case of multi-user facilities, such as ports and airports, it is recommended that reform strategy be based on five principles to increase incentives for efficiency and promote fair competition – commercial autonomy for each port, separation of port and transport service interests, competition within and between ports, clear demarcation of responsibilities between government and port management, and maximum involvement of the private sector.

4.7 Strengthening Sector Management

Effective sector management requires a greater degree of decentralization, with government focussed on core government oversight and infrastructure management functions, employing better trained personnel.

The overall strategy required to achieve these objectives involves the following three elements:

(a) Enhancing Management Systems to Promote Decentralization - requiring measures such as:

- organizational changes designed to allow decision-making at the lowest level, with each organization having the appropriate authority and organization to fulfill its mandates in managing transport,
- definition of management systems and tools for required activities such as policy-making, planning, programming, financing and database handling,
- implementing these systems using guidance documents, monitoring and control mechanisms.

(b) Divesting Commercial Functions - requiring measures such as:

- separate regulatory and commercial functions,
- promote competition in supply of services (contracting of construction and consulting services).

(c) Human Resource Development - requiring measures such as:

- policy commitment by MOT to promote human resource development by a clear policy statement setting out goals and specific objectives (including better training incentives and opportunities),
- stronger training incentives (setting higher qualification standards for government personnel, for contracted consultancy and construction services)
- enhanced training capacity (better trained trainers, modern syllabuses, training aids and equipment)
- basis for financing (loans for training, ODA support)

The rationale for this strategy is that decentralizing decision-making should be more efficient (involving simpler administration and releasing senior staff for the more important strategic matters), divesting commercial activities should allow these to be carried out more efficiently by the private sector under truly competitive conditions, and measures are required to tackle human resource constraints. This strategy is also realistic. The government is likely to have extremely limited resources to attract skilled management, for the foreseeable future. The proposed strategy allows MOT to adapt to the present trend of reducing government expenditure on administration, especially at central level, by reducing staff numbers but gradually increasing the number that are properly qualified during the master plan period.

The strategy places emphasis on human resource development because this has already become a bottleneck to transport development - the lack of suitably experienced and qualified government staff at all levels has been found to be a major constraint on implementing projects and making institutional reforms. The constraint will become even more serious as more modern technology is adopted and more sophisticated planning and management systems are required.

If such a strategy is adopted during the next ten years or so, continued divesting of MOT agencies as independent, self-financing units can be expected, leaving only the

core oversight functions and infrastructure management under the direct control of MOT. There will be a continued need for developing contractual relationships with external agencies during the master plan period (not only construction services, but also infrastructure maintenance, local planning/engineering consultancies and a variety of other services). Efficient contracting methods will become even more crucial for MOT to obtain cost-effective services (requiring present contracting methods to be improved to promote genuine competition).

Under any scenario, human resource development is central to institutional strengthening. Under this assumed scenario, the strategy for training must take account of the need to create mechanisms for meeting training needs not only within government but also outside. While the need for direct government funding of training will be reduced, government can continue to have a powerful influence over human resource development by setting increasingly higher qualification standards for the services provided. In particular government can be expected to raise standards of:

- infrastructure construction and maintenance work performed by Vietnamese contractors, towards international standards,
- planning and engineering consultancy services offered by local companies
- a wide range of routine activities required for regulating transport safety, such as safety inspections of road vehicles (which can effectively done by licensed private workshops as planned by VRA).

Raising standards in this way will continue to give a powerful incentive for training and encourage increasing finance for training from the private sector (at least for specialist areas above the basic school levels). This in turn will reduce the need for government to finance specialist training and allow the MOT to concentrate on the training needs related to its core oversight functions.

4.8 Constraints and Opportunities for Infrastructure Funding

Funding Scenario

Funding of transport infrastructure in Vietnam is severely constrained due to a number of reasons such as low level of general revenue, inadequate pricing, lack of user charge policy, inefficient use of available resources, etc. Thus the government has no choice but to rely on ODA. An exercise has been made to estimate the future funding scenario of the transport sector for different assumed levels of dependency on ODA. The three scenarios are as follows (see Figure 4.8.1):

Scenario 1: Heavy dependence on ODA (90%) continues.
Scenario 2: Dependence on ODA decreases gradually from 90% (2001) to 50% (2020).
Scenario 3: ODA remains constant up to 2010 and decreases gradually to zero in 2020.

Assuming that the percentage of conventional domestic fund is at 10%, the amount of new funds required is US$ 8.7 - 10.4 billion for Scenario 2 and US$ 16.0 - 20.0 billion for Scenario 3 during 2001 – 2020, as shown in Table 4.8.1.

Since Scenario 1 is apparently unrealistic and Scenario 2 may be optimistic, the Government of Vietnam should create new fund sources to implement the proposed projects/programs of the transport sector based on Scenario 3.

Figure 4.8.1
Concept of Possible Funding Scenarios

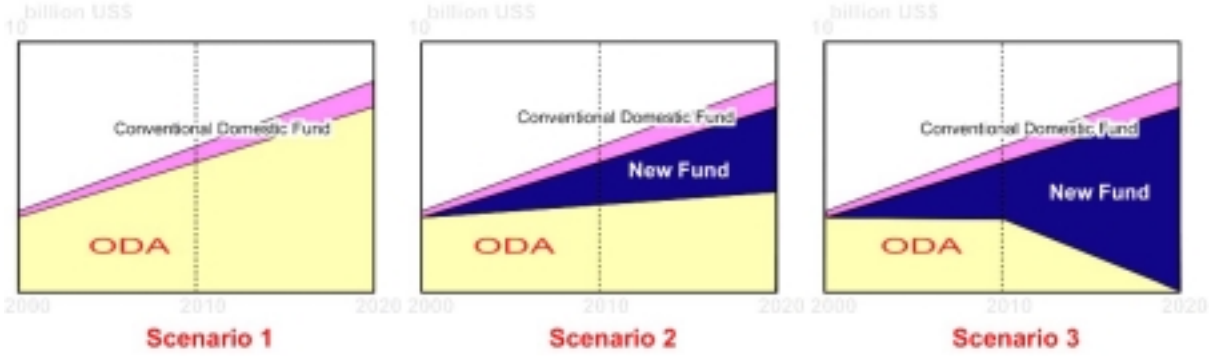


Table 4.8.1
Required Funding Amount by Scenario

US$ billion

Period	Fund Source	Scenario 1		Scenario 2		Scenario 3	
		Low	High	Low	High	Low	High
2001-2010	Conventional Domestic	1.2	1.3	1.2	1.3	1.2	1.3
	ODA	10.5	11.3	8.8	9.5	7.8	7.9
	New Domestic	-	-	1.7	1.8	2.7	3.4
	Subtotal	11.7	12.6	11.7	12.6	11.7	12.6
2011-2020	Conventional Domestic	2.1	2.5	2.1	2.5	2.1	2.5
	ODA	18.4	22.5	11.4	13.9	5.1	5.8
	New Domestic	-	-	7.0	8.6	13.3	16.7
	Subtotal	20.5	25.0	20.5	25.0	20.5	25.0
Total (2001-2020)	Conventional Domestic	3.2	3.8	3.2	3.8	3.2	3.8
	ODA	28.9	33.8	20.2	23.4	12.9	13.8
	New Domestic	-	-	8.7	10.4	16.0	20.0
	Total	32.1	37.6	32.1	37.6	32.1	37.6

Potential New Revenue Sources

Since the first scenario, which reflects the current trend of relying heavily on ODA, would not be a preferred option for Vietnam, there is a need to identify and establish new sources of funding for the transport sector. In order to estimate the potential amount of funding from these sources, an exercise was made which considered various charges on road vehicles. The assumed charges included fuel tax (10% of the market price),

vehicle acquisition tax (10% of new-vehicle price) and vehicle ownership tax (1% of new-vehicle price per year). The result showed that an approximate total of US$ 37.5 billion could be raised in the next two decades (see Table 4.8.2).

Table 4.8.2
Possible Revenue Sources

Period	Fuel Tax	Vehicle Acquisition Tax	Vehicle Ownership Tax	Total
	10% of Market Price	10% of Vehicle Price	1% p.a. of New Vehicle Price	
2001 –2010	2.1	7.5	5.5	15.1
2011 – 2020	3.7	9.2	9.5	22.4
Total	5.8	16.7	15.0	37.5

Japan and many other countries practice different systems to fund the transport sector, through various taxation schemes, special account, user charges, etc. Appendix 4-D gives a summary of Japan's experience.

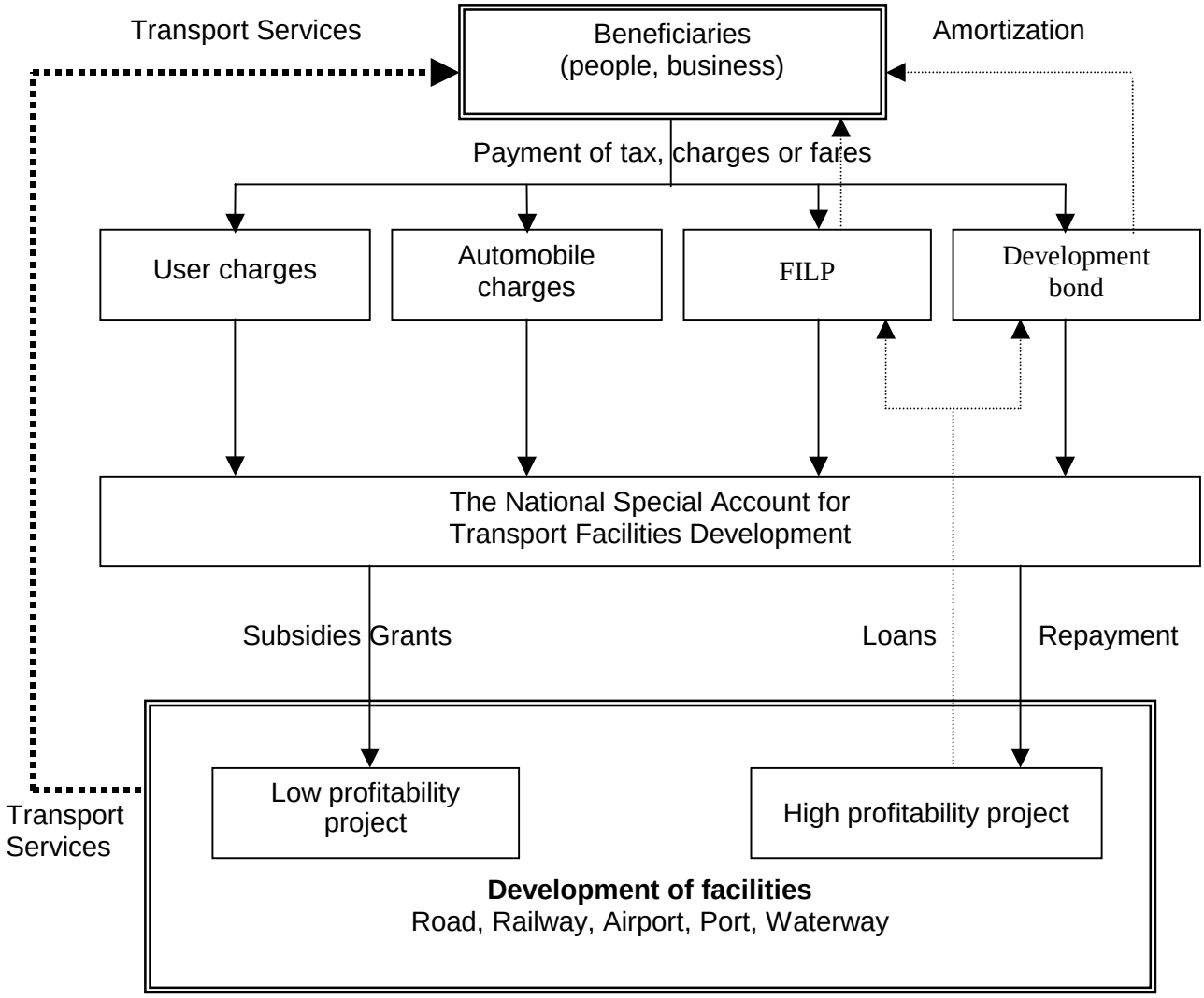
Strengthening of Funding Capability

For a government to strengthen its funding capability for transport development, there are basically three directions:

- Increase budget by developing new fund sources through expansion of user charges,
- Curtail costs by adopting economical methods of development or by improving efficiency and management in infrastructure development and operation, and
- Shift fiscal responsibility more to the private sector including foreign investment.

There are options for the Government of Vietnam to strengthen its funding capability. User charge and FILP (Fiscal Investment and Loan Program) are the major candidate measures to expand government budget. The former meets the "beneficiaries-pay" principle and can be used more extensively considering the current charge level and future economic growth. The latter, which was discussed in VITRANSS Interim 2 Report, meets the condition of fair shouldering of the cost among generations (transport infrastructure has a long life), although it should be clearly institutionalized before it is mobilized. Figure 4.8.2 shows the conceptual framework of Special Account for Transport Facilities Development, which mobilizes user charges, FILP, development bonds, among others, for the development of transport facilities. A similar concept has been realized in Korea and it is used not only for roads but other transport subsectors as well, such as railway and port.

Figure 4.8.2
Conceptual Framework of Special Account for Transport Facilities Development



Private sector participation in provision of transport infrastructure is common in many countries. In developing countries, however, it is not easy for the private sector to implement, successfully, such projects due to various risks such as government interference, insufficient legal/institutional basis and socio-economic instability. While the public-private role-sharing in the transport sector of Vietnam can be summarized (see Table 4.8.3), the following conditions need to be satisfied to mobilize private fund:

1) The financial position of counterpart organizations, public corporations or SOEs should be satisfactory.
2) Commitment to the contract should be fully honored.
3) Transparency in approval process or in selection of suppliers or contractors should be maintained.

4) Irrational intervention by the government in business operation and management should be avoided.
5) Related laws and regulations should be promulgated.
6) Information should be disseminated.
7) Government guarantee for the project should be considered if it is the prerequisite of private investment.

An example of financing berth development in Japan is introduced in Box 4.8.1 for reference.

Table 4.8.3
Public-Private Role-sharing for Transport Infrastructure Development and Operation

Sector	Item		Player[1/]		
			National Gov't.	Local Gov't.	Private Sector
Road	Infrastructure	• Primary/Secondary	✓✓	-	-
		• Tertiary	✓	✓✓	-
		• Expressway	✓	✓	✓✓
	Public Transport	• Passenger	-	✓	✓✓
		• Freight	-	✓	✓✓
		• Terminals	-	✓	✓✓
Rail	Infrastructure	• Track/facilities	✓✓-	✓	-
		• Station		✓✓	✓
	Operation	• Passenger	-	-	✓✓
		• Freight	-	-	✓✓
Port	Infrastructure	• Primary/Secondary	✓✓	✓	✓✓
		• Tertiary ports	✓	✓✓	✓
	Facilities/Operation	• Primary/Secondary	✓	-	✓✓
		• Tertiary ports	-	✓	✓✓
Inland Waterway	Waterway	• Primary/Secondary	✓✓	✓	-
		• Tertiary	✓	✓✓	-
	River Ports	• Infrastructure	✓✓	✓✓	✓
		• Operation	-	✓	✓✓
Airport	Infrastructure	• Primary/Secondary	✓✓	✓	✓
		• Tertiary	✓	✓✓	-
	Terminals	• Primary/Secondary	✓	✓	✓
		• Tertiary	✓	✓	-

1/ Symbol denotes as follows: ✓✓: Primary role
✓: Secondary role

Box 4.8.1

Berth Development by Public Corporation in Japan

1) General

In Japan, there is a scheme for berth development by public corporation. The public corporation develops the berth and provides cargo-handling equipment, cargo yard and office buildings to the specific user(s), and the user(s) can lease the port facilities. The advantage of this scheme is that the user(s) can use the port facility without large initial investment and the public corporation can obtain regular revenue regardless of the cargo volume handled at the berth.

2) Fund Source

The fund source of this scheme is various, as shown in the table below. Some of the fund sources are non-interest loans from the government (central and local) and these are actually subsidies to promote port development.

Fund Source for Berth Development by Public Corporation

	Berth for Foreign Container		Ferry Berth
	Depth more than 15 m	Depth less than 15 m	
1. Non-interest Loan from National Government	30 %	20 %	20 %
2. Non-interest Loan from Port Administrator	30 %	20 %	20 %
3. Special Bond	20 %	30 %	50 %
4. Loan from Stakeholder including Berth User(s)	20 %	30 %	10 %
Total	100 %	100 %	100 %

3) Lease Cost

The charge of using the berth is set by terminal to cover the following:

- Depreciation of facilities
- Interest Rate
- Maintenance and management
- Lease cost of land
- Taxes and levies (City Planning Tax, Real Property Tax, Registration Charge, etc.)

Source: MOT, Japan