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

SUMMARY

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)

VITRANSS Process

The 1st Steering Committee
(Mar. 1999, Hanoi)

The 1st Seminar
(Mar. 1999, Hanoi)

The 4th Seminar
(Nov. 1999, Hanoi)

The 6th Seminar on the VITRANSS Final Report
(Jul. 2000, Hanoi)

The Seminar in HCMC
(Mar. 2000, HCMC)

Learning Session
(12 sessions, Feb.-Sep. 1999)

Intensive Training Course on Demand Forecast
(Aug. 1999 and Feb. 2000)

Field Surveys on the Existing Conditions

Road Traffic Survey (Mar. and Apr. 1999)

THE STUDY ON THE
NATIONAL TRANSPORT DEVELOPMENT STRATEGY
IN THE SOCIALIST REPUBLIC OF VIETNAM
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SUMMARY

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Glossary

ACC	Area Control Center
ADB	Asian Development Bank
AFTA	ASEAN Free Trade Area
ASEAN	Association of Southeast Asian Nations
ATC	Air Traffic Control
ATN	Aid to Navigation
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
EIRR	Economic Internal Rate of Return
FILP	Fiscal Investment and Loan Program
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
ISM Code	International Safety Management Code
IWT	Inland Waterway Transport
JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency
MOT	Ministry of Transport
MPI	Ministry of Planning and Investment
MTO	Multimodal Transport Operator
MTTS	Maritime Technical & Training School
NAA	Northern Airports Authority
NH	National Highway
NTSC	National Traffic Safety Committee
OD	Origination and Destination
ODA	Official Development Assistance
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
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

EXCHANGE RATE USED

US$ 1 = VND 14,000

Executive Summary

Scope of the Study

The JICA-assisted Vietnam National Transport Strategy Study (VITRANSS) was conducted with the following main objectives:

- formulation of long-term development strategies for the national transport sector up to the year 2020;
- formulation of a national transport development master plan up to the year 2010;
- formulation of a short-term investment program up to year 2005 based on the above plan; and,
- conduct of necessary technology transfer on the planning process of the study.

The study covered the entire geographical area of Vietnam[1] with particular focus on the development and improvement of national transport infrastructure and services used for interprovincial transport[2].

The Study commenced in February 1999 and was completed in June 2000.[3] The Study was conducted under a multisectoral Steering Committee headed by the Vice Minister of the Ministry of Transport (MOT)[4] and with extensive involvement of the Vietnamese counterparts through Task Force meetings, a series of seminars/workshops, learning sessions, training course on transport planning, joint work with the direct counterparts, the TDSI, and consultation meetings with donors. In addition to these working arrangements, the development of a set of up-to-date databases contributed to the successful completion of the Study on time.

Transport Sector Issues in Vietnam

Overview: The transport sector of Vietnam consists of the full range of transport modes: road, railway, inland waterway, coastal and sea shipping, and aviation. The transport sector grew significantly during the 1990s.[5] This was supported by the development of transport infrastructure during the 1990s and partial transport deregulation. In addition to general reforms, the transport sector saw extensive commercialization. Various new services commenced such as container transport on road, rail and inland waterway, bonded transport, ICD operation, scheduled liner operation even in coastal shipping, liberalized transit transport between Lao PDR, etc.

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[1] The neighboring countries of China, Laos, Thailand, and Cambodia were also considered in the demand forecast and in the formulation of relevant plans and policies, when and where necessary.

[2] The urban transport sector was considered only with regard to such aspects as interfacing with inter-city transport network and allocating national financial resources. Rural transport, which was outside the original scope of the Study, was included on a case study basis.

[3] The Draft Final Report was submitted in March 2000.

[4] The Steering Committee was composed of senior representatives of MPI, MOT, VR, VIWA, VRA, VINAMARINE, CAAV, and TDSI.

[5] Interprovincial traffic flow, for instance, increased between 1992 and 1999 by 2.1 and 2.9 times for passenger and goods, respectively.

The active investment in transport infrastructure with particular regard to the rehabilitation and upgrading of all modes, including urban and rural transport, has been continuing. There are 42 transport projects that are either ongoing or committed. Many are expected to be completed by 2000-2003. The projects have a total cost of US$ 5.7 billion. Of this amount, 72% is for roads followed by air (12%), ports (6%), railway (2%), inland waterway (2%), rural transport (3%), and urban transport (3%).

At present though, Vietnam's transport infrastructure and services are still weak and there are a number of areas that need immediate attention: new or improved infrastructure is still needed to meet growing demand in many places. 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 about how to promote development of the transport sector more effectively, including building a sustainable infrastructure maintenance system, expanding domestic sources of funds, strengthening operation and management capacity, balancing investment between regions and between modes, encouraging private sector participation, implementing institutional reforms (especially within SOEs), and modernizing infrastructure and management.

Road and Road Transport: Vietnam has a total road network of over 200,000 km as of 1999. National roads, however, account for merely 15,250 km. The road network in Vietnam is relatively well developed, but poor in quality and lacks clearly defined hierarchy. The main issues confronting the subsector include poor quality of service, poor primary/secondary roads, lack of tertiary roads, lack of legal framework, inadequate road safety programs, weak infrastructure management, especially at provincial level, and lack of sustainable financing.

Railway Transport: The railway operates over 2,600 route-km, comprising seven main lines and several branch lines.[6] The subsector faces issues such as lack of market orientation, low utilization of assets, huge backlog of infrastructure maintenance, lack of modern business tools, and inadequate financial/performance agreement between railway and government.

Inland Waterway Transport: About 8,000 km of rivers are used for inland water transport, of which 6,230 km are managed by the VIWA and the rest by local governments. Although inland waterways play an important role in the deltas, the potential capacity of the subsector is constrained due to various factors such as poor port services, weak market mechanisms, inadequate dredging and navigational aids, lack of legal framework, weak infrastructure management, and lack of sustainable financing.

Maritime Transport: Vietnam's ports are virtually all owned and operated by the state sector.[7] They are managed by VINAMARINE, VINALINES, local governments, and SOEs

[6] The network is all single track with 1,000 mm gauge, 1,435 mm gauge and dual-gauge sections.
[7] Vietnam International Container Terminal (VICT) is a joint venture project with private involvement which commenced operation in 1998.

under ministries other than the MOT. They suffer from shallow water depth[8] and inadequate infrastructure and cargo handling equipment. In spite of these constraints, cargo traffic through Hai Phong and Saigon has been constantly increasing.[9] VINALINES, which holds 60% of the total national fleet, shared only 11% of the total foreign trade due to stiff competition from foreign operators. Domestic shipping consists of sea-cum-river shipping in the delta areas and coastal shipping.

The issues facing maritime transport include limited competition in coastal shipping, lack of experienced management, poor condition of shipping fleet, inadequate port services and charging system, lack of modern handling methods, inadequate dredging, incomplete legal framework, weak maritime infrastructure management, and need to attract foreign investment in modern port facilities.

Civil Aviation Transport: There are 135 airports/airstrips for civil, military and police use in the country. The CAAV is responsible for direct management of 18 airports (including the three major airports) and air navigation services. The subsector is confronted by various issues, including limited competition, lack of experienced management, poor airport facilities, need to develop a new CNS/ATM system, inadequate legal framework, weak infrastructure management, and lack of sustainable financing.

Rural Transport: While primary roads are being rehabilitated, there is growing concern about improving accessibility in rural areas where 80% of the country's population resides. The main issues in rural transport include limited all-weather access by motor vehicle[10], price controls on transport services, weak infrastructure management, and lack of sustainable financing.

Cross-border Transport: A total of 24 provinces in Vietnam share the long border (4,639 km) with the adjoining countries of China, Lao PDR and Cambodia.[11] The significance of cross-border transport can be viewed from both the regional and local perspectives.[12] The main issues in cross-border transport include limited and uncertain traffic levels, limited physical infrastructure and institutional bottlenecks.

Multimodal Transport: Seamless transport services at reasonable cost to make the transport sector more competitive has become an increasingly critical objective, both for international and interprovincial transport of goods. The importance of multimodal transport concept is being recognized in Vietnam but services are still very much constrained due to various factors such as lack of guaranteed scheduled services, lack of cargo information systems, lack of modern cargo handling methods, poor access links to ports, physical constraints on containerization, bureaucratic bottlenecks, lack of legal framework, and need to attract foreign investment.

[8] At present, Hai Phong can hardly accommodate vessels of more than 7,000 DWT, while Saigon River allows vessels of more or less 20,000 DWT.
[9] In 1999, Saigon and Hai Phong handled 8.3 million tons and 6.3 million tons, respectively
[10] Motor vehicles cannot access 606 out of 9,816 communes.
[11] Six, ten and eight Vietnamese provinces share the border with China, Lao PDR and Cambodia, respectively.
[12] The current initiatives for regional cooperation through the Association of Southeast Asian Nations (ASEAN), Greater Mekong Subregion (GMS) and other bilateral arrangements

Sector Management: Various subsector issues mentioned above are not specific to particular subsectors but require a sector-wide approach. Key transport sector management issues include weak management, need to divest remaining commercial functions, lack of trained staff and training policies, inadequate level-playing-field and basis for cost recovery, slow pace of SOE reform, and need to generate new revenue sources.

Long-term Transport Strategies

Transport Sector Goals: 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, human resource development and regional cooperation. Of the wide range of sector development objectives, the most critical aspect is to meet the economic and social needs of society. The key objectives of transport sector development are thus summarized in the phrase,

"Competitive Transport with Social Equity".

Transport Sector Objectives and Strategies: The major issues, policies and strategies that need to be addressed for the transport sector in Vietnam are categorized into the four aspects, "operations and management", "infrastructure", "institutional/competitive framework" and "funding", and worked out as summarized in Table 1.

For each subsector, long-term objectives and strategies have been further defined based on these overall transport sector objectives and strategies.

Modal Balance Target: 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. An exercise has been conducted to test relative changes in overall freight transport costs by analyzing various scenarios for the future modal composition of the national transport network. Though based on many assumptions, it indicates that if the current trend in modal split continues[13], 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.

[13] At present, the modal share in interprovincial goods transport is 48% by road, 18% by IWT, 6% by rail, and 33% by coastal shipping, with an increasing share for road.

Table 1
Transport Sector Objectives and Strategies

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

Overall Network Development: A long-term transport network plan provides a useful basis to guide infrastructure investments in a coordinated and integrated manner. In formulating the overall network structure and the estimated future demand, the following factors were duly considered:

- All growth centers, production areas, communities, and other activity centers should be provided with adequate transport infrastructure and services.
- 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.
- Intermodal connection should be assured through infrastructure and institutional arrangements to facilitate the smooth transport of goods and people.
- International linkages with global markets and adjoining countries should be strengthened.
- Growth belts in the north, south and central part of Vietnam should be provided with strategic transport infrastructure.
- Other factors, such as environmental and geographical characteristics, should be properly incorporated into the plan.

The formulated long-term transport network plan 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 accessibility to/from the remaining areas (see Figure 1).

Corridor Development Strategies: For practical planning the long-term network was further divided into 27 transport corridors. For each of the identified corridors, existing conditions have been described, future demand analyzed, constraints and opportunities assessed and development strategies identified, forming the basis of the projects that shall be formulated. As a result, seven priority corridors of national economic importance were identified including (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, and (7) HCMC-Can Tho Corridor, although other corridors also require due attention.

This corridor approach has been further expanded for the growth zones in the north and south where further exploitation of interaction between corridors is expected to enhance development potential (see Figures 2 and 3).

Cross-border corridors, seven of which are primary and five are secondary, need special attention from neighboring countries in the name of regional cooperation, as well as from rural transport/development viewpoints, though the demand level is uncertain and construction and operation/maintenance costs are relatively high.

Figure 1
Long-term Transport Network

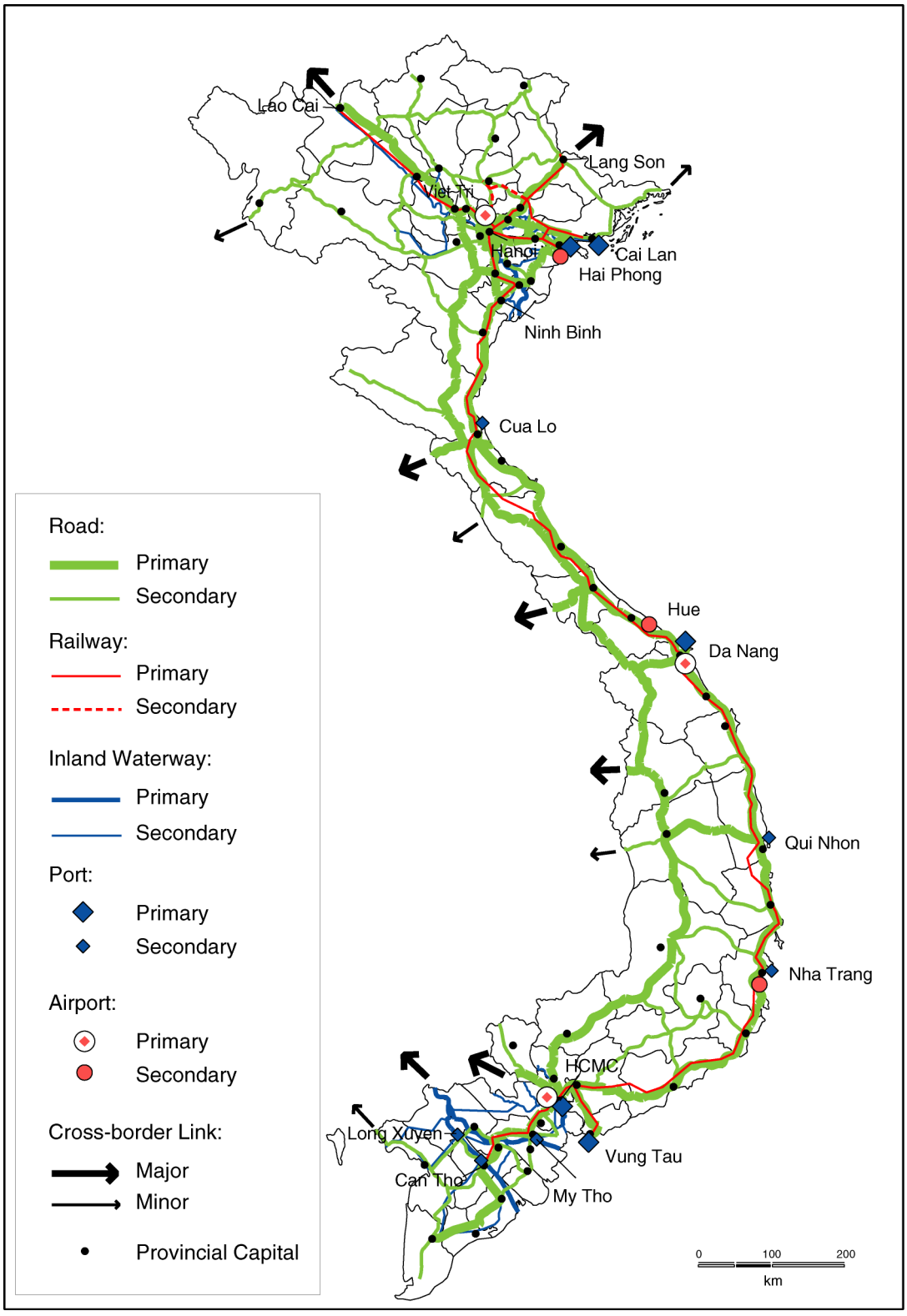


Figure 2
Long-term Transport Network Development Strategy for the North Growth Zone [1/]

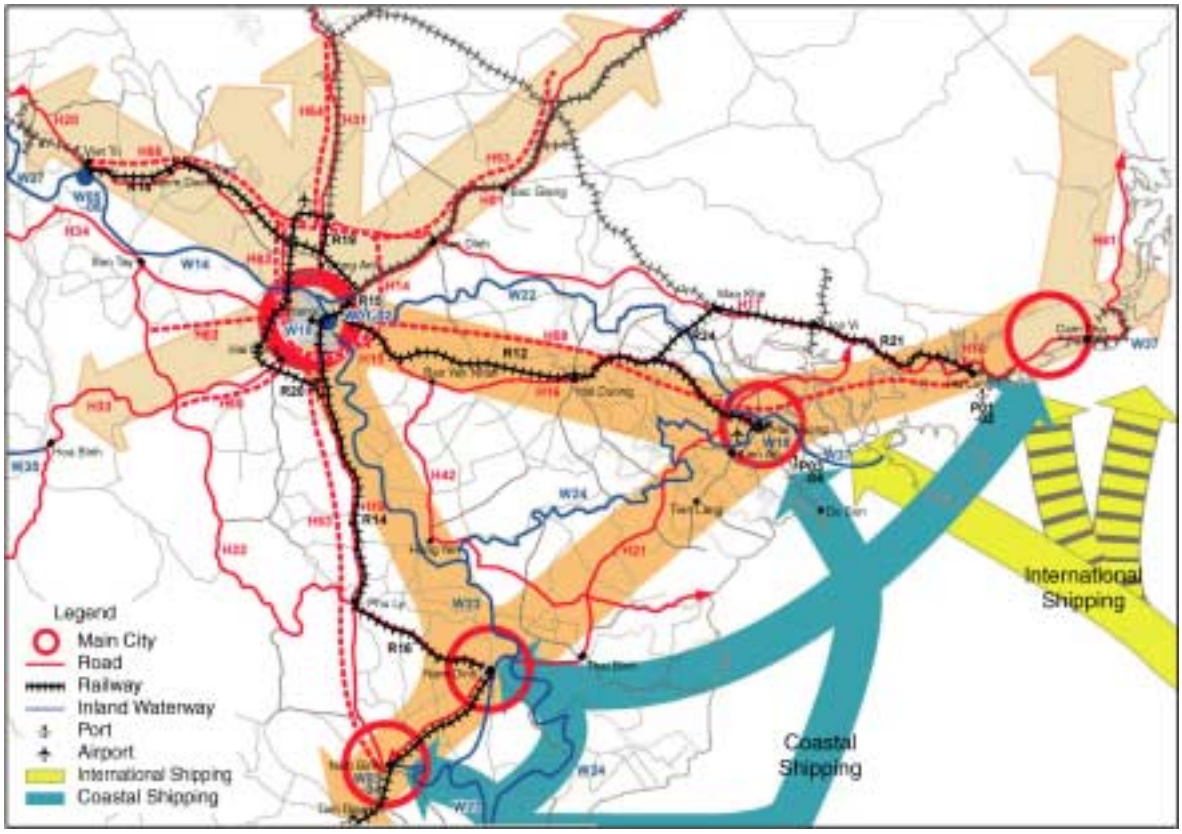
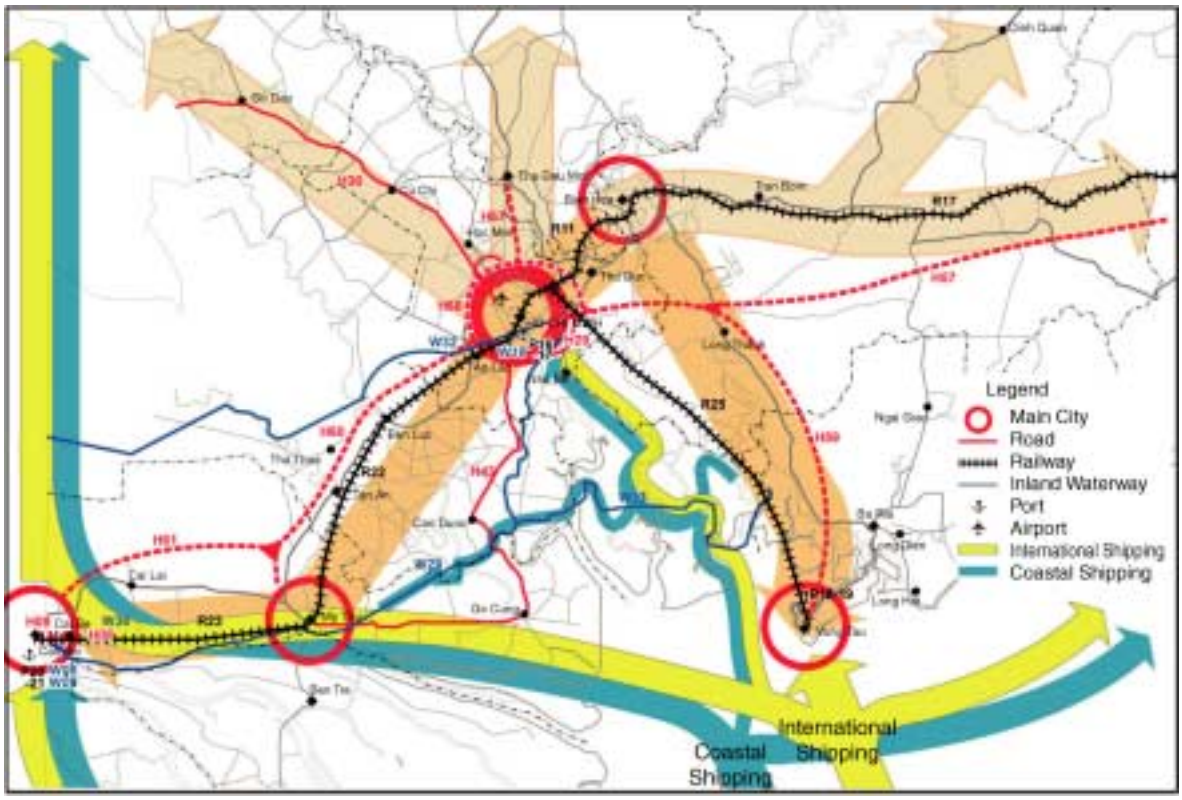


Figure 3
Long-term Transport Network Development Strategy for the South Growth Zone [1/]



1/ Symbols (e.g. R12, H43 …..etc) denote code no. of the identified/possible projects which comprise long-term strategies.

Strategy for Institutional Development: Long-term institutional development issues concern the role of the private and public sectors and the distribution of responsibilities between government agencies. While the private sector will play an increasingly dominant role in providing transport services, a step-by-step approach to equitization is required to tackle implementation obstacles. This should focus initially on the smaller transport enterprises (especially road transport) while efforts are made to improve management and efficiency of remaining SOEs (railway, shipping operators etc).

Effective sector management requires greater decentralization, with government focussed on core oversight and infrastructure management functions. This calls for an overall strategy with three elements:

- enhancing management systems (especially modern management systems/tools and guidance documents in the specialized management departments of MOT and in the provincial/district administrations),
- divesting of commercial functions (especially in construction services), and
- human resource development (clear policies, stronger training incentives, enhanced training capacity and basis for finance).

Infrastructure Funding – Constraints and Opportunities: Funding of transport infrastructure in Vietnam is severely constrained for 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.

Investment in the transport sector has been about one-fourth of public investment in recent years or about 1.8% of GDP. Although it has been advocated that transport sector investment should be 3% of GDP[14]. The estimated amount likely to be available for the transport sector from the government ranges between US$ 23 billion and US$ 45 billion for the next two decades.

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

- Increase budget by developing new fund sources through expansion of user charges,
- Curtail costs by adopting more 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.

Master Plan

Objectives: The Master Plan is a ten-year plan that gives a more concrete direction to the country's transport system and services. It has the long-term objective of making Vietnam's transport sector competitive and equitable, where consumer needs are satisfied at minimum costs. The Master Plan aims for a transport sector that sustains balanced development of the country, supports the poor (especially in the rural areas), protects and

[14] 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).

enhances the environment, and facilitates international integration at GMS and ASEAN levels as well as globally.

Broad Priorities for the Master Plan[15]: Vietnam's transport sector is constrained in terms of funding capacity. Available resources should be effectively allocated and so broad priorities have been defined for allocating the likely available budget of the government. They are as follows:

- Maintenance, rehabilitation and minor improvements outside the VITRANSS project list. It is assumed that about 20% of the budget envelope will be allocated for this.
- Projects that remove traffic bottlenecks and strengthen the network to meet demand.
- Growth corridors in the north, south and central areas, which are expected to act as engines of national economic growth. Strategic infrastructure for land, water and air transport should be provided and integrated with transport links to the global market and neighboring countries.
- Strengthening of north-south integration and enabling the smooth flow of people and goods.
- Urban transport before congestion chokes the cities, especially in large urban areas, and adversely affects the efficiency of interurban transport.

Master Plan Projects: The initial long list of projects, derived from the proposed long-term strategies, were screened to identify candidate projects for the Master Plan.[16]

The candidate projects have been evaluated primarily from the economic viewpoint because the nature of the VITRANSS projects is to serve the interprovincial level of transport needs.[17] They were evaluated based on a simplified economic evaluation and other criteria such as contribution to strengthen the network, contribution to strengthen international linkages, opportunity to recover the cost of investment in the project, contribution to social equity and poverty alleviation, level of impact of the project on the environment, and magnitude of requirements for resettlement and right-of-way acquisition.

A total of 116 projects considered necessary to provide the transport network and services intended within the Master Plan period have been selected (see Table 2), comprising ongoing and committed projects (33 projects), safety and training projects (4 projects), infrastructure projects (64 projects), and equipment/facility/system projects integrated with the above infrastructure projects (15 projects)

Overall Evaluation of the Master Plan by Subsector: An economic evaluation was conducted on the projects included in the Master Plan by subsector on several assumptions.[18] The results indicate that if all the Master Plan projects are implemented,

[15] Whereas the Master Plan in the Study mainly aims to improve and develop interurban transport, it is to be noted that the rural transport issue is also seriously being attended to and has a separate strategy being developed by the government.
[16] The long list is excluded from the Executive Summary but included in the Main Text.
[17] Some candidate projects which are difficult to be assessed quantitatively are prioritized based on the judgement of the Study Team.
[18] Key assumptions include 2005 as the starting year, project life of 30 years, and SCF of 80%.

the overall EIRR is calculated at 22%. The road subsector registers an average of 25% EIRR. However, if ongoing and committed projects are excluded, the average EIRR of road projects reduces to 12%. This implies that future investments in roads should undergo critical economic evaluation. The railway subsector shows a sound level of EIRR on condition that the system can be operated and managed efficiently, while the maritime (including inland waterway transport) subsector shows a significant economic return, clearly indicating that this subsector will become critical in meeting future demand.

Table 2
List of Master Plan Projects (up to 2010)

Sector	Project No.	Project	Status (original Schedule)	Fund Source	Project Cost (million US$)		Priority[1/]
					Total	2001-	
Road	***Primary Road Network Development***						
	H01	Highway Rehabilitation Project (Hanoi-Lang Son; 190km)	Ongoing (1997-2000)	ADB	162.5	16.3	A
	H02	Highway Rehabilitation Project II (Vinh-Dong Ha; 100km)	Ongoing (1997-2000)	WB	236.6	23.7	A
	H03	2nd Road Development (Nha Trang-Quang Ngai; 600km)	Ongoing (1999-2002)	ADB	163.0	81.5	A
	H04	Highway Rehabilitation Project III (Can Tho-Nam Can; 230km)	Ongoing (2000-2004)	WB	180.0	180.0	A
	H05	Bridge Rehabilitation Project - Phase I (435km)	Ongoing (1995-2000)	JBIC	162.2	16.2	A
	H06	Bridge Rehabilitation Project - Phase II (752km)	Ongoing (1996-2001)	JBIC	211.0	105.5	A
	H07	Hai Van Pass Tunnel (2 lanes, 14km)	Ongoing (1998-2003)	JBIC	251.0	225.9	A
	H08	My Thuan Bridge (1,535m)	Ongoing (1997-2000)	Australia	79.3	15.9	A
	H09	Can Tho Bridge Construction	Ongoing (2000-2004)	JBIC	294.0	294.0	A
	H10	National Highway No.1 Urban Bypass (Hanoi-HCMC; 70km)	New		67.0	67.0	A
	H12	Rehabilitation and Upgrading of HCM Highway (Hoa Lac -Ngoc Ha)	Ongoing (2000-2003)	GOV	380.0	380.0	A
	H13	National Highway No.14 Rehabilitation Project	Ongoing (2000-2003)	GOV	15.0	15.0	A
	H14	Hanoi Ring Road	New		256.0	256.0	A
	H15	Thanh Tri Bridge Construction	Ongoing (2000-2004)	JBIC	410.0	410.0	A
	H16	National Highway No.5 Improvement Project (remaining section, 91km)	Ongoing (1995-2000)	JBIC	215.6	215.6	A
	H17	National Highway No.18 Widening Projects - Phase 2 (remain section, 70km)	Ongoing (1998-2003)	JBIC	232.0	232.0	A
	H18	Bai Chay Bridge Construction	Ongoing (2000-2004)	JBIC	98.0	98.0	A
	H19	National Highway No.1 Hanoi - Ninh Binh Widening Project (80km)	New		76.0	76.0	A
	H20	National Highway No.70 Upgrading Project (Hanoi-Lao Cai; 191km)	New		125.0	125.0	A
	H21	National Highway No.10 Upgrading Project (147km)	Ongoing (1998-2003)	JBIC	302.0	302.0	A
	H22	National Highway No.21 Upgrading Project (80km)	New		58.0	58.0	B
	H23	East-West Corridor Project (ASEAN 7; NH8, 8B; 110km)	New		90.0	90.0	B
	H24	East-West Corridor Project (ASEAN 8; NH9; 75km)	Ongoing (1999-2003)	ADB	30.0	24.0	A
	H25	East-West Corridor Project (ASEAN 7A; NH12A, 29; 120km)	Ongoing	GOV	65.0	39.0	A
	H26	National Highway No.40 Upgrading Project (ASEAN 7B,24km)	New		14.0	14.0	B
	H27	Rehabilitation (NH19, 20, 24, 26, 27, 28)	New		150.0	150.0	B
	H29	Trans HCMC Highway Project (21.4km)	Ongoing (2000-2004)	JBIC	758.6	758.6	A
	H30	Trans Asia Highway Project (NH22 to Cambodia; 80km)	Ongoing (1999-2002)	ADB	144.7	144.7	A

1/ "A" refers to projects for implementation before 2005, while "B", after 2005.

to continue

Cont. Table 2

Sector	Project No.	Project	Status (Original Schedule)	Fund Source	Project Cost (million US$)		Priority[1/]
					Total	2001-	
	Secondary Road Network Development						
	H31	Hanoi-Cao Bang (NH3) Improvement (310km)	New		148.0	148.0	B
	H32	Hanoi-Ha Giang (NH2) Improvement (300km)	New		137.0	137.0	B
	H33	Hanoi-Dien Bien Phu (NH6) Improvement (468km)	New		223.0	223.0	B
	H34	Hanoi-Lai Chau (NH32) Improvement (390km)	New		200.0	200.0	B
	H35	North C1 (North-East Ring, NH5-NH3, NH37; 150km)	New		101.0	101.0	B
	H36	North C1 (North Ring, NH3-NH70, NH37; 115km)	New		122.0	122.0	B
	H41	Cua Ong-Bac Luan (NH18) Road Improvement (130km)	New		92.0	92.0	B
	H42	Hung Yen-Thai Binh Road (NH39) Improvement (100km)	New		124.0	124.0	B
	H43	HCMC-My Tho Road (NH50) Improvement (80km)	New		79.0	79.0	B
	H45	Can Tho-Ha Tien (NH80) Improvement (200km)	New		197.0	197.0	B
	H46	Can Tho-Kien Giang-Ca Mau Route Improvement (200km)	New		197.0	197.0	B
	H48	NH22B Improvement (Go Dau-Xau Mai; 80km)	New		55.0	55.0	B
	H49	Secondary Road Network rehabilitation Program	New		94.0	94.0	A
	H50	Tertiary Road Improvement Project	New		569.0	569.0	A
	Road Safety						
	H52	Road Safety Improvement Program	New		30.0	30.0	A
	Expressway						
	H60	HCMC-Can Tho Expressway 1 (HCMC-My Tho; 50km)	New		350.0	350.0	B
		Subtotal			**7,944.5**	**7,131.9**	
Railway	***Rehabilitation and Minor Improvement***						
	R01	Hanoi-HCMC Railway Bridge Rehabilitation	Ongoing (1995-2001)	JBIC	104.0	47.0	A
	R02	Rehabilitation of Tracks & Bridges	New		325.0	325.0	A
	R04	Hai Van Pass Tunnel	New		389.0	389.0	B
	R05	Signal and Communication Equipment Modernization	New		128.0	128.0	A
	R07	Alarm at Crossings	New		21.0	21.0	A
	Capacity Expansion of Critical Sections						
	R08	New Stations for Train Exchange (100 stations)	New		26.0	26.0	A
	R11	Bien Hoa - Saigon section (29.4km)	New		130.0	130.0	B
	R12	Hanoi - Haiphong section (101.4km)	New		293.0	293.0	B
	R13	Hanoi - Giap Bat section (5.4km)	New		32.0	32.0	B
	Operation						
	R28	CTC and Computerization	New		136.0	136.0	A
		Subtotal			**1,584.0**	**1,527.0**	
Inland Water-way	***Port Improvement***						
	W01	Hanoi/Khuyen Luong Port Improvement	New		11.0	11.0	A
	W03	Ninh Binh/Ninh Phuc Port Improvement	Partly Ongoing	GOV	14.4	14.4	A
	W05	Viet Tri Port Improvement	New		3.5	3.5	B
	W08	My Tho/Can Tho Port Improvement for IWT	Partly Ongoing	WB/GOV	6.1	6.1	A
	W10	Vinh Thai (Vinh Long) Port Improvement	New		4.3	4.3	A
	W12	Ca Mau Port Improvement	New		2.9	2.9	A
	W14	Cao Lanh (Dong Thap) Port Improvement	New		6.4	6.4	A
	W16	My Thoi (Long Xuyen) Port Improvement	New		6.2	6.2	A
	W18	Passenger Terminal Development	New		2.2	2.2	A
	W20	Other Local Port Development	New		47.7	47.7	A
	Waterway Improvement						
	W22	Quang Ninh-Hanoi/Pha Lai Waterway Improvement	New		13.9	13.9	A
	W23	Ninh Binh/Nam Dinh-Hanoi Waterway Improvement	New		19.9	19.9	A
	W24	Quang Ninh-Nam Dinh/Ninh Binh Waterway Improvement	New		6.0	6.0	A
	W25	Hanoi-Viet Tri-Lao Cai Waterway Improvement	New		74.0	74.0	A
	W29	HCM-Can Tho Waterway Improvement	Partly Ongoing	WB/GOV	23.2	23.2	A
	W30	Can Tho-Ca Mau Waterway Improvement	Partly Ongoing	WB/GOV	17.6	17.6	A
	W31	Cho-Lach-Kien Luong Waterway Improvement	Partly Ongoing	WB/GOV	25.5	25.5	A
	W32	Saigon-Dong Thap Muoi-Long Xuyen Waterway Improvement	Partly Ongoing	GOV	5.4	5.4	A
	W33	Thi Vai-Nuoc Man Canal Development	New		3.2	3.2	A
	W35	Da River and Hoa Binh Port Improvement in Hoa Binh Lake	New		2.1	2.1	B
	W36	Cuu Long-Cambodia Waterway Improvement	New		20.5	20.5	B
	W37	Island Service Improvement (Co To and Cat Ba Islands)	New		2.5	2.5	B
	Operation & Safety						
	W39	IWT Safety Enhancement	New		52.7	52.7	A
	W41	IWT Education	Ongoing (1997-2002)	CIDA	14.1	14.1	A
		Subtotal			**385.3**	**385.3**	

1/ "A" refers to projects for implementation before 2005, while "B", after 2005.

to continue

Cont. Table 2

Sector	Project No.	Project	Status (original Schedule)	Fund Source	Project Cost (million US$)		Priority[1/]
					Total	2001-	
Port & Ship-ping	***Port Expansion/Development***						
	P01	Cai Lan Port Expansion Project	Partly Ongoing (96-01)	JBIC	128.1	128.1	A
	P03	Hai Phong General Port (Phase II)	Ongoing (2000-2010)	JBIC	138.0	138.0	A
	P05	Cua Lo Port Project	New		49.3	49.3	A
	P07	Danang Bay - Lien Chieu Port Development	New		158.0	158.0	B
	P09	Danang Bay - Tien Sa Port Rehabilitation	Partly Ongoing (1999-2003)	JBIC	172.0	172.0	A
	P10	Specialized Port for Dung Quat Industrial Zone	New		130.0	130.0	A
	P12	Qui Nhon Port Development	New		36.0	36.0	A
	P14	Nha Trang Port Development	New		57.0	57.0	A
	P16	Ho Chi Minh City General Port	New		200.0	200.0	A
	P18	Ba Ria Vung Tau General Port	New		206.0	206.0	A
	P20	Can Tho Port Development	New		64.0	64.0	A
	P22	Industrial Port Development	New		67.0	67.0	A
	P24	Other Local Ports	New		22.7	22.7	A
	Operation & Safety						
	P26	Port EDI System at Gateway Ports	New		10.0	10.0	B
	P27	Large-scale ICD Development Project	New		72.2	72.2	B
	P31	Development of Aids to Navigation (ATN)	New		63.6	63.6	A
	P33	Maritime SAR and Oil Spill Protection	New		52.8	52.8	A
	P35	Seafarers' Education Upgrading Project	New		20.9	20.9	A
		Subtotal			**1,647.6**	**1,647.6**	
Air	***Airport Expansion/Development***						
	A01	Noi Bai International Airport Development Project	Ongoing (1996-2002)	GOV	57.1	17.1	A
	A02	New Passenger Terminal Building (T1) Construction in Noi Bai International Airport	Ongoing (1995-2001)	GOV & Credit Loans	80.0	24.0	A
	A03	Noi Bai Airport Development Project - Phase 1	New		53.9	53.9	A
	A05	Danang International Airport Development Project - Phase 1	New		77.7	77.7	A
	A07	Expansion of International Passenger Terminal Building in Tan Son Nhat International Airport	Ongoing (1999-2002)	SAA	12.0	6.0	A
	A08	Airfield Pavement Overlay in Tan Son Nhat International Airport	Ongoing (1999-2001)	SAA	16.0	14.4	A
	A09	Tan Son Nhat International Airport Development Project	New		226.7	226.7	A
	A11	Secondary Airport Development Project (Cat Bi, Phu Bai, Nha Trang)	New		85.6	85.6	A
	A13	New Airport Construction Project (Cao Bang, Lao Cai, Dong Hoi, Chu Lai)	New		83.6	83.6	B
	A14	Rehabilitation of Tertiary Airports - Phase 1 (9 airports)	New		120.8	120.8	A
	Air Traffic Control						
	A16	Reconstruction of HCM Area Control Center and Noi Bai Air Traffic Management Center	New		58.0	58.0	A
	A17	Provision of Navigation Aids in Secondary Airport (Cat Bi, Phu Bai, Nha Trang)	New		4.5	4.5	B
	A18	Provision of Control Tower System Packages and Automatic Weather Observation Stations (AWOS) in 4 New Airports	New		1.3	1.3	B
	A19	Communication and Navigational Equipment Replacement Program	New		12.2	12.2	A
	A20	Equipment Installation and Upgrading Project for New CNS/ATM -Phase 1	New		32.8	32.8	A
	A21	Equipment Installation and Upgrading Project for New CNS/ATM - Phase 2	New		10.9	10.9	B
	A22	Restructuring of Air Traffic Service - Direct Speech (ATS-DS) Circuits and Aeronautical Fixed Telecommunications Network (AFTN)	New		2.5	2.5	A
	A23	Rehabilitation of Civil Aviation Training Center of Vietnam (CATCV)	New		3.0	3.0	A
	A24	Flight Calibration of Navigation Aids	New		1.1	1.1	A
	A25	Test Equipment Replacement and the Equipment Standards Laboratory	New		1.9	1.9	A
		Subtotal			**941.6**	**838.0**	
		Total			**12,503.0**	**11,529.8**	

1/ "A" refers to projects for implementation before 2005, while "B", after 2005.

Figure 4-a
Master Plan Projects up to 2010 (Infrastructure Projects Only), North

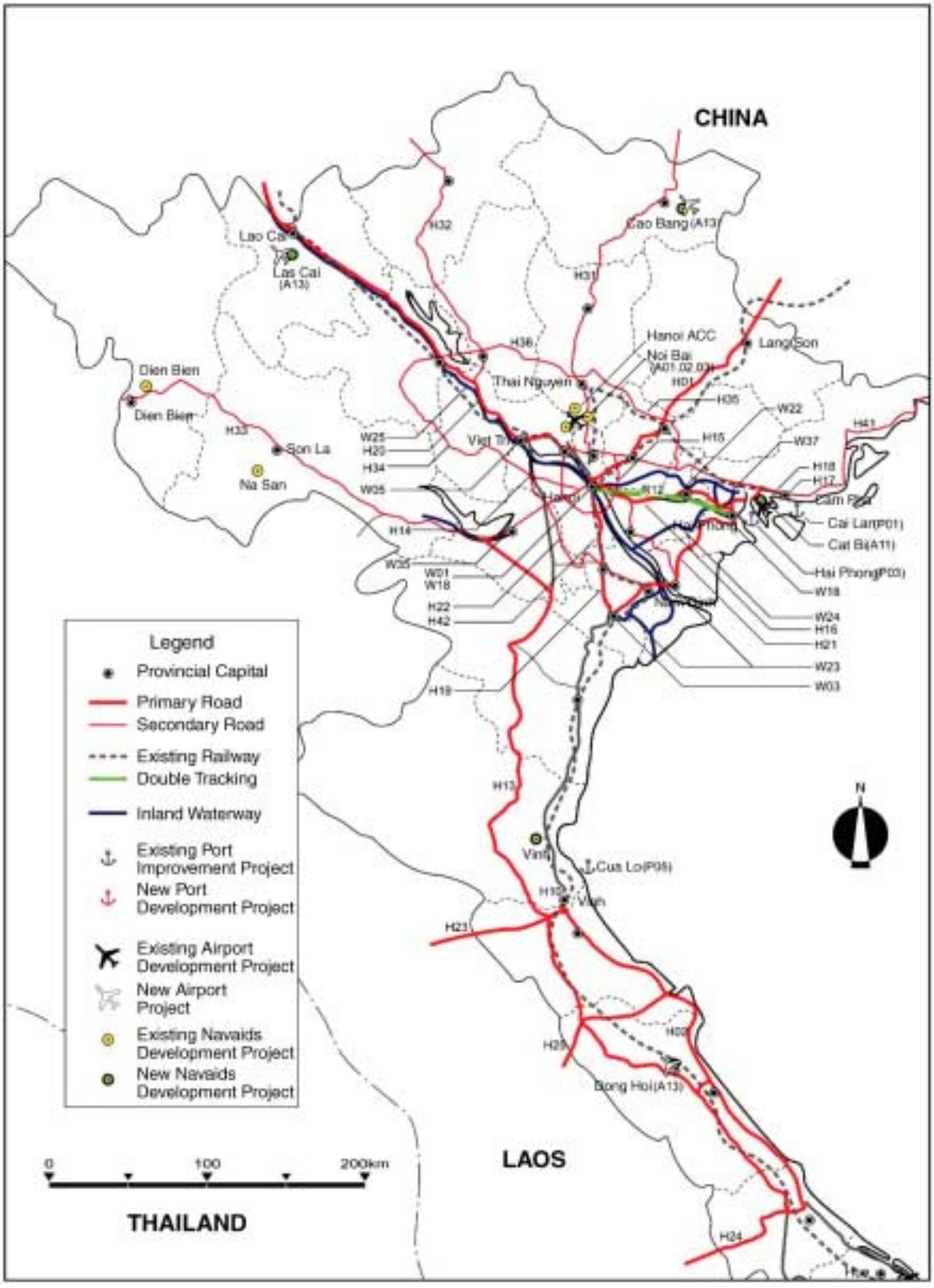


Figure 4-b
Master Plan Projects up to 2010 (Infrastructure Projects Only), Central

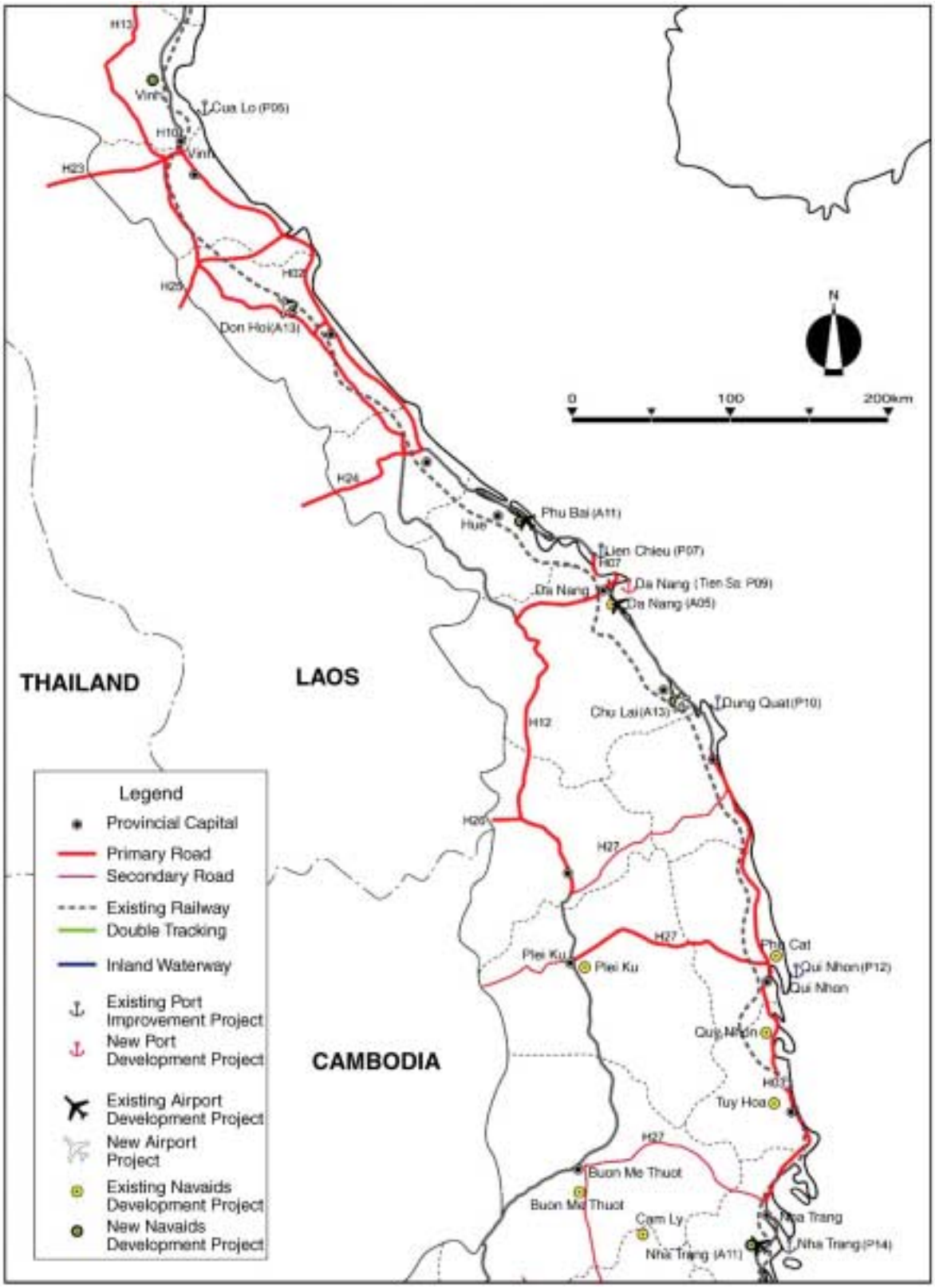
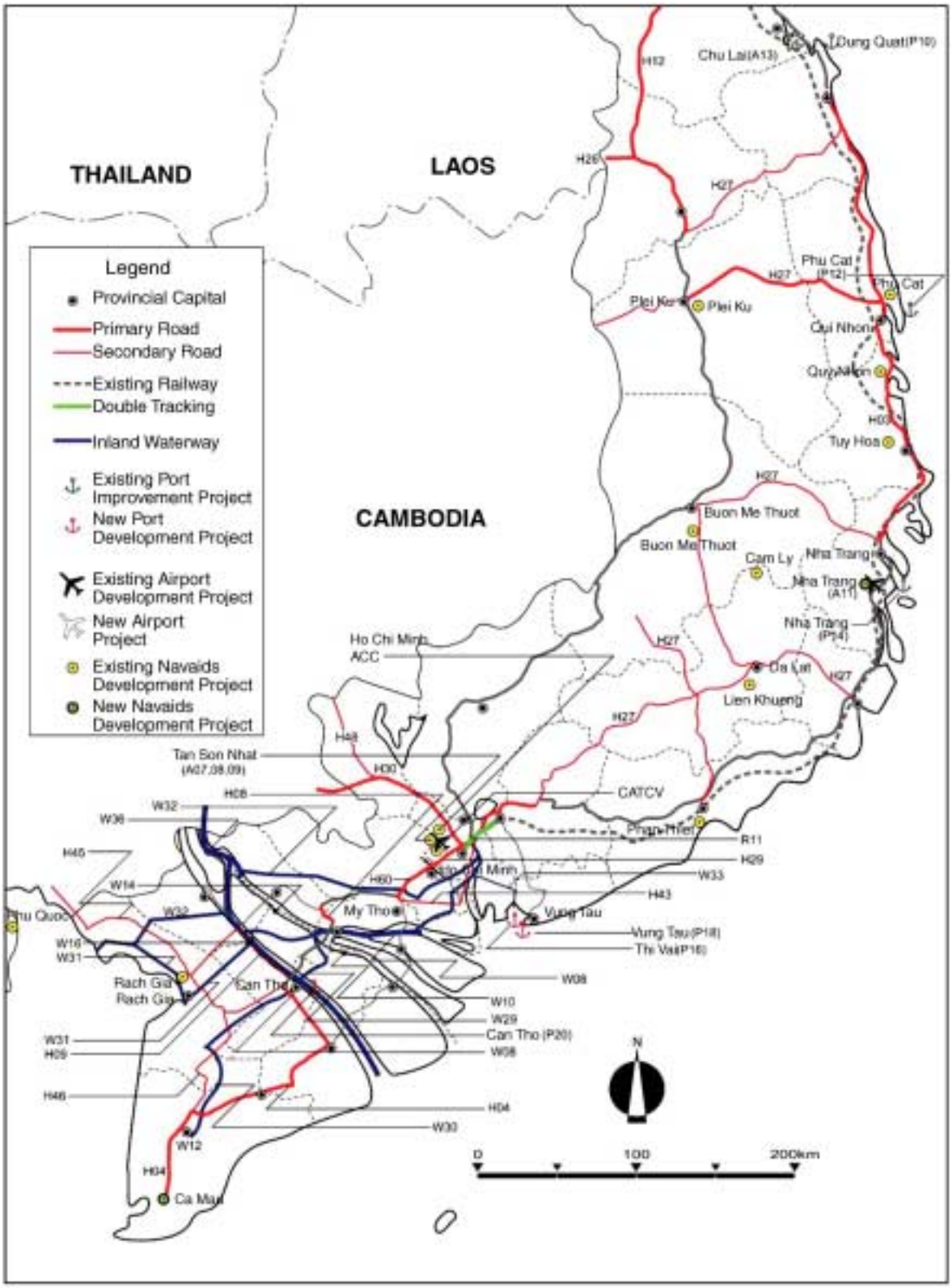


Figure 4-c
Master Plan Projects up to 2010 (Infrastructure Projects Only), South



Investment Requirement and Fund Availability: The investment requirement of the Master Plan reaches almost US$ 11.5 billion in total capital costs. Excluding that part of the investment required for revenue-generating projects, such as expressways and ports, and the cost of transport equipment that operators should shoulder, the cost to government (central and local) is estimated to be about US$ 10.5 billion (see Table 3).[19]

Road accounts for about 65% of the cost to government, followed by rail (13.2%), port and shipping (11.5%), air (6.6%), and inland waterway (3.6%), However, the road subsector includes US$ 3.6 billion for ongoing/committed projects which is almost 50% of the total road investment cost.

Table 3
Investment Requirement for the Transport Sector up to 2010

Sector	Category	Estimated Capital Cost (US$ mil)		Cost to Government		
		Total	Ongoing	Share % in Capital Cost	US$ Mil.	% to Total
Road	Primary Road Network Development	4,413.9	3,577.9	100	4,414	41.9
	Secondary Road Network Development	2,338.0	-	100	2,338	22.2
	Road Safety	30.0	-	100	30	0.3
	Expressway	350.0	-	20	70	0.7
	Subtotal	7,131.9	3,577.9	-	6,852	65.1
Railway	Rehabilitation and Minor Improvement	910.0	47.0	100	910	8.6
	Capacity Expansion of Critical Sections	481.0	-	100	481	4.6
	Operation	136.0	-	0	0	0.0
	Subtotal	1,527.0	47.0	-	1,391	13.2
Inland Waterway	Port Improvement	104.7	20.5	90	94	0.9
	Waterway Improvement	213.8	71.7	100	214	2.0
	Safety	66.8	14.1	100	67	0.6
	Subtotal	385.3	106.3	-	375	3.6
Port & Shipping	Port Expansion/Development	1,428.1	438.1	70	990	9.4
	Safety	219.5	-	100	220	2.1
	Subtotal	1,647.6	438.1	-	1,209	11.5
Air	Airport Expansion/Development	709.8	61.5	80	568	5.4
	Air Traffic Control	128.2	-	100	128	1.2
	Subtotal	838.0	61.5	-	696	6.6
Total		11,529.8	4,230.8	-	10,523	100.0

Source: VITRANSS

Another important area of investment in the transport sector is transport equipment for road, railway, IWT, shipping, and air subsectors. The total investment is roughly US$ 38 billion, 84% of which is for road vehicles (see Table 4).

[19] Urban and rural transport sectors have not been covered by the VITRANSS. Since strategies on rural transport sector are being developed by the World Bank with the support of the DFID of UK, they need to be further incorporated in the Master Plan.

Table 4
Transport Equipment Costs for the Master Plan Period

Sector	Type	Cost	
		US$ mil	%
Road	Car, utility vehicle, truck, bus, motorcycle	32,200	84.8
Railway	Diesel/electric locomotive, passenger cars, wagons	1,882	5.0
Inland Waterway	Cargo and passenger ships	192	0.5
Shipping	Ocean-going vessels, coastal ships	1,407	3.7
Air	Various aircraft	2,289	6.0
Total		37,970	100.0

1/ Including ongoing projects worth US$ 500 million, of which US$ 400 million is included in the Master Plan period.

The possible investment amount for the Master Plan period (2001-2010) was estimated at US$ 11.7-12.6 billion[20], assuming a 2.5% allocation of GDP to the transport sector. The total investment requirements of the transport sector include maintenance/minor projects and urban and rural transport which amount to US$ 5.9 billion and are outside of the VITRANSS but are definitely needed and given high priority by the government. Thus, available funds for the VITRANSS is US$ 5.8 to 6.7 billion, of which US$ 3.0 billion is for ongoing/committed projects and only US$ 2.8 to 3.7 billion is available for new projects (see Table 5). On the other hand, the selected new projects for the Master Plan require a total of US$ 6.1 billion, and US$ 3.9 billion is needed for disbursement during the Master Plan period. This indicates that the proposed investment size needs to be reduced, otherwise implementation will be a little delayed.

Table 5
Investment Requirements vs. Fund Availability

		US$ billion
• **Investment Requirement for the Master Plan Period (2001-2010)**		
1) Maintenance/Minor Projects not covered by the VITRANSS		2.4
2) Urban Transport 1/		2.5
3) Rural Transport 2/		1.0
	Subtotal	**5.9**
4) VITRANSS Project		
(1) Ongoing/Committed Projects		3.0
(2) New Projects		6.1 (3.9)3/
	Subtotal	**9.1 (6.9)3/**
	Total	**15.0 (12.8)3/**
• **Possible Available Fund (Low – High Case)**		**11.7 – 12.6**

1/ At present, there are no definite strategy and investment program for urban transport.
2/ The amount needs to be adjusted based on the strategy which is being developed by the government.
3/ The amount to be disbursed during the Master Plan period.

[20] The range of the amount is due to the difference in the assumed GDP growth rate.

Short-term Projects and Plan

Core projects have been selected for short-term projects which are composed of ongoing/committed projects and new projects.[21] Of the total cost to government at US$ 7.3 billion, US$ 4.2 billion is for ongoing/committed projects. The road subsector accounts for US$ 4.8 billion (including ongoing/committed projects) or 65% of the total cost to government. However, 75% of this cost is for ongoing/committed projects, leaving only US$ 1.2 billion for new ones. Port and shipping subsector requires US$ 1.03 billion (14.0%), air subsector, US$ 0.61 billion (8.4%), railway subsector, US$ 0.55 billion (7.5%), and inland waterway subsector, US$ 0.35 billion (4.7%) (see Table 6).

Table 6
Investment Requirement for the Transport Sector up to 2005

Sector	Category	Estimated Capital Cost (US$ mil)		Cost to Government		
		Total	Ongoing	% to Capital	US$ Mil.	% to total
Road	Primary Road Network Development	4,102[1/]	3,578[1/]	100	4,102[1/]	56.0
	Secondary Road Network Development	663	-	100	663	9.0
	Road Safety	30	-	100	30	0.4
	Subtotal	4,795	3,578		4,795	65.4
Railway	Rehabilitation and Minor Improvement	521	47	100	521	7.1
	Capacity Expansion of Critical Sections	26	-	100	26	0.4
	Operation	136	-	0	0	0.0
	Subtotal	683	47		547	7.5
Inland Waterway	Port Improvement	101	21	90	91	1.2
	Waterway Improvement	189	72	100	189	2.6
	Operation & Safety	67	14	100	67	0.9
	Subtotal	357	107		347	4.7
Port & Shipping	Port Expansion/Development	1,270	438	70	889	12.1
	Operation & Safety	137	-	100	137	1.9
	Subtotal	1,407	438		1,026	14.0
Air	Airport Expansion/Development	626	62	80	501	6.8
	Air Traffic Control	112	-	100	112	1.5
	Subtotal	738	62		612	8.4
	Total	**7,980**	**4,232**		**7,327**	100.0

1/ Including US$ 1.5 billion for urban road projects.

Available funds during the period of 2001-2005 are about US$ 5 billion, whereas the investment requirements for maintenance/minor projects, urban and rural transport, and ongoing/committed projects amount to US$ 5.8 billion, which exceeds the available funds (see Table 7). This makes it difficult for government to undertake big, new projects, unless new fund sources are found or policy priority to the transport sector is determined.

Table 7
Investment Requirements vs. Fund Availability During 2001-2005

		US$ billion
• **Investment Requirement for the Master Plan Period (2001-2005)**		
1) Maintenance/Minor Projects not covered by the VITRANSS		1.0
2) Urban Transport [1/]		1.5
3) Rural Transport [2/]		0.4
	Subtotal	**2.9**
4) VITRANSS Project		
(1) Ongoing/Committed Projects		2.9
(2) New Projects		0.6
	Subtotal	**3.5**
	Total	**6.4**
• **Possible Available Fund (Low – High Case)**		**4.9 – 5.1**

1/ At present, there are no definite strategy and investment program for urban transport.
2/ The amount needs to be adjusted based on the strategy which is being developed by the government

[21] See Figure 5 for the assumed implementation schedule of the projects.

Figure 5
Implementation Schedule of Short-term Projects

Sector	Project No.	Project	Project Cost (mil. US$) Total	2001-	2001 2002 2003 2004 2005 2006-
Road	H01	Highway Rehabilitation Project (Hanoi-Lang Son; 190km)	162.5	16.3	
Primary Network Development	H02	Highway Rehabilitation Project II (Vinh-Dong Ha; 100km)	236.6	23.7	
	H03	2nd Road Development (Nha Trang-Quang Ngai; 600km)	163.0	81.5	
	H04	Highway Rehabilitation Project III (Can Tho-Nam Can; 230km)	180.0	180.0	
	H05	Bridge Rehabilitation Project - Phase I (435km)	162.2	16.2	
	H06	Bridge Rehabilitation Project - Phase II (752km)	211.0	105.5	
	H07	Hai Van Pass Tunnel (2 lanes, 14km)	251.0	225.9	
	H08	My Thuan Bridge (1,535m)	79.3	15.9	(completed)
	H09	Can Tho Bridge Construction	294.0	294.0	
	H10	NH No.1 Urban Bypass (Hanoi-HCMC; 70km)	67.0	67.0	
	H12	NH No.14, 14B Upgrading Project (Danang-Tay Ninh; 900km)	350.0	350.0	
	H13	NH No.15 Rehabilitation Project (Hanoi - Hue; 748km)	45.0	45.0	
	H14	Hanoi Ring Road	256.0	256.0	
	H15	Thanh Tri Bridge Construction	410.0	410.0	
	H16	NH No.5 Improvement Project (remaining section, 91km)	215.6	215.6	(completed)
	H17	NH No.18 Widening Projects - Phase 2 (remain section, 70km)	232.0	232.0	
	H18	Bai Chay Bridge Construction	98.0	98.0	
	H19	NH No.1 Hanoi - Ninh Binh Widening Project (80km)	76.0	76.0	
	H20	NH No.70 Upgrading Project (Hanoi-Lao Cai; 191km)	125.0	125.0	
	H21	NH No.10 Upgrading Project (147km)	302.0	302.0	
	H24	East-West Corridor Project (ASEAN 8; NH9; 75km)	30.0	24.0	
	H25	East-West Corridor Project (ASEAN 7A; NH12A, 29; 120km)	65.0	39.0	
	H29	Trans HCMC Highway Project (21.4km)	758.6	758.6	
	H30	Trans Asia Highway Project (NH22 to Cambodia; 80km)	144.7	144.7	
Secondary Network Dev't.	H49	Secondary Road Network rehabilitation Program	94.0	94.0	
	H50	Tertiary Road Improvement Project	569.0	569.0	
Road Safety	H52	Road Safety Improvement Program	30.0	30.0	
Railway	R01	Hanoi-HCMC Railway Bridge Rehabilitation	104.0	47.0	
Rehabilitation and Minor Improvement	R02	Rehabilitation of Tracks & Bridges	325.0	325.0	
	R05	Signal and Communication Equipment Modernization	128.0	128.0	
	R07	Alarm at Crossings	21.0	21.0	
Cap. Expans'n.	R08	New Stations for Train Exchange (100 stations)	26.0	26.0	
Inland Water	W01	Hanoi/Khuyen Luong Port Improvement	11.0	11.0	
Port Improvement	W03	Ninh Binh/Ninh Phuc Port Improvement	14.4	14.4	
	W08	My Tho/Can Tho Port Improvement for IWT	6.1	6.1	
	W10	Vinh Thai (Vinh Long) Port Improvement	4.3	4.3	
	W12	Ca Mau Port Improvement	2.9	2.9	
	W14	Cao Lanh (Dong Thap) Port Improvement	6.4	6.4	
	W16	My Thoi (Long Xuyen) Port Improvement	6.2	6.2	
	W18	Passenger Terminal Development	2.2	2.2	
	W20	Other Local Port Development	47.7	47.7	
Water Improvement	W22	Quang Ninh-Hanoi/Pha Lai Waterway Improvement	13.9	13.9	
	W23	Ninh Binh/Nam Dinh-Hanoi Waterway Improvement	19.9	19.9	
	W24	Quang Ninh-Nam Dinh/Ninh Binh Waterway Improvement	6.0	6.0	
	W25	Hanoi-Viet Tri-Lao Cai Waterway Improvement	74.0	74.0	
	W29	HCM-Can Tho Waterway Improvement	23.2	23.2	
	W30	Can Tho-Ca Mau Waterway Improvement	17.6	17.6	
	W31	Cho-Lach-Kien Luong Waterway Improvement	25.5	25.5	
	W32	Saigon-Dong Thap Muoi-Long Xuyen Waterway Improvement	5.4	5.4	
	W33	Thi Vai-Nuoc Man Canal Development	3.2	3.2	
Safety	W39	IWT Safety Enhancement	52.7	52.7	
	W41	IWT Education	14.1	14.1	
Port & Shipping	P01	Cai Lan Port Expansion Project	128.1	128.1	
Port Expansion / Development	P03	Hai Phong General Port (Phase II)	138.0	138.0	
	P05	Cua Lo Port Project	49.3	49.3	
	P09	Danang Bay - Tien Sa Port Rehabilitation	172.0	172.0	
	P10	Specialized Port for Dung Quat Industrial Zone	130.0	130.0	
	P12	Qui Nhon Port Development	36.0	36.0	
	P14	Nha Trang Port Development	57.0	57.0	
	P16	Ho Chi Minh City General Port	200.0	200.0	
	P18	Ba Ria-Vung Tau General Port	206.0	206.0	
	P20	Can Tho Port Development	64.0	64.0	
	P22	Industrial Port Development	67.0	67.0	
	P24	Other Local Ports	22.7	22.7	
Safety and Environmental Protection	P31	Development of Aids to Navigation (ATN)	63.6	63.6	
	P33	Maritime SAR and Oil Spill Protection	52.8	52.8	
	P35	Seafarers' Education Upgrading Project	20.9	20.9	
Air	A01	Noi Bai International Airport Development Project	57.1	17.1	
Airport Expansion / Development	A02	New Passgr. Ter. Bldg. (T1) Construction in Noi Bai Int'l. Airport	80.0	24.0	
	A03	Noi Bai Airport Development Project - Phase 1	53.9	53.9	
	A05	Danang International Airport Development Project - Phase 1	77.7	77.7	
	A07	Exp'n of Int'l Passenger Ter. Bldg in Tan Son Nhat Int'l Airport	12.0	6.0	
	A08	Airfield Pavement Overlay in Tan Son Nhat International Airport	16.0	14.4	
	A09	Tan Son Nhat International Airport Development Project	226.7	226.7	
	A11	Secondary Airport Dev't Project (Cat Bi, Phu Bai, Nha Trang)	85.6	85.6	
	A14	Rehabilitation of Tertiary Airports - Phase 1 (9 airports)	120.8	120.8	
Air Traffic Control	A16	Reconst'n of HCM Area Control Ctr. and Noi Bai Air Traffic Mng't Ctr.	58.0	58.0	
	A19	Communication and Navigational Equipment Replacement Program	12.2	12.2	
	A20	Equip't. Installation and Upgrading Proj. for New CNS/ATM -Phase 1	32.8	32.8	
	A22	Restructuring of ATS-DS Circuits and AFTN	2.5	2.5	
	A23	Rehabilitation of Civil Aviation Training Center of Vietnam (CATCV)	3.0	3.0	
	A24	Flight Calibration of Navigation Aids	1.1	1.1	
	A25	Test Equip't. Replacement and the Equip't. Standards Lab.	1.9	1.9	

Legend : F/S
: Implementation

Policy Priorities and Institutional Improvement to Support the Master Plan

A wide range of policy actions are required, for each transport mode, to support the implementation of the short-term plan: (a) to increase efficiency, safety and level of transport service, and (b) to provide the planned infrastructure cost-effectively with adequate funds.

However effective implementation of the master plan requires policy-making to be based not just on the viewpoints of each mode but rather based on a view of the transport sector as a whole. This, in turn, requires effective transport sector policies in each of the following areas:

- Provision of a regulatory framework and enforcement mechanism to ensure efficient, competitive transport services, so that the proposed infrastructure investments achieve the intended benefits without excessive external costs such as accidents and adverse environmental impacts,
- Development of effective planning capability, to achieve objectives effectively at reasonable cost,
- Development of adequate construction services, to provide the required standards of infrastructure with minimum cost,
- Establishment of an adequate infrastructure maintenance capability, so that the improved infrastructure provides the expected improved transport conditions over the full planned lifetime,
- Provision of financial mechanisms for development, maintenance and overall management of the infrastructure, to provide sustainability, and
- Strengthening of sector management to coordinate reform and implement policies and projects.

To make the process manageable, the VITRANSS policy recommendations have to be further prioritized, realistic targets set and initial implementation steps defined in more detail. Once the MOT has finalized its implementation plan, consideration has to be given to strengthening project and policy implementation capacity.

Much technical assistance has been given in areas such as legal reform, management systems, databases and training, but this has not always been effective and has not covered all key areas. The approach to human resource development has been piece-meal and ineffective, often through short on-the-job training arrangements during projects. Although many training studies have been carried out, they have not been implemented, partly because relative priorities are not clear. There is no overall human resource development plan for the transport sector. Donor coordination has been poor. Relatively little assistance has been given to railway, to the MOT or PTAs. The need for technical assistance arises in management of all subsectors. However it is clear that to be effective, technical assistance must be long term in many areas, focused on recognized needs, with a realistic assessment of resources required, and aimed at sustaining improvements by effective transfer of know-how and techniques, and providing future financing mechanisms.

1 INTRODUCTION

Study Background

Since the *Doi Moi* policy was introduced in 1986, the country's economy has grown tremendously at an average rate of about 9% a year, though it has slowed down more recently due to the recent Asian financial crisis. Recognizing that transport infrastructure is a key catalyst for economic development, a large number of projects have been prepared and implemented in different subsectors. The amount of transport infrastructure in very poor state has been reduced considerably. The achievements in the sector during the first decade of reform are remarkable. Though unfinished work still remains, the improvements have allowed traffic volume to increase by 2.1 times in terms of passenger-km and 2.8 times in terms of ton-km, during the period 1990-1997. Vietnam, intending to become a member of the World Trade Organization (WTO) and ASEAN Free Trade Area (AFTA) and facing the next stage of national development, is building more effective transport systems to strengthen its economic competitiveness and degree of social equity, despite limited financial and human resources.

It is in this context that the Government of Vietnam requested the Government of Japan to conduct The Study on the National Transport Development Strategy in the Socialist Republic of Vietnam (VITRANSS) under the Japan International Cooperation Agency (JICA).

Study Objectives

The objectives of the Study include the:

- formulation of long-term development strategies for the national transport sector up to the year 2020;
- formulation of a national transport development master plan up to the year 2010;
- formulation of a short-term investment program up to year 2005 based on the above plan; and,
- conduct of necessary technology transfer on the planning process of the Study.

Study Area and Coverage

The Study area covered the entire geographical area of Vietnam. Neighboring countries of China, Laos, Thailand, and Cambodia were also considered in the demand forecast and in the formulation of relevant plans and policies, when and where necessary. The transport subsectors of road, rail, water (maritime and inland water), and air were covered. The urban transport sector was considered only with regard to such aspects as interfacing with inter-city transport network and allocating national financial resources. Rural transport, which was outside the original scope of the Study, was included on a case study basis.

Technical Approach

The national development goals and plans, being the starting point of transport sector planning, were translated into a planning framework, estimating the future transport demand level quantitatively and providing broad guidelines to direct the transport sector's development. The planning framework includes the forecast of population, gross domestic product (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.

Planning of Vietnam's transport sector is seriously constrained by lack of up-to-date data, and this weakens the basis of policy formulation, affects sound decision-making and inevitably results in unrealistic project proposals. The establishment of a reliable database is thus considered as one of the important tasks in the VITRANSS. Despite the limited time, the Study Team, in close coordination and joint work with the Counterpart Team, conducted a series of surveys especially on transport demand and operation.

Transport demand forecasting was emphasized in the Study[1] as providing a solid planning basis for the VITRANSS as well as for other studies and projects being undertaken by government and subsector agencies. Future demand in the Study was estimated under two different scenarios for future GDP (high growth and low growth cases).[2]

On the basis of the future regional development perspective, the demand forecasts were made on interprovincial movements[3] of passengers and goods, the latter categorized into 13 major commodity groups. The results were expressed in the form of origin-destination (OD) matrices for each commodity group and for passenger, by province (of which Vietnam has 61). The estimated interprovincial transport demand was 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 is utilized.[4]

Parallel to the demand forecasts, a series of studies and analyses were made for each of the major transport subsectors – road, railway, inland waterway, 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.

[1] Volume 2 of the report deals with the details of the demand forecasts.

[2] The scenario was set in consultation with the MPI/DSI. The high case assumes 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.

[3] Traffic movements within provinces were excluded from the demand forecasts.

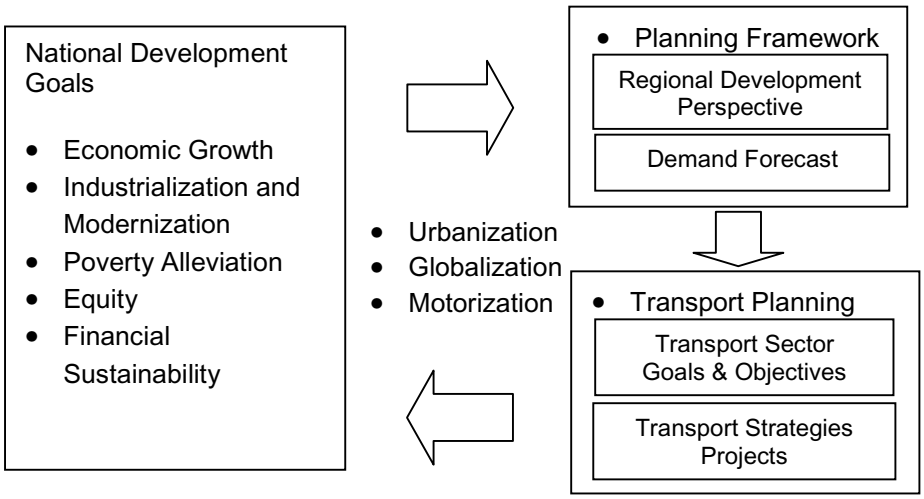
[4] The assignment process is described in detail in Volume 2 of the report. A series of training sessions were conducted for selected counterpart members of TDSI during the course of the Study.

Strategies covered operations/management, infrastructure, institutional/competitive framework and funding for the transport sector as a whole and for each subsector.

In accordance with sector objectives and strategies, projects were identified and a long list of these was formulated. The projects were subject to a preliminary and comprehensive evaluation, involving not only economic[5] aspects but also other factors such as social equity/poverty, environment, cost recovery, network integration, international linkages, and resettlement/ROW acquisition requirements. Since the VITRANSS focuses on projects of national and regional importance, economic aspects were given the heaviest consideration in prioritizing the projects.[6] These projects were also evaluated by subsector to take account of broad policy options in transport sector investment.

The future budget envelope for the transport sector was estimated based on different scenarios[7] which show the funding capacity levels of the government. Candidate projects were further screened and selected in such a way that total funding requirements will fall more or less within the estimated available budget. The process is conceptually shown below.

Figure 1.1
Concept of the VITRANSS Approach



Any plan does not remain rigid. Although the VITRANSS plan has been worked out jointly with the Counterpart Team and through extensive consultations with various subsector agencies, concerned ministries, donors, and stakeholders, who support and agree to the plan, its effectiveness should always be monitored as key conditions and the environment change. Hence, the VITRANSS has given importance both to the process and the output. Planning steps have been clearly

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

[6] The government's priority for rural, urban and essential minor transport projects, which are outside the scope of VITRANSS, were considered in the allocation of future funds that would be available to the transport sector.

[7] GDP growth and potential funding sources were considered.

documented together with a set of primary database, and training on key software/methodology has been provided, so that the plan can be reviewed and adjusted by the Counterpart Team.

It is also important to note that the projects identified and proposed in the VITRANSS are not intended for unconditional endorsement but seek the commitment of a detailed and comprehensive study and evaluation, particularly from the viewpoint that the proposed project is the best alternative and ensures the integration of strategies.

Urban and Rural Transport Aspects

As stated in the terms of reference (TOR) of the Study, the urban and rural transport subsectors have not been covered by the VITRANSS, although they are an integral part of the country's transport system.

In the VITRANSS context, the urban transport subsector is included in two aspects: interface of inter-city transport infrastructure and operation with those of intracity transport, and allocation of available transport sector funds. The first aspect was considered by identifying the bypass roads as well as elevating critical railway sections in and around large urban areas including Hanoi and HCMC which have been included in the VITRANSS plan. In addition to this, the fund requirement for intra-urban transportation development in major cities was assumed.

While past efforts have been directed to the rehabilitation and improvement of key national roads, rural transport has been given increasing importance. It should always be a central policy of the government to develop an efficient and competitive national and interurban transport system associated with well-articulated sub-hierarchical roads and transport system and vice versa. Hence, a preliminary look was given to provincial and rural (district and commune) levels, primarily to verify if roads and the local transport network could be adequately integrated with the national/interprovincial network and to estimate their investment requirements.[8]

Study Implementation

The Study was completed as scheduled within the relatively short period allocated to it. The process was documented in three Interim Reports, and the Draft Final Report was submitted in March 2000. In order to meet the Study objectives effectively with the involvement of concerned agencies and stakeholders, as well as to facilitate technology transfer with particular regard to database building and planning methodologies, the following working arrangements were made:

1) A multisectoral Steering Committee (S/C) headed by the Vice Minister of the Ministry of Transport (MOT) was organized which included senior representatives

[8] For rural transport, ongoing rural transport projects under the World Bank and DFID of UK provide overall strategies and program on rural road development.

of other agencies such as Ministry of Planning and Investment (MPI), MOT, Vietnam Railways (VR), Vietnam Inland Waterway Administration (VIWA), Vietnam Road Administration (VRA), Vietnam National Maritime Bureau (VINAMARINE), Civil Aviation Authority of Vietnam (CAAV), and Transport Development and Strategy Institute (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 to 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 seminars/workshops and separate consultation meetings.

Report Composition

The Final Report contains major findings and results of the Study and it is composed of a summary and three volumes of main text. These are:

Volume 1	Existing Conditions and Issues
Volume 2	Transport Demand Forecast
Volume 3	Transport Sector Strategy and Master Plan

In addition, a series of technical reports have been prepared (unpublished) to facilitate further discussions on specific issues, particularly with subsector agencies. These are:

No. 1	Transport Surveys and Database
No. 2	Main Commodities Analysis and Freight Transport
No. 3	Transport Cost and Pricing in Vietnam
No. 4	Transport Sector Institutions
No. 5	Road and Road Transport
No. 6	Railways
No. 7	Inland Waterways
No. 8	Port and Shipping
No. 9	Air Transport
No. 10	Rural Transport and Cross-border Transport
No. 11	Environment
No. 12	Transport Sector Funding

Moreover, database and training materials have also been prepared (unpublished) which are expected to serve as a planning basis for continued monitoring and, when necessary, modification of the master plan.

2 PROFILE OF THE STUDY AREA

Natural and Physical Conditions

Geography: Vietnam stands on an ancient geological foundation at the edge of the Euro-Asia continent. Its soil consists of four main types: alluvial soil, eroded and poor soil, red and yellow soil, and humus on the high mountain. Vietnam has a total of 331 thousand sq km extending about 1,700 km north to south with a 4,370 km long coastline. The narrowest east-west portion is only about 50 km in the central Vietnam province of Hue. Low flat lands are characteristic of the Red River delta, the eastern plain and the Mekong River delta which may allow dense habitation but are vulnerable to floods. Mountainous areas along the border provinces with China and Lao PDR hamper smooth traffic and make transport development costly. The Central Highlands is a unique upland, being part of the Mekong River watershed (with rainfall running off into Cambodia).

Land Use: Vietnam's population is very densely settled and almost all cultivable land is in use. Pressure on natural resources and the environment is acute. About 30% of land is cultivated and 29% is classified as forest and woodland (see Figure 2.2). Massive forested areas were damaged and burned during the long war from 1945 to 1975. Vietnam still bears severe scars: Millions of hectares of tropical forests were turned into denuded lands with 25 million bomb craters. Deforestation continued after the war, caused by agricultural clearings, forest fires and relentless collection of firewood and timber. The annual deforestation between 1986 and 1990 was estimated at 311,000 ha, slowing down to 7,000 ha in 1997. During the recent half century, forest cover declined from 43% in 1943 to 29% in 1997. Paddy production dominates agricultural land use. Through expansion of irrigation systems the sown area for food crops has increased and, at the same time, agricultural production has been diversified, to include rubber, coffee, tea and sugarcane.

Vietnam's large sea territory includes more than 3,000 islands and islets, stretches of mangrove forests, lagoons and coral reefs along the coasts. However, the degradation and pollution of the sea and coastal environment are becoming more critical. For example, 50% of the 400,000 ha of mangrove forests existing before 1940 had been destroyed by 1992. Given the high population density and low economic conditions in Vietnam, natural resources cannot be preserved without adequate land management measures.

Climate: There are two seasons in Vietnam. However, these two seasons are different between north and south. In the north, one season is winter and the other is summer, while in the south, the two seasons are rainy and dry. Every year, six to seven typhoons pass through Vietnam, and 13 typhoons on average pass through Vietnamese waters. Floods in the form of either storm surges or river floods may occur during the rainy season due to typhoons, heavy rain in the Central Highlands and northeast Cambodia caused by the southwest monsoon, and heavy rain along

Figure 2.1 Topography

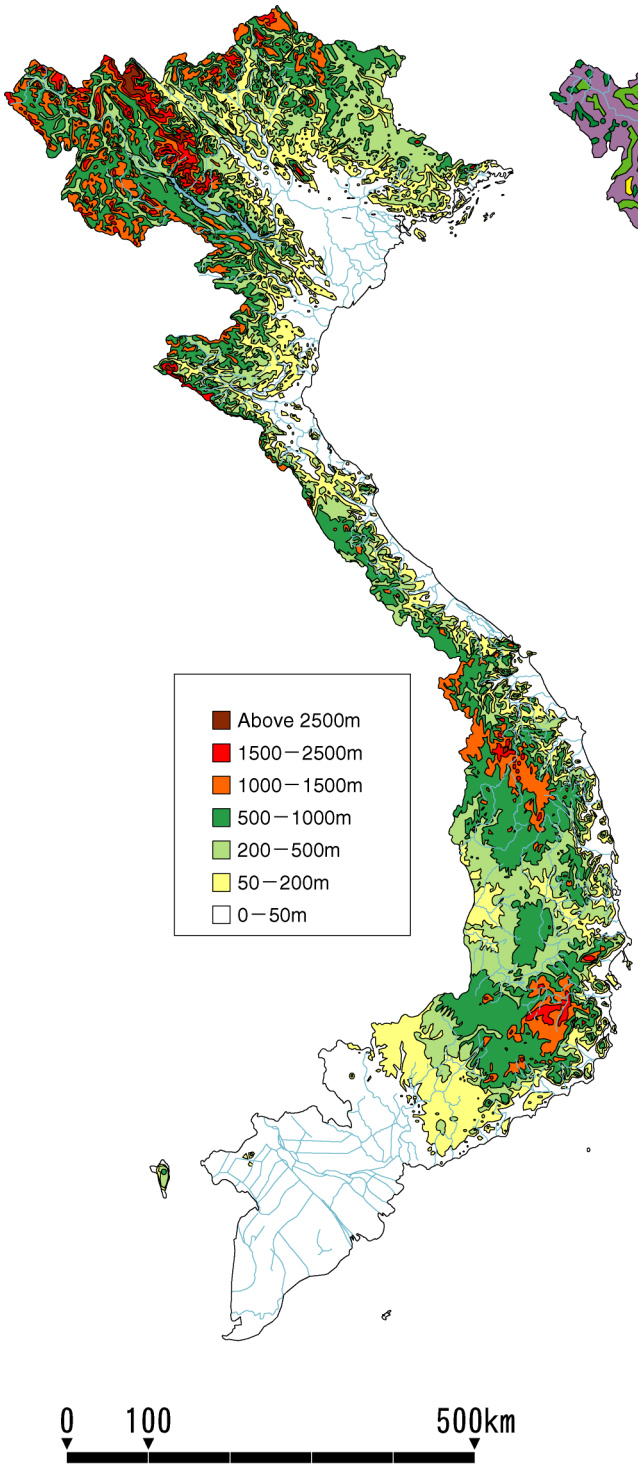
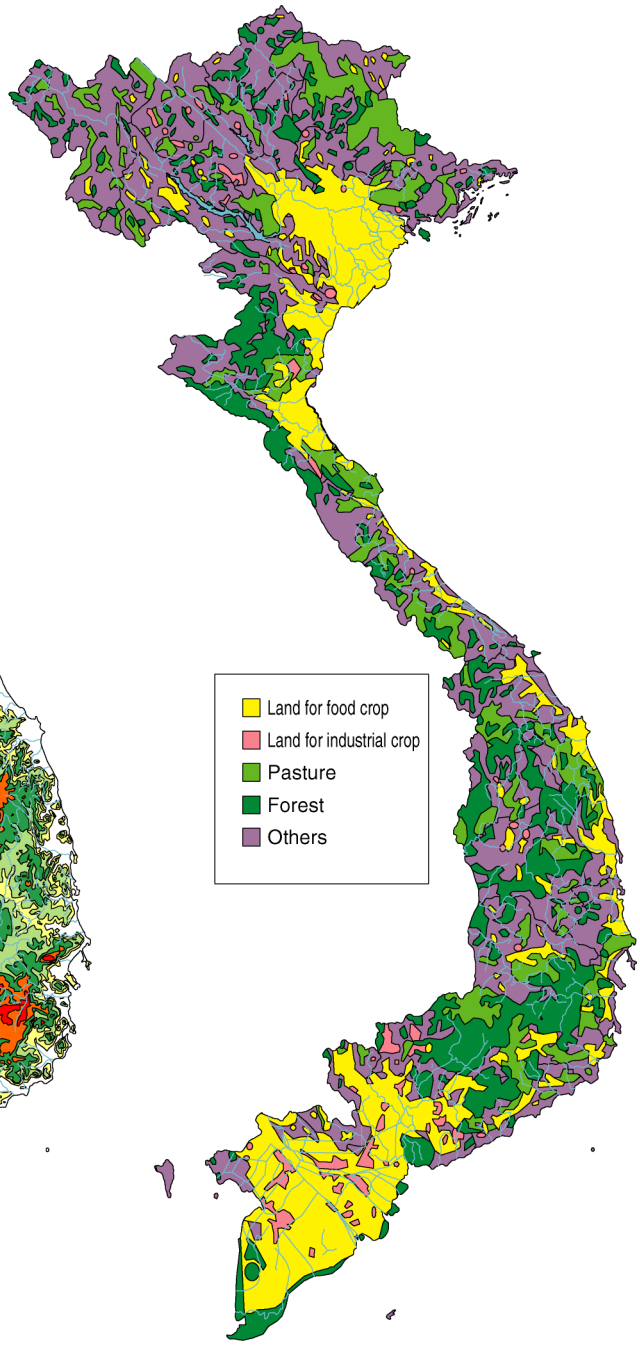


Figure 2.2 Land Use



the upper reaches of the Mekong river. Over the past 50 years, there has been no record of an earthquake.

Socio-economic Profile

Population: Vietnam had a population of about 76 million in 1997. In the 1950s, Vietnam's population growth rate was 3.4%. As the government introduced its family planning policy, or so-called "two-children policy", in the early 1960s, the growth fell to 3.1% in 1965, 2.2% in 1980 and less than 2% since 1996. The population density in the Red River Delta Region is extremely high (1,194 persons/km^2) compared to the national average (231/km^2) and even compared to the Mekong River Delta (421/km^2). The least populated region is the Central Highlands (55/km^2) followed by the northwest (61/km^2). The level of urbanization is still low except for the Northeastern South Region (see Table 2.1).

Table 2.1
Population by Region, 1997

Region	Population ('000)		'89-'97 Growth Rate (%)		Density (pers/km^2)
	Total	% Urban	Total	Urban	
1.Red River Delta	14,698	18.9	1.7	3.5	1,194
2.Northeast	10,846	13.9	2.7	3.7	161
3.Northwest	2,173	14.4	2.8	3.2	61
4.North Central Coast	10,196	10.9	2.4	3.6	199
5.South Central Coast	6,521	23.4	2.4	2.7	197
6.Central Highlands	2,461	19.1	4.1	5.5	55
7.Northeastern South	12,150	44.5	3.3	3.9	273
8.Mekong River Delta	16,619	15.6	2.2	2.9	421
Total	75,665	20.8	2.4	3.5	231

Source: GSO, "Statistical Yearbook", 1998

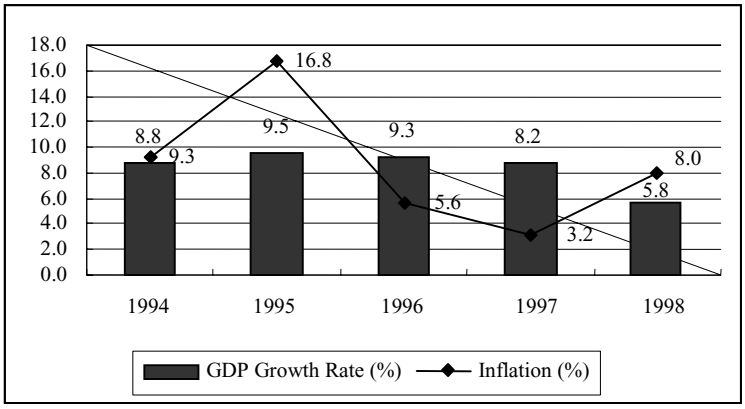
GDP: Still one of the poorest countries in the world, with a per capita GDP of about US$ 300, Vietnam is in transition to a modern and open market economy. Economic growth till 1997 was high, mainly driven by the industrial sector, supported by the agricultural sector.

Vietnam's closed capital account protected it from the early impact of the Asian crisis, but with the deepening regional recession it is now quite clear to policy-makers that the impact will be more severe than expected. Economic recovery in 1998 and 1999 is still modest at 5.8% and 4.8%, respectively.

More than 50% of total GDP comes from the Northeastern South and the Mekong River Delta, and the south area plays the role of economic pillar, supporting Vietnam's economy. GDP by sector is markedly different by region. In the case of the Mekong River Delta, more than half of the GDP comes from agriculture. On the other hand, almost 90% of the GDP of the Northeastern South Region comes from

the industrial and service sectors. That of the Red River Delta, however, is distributed equally among all sectors. The Northeastern South Region has the highest GDP per capita value, at VND 7.8 million.

Figure 2.3
Trend in GDP and Inflation



Source: MPI

Table 2.2
GDP Growth Rates by Sector

Item	1991-96	1997	1998	1999
Total GDP	8.4	8.2	5.8	4.8
Agriculture/forestry/fishery	4.4	4.3	3.5	5.2
Industry	12.8	12.6	8.6	7.6
Services	9.0	7.1	2.3	2.3

Source: DSI

Table 2.3
GDP and its Sectoral Composition by Region, 1997

	GDP (VND bil)	Per Capita GDP (VND mil)	% to Total	Share by Sector (%)		
				Agriculture	Industry	Services
1.Red River Delta	52,078	3.5	19.0	33.0	26.8	40.1
2.Northeast	22,905	2.1	8.4	46.0	24.9	29.1
3.Northwest	3,542	1.6	1.3	53.8	14.3	31.9
4.North Central Coast	21,788	2.1	8.0	46.3	18.2	35.5
5.South Central Coast	17,615	2.7	6.4	38.1	23.6	38.3
6.Central Highlands	6,751	2.7	2.5	64.3	12.9	22.7
7.Northeastern South	94,665	7.8	34.6	11.2	47.6	41.2
8.Mekong River Delta	54,622	3.3	19.9	56.6	16.7	26.7
Total	273,966	3.6	100.0	32.5	31.2	36.3

Source: GSO, "Statistical Yearbook", 1998

Employment: As of 1997, there were 34.7 million people of working age or about 46% of the country's population. It is estimated that the labor force increases by

about 3% annually. Until 1996 employment growth kept pace with labor force growth. In 1997, however, employment growth was negative, i.e., -0.6%, for the first time since Doi Moi reforms were initiated. The agriculture sector absorbs 66% of the employment, while the industry and service sectors absorb 10% and 24%, respectively. However, the Northeastern South Region has a significantly different employment structure with 47%, 23% and 30% in the agriculture, industry and service sectors, respectively.

Agricultural Sector: The most important output of this sector is rice. Other important food crops include other cereals such as maize, sweet potatoes, and cassava. Major nonfood crops are cotton, jute, rush, sugarcane, peanut, soybean, and tobacco. Gross output of foods, expressed in terms of equivalent amount of paddy, is almost 31 million tons in 1997 of which more than 40% is produced in the Mekong River Delta Region. Cattle breeding seems to be prevalent mainly in central Vietnam, buffalo raising in the north and hog raising equally distributed over all the country. Regarding marine products, about half of the total comes from the Mekong River Delta Region.

Industrial Sector: There are more than 620,000 establishments engaged in various forms of industrial production, including 1,880 state-owned enterprises (SOEs) and 587 foreign-invested enterprises. Most of these, 99.5%, are local non-SOEs. However, in terms of industrial output, SOEs and foreign-invested enterprises share 47% and 28% of the total value, respectively, leaving the remaining 25% for local non-SOEs. The Northeastern South Region, encompassing HCM City, Dong Nai and Ba Ria-Vung Tau, produces 53.7% of the national industrial output, since 73% of foreign-invested enterprises are located there. The second-largest industrial region is Red River Delta with a concentration of 33% of SOEs and 14% of foreign-invested enterprises.