

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

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

**Final Report**

**MAIN TEXT**

Volume 2

**TRANSPORT DEMAND FORECAST**

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 advise 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)

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**Table of Contents**

	<b>Page</b>
<b>1 INTRODUCTION</b>	
1.1 Background .....	1-1
1.2 Purpose of the Report .....	1-1
<b>2 FORMULATION OF OD MATRIX FOR INTERPROVINCIAL PASSENGER AND FREIGHT MOVEMENT</b>	
2.1 Methodology .....	2-1
2.2 Results of 1999 OD Matrix .....	2-15
<b>3 SOCIO-ECONOMIC DEVELOPMENT</b>	
3.1 Methodology .....	3-1
3.2 Population .....	3-3
3.3 GDP .....	3-7
3.4 Production and Consumption Forecast .....	3-19
3.5 International Passenger Traffic .....	3-50
<b>4 FUTURE TRANSPORT DEMAND</b>	
4.1 Methodology .....	4-1
4.2 Network Formulation for Traffic Assignment .....	4-10
4.3 Transport Demand Characteristics .....	4-16
<b>Appendices</b>	
<b>2-A</b> Number of Samples and Sampling Rate for Road and IWT Traffic	
<b>2-B</b> Passenger OD Matrix by Region, 1999	
<b>2-C</b> Freight OD Matrix by Region, 1999	
<b>2-D</b> Interprovincial Passenger and Freight Traffic Distribution by Transport Distance, 1999	
<b>3-A</b> Estimated Production and Consumption of Major Products by Province	
<b>4-A</b> Distribution of Interprovincial Traffic by Transport Distance, 2010	
<b>4-B</b> Distribution of Interprovincial Traffic by Transport Distance, 2020	

## List of Tables

Table 2.1.1	Commodity Classification .....	2-2
Table 2.1.2	Summary of Traffic Survey .....	2-2
Table 2.1.3	Change in Road Traffic in the Central Region, 1997-1999.....	2-7
Table 2.1.4	Adjustment of Commodity Items .....	2-7
Table 2.1.5	Change in Railway Passenger Volume, 1997-1998 .....	2-8
Table 2.1.6	Change in Railway Freight Volume, 1997-1998.....	2-8
Table 2.1.7	Adjustment of Commodity Items .....	2-9
Table 2.1.8	Change in Freight Volume, 1995-1998 .....	2-9
Table 2.1.9	Summary of Terminal Survey .....	2-12
Table 2.1.10	Modal Share of Interprovincial Passengers between Main Provinces Before Changing of OD Table .....	2-13
Table 2.1.11	Modal Share of Interprovincial Passengers between Main Provinces After Changing of OD Table .....	2-13
Table 2.1.12	Modal Share of Interprovincial Freights between Main Provinces Before Changing of OD Table .....	2-14
Table 2.1.13	Modal Share of Interprovincial Freights between Main Provinces After Changing of OD Table .....	2-14
Table 2.2.1	Comparison of Road Traffic Volume between Dry and Rainy Seasons .....	2-16
Table 2.2.2	Comparison of River Traffic Volumes between Dry and Rainy Seasons .....	2-17
Table 3.2.1	Summary of Population Forecast.....	3-4
Table 3.2.2	Population Forecast by Province .....	3-4
Table 3.2.3	Present Urban Centers .....	3-5
Table 3.2.4	Urban Centers in 2010 .....	3-6
Table 3.2.5	Urban Centers in 2020 .....	3-6
Table 3.3.1	Socio-economic Data .....	3-7
Table 3.3.2	Change in Employment Parameter: *(t) .....	3-10
Table 3.3.3	Vietnam's Development Alternatives .....	3-11
Table 3.3.4	GDP Forecast Results .....	3-12
Table 3.3.5	Sectoral Growth by Planning Terms .....	3-14
Table 3.3.6	Economic Growth Forecast by VITRANSS by Region .....	3-15
Table 3.3.7	Economic Growth Forecast by DSI by Region .....	3-15
Table 3.3.8	Per Capita GDP and Regional Disparity .....	3-16
Table 3.3.9	GDP Projection by Province under Low Assumption .....	3-17
Table 3.3.10	GDP Projection by Province under High Assumption.....	3-18
Table 3.4.1	Methods Used to Forecast Production and Consumption of Main Commodities .....	3-21
Table 3.4.2	Rice and Other Food Crops.....	3-23

Table 3.4.3	Trend in Food Crops.....	3-23
Table 3.4.4	Forecast of Sugarcane .....	3-24
Table 3.4.5	Forecast of Sugar.....	3-24
Table 3.4.6	Sugarcane Factories (Existing and Planned).....	3-25
Table 3.4.7	Forecast of Cutting Wood.....	3-27
Table 3.4.8	Trend in Cutting Wood.....	3-27
Table 3.4.9	Forecast of Industrial Crops.....	3-28
Table 3.4.10	Trend in Coffee and Rubber .....	3-28
Table 3.4.11	Forecast of Fishery Products.....	3-30
Table 3.4.12	Trend in Fishery Output.....	3-30
Table 3.4.13	Forecast of Animal Meat.....	3-32
Table 3.4.14	Steel Plants (Existing and Planned).....	3-33
Table 3.4.15	Forecast of Steel .....	3-34
Table 3.4.16	Supply of Steel .....	3-34
Table 3.4.17	Construction Materials (Stone, Sand) .....	3-35
Table 3.4.18	Consumption of Construction Materials .....	3-35
Table 3.4.19	Cement Production in Neighboring Countries.....	3-37
Table 3.4.20	Large Cement Plans (Existing and Planned) .....	3-37
Table 3.4.21	Forecast of Cement.....	3-38
Table 3.4.22	Trend in Cement.....	3-38
Table 3.4.23	Location and Production Capacity of State-owned Fertilizer Factories .....	3-39
Table 3.4.24	Forecast of Fertilizer Production and Consumption .....	3-39
Table 3.4.25	Trend in Fertilizer .....	3-39
Table 3.4.26	Forecast of Coal.....	3-41
Table 3.4.27	Trend in Coal.....	3-41
Table 3.4.28	Forecast of Refined Oil.....	3-43
Table 3.4.29	Trend in Oil.....	3-43
Table 3.4.30	Estimated Gross Output of Industry by Branch, 1997 .....	3-44
Table 3.4.31	Manufacturing Goods .....	3-45
Table 3.4.32	Ratio of Other Miscellaneous Goods to the National Balance.....	3-46
Table 3.4.33	Transit/ Transshipments .....	3-48
Table 3.4.34	Summary of Main Commodity Survey.....	3-48
Table 3.4.35	Forecast of National Trade Balance .....	3-49
Table 3.4.36	Aggregate Volume of Surplus and Deficit at Provincial Level.....	3-50
Table 3.5.1	Growth in International Passenger Traffic in the ASEAN Region .....	3-52
Table 3.5.2	Forecast of International Air Passengers .....	3-53
Table 3.5.3	Airport Traffic, 2020.....	3-53
Table 3.5.4	Characteristics of National Gateway Airports in the ASEAN Region,1997 .....	3-54

Table 4.1.1	Exogenous Variables used to Forecast Future Generation and Attraction.....	4-3
Table 4.1.2	Generation and Attraction Model of Freight .....	4-4
Table 4.2.1	Hourly Capacity of Two-lane Undivided Road.....	4-12
Table 4.2.2	Daily Capacity of Two-lane Undivided Road .....	4-13
Table 4.2.3	Travel Speed .....	4-14
Table 4.2.4	Economic Operating Cost.....	4-14
Table 4.2.5	Annualized Road Infrastructure and Maintenance Cost .....	4-15
Table 4.2.6	Railway Infrastructure and Maintenance Cost.....	4-15
Table 4.2.7	Port Infrastructure and Maintenance Cost .....	4-15
Table 4.2.8	Passenger Time Cost .....	4-16
Table 4.3.1	Generation/ Attraction of Interprovincial Passenger Traffic .....	4-17
Table 4.3.2	Increase in Interprovincial Passenger Traffic between Main Provinces.....	4-19
Table 4.3.3	Generation/attraction of Interprovincial Passenger Traffic, 2010.....	4-21
Table 4.3.4	Generation/attraction of Interprovincial Passenger Traffic, 2020 .....	4-21
Table 4.3.5	Summary of Interprovincial Passenger Traffic Assignment.....	4-23
Table 4.3.6	Interprovincial Freight Traffic Demand, 1999-2020 .....	4-26
Table 4.3.7	Summary of Freight Traffic Assignment.....	4-30

## List of Figures

Figure 2.1.1	General Procedure of Present OD Table Estimation.....	2-3
Figure 2.1.2	Share of Output by Commodity Item, 1997 .....	2-4
Figure 2.1.3	Example of “Potential Selected Routes” Between Hanoi and Quang Ninh .....	2-4
Figure 3.1.1	VITRANSS GDP/GRDP Projection Model (Klein Kosobud Model).....	3-1
Figure 3.3.1	GDP Forecast Between 1997 and 2020 .....	3-13
Figure 3.4.1	Forecast of Production and Consumption by Major Commodities .....	3-20
Figure 3.4.2	Trend in Cargo Volume at Phnom Penh Port and Sihanoukville Port.....	3-47
Figure 3.5.1	Characteristics of Foreign Visitors to Vietnam.....	3-51
Figure 4.4.1	Basis Structure of Passenger Transport Demand Forecast Model.....	4-1
Figure 3.5.1	Characteristics of Foreign Visitors to Vietnam.....	3-51
Figure 4.1.1	Basic Structure of Passenger Transport Demand Forecast Model.....	4-1
Figure 4.1.2	Binary Choice Structure of Modal Split Model.....	4-5
Figure 4.1.3	Concept of Speed Volume, Time Volume and Cost Volume .....	4-9
Figure 4.1.2	Binary Choice Structure of Modal Split Model.....	4-5
Figure 4.3.1	Generation/ attraction of Interprovincial Passenger, 1999-2020 .....	4-18
Figure 4.3.2	Interprovincial Passenger Flow, 1999-2020.....	4-20
Figure 4.3.3	Change in Modal Share of Interprovincial Passenger Traffic .....	4-22
Figure 4.3.4	Distribution of Interprovincial Passenger Traffic by Trip Distance .....	4-22
Figure 4.3.5	Distribution of Interprovincial Passenger-km by Trip Distance .....	4-23
Figure 4.3.6	Interprovincial Passenger Traffic Flow by Surface Mode (Bus and Rail).....	4-24
Figure 4.3.7	Air Passenger Traffic Flow.....	4-25
Figure 4.3.8	Growth of Interprovincial Freight Traffic Demand, 1999-2020.....	4-26
Figure 4.3.9	Interprovincial Freight Traffic Flow, 1999-2020 .....	4-28
Figure 4.3.10	Change in Modal Share.....	4-27
Figure 4.3.11	Distribution of Interprovincial Freight Traffic by Transport Distance (in Terms of Tons) .....	4-29
Figure 4.3.12	Distribution of Interprovincial Freight Traffic by Transport Distance (in Terms of Ton-kms).....	4-27
Figure 4.3.13	Interprovincial Freight Transport by Road.....	4-31
Figure 4.3.14	Cargo Transport by Rail, Inland Water and Coastal Shipping .....	4-32



## GLOSSARY

<b>ACPC</b>	Association of Coffee Producing Countries
<b>AFTA</b>	ASEAN Free Trade Area
<b>APEC</b>	Asia-Pacific Economic Cooperation
<b>ASEAN</b>	Association of Southeast Asian Nations
<b>CMA</b>	Cost Minimization Assignment
<b>DSI</b>	Development Strategy Institute
<b>EPZ</b>	Export Processing Zone
<b>FDI</b>	Foreign Direct Investment
<b>GDP</b>	Gross Domestic Product
<b>GSO</b>	General Statistic Office
<b>HCMC</b>	Ho Chi Minh City
<b>IRI</b>	International Roughness Index
<b>IWT</b>	Inland Water Transport
<b>JICA</b>	Japan International Cooperation Agency
<b>MARD</b>	Ministry of Agriculture and Rural Development
<b>MOC</b>	Ministry of Construction
<b>MOT</b>	Ministry of Transport
<b>MPI</b>	Ministry of Planning and Investment
<b>NCPFP</b>	National Committee for Population and Family Planning
<b>NTSR</b>	National Transport Sector Review
<b>OD</b>	Origin-Destination
<b>ODA</b>	Official Development Assistance
<b>PCU</b>	Passenger Car Unit
<b>SOE</b>	State-owned Enterprise
<b>TPM</b>	Trend Pattern Method
<b>TDSI</b>	Transport Development and Strategy Institute
<b>VCC</b>	Vietnam Cement Corporation
<b>VITRANSS</b>	Vietnam National Transport Development Strategy Study
<b>VR</b>	Vietnam Railways
<b>WB</b>	World Bank
<b>WTO</b>	World Trade Organization

# 1 INTRODUCTION

## 1.1 Background

Reliable information on both existing and future transport demand in Vietnam has been scarce. Most of the data and information were based on ad hoc surveys and for specific purposes of various projects. Comprehensive traffic surveys were not undertaken since the National Transport Sector Review (NTSR, 1990-1992), the first scientific and comprehensive transport master plan that conducted the first nationwide interprovincial traffic flow study. After the NTSR, no other transport sector study on a national scope was undertaken, only specific project studies. Such a situation served as an impetus and a requirement to conduct this particular survey.

Compared to the NTSR, the VITRANSS has the following characteristics:

- It covers all transport modes, such as road, inland waterway, railway, coastal shipping, and air, in terms of interprovincial passenger and freight movement. Of course, the NTSR also dealt with most of the transport modes but there were some limitations. For instance, interprovincial passenger flow was composed of road and railway even though air has a large share especially in long-distance trips, and coastal shipping was excluded in terms of interprovincial freight flow.
- It considers linked trips of both passenger and freight while the NTSR used unlinked trips. As a starting point, a critical issue is the kind of OD table to be used. As mentioned later, although some limitations of unlinked trips exist, data on unlinked trips were adapted to formulate linked OD table in the VITRANSS.

## 1.2 Purpose of the Report

This report mainly aims to provide interprovincial traffic demand analysis and transport forecast methodology and the results for road, inland waterway, rail, coastal shipping, and air transport. This volume of the report includes the following:

**Chapter 2:** This chapter explains the methodology and results of estimating 1999 interprovincial transport demand both for passengers and freight for relevant transport modes including road, rail inland waterway, shipping, and air. Passenger transport demand for road is further broken down into submodes of private (car) and public (bus) modes, whereas freight transport demand is done by major commodity type. The results are prepared in the form of OD matrices for 61 provinces.

**Chapter 3:** This chapter explains the country's key socio-economic parameters, such as population, GDP and production and consumption of major commodities, which provide the basis and framework for future transport demand analysis and forecast.

**Chapter 4:** This chapter explains the methodology and the results of future transport demand for passengers and goods. Future demand is estimated in terms of traffic

generation/attraction, traffic distribution, modal split, and assigned traffic on transport network for each mode of transport.

**Appendices:** Key information providing the basis of the analysis is included here such as the 1999 OD matrices for passenger and freight traffic and production and consumption of major products by province, among others.

## **2 FORMULATION OF OD MATRIX FOR INTERPROVINCIAL PASSENGER AND FREIGHT MOVEMENT**

### **2.1 Methodology**

#### 1) General

For a comprehensive analysis of the nationwide transport network, a set of reliable input data is necessary. The most critical and difficult one is transport demand, both for present and future. The first step is to know what is the current transport demand in terms of generation and distribution. For this, a series of traffic surveys have been conducted, and present origin-destination (OD) matrix of interprovincial movement of passengers and goods by major commodity group has been worked out.

As shown in Figure 2.1.1, two approaches were adopted: traffic survey and usage of existing data. OD matrices of road and inland waterway were built from the former while those of railway, air transport and coastal shipping from the latter. With regard to the latter, railway station-to-station OD traffic was provided by VR and the OD matrix of the Master Plan Study of Coastal Shipping Rehabilitation and Development (JICA, 1997) was referred to and updated. Note, however, that the OD table of air transport was estimated from the number of flights and average load factor.

At first, estimation methodology is herein described in detail according to transport mode. Then the present transport demand is analyzed as shown in Chapter 2.2 and 2.3. Before explaining the estimation methodology, the following points should be mentioned.

Transport Mode: In terms of passenger transport, five transport modes were included: passenger car, bus, inland waterway, railway, and air. On the other hand, freight transport is composed of the following transport modes: road, inland waterway, railway, coastal shipping, and air. Bicycle and motorcycle were excluded because they would have little impact on interprovincial traffic.

Commodity Classification: As shown in Table 2.1.1, commodity was classified into the following 13 items: paddy and other crops, sugarcane and sugar, wood and forest products, steel, construction materials, cement, fertilizer, coal and other mining products, petroleum products, industrial crops, manufacturing goods, fishery products, and animal meat and others. Table 2.1.1 also shows differences of commodity classification among the VITRANSS, NTSR (1992) and Central Region Transport Master Plan (1998). One reason why the above-mentioned 13 commodities were adopted is that they occupy a large share in the total gross output (see Figure 2.1.2).

Table 2.1.1  
 Commodity Classification

VITRANSS	NTSR <sup>1/</sup>	Central Region Transport Master Plan <sup>2/</sup>
1. Rice and other food crops 2. Sugarcane and sugar 3. Wood and forest products 4. Steel 5. Construction materials 6. Cement 7. Fertilizer 8. Coal and other mining products 9. Petroleum products 10. Industrial products 11. Manufacturing goods 12. Fishery products 13. Animal meat and others	1. Agriculture 2. Food industry 3. Fertilizer 4. Construction 5. Coal and peat 6. Ore 7. Petroleum products 8. Industrial products 9. Manufacturing goods 10. Wood and forest	1. Agricultural products 2. Wood and forestry products 3. Construction materials 4. Cement 5. Chemicals and fertilizers 6. Mining products 7. Petroleum products 8. Industrial crops 9. Others

1/ National Transport Sector Review, 1992, UNDP and MOTCP

2/ Transport Master Plan for the Central Region of Vietnam, 1998, France and MOT

## 2) Road and Inland Waterway

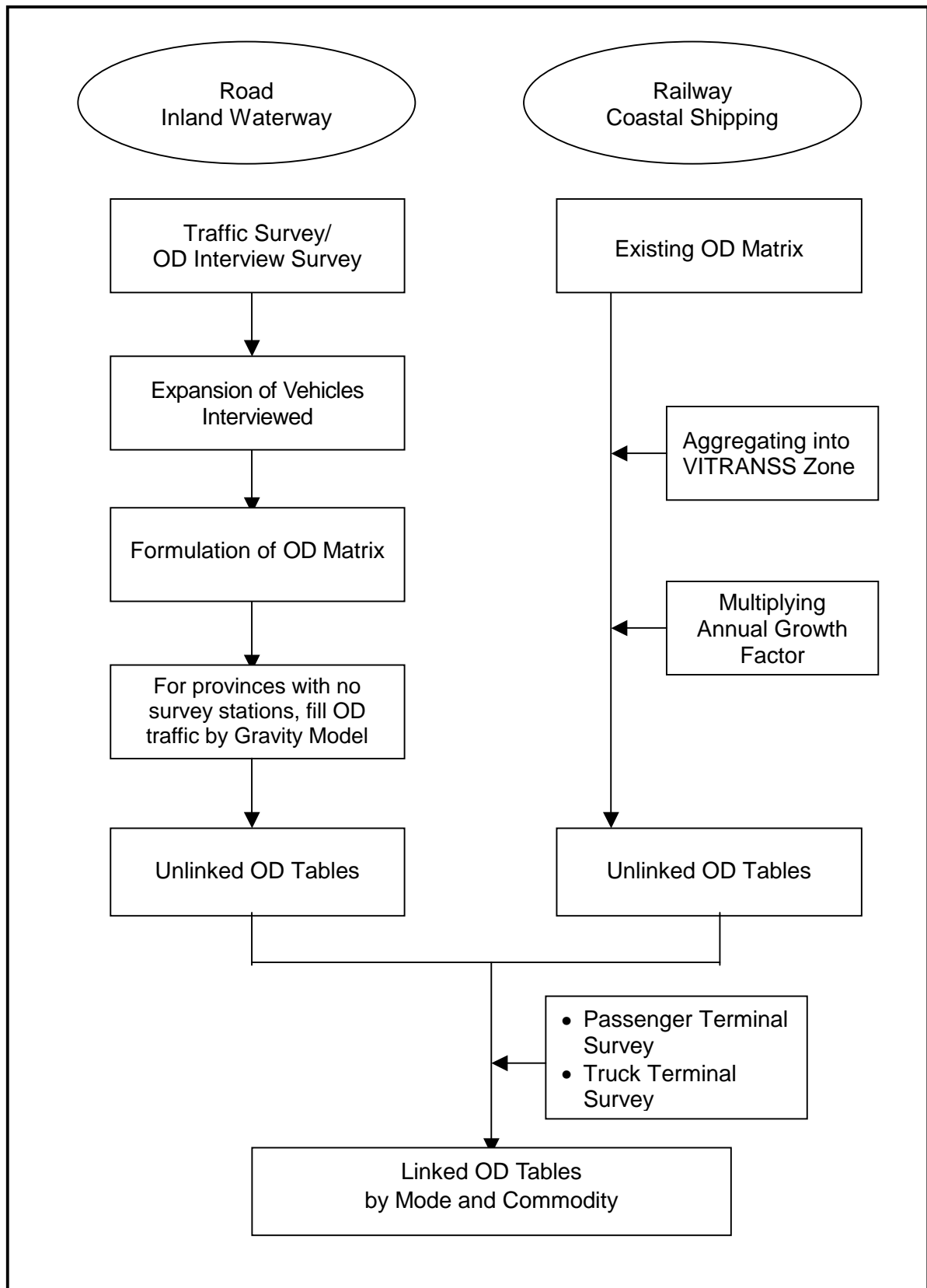
As mentioned earlier, OD matrices of road and inland waterway were estimated from on-site traffic survey. Here, estimation methodology is described step by step.

Summary of Traffic Survey: With regard to road, traffic survey was carried out at 39 stations, covering north, central and south and including a three-day traffic count and 14-hour OD interview survey. On the other hand, the traffic survey of inland waterway was conducted at 20 stations of the Red River delta and 20 stations of the Mekong River delta, requiring a two-day traffic count at all stations and 14-hour OD interview at only 15 stations (see Table 2.1.2 for more detail and Appendix 1 for traffic volume and sampling rate at OD interview survey stations).

Table 2.1.2  
 Summary of Traffic Survey

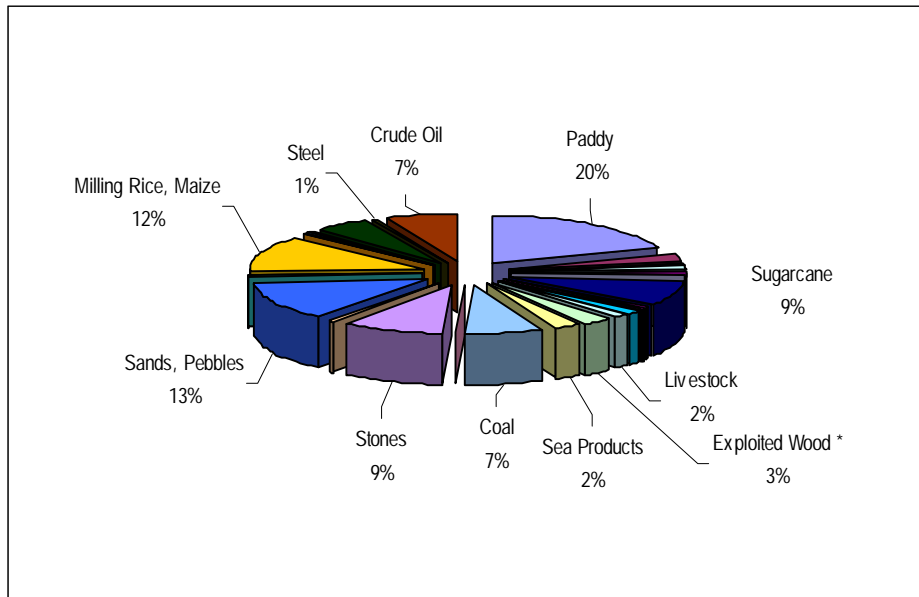
Traffic Survey	Coverage	Method
Road Traffic Survey	<ul style="list-style-type: none"> <li>39 on-road stations (20 in north, 6 in central and 13 in south Vietnam)</li> </ul>	<ul style="list-style-type: none"> <li>3-day traffic count</li> <li>14-hour OD interview at roadside</li> </ul>
Inland Waterway Traffic Survey	<ul style="list-style-type: none"> <li>40 stations at inland waterway sections (20 in the Red River delta and 20 in the Mekong River delta)</li> </ul>	<ul style="list-style-type: none"> <li>2-day (24-hour or 14 hour) traffic count</li> <li>14-hour OD interview at selected 15 stations</li> </ul>

Figure 2.1.1  
 General Procedure of Present OD Table Estimation



Note: OD table of air transport was estimated from the number of flights and average load factor.

Figure 2.1.2  
 Share of Output by Commodity Item, 1997



Source: GSO, "Statistical Yearbook", 1997

Expansion of Vehicles: Vehicles surveyed at survey stations should be expanded as follows, taking into account daily traffic volume.

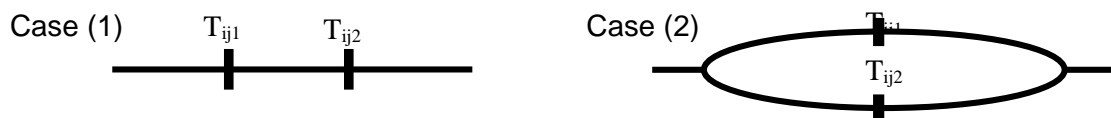
$$T_{ijk} = S_{ijk} / (SC_k / TC_k)$$

Where:

- $T_{ijk}$  = daily average traffic between origin  $i$  and destination  $j$  at survey station  $k$
- $S_{ijk}$  = interviewed traffic between origin  $i$  and destination  $j$  at survey station  $k$
- $TC_k$  = average daily traffic counted at survey station  $k$
- $SC_k$  = sample size interviewed at survey station  $k$

$SC_k / TC_k$  means the sampling rate. The lower this rate, the higher the error made in estimating OD matrix. Rates lower than 5% may lead to unreliable estimates. A sampling rate of more than 5%, as shown in Appendix I, was obtained at every survey station in this project.

Formulation of OD Matrix: In order to fix OD traffic between OD pairs, it is required to infer it from OD traffic interviewed at all survey stations. Information on how many routes between OD pairs and how many survey stations on route is indispensable to investigate how survey stations are located on route, i.e., "in series" or "in parallel", because it has impact on determination of OD traffic. For example, suppose the following two cases: in series and in parallel.



In Case (1), OD traffic,  $T_{ij}$ , becomes either the OD traffic at station 1,  $T_{ij1}$ , or the OD traffic at station 2,  $T_{ij2}$ . In Case (2), however, OD traffic,  $T_{ij}$ , becomes the sum of  $T_{ij1}$  and  $T_{ij2}$ . Note that average OD traffic of  $T_{ij1}$  and  $T_{ij2}$  was used in Case (1) because counted traffic of  $T_{ij1}$  and  $T_{ij2}$  is different even though they should be same theoretically.

As all routes between OD pairs and location of survey stations were coded, information on them can be automatically displayed and checked whether there are miscoded errors or not. Figure 2.1.3 shows an example of route information between Hanoi and Quang Ninh, and it can be judged with ease whether survey stations are located in a series or parallel to each other on routes and how many “potential routes” there are between Hanoi and Quang Ninh. Under the above-mentioned conditions, OD traffic will be reasonably estimated.

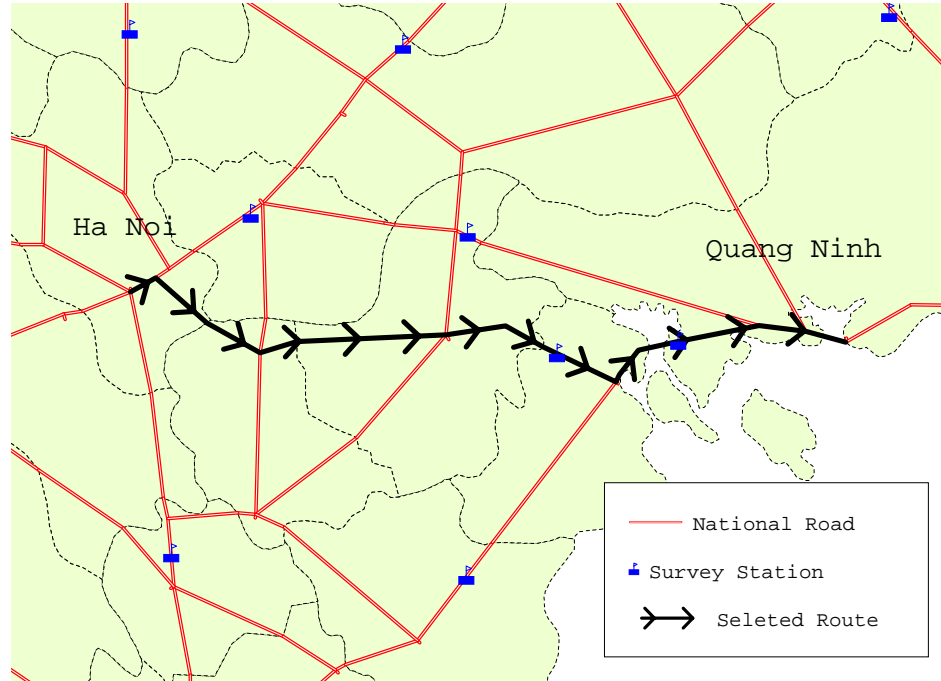
Filling OD Traffic by Gravity Model: As mentioned earlier, 39 interview stations for road and 15 survey stations for inland waterway were adopted (see Appendix 2-A.) However, these cannot capture every interprovincial traffic because, at some provincial boundaries, no survey stations were located. Hence, for provinces between which no survey station was located, interprovincial traffic was estimated using the gravity model.

Use of OD matrix of the Central Region: In VITRANSS, only six on-road survey stations were taken from the central region because it was assumed to utilize the results of the “Transport Master Plan for the Central Region of Vietnam (1998)”. Among six on-road survey stations, five are identical with those of the “Transport Master Plan for the Central Region of Vietnam”, and the change of traffic volume in the central region is shown in Table 2.1.3. It shows that traffic volume has increased at two on-road survey stations but it has decreased at three on-road survey stations. As a result, average traffic volume was little changed during the period of 1997-1999 and it would be caused by the Asian financial crisis. Taking into account the growth rate, the OD matrix of the “Transport Master Plan for the Central Region of Vietnam” was applied to the VITRANSS. Note, however, that this process is limited to road transport.



Figure 2.1.3  
Example of “Potential Selected Routes” Between Hanoi and Quang Ninh

The First Route



The Second Route

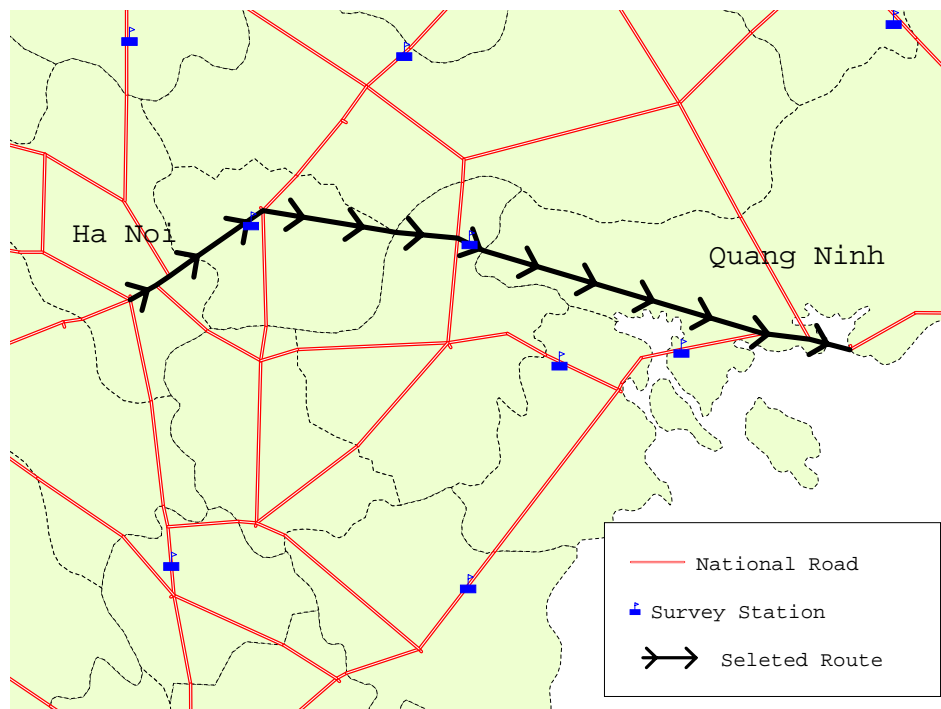


Table 2.1.3  
 Change in Road Traffic in the Central Region, 1997-1999

Road No.	Location <sup>1/</sup>	Average Daily Traffic (ADT)		1999/1997
		1997 <sup>2/</sup>	1999 <sup>3/</sup>	
9	West of Dong Ha	649	804	1.24
1	South of Hue	1,785	2,239	1.25
19	An Nhon	1,745	1,642	0.94
26	West of Ninh Hoa	1,069	943	0.88
20	North East of Dinh Quan	2,493	2,132	0.86
Total		7,741	7,760	1.00

1/ Among the VITRANSS survey stations, 5 stations are consistent with those of the Master Plan for the Central Region of Vietnam.

2/ Counted in the Transport Master Plan for the Central Region of Vietnam in 1997.

3/ Counted in VITRANSS in 1999.

### 3) Railway

Regarding railway, station-to-station passenger and freight traffic were provided by VR and it was aggregated into VITRANSS zoning system, multiplying the annual growth rate.

Adjustment of Commodity Items: Station-to-station freight traffic is composed of 16 commodity items shown in Table 2.1.4 and they are not identical with the commodity classification of VITRANSS. So, it is required to adjust the classification of VR into that of VITRANSS and it was aggregated as shown in Table 2.1.4.

Table 2.1.4  
 Adjustment of Commodity Items

VR	VITRANSS
1. Agriculture products	1.Rice and other food crops
2. Forest products	2.Wood and forest products
3. Metal wares	3.Steel
4. Stone and sands	4.Construction materials
5. Brick and tile	
6. Cement	5.Cement
7. Appetite	6.Fertilizer
8. Fertilizer	
9. Coal	7.Coal
10. Petroleum products	8.Petroleum products
11. Foodstuff	9.Industrial products
12. Chemicals	10.Manufacturing products
13. Cotton and textile	
14. General cargo	
15. Others	
16. Food	11.Animal meat and others

Increase in Passenger and Freight Volume: In order to formulate the 1999 OD matrix of railway, it is necessary to take into account the growth rate in terms of both passenger and freight volume. Table 2.1.5 and 2.1.6 show the change of railway passenger volume and freight volume in 1997-1998, respectively. Passenger volume has increased by 1.08 times and freight volume by 1.02 times, even though the growth rate is very different by commodity item. Based on the growth rates, the railway OD matrix of VITRANSS was completed.

Table 2.1.5  
 Change in Railway Passenger Volume, 1997-1998

	1997	1998	1998/1997
Including Intraprovincial Traffic	9.3	10.0	1.08
Excluding Intraprovincial Traffic	7.6	8.3	1.09

Source: VR

Table 2.1.6  
 Change in Railway Freight Volume, 1997-1998

	1997	1998	1998/1997
1. Coal	894	974	1.09
2. Petroleum products	90	77	0.86
3. Appetite	1,140	1,209	1.06
4. Metal wares	257	309	1.20
5. Chemical	124	127	1.02
6. Fertilizer	456	604	1.32
7. Cement	616	413	0.67
8. Stone and sand	563	639	1.13
9. Brick and tile	26	15	0.58
10. Forest products	125	93	0.74
11. Agriculture products	70	42	0.60
12. Food	43	92	2.14
13. Foodstuff	235	197	0.84
14. Cotton and textile	9	5	0.56
15. General Products	72	67	0.93
16. Others	34	20	0.59
Total	4,764	4,883	1.02

Source: VR

#### 4) Coastal Shipping

Like railway, the OD matrix of coastal shipping was estimated from that of the Master Plan Study on Coastal Shipping Rehabilitation and Development (JICA, 1997), taking into account the VITRANSS zoning system and the growth rate of freight volume. Passenger transport was disregarded because its amount is small.

Adjustment of Commodity Items: The OD matrix of the above study is composed of six commodities: agricultural products, construction materials/mining products, oil, bulky cargo, cement, and other cargo. The commodity items were adjusted in

the VITRANSS form as shown in Table 2.1.7.

Increase in Freight Volume: Table 2.1.8 shows the change of freight volume during the years 1995 and 1998. Taking into account the growth rate, the OD matrix of coastal shipping was recalculated.

Table 2.1.7  
 Adjustment of Commodity Items

Master Plan Study on Coastal Shipping Rehabilitation and Development	VITRANSS
1. Agricultural products	1. Agricultural products
2. Construction materials and mining products	2. Construction materials 3. Coal
3. Oil	4. Petroleum products
4. Bulky Cargo	5. Wood and forestry products 6. Steel 7. Fertilizer
5. Cement	8. Cement
6. Other cargo	9. Industrial crops 10. Manufacturing goods

Table 2.1.8  
 Change in Freight Volume, 1995-1998

	1995	1998	1998/1995
Estimate Overall			
Sea-borne Traffic(000 tons)			
Export	18,061	24,142	
Import	15,336	20,772	
Domestic	5,336	11,644	2.18
Total	38,991	56,558	
MOT Managed			
Sea-borne Traffic <sup>1/</sup> (000 tons)			
Export	3,715	4,780	
Import	7,915	7,418	
Domestic	2,799	4,832	1.73
Total	14,429	17,030	

Source: VINAMARINE, Master Plan Study on Coastal Shipping Rehabilitation and Development

<sup>1/</sup> Including Hai Phong, Nghe Tinh, Danang, Qui Nhon, Nha Trang, Saigon, Quang Ninh, and Can Tho ports

## 5) Air Transport

The OD table of air transport was estimated from the number of flights and average load factor. Freight volume carried by air transport is very small and was regarded as manufacturing goods.

## 6) Adjustment from Unlinked Trip to Linked Trip

Limitation of Unlinked Trip: Through the process above-mentioned, OD matrices by transport modes are made and they are composed of unlinked trips<sup>1</sup>. However, an unlinked trip has the following limitations:

- Double counting: Given the unlinked trip, as passenger and freight volume is doubly counted in proportion to transport modes used, total traffic volume becomes higher than the actual traffic volume.
- Not coincidental with production and consumption: As trip is doubly counted, generation and attraction of a province is not coincidental with its production and consumption especially in terms of freight transport. It could have critical impact on generation and attraction model and decrease model reliability.
- Problem with traffic assignment: In the VITRANSS, two approaches were taken in making freight demand forecast – TPM (Trend Pattern Method) and CMA (Cost Minimization Assignment). TPM extrapolates the past trend or demand mechanism to the future, using the growth rate or mathematical models. On the other hand, CMA seeks the most desirable demand structure by maximizing or minimizing some target functions under some constraints. Especially, through CMA, transport mode and route used are simultaneously determined from doing traffic assignment. Therefore, the unlinked trip could prevent CMA from well being done, resulting in overestimation or underestimation of project assessment.

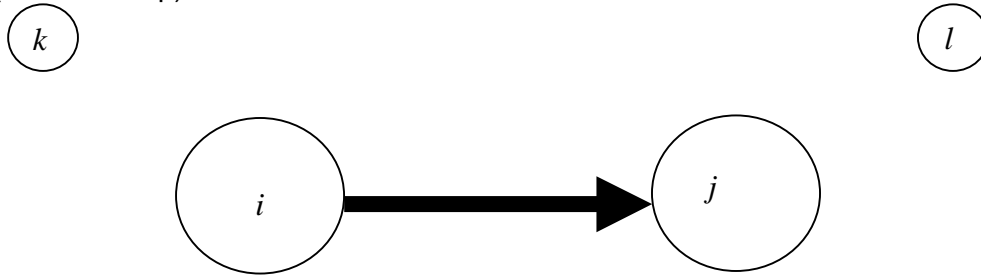
For the above reasons, the change from unlinked trip to linked trip is recommended. However, it is very difficult to change into linked trip, particularly in freight transport, even in a developed country where a lot of data related to freight transport were available. Needless to say, it is more difficult in Vietnam. So, it was challenged to change into linked trip, by using passenger and truck terminal survey data. The basic concept and summary of a terminal survey will be herein described.

Basic Concept: As mentioned earlier, passenger and truck terminal survey data are a clue to be able to change from unlinked to linked trip. Following is a simple example to help understand the basic concept of transforming unlinked into linked trip:

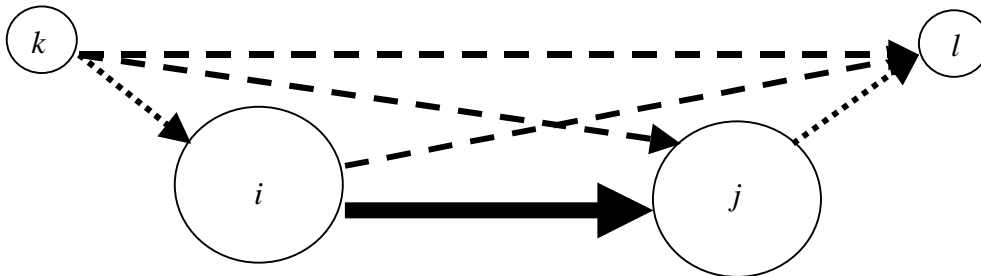
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<sup>1</sup> “Unlinked trip” is regarded as trip by mode. Therefore it is counted whenever a passenger or cargo transfers to another mode. Meanwhile, “Linked trip” is regarded as trip by purpose regardless of used modes. For instance, when some people move from Hai Phong to Hanoi by bus and then to HCMC by air, Hai Phong-Hanoi trip and Hanoi-HCMC are regarded as bus trip and air trip, respectively. As a result two trips take place in terms of unlinked trip. But it will become one trip in terms of linked trip.

(Unlinked Trip)



(Linked Trip)



Suppose that province i and j have railway stations while province k and l have none. Under the unlinked trip, there is traffic only from i to j,  $T_{ij}$ , and none between k and i,  $T_{ki}$ , k and j,  $T_{kj}$  and k and l,  $T_{kl}$ . This despite the fact that some people who live in province k go to province i by other modes, such as bus or car, then move to final destination to province j or l. If the terminal survey was carried out in province i and passenger behavior or cargo movement was exactly captured, the data can be transformed from unlinked trip to linked trip through the following steps:

- Calculate probability of movement between provinces,  $P_{ij}$ ,  $P_{kj}$ ,  $P_{il}$ , and  $P_{kl}$  from the terminal survey.
- Calculate linked traffic between provinces as follows:

$$\begin{aligned}
 Tl_{ij} &= Tu_{ij}^* P_{ij} \\
 Tl_{kj} &= Tu_{ij}^* P_{kj} \\
 Tl_{kl} &= Tu_{ij}^* P_{kl} \\
 Tl_{il} &= Tu_{ij}^* P_{il}
 \end{aligned}$$

Where:  $Tl_{ij}$  = Traffic from i to j in linked trip  
 $Tu_{ij}$  = Traffic from i to j in unlinked trip

- Adjust OD matrix of access or egress modes such as car, bus and so on. Note that motorcycle and bicycle were disregarded.

$$\begin{aligned}
 Tl_{kim} &= Tu_{kim} - Tu_{ij}^* (P_{kim}) \\
 Tl_{jlm} &= Tu_{jlm} - Tu_{ij}^* (P_{jlm})
 \end{aligned}$$

Where:  $Tl_{kim}$  = Linked traffic from k to i by access mode m  
 $Tl_{jlm}$  = Linked traffic from j to l by egress mode m  
 $Tu_{kim}$  = Unlinked traffic from k to i by access mode m

$T_{jlm}$ =Unlinked traffic from  $j$  to  $l$  by egress mode  $m$   
 $P_{kim}$ =Probability of movement from  $k$  to  $i$  by access mode  $m$   
 $P_{jlm}$ =Probability of movement from  $j$  to  $l$  by egress mode  $m$

Based on the method above-mentioned, unlinked trip was changed into linked trip. Table 2.1.10, 2.1.11, 2.1.12, and 2.1.13 show the differences in traffic volume and modal share between leading provinces before and after changing into linked trip. Roughly speaking, modal share is little changed between before and after but traffic volume substantially changed. For instance, usage of railway between Hai Phong and HCMC increased from zero to 149 in terms of daily interprovincial passengers. Instead, railway traffic volume between Hanoi and HCMC decreased by around a fourth. In terms of unlinked trip of freight transport, animated freight volume carried by coastal shipping appears between HCMC and Hai Phong, amounting to 6,203 tons per day. However, after changing into linked trip, it appears between Hanoi and HCMC, coming to 3,294 tons per day. As expected, OD matrices changed into linked trips show reasonable results and will be used for further transport demand forecast.

Summary of Terminal Survey: As mentioned earlier, the change from unlinked trip to linked trip was taken from passenger and freight terminal survey data. Its coverage is nationwide as shown in Table 2.1.9, including 10 passenger railway stations, 10 passenger bus terminals, seven passenger airports, five freight ports, and five freight railway stations. More than 200 passengers and truck drivers were sampled at every survey station and detail components, such as origin, destination, access/egress mode, and freight volume loaded, were surveyed.

Table 2.1.9  
 Summary of Terminal Survey

Terminal	Station Name	Terminal	Station Name
Railway Station	Long Bien (Hanoi)	Bus Terminal	Gia Lam (Hanoi)
	Hanoi		Giap Bat (Hanoi)
	Hai Phong		Hai Phong
	Viet Tri		East Terminal (HCMC)
	Kep		West Terminal (HCMC)
	Vinh		Vinh
	Hue		Hue
	Danang		Danang
	Nha Trang		Buon Ma Thuot
	Hoa Hung (HCMC)		Can Tho
Airport	Hanoi International	Truck Terminal	Hai Phong Port
	Hanoi Domestic		Saigon Port
	HCM International		Cua Lo Port
	HCM Domestic		Danang Port
	Danang		Quy Nhon Port
	Nha Trang		Viet Tri Sta.
	Hue		Yen Vien Sta.
			Van Dien Sta.
			Danang Sta.
			Song Than Sta.

Finally, linked OD matrices by transport mode and commodity item were completed through all the above-mentioned processes. Based on the OD matrices, present transport demand was analyzed and proposed in Chapter 2.2 in terms of passenger transport and freight transport.

Table 2.1.10  
 Modal Share of Interprovincial Passengers between Main Provinces  
 Before Changing of OD Table

Distance	Provinces	Road		IWT	Rail	Air	Total
		Car	Bus				
Long Distance	Hanoi ⇄ HCM	72 (1.5)	998 (21.3)	0 (0.0)	1283 (27.4)	2324 (49.7)	4677
	Hai Phong ⇄ HCM	8 (2.6)	150 (48.1)	0 (0.0)	0 (0.0)	154 (49.3)	312
Medium Distance	Hanoi ⇄ Danang	92 (6.8)	584 (43.3)	0 (0.0)	276 (20.5)	396 (29.4)	1348
	Hai Phong ⇄ Danang	10 (10.6)	84 (89.4)	0 (0.0)	0 (0.0)	0 (0.0)	94
	HCM ⇄ Danang	72 (3.6)	1042 (52.4)	0 (0.0)	401 (20.2)	472 (23.8)	1987
Short Distance	Hanoi ⇄ Hai Phong	2818 (18.3)	9602 (62.4)	0 (0.0)	2976 (19.3)	0 (0.0)	15396
	Hanoi ⇄ Lao Cai	176 (11.8)	510 (34.1)	0 (0.0)	809 (54.1)	0 (0.0)	1495
	HCM ⇄ Can Tho	632 (4.5)	13288 (94.1)	200 (1.4)	0 (0.0)	0 (0.0)	14120

Upper figures refer to interprovincial passengers per day.  
 Figures in parentheses mean % share.

Table 2.1.11  
 Modal Share of Interprovincial Passengers between Main Provinces  
 After Changing of OD Table

Distance	Provinces	Road		IWT	Rail	Air	Total
		Car	Bus				
Long Distance	Hanoi ⇄ HCM	67 (1.7)	761 (20.6)	0 (0.0)	808 (21.9)	2056 (55.8)	3687
	Hai Phong ⇄ HCM	8 (1.4)	251 (42.8)	0 (0.0)	149 (25.4)	179 (30.5)	587
Medium Distance	Hanoi ⇄ Danang	92 (8.7)	430 (40.6)	0 (0.0)	202 (19.1)	334 (31.6)	1058
	Hai Phong ⇄ Danang	10 (9.2)	82 (75.2)	0 (0.0)	17 (15.6)	0 (0.0)	109
	HCM ⇄ Danang	72 (4.0)	979 (54.7)	0 (0.0)	325 (18.2)	413 (23.1)	1789
Short Distance	Hanoi ⇄ Hai Phong	2737 (21.4)	7744 (60.6)	0 (0.0)	2297 (18.0)	0 (0.0)	12778
	Hanoi ⇄ Lao Cai	176 (14.2)	424 (34.2)	0 (0.0)	638 (51.5)	0 (0.0)	1238
	HCM ⇄ Can Tho	582 (4.9)	10382 (93.3)	200 (1.8)	0 (0.0)	0 (0.0)	11164

Upper figures refer to interprovincial passengers per day.  
 Figures in parentheses mean % share.



Table 2.1.12  
 Modal Share of Interprovincial Freights between Main Provinces  
 Before Changing of OD Table

Distance	Provinces						Tons/day	
		Road	IWT	Railway	Coastal Shipping	Air	Total	
Long Distance	Hanoi ⇔ HCM	1,775 (83.9)	0 0.0	286 (13.5)	0 0.0	54 (2.6)	2,115	
	Hai Phong ⇔ HCM	133 (2.1)	0 0.0	21 (0.3)	6,045 (97.5)	4 (0.1)	6,203	
Medium Distance	Hanoi ⇔ Danang	291 (92.4)	0 0.0	20 (6.3)	0 0.0	4 (1.3)	315	
	Hai Phong ⇔ Danang	204 (40.8)	0 0.0	5 (1.0)	291 (58.2)	0 0.0	500	
	HCM ⇔ Danang	881 (90.4)	0 0.0	16 (1.6)	74 (7.6)	4 (0.4)	975	
Short Distance	Hanoi ⇔ Hai Phong	3,760 (91.4)	0 0.0	353 (8.6)	0 0.0	0 0.0	4,113	
	Hanoi ⇔ Lao Cai	224 (36.7)	0 0.0	387 (63.3)	0 0.0	0 0.0	611	
	HCM ⇔ Can Tho	1,570 (18.5)	6,903 (81.5)	0 0.0	0 0.0	0 0.0	8,473	

Upper figures refer to interprovincial passengers per day.  
 Figures in parentheses mean % share.

Table 2.1.13  
 Modal Share of Interprovincial Freights between Main Provinces  
 After Changing of OD Table

Distance	Provinces						Tons/day	
		Road	IWT	Railway	Coastal Shipping	Air	Total	
Long Distance	Hanoi ⇔ HCM	1,775 (53.9)	0 0.0	244 (7.4)	1,221 (37.1)	54 (1.6)	3,294	
	Hai Phong ⇔ HCM	118 (6.0)	0 0.0	18 (0.9)	1,835 (92.9)	4 (0.2)	1,975	
Medium Distance	Hanoi ⇔ Danang	289 (92.3)	0 0.0	20 (6.4)	0 0.0	4 (1.3)	313	
	Hai Phong ⇔ Danang	204 (40.8)	0 0.0	5 (1.0)	291 (58.2)	0 0.0	500	
	HCM ⇔ Danang	881 (93.6)	0 0.0	17 (1.8)	39 (4.1)	4 (0.4)	941	
Short Distance	Hanoi ⇔ Hai Phong	3,188 (90.3)	0 0.0	341 (9.7)	0 0.0	0 0.0	3,529	
	Hanoi ⇔ Lao Cai	224 (37.2)	0 0.0	378 (62.8)	0 0.0	0 0.0	602	
	HCM ⇔ Can Tho	1,570 (18.5)	6,903 (81.5)	0 0.0	0 0.0	0 0.0	8,473	

Upper figures refer to interprovincial passengers per day.  
 Figures in parentheses mean % share.

## 7) Traffic Volume Adjustment to Seasonal Variation

Rainy Season Traffic Count: Traffic count survey was conducted in September 1999 by the VITRANSS in some selected places for both road and inland waterway to assess the traffic volume during the rainy season. Table 2.1.14 and Table 2.1.15 summarize the result of this survey in comparison with the dry-season survey.

Assessment of Rainy-Season Traffic: It is clear that there is no common trend in the traffic counts in both road and inland waterway. Some stations show smaller traffic during rainy season, while others show the opposite.

As a whole, road traffic seems to be stable in terms of the number of vehicles, passengers and the tons of goods carried. Although there are some evidences that traffic on rural unpaved roads decreases during the rainy season by about 10-20%, it may be concluded that traffic on major paved roads does not fluctuate largely between dry and rainy season. However, this should be further investigated by conducting traffic counts periodically at a number of stations located in various places of the country.

With regard to inland waterway traffic, no large difference is likewise seen between dry and rainy season. Although the number of passengers seems to decrease considerably in the rainy season, its absolute number and the number of stations are too few to extract meaningful findings.

Conclusion: Based on the analysis described above, it was decided not to make an adjustment of the present OD matrices for the rainy-season traffic.

## 2.2 Results of 1999 OD Matrix

The interprovincial passenger and freight OD matrices by mode and commodity type have been worked out. They have been further aggregated and included in Appendix 2-B and 2-C.

Table 2.2.1  
Comparison of Road Traffic Volume between Dry and Rainy Seasons

St.No	Season	No. of Vehicle				No. of Passengers			Vol. of tons by Truck
		Car	Bus	Truck	Total	Car	Bus	Truck	
4	Dry	812	862	1985	3660	2843	16464	19307	7941
	Rainy	811	434	1798	3043	2837	8292	11129	7192
	Rainy/Dry	1.0	0.5	0.9	0.8	1.0	0.5	0.6	0.9
5	Dry	146	172	245	563	510	3279	3789	981
	Rainy	115	240	201	556	402	4587	4988	804
	Rainy/Dry	0.8	1.4	0.8	1.0	0.8	1.4	1.3	0.8
6	Dry	488	559	1137	2184	1707	10671	12377	4549
	Rainy	688	567	1227	2462	2388	10829	13167	4906
	Rainy/Dry	1.4	1.0	1.1	1.1	1.4	1.0	1.1	1.1
7	Dry	1224	1255	1827	4306	4284	23977	28261	7308
	Rainy	1326	956	2388	4670	4642	18259	22901	9551
	Rainy/Dry	1.1	0.8	1.3	1.1	1.1	0.8	0.8	1.3
11	Dry	87	993	335	587	306	3139	3444	1340
	Rainy	69	766	325	520	241	2407	2648	1301
	Rainy/Dry	0.8	0.8	1.0	0.9	0.8	0.8	0.8	1.0
14	Dry	1340	1773	3245	6357	4690	33858	38548	12979
	Rainy	1445	1331	3087	5863	5057	25430	30487	12348
	Rainy/Dry	1.1	0.8	1.0	0.9	1.1	0.8	0.8	1.0
17	Dry	851	993	2581	4425	2977	18966	21944	10324
	Rainy	733	766	1890	3389	2566	14636	17202	7559
	Rainy/Dry	0.9	0.8	0.7	0.8	0.9	0.8	0.8	0.7
19	Dry	1099	854	2087	4041	3847	16318	20164	8349
	Rainy	1084	768	2224	4075	3793	14661	18453	8896
	Rainy/Dry	1.0	0.9	1.1	1.0	1.0	0.9	0.9	1.1
27	Dry	148	285	736	1170	518	5450	5968	2945
	Rainy	176	273	706	1155	616	5214	5830	2824
	Rainy/Dry	1.2	1.0	1.0	1.0	1.2	1.0	1.0	1.0
28	Dry	149	802	1181	2132	522	15312	15833	4724
	Rainy	197	802	915	1914	689	15323	16012	3661
	Rainy/Dry	1.3	1.0	0.8	0.9	1.3	1.0	1.0	0.8
29	Dry	310	987	1972	3270	1086	18858	19944	7889
	Rainy	531	1214	3962	5707	1857	23181	25038	15849
	Rainy/Dry	1.7	1.2	2.0	1.7	1.7	1.2	1.3	2.0
30	Dry	957	1373	1935	4265	3348	26224	29573	7740
	Rainy	966	1692	3083	5741	3382	32313	35696	12322
	Rainy/Dry	1.0	1.2	1.6	1.3	1.0	1.2	1.2	1.6
32	Dry	1507	2126	3187	6820	5273	40613	45886	12747
	Rainy	1528	1880	4102	7510	5348	35905	41254	16407
	Rainy/Dry	1.0	0.9	1.3	1.1	1.0	0.9	0.9	1.3
33	Dry	1976	4062	5645	11683	6916	77584	84500	22579
	Rainy	1866	3770	5885	11522	6532	72013	78545	23540
	Rainy/Dry	0.9	0.9	1.0	1.0	0.9	0.9	0.9	1.0
34	Dry	758	857	1669	3284	2652	16375	19027	6675
	Rainy	575	757	1661	2992	2013	14453	16466	6643
	Rainy/Dry	0.8	0.9	1.0	0.9	0.8	0.9	0.9	1.0
37	Dry	440	1123	1069	2632	1540	21443	22983	4277
	Rainy	412	932	1005	2349	1443	17801	19244	4019
	Rainy/Dry	0.9	0.8	0.9	0.9	0.9	0.8	0.8	0.9
39	Dry	354	1177	734	2265	1240	22474	23715	2937
	Rainy	190	425	602	1217	666	8124	8790	2407
	Rainy/Dry	0.5	0.4	0.8	0.5	0.5	0.4	0.4	0.8
18 Total	Dry	12645	19424	31571	63641	44259	371005	415263	126285
	Rainy	12692	16933	35060	64686	44423	323429	367852	140240
	Rainy/Dry	1.0	0.9	1.1	1.0	1.0	0.9	0.9	1.1

Table 2.2.2  
 Comparison of River Traffic Volumes between Dry and Rainy Seasons

24-hour, both directions

Stn. No.	Season	Sea-going Vessel	Ship & Barge self-propelled	Oil Tanker	Tow Barge Tanker	Push Barge Tanker	Passenger Ship	Non-motorized Boat	Total No. of Vessels	Total Volume of Tons	Total No. of Pax
3	Dry	0	432	1	9	21	0	1	463	39129	0
	Rainy	0	432	0	17	26	0	4	480	44163	0
	Rainy/Dry	-	1.0	0.0	1.8	1.3	-	4.4	1.0	1.1	-
6	Dry	0	80	2	7	3	0	0	91	8618	0
	Rainy	0	66	8	6	7	0	3	91	10966	0
	Rainy/Dry	-	0.8	3.9	0.9	2.4	-	-	1.0	1.3	-
13	Dry	0	203	0	3	4	0	0	209	14985	0
	Rainy	0	80	2	3	12	0	2	99	11881	0
	Rainy/Dry	-	0.4	-	1.2	2.9	-	-	0.5	0.8	-
21	Dry	0	328	23	18	48	9	1	426	28709	144
	Rainy	0	413	26	21	48	7	9	524	33365	106
	Rainy/Dry	-	1.3	1.1	1.2	1.0	0.7	17.6	1.2	1.2	0.7
28	Dry	0	999	34	18	44	13	2	1109	53173	200
	Rainy	2	710	37	23	22	6	2	801	41959	88
	Rainy/Dry	-	0.7	1.1	1.3	0.5	0.4	1.5	0.7	0.8	0.4
37	Dry	0	651	7	8	6	3	23	696	27076	40
	Rainy	0	572	3	2	1	3	46	628	21244	53
	Rainy/Dry	-	0.9	0.5	0.2	0.3	1.3	2.0	0.9	0.8	1.3
6 stn Total	Dry	0	2692	66	61	125	24	26	2994	171689	384
	Rainy	2	2274	76	71	117	15	67	2623	163578	248
	Rainy/Dry	-	0.8	1.1	1.2	0.9	0.6	2.6	0.9	1.0	0.6

Source: VITRANSS River Traffic Survey (Dry: Apr.19-20, 26-27, Rainy:Sep. 10,1999)

Note: Average occupancy per cargo vessel (tons); sea-going vessel (0.0,61.2), self-propelled ship (60.5, 34.7), oil tanker (200.0, 172.2), tow barge (293.6, 324.0), push barge (500.0, 158.6), non-motorized boat (0.0, 2.8) in the north and south, respectively.

Average occupancy per passenger vessel is 20 and 16 in the north and south, respectively.

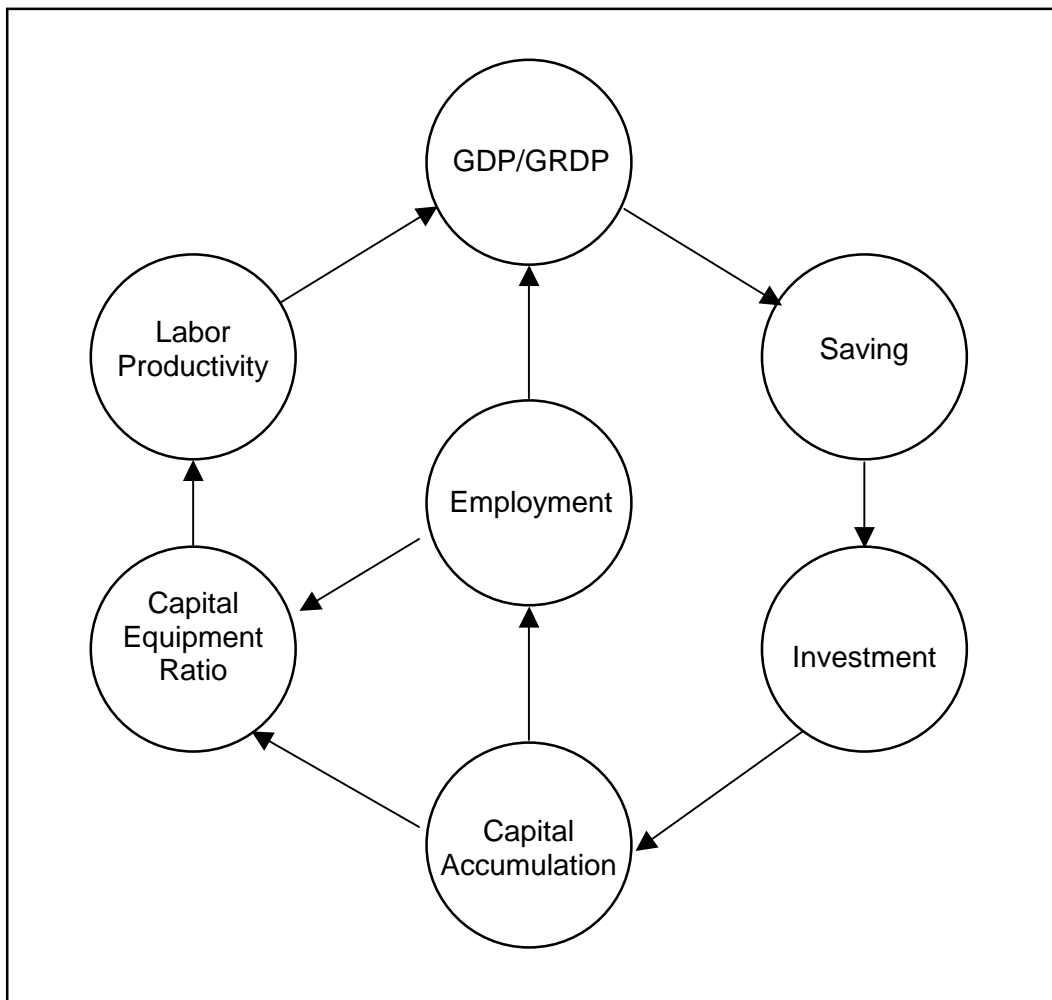
### 3 SOCIO-ECONOMIC DEVELOPMENT

#### 3.1 Methodology

The Vietnamese economy has immensely changed since the Doi Moi initiatives. Economic indicators are relatively unstable and relationships between variables are quite difficult to establish, making it difficult to make economic projections. The challenge here is to develop a simple econometric model that would best capture the Vietnamese economy based on the available economic data in the past decade.

The econometric model proposed by L.R. Klein and R. F. Kosobud (“Some Econometrics of Growth: Great Ratios of Econometrics,” Quarterly Journal of Economics, May 1961), which is suitable for long-term projection, was used in this report. The basic concept of the model is that labor productivity is determined by the level of capital-equipment ratio (accumulated capital stock per employee). The model is depicted in Figure 3.1.1 and described in detail as follows:

Figure 3.1.1  
VITRANSS GDP/GRDP Projection Model (Klein-Kosobud Model)



Internal Variables:

- Y : GDP  
 S : Gross Saving  
 K : Capital Stock  
 $f \phi K$  : Increase in Capital  
 I : Gross Investment  
 N : Total Employment  
 $N_h$  : Annual Working Hours  
 $f \hat{A}$  : Employment Parameter

External Variables

- P : Total Population  
 $W_h$  : Average Daily Working Hours a Day  
 $L_d$  : Annual Average Working Days per Person

Klein-Kosobud Model:

$$\begin{array}{ll}
 (1) & \frac{S(t)}{Y(t)} = f\left(\frac{Y(t)}{P(t)}\right) & (4) & K(t) = K(t-1) + \Delta K(t) \\
 (2) & \frac{Y(t)}{N_{h(t)}} = g\left(\frac{K(t-1)}{N(t)}\right) & (5) & S(t) = I(t) \\
 (3) & \Delta K(t) = f[I(t)] & (6) & N(t) = \delta(t) \cdot P(t) \\
 & & (7) & N_h(t) = W_h(t) \cdot L_d(t) \cdot N(t)
 \end{array}$$

Formula (1) shows that gross savings ratio is influenced by the change of GDP per capita. Formula (2) is the most important one in this model, stating that labor productivity is determined by capital-equipment ratio. Here, one year is assumed as the gestation period of capital. Formula (3) presents the relationship between increment in capital stock and gross investment, which includes investment for replacement and rehabilitation. Formulae (4) to (7) are easily deduced by the definition of variables or the definition itself.

Although the model structure is very simple and clear, applicability of the model to the Vietnamese economy is not apparent. For example, the savings ratio has been fluctuating in spite of the fact that there has been almost no change in the level of GDP per capita. Moreover, investment is not fully explained by domestic savings in Vietnam, because a fairly large portion of investment comes from abroad in the form of direct investments and loans. Therefore, some modifications and further simplification has to be done before applying the model to the Vietnamese economy.

## 3.2 Population

### 1) Population forecast

Population and urbanization were forecast after reviewing the two government documents issued by the National Committee for Population and Family Planning (NCPFP) and the Ministry of Construction. Although the NCPFP is regarded as a reliable source and their document is widely used as the primary basis for projections, it is still mostly likely to underestimate migration due to urbanization. As for the population breakdown by province, surprisingly, the provinces considered as growth poles, such as Quang Ninh, Danang and Ba Ria-Vung Tau, will increase their population at a lower rate than that of the regions to which they belong. The three provinces' projected population has been adjusted with that of neighboring provinces to meet urbanization trend (refer to Table 3.2.1 and Table 3.2.2).

The Ministry of Construction expects a sharp increase in the number of urban residents, i.e., 30.4 million in 2010 and 46 million in 2020 in comparison with 14.7 million at present. This sharp increase, however, does not share the same trend with the NCPFP and its provincial breakdown made by the MPI/DSI, which envisions to develop small to medium-size urban centers all over the country in spite of emerging mega cities. The VITRANSS, therefore, adopts a rather moderate urbanization trend wherein urban residents will increase to 35.6 million in 2020, about a third of the country's population.

### 2) Urban Centers

The number of urban centers with a population of more than 10,000 will increase from 569 at present to 1,226 in 2010 and 1,953 in 2020. During the forecast period, urban migration will continuously head for the two national centers. Until the year 2020, three million urban residents will reside in Hanoi and will strengthen their economic relations with Xuan Mai-Hoa Lac (0.5 million), Hai Phong (1.5 million) and Ha Long (0.7 million). Meanwhile, Ho Chi Minh City (6.2 million) will give bigger economic influence to Bien Hoa (0.85 million) and Vung Tau (0.5 million). In other regions, large cities will accumulate urban functions and provide extensive urban services. These cities in the year 2020 will be Hue (0.7 million), Danang (1 million), Nha Trang (0.5 million), and Can Tho (0.5 million). While numerous small urban centers are being created in rural areas, national and provincial governments intend to construct 25 new towns (Class VI) in line with national and regional development. Present and future urban centers are listed by region and classification in Table 3.2.3 ~ 5.

Table 3.2.1  
Summary of Population Forecast

Region/Year		1999	2000	2005	2010	2015	2020	Growth Rate (% p.a.)	
								1997/2010	2010/2020
	Entire Country	76325	80498.6	87297.3	94548.1	100332.2	109521.4	1.73	1.48
1	Red River Delta	1480	15438.8	16565.7	17698.9	18785.7	20024.1	1.44	1.24
2	Northeast	10861	11612.4	12608.6	13615.9	14629.4	15613.1	1.76	1.38
3	Northwest	2228	2355.7	2561.5	2763.7	2965.7	3158.4	1.87	1.34
4	North Central Coast	10007	10694.7	11507.6	12294.4	13056.8	13740.3	1.45	1.12
5	South Central Coast	6526	6923.4	7393.0	7886.5	8391.9	8892.6	1.47	1.21
6	Central Highlands	3062	2702.9	3044.2	3421.6	3796.3	4203.2	2.57	2.08
7	Northeastern South	12709	12837.1	14121.1	15810.1	17251.1	18970.8	2.05	1.84
8	Mekong Delta	16132	17933.6	19495.7	21057.0	22455.3	24918.9	1.84	1.70

Table 3.2.2  
Population Forecast by Province

Region	Zone	Province	Population (000)					
			1997	2000	2005	2010	2015	2020
1 Red River Delta	1	Hanoi	2,306.5	2,480.5	2,733.4	2,988.7	3,245.2	3,590.3
	2	Hai Phong	1,692.6	1,783.1	1,891.2	1,984.3	2,067.6	2,199.6
	3	Hai Duong	1,717.2	1,789.6	1,909.5	2,035.1	2,145.7	2,275.3
	4	Hung Yen	1,098.0	1,142.3	1,215.9	1,300.3	1,380.6	1,453.2
	5	Thai Binh	1,852.6	1,920.0	2,032.3	2,144.9	2,259.9	2,383.2
	6	Nam Dinh	1,934.1	2,014.2	2,150.8	2,290.5	2,431.1	2,570.6
	7	Ninh Binh	905.9	948.5	1,024.8	1,103.4	1,176.6	1,249.2
	8	Ha Nam	824.9	882.9	939.4	988.4	1,032.1	1,069.8
	9	Ha Tay	2,366.6	2,477.7	2,668.4	2,863.3	3,046.9	3,232.9
	Subtotal	14,698.4	15,438.8	16,565.7	17,698.9	18,785.7	20,024.1	
2 Northeast	10	Cao Bang	657.4	592.7	622.7	664.7	704.5	740.2
	11	Lang Son	728.8	755.2	786.4	815.3	844.5	871.7
	12	Quang Ninh	938.4	1,087.8	1,256.0	1,455.7	1,653.5	1,845.3
	13	Thai Nguyen	966.4	1,021.3	1,061.9	1,104.2	1,144.3	1,183.6
	14	Bac Can	256.9	331.6	355.6	378.9	400.2	419.6
	15	Bac Ninh	939.6	984.6	1,057.8	1,131.2	1,200.1	1,270.1
	16	Bac Giang	1,475.4	1,514.2	1,568.1	1,649.7	1,728.9	1,805.6
	17	Phu Tho	1,283.5	1,433.5	1,572.6	1,715.0	1,859.5	1,998.8
	18	Vinh Phuc	1,084.6	1,137.5	1,222.8	1,311.1	1,398.2	1,487.3
	19	Lao Cai	584.5	621.6	702.1	738.3	794.4	842.6
	20	Yen Bai	686.6	755.9	866.1	954.8	1,042.3	1,128.1
	21	Tuyen Quang	679.8	760.8	849.3	937.5	1,026.0	1,114.4
	Subtotal	10,846.2	11,612.4	12,608.6	13,615.9	14,629.4	15,613.1	
3 Northwest	23	Son La	846.9	890.1	964.6	1,037.8	1,112.8	1,187.1
	24	Lai Chau	555.7	592.0	656.0	716.8	775.3	827.4
	25	Hoa Binh	770.4	873.6	940.9	1,009.1	1,077.6	1,143.9
	Subtotal	2,173.0	2,355.7	2,561.5	2,763.7	2,965.7	3,158.4	
4 North Central Coast	26	Thanh Hoa	3,553.1	3,733.7	4,010.6	4,275.1	4,528.2	4,750.9
	27	Nghé An	2,873.8	3,005.1	3,233.6	3,470.1	3,700.4	3,909.4
	28	Ha Tinh	1,358.6	1,425.3	1,530.7	1,630.9	1,723.6	1,802.5
	29	Quang Binh	806.4	847.7	922.2	988.5	1,056.8	1,121.3
	30	Quang Tri	562.3	589.6	632.2	674.1	721.0	764.5
	Subtotal	10,196.1	10,694.7	11,507.6	12,294.4	13,056.8	13,740.3	
5 South Central Coast	32	Quang Nam	1,379.4	1,528.5	1,548.1	1,572.2	1,628.8	1,686.7
	33	Danang	667.2	726.8	859.1	997.6	1,112.9	1,219.6
	34	Quang Ngai	1,233.5	1,288.3	1,367.2	1,454.0	1,543.6	1,635.2
	35	Binh Dinh	1,477.9	1,536.1	1,637.4	1,744.2	1,843.1	1,953.7
	36	Phu Yen	769.6	805.5	864.4	928.6	980.9	1,041.8
	Subtotal	6,521.1	6,923.4	7,393.0	7,886.5	8,391.9	8,892.6	
6 Central Highlands	38	Kon Tum	269.0	287.1	297.8	322.8	331.1	360.5
	39	Gia Lai	844.4	932.7	1,043.0	1,158.6	1,288.5	1,435.4
	40	Dac Lac	1,347.2	1,483.1	1,703.4	1,940.2	2,176.7	2,407.3
	Subtotal	2,460.6	2,702.9	3,044.2	3,421.6	3,796.3	4,203.2	



Cont. of Table 3.2.2

Region	Zone	Province	Population (000)					
			1997	2000	2005	2010	2015	2020
7 North-eastern South	41	Ho Chi Minh	5,050.3	5,104.1	5,436.5	6,122.3	6,689.5	7,239.8
	42	Lam Dong	854.1	942.6	1,079.4	1,210.3	1,269.8	1,597.9
	43	Ninh Thuan	483.4	515.8	558.6	614.7	660.3	728.7
	44	Binh Phuoc	548.8	605.6	685.6	762.8	837.0	906.3
	45	Tay Ninh	931.9	982.6	1,049.2	1,138.5	1,224.1	1,310.5
	46	Binh Duong	649.6	703.8	793.1	888.1	983.7	1,072.7
	47	Dong Nai	1,964.8	2,172.0	2,491.8	2,828.5	3,128.5	3,455.4
	48	Binh Thuan	943.0	992.1	1,059.9	1,129.7	1,197.3	1,266.6
	49	Ba Ria-Vung Tau	724.2	818.5	967.0	1,115.2	1,260.9	1,392.9
	Subtotal	12,150.1	12,837.1	14,121.1	15,810.1	17,251.1	18,970.8	
8 Mekong River Delta	50	Long An	1,300.1	1,416.1	1,530.5	1,638.4	1,733.3	1,816.3
	51	Dong Thap	1,558.7	1,662.9	1,795.3	1,920.6	2,027.2	2,213.5
	52	An Giang	2,055.5	2,201.3	2,366.9	2,537.5	2,672.2	3,876.5
	53	Tien Giang	1,726.1	1,795.9	1,920.9	2,037.8	2,153.6	2,278.9
	54	Vinh Long	1,100.0	1,210.7	1,315.0	1,415.6	1,506.8	1,582.1
	55	Ben Tre	1,393.9	1,465.5	1,574.6	1,695.9	1,796.5	1,911.8
	56	Kien Giang	1,446.9	1,653.7	1,871.7	2,103.8	2,343.3	2,588.0
	57	Can Tho	1,904.6	2,061.4	2,237.6	2,419.4	2,570.3	2,697.8
	58	Tra Vinh	1,003.3	1,083.4	1,181.9	1,279.0	1,369.4	1,447.3
	59	Soc Trang	1,254.5	1,358.8	1,481.9	1,601.0	1,706.4	1,794.5
	60	Bac Lieu	783.6	849.2	930.2	1,007.9	1,076.8	1,131.9
	61	Ca Mau	1,082.1	1,174.7	1,289.2	1,400.1	1,499.5	1,580.3
	Subtotal	16,609.3	17,933.6	19,495.7	21,057.0	22,455.3	24,918.9	
Vietnam Total			75,654.8	80,498.6	87,297.4	94,548.1	101,332.2	109,521.4

Table 3.2.3  
Present Urban Centers

'000 Urban Residents

Region	Class I	Class II	Class III	Class IV	Class V	Class VI	Total
1. Red River Delta	Hanoi (1,151) Hai Phong (540)	Nam Dinh (198)	6 (283)	3 (72)	(538)	0	2,781
2. Northeast	0	Ha Long (129) Tay Nguyen (176) Viet Tri (86)	10 (373)	7 (247)	(498)	0	1,509
3. Northwest	0	Hoa Binh (70)	2 (71)	1 (21)	(150)	0	312
4. North Central Coast	Hue (215)	Vinh (122)	4 (257)	5 (86)	(427)	0	1,107
5. South Central Coast	Danang (476)	Nha Trang (216)	4 (330)	1 (25)	(479)	0	1,526
6. Central Highlands	0	Buon Me Thuot (106)	2 (110)		(254)	0	470
7. Northeast South	HCM City (3,252)	Bien Hoa (291) Vung Tau (140)	6 (406)	3 (143)	(1,178)	0	5,410
8. Mekong River Delta	0	Can Tho (220)	11 (976)	5 (214)	(1,183)	0	2,593
Total	5 (5,633)	11 (1,754)	45 (2,806)	25 (809)	(4,705)	0	15,707

Table 3.2.4  
 Urban Centers in 2010

'000 Persons

Region	Class I	Class II	Class III	Class IV	Class V	Class VI	Total
1. Red River Delta	Hanoi (2,017) Hai Phong (1,000)	Nam Dinh (254)	6 (538)	3 (108)	(590)	Noi Bai (75), Pha Lai (50), Ninh Duong (25), Hoa Lac (250)	4,908
2. Northeast		Ha Long (500), Tay Nguyen (279) Viet Tri (181)	10 (779)	7 (379)	(600)	Dong Trieu (50) Uong Bi (50)	2,818
3. Northwest		Hoa Binh (150)	2 (141)	1 (25)	(188)		503
4. North Central Coast	Hue (400)	Vinh (250)	4 (500)	5 (130)	(445)	Nghi Son (25), Others (75)	1,825
5. South Central Coast	Danang (750)	Nha Trang (350)	4 (571)	1 (38)	(579)	Dien Nam (15) Dung Quat (15)	2,318
6. Central Highlands		Buon Me Thuot (200)	2 (230)		(318)		748
7. Northeastern South	HCM City (5,000)	Bien Hoa (600), Vung Tau (350)	6 (860)	3 (227)	(1,275)	Nhon Trach (125), Phu My (125), Others (130)	8,692
8. Mekong River Delta		Can Tho (300)	11 (1,723)	5 (324)	(1,412)	Ben Luc (50) Phu Quoc (125)	3,933
Total	5 (9,167)	11 (3,414)	45 (5,342)	25 (1,231)	(5,406)	20 (1,185)	25,745

Table 3.2.5  
 Urban Centers in 2020

'000 Persons

Region	Class I	Class II	Class III	Class IV	Class V	Class VI	Total
1. Red River Delta	Hanoi (3,000) Hai Phong (1,500)	Nam Dinh (300)	6 (813)	3 (119)	(643)	Noi Bai (250) Pha Lai (125) Ninh Duong (50) Hoa Lac (500)	7,300
2. Northeast		Ha Long (700), Tay Nguyen (467) Viet Tri (294)	10 (1,224)	7 (424)	(702)	Dong Trieu (125) Uong Bi (125)	4,061
3. Northwest		Hoa Binh (200)	2 (200)	1 (30)	(225)		655
4. North Central Coast	Hue (700)	Vinh (380)	4 (750)	5 (146)	(463)	Nghi Son (75) Others (200)	2,714
5. South Central Coast	Danang (1,000)	Nha Trang (500)	4 (815)	1 (42)	(667)	Dien Nam (50) Dung Quat (50)	3,124
6. Central Highlands		Buon Me Thuot (350)	2 (320)		(381)		1,051
7. Northeastern South	HCM City (6,200)	Bien Hoa (850), Vung Tau (500)	6 (1,400)	3 (255)	(1,371)	Nhon Trach (275) Phu My (250) Others (260)	11,361
8. Mekong River Delta		Can Tho (500)	11 (2,480)	5 (373)	(1,640)	Ben Luc (100) Phu Quoc (219)	5,312
Total	5 (12,400)	11 (5,041)	45 (8,002)	25 (1,389)	(6,092)	20 (2,655)	35,579

### 3.3 GDP

#### 1) Input Data and Variables

Taking into account the differences in statistical definition and its reliability, data in the 1990s were mainly adopted for the formula estimation (refer to Table 3.3.1).

Table 3.3.1  
 Socio-economic Data

VND billion

Year	Total GDP	Agriculture, Forestry & Fishing	Industry & Construction	Service				
					Total Investment	Agriculture, Forestry & Fishing	Industry & Construction	Service
1985	101.666	37.063	25.382	39.221	0	0	0	0
1986	104.034	37.943	27.988	38.103	0	0	0	0
1987	107.823	37.544	30.387	39.892	0	0	0	0
1988	114.270	38.934	31.920	43.416	0	0	0	0
1989	119.627	41.679	31.107	46.842	0	0	0	0
1990	125.729	42.161	31.871	51.698	22.386	2.747	9.725	9.914
1991	133.224	42.893	34.602	55.729	24.862	2.578	12.283	9.822
1992	144.743	45.846	39.385	59.511	34.774	3.081	18.730	12.963
1993	156.427	47.384	44.355	64.869	61.536	3.764	37.201	20.571
1994	170.254	49.000	50.322	70.933	59.769	3.689	24.356	31.725
1995	186.499	51.282	57.319	78.123	58.003	4.657	21.208	32.139
1996	203.919	53.539	65.000	85.380	66.168	4.876	27.537	33.764
1997	221.872	55.923	73.493	92.456	0	0	0	0
Est. 1988	224.834	57.451	81.026	96.357	0	0	0	0

'000 Persons

Year	Population	Total Employment			
			Agriculture, Forestry & Fishing	Industry & Construction	Service
1985		0	0	0	0
1986		0	0	0	0
1987		0	0	0	0
1988		0	0	0	0
1989		0	0	0	0
1990	66.233	30.286	21889	4210	4187
1991	67.774	30.794	22483	4214	4277
1992	69.450	31815	23208	4275	4332
1993	71.250	32718	23898	4370	4450
1994	72.509	33664	24511	4575	4578
1995	73.962	34590	24122	4582	5886
1996	75.355	35792	24775	4629	6388
1997	76.715	36994	25443	4633	6978
Est. 1988	78.059	0	0	0	0

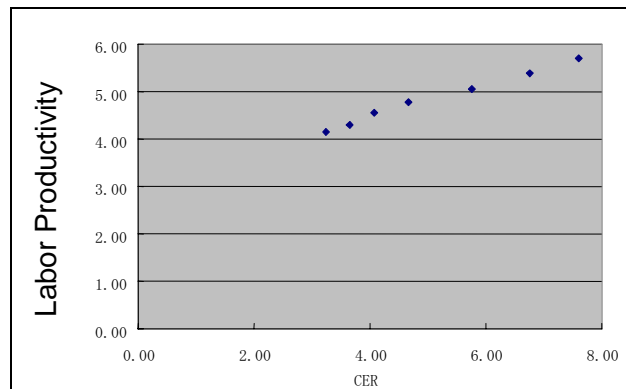
The formulae established on the existing data are briefly explained as follows:

(Formula 1)  $y = S(T)/Y(T)$ ,  $X = Y(T)/P(T)$   
 $y = 0.4 / (1 + \text{EXP}(-2.1341x + 4.2187))$   
 (R=0.987)

	Y	X	Y' (Model Value)
1990	17.81	1.898	18.33
1991	18.66	1.966	19.77
1992	24.02	2.085	22.31
1993	39.34	2.202	24.73
1994	35.11	2.348	27.54
1995	31.10	2.522	30.48
1996	32.45	2.706	33.04

Vietnam's gross investment can be mathematically explained by a logistics curve, since its regressive correlation rate is 0.987. However, this curve must have a ceiling at around 40%.

(Formula 2)  $Y(t)/Nh(t)=0.3442K(t-1)/N(t)+3.088$   
 (R=0.996)



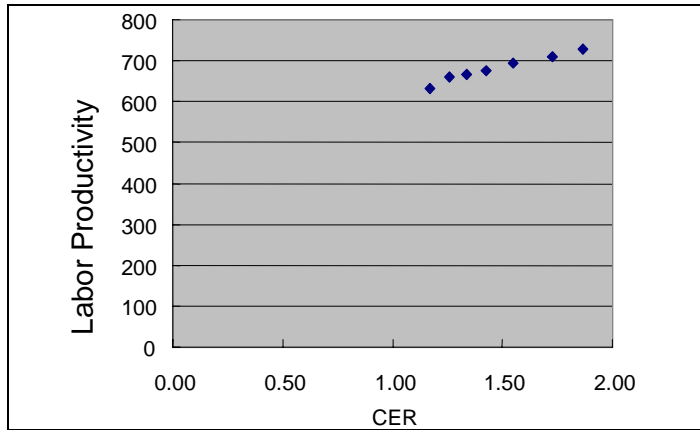
K (year 1990) or accumulated capital stock in 1990 is unknown. But it may not be big since most of the capital stock are aged and depreciated at that time. K (year 1990) is assumed in relation with the investment amount between 1990 and 1997 as follows:

- All Sectors : 30% of the total investment 1990-1997
- Primary Sector : 100% of the primary sector investment 1990-1997
- Secondary : 50% of the secondary sector investment 1990-1997
- Tertiary : 20% of the tertiary sector investment 1990-1997

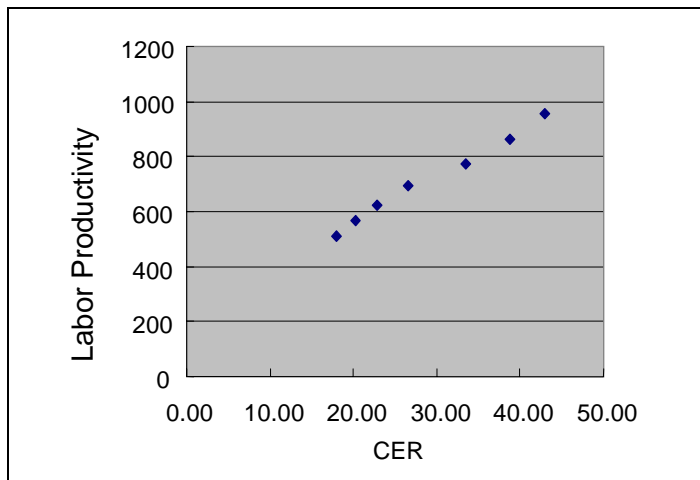
Accumulated capital stock by sector can be obtained by the same formula as follows:

- Primary Sector  $Y(t)/Nh(t) = 0.3353 K(t-1)/N(t)+1.6984$  (R=0.958)
- Secondary Sector  $Y(t)/Nh(t) = 0.2380 K(t-1)/N(t)+3.4774$  (R=0.990)
- Tertiary Sector  $Y(t)/Nh(t) = 0.2879 K(t-1)/N(t)+10.3469$  (R=0.997)

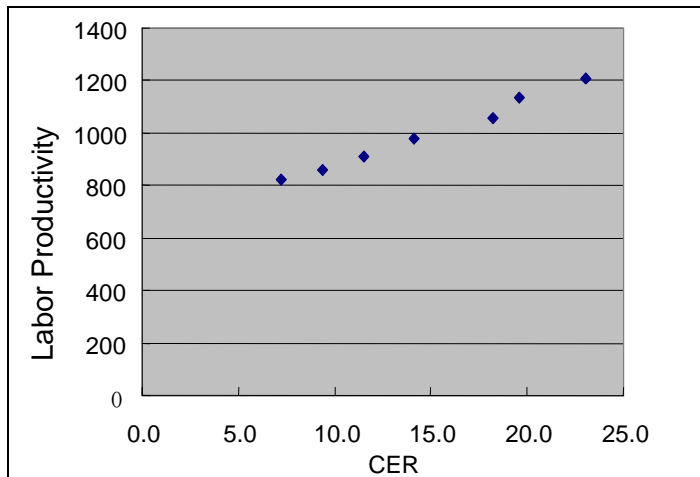
### Primary Sector



### Secondary Sector



### Tertiary Sector



(Formula 3)  $\Delta K(t-1)=aI(t)$

Variable “a” is as high as 0.6 at present. Since future investment is replacing and repairing old stock, variable “a” will decline to 0.4 until the year 2020.

(Formula 4) (Formula 5): No additional parameters are necessary.

(Formula 6) (Formula 7)  $N(t) = \delta(t) \cdot P(t)$

Employment parameter was set at 1,000 in 1997 and forecast at 1.272 in 2020. Table 3.3.2 indicates the trend in employment parameter between 1997 and 2020 and the relevant assumptions. The parameter will consistently increase with labor force. Employment rate increases, i.e., 49% in 1997 to 54% in 2020. However, a shift from primary sector to secondary and tertiary sector and a reduction in working hours to a five-day workweek will taper the growth rate more moderately.

Table 3.3.2  
 Change in Employment Parameter:  $\delta(t)$

Year	Sunday	Holiday	Saturday	Paid Holiday	Total	Working Days	W. Hours /Day	W. Hours /Year	Population	Labor Ratio	Labor Force	$\delta(t)$
1997	52.0	8.0	26.0	3.9	89.9	275.1	7.5	2,063	78,059	0.49	38,249	1.000
1998	52.0	8.0	26.8	4.0	90.8	274.2	7.4	2,039	78,864	0.49	38,340	1.002
1999	52.0	8.0	27.7	4.1	91.8	273.2	7.4	2,014	79,677	0.49	38,427	1.005
2000	52.0	8.0	28.6	4.2	92.7	272.3	7.3	1,909	80,499	0.50	38,509	1.007
2001	52.0	8.0	29.5	4.3	93.7	271.3	7.2	1,966	81,815	0.50	38,816	1.015
2002	52.0	8.0	30.4	4.4	94.7	270.3	7.2	1,941	83,152	0.50	39,120	1.023
2003	52.0	8.0	31.4	4.5	95.8	269.2	7.1	1,917	84,512	0.50	39,420	1.031
2004	52.0	8.0	32.3	4.6	96.9	268.1	7.1	1,893	85,893	0.50	39,717	1.038
2005	52.0	8.0	33.4	4.7	98.0	267.0	7.0	1,869	87,297	0.51	40,010	1.046
2006	52.0	8.0	34.4	4.8	99.2	265.8	7.0	1,861	88,702	0.51	40,636	1.062
2007	52.0	8.0	35.5	4.9	100.4	264.6	7.0	1,852	90,128	0.51	41,266	1.079
2008	52.0	8.0	36.6	5.0	101.6	263.4	7.0	1,844	91,578	0.51	41,898	1.095
2009	52.0	8.0	37.8	5.1	102.9	262.1	7.0	1,835	93,051	0.51	42,531	1.112
2010	52.0	8.0	39.0	5.2	104.2	260.8	7.0	1,826	94,548	0.52	34,167	1.129
2011	52.0	8.0	40.1	5.3	105.5	259.5	7.0	1,817	95,678	0.52	43,640	1.141
2012	52.0	8.0	41.3	5.4	106.8	258.2	7.0	1,808	96,821	0.52	44,112	1.153
2013	52.0	8.0	42.5	5.6	108.1	256.9	7.0	1,798	97,977	0.52	44,580	1.166
2014	52.0	8.0	43.8	5.7	109.4	255.6	7.0	1,789	99,148	0.52	45,045	1.178
2015	52.0	8.0	45.0	5.8	110.9	254.1	7.0	1,779	100,332	0.53	45,505	1.190
2016	52.0	8.0	46.3	5.9	112.3	252.7	7.0	1,769	101,919	0.53	46,137	1.206
2017	52.0	8.0	47.7	6.1	113.8	251.2	7.0	1,759	103,531	0.53	46,768	1.223
2018	52.0	8.0	49.1	6.2	115.3	249.7	7.0	1,748	105,168	0.53	47,396	1.239
2019	52.0	8.0	50.5	6.4	116.9	248.1	7.0	1,737	106,832	0.53	48,023	1.256
2020	52.0	8.0	52.0	6.5	118.5	246.5	7.0	1,726	108,521	0.54	48,646	1.272

## 2) Development Alternatives

GDP projection heavily relies on investment. It is broadly said that an increase in GDP by 1% would require an increase in investment by 3% in developing countries like Vietnam. As Formula 5 shows, under a closed economy, gross investment should be equal to gross saving. However, modern economies can offset insufficient gross saving with foreign investment. S(t) in the Formula 5 must encompass such available resources.

Vietnam experienced unprecedented economic growth during 1992-1997, averaging 8.2% a year. But Vietnam's growth is now slowing down because of the recent financial crisis in Asia and because of its own inertia in implementing structural and policy reforms. These forces have reduced foreign direct investment, as some investors have less to invest and others are totally discouraged.

Vietnam enjoyed large investments during 1992-1997, ranging from 30% to 40% per GDP. GDP projection based on these years expects a high growth rate. However, this is unlikely, judging from the economic performance of the country since 1998. The regional economic perspective is also unclear. Experiences of neighboring countries, whose market economies were built much earlier than Vietnam's, show that economic recessions at intervals are inevitable and that there is a need for continuous economic reform.

The VITRANSS has prepared three development alternatives in terms of investment per GDP in order to clarify the role of Vietnam's transport sector under different economic situations.

The trend-based projection will be possible when Vietnam fast-tracks economic growth as soon as possible by implementing swift policy reforms given favorable regional economic conditions. The low-assumption scenario will become a reality when foreign investment in the form of FDI and ODA declines to half of the current amount and domestic investment becomes stagnant. The high-assumption scenario is placed in between.

Table 3.3.3  
 Vietnam's Development Alternatives

		Trend-based Projection	High-assumption Scenario	Low-assumption Scenario
Investment per GDP Rate	- 2005	Ascending to 40%	31-32%	25%
	2006-2010	40%	Declining to 28%	Declining to 20%
	2011 -2020	40%	28%	20%

### 3) Projection Results and Some Analyses

National Forecast: The projection results are indicated in Table 3.3.4 and Figure 3.3.1. Their annual increase rates during the projection term are 9.28% for the trend-based forecast, 7.39% for the high-assumption and 6.20% for the low-assumption scenario.

Recently, the Development Strategy Institute (DSI) under the MPI worked out a new estimate or target of long-term economic growth to review and modify the target downward after the regional economic crisis. Although these are not official figures yet as of July 1999, the outline of the estimate is, however, shown in Table 3.3.4. The VITRANSS forecast has a wider range particularly during the period 2010-2020. The DSI forecast falls between the low and high assumptions of the VITRANSS forecast.

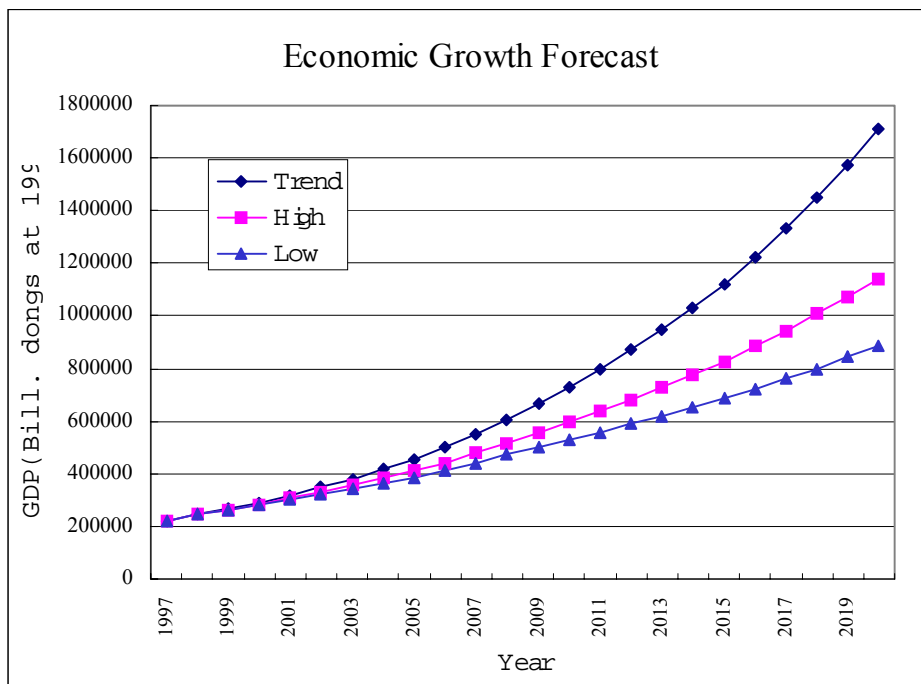
Table 3.3.4  
 GDP Forecast Results

VND Billion at 1994 Constant Prices

Year	VITRANSS Forecast			DSI Forecast
	Trend	High	Low	
1997	221,872	221,872	221,872	
1998	244,676	244,676	244,676	
1999	266,644	264,016	264,016	
2000	289,834	283,502	282,918	269,749
2001	317,601	306,490	301,547	
2002	347,870	330,254	321,057	
2003	380,686	355,415	341,467	
2004	416,117	382,019	362,792	
2005	454,253	409,327	385,046	366,109 – 389,059
2006	500,473	442,859	412,781	
2007	550,889	478,749	441,355	
2008	605,813	516,165	470,685	
2009	665,581	556,065	500,676	
2010	730,550	598,574	531,225	480,774 – 535,540
2011	797,563	639,693	559,569	
2012	869,722	683,015	588,994	
2013	947,322	728,608	619,511	
2014	1,030,663	776,536	651,128	
2015	1,120,051	826,862	683,850	
2016	1,221,097	883,659	721,078	
2017	1,330,034	943,640	759,848	
2018	1,447,343	1,006,917	800,184	
2019	1,573,520	1,073,601	842,107	
2020	1,709,072	1,143,799	885,634	961,540



Figure 3.3.1  
 GDP Forecast Between 1997 and 2020



In the VITRANSS, the high and low scenarios will be mainly discussed hereafter, and the trend-based forecast will be referred to when necessary.

Sector Growth: The Vietnamese economy will become less dependent on the primary sector and more on secondary and tertiary sectors due to the difference in the growth rate of the industrial sector.

The economic growth forecast in the high-assumption scenario, averaging 7.2% a year during 2000-2020 is driven by a high export growth and a high and sustained level of foreign investment. Various trading services around ports, airports and cross-border points provided by many small-scale non-SOEs will play a vital role and this will expand the tertiary sector considerably.

Table 3.3.5  
 Sectoral Growth by Planning Terms

	% p.a.			
	Primary	Secondary	Tertiary	All Sectors
<b>VITRANSS High-assumption Scenario</b>				
2000-2005	4.95	8.82	8.03	7.62
2005-2010	5.10	8.91	8.30	7.90
2010-2020	3.76	7.44	7.09	6.69
<b>VITRANSS Low-assumption Scenario</b>				
2000-2005	3.01	7.40	7.42	6.35
2005-2010	3.78	7.34	7.42	6.63
2010-2020	2.66	5.84	5.70	5.24
<b>DSI Forecast</b>				
2000-2005	3.30-3.80	7.68-9.50	6.43-7.50	6.30-7.60
2005-2010	3.06-3.40	7.00-8.50	5.45-6.40	5.60-6.60
2010-2020	6.37-7.32	6.18-7.12	5.75-7.17	6.03-7.18

#### 4) Regional and Provincial Breakdown

Potential GDP has been estimated at regional and provincial levels with consideration of present labor productivity (GDP/labor force), and labor force will be able to enjoy a sharp GDP increase in the future. The VITRANSS GDP forecast at regional level is summarized in Table 3.3.6 and at provincial level in Table 3.3.9. No significant difference can be found using the DSI forecast (see Table 3.3.7). Both the VITRANSS and DSI forecast faster growth in the northwest and central highlands than the entire country during 2010-2020.

Table 3.3.8 shows per capita GDP by region. Assuming the national average is 100, the highest is 204 of northeastern south while the lowest is 42 of the northwest in the year 1998. The ratio of the highest to the lowest is 4.8. In 2010 and 2020, this ratio is expected to range from 4.5 (low assumption) to 5.0 (high assumption) and from 4.7 to 4.9, respectively. Therefore, there will be no change in regional disparity despite the drastic change in industrial structure.

At provincial level, the economic disparity between the richest province (Ba Ria - Vung Tau, VND 20.26 million per capita) and the poorest (Son La, VND 1.04 million per capita) is 19.5 times the figure posted in 1998. Such disparity will be improved, i.e., 13.5 times between the two provinces in 2020 under the high-assumption scenario (see Table 3.3.10).

Table 3.3.6  
 Economic Growth Forecast by VITRANSS by Region

Billion VND at 1994 Prices

Region / Year	Scenario	GDP Estimates			Growth Rate	
		1998	2010	2020	1998-2010	2010-2020
All country	Low	244,676	531,225	885,634	6.67	5.24
	High		598,574	1,143,800	7.74	6.69
1 Red River Delta	Low	42,136	94,897	158,957	7.00	5.29
	High		107,360	207,356	8.11	6.80
2 Northeast	Low	19,385	40,634	67,036	6.36	5.13
	High		44,989	84,919	7.27	6.56
3 Northwest	Low	2,987	6,795	11,180	7.09	5.11
	High		7,318	13,720	9.37	6.49
4 North Central Coast	Low	19,166	40,449	66,682	6.42	5.13
	High		45,593	86,244	7.49	6.58
5 South Central Coast	Low	17,604	36,752	60,280	6.33	5.07
	High		41,780	78,441	7.47	6.50
6 Central Highlands	Low	6,386	14,995	25,727	7.37	5.55
	High		16,750	32,715	8.37	6.92
7 Northeastern South	Low	80,150	175,588	298,043	6.75	5.43
	High		198,296	385,591	7.84	6.88
8 Mekong River	Low	56,864	121,116	197,727	6.50	5.02
	High		136,488	254,814	7.57	6.44

Table 3.3.7  
 Economic Growth Forecast by DSI by Region

Region / Year	GDP (VND billion at 1994 price)			Growth Rate/Year	
	1998	2010	2020	1998-2010	2010-2020
All Country	244,676	480,774	-	5.79	-
		535,540	961,540	6.21	6.03
1 Red River Delta	42,136	91,036	-	6.63	-
		99,644	192,308	7.44	6.80
2 Northeast	19,385	36,339	-	5.38	-
		38,701	76,923	5.93	7.11
3 Northwest	2,987	4,992	-	4.37	-
		5,269	14,423	4.84	10.59
4 North Central Coast	19,166	32,111	-	4.39	-
		36,121	57,692	5.42	4.79
5 South Central Coast	17,604	31,366	-	4.93	-
		34,997	72,116	5.89	7.50
6 Central Highlands	6,386	11,215	-	4.80	-
		11,511	22,115	5.03	6.75
7 Northeastern South	80,150	181,388	-	7.04	-
		207,010	348,078	8.23	5.33
8 Mekong River	56,864	92,328	-	4.12	-
		102,288	177,885	5.01	5.69

Upper Line – Scenario 1, Lower Line – Scenario 2

Table 3.3.8  
 Per Capita GDP and Regional Disparity

Region / Case		1998		VITRANSS Low Assumption				VITRANSS High Assumption			
		GDP/ Capita	All Country =100	GDP/capita (VND mil)		All Country = 100		GDP/capita (VND mil)		All Country = 100	
				2010	2020	2010	2020	2010	2020	2010	2020
	All Country	3.23	100	5.62	9.37	100	100	7.44	12.10	100	100
1	Red River Delta	2.87	89	5.36	8.98	95	96	6.95	11.72	93	97
2	Northeast	1.79	55	2.98	4.92	53	53	3.87	6.24	52	52
3	Northwest	1.37	42	2.46	4.05	44	43	3.11	4.96	42	41
4	North Central Coast	1.88	58	3.29	5.42	59	58	4.26	7.01	57	58
5	South Central Coast	2.70	84	4.66	7.64	83	82	6.03	9.95	81	82
6	Central Highlands	2.60	80	4.38	7.52	78	80	6.20	9.56	83	79
7	Northeastern South	6.60	204	11.11	18.85	198	201	15.45	24.39	208	202
8	Mekong River	3.42	106	5.75	9.39	102	100	7.61	12.10	103	100

Table 3.3.9  
GDP Projection by Province under Low Assumption

Region	Zone	Province Name	GDP (Billion VND)					GDP Per Capita (Mil. VND)			
			1998	2010	2020 Total	2020 Primary	2020 Secondary	2020 Tertiary	1998	2010	2020
1 Red River Delta	1	Ha Noi	15,504	32,720	54,412	276	27,609	26,528	6.72	10.95	18.21
	2	Hai Phong	6,054	12,795	19,667	1,518	8,535	9,614	3.58	6.45	9.91
	3	Hai Duong	3,982	8,371	14,742	1,817	7,359	5,567	2.32	4.11	7.24
	4	Hung Yen	2,109	4,547	7,574	1,345	3,172	3,057	1.92	3.50	5.82
	5	Thai Binh	4,133	9,818	16,461	2,877	6,637	6,946	2.23	4.58	7.67
	6	Nam Dinh	3,573	10,212	18,425	1,806	7,492	9,127	1.85	4.46	8.04
	7	Ninh Binh	1,387	3,093	5,184	931	2,629	1,623	1.53	2.80	4.70
	8	Ha Nam	1,397	3,683	6,390	820	2,587	2,984	1.69	3.73	6.46
	9	Ha Tay	3,998	9,659	16,102	2,527	8,012	5,563	1.69	3.37	5.62
	<b>Total</b>	<b>42,136</b>	<b>94,897</b>	<b>158,957</b>	<b>13,917</b>	<b>74,032</b>	<b>71,008</b>	<b>2.87</b>	<b>5.36</b>	<b>8.98</b>	
2 North East	10	Cao Bang	824	1,638	2,689	1,290	487	912	1.25	2.46	4.05
	11	Lang Son	1,508	2,431	4,032	1,766	841	1,426	2.07	2.98	4.95
	12	Quang Ninh	2,996	6,865	10,940	684	5,430	4,826	3.19	4.72	7.52
	13	Thai Nguyen	1,968	2,727	4,446	1,258	1,893	1,294	2.04	2.47	4.03
	14	Bac Can	309	600	1,074	676	265	133	1.20	1.58	2.83
	15	Bac Ninh	1,724	5,426	8,467	1,215	4,483	2,769	1.83	4.80	7.49
	16	Bac Giang	2,350	4,494	6,850	2,476	2,765	1,609	1.59	2.72	4.15
	17	Phu Tho	2,384	5,737	10,091	1,654	4,626	3,811	1.86	3.35	5.88
	18	Vinh Phuc	1,856	3,065	5,158	1,430	1,140	2,588	1.71	2.34	3.93
	19	Lao Cai	616	2,230	3,990	1,441	1,325	1,224	1.05	3.02	5.40
	20	Yen Bai	1,098	1,965	3,498	1,184	1,685	629	1.60	2.06	3.66
	21	Tuyen Quang	1,105	2,288	3,796	1,418	1,200	1,178	1.63	2.44	4.05
	22	Ha Giang	646	1,169	2,004	1,012	562	430	1.14	1.54	2.64
	<b>Total</b>	<b>19,384</b>	<b>40,634</b>	<b>67,036</b>	<b>17,506</b>	<b>26,701</b>	<b>22,830</b>	<b>1.79</b>	<b>2.98</b>	<b>4.92</b>	
3 North West	23	Son La	880	2,208	3,512	2,313	739	460	1.04	2.13	3.38
	24	Lai Chau	909	2,371	4,215	1,112	2,008	1,095	1.64	3.31	5.88
	25	Hoa Binh	1,198	2,216	3,453	1,330	1,270	853	1.56	2.20	3.42
	<b>Total</b>	<b>2,987</b>	<b>6,795</b>	<b>11,180</b>	<b>4,755</b>	<b>4,017</b>	<b>2,408</b>	<b>1.37</b>	<b>2.46</b>	<b>4.05</b>	
4 North Central Coast	26	Thanh Hoa	6,874	14,338	23,979	4,960	7,612	11,407	1.93	3.35	5.61
	27	Nghe An	5,615	11,518	19,187	4,687	4,588	9,911	1.95	3.32	5.53
	28	Ha Tinh	2,318	4,551	7,320	2,571	1,296	3,452	1.71	2.79	4.49
	29	Quang Binh	1,264	3,099	5,215	1,427	1,212	2,576	1.57	3.14	5.28
	30	Quang Tri	1,012	1,760	2,875	1,183	366	1,326	1.80	2.61	4.27
	31	Thua Thien - Hue	2,084	5,182	8,106	1,906	1,585	4,615	2.00	4.13	6.46
	<b>Total</b>	<b>19,166</b>	<b>40,449</b>	<b>66,682</b>	<b>16,735</b>	<b>16,660</b>	<b>33,288</b>	<b>1.88</b>	<b>3.29</b>	<b>5.42</b>	
5 South Central Coast	32	Quang Nam	3,094	5,570	7,731	1,974	2,779	2,978	2.24	3.54	4.92
	33	Da Nang	3,242	7,785	14,644	431	5,899	8,314	4.86	7.80	14.68
	34	Quang Ngai	2,239	5,933	9,993	1,417	2,371	6,206	1.82	4.08	6.87
	35	Binh Dinh	3,468	6,823	10,982	3,157	1,626	6,199	2.35	3.91	6.30
	36	Phu Yen	1,508	3,734	6,141	1,287	2,037	2,817	1.96	4.02	6.61
	37	Khanh Hoa	4,053	6,908	10,789	3,817	2,681	4,291	4.08	5.81	9.07
	<b>Total</b>	<b>17,604</b>	<b>36,752</b>	<b>60,280</b>	<b>12,084</b>	<b>17,393</b>	<b>30,804</b>	<b>2.70</b>	<b>4.66</b>	<b>7.64</b>	
6 Central Highlands	38	Kon Tum	567	1,228	2,026	535	420	1,070	2.11	3.80	6.27
	39	Gia Lai	1,643	4,353	7,580	1,690	2,692	3,198	1.95	3.76	6.54
	40	Dac Lac	4,176	9,414	16,121	6,447	2,935	6,739	3.10	4.85	8.31
	<b>Total</b>	<b>6,386</b>	<b>14,995</b>	<b>25,727</b>	<b>8,673</b>	<b>6,047</b>	<b>11,007</b>	<b>2.60</b>	<b>4.38</b>	<b>7.52</b>	
7 North East South	41	Ho Chi Minh	44,797	88,800	142,353	136	81,875	60,342	8.87	14.50	23.25
	42	Lam Dong	2,201	4,444	7,607	2,607	2,162	2,838	2.58	3.67	6.28
	43	Ninh Thuan	1,176	2,439	4,084	1,612	1,448	1,023	2.43	3.97	6.64
	44	Binh Phuoc	1,121	2,129	3,249	1,340	401	1,508	2.04	2.79	4.26
	45	Tay Ninh	2,735	5,570	9,624	1,991	5,034	2,599	2.93	4.89	8.45
	46	Binh Duong	2,977	10,513	19,524	1,617	12,610	5,297	4.58	11.84	21.98
	47	Dong Nai	8,634	32,008	58,355	2,999	37,097	18,260	4.39	11.32	20.63
	48	Binh Thuan	1,837	3,590	5,912	2,280	1,478	2,155	1.95	3.18	5.23
	49	Ba Ria - Vung Tau	14,673	26,095	47,335	1,118	34,865	11,352	20.26	23.40	42.45
	<b>Total</b>	<b>80,150</b>	<b>175,588</b>	<b>298,043</b>	<b>15,700</b>	<b>176,970</b>	<b>105,374</b>	<b>6.60</b>	<b>11.11</b>	<b>18.85</b>	
8 Mekong River Delta	50	Long An	5,113	8,835	14,494	3,829	3,273	7,391	3.93	5.39	8.85
	51	Dong Thap	4,883	6,762	10,551	4,482	2,274	3,795	3.13	3.52	5.49
	52	An Giang	7,395	20,088	33,306	5,132	6,365	21,809	3.60	7.92	13.13
	53	Tien Giang	5,781	9,314	14,651	5,648	2,587	6,415	3.35	4.57	7.19
	54	Vinh Long	3,086	6,233	9,581	3,929	2,200	3,452	2.81	4.40	6.77
	55	Ben Tre	4,070	9,067	14,648	4,251	3,385	7,012	2.92	5.35	8.64
	56	Kien Giang	6,685	15,920	26,128	5,316	9,706	11,105	4.62	7.57	12.42
	57	Can Tho	6,846	18,662	32,109	3,826	10,647	17,636	3.59	7.71	13.27
	58	Tra Vinh	2,761	5,535	8,735	3,341	1,868	3,525	2.75	4.33	6.83
	59	Soc Trang	3,756	6,650	10,794	4,062	3,517	3,214	2.99	4.15	6.74
	60	Bac Lieu	2,072	4,750	7,469	1,860	2,787	2,822	2.64	4.71	7.41
61	Ca Mau	4,417	9,300	15,263	4,650	5,291	5,321	4.08	6.64	10.90	
	<b>Total</b>	<b>56,864</b>	<b>121,116</b>	<b>197,727</b>	<b>50,326</b>	<b>53,902</b>	<b>93,500</b>	<b>3.42</b>	<b>5.75</b>	<b>9.39</b>	
<b>Vietnam Total</b>			<b>244,675</b>	<b>531,225</b>	<b>885,634</b>	<b>139,694</b>	<b>375,720</b>	<b>370,219</b>	<b>3.23</b>	<b>5.62</b>	<b>9.37</b>

Table 3.3.10  
 GDP Projection by Province under High Assumption

Region	Zone	Province Name	GDP (Billion VND)						GDP Per Capita (Mil. VND)		
			1998	2010	2020 Total	2020 Primary	2020 Secondary	2020 Tertiary	1998	2010	2020
1 Red River Delta	1	Ha Noi	15,504	37,756	71,870	310	34,331	37,230	6.72	15.22	24.05
	2	Hai Phong	6,054	14,478	25,812	1,706	10,613	13,492	3.58	8.12	13.01
	3	Hai Duong	3,982	9,326	19,005	2,042	9,150	7,813	2.32	5.21	9.34
	4	Hung Yen	2,109	5,041	9,747	1,511	3,945	4,291	1.92	4.41	7.50
	5	Thai Binh	4,133	10,936	21,236	3,233	8,253	9,749	2.23	5.70	9.90
	6	Nam Dinh	3,573	11,600	24,155	2,031	9,316	12,809	1.85	5.76	10.55
	7	Ninh Binh	1,387	3,399	6,594	1,047	3,270	2,278	1.53	3.58	5.98
	8	Ha Nam	1,397	4,141	8,325	921	3,217	4,187	1.69	4.69	8.42
	9	Ha Tay	3,998	10,683	20,611	2,841	9,963	7,807	1.69	4.31	7.20
		<b>Total</b>	<b>42,136</b>	<b>107,360</b>	<b>207,356</b>	<b>15,643</b>	<b>92,057</b>	<b>99,656</b>	<b>2.87</b>	<b>6.95</b>	<b>11.72</b>
2 North East	10	Cao Bang	824	1,783	3,335	1,450	605	1,280	1.25	3.01	5.02
	11	Lang Son	1,508	2,665	5,031	1,985	1,045	2,001	2.07	3.53	6.17
	12	Quang Ninh	2,996	7,830	14,294	769	6,752	6,773	3.19	7.20	9.82
	13	Thai Nguyen	1,968	2,983	5,585	1,415	2,354	1,816	2.04	2.92	5.06
	14	Bac Can	309	633	1,276	760	330	186	1.20	1.91	3.37
	15	Bac Ninh	1,724	6,007	10,827	1,366	5,574	3,886	1.83	6.10	9.57
	16	Bac Giang	2,350	4,892	8,480	2,783	3,438	2,258	1.59	3.23	5.14
	17	Phu Tho	2,384	6,420	12,960	1,859	5,752	5,349	1.86	4.48	7.56
	18	Vinh Phuc	1,856	3,451	6,657	1,607	1,418	3,633	1.71	3.03	5.08
	19	Lao Cai	616	2,445	4,985	1,620	1,648	1,718	1.05	3.93	6.75
	20	Yen Bai	1,098	2,111	4,309	1,331	2,095	883	1.60	2.79	4.51
	21	Tuyen Quang	1,105	2,517	4,740	1,594	1,492	1,654	1.63	3.31	5.06
	22	Ha Giang	646	1,252	2,440	1,138	699	603	1.14	2.03	3.21
		<b>Total</b>	<b>19,384</b>	<b>44,989</b>	<b>84,919</b>	<b>19,677</b>	<b>33,202</b>	<b>32,040</b>	<b>1.79</b>	<b>3.87</b>	<b>6.24</b>
3 North West	23	Son La	880	2,320	4,164	2,600	919	646	1.04	2.61	4.01
	24	Lai Chau	909	2,592	5,284	1,250	2,497	1,537	1.64	4.38	7.37
	25	Hoa Binh	1,198	2,405	4,272	1,495	1,579	1,198	1.56	2.75	4.23
		<b>Total</b>	<b>2,987</b>	<b>7,318</b>	<b>13,720</b>	<b>5,345</b>	<b>4,995</b>	<b>3,380</b>	<b>1.37</b>	<b>3.11</b>	<b>4.96</b>
4 North Central Coast	26	Thanh Hoa	6,874	16,143	31,050	5,575	9,466	16,009	1.93	4.32	7.26
	27	Nghe An	5,615	12,991	24,884	5,269	5,705	13,910	1.95	4.32	7.17
	28	Ha Tinh	2,318	5,065	9,347	2,890	1,612	4,845	1.71	3.55	5.73
	29	Quang Binh	1,264	3,490	6,726	1,604	1,507	3,615	1.57	4.12	6.80
	30	Quang Tri	1,012	1,952	3,646	1,330	455	1,861	1.80	3.31	5.41
	31	Thua Thien - Hue	2,084	5,952	10,590	2,142	1,971	6,477	2.00	5.44	8.43
	<b>Total</b>	<b>19,166</b>	<b>45,593</b>	<b>86,244</b>	<b>18,810</b>	<b>20,716</b>	<b>46,718</b>	<b>1.88</b>	<b>4.26</b>	<b>7.01</b>	
5 South Central Coast	32	Quang Nam	3,094	6,238	9,854	2,219	3,456	4,179	2.24	4.08	6.27
	33	Da Nang	3,242	9,053	19,487	485	7,335	11,668	4.86	12.46	19.53
	34	Quang Ngai	2,239	6,855	13,250	1,593	2,948	8,709	1.82	5.32	9.11
	35	Binh Dinh	3,468	7,747	14,271	3,549	2,022	8,700	2.35	5.04	8.18
	36	Phu Yen	1,508	4,213	7,933	1,447	2,533	3,953	1.96	5.23	8.54
	37	Khanh Hoa	4,053	7,673	13,646	4,291	3,334	6,022	4.08	7.39	11.47
	<b>Total</b>	<b>17,604</b>	<b>41,780</b>	<b>78,441</b>	<b>13,583</b>	<b>21,627</b>	<b>43,231</b>	<b>2.70</b>	<b>6.03</b>	<b>9.95</b>	
6 Central Highlands	38	Kon Tum	567	1,398	2,626	602	522	1,502	2.11	4.87	8.14
	39	Gia Lai	1,643	4,902	9,735	1,900	3,347	4,488	1.95	5.26	8.40
	40	Dac Lac	4,176	10,450	20,355	7,246	3,650	9,458	3.10	7.05	10.49
		<b>Total</b>	<b>6,386</b>	<b>16,750</b>	<b>32,715</b>	<b>9,748</b>	<b>7,519</b>	<b>15,448</b>	<b>2.60</b>	<b>6.20</b>	<b>9.56</b>
7 North East South	41	Ho Chi Minh	44,797	101,652	186,649	153	101,810	84,686	8.87	19.92	30.49
	42	Lam Dong	2,201	4,916	9,601	2,930	2,688	3,982	2.58	5.22	7.93
	43	Ninh Thuan	1,176	2,641	5,049	1,812	1,801	1,436	2.43	5.12	8.21
	44	Binh Phuoc	1,121	2,355	4,121	1,506	498	2,117	2.04	3.89	5.40
	45	Tay Ninh	2,735	6,111	12,145	2,237	6,260	3,648	2.93	6.22	10.67
	46	Binh Duong	2,977	11,671	24,932	1,817	15,681	7,434	4.58	16.58	28.07
	47	Dong Nai	8,634	35,953	75,126	3,371	46,128	25,627	4.39	16.55	26.56
	48	Binh Thuan	1,837	3,960	7,424	2,563	1,837	3,024	1.95	3.99	6.57
	49	Ba Ria - Vung Tau	14,673	29,037	60,543	1,257	43,353	15,933	20.26	35.48	54.29
		<b>Total</b>	<b>80,150</b>	<b>198,296</b>	<b>385,590</b>	<b>17,647</b>	<b>220,057</b>	<b>147,887</b>	<b>6.60</b>	<b>15.45</b>	<b>24.39</b>
8 Mekong River Delta	50	Long An	5,113	9,988	18,747	4,303	4,070	10,373	3.93	7.05	11.44
	51	Dong Thap	4,883	7,392	13,191	5,038	2,827	5,326	3.13	4.44	6.87
	52	An Giang	7,395	23,398	44,291	5,768	7,915	30,607	3.60	10.63	17.45
	53	Tien Giang	5,781	10,335	18,569	6,349	3,217	9,004	3.35	5.75	9.11
	54	Vinh Long	3,086	6,834	11,997	4,416	2,736	4,845	2.81	5.64	8.47
	55	Ben Tre	4,070	10,149	18,829	4,778	4,209	9,841	2.92	6.93	11.10
	56	Kien Giang	6,685	17,942	33,631	5,976	12,069	15,586	4.62	10.85	15.99
	57	Can Tho	6,846	21,523	42,291	4,300	13,240	24,751	3.59	10.44	17.48
	58	Tra Vinh	2,761	6,085	11,026	3,755	2,323	4,948	2.75	5.62	8.62
	59	Soc Trang	3,756	7,238	13,450	4,566	4,373	4,511	2.99	5.33	8.40
	60	Bac Lieu	2,072	5,304	9,517	2,090	3,465	3,961	2.64	6.25	9.44
61	Ca Mau	4,417	10,300	19,275	5,226	6,580	7,468	4.08	8.77	13.77	
	<b>Total</b>	<b>56,864</b>	<b>136,488</b>	<b>254,814</b>	<b>56,567</b>	<b>67,025</b>	<b>131,222</b>	<b>3.42</b>	<b>7.61</b>	<b>12.10</b>	
<b>Vietnam Total</b>			<b>244,675</b>	<b>598,574</b>	<b>1,143,799</b>	<b>157,019</b>	<b>467,198</b>	<b>519,582</b>	<b>3.23</b>	<b>7.44</b>	<b>12.10</b>

### 3.4 Production and Consumption Forecast

#### 1) Methodology

Cargo transport planning must start from commodity analysis. Unlike passenger transport, cargo transport must be analyzed according to commodity since each commodity has a particular package style (i.e, bagged, tank, bulk, etc.) and consignment size. Some commodities even are seasonal. Given these variances it is not proper to make generalizations on cargo flow. Specific commodity analysis is required including production sites, consumption sites and suitable haulage methods.

The VITRANSS conducted a series of traffic surveys and analyzed the present traffic flow consisting of 13 major commodities. To understand the socio-economic conditions of the present cargo traffic, commodity production and consumption were analyzed at provincial level, using provincial statistics, trade statistics, government documents, and the results of various VITRANSS surveys. As a next step, future production and consumption by commodity are forecast to specify possible cargo traffic demand. The socio-economic framework prepared by the VITRANSS is the main indicator, and relevant government policies on agriculture/industry development, area development/preservation and trade facilitation, among others, are examined more deeply (refer to Figure 3.4.1).

Table 3.4.1 shows the methods used in forecasting the production and consumption of each of the main commodities. The following are worthy of note:

- In the transition to a market economy, liberalized policies intensified domestic production much faster than the GDP growth. But still, they could not meet the domestic demand. Thus, domestic manufacturers forged active expansion plans and invested considerably in expanding production capacity. After the regional economic crisis, many domestic industrial products, such as coal, steel, sugar and cement, were left unsold in warehouses. As result, development/investment plans formulated before the crisis are now being reviewed carefully. High growth rates achieved before the crisis are also doubtful.
- As economy grows, people's living standards improve. For instance, food component will change and per capita consumption of fish, meat and sugar will increase. Unlike in 1997, a greater number of the almost 30 million residents now have access to electricity as more thermal power plants have been constructed. The improvement of future living standards is considered as the national minimum.
- Generally speaking, forecast deficit/surplus of main commodities at provincial and national level will be the possible cargo demand on interprovincial and international traffic, respectively. Liberalized trade regimes which the AFTA, APEC and WTO are advocating will minimize trade tariff and import ban. Under

such circumstances, regardless of shortage of domestic products, trade will become active than ever. It will also be true in domestic trade to some extent since buyers do not need to follow suppliers' suggestions, and they can choose the most suitable products from among a wide selection including imported products.

- The government will have to elaborate its export policy as necessary to earn hard currency. Current strategic export commodities are rice, coffee, rubber, fishery products, textile and garment, chemical shoes, crude oil, and coal. Vietnam must export such commodities to international markets even though domestic demand is high. For instance, the Association of Coffee Producing Countries (ACPC) has not admitted Vietnam because one of the requirements is to store 20% of the national production, in this case, 60,000 tons which is not affordable. Therefore the government's export policy should be carefully examined.

The forecast production and consumption of goods are provided in Appendix III.

Figure 3.4.1  
 Forecast of Production and Consumption by Major Commodities

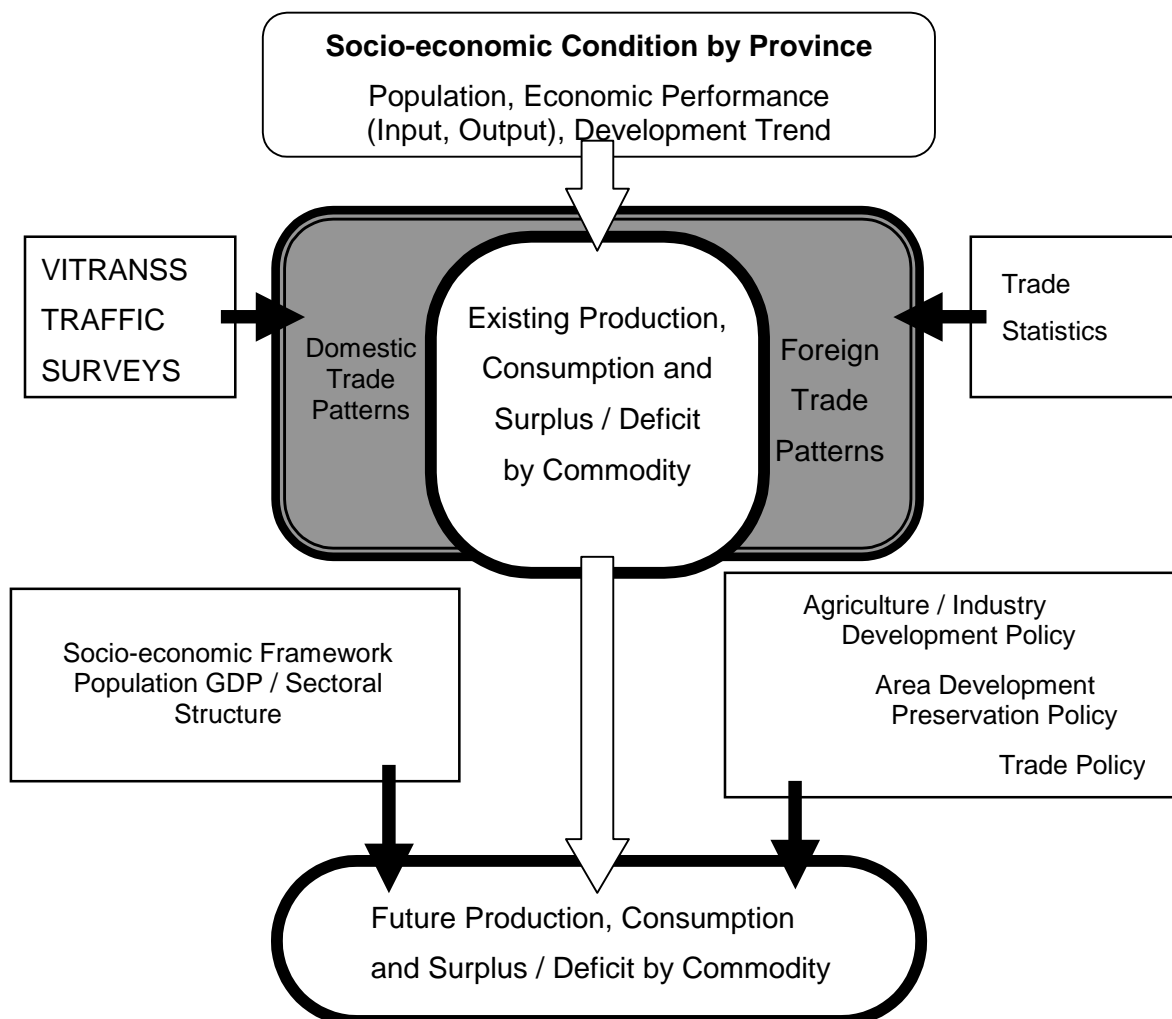




Table 3.4.1  
 Methods Used To Forecast Production and Consumption of Main Commodities

Commodity	Production	Consumption	Indicators
1. Rice and Other Food Crops	Change in sown area, Yield increase, Conversion rate from paddy equivalent to rice equivalent	Per capita consumption rate, Exported volume and its target	Population, Export
2. Sugarcane, Sugar	Change in sown area, Yield increase, Designed capacity of sugar by sugar mill	Designed processing volume of sugarcane by sugar mill, Per capita sugar consumption	Population
3. Wood	The government's wood-cutting control policy, Cut to meet the demand	GDP (industry & construction), Limited consumption by the Government's policy	GDP (industry & construction)
4. Industrial Crops	Commodity market analysis, export policy	Estimate of domestic consumption, GDP	GDP, Export
5. Fishery Products	Trend in fishery products, Potential analysis of catching fishery and breeding fishery, Export policy	Per capita consumption by region	Population by region, Export
6. Animal Meat	Trend in animal meat output	Per capita consumption by region	Population by region
7. Steel	Designed capacity of steel by plant	Estimate of domestic consumption (domestic production + import), GDP (industry & construction)	GDP (industry & construction), Import
8. Construction Materials	Exploitation of stone and sand	Demand forecast (MOC), GDP (industry & construction)	GDP (industry & construction)
9. Cement	Designed capacity of cement by plant, Neighboring countries' experience	Estimate of domestic consumption (domestic production + import), Demand forecast (MOC), GDP (industry & construction)	GDP (industry & construction)
10. Fertilizer	Designed capacity of fertilizer by plant	Estimate of domestic consumption (domestic production + import), GDP	GDP (primary sector), Import
11. Coal	Coal extraction predictions, Coal export policy	Estimate of domestic consumption (domestic production + export), Thermal plants for energy use, Major coal-consuming factories for industrial use, rural population for residents use	Rural population, GDP (industry & construction), Export
12. Crude Oil and Petroleum Products	Expected oil production from discovered reserves, oil refinery project, Export policy	Supply to refinery from the oil fields, Prediction of oil products consumption, GDP	GDP, Export, Import
13. Manufacturing Goods	Analysis of major industrial production and export, GDP (industry & construction)	Analysis of major industrial production and import, GDP	GDP, Export, Import

## 2) Rice and Other Food Crops

Present Situation: Between 1987 and 1997 food output (paddy equivalent) increased at the rate of 5.7% (1 million tons a year on the average). Gross output of food grains per capita increased from 281 kg in 1987 to 398 kg in 1997. In a short period of time Vietnam has become a rice-exporting country, shipping out 1.4 million tons in 1989 to 3.5 million tons in 1997.

Cultivated area also expanded from 7.1 million hectares in 1990 to 8.3 million hectares in 1997, averaging 2.2% a year. However, there is still 16% of paddy land (more than 1 million hectares) neither irrigated nor drained which is also vulnerable to floods and typhoons. In the Mekong River delta, for instance, low-lying farmlands covering 1.8 million hectares regularly suffer from flood tides.

Paddy productivity increased from 3,022 kg per hectare in 1991 to 3,684 kg per hectare in 1997. When compared with world records, Vietnam's productivity is 85% of Indonesia's and 60% of China's and Japan's yield records. Its competitiveness in the international market is also weak, Vietnamese rice is transacted at US\$ 30-50 per ton lower than the average market price.

Future Perspective: The Ministry of Agriculture and Rural Development (MARD) expects to harvest 38-40 million tons of food crops in 2010, representing a production increase of 1.8-2.1% annually to enable the country to export 5 million tons<sup>1</sup> of rice. In 2020, exported rice is estimated at 6 million tons.

Although Vietnam is already self-sufficient in rice, it can further improve productivity. At present, one ton of paddy rice produces an average 680 kg of winnowed rice. The current conversion rate of 68% will be improved to 70% in 2010 and 72% in 2020. The Mekong River delta is a rice basket region. This role will remain the same until the year 2020, offsetting other regions' deficit in rice production and exporting the rest to global markets (see Table 3.4.2).

Production of other food crops, such as maize, sweet potatoes and cassava, initiated by the MARD, is likewise expected to increase (see Table 3.4.3).

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<sup>1</sup> Government Direction on Agriculture and Rural Development, Government Report for the Consultative Group Meeting, December 1998.

Table 3.4.2  
 Rice and Other Food Crops

Region	Production			Consumption		
	1997	2010	2020	1997	2010	2020
1. Red River Delta	3,756.5	4,376.0	4,731.2	3,350.5	4,430.6	4,661.9
2. Northeast	2,037.3	2,758.8	3,115.8	2,472.4	3,408.5	3,634.9
3. Northwest	384.8	436.7	496.2	495.3	691.8	735.3
4. North Central Coast	1,991.7	2,337.5	2,655.8	2,324.2	3,077.7	3,198.9
5. South Central Coast	1,218.4	1,480.3	1,681.9	1,486.5	1,974.3	2,070.3
6. Central Highlands	443.2	614.7	698.4	560.9	856.5	978.6
7. Northeastern South	1,479.1	1,841.0	2,091.8	2,769.6	3,957.8	4,416.6
8. Mekong River Delta	9,509.4	14,823.7	16,027.0	3,786.0	5,271.3	5,801.4
Total	20,820.3	28,668.6	31,498.0	17,245.3	23,668.6	25,498.0

Region	Surplus/Deficit		
	1997	2010	2020
1. Red River Delta	+406.0	-54.6	+69.4
2. Northeast	-435.1	649.8	-519.1
3. Northwest	-110.5	-255.1	-239.1
4. North Central Coast	-332.5	-740.2	-543.1
5. South Central Coast	-268.0	-494.0	-388.4
6. Central Highlands	-117.7	-241.9	-280.2
7. Northeastern South	-1,290.5	-2,166.8	-2,324.9
8. Mekong River Delta	+5,723.3	+9,552.4	+10,225.5
Total	+3,575.0	+5,000.0	+6,000.0

Table 3.4.3 Trend in Food Crops  
 Paddy Equivalent, '000 Tons

Year 1990	21,489
Year 1991	21,990
Year 1992	24,215
Year 1993	25,502
Year 1994	26,199
Year 1995	27,571
Year 1996	29,218
Year 1997	30,618
Year 1998	31,854

### 3) Sugarcane and Sugar

**Present Situation:** The gross output of sugarcane substantially increased from 5.4 million tons in 1990 to 13.8 million tons in 1998. The increase was caused by the corresponding increase in the cultivated area by 116% as well as the yield improvement by 18%. About 54% of output is processed in sugar mills since sugarcane is popular for its juice and sugar.

Current sugar consumption amounts to 9.5 kg a year per person, or a total of 719,100 tons per year. Vietnam imports a small volume of sugar products to offset the shortage in domestic production. In 1994, the government launched a sugar production program called "One Million Tons of Sugar by 2000" and has promoted the construction of sugar mills. Today, 34 sugar mills and small household mills produce 730,000 tons just enough to meet the domestic demand.

After the government banned the entry of imported sugar, smuggling of the product increased allegedly through China and Thailand. The low price of smuggled sugar which ranges from US\$ 0.32 to 0.39 a kilogram, relative to the price of local sugar which is pegged at US\$ 0.46-50, might increase the demand for smuggled sugar

reaching 150,000 tons or 20% of domestic demand. Consequently, 290,000 tons of local sugar were kept in warehouses as of June 1999. Government also postponed the construction of new sugar mills.

Future Perspective: Experiences of other countries show that per capita sugar consumption increases as an economy grows. The same is expected to be true in the case of Vietnam. The Institute of Agricultural Planning and Statistics thus projects an annual per capita consumption of 13-20 kg of sugar in 2010.

Although the government's sugar production plan is temporarily suspended, it still intends to operate 47 mills mostly located in the north. These mills are estimated to produce about 2.5 million tons in 2020. Table 3.4.5 shows that Vietnam's per capita consumption of sugar of 20 kg in 2020 projects a corresponding annual export of 470,000 tons.

Table 3.4.4  
 Forecast of Sugarcane

'000 Tons

Region	Gross Output			Processed in Factories		
	1997	2010	2020	1997	2010	2020
1. Red River Delta	130.1	799.0	824.0	0.0	0.0	1,135.01
2. Northeast	476.3	1,423.5	1,807.5	195.5	391.0	1,134.0
3. Northwest	441.5	688.7	825.0	213.3	267.0	381.0
4. North Central Coast	1,220.1	4,366.4	5,287.5	2,507.0	4,765.0	5,336.6
5. South Central Coast	2,075.2	4,207.8	4,950.5	1,213.5	1,975.0	4,760.2
6. Central Highlands	695.7	1,343.4	1,575.0	355.0	875.0	983.5
7. Northeastern South	2,454.1	5,688.7	6,630.0	1,705.5	3,775.0	7,780.2
8. Mekong River Delta	4,427.9	5,099.9	5,940.0	300.0	2,160.0	3,456.6
Total	11,920.9	23,617.3	27,839.0	6,490.1	14,208.0	24,967.0

Table 3.4.5  
 Forecast of Sugar

'000 Tons

Region	Production			Consumption		
	1997	2010	2020	1997	2010	2020
1. Red River Delta	0.0	0.0	113.5	139.7	265.5	375.7
2. Northeast	19.6	391.1	113.4	103.1	204.2	292.6
3. Northwest	21.4	26.7	38.1	20.7	41.5	59.3
4. North Central Coast	250.7	476.5	533.7	96.6	184.4	261.1
5. South Central Coast	121.4	197.5	476.0	62.0	118.3	167.8
6. Central Highlands	35.5	87.5	98.4	23.4	51.3	75.9
7. Northeastern South	170.6	377.5	778.0	115.5	237.2	345.0
8. Mekong River Delta	30.0	216.0	345.7	157.9	315.9	449.1
Total	649.0	1,420.8	2,496.7	719.1	1,418.2	2,026.6

Region	Surplus/Deficit		
	1997	2010	2020
1. Red River Delta	-139.7	-265.5	-262.2
2. Northeast	-83.5	-165.1	-179.2
3. Northwest	+0.7	-14.8	-21.2
4. North Central Coast	+153.8	+292.1	+272.5
5. South Central Coast	+59.4	+79.2	+308.2
6. Central Highlands	+12.1	+36.2	+22.4
7. Northeastern South	+55.1	+140.3	+433.0
8. Mekong River Delta	-127.9	-99.9	+103.5
Total	-70.1	+2.6	+470.1

Table 3.4.6  
Sugarcane Factories (Existing and Planned)

No.	Factory name	Location	Designed Sugarcane Processing Capacity (ton/day)	Planned Sugar Production (ton/year)	Actual Sugar Production in 1998 or Factory Construction Schedule
1	Lam Son	Thanh Hoa	6,000	108,000	8,640
2	Viet Tri	Phu Tho	500	6,600	330
3	Xuan Duong	Tuyen Quang	1,000	1,750	8,750
4	Tuyen Quang	Tuyen Quang	700	7,500	3,750
5	Hoa Binh	Hoa Binh	700	7,500	6,000
6	Song Con	Nge An	1,250	21,000	16,800
7	Son La	Son La	1,000	19,200	15,360
8	Linh Cam	Ha Tinh	1,000	17,500	5,250
9	Cao Bang	Cao Bang	700	7,500	3,750
10	Song Lam NA	Nghe An	300	4,500	3,600
11	Viet Dai TH	Thanh Hoa	6,000	108,000	54,000
12	TEXALine	Nghe An	6,000	108,000	5,400
13	Quang Binh	Quang Binh	1,500	22,500	11,250
14	CCP	Hue	3,000	60,000	30,000
15	Kontum	Kon Tum	1,000	17,500	8,750
16	Dac Lac	Dak Lak	1,000	17,500	14,000
17	Quang Nam	Quang Nam	1,000	17,500	5,250
18	Quang Ngai 1	Quang Ngai	2,000	24,000	24,000
19	Quang Ngai 2	Quang Ngai	2,000	24,000	21,600
20	Binh Dinh	Binh Dinh	1,500	21,000	21,000
21	Dien Khanh	Khanh Hoa	300	6,000	6,000
22	Ninh Hoa	Khanh Hoa	1,250	21,000	21,000
23	Phan Rang	Ninh Thuan	1,000	21,000	6,300
24	Dong Xuan PY	Phu Yen	100	3,000	1,500
25	Tuy Hoa	Phu Yen	1,250	21,000	21,000
26	Gia Lai	Gia Lai	3,000	45,000	9,000
27	333 Dak Lac	Dak Lak	500	7,500	3,750
28	Binh Thuan	Binh Thuan	1,000	17,500	5,250
29	Nuoc Trong	Tay Ninh	900	18,000	14,400
30	Tri An	Dong Nai	1,000	21,000	12,600
31	La Nga	Dong Nai	2,000	30,000	30,000
32	Binh Duong	Binh Duong	2,000	30,000	30,000
33	Hiep Hoa	Long An	2,000	30,000	72,000
34	Buc Bong	Tay Ninh	8,000	180,000	By Year 2010
35	Nong Cong	Thanh Hoa	1,500	27,000	-do-
36	An Do	Long An	3,000	60,000	-do-
37	Soc Trang	Soc Trang	1,000	21,000	-do-

Cont. of Table 3.4.6

No.	Factory name	Location	Designed Sugarcane Processing Capacity (ton/day)	Planned Sugar Production (ton/year)	Actual Sugar Production in 1998 or Factory Construction Schedule
38	Kien Giang	Kien Giang	1,000	21,000	-do-
39	Ben Tre	Ben Tre	1,000	21,000	-do-
40	Vi Thanh	Can Tho	1,000	21,000	-do-
41	Phung Hiep	Can Tho	1,000	21,000	-do-
42	Thoi Binh	Ca Mau	1,000	21,000	-do-
43	Cam Ranh	Khanh Hoa	3,000	60,000	-do-
44	Duong Tho	Tay Ninh	2,500	60,000	-do-
45	Hai Duong	Hai Duong	n.a	9,450	By Year 2020
46	Ninh Binh	Ninh Binh	n.a	75,600	-do-
47	Ha Nam	Ha Nam	n.a	9,450	-do-
48	Ha Tay	Ha Tay	n.a	18,900	-do-
49	Thai Nguyen	Thai Nguyen	n.a	18,900	-do-
50	Phu Tho	Phu Tho	n.a	1,890	-do-
51	Thanh Hoa	Thanh Hoa	n.a	88,200	-do-
52	Ha Tinh	Ha Tinh	n.a	18,900	-do-
53	Quang Nam	Quang Nam	n.a	37,800	-do-
54	Quang Ngai	Quang Ngai	n.a	94,500	-do-
55	Binh Dinh	Binh Dinh	n.a	28,350	-do-
56	Gia Lai	Gia Lai	n.a	18,900	-do-
57	Ninh Thuan	Ninh Thuan	n.a	85,050	-do-
58	Binh Phuoc	Binh Phuoc	n.a	94,500	-do-
59	Tay Ninh	Tay Ninh	n.a	113,400	-do-
60	Dong Nai	Dong Nai	n.a	170,100	-do-
61	Binh Thuan	Binh Thuan	n.a	14,200	-do-

#### 4) Wood

Present Situation: The country has long been an exporter of timber, notably to Thailand, the former USSR and other socialist countries. Due to commercial deforestation and war damage, forested lands covering 43% of the country in 1943 were reduced to 28% in 1990.

In 1992, a ban on the export of logs and processed timber was introduced to limit the destruction of Vietnam's remaining forests. Exploitation of natural forest in 1997 covered a total area of 525,000 m<sup>3</sup>. This is projected to decrease to 300,000 m<sup>3</sup> in the coming years. The government has decided to reforest five million hectares under the National Reforestation Project, so that by 2010, forested areas will occupy 43% of the country again. This project has also classified forested lands into three – production forest, protected forest and forest for special use such as parks. The government has also ordered to start reforestation project at least 5-10 years before exploitation.

At present, Vietnam has no record of wood imports aside from small quantities from neighboring Laos and Cambodia. In the coming years and with the pace of development, a scarcity of supply is anticipated. To tackle the situation, government has assigned the National Forestry Corporation to reforest 500,000 hectares for the wood processing industry and expects foreign investors to join in the reforestation and lumber processing projects. The MARD has also allowed various industries to consume 12.7 million m<sup>3</sup> of wood in the early 2000s. A total of 1.1 million m<sup>3</sup> will come from abroad under strict government control.

Future Perspective: Although cutting wood has been a practice in 27 provinces, it is broadly permitted only in 19 provinces under the National Reforestation Project. The forest industry in the northeast and northwest will concentrate on reforestation in the coming 10 years, while production shortfall in wood products will be the concern of the central region. Thus, the cutting of wood at its present level would be possible only from 2000 to 2010 and will be allowed a steady increase of 3% yearly from 2011 to 2020. Unlike the experience of Vietnam in the 1980s, the overseas demand at this time is almost impossible to meet.

With regard to firewood, the MARD forecasts that 14.4 million m<sup>3</sup> will be used for daily consumption and industrial activity in the early 2000s. Since consignment size is small and less valuable than timber and lumber, its haulage is short and is possible within a province. Firewood will be gradually replaced with other energy sources due to environmental reasons and because of improved electrification throughout the country.

Table 3.4.7  
 Forecast of Cutting Wood

'000 Tons

Region	Production			Consumption		
	1997	2010	2020	1997	2010	2020
1. Red River Delta	153.6	0	0	440.0	527.3	672.7
2. Northeast	486.7	43.3	477.2	165.2	179.6	242.6
3. Northwest	226.7	0	236.0	14.6	27.0	36.5
4. North Central Coast	290.7	454.3	473.0	120.4	119.4	151.4
5. South Central Coast	316.9	467.3	486.5	127.0	119.2	158.0
6. Central Highlands	279.2	1,263.5	1,315.5	29.0	37.8	54.9
7. Northeastern South	198.3	311.6	389.3	1,268.4	1,181.8	1,608.0
8. Mekong River Delta	527.9	0	36.6	240.5	348.0	489.8
Total	2,480.0	2,540.0	3,413.9	2,405.0	2,540.0	3,413.9

Region	Surplus/Deficit		
	1997	2010	2020
1. Red River Delta	-286.4	-527.3	-672.7
2. Northeast	+321.5	-136.3	+234.6
3. Northwest	+212.1	-27.0	+199.5
4. North Central Coast	+170.3	+334.9	+321.6
5. South Central Coast	+189.9	+348.2	+328.5
6. Central Highlands	+250.2	+1,225.7	+1,260.5
7. Northeastern South	-1,070.1	-870.3	-1,218.7
8. Mekong River Delta	+287.4	-348.0	-453.4
Total	+75.0	0	0

Table 3.4.8 Trend in Cutting Wood  
 '000 m<sup>3</sup>

Year	Exploitation	Consumption
1988	3,356	3,164
1989	3,262	3,007
1990	4,446	4,182
1991	3,210	1,868
1992	2,687	1,997
1993	2,884	2,187
1994	2,823	2,769
1995	2,793	2,785

## 5) Industrial Crops

Present Situation: The 1989 crop diversification has begun in rice-producing regions in an attempt to cash in on higher-earning food crops in local and

international markets. In Vietnam, cultivable industrial crops are classified into two: perennial crops (tea, coffee, rubber, pepper, coconut) and single-year crops (cotton, jute, rush peanut, soybean, tobacco, sugarcane). Except for sugarcane which is separately discussed, the country has harvested 2.2 million tons of perennial industrial crops and 0.6 million tons of single-year industrial crops. Of the total amount of production, 0.6 million tons were exported. In fact, most of the coffee, rubber and pepper harvests were exported, thus, limiting domestic consumption.

Future Perspective: Coffee is the second hard-currency earner in the agricultural sector. Coffee prices in world markets averaged US\$ 1,638 per ton in the second half of 1998. Such a valuable commodity can absorb its transportation cost, even long-distance haulage. With a favorable natural environment and climate, Vietnam has a strong policy of developing rubber plantations. It is now one of the leading exporters of rubber to the world market, whose annual demand of 12-13 million tons might not be met by 2010. Coffee and rubber plantations are concentrated in the central highlands and northeastern south. Since they are located on mid to uplands, access roads to ports are of important consideration.

Table 3.4.9  
 Forecast of Industrial Crops

Region	Gross Output			Consumption		
	1997	2010	2020	1997	2010	2020
1. Red River Delta	97.8	184.5	307.2	410.7	588.1	761.9
2. Northeast	190.4	359.0	597.8	178.7	255.9	312.0
3. Northwest	28.3	53.4	88.9	27.6	39.5	50.4
4. North Central Coast	162.4	306.3	510.0	169.8	243.2	316.9
5. South Central Coast	191.2	360.6	600.4	137.1	196.3	288.2
6. Central Highlands	365.3	688.9	1,147.1	52.6	75.4	120.2
7. Northeastern South	599.3	1,130.1	1,881.8	736.7	1,054.8	1,416.7
8. Mekong River Delta	1,116.4	2,105.2	3,505.2	415.8	595.4	936.2
Total	2,751.3	5,188.0	8,638.4	2,129.1	3,048.6	4,202.5

Region	Surplus/Deficit		
	1997	2010	2020
1. Red River Delta	-312.9	-403.6	-454.7
2. Northeast	+11.7	+103.1	+285.8
3. Northwest	+0.7	+13.9	+38.5
4. North Central Coast	-7.4	+63.1	+193.1
5. South Central Coast	+54.1	+164.3	+312.2
6. Central Highlands	+312.7	+613.5	+1,026.9
7. Northeastern South	+137.3	+75.3	+465.0
8. Mekong River Delta	+700.6	+1,509.8	+2,569.0
Total	+622.2	2,139.4	+4,435.9

Table 3.4.10 Trend in Coffee & Rubber  
 '000 Tons

Year	Coffee	Rubber
1990	92.0	57.9
1991	100.0	64.6
1992	119.0	67.0
1993	136.0	96.9
1994	180.0	128.8
1995	218.1	122.7
1996	254.2	142.5
1997	294.6	185.7



## 6) Fishery Products

Production Trend: Vietnam has a coastline of 3,260 km and an exclusive economic zone of more than 1 million square kilometers. The continental shelf area is wide and shallow in the north and south while narrow with a steep slope in the central region. The maritime fish fauna is characterized by a high number of species with a short life cycle.

The total fish production in 1998 was 1.76 million tons, 1.03 million tons of which came from marine fishing. Production has been increasing by 8.9% on average per year during the 1990s. Marine fisheries are concentrated along the coast at less than 30 m deep. In terms of landing fish volume, southern coastal provinces and the Mekong River delta region have significant production compared with northern provinces.

The potential for aquaculture is more promising in the south since its climate is warmer, resulting in longer growing seasons for tropical species such as tiger shrimp. Its relative freedom from typhoon is also more favorable for coastal saline, brackish water and marine aquaculture. In fact, the Mekong River delta has dominant shares of 59% in breeding fish and 80% in breeding shrimp.

Industrial Structure: About two-thirds of the catch came from the south. Drift nets and trawl lines are the most used fishing gears. Fishing boats number more than 95,000, 60,000 of which are less than 20 m in length while 68,000 are motorized. However, Vietnam only has a few ocean-going fishing boats. There are about 380,000 fishermen and an estimated 3 million people engaged in fishery. Seventy-seven percent (77%) of full-time workers belong to the private sector, while 19% to cooperatives and 3% to state enterprises.

There are at present 508,000 has. for aquaculture. In the 1990s, the area has expanded by 72%, equally divided into fish and shrimp culture. At present, however, the area for shrimp culture has remarkably expanded more than twice its area (93,544 ha in 1990 to 235,498 ha in 1998).

Consumption and Trade: The fishery sector contributed an estimated 3.2% to Vietnam's 1998 GDP. It provides about 40% of the animal protein required by man. The annual per capita fishing consumption is estimated at 19 kg including domestic consumption. The 1993 Living Standard Survey indicated that the volume of fishery product consumption per month varied from region to region, e.g., 0.33 kg in the northern mountainous area and 2.4 kg in the Mekong River delta. Reports show however, that in recent years, mountain folks have increased their fish intake as the road network has developed.

As to retail prices, sea shrimp is much more valuable than fresh carp, valued at VND 48,323/kg and VND 16,783/kg, respectively, as of 1997. Such valuable products may bear the costs of long-distance transportation in domestic markets. An average export price of shrimp was US\$ 6.27/kg as of 1998, enough to cover air haulage.

Over the past 10 years, export turnover increased on an annual average of 20%, since fishery products have proven to be a high foreign-currency earner for Vietnam. In 1997 alone, it accounted for 8.5% of total export with a value of US\$ 782 million.

Future Perspective: One estimate indicates that there is 3.6 million tons of pelagic stock in Vietnamese seas, where the maximum sustainable yield is estimated at 1.2 to 1.3 million tons per year. Meanwhile, potential areas for aquaculture are about 2 million hectares, of which fresh water shares 1 million hectares, brackish water, 0.62 million hectares, and saline water, 0.38 million hectares. This area is four times larger than the existing one (508,018 hectares in 1998). Seafood breeding is therefore, expected to increase faster than fish breeding.

With an increase rate of 3-5%, per capita fishery consumption will reach an average of 29 kg in 2020. The export volume, on the other hand, is projected to increase five times the 1997 figure. To strengthen export, however, there are some issues which need to be addressed, for example, improvement in the provision of chilled warehouses and containers and development of fleet and ports. Qui Nhon, Nha Trang and Can Tho provinces are suitably located as export bases.

Table 3.4.11  
 Forecast of Fishery Products

'000 Tons

Region	Gross Output			Consumption		
	1997	2010	2020	1997	2010	2020
1. Red River Delta	122.9	231.9	311.7	144.0	228.3	310.4
2. Northeast	49.2	92.8	124.7	58.6	96.7	132.7
3. Northwest	5.0	9.4	12.6	11.7	19.6	26.8
4. North Central Coast	126.0	237.9	319.7	133.6	211.5	284.4
5. South Central Coast	241.3	455.3	611.9	181.3	288.6	355.7
6. Central Highlands	4.5	8.4	11.3	24.1	44.1	65.1
7. Northeastern South	298.0	562.3	755.7	319.5	545.4	728.5
8. Mekong River Delta	883.6	1,667.3	2,240.8	597.9	968.6	1,248.4
Total	1,730.4	3,265.3	4,388.4	1,470.8	2,402.9	3,152.1

Region	Surplus / Deficit		
	1997	2010	2020
1. Red River Delta	-21.1	+3.6	+1.3
2. Northeast	-9.4	-3.9	-8.0
3. Northwest	-6.8	-10.3	-14.3
4. North Central Coast	-7.5	+26.4	+35.2
5. South Central Coast	+60.0	+166.7	+256.2
6. Central Highlands	-19.6	-35.7	-53.8
7. Northeastern South	-21.6	+16.9	+27.2
8. Mekong River Delta	+285.7	+698.7	+992.3
Total	+259.6	+862.4	+1,236.2

Table 3.4.12 Trend in Fishery Output

'000 Tons

Year	Catching	Breeding
1990	728.5	162.1
1995	1,195.3	389.1
1996	1,277.9	423.0
1997	1,315.8	414.6
1998	1,335.7	419.8

## 7) Animal Husbandry

Present Situation: Since 1989, farmers have been entitled to purchase, sell and transfer their products in the market. Vietnam's animal husbandry sector has been growing rapidly. For instance, the number of pigs and poultry increased by 1.5 and 1.7 times between 1990 and 1997.

Domestic production of meat has increased by an average of 6% per year reaching a per capita production of 8 kg. In 1997, there were 17.6 million pigs, 3.8 million cattle, nearly 3 million buffaloes, 121 million chickens, 39 million ducks, and 1 million geese in Vietnam. Throughout Vietnam, hog raising is done in small-scale farms and in conjunction with cropping, while poultry farming is widespread. This activity provides a relatively small but constant income to farmers. There is a large room for the introduction of advanced technologies for efficient mass production. The production of processed meat for export steadily increased from 16,000 tons in 1990 to 32,000 tons in 1997, because of the corresponding increase in domestic consumption. Export of meat, pork in particular, is deemed as a possible source of foreign exchange.

Future Perspective: Government believes that animal husbandry could occupy about 30% of the total agricultural gross value by the year 2010 (19.5% in 1997), accompanied by the necessary capital investment, technical advancements and adequate policies. The subsector's average growth rate of export is 6-7% a year.

The 1993 Living Standard Survey revealed that the average monthly consumption of meat was 0.58 kg per capita and its regional fluctuation ranged from 0.40 in the north central coast and the central highlands to 0.70 in the northeast south. However, the regional disparity in per capita meat consumption relatively is small compared with fishery products.

The VITRANSS forecasts that the subsector will produce nearly 2.7 million tons of various animal meats in 2020. With an expected average growth rate of 5.5-7.5% until the year 2020, the average capital meat consumption is expected at 24 kg. Compared with fishery products, production surplus is expected in the Red River delta and the north central coast and may offset the likely shortage in meat production in northeastern and the Mekong River delta.

Table 3.4.13  
 Forecast of Animal Meat

'000 Tons

Region	Gross Output			Consumption		
	1997	2010	2020	1997	2010	2020
1. Red River Delta	121.2	310.4	530.2	121.7	300.9	516.6
2. Northeast	129.1	330.5	564.5	76.2	204.2	345.0
3. Northwest	25.3	64.7	110.5	15.3	30.4	55.6
4. North Central Coast	97.5	249.5	426.2	56.3	153.7	241.8
5. South Central Coast	61.8	158.2	270.2	38.7	102.5	167.2
6. Central Highlands	25.6	65.5	111.9	13.6	42.8	74.0
7. Northeastern South	56.6	144.8	247.3	117.4	305.1	550.2
8. Mekong River Delta	92.4	236.4	403.8	137.5	358.0	642.9
Total	609.4	1,560.0	2,664.5	576.7	1,497.6	2,593.3

Region	Surplus / Deficit		
	1997	2010	2020
1. Red River Delta	-0.5	+9.5	+13.5
2. Northeast	+52.8	+126.2	+219.4
3. Northwest	+10.0	+34.3	+54.9
4. North Central Coast	+41.2	+95.8	+184.3
5. South Central Coast	+23.1	+55.7	+103.0
6. Central Highlands	+12.0	+22.7	+37.9
7. Northeastern South	-60.8	-160.3	-302.8
8. Mekong River Delta	-45.2	-121.5	-239.1
Total	+32.7	+62.4	+71.2

## 8) Steel

**Present Situation:** Over the period 1992-1997 the demand for steel increased at an annual average of 134%. However, it is difficult to estimate actual domestic consumption since Vietnam must import scrapped steel to operate small steel plants. In recent years, Vietnam Steel Corporation constructed several new plants to meet domestic demand as well as to save its foreign currency. As a result, production expanded by nearly five times during the period 1992-1997. After the onset of the regional economic crisis, many steel plants have struggled to earn money as steel stockpiles grew due to weak domestic demand and the availability of other steel products. Domestic production in 1998 is estimated at 853,000 tons, the first decrease since the Doi Moi initiatives.

**Future Perspective:** Before the crisis, Vietnam Steel Corporation predicted that domestic steel demand in 2010 would be 7.7 million tons, 7.0 million tons of which would be supplied by 18 domestic plants. In the face of current weak domestic demand and the projected economic slowdown, the country's steel production program needs to be reviewed.

Regardless of the pace of production expansion, the country is in need of a sustainable domestic steel industry. The iron ore deposit in Thach Khe, Ha Tinh seems to hold suitable reserves. However, two different views were expressed in

1997 by the province and a Vietnam-South Africa-Japan consortium. The former forecast possible mining products of 10 million tons, while the latter concluded that resources are not economically viable enough to exploit because of the very high zinc content. According to the provincial government's reply to the VITRANSS Study Team, the Ministry of Industry is now re-examining the viability of the mining and steel manufacturing project in Ha Tinh. It may be because of the fact that the future volume of imported steel products mostly depends on the Ha Tinh project. Taking the current situation into account, the project is not included in the forecast for 2010. Moreover, a moderate production of 2 million tons compared with the original plan of 10 million tons is estimated from Ha Tinh by the year 2020.

Table 3.4.14  
Steel Plants (Existing and Planned)

No	Plant Name	Location	Estimated Steel Production (‘000 tons/year)		
			1997	2010	2020
1	Thai Nguyen	Thai Nguyen	183.1	250	250
2	Nat Steel Vina	Thai Nguyen	54.0	120	120
3	Vina Pipe	Hai Phong	25.1	45	45
4	VPS	Hai Phong	112.0	200	200
5	Vina Steel	Hai Phong	100.0	180	180
6	Thep Phoi – Tam Vua	Hai Phong	0	0	600
7	Phoi Thep Cai Lan	Quang Ninh	0	500	500
8	Ong Han Co Lon HP	Hai Phong	0	150	150
9	Phuong Nam	Hanoi	0	50	100
10	Danang	Danang	9.4	10	10
11	Lien Chieu	Danang	0	1,000	1,000
12	Nha May	Ha Tinh	0	0	2,000
13	Vina Kioei	Ba Ria-Vung Tau	197.4	240	240
14	South Steel	Dong Nai	310	350	350
15	Posvina	HCM City	0	50	50
16	NM Sat Xop Lo Dien	Ba Ria-Vung Tau	0	1,000	1,000
17	Ton Ma Thep	Dong Nai	0	90	90
18	NM Thep Dac Biet	Bac Ninh	9.1	50	100
19	Nam Dinh	Nam Dinh	0	100	100
20	Ninh Binh	Ninh Binh	13.2	15	15
Total			1,046.5	5,010	7,010

Source: GSO, SCID

Table 3.4.15  
 Forecast of Steel

Region	Production			Consumption		
	1997	2010	2020	1997	2010	2020
1. Red River Delta	250.3	1,390.0	1,390.0	447.8	1,430.8	2,717.0
2. Northeast	279.4	880.0	880.0	168.1	475.8	979.9
3. Northwest	0.0	0.0	0.0	14.8	71.5	147.4
4. North Central Coast	0.0	0.0	2,000.0	122.5	316.4	611.4
5. South Central Coast	9.4	1,010.0	1,010.0	129.2	315.8	638.3
6. Central Highlands	0.0	0.0	0.0	29.5	100.1	221.9
7. Northeastern South	507.4	1,730.0	1,730.0	1,290.8	3,131.3	6,494.8
8. Mekong River Delta	0.0	0.0	0.0	244.7	922.0	1,978.2
Total	1,046.5	5,010.0	7,010.0	2,447.5	6,763.7	13,789.0

Region	Surplus /Deficit		
	1997	2010	2020
1. Red River Delta	-197.5	-40.8	-1,327.0
2. Northeast	+111.2	+404.2	-99.9
3. Northwest	-14.8	-71.5	-147.4
4. North Central Coast	-122.5	-316.4	+1,388.6
5. South Central Coast	-119.8	+694.2	+371.7
6. Central Highlands	-29.5	-100.1	-221.9
7. Northeastern South	-783.4	-1,401.3	-4,764.8
8. Mekong River Delta	-244.7	-922.0	-1,978.2
Total	-1,401.0	-1,753.7	-6,779.0

Table 3.4.16 Supply of Steel

Year	Supply of Steel ('000 Tons)	
	Production	Import
1989	87.0	379.4
1990	101.0	324.3
1991	142.0	113.0
1992	202.0	343.0
1993	252.0	386.3
1994	288.0	754.0
1995	470.0	1,116.2
1996	923.0	1,548.5

## 9) Construction Materials

**Present Situation:** For the forecast period, huge amounts of construction materials, i.e., bricks, tiles, stone, and sand, are estimated to be supplied and consumed daily by a variety of construction projects initiated by both public and private sectors. This section deals with the cited construction materials, while cement and steel are discussed separately. Asphalt is considered a refined oil product.

In 1998, the country produced 7,378 million pieces of bricks and 484 million of tiles. Three-quarters of these were made in small-scale nonstate factories widely spread throughout the country. Factories with foreign investments have contributed negligibly. The VITRANSS traffic survey observed almost no traffic of vehicles carrying bricks and tiles across provincial borders.

**Future Perspective:** The Ministry of Construction (MOC) estimates that the construction industry will need 15.5 billion bricks and 2.6 billion tiles in the year 2020. However, it was concluded that the supply and consumption of these materials would be done by short-distance haulage and thus, may not affect national transport planning exercises.

On the other hand, quarries are quite locational. Products, such as stones, crushed rocks, gravel, and sand, are supplied in concentrated traffic flows to specific construction sites during a limited period of time. It is also noted that the distribution of such traffic flows depends on a constructor's preferred quarries. The VITRANSS traffic surveys observed that many long-distance trips are needed to carry stones and sand even though there are quarries available in destination provinces. The MOC projects that 32.9 million m<sup>3</sup> of stones and 53.0 million m<sup>3</sup> of sand will be consumed by various construction activities in the year 2020.

The northeastern south and the Mekong River delta areas are not endowed with good, sufficient quarries and will have to buy from the central and northern regions. Even though abundant quarries are available in Red River delta, Hanoi, Hai Phong, and Ha Tay (Hoa Lac-Xuan Mai New Town) they will need to bring in considerable amount of stones and sand from other provinces.

Table 3.4.17  
 Construction Materials (Stone, Sand)

Region	Gross Output			Consumption		
	1997	2010	2020	1997	2010	2020
1. Red River Delta	10,719.0	18,813.2	26,005.4	6,610.0	13,752.0	27,456.0
2. Northeast	4,971.7	8,554.4	12,656.0	2,341.0	4,871.0	6,537.0
3. Northwest	2,171.9	3,723.5	5,575.7	551.0	1,146.0	1,538.0
4. North Central Coast	4,355.1	7,626.4	10,626.3	2,479.0	5,157.0	6,920.0
5. South Central Coast	2,473.1	4,277.8	6,217.4	2,203.0	4,584.0	6,152.0
6. Central Highlands	1,761.9	3,017.9	4,532.5	688.0	1,432.0	1,923.0
7. Northeastern South	7,553.9	13,386.0	17,884.1	8,262.0	16,190.0	23,070.0
8. Mekong River Delta	4,236.8	7,420.8	10,332.5	4,406.0	9,168.0	12,298.0
Total	38,243.4	66,819.9	93,829.9	27,540.0	56,300.0	85,894.0

Region	Surplus / Deficit		
	1997	2010	2020
1. Red River Delta	+4,109.0	+5,061.2	-1,450.6
2. Northeast	+2,630.7	+3,683.4	+6,119.0
3. Northwest	+1,620.9	+2,577.5	+4,037.7
4. North Central Coast	+1,876.1	+2,469.4	+3,706.3
5. South Central Coast	+270.1	-306.2	+65.4
6. Central Highlands	+1,073.9	+1,585.9	+2,609.5
7. Northeastern South	-708.1	-2,804.0	-5,185.9
8. Mekong River Delta	-169.2	-1,747.2	-1,965.5
Total	+10,703.4	+10,519.9	+7,935.9

Table 3.4.18  
 Consumption of Construction Materials

Year	Consumption	
	Stone	Sand
1990	5,362	10,438
1991	4,464	12,507
1992	5,420	10,572
1993	7,415	11,061
1994	8,873	13,843
1995	10,615	14,363
1996	12,465	17,147

## 10) Cement

Present Situation: In the early 1990s, domestic cement production did not keep pace with its demand. However, local demand slowed down due to price fluctuations, thereby favoring the demand for imported cement between 1995 and 1997. A foreign-invested cement plant, Chin Fong, which started to supply 836,000 tons in 1997 and expanded its operation to 2 million tons in 1998, freed the country from its reliance on imported cement.

With an abundance of limestone and other mineral resources, Vietnam can provide favorable locations for cement production not only for domestic cement makers but also to foreign investors. Vietnam Cement Corporation (VCC) dominates the local market and now holds 52% of the market share. Regardless of the stiff competition from the private sector, the VCC is investing in its facilities to further increase market share. The other foreign-invested cement plants, on the other hand, are slated to start operation in the near future. A ban on cement imports in 1999 has so far failed to ease oversupply, since more than 1 million tons of cement and 0.75 million tons of clinker still remain unsold.

With such fierce competition among cement producers and an emerging oversupply, it will be inevitable to export locally made cement. Vietnamese cement can compete with Thai cement in Laos and Cambodia (US\$ 80-86 per ton) but cannot in other countries due to high transportation cost, particularly shipment cost.

Future Perspective: In theory, industrialization intensifies cement demand. Table 3.4.18 clearly shows that a less industrialized country needs to produce less amount of cement. The anticipated GDP of the secondary sector until 2020, including industry and construction, is applied to obtain the forecast demand. As a result, per capita cement consumption is projected at 304 kg, 2.87 times bigger than the present level, 106 kg in 1997.

The MOC projects an increase in domestic cement consumption – 54 million tons in 2020 – based on a recent sharp increase, associated by ambitious economic growth projection in per capita GDP in 2020 (US\$ 1,800-2,000). It then formulated an investment program which consists of constructing 38 large cement plants and numerous small mills.

Large cement plants are being upgraded, expanded and under construction such as those in Hoang Thach, Ha Tien II, Bim Son, Hoang Mai, and Nghi Son, aggravating the current oversupply problem. However, there is some possibility of exporting production surplus since government has allowed investors to construct new plants in areas with transport advantages, especially shipping. Such plants will be able to ship out their products to foreign countries in the ASEAN region as well as in East Asia, provided they own or utilize efficient ports and assign specialized cement tankers on trade routes. It is therefore anticipated that 25 large plants in combination with seven existing and 18 new plants, including numerous small mills,



will meet domestic demand. It is projected to export 3-6 million tons of surplus cement during the forecast period. Since necessary mineral products are concentrated in the north and north central coast, the domestic distribution of cement will be broad, from north to south. Cement plants in the north will also have to supply clinker to small cement mills which are mainly located in the south.

Table 3.4.19  
Cement Production in Neighboring Countries

	Cement Production (‘000 tons in 1996/1997)	Production Per Capita (kg)	GNP Per Capita (USD, 1996/1997)
China PR	491,189	399	750
Indonesia	27,716	139	1,080
Malaysia	12,558	579	4,370
Myanmar	524	11	267
Philippines	12,429	169	1,160
Thailand	37,086	611	2,960
Taiwan	21,522	997	13,310
Vietnam	8,019	106	312

Source: ADB Socio-economic Indicators

Table 3.4.20  
Large Cement Plants (Existing and Planned)

No	Cement Plant	Location	Designed Production Capacity (‘000 tons/year)		
			1997	2010	2020
1	Haiphong	Haiphong	300	1,400	1,400
2	Chin Fong	Haiphong	1,400	2,800	2,800
3	Hoang Thach	Hai Duong	1,100	1,100	1,100
4	Phuc Son	Hai Duong		1,800	1,800
5	Tam Diep	Ninh Binh		1,400	1,400
6	But Son	Ha Nam	1,400	1,400	2,800
7	Hai Long	Quang Ninh		1,400	1,400
8	Hoan Cau	Quang Ninh		1,400	1,400
9	Ta Bu	Son La		450	450
10	Bim Son	Thanh Hoa	1,200	1,200	1,200
11	Nghi Son	Thanh Hoa		2,300	3,700
12	Hoang Mai	Nghe An		1,400	1,400
13	Thanh Ha	Quang Binh			2,500
14	Lang Bang	Quang Ninh			2,500
15	Cam Lo	Quang Tri			1,200
16	Dong Lam	Thua Thien - Hue			1,400
17	Thach My	Quang Nam		600	600
18	Hai Van	Danang		600	600
19	Dung Quat	Quang Ngai			500
20	Qui Nhon	Binh Dinh			500
21	Sao Mai	HCM City	1,400	1,400	1,400
22	Ta Thiet	Binh Phuoc			1,400
23	Mui Ne	Binh Thuan			500
24	Hiep Phuoc	Ba Ria – Vung Tau			500
25	Ha Tien	Kien Giang	1,300	2,600	2,600
TOTAL			8,100	23,250	37,050

Source: Vietnam Cement Corporation

Ministry of Construction “Master Plan on Construction Material Industry in Vietnam, 1998”

Table 3.4.21  
 Forecast of Cement

('000 tons)

Region	Gross Output			Consumption		
	1997	2010	2020	1997	2010	2020
1. Red River Delta	3,748.7	10,049.7	11,958.7	2,135.0	4,800.0	7,920.0
2. Northeast	226.6	3,026.6	3,026.6	756.0	1,700.0	2,805.0
3. Northwest	113.3	563.3	563.3	178.0	400.0	660.0
4. North Central Coast	1,418.7	3,717.7	12,217.7	801.0	1,800.0	2,970.0
5. South Central Coast	130.7	1,150.7	3,550.7	712.0	1,600.0	2,640.0
6. Central Highlands	39.1	39.1	39.1	222.0	500.0	825.0
7. Northeast South	1,378.1	1,628.1	4,028.1	2,669.0	6,000.0	9,900.0
8. Mekong River Delta	963.8	2,963.8	3,163.8	1,424.0	3,200.0	5,280.0
TOTAL	8,019.0	23,139.0	38,548.0	8,897.0	20,000.0	33,000.0

Region	Surplus / Deficit		
	1997	2010	2020
1. Red River Delta	+1,613.7	+5,249.7	+4,038.7
2. North East	-529.5	+1,326.6	+221.6
3. North West	-64.7	+163.3	-96.7
4. North Central Coast	+617.7	+1,917.7	+9,247.7
5. South Central Coast	-581.3	-449.3	+910.7
6. Central Highlands	-182.9	-460.9	-785.9
7. North East South	-1,290.9	-4,371.9	-5,871.9
8. Mekong River Delta	-460.2	-236.2	-2,116.2
TOTAL	-878.0	+3,139.0	+5,548.0

Table 3.4.22 Trend in Cement  
 ('000 tons)

Year	Production	Consumption
1989	n.a.	2,332
1990	n.a.	2,745
1991	n.a.	3,134
1992	3,900	3,946
1993	4,800	4,948
1994	5,200	5,931
1995	5,828	7,109
1996	6,585	8,235

## 11) Fertilizer

**Present Situation:** The national output of chemical fertilizer was 982,400 tons in 1997. Phosphate and nitrogen fertilizers are mostly produced in the north. Appetite (phosphaticore) is a source used in the manufacture of fertilizers, with reserves mainly in Lao Cai. Mined appetite in 1997 reached 581,000 tons.

Domestic production of fertilizers cannot compete with imported ones in terms of price as well as quality. Imported chemical fertilizers reached 2,520,700 tons in 1997, or 2.6 times bigger than domestic production. Then too as domestic consumption increased by 10% a year in the last decade, imported fertilizers similarly increased by 10%.

**Future Perspective:** The Ministry of Industry is responsible for expanding fertilizer production through seven major SOEs. The Ministry of Finance compensates these SOEs for their business losses with a surcharge imposed on imported fertilizer. With such assistance, these SOEs, plus a new urea factory within the proposed Dung Quat petrochemical complex, are anticipated to produce 3,580,000 tons of fertilizers in the year 2010. However, domestic products may not be dominant in the market during the forecast period. Therefore, southern farmers will continue to patronize imported fertilizers.

The use of fertilizers differs from one region to another. The south consumes more than half of the national demand while the central region gets less than 20%.

Table 3.4.23  
Location and Production Capacity of State-owned Fertilizer Factories

No	Factory	Location	Production Capacity ('000 tons/year)		
			1997	2010	2020 <sup>1/</sup>
1	Super Lam Thao	Phu Tho	655.8	1,000	1,500
2	DAP Quang Ninh	Quang Ninh	n.a.	300	500
3	Meltd Van Dien	Hanoi	192.0	200	400
4	Meltd Ninh Binh	Ninh Binh	40.1	90	190
5	Super Long Thanh	Dong Nai	n.a.	200	400
6	Urea Ha Bac	Bac Giang	133.6	340	460
7	Urea Dung Quat	Quang Ngai	0	250	500
8	Urea Phu My	Baria-Vung Tau	39.9	600	1,000

Source: GSO, Vietnam Chemical Corporation

1/ Forecast figures made by the Study Team.

Table 3.4.24  
Forecast of Fertilizer Production and Consumption

Region	Gross Output			Consumption		
	1997	2010	2020	1997	2010	2020
1. Red River Delta	232.1	290.0	590.0	818.5	984.0	1,186.8
2. Northeast	790.4	1,640.0	2,460.0	356.2	961.8	1,492.9
3. Northwest	0.0	0.0	0.0	55.0	242.9	405.5
4. North Central Coast	52.1	50.0	100.0	338.5	968.0	1,427.1
5. South Central Coast	182.1	420.0	770.0	273.2	712.8	1,030.5
6. Central Highlands	0.0	0.0	0.0	104.9	439.7	739.6
7. Northeastern South	286.7	1,150.0	2,000.0	1,468.1	971.7	1,338.8
8. Mekong River Delta	20.0	30.0	80.0	828.7	2,954.0	4,291.7
Total	1,563.4	3,580.0	6,000.0	4,243.0	8,235.0	11,913.0

Region	Surplus / Deficit		
	1997	2010	2020
1. Red River Delta	-586.4	-694.0	-596.8
2. Northeast	+434.2	+678.2	+967.1
3. Northwest	-55.0	-242.9	-405.5
4. North Central Coast	-286.3	-918.0	-1,327.1
5. South Central Coast	-91.1	-292.8	-260.5
6. Central Highlands	-104.9	-439.7	-739.6
7. Northeastern South	-1,181.4	+178.3	+661.2
8. Mekong River Delta	-808.7	-2,924.0	-4,211.7
Total	-2,679.6	-4,655.0	-5,913.0

Table 3.4.25 Trend in Fertilizer

Year	'000 Tons	
	Production	Consumption
1989	370.7	1,363.4
1990	349.8	1,708.9
1991	436.2	2,193.1
1992	505.6	2,207.2
1993	550.0	2,067.7
1994	806.0	2,906.0
1995	931.0	2,716.0
1996	965.0	3,315.6

## 12) Coal and Other Mining Products

Present Situation: Coal has supported the country's rapid economic growth. Domestic coal sales increased from 4.0 million tons in 1990 to 7.9 million tons in 1997, while export grew from less than 0.7 million tons in 1990 to 3.5 million tons in 1997. Large coal consumers are state-owned thermal plants, steel, fertilizer, and cement factories. Except for thermal plants, these factories have large stockpiles of coal due to the regional economic crisis. The coal industry itself has 4 million tons in stock as of mid-1999.

Vietnam's principal coal reserves lie in the Quang Ninh coalfield. In situ reserves down to 100 meters are estimated at 660 million tons. Of these, about 250 million tons are considered accessible by open-pit method while the rest by underground operations. Other countries prize Vietnam's anthracite coal for its low ash, low phosphorus and high fixed-carbon content.

From a marketing perspective, the most important question is how to transport coal economically to consumers within Vietnam to compete with other energy sources, such as firewood and petroleum products, or to transport Chinese anthracite coal to the global market. Coal is now distributed in the north by rail and barge to or from many coal yards. But in the south, it is carried by ship then distributed by barge and truck. Only three coal yards cannot efficiently and economically support such distribution. As a result, it costs US\$ 26.9 a ton more than in the north<sup>2</sup>, thus failing in the competition with other resources. In the world market, Vietnam accounts for a 40% share of anthracite coal, which is limited to about 10 million tons a year. Since China's anthracite production is growing, it is essential for Vietnam to reduce its shipment cost to its major customers such as Japan, West Europe and Bulgaria to maintain its market share.

Future Perspective: According to 1997 World Bank (WB) estimate, 2.1 million tons of coal were used to generate electricity, 1.9 million for various industrial activities and 2.6 million for rural household, particularly in mountainous provinces. The WB also forecasts increasing coal consumption by industry and energy sectors and the same coal consumption among rural residents until the year 2015. Its projected domestic consumption and export in 2010 are 11.0 million tons and 4.5 million tons, respectively.

Although Vietnam has ample mineral resource, the mining industry excluding fossil fuel is small. Only a few mineral resources are currently exploited in an industrial scale: limestone (11.2 million tons for cement and steel factories), appetite (0.8 million tons for fertilizer factories), chromium, titanium, and crystalline sand. Mining equipment is outdated, while the processing industry requires modern technology and huge investment. However, this sector is likely to develop during the forecast period with foreign investment inflow.

According to the Vietnam Mining Corporation and other sources, various mining resources are distributed over the country as follows:

- 1) Chromium: Thanh Hoa
- 2) Titanium: Ha Tinh, Thua Thien – Hue, Binh Dinh
- 3) Crystalline Sand: Quang Nam, Khanh Hoa
- 4) White Sand for glass production: Binh Dinh, Ninh Thuan, Binh Thuan
- 5) Silica Sand: Quang Tri, Quang Nam

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<sup>2</sup> 1997 coal prices in the north: US\$ 20.69 -28.84 a ton for electricity, US\$ 19 for mountain dwellers, and US\$ 25.86 for other consumers (Source: World Bank).

- 6) Bauxite and Alumina: Dak Lak, Lam Dong, Phu Yen  
 7) Ore: Lao Cai, Phu Tho, Cao Bang, Ha Tinh

Vietnam exported various mining products amounting to 120,000 tons in 1997. A new mining project, which reportedly will be served either by a railway, road or inland waterway connected with a port, is not yet disclosed. The sector's aluminum project needs to develop a combined hydropower plant, but project implementability is still uncertain. At this stage, future export volume is estimated at 0.5 million tons in 2010 and 1 million tons in 2020, including expansion of present mining sites and development of new ones.

Table 3.4.26  
 Forecast of Coal

Region	Gross Output			Consumption		
	1997	2010	2020	1997	2010	2020
1. Red River Delta	0.0	0.0	0.0	2,756.3	3,827.7	4,976.9
2. Northeast	11,347.1	15,559.5	18,941.1	1,523.7	2,163.9	2,919.1
3. Northwest	38.6	52.9	64.4	128.0	105.8	109.5
4. North Central Coast	2.3	3.1	3.8	841.2	837.1	2,178.2
5. South Central Coast	0.0	0.0	0.0	372.4	340.1	383.1
6. Central Highlands	0.0	0.0	0.0	141.3	128.5	141.6
7. Northeastern South	0.0	0.0	0.0	1,164.5	2,794.6	2,857.4
8. Mekong River Delta	0.0	0.0	0.0	1,006.8	881.8	942.4
Total	11,388.0	15,615.5	19,009.3	7,934.2	11,079.5	14,508.1

Region	Surplus / Deficit		
	1997	2010	2020
1. Red River Delta	-2,756.3	-3,827.7	-4,976.9
2. Northeast	+9,823.4	+13,395.6	+16,022.1
3. Northwest	-89.4	-52.9	-45.0
4. North Central Coast	-838.9	-834.0	-2,174.4
5. South Central Coast	-372.4	-340.1	-383.1
6. Central Highlands	-141.3	-128.5	-141.6
7. Northeastern South	-1,164.5	-2,794.6	-2,857.4
8. Mekong River Delta	-1,006.8	-881.8	-942.4
Total	+3,453.8	+4,536.0	+4,501.2

Table 3.4.27 Trend in Coal

Year	'000 Tons	
	Production	Consumption
1990	4,600	3,812
1991	5,000	3,827
1992	5,000	3,377
1993	5,900	4,468
1994	5,700	3,632
1995	8,400	5,579
1996	9,823	6,223

13) Crude Oil and Refined Oil

Present Situation: Vietnam's continental shelf remains largely unexplored relative to those of its neighbors, including China, Malaysia, Indonesia, and Thailand. Petro Vietnam has made intense efforts to attract international oil companies to explore the country's sedimentary basins, and recent discoveries of commercial quantities of oil and gas have revived interest in exploration. The discovered field in the Cuu Long and Nam Con Son basins potentially contains 2,000 million

barrels of oil and 230 billion cubic meters of gas. These figures are likely to change because some of the main oil and gas discoveries are still at an early stage of appraisal. Preliminary analysis indicates, however, that oil production from the Cuu Long basin will peak at 125 million barrels a year in 2001-02. Associated with gas and condensate, 17 million toe (tons of oil equivalent) is anticipated in the early 2000s and thereafter production from these fields will decline. But many potential fields still remain unexplored.

Since Vietnam is not yet provided with refinery facilities able to process its ample reserves, except for small facilities owned by Saigon Petro (8,800 barrels per day), most refined products must be imported. The imported amount increased substantially from 2.9 million tons in 1990 to 6.0 million tons in 1997, averaging 11.1% a year. There are three ports exclusively importing refined products, i.e., B12 in Quang Ninh, My Ke in Danang and Nha Be in HCMC. In the north, a pipeline network has been developed for refined oil haulage, stretching from B 12 Oil Port to Hai Phong, Hai Duong, Hanoi, and Ha Nam. On the other hand, truck is a dominant transport mode in the central region and in the south.

The first oil refinery will be built in Dung Quat, Quang Ngai province with capacity to process 6.5 million tons per annum of crude oil. It is now under construction by Viet Sov Petro, the joint venture between Petro Vietnam and its Russian partner. Its opening is slated for the year 2003. With this operation, the distribution of refined oil will have to be changed drastically with increasing demand on coastal shipping. A new pipeline is planned between Dung Quat and Danang.

Future Perspective: It is reported that a second oil refinery will be constructed by the year 2010 with a capacity of 6.5 million tons. While the location is still uncertain, it is assumed to be built beside the first one based on the original scheme.

According to the WB's energy sector report, the increase in refined oil demand will be faster than Vietnam's GDP until the year 2015: 7.0 million tons in 2000, 10.4 million tons in 2005, 15.3 million tons in 2010, and 22.7 million tons in 2015. By extending this curve, the domestic demand in the year 2020 is expected to reach 30 million tons.

The country is a net importer of asphalt and will be until the Dung Quat oil refinery starts its operation. Trade statistics show 143,500 tons of imported asphalt in 1997. The oil refinery will initially produce 150,000 tons and subsequently, up to 300,000 tons by the year 2010 to meet domestic demand.

Table 3.4.28  
 Forecast of Refined Oil

'000 Tons

Region	Gross Output			Consumption		
	1997	2010	2020	1997	2010	2020
1. Red River Delta	0.0	0.0	0.0	975.7	2,735.5	5,460.9
2. Northeast	0.0	0.0	0.0	424.5	1,146.3	2,236.4
3. Northwest	0.0	0.0	0.0	65.6	186.4	361.3
4. North Central Coast	0.0	0.0	0.0	526.2	1,161.7	2,271.3
5. South Central Coast	0.0	12,000.0	12,000.0	325.7	1,064.5	2,065.8
6. Central Highlands	0.0	0.0	0.0	125.0	426.8	861.6
7. Northeastern South	300.0	300.0	300.0	2,250.0	5,052.5	10,154.9
8. Mekong River Delta	0.0	0.0	0.0	1,287.8	3,477.7	6,710.8
Total	300.0	12,300.0	12,300.0	5,980.5	15,251.4	30,123.0

Region	Surplus / Deficit		
	1997	2010	2020
1. Red River Delta	-975.7	-2,735.5	-5,460.9
2. Northeast	-424.5	-1,146.3	-2,236.4
3. Northwest	-65.6	-186.4	-361.3
4. North Central Coast	-526.2	-1,161.7	-2,271.3
5. South Central Coast	-325.7	+10,935.5	+9,934.2
6. Central Highlands	-125.0	-426.8	-861.6
7. Northeastern South	-1,950.0	-4,752.5	-9,854.9
8. Mekong River Delta	-1,287.8	-3,477.7	-6,710.8
Total	-5,680.5	-2,951.4	-17,823.0

Table 3.4.29 Trend in Oil

'000 Tons

Year	Crude Oil	Refined Oil
	Production	Consumption
1990	2,568	2,861
1991	3,729	2,573
1992	5,231	3,142
1993	6,001	4,095
1994	6,563	4,381
1995	7,620	4,588
1996	8,803	5,327

#### 14) Manufacturing Goods

Present Situation: The gross output of industry in 1997 is estimated at VND 133,685 billion. Some industrial and manufacturing goods are already taken into account in this section and they should be discarded to estimate the rest, as follows:

- Energy combustible consisting of coal, oil and gas (refer to 11) Coal and 12) Oil)
- Metallurgy (refer to 7) Steel)
- Chemicals (refer to 9) Cement and 10. Fertilizer)
- Other manufacturing: wood and construction materials are discarded (refer to 3) Wood, 8) Construction Material)
- Food and foodstuff: Industrial crops are discarded (refer to 4) Industrial Crops)

As a result, about 50% of industrial output is not covered by the aforementioned analyses, as shown in Table 3.4.26. The rest consisting of machinery, cellulose part, paper, beverage, salt, textile, garment, printing, etc. is called "manufacturing goods" in this study.

Future Perspective: Manufacturing goods are expressed in value in the statistics. Therefore, the value should be converted to tonnage for transport planning purposes. Since this category include so many industrial products, it is difficult to weigh all of them. It was reported that two export processing zones (EPZs) in Ho Chi Minh City export their machinery products, making an average of US\$ 4,400 per ton. On the other hand, beverage and paper must have a far lower value. A concept of capacity tonnage should be applied to light and mass products such as textile and garment. This would result in decreasing value per ton. Then the average of manufacturing products is estimated at US\$ 1,000 per ton supported by VITRANSS traffic surveys.

With this unit value, manufacturing goods in domestic and foreign trade can be translated into the following volumes:

Domestic production	=	5.50 million tons
Export	=	2.63 million tons
Import	=	2.74 million tons
Domestic consumption	=	5.61 millions tons

Table 3.4.30  
 Estimated Gross Output of Industry by Branch, 1997

Industrial Branches	Gross Output	Manufacturing Goods	
		Value	%
Energy Combustible	23,871	0	0
Metallurgy	4,548	0	0
Machinery	14,589	14,589	100
Chemicals	10,422	0	0
Other manufacturing <sup>1/</sup>	14,823	1,334	9
Food and foodstuff	39,438	24,887	63
Textile, leather and garments	16,259	16,259	100
Printing and cultural products	2,685	2,685	100
Others	7,071	7,071	100
<b>Total</b>	<b>133,685</b>	<b>66,825</b>	<b>50</b>

Source: General Statistical Service, World Bank

1/ Including construction materials, wood, forest products, cellulose part, and paper industries



Table 3.4.31  
 Manufacturing Goods

'000 Tons

Region	Gross Output			Consumption		
	1997	2010	2020	1997	2010	2020
1. Red River Delta	1,006.2	3,542.5	6,175.4	1,081.7	3,120.3	5,792.1
2. Northeast	377.8	1,206.6	2,227.3	470.6	1,307.6	2,372.1
3. Northwest	33.4	181.4	335.1	72.7	212.7	383.2
4. North Central Coast	275.3	802.3	1,389.7	447.3	1,325.1	2,409.1
5. South Central Coast	290.3	800.7	1,450.8	361.1	1,214.3	2,191.1
6. Central Highlands	66.4	253.8	504.4	138.6	486.8	913.8
7. Northeastern South	2,900.7	7,939.9	14,762.1	1,940.0	5,763.3	10,770.8
8. Mekong River Delta	549.9	2,337.9	4,496.2	1,095.0	3,966.9	7,117.8
Total	5,500.0	17,065.0	31,341.0	5,607.0	17,397.0	31,950.0

## 15) Analysis of Aggregated Surplus and Deficit of Commodities

### National Trade Balance

This section aims at estimating the national trade balance based on the Main Commodity Survey.

Based on the results of the Main Commodity Survey with supplementary data sources such as GSO trade statistics and VINAMARINE port statistics, Vietnam's foreign trade by major commodity was estimated for 1997 and forecast for the years 2010 and 2020. In this traffic analysis, the following important aspects that need to be considered in planning have been duly considered:

- (1) High and low assumptions: Based on VITRANSS GDP projections, high and low assumptions have been made for future traffic. In general, a lower GDP scenario shrinks domestic traffic demand. However, for cement manufacturing, in particular, government has already approved or committed new plants. Under the low assumption, oversupply would be exacerbated with sluggish domestic demand, and manufacturers would eventually resort to exportation. Under any economic circumstance, government must somehow earn hard currency to balance its foreign trade. Toward this end government has expressed a clear policy to export strategic commodities, such as rice, industrial crops (coffee, rubber, etc.) and coal, in many occasions, such as the Consultative Group Meeting consisting of Vietnam's donor community, which may not be affected under any assumptions.
- (2) Other miscellaneous goods: There is some discrepancy between the commodity survey and port statistics. The estimated national balance in 1997 based on the commodity survey is short of 756,000 tons in export and 2,412,000 tons in import, which is equal to 3.7% and 16.2% of the estimated national balance. They are considered other miscellaneous goods. Judging from available statistics and documents in Vietnam, export volume and its component can be estimated rather easily since SOEs export goods in bulk.

On the other hand, it is difficult to analyze correct import volume and its component. Vietnam imports numerous industrial goods not only for end-users but also for manufacturers who may use them as parts or intermediate materials of final products which may either be exported or sold to local markets. Such numerous industrial products except mass final products are not specified in trade statistics and are thus impossible to estimate. In future, liberalized trade regimes will further accelerate such transactions as Vietnam's economy becomes more integrated with the global economy. It is expected that exported "other miscellaneous goods" will increase since the private sector is growing and export processing industries are promising in Vietnam.

Taking such economic condition into account, the ratio of other miscellaneous goods to the national balance is determined as follows:

Table 3.4.32  
 Ratio of Other Miscellaneous Goods to the National Balance

	1997	High Assumption		Low Assumption	
		2010	2020	2010	2020
Export	3.7 %	10 %	20 %	9 %	16 %
Import	16.2 %	25 %	30 %	22.5 %	24 %

(3) Transit/Transshipment: According to VINAMARINE, Vietnamese ports handled 3,151,000 tons in transit in 1997. However, the figure may include transit cargo to/from neighboring countries transported by land and inland waterways, as well as transshipment cargo to/from the next port by ocean-going vessel. After examining each port statistics, transit cargo is estimated at 2,639,000 tons with the following breakdown: Lao PDR 240,600 tons; Cambodia 1,863,400 tons and China PR 536,300 tons, while transshipment cargo is 512,000 tons.

As a whole, transit cargo is expected to increase as international infrastructure and institutional development strengthens to facilitate cross-border traffic. However, the magnitude of future cross-border traffic which will connect with Vietnamese sea ports is quite uncertain. Supported by relevant studies, statistics and survey results done by neighboring countries, cross-border traffic is tentatively forecast as follows:

Lao PDR: Vientiane is 680 km away from Bangkok and 380 km away from Cua Lo, Vietnam. The special development zones of Xieng Khouang, Bolikhamsay and Khamouane provinces are in the range of 100-400 km from Vietnam sea. Savannakhet and Saravance are undergoing a socio-economic development using local resources and as a result of the East-West Corridor Development (Thailand: Laem Chabang- Savannakhet-Danang). Laos now uses Danang port as transit and home port for its two ocean-going vessels. With the corridor development, Laotian cargo is expected to increase substantially, exporting sawn timber, rice and rubber and importing fertilizer and daily goods.

Cambodia-Mekong River: Sihanoukville port, Cambodia's only sea port, is growing rapidly, averaging 23% a year in cargo handling during the period

1992-1997. Activities at Phnom Penh port, its biggest river port, are likewise increasing, albeit steadily: Its international cargo to/from and via Vietnam increased by 3.5% annually between 1992 and 1997 and may continue in future (refer to Figure 3.4.2)

Cambodia-Ho Chi Minh City to Phnom Penh Highway: It is now under construction with the assistance of the Asian Development Bank. The project anticipates considerable cross-border traffic, i.e., 1,385 and 2,536 trucks a day in 2010 and 2020, respectively. Some of them will access HCM City port or Vung Tau-Thi Vai port. The highway project has estimated that the conversion traffic from Mekong River would be limited.

North Cambodia to Qui Nhon Port: This port used to handle Cambodian timber for export. But it cannot be expected to increase its handling capacity. The traffic pattern is also quite unidirectional, from northern Cambodia to Qui Nhon. With the improvement of National Road No 13 and economic development in northern Cambodia, future traffic will generate from both sides. Therefore, transit traffic will significantly increase after the year 2010 from the current level.

Yunnan Province, China PR: Yunnan is a land-locked province and thus it ships out trading goods from a sea port outside the province. Haiphong port where many ship calls is convenient for such cargo. But the access railway, roads and rivers are all problematic. Compared with Chinese inland transport system (road and rail) and ports (Fang Cheng and Bei Hai), Vietnam is currently less competitive. With the improvement of railway and National Road No 70, Vietnam may expect to receive substantial transit cargo from Yunnan after the year 2010. But in Guangxi Province two deep-sea ports are growing and therefore the volume of transit cargo from China through Vietnamese sea ports will be the same at best.

Transshipment: Vietnamese ports will not be suitable for transshipment since large vessels assigned on trunk trans-ocean routes do not frequently enter. But as the number of ship calls increases, transshipment cargo will somewhat increase to the convenience of shipping companies. This forecast does not consider any exclusive transshipment ports.

Figure 3.4.2  
 Trend in Cargo Volume at Phnom Penh Port and Sihanoukville Port

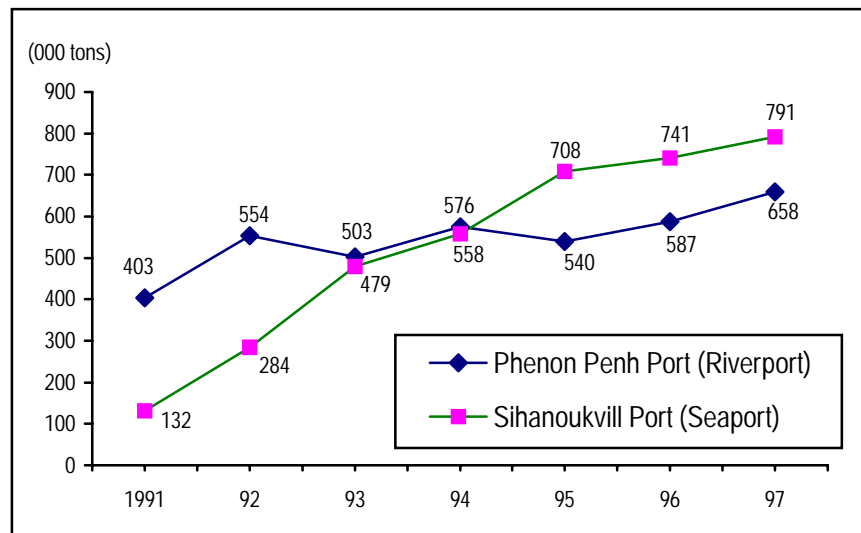


Table 3.4.33  
 Transit/Transshipments

('000 tons)

	1997	High Assumption		Low Assumption	
		2010	2020	2010	2020
Lao PDR	240.6	735	1,470	716	1,303
Cambodia	1,863.4	3,439	5,171	3,117	4,176
- Qui Nhon	218.3	220	358	220	326
- Mekong	1,645.1	2,573	3,630	2,316	2,904
- Road to HCM City Port	0	646	1,183	581	946
China	536.3	628	1,092	565	913
Transit Total	2,639	4,802	7,733	4,398	6,392
Transshipment	512	965	1,573	853	1,262
<b>TOTAL</b>	<b>3,151</b>	<b>5,767</b>	<b>9,306</b>	<b>5,251</b>	<b>7,654</b>

Sources: VINAMARINE (1997 Data), "The Study on the Port Development Plan in the Key Area of the Central Region" (JICA, 1998), "Transport Master Plan for the Central Region of Vietnam" (1998), "Ho Chi Minh City To Phnom Penh Highway Improvement Project" (ADB, 1997)

Table 3.4.34  
 Summary of Main Commodity Survey

('000 tons)

Commodity Classification		Domestic Production			Domestic Consumption			
		1997	2010	2020	1997	2010	2020	
1	Rice and Other Food Crops	20,820	28,669	31,498	17,245	23,669	25,498	
2	Sugarcane, Sugar	Sugarcane	11,921	23,617	27,839	6,490	14,208	24,976
		Sugar	649	1,421	2,497	719	1,418	2,027
3	Wood	2,480	3,642	5,932	2,405	3,642	5,932	
4	Industrial Crops	2,740	5,188	8,683	2,129	3,049	4,203	
5	Fishery Products	1,730	3,265	4,388	1,471	2,403	3,152	
6	Animal Meat	609	1,560	2,664	577	1,498	2,593	
7	Steel	1,047	5,010	7,010	2,448	6,764	13,789	
8	Construction Material	Stone, Sand	40,264	66,820	93,830	27,540	56,300	85,894
9	Cement, Clinker	Cement	8,019	23,139	38,639	8,897	20,000	33,000
10	Fertilizer		1,563	3,580	6,000	4,243	8,235	11,913
11	Coal & Other Mining Products	Coal	11,388	15,616	19,009	7,934	11,080	14,508
		Other Mining	1,200	5,000	10,000	0	0	0
12	Crude oil & Refined oil	Crude Oil	10,090	17,000	17,000	330	13,530	13,530
		Refined Oil	300	12,300	12,300	6,401	15,251	30,123
13	Manufacturing Goods		5,500	17,065	31,341	5,607	17,397	31,950
<b>TOTAL</b>			<b>120,320</b>	<b>232,892</b>	<b>318,630</b>	<b>93,872</b>	<b>198,444</b>	<b>303,088</b>

Table 3.4.35  
 Forecast of National Trade Balance

('000 tons, +: export, -: import)

Commodity Type		1997	High Assumption		Low Assumption	
			2010	2020	2010	2020
Estimated National Balance *	1. Rice and Other Food Crops	+3,575	+5,000	+6,000	+5,000	+6,000
	2. Sugar	-70	0	+470	0	+36
	3. Wood	+75	-1,100	0	-1,100	0
	4. Industrial Crops	+611	+2,130	+4,430	+2,130	+4,430
	5. Fishery Products	+259	+860	+1,236	+860	+970
	6. Animal Meat	+32	+62	+71	+62	+61
	7. Steel	-1,401	-1,751	-6,779	-1,532	-4,066
	8. Construction Materials	-144	0	0	0	0
	9. Cement, Clinker	-1,740	+3,139	+5,548	+4,486	+6,027
	10. Fertilizer	-2,680	-4,655	-5,913	-4,576	-4,599
	11. Coal and Other Mining	+3,574	+5,000	+5,500	+4,900	+5,300
	12. Crude Oil and Refined Oil	+9,670	+3,470	+3,470	+3,470	+3,470
	13. Manufacturing Goods	-6,101	-2,951	-17,823	-1,235	-11,024
Other Miscellaneous Goods	+2,630	+8,157	+14,987	+7,608	+13,440	
	-2,737	-8,489	-15,596	-7,917	-13,987	
	+756	+2,782	+8,342	+2,566	+6,357	
	-2,412	-4,462	-13,833	-3,434	-8,082	
Export Subtotal	21,182	30,600	50,054	31,082	46,091	
Import Subtotal	17,285	22,308	59,944	18,694	41,758	
Transit/Transshipment	3,151	5,767	9,306	5,251	7,654	
Cargo Throughput Total	41,618	58,674	119,305	55,027	95,504	

### Interprovincial Balance

One of the major objectives of the Main Commodity Survey is to estimate interprovincial balance by looking at trade surplus and deficit since the VITRANSS highlights interprovincial traffic and disregards intra-provincial movement. The surplus and deficit by main commodity at provincial level can provide the minimum transport requirement of each item as long as its production and consumption are also duly estimated. Actual goods transport may be more active than the estimated interprovincial balance with the following reasons:

- The Main Commodity Survey estimates a year-round balance without taking account of seasonality.
- Generally in a market economy, goods production as well as sales generates and attracts various goods traffic such as transporting raw materials and intermediate products to production and processing sites, carrying final products to warehouses and wholesale markets in bulk, and distributing them to retail sales shops. However, likely minimum transactions are estimated in the Main Commodity Survey, i.e., production sites and consumption sites of final products.

The aggregated volume of surplus and deficit at provincial level, including external foreign linkages, is summarized in Table 3.4.36.

In conclusion, the volume of surplus and deficit in 1997 is expected to expand until the year 2020 by 2.7 times under the low assumption scenario, and by 3.3 times under the high assumption scenario.

Table 3.4.36  
 Aggregate Volume of Surplus and Deficit at Provincial Level

Commodity Groups	Amount of Surplus and Deficit at Provincial Level				
	1997	2010-Low	2020-Low	2010-High	2020-High
1. Rice and Other Food Crops	6,868	10,587	11,601	10,587	11,601
2. Sugarcane and Sugar	2,085	1,202	2,947	1,454	6,123
3. Wood	1,621	2,250	2,783	2,250	2,783
4. Industrial Crops	1,581	3,382	5,822	3,382	5,822
5. Fishery Products	688	1,498	1,754	1,498	2,069
6. Animal Meat	153	384	625	384	690
7. Steel	2,068	4,832	8,654	5,017	10,988
8. Construction Materials	12,788	24,356	32,118	26,946	43,103
9. Cement	6,429	16,484	22,883	16,231	27,289
10. Fertilizer	3,500	7,281	9,499	7,352	10,699
11. Coal and Other Mining Products	10,997	13,973	15,627	14,534	17,690
12-1 Crude Oil	10,090	17,000	17,000	17,000	17,000
12-2 Refined Oil	6,101	13,084	22,761	14,776	29,474
13. Manufacturing Goods	6,802*	19,679	34,766*	21,100	38,760*
Other Miscellaneous Goods	3,588	6,000	14,439	7,244	22,175
<b>TOTAL</b>	<b>75,359</b>	<b>141,992</b>	<b>203,279</b>	<b>149,755</b>	<b>246,266</b>

### 3.5 International Passenger Traffic

#### 1) Foreign Visitors to Vietnam

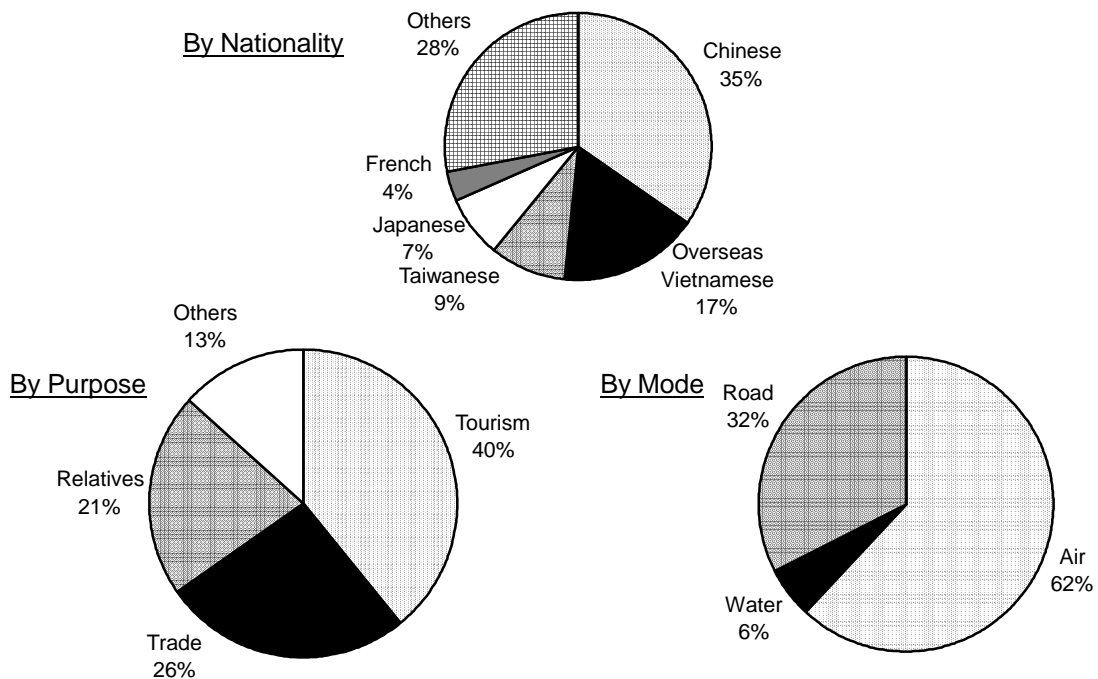
Vietnam received 1.8 million foreign visitors in 1998, increasing from 1.6 million in 1996 and 1.7 million in 1997. The statistics provided by the GSO, may not include cross-border movement of foreign visitors. Neither does it indicate international passenger traffic by railway.<sup>3</sup> However, the following characteristics can be pointed out:

- By nationality, the Chinese comprise the largest group with 626,147 visitors, followed by overseas Vietnamese (165,677), Taiwanese (165,677), Japanese (133,094), and French (68,033). Its two neighbors, the Cambodian and Laotian, are included in the category “others” (626,147).

<sup>3</sup> According to VR, international trains carried 994 cross-border passengers to Vietnam in January, June and September of 1998. The volume is quite marginal compared with the national total of 1.8 million.

- By purpose, nearly 40% of foreigners came to Vietnam for tourism, followed by trade (26%) and to meet relatives (21%). Most overseas Vietnamese visited their relatives.
- By transport mode, air transport has a major share of 62% while roads and waterways accounted for 32% and 6%, respectively. However, the recent trend shows that air and road shares are increasing while that of waterways is decreasing.

Figure 3.5.1  
 Characteristics of Foreign Visitors to Vietnam, 1998



Source : GSO  
 Note : Preliminary Estimate of 1998 Data

## 2) Air Passenger Demand

In carrying international air passengers, Vietnam experienced rapid growth until 1996. In 1997 and 1998, ridership dropped, an effect of the regional economic crisis. Noi Bai and Tan Son Nhat airports have so far accommodated regular flights, while Danang has received regular international flights since last year.

The ASEAN region as a whole experienced rapid traffic increase. In particular, Lao PDR, Myanmar and Vietnam experienced a rapid annual increase rate of 17.7%, 27.4% and 17.8%, respectively, until 1997. Their elasticity to their respective GDP growth rates was 2.7, 5.0 and 2.0, respectively. On the other hand, Malaysia, Singapore and Thailand showed a rather stable passenger increase of less than 10% annually and low elasticity, i.e., 1.0, 0.8 and 1.3, respectively (refer to Table 3.5.1)

The passenger decrease in 1997-1998 is, however, considered temporary. As GDP increases in Vietnam, more people will travel by air as experienced in the region. But the rapid growth which occurred until 1996, nearly 20% a year, may not happen again since it took place during the course of Vietnam's normalization of ties with neighboring countries through its participation in regional communities such as ASEAN and APEC. If Vietnam maintains a robust economic development until year 2020 as forecast by the VITRANSS, it may expect an elasticity of air passenger volume to GDP growth of 1.5 during the period 1999-2010 and 1.0

Table 3.5.1  
 Growth in International Passenger Traffic in the ASEAN Region

Country	Total	Year	Ave. Pax	Ave. GDP	Pax/GDP
			Growth Rate	Growth Rate	Elasticity
Brunei	1,212,267	1997	12.7%	2.8%	4.5
Indonesia	9,460,821	1996	12.8%	7.5%	1.7
Lao PDR	162,022	1997	17.7%	6.5%	2.7
Malaysia	10,896,861	1997	8.5%	8.5%	1.0
Myanmar	1,461,000	1997	27.4%	5.5%	5.0
Philippines	6,584,169	1995	10.8%	2.2%	4.9
Singapore	25,174,000	1997	6.8%	8.8%	0.8
Thailand	19,690,000	1997	9.4%	7.3%	1.3
Vietnam	2,304,160	1997	17.8%	8.9%	2.0

Country	Increase Rate of International Air Passengers (%)							
	1990	1991	1992	1993	1994	1995	1996	1997
Brunei	6.8	18.0	21.9	10.8	-0.4	19.3	13.6	13.2
Indonesia				18.9	17.3	4.6	11.0	
Lao PDR	11.4	0.9	32.2	2.0	25.1	451.3	-73.0	31.0
Malaysia		15.9	9.0	5.2	5.7	8.9	9.6	5.6
Myanmar	153.5	43.5	-2.9	17.7	20.1	16.5	-6.4	
Philippines		11.8	15.7	10.2	9.6	6.9		
Singapore				10.4	8.3	7.2	5.7	2.7
Thailand	12.5	-3.0	7.9	16.8	13.0	11.6	11.5	6.1
Vietnam				22.5	48.2	15.4	10.9	-2.4

Note: Average annual growth rates for international air passengers and real GDP growth are calculated for the same time period

during 2011-2020 in the three international airports. The airports' shares will slightly change in 2020: Tan Son Nhat will decrease its share from 76.4% to 65% while Noi Bai will have 25%. Danang's share will be 10% due mainly to the great



tourism potential around Danang: Three of four UNESCO World Heritage Sites in Vietnam are located there, i.e., Hue, Hoi An and My Son. It should be noted that these forecasts must be supported by infrastructure development at least one step ahead of the demand as well as by institutional reforms to liberalize air services and meet passenger demand in terms of transport quantity and quality (refer to Table 3.5.2).

Table 3.5.2  
 Forecast of International Air Passengers

Year	Vietnam Total		Noi Bai		Danang		Tan Son Nhat		Anticipated Shares (%)		
	High	Low	High	Low	High	Low	High	Low	NB	D	TSN
1992	1,015		220		0		795		21.7		78.3
1993	1,243		280		0		963		22.5		77.5
1994	1,842		530		0		1,312		28.8		71.2
1995	2,127		464		0		1,662		21.8		78.1
1996	2,359		524		0		1,835		22.2		77.8
1997	2,304		542		0		1,761		23.5		76.4
1998	2,243		529		0		1,714		23.6		76.4
1999	2,497	2,497	574	574	25	25	1,898	1,898	23.0	1.0	76.0
2000	2,774	2,765	638	636	83	83	2,052	2,046	23.0	3.0	74.0
2001	3,111	3,038	715	699	93	91	2,302	2,248	23.0	3.0	74.0
2002	3,473	3,333	799	767	104	100	2,570	2,466	23.0	3.0	74.0
2003	3,870	3,650	890	839	116	109	2,863	2,701	23.0	3.0	74.0
2004	4,304	3,990	990	918	129	120	3,185	2,953	23.0	3.0	74.0
2005	4,765	4,355	1,144	1,045	191	174	3,431	3,136	24.0	4.0	72.0
2006	5,351	4,826	1,284	1,158	214	193	3,853	3,475	24.0	4.0	72.0
2007	6,002	5,324	1,440	1,278	240	213	4,321	3,833	24.0	4.0	72.0
2008	6,705	5,850	1,609	1,404	268	234	4,828	4,212	24.0	4.0	72.0
2009	7,483	6,403	1,796	1,537	299	256	5,387	4,610	24.0	4.0	72.0
2010	8,341	6,981	2,085	1,745	417	349	5,838	4,887	25.0	5.0	70.0
2011	8,914	7,354	2,228	1,838	446	368	6,239	5,148	25.0	5.0	70.0
2012	9,517	7,740	2,379	1,935	571	464	6,567	5,341	25.0	6.0	69.0
2013	10,152	8,141	2,538	2,035	609	488	7,005	5,618	25.0	6.0	69.0
2014	10,820	8,557	2,705	2,139	757	599	7,358	5,819	25.0	7.0	68.0
2015	11,522	8,987	2,880	2,247	807	629	7,835	6,111	25.0	7.0	68.0
2016	12,313	9,476	3,078	2,369	985	758	8,250	6,349	25.0	8.0	67.0
2017	13,149	9,986	3,287	2,496	1,052	799	8,810	6,690	25.0	8.0	67.0
2018	14,030	10,516	3,508	2,629	1,263	946	9,260	6,940	25.0	9.0	66.0
2019	14,960	11,067	3,740	2,767	1,346	996	9,873	7,304	25.0	9.0	66.0
2020	15,938	11,639	3,984	2,910	1,594	1,164	10,360	7,565	25.0	10.0	65.0

Combined with the domestic demand forecast, airport traffic in 2020 is projected in the following range under two GDP assumptions:

Table 3.5.3  
 Airport Traffic, 2020

	Persons/year		
	Noi Bai Airport	Danang Airport	Tan Son Nhat Airport
Low Assumption 2020	7,210,000	3,352,000	12,772,000
High Assumption 2020	8,285,000	4,345,000	14,241,000

In comparison with major ASEAN international airports, Tan Son Nhat in 2020 will handle the same number of passengers which Soekarno Hatta in Jakarta and Ninoy Aquino in Manila are currently managing (refer to Table 3.5.4).

Table 3.5.4  
Characteristics of National Gateway Airports in the ASEAN Region, 1997

Airport Name	Present Runway (m)	Traffic Volume 1997		Committed Development
		Passenger (000)	Cargo (000 tons)	
Bandar Seri Begawan	4,000 x 1	1,212	19	Terminal expansion
Pochentong (Phnom Penh)	3,000 x 1	552	3.5	Rehabilitation of runway, safety equipment, terminal
Soekarno Hatta (Jakarta)	3,660 x 1 3,600 x 1	13,924	355	Minor improvement
Vientiane	3,000 x 1	375	140	New international terminal
Kuala Lumpur	4,000 x 2	15,819	419	2 more runways and terminal construction
Yangon	2,400 x 1	1,491 <sup>2/</sup>	16 <sup>2/</sup>	Expansion/upgrading of existing airport
Ninoy Aquino (Manila)	3,354 x 1 2,425 x 1	13,603	488	Additional runway and terminal
Changi (Singapore)	4,000 x 2	23,803 <sup>1/</sup>	1,283 <sup>1/</sup>	The Third Terminal
Bangkok	3,700 x 1 3,500 x 1	25,142	771	The Second International Airport
Noi Bai (Hanoi)	3,200 x 1	1,614 <sup>1/</sup>	54 <sup>1/</sup>	Terminal Expansion
Tan Son Nhat (HCM)	3,036 x 1 3,045 x 1	2,993 <sup>1/</sup>	118 <sup>1/</sup>	Terminal Expansion

Source: ASEAN Secretariat, CAAV  
1/ as of 1998

## 4 FUTURE TRANSPORT DEMAND

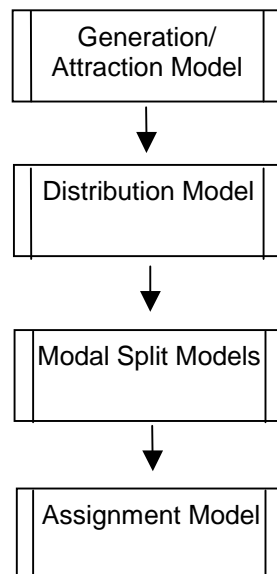
### 4.1 Methodology

#### 1) General

Transport demand is strongly linked to socio-economic indicators, since future transport demand is forecast based on them. This chapter explains how to forecast future transport demand and to what extent transport demand will increase in future in terms of passenger and freight transport.

Models for demand forecast follow the conventional four-step method, namely, a) Trip generation/attraction, b) Trip distribution, c) Modal split, and d) Traffic assignment. Trip production model is often used in combination with the trip generation/attraction model to control the total number of trips generated in the study area. In this study, however, the output of the trip generation/attraction model is used directly (see Figure 4.1.1).

Figure 4.1.1  
 Basic Structure of Passenger Transport Demand Forecast Model



#### 2) Trip Generation/Attraction Model

Passenger Transport: After analyzing the interrelationship between trip generation/attraction by zone and zonal parameters including population, GDP (by sector) and employment (by sector), the following regression equations were adopted:

$$G_j = 3.2974 * UPOP_j * GDPC_j + 4829.5$$

$$A_j = 3.2993 * UPOP_j * GDPC_j + 4826.7$$

Where:  $G_i$  : Generation of Zone  $i$   
 $A_j$  : Attraction of Zone  $j$   
 $UPOP_i$  : Urban Population of Zone  $i$  (1,000)  
 $GDPC_i$  : GDP per Capita of Zone  $i$  (VND million)

Variable	Generation Model		Attraction Model	
	Coefficient	t Value	Coefficient	t Value
Urban population * GDP per capita	3.2974	27.1	3.2993	27.1
Constant	4829.5	7.7	4826.7	7.7
Multiple correlation coefficient	0.96		0.96	
Number of Samples	61		61	

Although the multiple correlation coefficient is high at 0.96, this is strongly affected by some large cities, such as HCMC and Hanoi, and the error is not necessarily small particularly in zones with small demand. Thus, the following adjustment factor was introduced:

$$RG_i = \frac{G_i}{g_i}$$

$$RA_j = \frac{A_j}{a_j}$$

Where:  $RG_i$  : Generation adjustment factor of Zone  $i$   
 $RA_j$  : Attraction adjustment factor of Zone  $j$   
 $G_i$  : Present actual generation of Zone  $i$   
 $A_j$  : Present actual attraction of Zone  $j$   
 $g_i$  : Present calculated generation of Zone  $i$   
 $a_j$  : Present calculated attraction of Zone  $j$

Freight Transport: Transport demand of freight is forecast under the following assumptions:

- If a province has much surplus (production-consumption), it will have more generation of freight, or if a province has much deficit (consumption-production), it will have more attraction of freight.
- More freight is generated and attracted in a province with well-equipped logistics or delivery system. Usually, leading cities, such as Hanoi and HCMC, have good logistics and a lot of freight is delivered to the final destination via such cities. For this reason, socio-economic indicators were also used as exogenous variables.
- Export is regarded as consumption and import as production. Therefore, provinces with international ports will have more generation and attraction.

Based on the above assumptions, multiple linear regression models were developed as follows:

$$G_i = a_1 S_i + a_2 X_i + b$$

$$A_j = c_1 D_j + c_2 X_j + d$$

Where,

$G_i$	: Generation from Zone $i$
$A_j$	: Attraction to Zone $j$
$S_i$	: Surplus in Zone $i$
$D_i$	: Deficit in Zone $j$
$X_i$ & $X_j$	: Socio-economic indicators of Zone $i$ and $j$
$a_1, a_2, c_1$ and $c_2$	: Parameter
$b$ and $d$	: Constant

The exogenous variables used to forecast freight generation and attraction and calibration results are summarized in Table 4.1.2 and 4.1.3, respectively.

Table 4.1.1  
 Exogenous Variables used to Forecast Future Generation and Attraction

Commodity	Generation	Attraction
1. Paddy and Other Crops	Surplus, Tertiary GRDP	Deficit, GRDP
2-1. Sugarcane	Surplus, Dummy Variable <sup>3/</sup>	Deficit, GRDP
2-2. Sugar	Surplus, GRDP	Urban Population
3. Wood and Forest Products	Surplus <sup>1/</sup> , Secondary GRDP <sup>1/</sup>	Deficit <sup>1/</sup> , GRDP <sup>1/</sup>
4. Steel	Surplus, Tertiary GRDP	Deficit, GRDP
5. Construction Materials	Surplus*Dummy Variable <sup>2/</sup> , Tertiary GRDP	Deficit*Dummy Variable <sup>2/</sup> , Secondary GRDP
6. Cement	Surplus, Tertiary GRDP	Deficit, Secondary + Tertiary GRDP
7. Fertilizer	Surplus, Tertiary GRDP	Tertiary GRDP <sup>1/</sup>
8. Coal	Surplus, Secondary GRDP	Deficit
9. Petroleum Products	Surplus, Tertiary GRDP	Deficit, Secondary + Tertiary GRDP
10. Industrial Crops	Surplus, Tertiary GRDP	Deficit, Urban Population
11. Manufacturing Goods	Surplus, Tertiary GRDP	Deficit, Secondary GRDP
12. Fishery Products	Surplus, Tertiary GRDP	Deficit, Urban Population
13. Animal Meat and Others	Surplus, Tertiary GRDP	Deficit, Urban Population

1/ Regional data were used as an exogenous variable.

2/ If a province has more than 1,000 tons of generation or attraction, generation or attraction are divided by 1000 and dummy variable has its integer. Otherwise, dummy variable is 1.

3/ If a province has more than 100 tons of generation or attraction, dummy variable is 1. Otherwise, dummy variable is 0.

4/ Units of GRDP and population used in forecast model are billion VND and 1,000 population, respectively.

**Table 4.1.2**  
**Generation and Attraction Model of Freight**

Commodity	Generation	R <sup>2</sup>	Attraction	R <sup>2</sup>
Paddy and Other Crops	1.57X <sub>1</sub> +0.25X <sub>2</sub> -39.7 (4.4) (11.2)	0.71	1.13X <sub>1</sub> +0.10X <sub>2</sub> -10.3 (5.5) (6.1)	0.93
2-1. Sugarcane	0.05X <sub>1</sub> +148.8X <sub>2</sub> +10.3 (3.0) (10.3)	0.78	0.70X <sub>1</sub> +0.001X <sub>2</sub> +8.3 (19.8) (1.9)	0.88
2-2. Sugar	1.60X <sub>1</sub> +0.03X <sub>2</sub> -53.9 (2.6) (15.5)	0.81	0.25X <sub>2</sub> -2.93 (10.1)	0.71
Wood/Forest Products	0.55X <sub>1</sub> +0.07X <sub>2</sub> +90.9 (0.3) (2.9)	0.76	2.51X <sub>1</sub> +0.01X <sub>2</sub> +13.4 (4.4) (11.2)	0.98
Steel	1.73X <sub>1</sub> +0.06X <sub>2</sub> -19.8 (12.4) (13.6)	0.86	1.80X <sub>1</sub> +0.02X <sub>2</sub> -9.6 (3.4) (6.6)	0.58
Construction Materials	0.78X <sub>1</sub> +0.11X <sub>2</sub> -54.7 (19.4) (7.4)	0.88	0.27X <sub>1</sub> +0.04X <sub>2</sub> +436.8 (3.2) (1.0)	0.41
Cement	1.72X <sub>1</sub> +0.06X <sub>2</sub> +6.9 (21.1) (6.9)	0.92	1.37X <sub>1</sub> +0.04X <sub>2</sub> +23.0 (4.8) (6.3)	0.62
Fertilizer	2.36X <sub>1</sub> +0.13X <sub>2</sub> -41.7 (5.8) (11.9)	0.87	0.15X <sub>2</sub> +218.2 (5.6)	0.96
Coal	4.32X <sub>1</sub> +0.01X <sub>2</sub> +110.4 (59.2) (1.2)	0.98	7.14X <sub>1</sub> -234.1 (9.4)	0.60
Petroleum Products	1.12X <sub>1</sub> +0.24X <sub>2</sub> -195.1 (6.4) (13.5)	0.94	2.55X <sub>1</sub> +0.01X <sub>2</sub> +34.4 (7.9) (3.2)	0.62
Industrial Crops	1.79X <sub>1</sub> +0.03X <sub>2</sub> -22.4 (5.5) (6.3)	0.53	0.40X <sub>1</sub> +0.35X <sub>2</sub> -44.4 (1.4) (6.9)	0.90
Manufacturing Goods	1.43X <sub>1</sub> +0.20X <sub>2</sub> +62.5 (8.0) (15.1)	0.92	1.33X <sub>1</sub> +0.16X <sub>2</sub> +188.5 (3.0) (5.2)	0.80
Fishery Products	0.004X <sub>1</sub> +0.026X <sub>2</sub> -9.9 (7.1) (7.2)	0.63	0.0008X <sub>1</sub> +0.29X <sub>2</sub> -16.5 (1.2) (11.0)	0.85
Animal Meat and Others	0.007X <sub>1</sub> +0.02X <sub>2</sub> +4.3 (3.5) (10.5)	0.66	0.01X <sub>1</sub> +0.13X <sub>2</sub> -11.2 (4.1) (5.2)	0.93

Note: Figures in parentheses meant values.

### 3) Trip Distribution Model

Passenger Transport: In order to obtain a good trip distribution model based on trip generation/attraction and interzonal impedance (shortest time distance on the multimodal network), the Gravity Model of different types was investigated. However, good correlation could not be found. Particularly between HCMC and neighboring zones where traffic volume is large, the discrepancy between actual and estimated values is outstanding and contributes to the poor correlation. Hence, a dummy parameter was introduced for the OD pairs centering at HCMC and Hanoi. The following equation was obtained:

$$T_{ij} = \frac{C \times G_i^{0.7075} \times A_j^{0.70764}}{d_{ij}^{1.0094}} \times 6.4053^\delta$$

Where,  $C$  : Constant  
 $T_{ij}$  : No. of trips between Zone  $i$  and  $j$   
 $G_i$  : Trip Generation of Zone  $i$   
 $A_j$  : Trip Attraction of Zone  $j$   
 $d_{ij}$  : Distance between Zone  $i$  and  $j$  (km)  
 $\delta$  : Dummy variable (-1 or 1 for selected zone pairs and 0 for the rest)

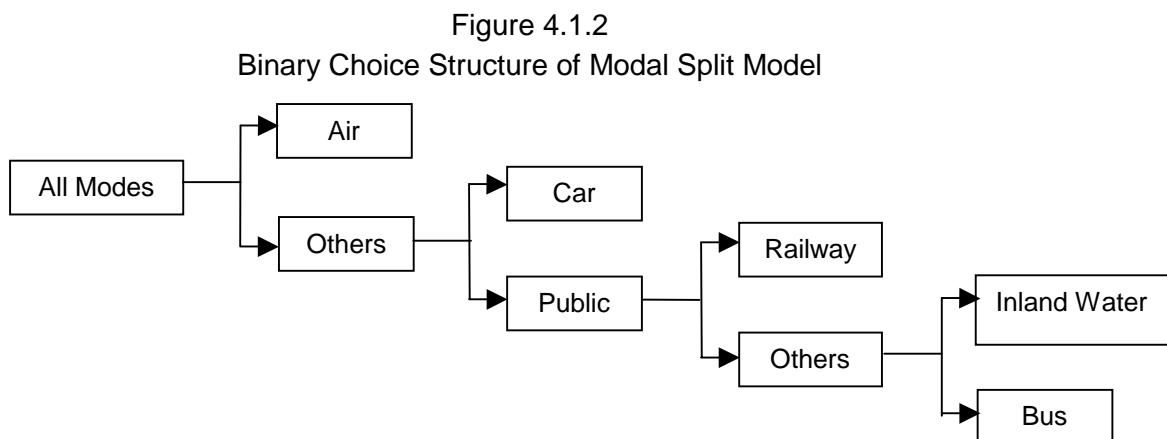
Variable	Coefficient	Value
Constant	0.0812	
Generation	0.7075	45.8
Attraction	0.7076	45.9
Distance Impedance	-1.0094	-67.3
Dummy	6.4053	76.1
Multiple Correlation Coefficient	0.95	
Number of Samples	1644	

After applying the trip distribution model mentioned above, the Fratar convergence calculation was conducted to adjust the OD values to the trip generation/attraction estimated earlier.

Freight Transport: The Fratar method was used to forecast future OD traffic. If generation and attraction will take place in a province where there are no generation and attraction, future generation and attraction are taken into account.

#### 4) Modal Split Model

Passenger Transport: A binary choice structure was introduced in this model as shown below.



Judging from the present OD tables, the trips made by modes other than bus and car are concentrated in some zones where specific facilities, such as airports and railway stations, are available. In particular, air transport is available only for some specific OD pairs. Moreover, most air trips are not made daily by an individual. Therefore, air trips were segregated at first from the rest.

- a) Separation of Air Passengers: Number of air passengers is estimated directly from zonal parameters by the following formula:

$$T_{ij}^{Air} = 0.6554 * (UPOP_i \times GDPC_i)^{0.2951} * (UPOP_j \times GDPC_j)^{0.1441} * 4.8423^\delta$$

Where,  $T_{ij}^{Air}$  : Air passengers between Zone  $i$  and  $j$   
 $UPOP_i$  : Urban Population of Zone  $i$  (1,000)  
 $GDPC_i$  : GDP per Capita of Zone  $i$  (VND million)  
 $\delta$  : Dummy variable (2 for HCMC – Hanoi, 1 for Danang – HCMC and Danang – Hanoi, and 0 for the rest)

Variable	Coefficient	T Value
Constant	0.6554	
Urban Population in Origin	0.2957	2.6
Urban Population in Destination	0.1441	2.2
Multiple Correlation Coefficient	0.75	
Number of Samples	72	

- b) Separation of Car Passengers: Car passenger trips are also estimated from zonal parameters by the following formula:

$$T_{ij}^{Car} = \frac{0.6199 * UPOP_i^{0.3023} * GDPC_i^{0.4867} * UPOP_j^{0.2957} * GDPC_j^{0.5217}}{t_{ij}^{0.9449}}$$

Where,  $T_{ij}^{Car}$  : Car passengers between Zone  $i$  and  $j$   
 $UPOP_i$  : Urban Population of Zone  $i$  (1,000)  
 $GDPC_i$  : GDP per Capita of Zone  $i$  (VND million)  
 $t_{ij}$  : Car Travel Time between Zone  $i$  and  $j$

Variable	Coefficient	Value
Constant	0.6199	
Urban Population in Origin	0.3023	5.4
GDP per Capita in Origin	0.4867	4.7
Urban Population in Destination	0.2957	5.4
GDP per Capita in Destination	0.5217	5.1
Travel Time	0.9449	30.5
Multiple Correlation Coefficient	0.79	
Number of Samples	910	

- c) Separation of Railway Passengers: Railway passenger trips are extracted by the following formula, if railway is available for the zone pair:

$$P_{ij}^{rail} = \frac{1}{1 + e^{2.4281 - 0.0295 \times (t_{ij}^{Bus} - t_{ij}^{Rail}) + 2.6279 \times \delta}}$$



Where,  $P_{ij}^{Rail}$  : Share of railway between Zone  $i$  and  $j$   
 $t_{ij}^{Bus}$  : Bus travel time between Zone  $i$  and  $j$   
 $t_{ij}^{Rail}$  : Railway travel time between Zone  $i$  and  $j$   
 $\delta$  : Dummy variable (1 or -1 for selected zone pairs and 0 for the rest)

Variable	Coefficient	Value
Constant	2.4281	
Travel Time	-0.0295	-15.1
Dummy	2.6279	26.8
Multiple Correlation Coefficient	0.89	
Number of Samples	342	

d) Modal Split between Inland Waterway and Bus: The following formula is applied to the remaining trips, if inland waterway is available for the zone pair:

$$P_{ij}^{Water} = \frac{1}{1 + e^{-0.6676 - 0.0418 \times (t_{ij}^{Bus} - t_{ij}^{Water}) + 3.9848 \times \delta}}$$

Where,  $P_{ij}^{Water}$  : Share of inland waterway between Zone  $i$  and  $j$   
 $t_{ij}^{Bus}$  : Bus travel time between Zone  $i$  and  $j$   
 $t_{ij}^{Water}$  : Inland waterway travel time between Zone  $i$  and  $j$   
 $\delta$  : Dummy variable (1 for selected zone pairs and 0 for the rest)

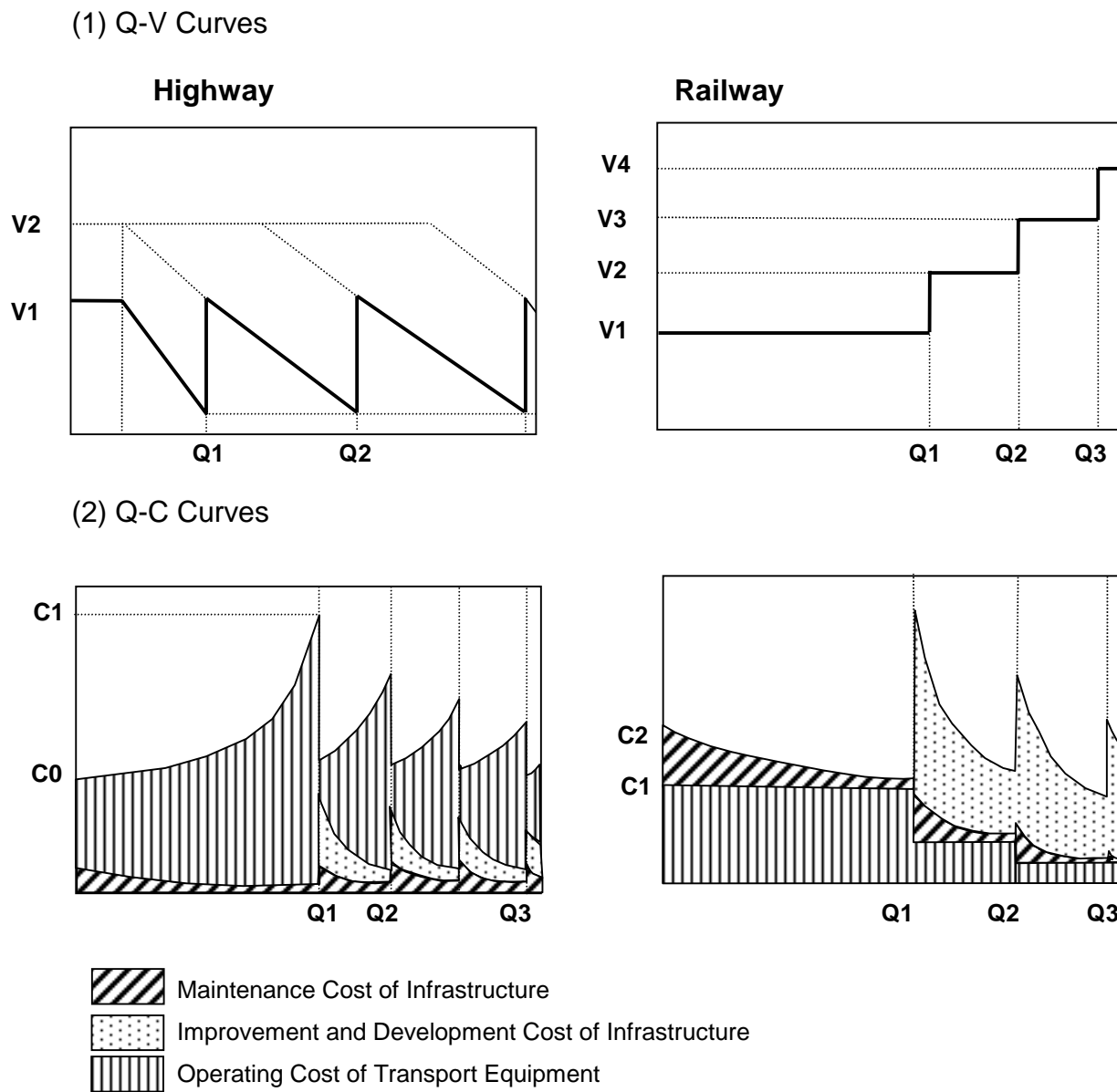
Variable	Coefficient	Value
Constant	-0.6676	
Travel Time	-0.0418	-2.4
Dummy	3.9848	13.3
Multiple Correlation Coefficient	0.94	
Number of Samples	32	

Freight Transport: There are two approaches for traffic assignment, namely TPM (Trend Pattern Method) and CMA (Cost Minimization Assignment). TPM extrapolates the past trend or demand to the future, using the growth rate or mathematical models, while CMA seeks the most desirable demand structure by maximizing or minimizing some target functions. So, CMA does not need the process of modal split because it is simultaneously determined with traffic assignment on the network. On the other hand, TPM determined modal share given the assumption that present modal share will continue in the future.

## 5) Traffic Assignment

All-or-nothing assignment without capacity constraint was adopted for passenger traffic assignment. On the other hand, the incremental assignment with capacity restraint was adopted for freight traffic assignment. In incremental assignment, successive proportions of OD matrix are assigned on the minimum time (or cost) route, and the travel time (or cost) is recalculated based on the assigned traffic volume. In order to incorporate the effects of traffic flows it is necessary to use performance function. QC curve was applied to traffic assignment as performance function. The relation of speed volume, time volume and cost volume is shown in Figure 4.1.3.

Figure 4.1.3  
 Concept of Speed Volume, Time Volume and Cost Volume



## 4.2 Network Formulation for Traffic Assignment

### 1) General

For assignment, it is required to input the coordinates of nodes and links as well as the characteristics of each link of which there are four, i.e., link length, average capacity, travel speed, and travel cost.

### 2) Capacity

In order to determine the road traffic capacity, the methodology developed by the Indonesian Highway Capacity Manual (IHCM) was used. According to IHCM, road capacity is calculated by the following formula:

$$C = C_0 \times FC_w \times FC_{sp} \times FC_{mc} \times FC_{sf}$$

Where:

- C = Capacity (PCU/hr),
- C<sub>0</sub> = Base capacity in ideal conditions (PCU/hr),
- FC<sub>w</sub> = Adjustment factor for carriageway width,
- FC<sub>sp</sub> = Adjustment factor for directional split,
- FC<sub>mc</sub> = Adjustment factor for motorcycle traffic,
- FC<sub>sf</sub> = Adjustment factor for side friction

Base Capacity: Base capacity (C<sub>0</sub>) was assumed as follows:

Terrain type	Base Capacity (PCU/hr)
Flat (less than 5% gradient)	3,100
Hilly (4-8 % gradient)	2,900
Mountainous (with sections often reaching 10%)	2,500

Adjustment for Carriageway Width: Adjustment factor (FC<sub>w</sub>) for carriageway width (FC<sub>w</sub>) for two-lane undivided road is shown in the following table.

Effective Width	FC <sub>w</sub>
<5m	0.69
5m	0.81
6m	0.91
7m	1.00
8m	1.08
9m	1.15
12m	1.27

Source: IHCM

In the actual application, “effective width” was understood to be equal to pavement width for paved roads in the absence of accurate road inventory. For unpaved roads, “effective width” was assumed to be less than 5 m.

Adjustment for Directional Split: The adjustment factor for directional split (FCsp) depends on the directional split of the traffic as shown in the following table:

Directional split (%)	FCsp
50-50	1.00
55-45	0.97
60-40	0.94
65-35	0.91
70-30	0.88

Source: IHCM

However, most of the road links fall in the category of “60-40”, judging from the results of VITRANSS traffic counts.

Adjustment for Motorcycle Traffic: According to the IHCM, the adjustment factor for motorcycle traffic (FCmc) is based on the motorcycle ratio as follows:

$$FCmc = 1 - Q_{mc}/Q_c$$

Where,  $Q_{mc}$  = Motorcycle flow (PCU/hr) = 0.25 x Motorcycle flow (MC/hr)  
 $Q_c$  = Sum of flow for all motor vehicle types expressed in PCU/hr

When this formula is applied to the results of VITRANSS traffic counts (39 stations), FCmc was calculated at 0.662 to 0.935 with an average of 0.820. The stations near HCMC tend to show lower values. In this study, the average was used on the entire network because traffic data is not available for all road links and the traffic mix changes quickly depending on the situation of road development and traffic demand.

The PCU values used in this study are shown below.

Vehicle Type	PCU	Vehicle Type	PCU
Bicycle	0.50	Light truck	1.00
Motorcycle	0.25	Medium truck	2.00
Car	1.00	Heavy truck	2.50
Minibus	1.50	Articulated truck	3.00
Large bus	2.00	Others	1.00

Source: IHCM

Adjustment for Side Friction: Adjustment factor for side friction (FCsf) is based on roadside activities and shoulder width. For two-lane undivided roads, this factor is as shown in the following table:

Typical conditions	Side friction	Shoulder Width			
		<0.5m	1.0m	1.5m	>2m
Rural, agriculture or undeveloped, no activities	Very low	0.96	0.98	1.00	1.03
Rural, some roadside building & activities	Low	0.90	0.92	0.95	0.99
Semi-urban, residential activities	Medium	0.83	0.86	0.90	0.96
Semi-urban, some market activities	High	0.76	0.80	0.85	0.93
Almost urban market/business activities	Very High	0.70	0.74	0.80	0.90

Source: IHCM

However, judging from the fact that side friction is usually large in Vietnamese roads (e.g. nonmotorized vehicles, farmer's activities). It was assumed that road shoulder is always less than 0.5 m regardless of the actual width.

Estimated Capacity: As a result, the hourly capacity of a two-lane undivided road is summarized as follows:

Table 4.2.1  
Hourly Capacity of Two-lane Undivided Road

Terrain	Side Friction	Pavement Width						
		<5m	5m	6m	7m	8m	9m	12m
Flat	Rural, no activity	1,583	1,858	2,087	2,294	2,477	2,638	2,913
	Rural, some activity	1,484	1,742	1,957	2,151	2,323	2,473	2,731
	Semi-urban, residential	1,368	1,606	1,805	1,983	2,142	2,281	2,519
	Semi-urban, some commercial	1,253	1,471	1,653	1,816	1,961	2,088	2,306
	Urban	1,154	1,355	1,522	1,673	1,806	1,924	2,124
Hilly	Rural, no activity	1,481	1,738	1,953	2,146	2,318	2,468	2,725
	Rural, some activity	1,388	1,630	1,831	2,012	2,173	2,314	2,555
	Semi-urban, residential	1,280	1,503	1,688	1,855	2,004	2,134	2,356
	Semi-urban, some commercial	1,172	1,376	1,546	1,699	1,835	1,954	2,158
	Urban	1,080	1,267	1,424	1,565	1,690	1,799	1,987
Mountainous	Rural, no activity	1,276	1,498	1,683	1,850	1,998	2,217	2,349
	Rural, some activity	1,197	1,405	1,578	1,734	1,873	1,994	2,203
	Semi-urban, residential	1,104	1,296	1,455	1,599	1,727	1,839	2,031
	Semi-urban, some commercial	1,011	1,186	1,333	1,465	1,582	1,684	1,860
	Urban	931	1,093	1,227	1,349	1,457	1,551	1,713

Based on the VITRANSS traffic counts (39 stations), the peak hour ratio (against 24-hour traffic for both directions in terms of PCU, excluding motorcycle and nonmotorized transport) varies depending on the survey station from 5.0% to 11.9% with typical values between 8 and 9%. Assuming a peak hour ratio of 8.5%, which is the same as the French study, the hourly capacity can be converted into daily capacity as shown in the following table:

Table 4.2.2  
Daily Capacity of Two-lane Undivided Road

Terrain	Side Friction	Pavement Width						PCU/day
		<5m	5m	6m	7m	8m	9m	
Flat	Rural, no activity	18,624	21,859	24,553	26,998	29,141	31,035	34,271
	Rural, some activity	17,459	20,494	23,024	25,306	27,329	29,094	32,129
	Semi-urban, residential	16,094	18,894	21,235	23,329	25,200	26,835	29,635
	Semi-urban, some commercial	14,741	17,306	19,447	21,365	23,071	24,565	27,129
	Urban	13,576	15,941	17,906	19,682	21,247	22,635	24,988
Hilly	Rural, no activity	17,424	20,447	22,976	25,247	27,271	29,035	32,059
	Rural, some activity	16,329	19,176	21,541	23,671	25,565	27,224	30,059
	Semi-urban, residential	15,059	17,682	19,859	21,824	23,576	25,106	27,718
	Semi-urban, some commercial	13,788	16,188	18,188	19,988	21,588	22,988	25,388
	Urban	12,706	14,906	16,753	18,412	19,882	21,165	23,376
Mountainous	Rural, no activity	15,012	17,624	19,800	21,765	23,506	25,024	27,635
	Rural, some activity	14,082	16,529	18,565	20,400	22,035	23,459	25,918
	Semi-urban, residential	12,988	15,247	17,118	18,812	20,318	21,635	23,894
	Semi-urban, some commercial	11,894	13,953	15,682	17,235	18,612	19,812	21,882
	Urban	10,953	12,859	14,435	15,871	17,141	18,247	20,153

When a two-lane road is widened to four lanes, it is assumed that the capacity increases by its base capacity without multiplying any adjustment factors.

Adjustment for Road Surface Condition: Besides the above factors, capacity strongly depends on road surface condition. The IRI (International Roughness Index) definition of road surface condition is provided below. It is applied to VITRANSS.

Road surface	Road condition	Range of IRI (m/km)	Average IRI (m/km)
Paved	Good	0-4	3
	Fair	4-8	6
	Poor	8-10	9
	Very Poor	>10	12
Unpaved	Good	5-9	7
	Fair	9-11	10
	Poor	11-15	14
	Very Poor	>15	17

On this basis, it was adjusted using the following factors:

Surface Conditions	Good	Fair	Poor	Very Poor
Index	100	80	50	30

### 3) Travel Speed

Based on factors such as the number of lanes, terrain type and surface condition, travel speed is assumed as follows:

Table 4.2.3

## Travel Speed

Category	Lanes	Designed Speed (kph) <sup>1/</sup>			Surface Condition			
		Flat	Hilly	Mountainous	Good	Fair	Poor	V. Poor
1	4x3.75 (m)	120	105	90	100	80	50	30
2	2x3.75	100	90	80	100	80	50	30
3	2x3.5	80	70	60	100	80	50	30
4	2x3.0	60	50	40	100	80	50	30
5	1x3.5	40	35	25	100	80	50	30
6	1x3.0	25	20	15	100	80	50	30

1/ Vietnam Design Standards (TCVN 4054-85), slightly modified.

## 4) Travel Cost

Travel cost is summarized in the following section (refer to VITRANSS Technical Report No. 3 Transport Cost and Pricing in Vietnam for detail). The economic cost of passenger and freight transport was estimated as follows:

Table 4.2.4  
Economic Operating Cost

Mode	Passenger Transport (VND/pass-km)	Cargo Transport (VND/ton-km)	Loading/unloading and other Mobilization Charge (VND/ton)
Car	264	-	-
Bus	94	-	-
Truck	-	546	55,000
Inland Waterway	48-66	138-223	104,000
Railway	209	263	91,000
Coastal Shipping	-	84	199,000

For road traffic, running speed varies depending on the volume/capacity ratio. Running speed influences the operating cost considerably. In this study, the following adjustment factors were assumed.

Vehicle Type	Adjustment Factor (60kph = 1.00) of VOC						
	15	20	30	40	50	60	70
Passenger Car	2.61	1.80	1.45	1.24	1.10	1.00	1.02
Bus	1.92	1.49	1.29	1.16	1.07	1.00	1.00
Truck	2.01	1.53	1.31	1.17	1.07	1.00	1.00

Source: Transport Master Plan for the Central Region for Vietnam (1998), French ODA



## 5) Economic Infrastructure and Maintenance Cost

Economic infrastructure and maintenance cost was assumed as follows:

Table 4.2.5  
 Annualized Road Infrastructure and Maintenance Cost<sup>1/</sup>  
 (VND million/km/year)

Terrain	Capital		Maintenance Cost	Total
	Construction	Pavement		
Flat	801	283	86	887
Hilly	947	283	86	1,033
Mountainous	1,092	283	86	1,178
Highly mountainous	1,125	217	86	1,211
Bridge	34,693		86	34,779

1/ Annualized at 12% for 30 years.

Table 4.2.6  
 Railway Infrastructure and Maintenance Cost

VND million/km/yr

Investment	Initial Capital Cost	Annualized Cost <sup>1)</sup>
New single Tracking	22.400	2,483
Double Tracking	11.200	1,241
Station	430	48
Electrification	11.200	1,241
Communication	640	71
Facilities Improvement	-	
Maintenance	-	258

1/ Annualized at 12% for 30 years.

Table 4.2.7  
 Port Infrastructure and Maintenance Cost

	Construction Cost <sup>1/</sup>	Equipment Cost <sup>1/</sup>	Maintenance Cost	Operation Cost
Annualized Economic Cost (VND 000/ton)	39.9	7.9	3.6	3.6

1) Annualized at 12% for 30 years.

## 6) Passenger and Cargo Time Cost

Passenger time cost was determined by an income approach as shown in the following table:

Table 4.2.8  
 Passenger Time Cost<sup>1/</sup>

	1999	Low Case		High Case	
		2010	2020	2010	2020
		VND/hr			
Average Income	3,180 <sup>1/</sup>	5,097	7,691	5,757	9,558
Growth Rate (%/yr)	4.0	4.0	4.2	5.0	5.2
Passenger Time Cost					
-for bus, railway and inland water	3,180	5,097	7,691	45,757	9,558
-for car and air	6,360	10,194	15,382	11,514	19,116
Economic Passenger Time Cost					
-for bus, railway and inland water	960	1,539	2,323	1,739	2,887
-for car and air	1,921	3,079	4,645	3,477	5,773

1/ Average of state sector employee (160 working hours/month)

Cargo time cost can be quantified as an interest cost (12%/yr is assumed) during transport. In this study, it was assumed as follows:

Cargo	Assumed Value (VND million/ton)	Cargo Time Cost (VND/hour/ton)
1.paddy and food crop	3.0	41
2.sugar/sugarcane	7.1	97
3.wood/forestry	0.6	8
4.steel	5.6	77
5.construction materials	0.2	3
6.cement	0.7	10
7.fertilizer	3.0	41
8.coal	0.4	5
9.petroleum products	4.5	62
10.industrial crop	3.5	48
11.manufacturing Goods	28.0	384
12.fishery Products	20.0	274
13.animal meat	20.0	274

### 4.3 Transport Demand Characteristics

#### 1) General

Based on the socio-economic forecast developed in Chapter 2, Vietnam will have a total population of 95 million in 2010 and 110 million in 2020. Also, GDP will increase by VND 531 billion in 2010 and VND 886 billion in 2020 under a low assumption, whereas it will increase by 599 billion VND in 2010 and 1,144 billion VND in 2020 under a high assumption. Future transport demand was forecast based on future socio-economic scenarios. According to forecast results, transport demand will grow steadily. As of 2010, it will increase by 1.5 times under a low assumption and 2.1 times under a high assumption, as compared to 600 thousand passengers a day at present. It is expected to increase by 3.0

times under a low assumption and 3.6 times under a high assumption in 2020. Meanwhile, the transport demand of freight will increase by 1.8 times under a low assumption and 2.0 times under a high assumption in 2010. In 2020, it will increase by 2.9 times under a low assumption and 3.3 times under a high assumption. In this study, it was assumed that the average of low and high assumptions would be the future transport demand.

## 2) Passenger Transport

Generation/Attraction: Estimated results show that compared to approximately 600 thousand passengers a day (219 million passengers a year) at present, the number of interprovincial passengers will double in 2010, totaling approximately one million passengers a day (400 million passengers a year) and triple in 2020, amounting to two million passengers a day (733 million passengers a year) (see Table 4.3.1). They also show that the Red River delta and the southeast, presently accounting for a large share of total transport demand, will still have a larger share than other regions even in the future, increasing by 3.7 times in the Red River delta and 3.9 times in the southeast. These regions will account for about three-fourths of total interprovincial passengers in the future (see Figure 4.3.1).

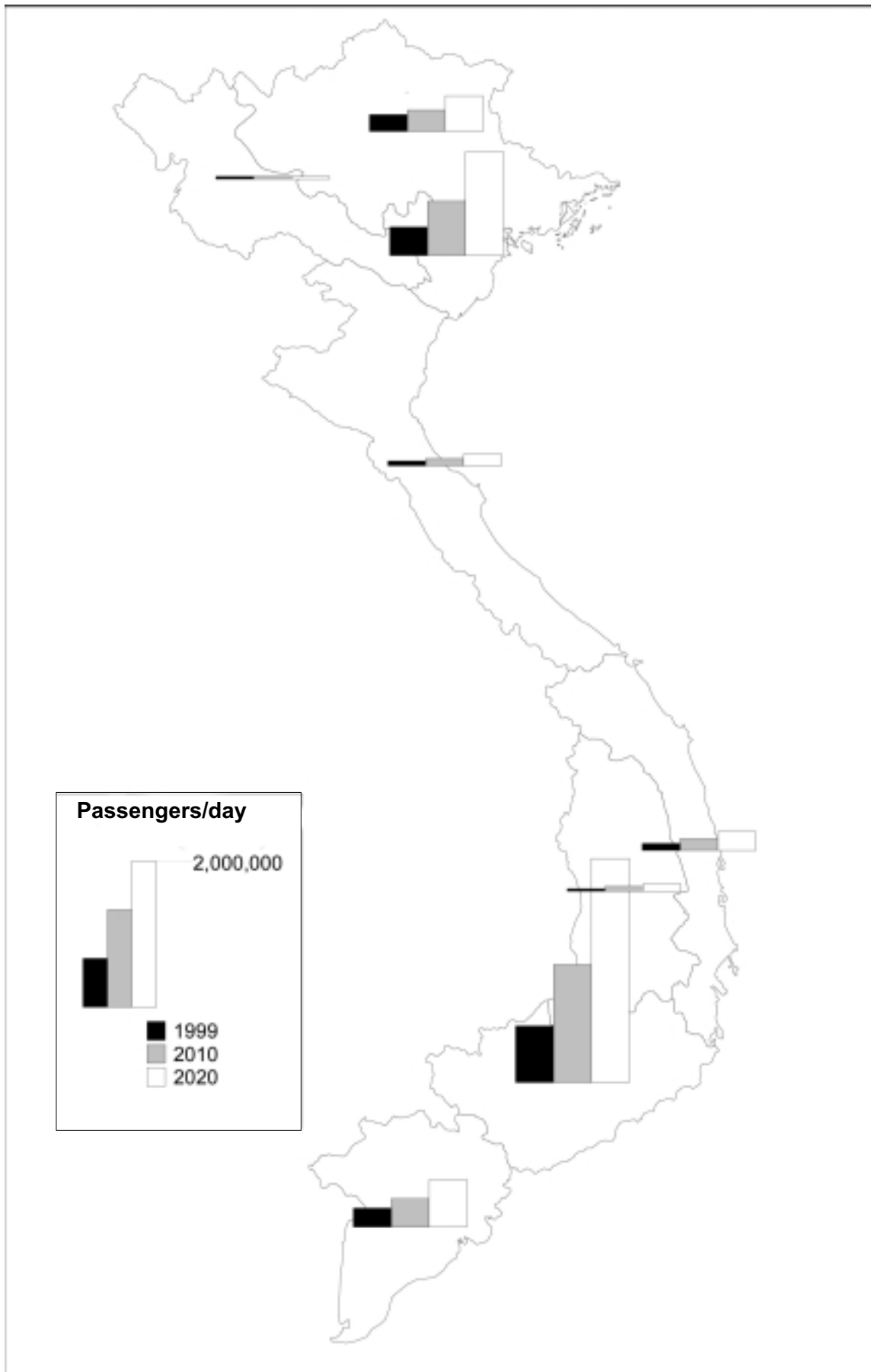
Table 4.3.1  
 Generation/attraction of Interprovincial Passenger Traffic<sup>1/</sup>, 1999-2020

	1999	2010	2020	2010/99	2020/99
1. Red River Delta	244,776	472,114	919,260	1.93	3.76
2. Northeast	139,644	197,442	314,595	1.41	2.25
3. Northwest	13,061	15,780	21,924	1.21	1.68
4. North Central Coast	45,332	64,833	112,866	1.43	2.49
5. South Central Coast	67,288	106,072	176,385	1.58	2.62
6. Central Highlands	30,906	42,484	67,422	1.37	2.18
7. Eastern South	502,749	1,036,666	1,982,204	2.06	3.94
8. Mekong River Delta	157,719	259,616	420,994	1.65	2.67
9. Foreign Countries	895	1,559	2,854	1.74	3.19
Total	1,202,370	2,196,566	4,018,504	1.83	3.34

Source: VITRANSS

1/ Figures mean the sum of generation and attraction. Hence, the number of trips decreases by half.

Figure 3.4.1  
Generation/Attraction of Interprovincial Passengers, 1999-2020



**Distribution:** Interprovincial passenger flow aggregated at the regional level is shown in Figure 4.3.2. According to the results, interprovincial passenger flow will be more accelerated between the Red River delta and the northeast and between the southeast and Mekong River delta in future. For example, interprovincial passengers will increase by 3.5 times in 2010 and 9.1 times in 2020 between Hanoi and Danang, 3.4 times in 2010 and 8.3 times in 2020 between Hanoi and Hai Phong and 3.1 times in 2010 and 6.7 times in 2020 between Hanoi and HCM. In future, as the results show, the demand of interprovincial passengers will increase at a rapid pace, especially between major provinces (see Table 4.3.2).

Table 4.3.2  
Increase in Interprovincial Passenger Traffic between Main Provinces

Classification	Between Provinces	1999	2010	2020	2010/ 1999	2020/ 1999
Long Distance <sup>1/</sup>	Hanoi <-> HCM	3,686	11,528	24,762	3.1	6.7
	Hai Phong <-> HCM	587	1,490	2,546	2.5	4.3
Medium Distance <sup>2/</sup>	Hanoi <-> Danang	1,058	3,714	9,650	3.5	9.1
	Hai Phong <-> Danang	108	308	656	2.9	6.1
	HCM <-> Danang	1,789	4,778	8,834	2.7	4.9
Short Distance <sup>3/</sup>	Hanoi <-> Hai Phong	12,777	43,374	106,154	3.4	8.3
	Hanoi <-> Lao Cai	1,238	2,286	4,114	1.8	3.3
	HCM <-> Can Tho	11,133	23,442	45,556	2.1	4.1

Source: VITRANSS

1/ More than 1,000 km; 2/ 500 km to 1,000 km; 3/ less than 500 km

**Modal Share:** According to the generation and attraction of interprovincial passengers, modal share becomes as shown in Figure 4.3.3. In general, as the national economy develops and GDP increases, car ownership will increase. As a result, car usage will be accelerated. An estimated result shows that car usage will increase from 8.7% at present to 17.4% in 2010 and 17.9% in 2020. The share of railway will also increase from 4.1% at present to 7.8% in 2010 and 8.0% in 2020 partly because of the increase in the average trip length in terms of passenger transport. On the other hand, bus usage will decrease by 73.0% in 2010 and 72.4% in 2020 but still play a primary role in interprovincial passenger flow. Also, the share of inland waterway will be marginal in terms of passenger transport. As a general trend, the share of passenger car, railway and air will increase in the future while that of bus and inland waterway will decrease. More details are illustrated in Table 4.3.3 and Table 4.3.4.

Figure 4.3.2  
Interprovincial Passenger Flow, 1999-2020

(a) 1999

(b) 2010

(c) 2020

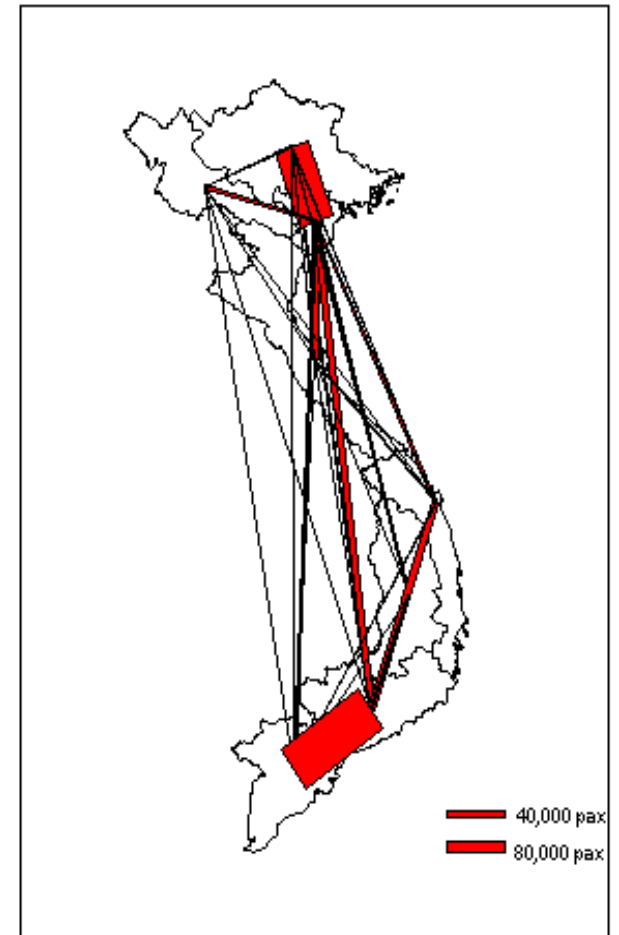
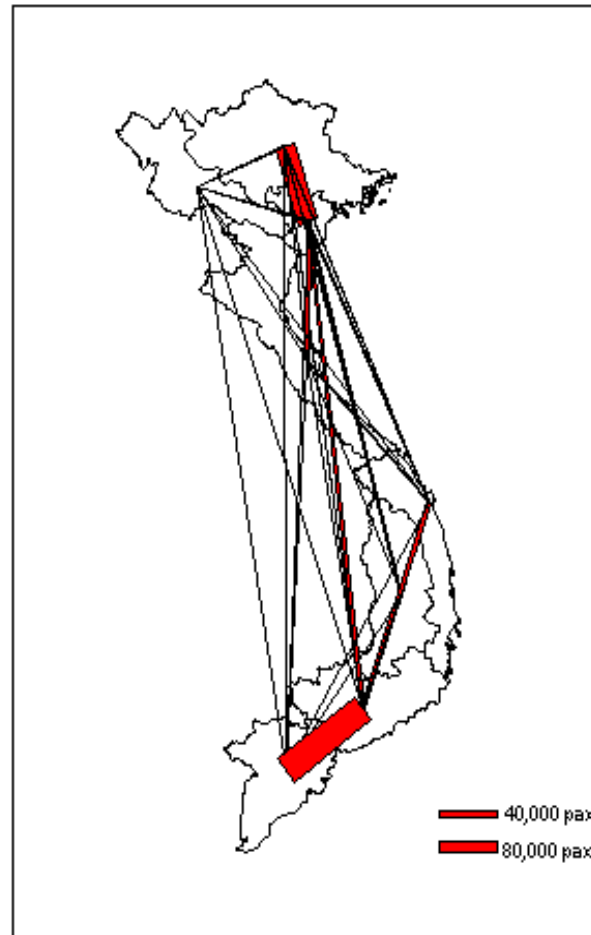
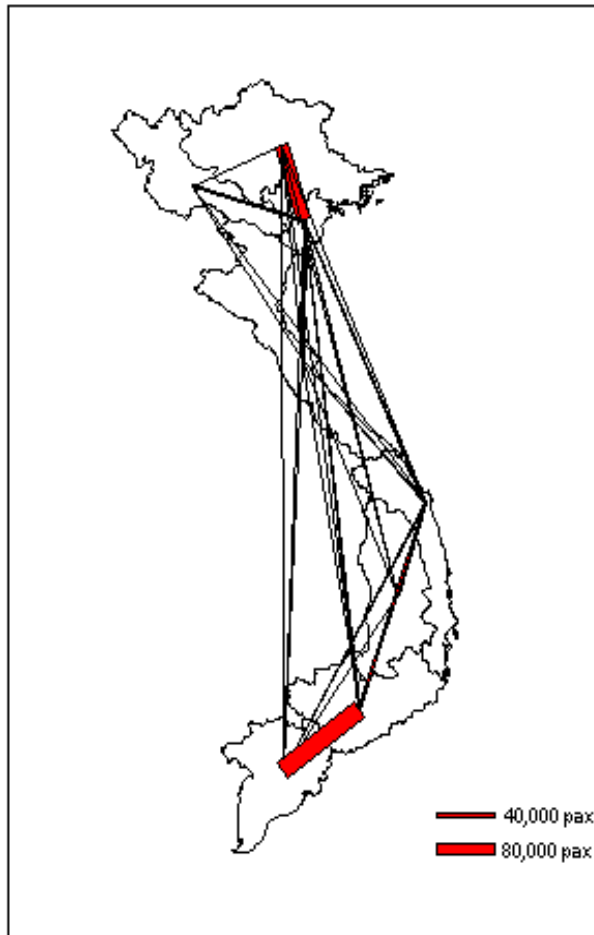


Table 4.3.3  
Generation/Attraction of Interprovincial Passenger Traffic, 2010<sup>1/</sup>

Region		Road		Inland Waterway	Railway	Air	Total
		Car	Bus				
1. Red River Delta	No/day %	83,822 (17.8)	323,946 (68.6)	378 (0.1)	53,476 (11.4)	10,492 (2.2)	472,114 (100.0)
2. Northeast	No/day %	21,228 (10.8)	158,810 (80.4)	378 (0.2)	16,764 (8.5)	262 (0.1)	197,442 (100.0)
3. Northwest	No/day %	2,142 (13.6)	12,760 (80.9)	0 (0.0)	724 (4.6)	154 (1.0)	15,780 (100.0)
4. North Central Coast	No/day %	8,609 (13.3)	45,450 (70.1)	0 (0.0)	9,678 (15.0)	1,096 (1.7)	64,833 (100.0)
5. South Central Coast	No/day %	13,028 (12.3)	77,960 (73.5)	0 (0.0)	10,156 (9.6)	4,928 (4.6)	106,072 (100.0)
6. Central Highlands	No/day %	6,252 (14.7)	33,992 (80.0)	0 (0.0)	1,706 (4.0)	534 (1.3)	42,484 (100.0)
7. Northeastern South	No/day %	207,172 (20.0)	756,838 (73.0)	2,858 (0.3)	58,194 (5.6)	11,604 (1.1)	1,036,666 (100.0)
8. Mekong River Delta	No/day %	39,718 (15.3)	193,260 (74.4)	6,334 (2.4)	19,878 (7.7)	426 (0.2)	259,616 (100.0)
9. Other Countries	No/day %	287 (18.4)	1272 (81.6)	n.a -	n.a -	n.a -	1,559 (100.0)
Total	No/day %	382,258 (17.4)	1,604,288 (73.0)	9,948 (0.5)	170,576 (7.8)	29,496 (1.3)	2,196,566 (100.0)

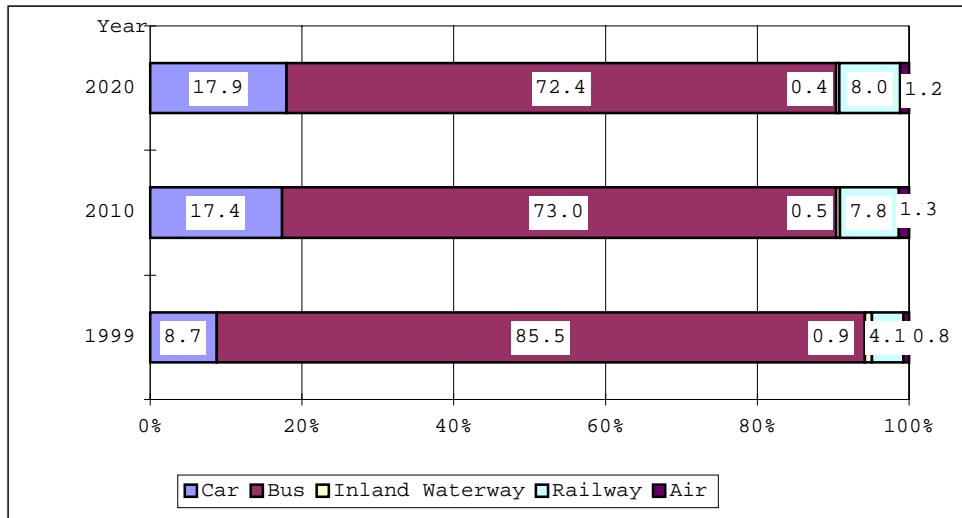
1/ OD matrix of road and inland waterway came from VITRANSS traffic survey, that of railway from VR, and that of air transport estimated from the number of flights and average load factor. Figures are the sum of generation and attraction.

Table 4.3.4  
Generation/Attraction of Interprovincial Passenger Traffic, 2020<sup>1/</sup>

Region		Road		Inland Waterway	Railway	Air	Total
		Car	Bus				
1. Red River Delta	No/day %	165,991 (18.1)	622,157 (67.7)	582 (0.1)	112,456 (12.2)	18,074 (2.0)	917,334 (100.0)
2. Northeast	No/day %	34,000 (10.8)	255,035 (81.1)	582 (0.2)	24,616 (7.8)	362 (0.1)	314,196 (100.0)
3. Northwest	No/day %	3,218 (14.7)	17,482 (79.7)	0 (0.0)	1,002 (4.6)	222 (1.0)	21,924 (100.0)
4. North Central Coast	No/day %	15,276 (13.5)	77,784 (68.9)	0 (0.0)	18,180 (16.2)	1,626 (1.4)	112,504 (100.0)
5. South Central Coast	No/day %	21,980 (12.5)	127,947 (72.5)	0 (0.0)	19,666 (11.2)	6,792 (3.9)	176,218 (100.0)
6. Central Highlands	No/day %	9,688 (14.4)	54,214 (80.4)	0 (0.0)	2,792 (4.1)	728 (1.1)	67,422 (100.0)
7. Northeastern South	No/day %	406,820 (20.5)	1,439,636 (72.6)	5,666 (0.3)	110,810 (5.6)	19,272 (1.0)	1,982,204 (100.0)
8. Mekong River Delta	No/day %	63,398 (15.1)	314,188 (74.6)	10,274 (2.4)	32,546 (7.7)	588 (0.1)	420,994 (100.0)
9. Other Countries	No/day %	543 (19.0)	2,311 (81.0)	n.a -	n.a -	n.a -	2,854 (100.0)
Total	No/day %	720,914 (17.9)	2,910,754 (72.4)	17,104 (0.4)	322,068 (8.0)	47,664 (1.2)	4,018,504 (100.0)

1/ OD matrix of road and inland waterway came from VITRANSS traffic survey, that of railway from VR, and that of air transport estimated from the number of flights and average load factor. Figures are the sum of generation and attraction.

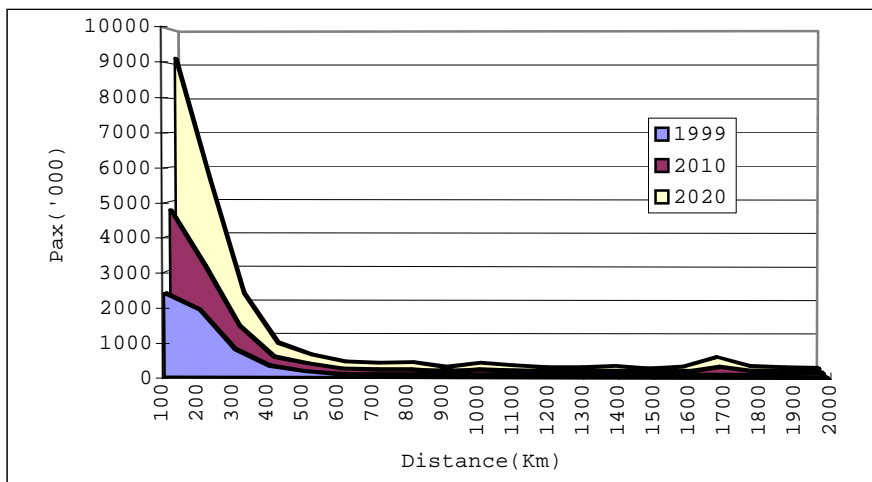
**Figure 4.3.3**  
 Change in Modal Share of Interprovincial Passenger Traffic



Source: VITRANSS

Traffic Distribution by Travel Distance: Taking into account the relation of interprovincial passengers and travel distance, most trips will be completed in a radius of 400 km, showing remarkable increase within its boundary in future. For a trip distance exceeding a radius of 400 km, the amount of interprovincial passengers will rapidly reduce, reflecting that passenger trips will move around leading cities. Additionally, small peaks will appear mainly due to large numbers of passenger trips between sizable cities such as Hanoi, Danang and HCM. They are found in distances between 700 km and 800 km and between 1,600 km and 1,700 km. Conclusively, interprovincial passengers will increase with the increase of short trips and inter-city trips, based on the relationship of passenger demand and travel distance (see Figure 4.3.4 and Figure 4.3.5). Detailed information can be obtained from Appendix IV.

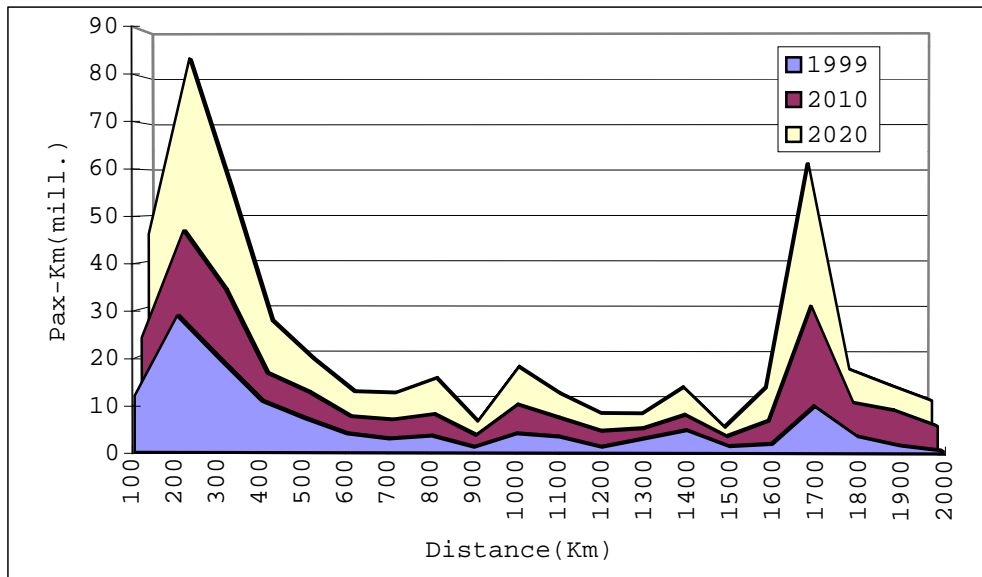
**Figure 4.3.4**  
 Distribution of Interprovincial Passenger Traffic by Trip Distance



Source: VITRANSS



Figure 4.3.5  
 Distribution of Interprovincial Passenger-km by Trip Distance



Source: VITRANSS

**Traffic Assignment:** The estimated future passenger transport demand was assigned onto the future transport network (see Figure 4.3.6 and Figure 4.3.7). A most specific characteristic, transport demand increase will be remarkable on the north-south axis between Hanoi and HCMC for all modes except inland waterway. Also, the substantial transport demand will move around leading cities such as Hanoi and HCMC. The assignment results are summarized in Table 4.3.5.

Table 4.3.5  
 Summary of Interprovincial Passenger Traffic Assignment

	Mode	1999		2010		2020		2010/	2020/
		Mil/day	%	Mil/day	%	Mil/day	%	1999	1999
Pass-km	Car	7.0	(4.4)	27.2	(9.0)	46.6	(8.7)	3.9	6.6
	Bus	136.8	(86.1)	237.8	(78.6)	416.9	(77.8)	1.7	3.0
	Inland Water	0.6	(0.4)	1.1	(0.3)	1.6	(0.3)	1.7	2.5
	Railway	10.5	(6.6)	23.6	(7.8)	49.6	(9.2)	2.3	4.7
	Air	4.0	(2.5)	12.7	(4.2)	21.4	(4.0)	3.2	5.3
	Total	159.0	(100)	302.5	(100)	536.0	(100)	1.9	3.4
Ave. Trip Length (km)	Car	134.4		142.5		129.4		1.1	1.0
	Bus	266.3		297.0		286.9		1.1	1.1
	Inland Water	111.7		212.0		182.0		1.9	1.6
	Railway	427.4		277.2		307.9		0.6	0.7
	Air	850.9		862.0		900.0		1.0	1.1
	Total	264.5		275.8		267.2		1.0	1.0

Source: VITRANSS

Figure 4.3.6  
Interprovincial Passenger Traffic Flow by Surface Mode

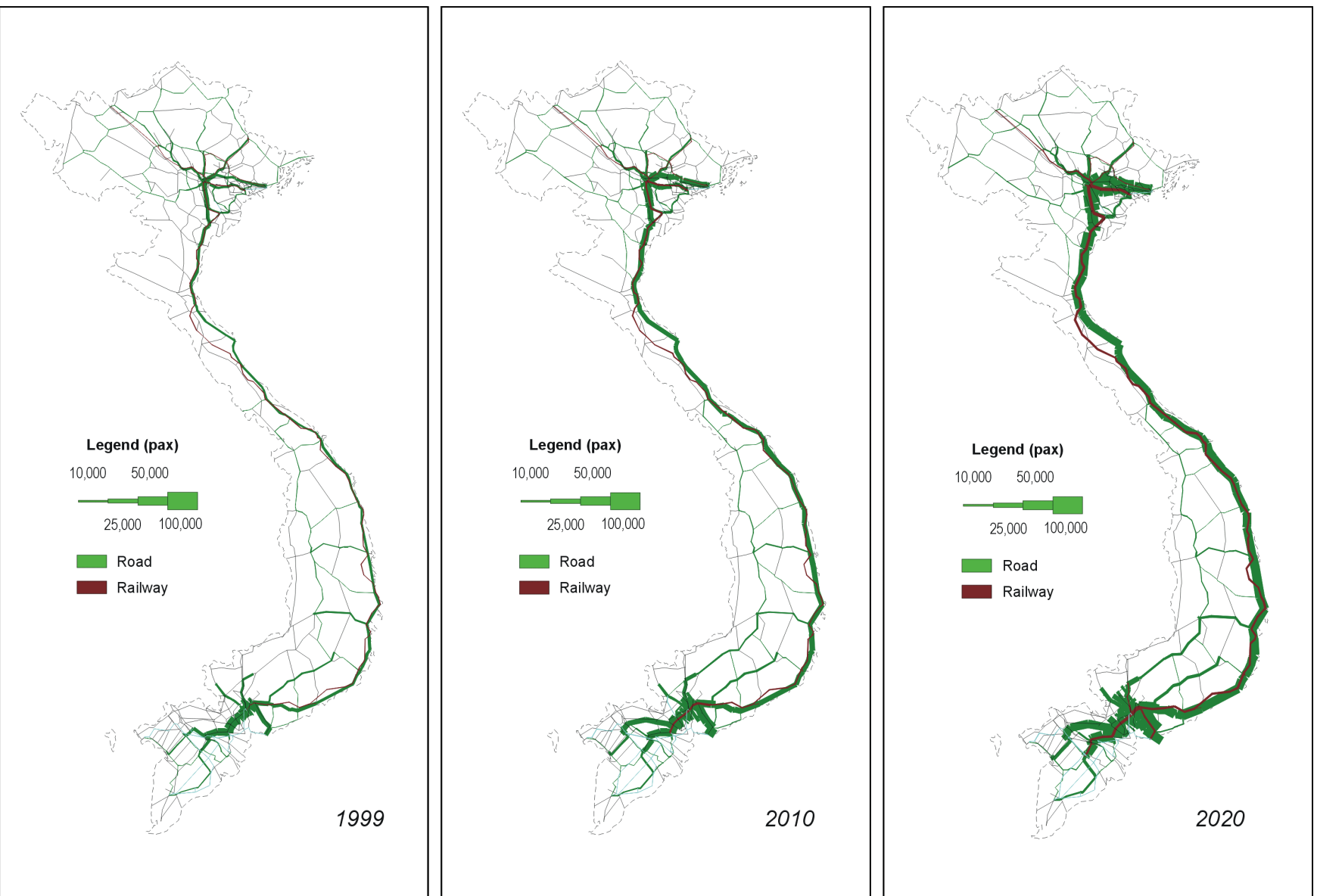
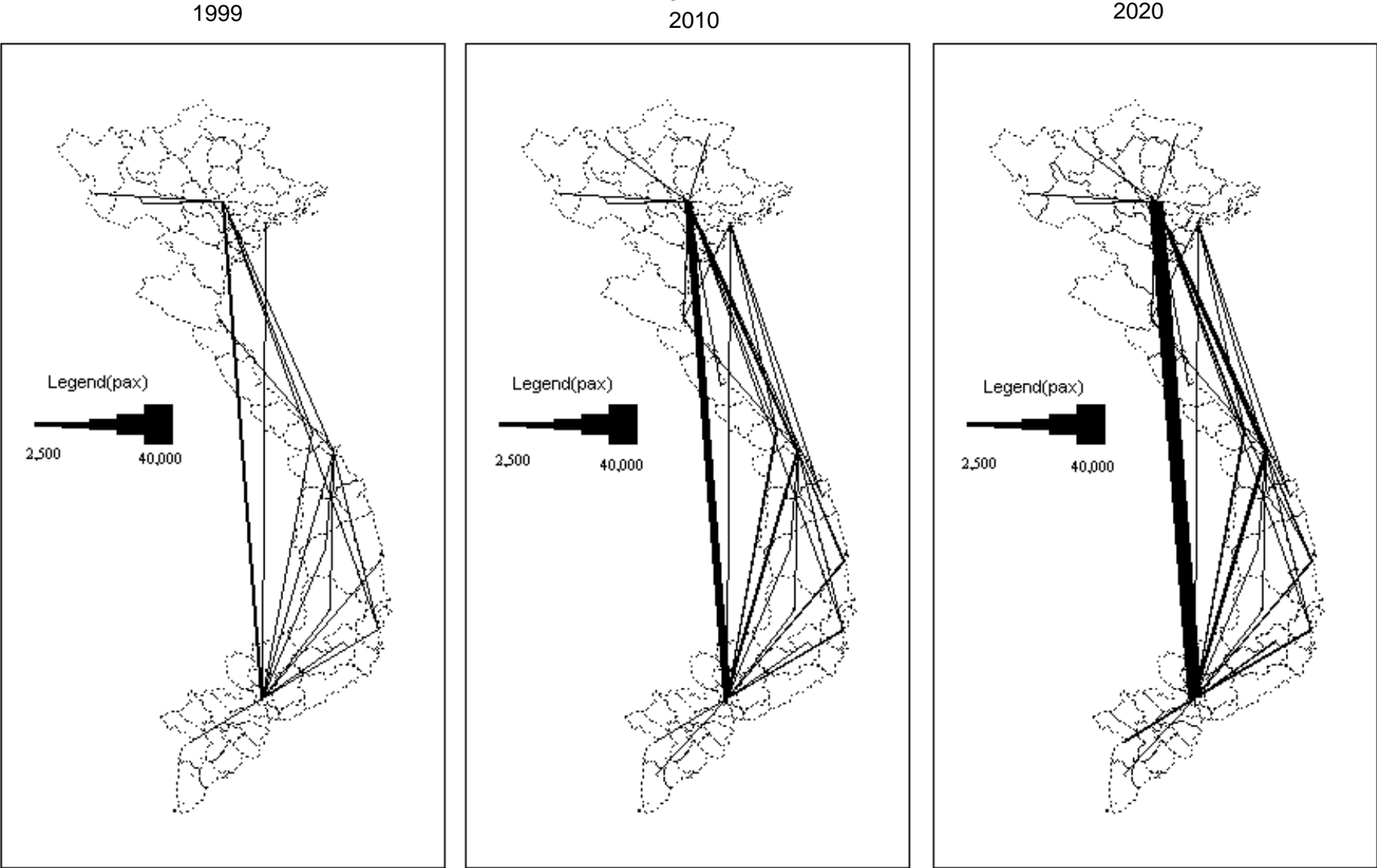


Figure 4.3.7  
Air Passenger Traffic Flow



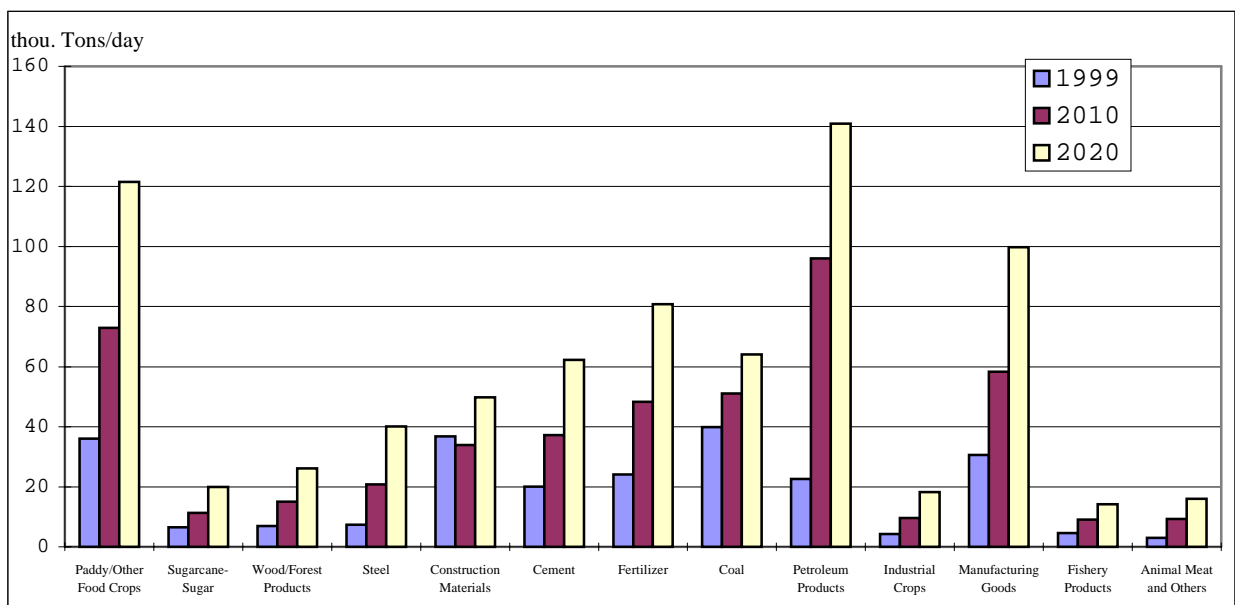
## 3) Freight Transport

Changes in Interprovincial Cargoes: As compared to approximately 0.2 million tons a day (88.6 million tons a year), the future transport demand of freight will double in 2010, totaling approximately 0.5 million tons a day (172.6 million tons a year), and triple in 2020, amounting to 0.7 million tons a day (274.8 million tons a year) (see Table 4.3.6). The estimated results show comparatively large increases in the commodity items of steel, petroleum products, industrial crops, and animal meat/others.

Table 4.3.6  
Interprovincial Freight Traffic Demand, 1999-2020

Commodity Item	'000 Tons				
	1999	2010	2020	2010/1999	2020/1999
Paddy/Other Food Crops	36,016	72,927	121,533	2.02	3.37
Sugarcane-Sugar	6,456	11,300	19,969	1.75	3.09
Wood/Forest Products	6,902	15,065	26,112	2.18	3.78
Steel	7,340	20,796	40,095	2.83	5.46
Construction Materials	36,834	33,952	49,835	0.92	1.35
Cement	20,069	37,187	62,336	1.85	3.11
Fertilizer	24,099	48,299	80,740	2.00	3.35
Coal	39,865	51,123	64,149	1.28	1.61
Petroleum Products	22,653	95,989	140,893	4.24	6.22
Industrial Crops	4,233	9,601	18,259	2.27	4.31
Manufacturing Goods	30,657	58,344	99,783	1.90	3.25
Fishery Products	4,542	9,106	14,152	2.00	3.12
Animal Meat and Others	2,961	9,254	16,021	3.13	5.41
Total	242,627	472,943	753,877	1.95	3.11

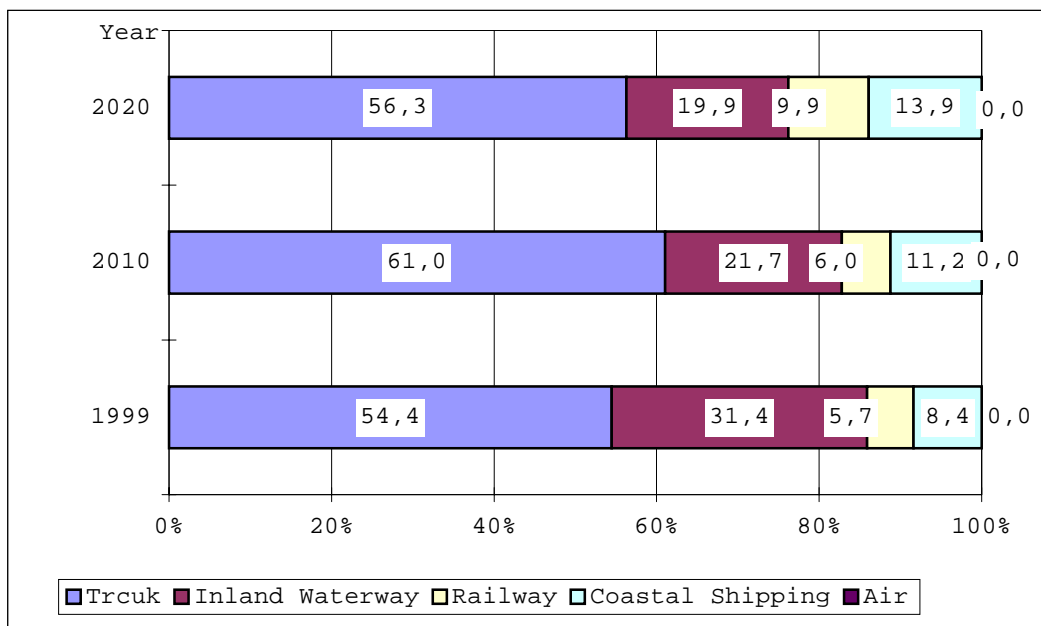
Figure 4.3.8  
Growth of Interprovincial Freight Traffic Demand, 1999-2020



**Distribution:** As shown in Figure 4.3.9 which was aggregated at the regional level, interprovincial freight flow will become more and more active between the Red River delta and the northeast as well as between the northeastern south and the Mekong River delta largely because of the economic growth in major cities such as Hanoi, HCMC and Danang.

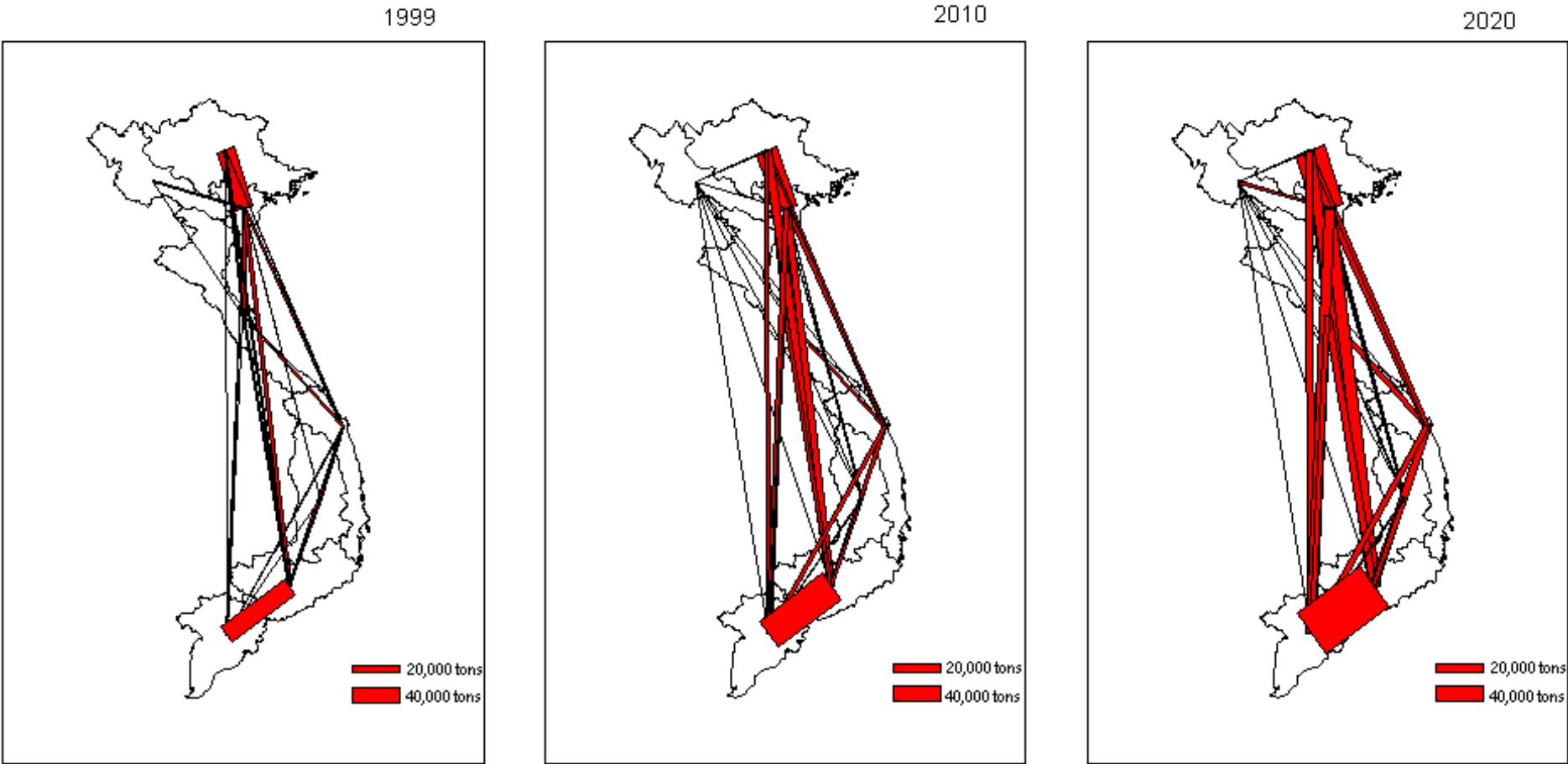
**Modal Share:** Based on the freight volume (tons/day) carried, modal share becomes as shown in Figure 4.3.10. Truck usage will also be substantial in the future (61.0% in 2010 and 56.3% in 2020, as compared to 54.4% at present). Meanwhile, the share of inland waterway will decrease slightly mainly because of the increase of medium or long distance freight transport by focusing on the development of leading cities such as Hanoi, HCMC and Danang. For the same reason, the share of railway and coastal shipping will increase.

Figure 4.3.10  
Change in Modal Share



**Traffic Distribution by Travel Distance:** Transport demand of freight will increase remarkably within a distance of 400 km, 800-1000 km and 1600-1800 km because of the increase in freight volume between leading provinces such as Hanoi, HCMC and Danang. Information on traffic distribution of commodity item by travel distance can be obtained from Appendix IV.

Figure 4.3.9  
Interprovincial Freight Traffic Flow, 1999-2020



4-28

Figure 4.3.11  
 Distribution of Interprovincial Freight Traffic by Transport Distance (in Terms of tons)

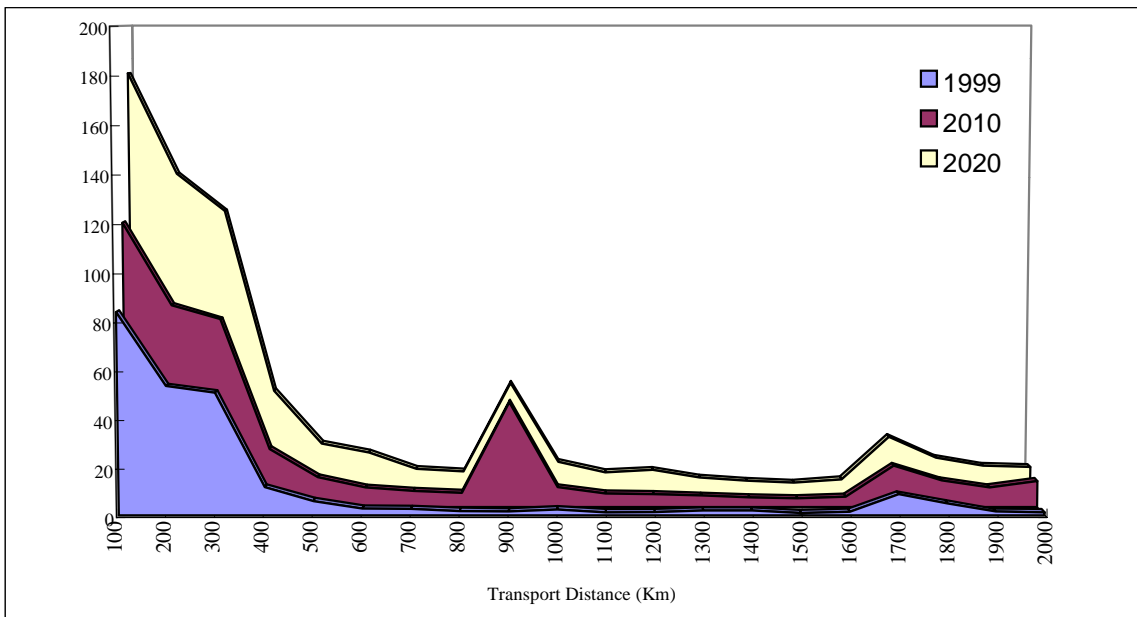
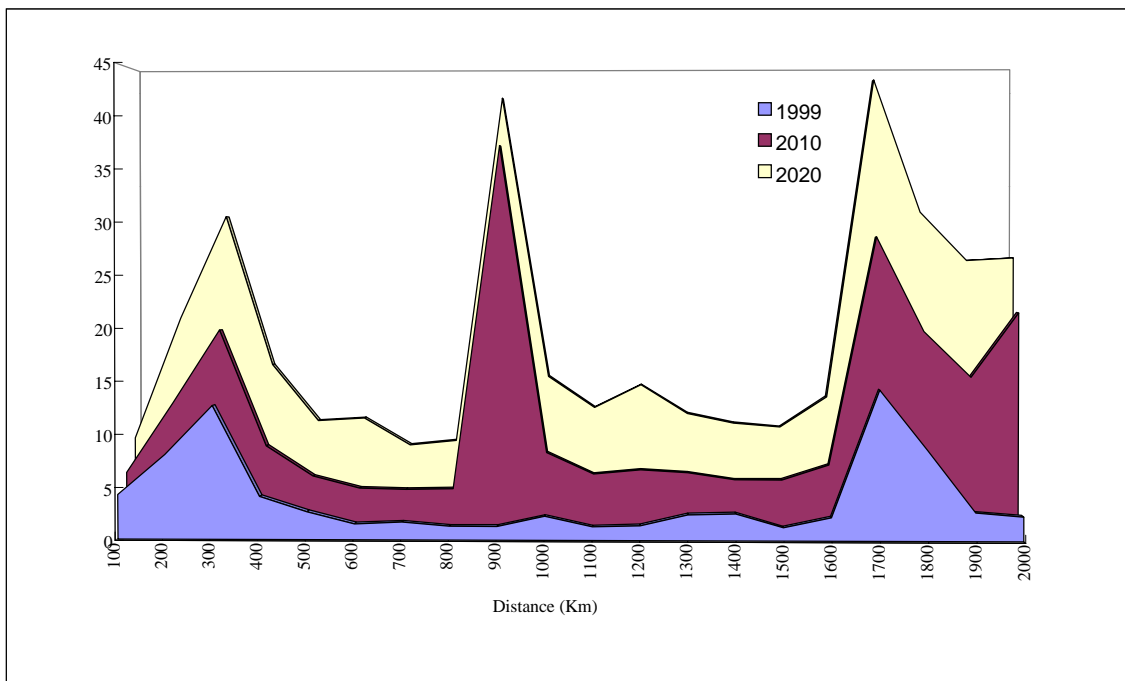


Figure 4.3.12  
 Distribution of Interprovincial Freight Traffic by Transport Distance (in Terms of Ton-kms)



**Traffic Assignment:** The estimated future freight transport demand was assigned onto the future transport network (see Table 4.3.7 and Figure 4.3.13 ~ 14).

#### 4) Traffic Assignment

As mentioned earlier, there are two types of methodology in estimating freight traffic assignment, i.e. TPM (Trend Pattern Method) and CMA (Cost Minimization Assignment). TPM assumes that transport demand is assigned according to present shares and CMA presumes that it is assigned in inverse proportion to each modes' cost between OD pairs. Assignment results show that the gap of TPM and CMA will come to about US\$ 5 billion as of 2020 in terms of transport cost, consisting of the sum of the operating cost, time cost, construction and maintenance cost. Therefore, the latter should be supported as a national development strategy. However, even though the latter is strongly recommendable, it would be quite difficult to archive its target level. For this reason, the mixture of 2/3 TPM and 1/3 CMA was taken as the future transport demand for 2010 and 1/2 TPM and 1/2 CMA as the future transport demand for 2020. The assigned traffic volume onto each modes' routes is shown in Figure 4.3.13 and 4.3.12. Like passenger transport, most cargoes will be loaded on the north-south axis between Hanoi and HCMC. In addition, substantial cargoes will be seen around major cities. Table 4.3.7 summarizes modal share and average trip length in terms of ton-km. According to the summary, the road will remain as the major transport mode even in the future, though its modal share in terms of ton-km will decrease a little in 2020 compared to that in 2010. Also, railway and coastal shipping will play an important role especially long distance trips. As a remarkable characteristic, average trip length of railway will be double compared to the present and it will carry freight over medium distances.

Table 4.3.7  
 Summary of Freight Traffic Assignment

Mode		1999(A)		2010(B)		2020(C)		B/A	C/A
Ton-km (mil./day)	Road	33.7	(43.2)	128.3	(56.8)	172.7	(47.9)	3.8	5.1
	Inland Water	14.2	(18.2)	17.9	(7.9)	26.2	(7.3)	1.3	1.9
	Railway	4.3	(5.6)	16.6	(7.3)	44.9	(12.4)	3.9	10.4
	Coastal Shipping	25.6	(32.9)	62.9	(27.9)	116.4	(32.3)	2.5	4.6
	Air	0.1	(0.1)	0.2	(0.1)	0.5	(0.1)	2.0	5.0
	Total	78.0	(100)	225.9	(100)	360.7	(100)	2.9	4.6
Average Trip Length (km)	Road	242.7		383.6		363.1			
	Inland Water	177.0		166.4		168.6			
	Railway	281.8		426.7		492.3			
	Coastal Shipping	1,437.3		1,315.4		1,177.1			
	Air	1,514.7		1,586.2		1,613.7			
	Total	325.8		443.2		449.9			

Source: VITRANSS

Note: Figures in parentheses mean modal share.



Figure 4.3.13  
Interprovincial Freight Transport by Road

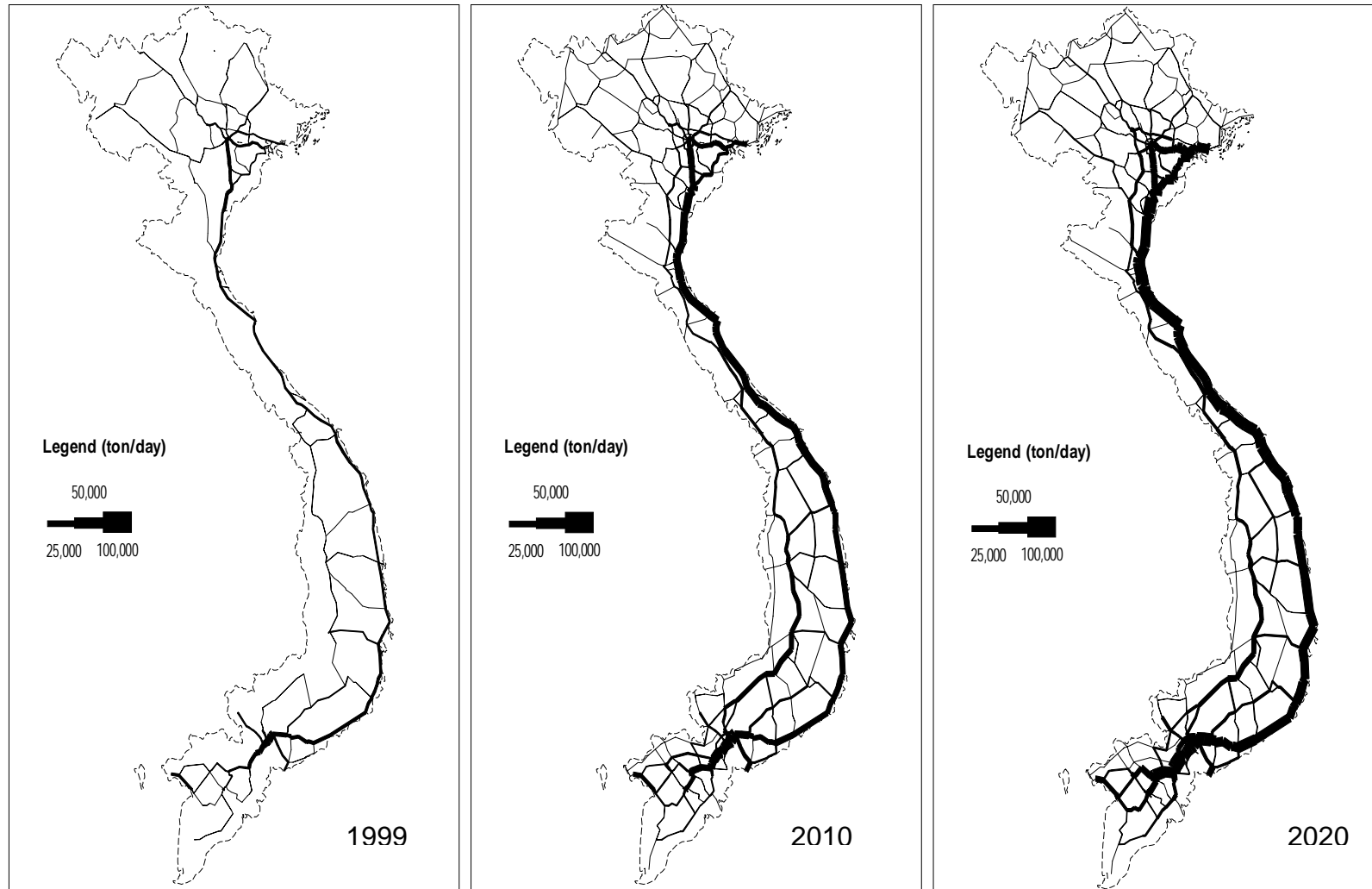
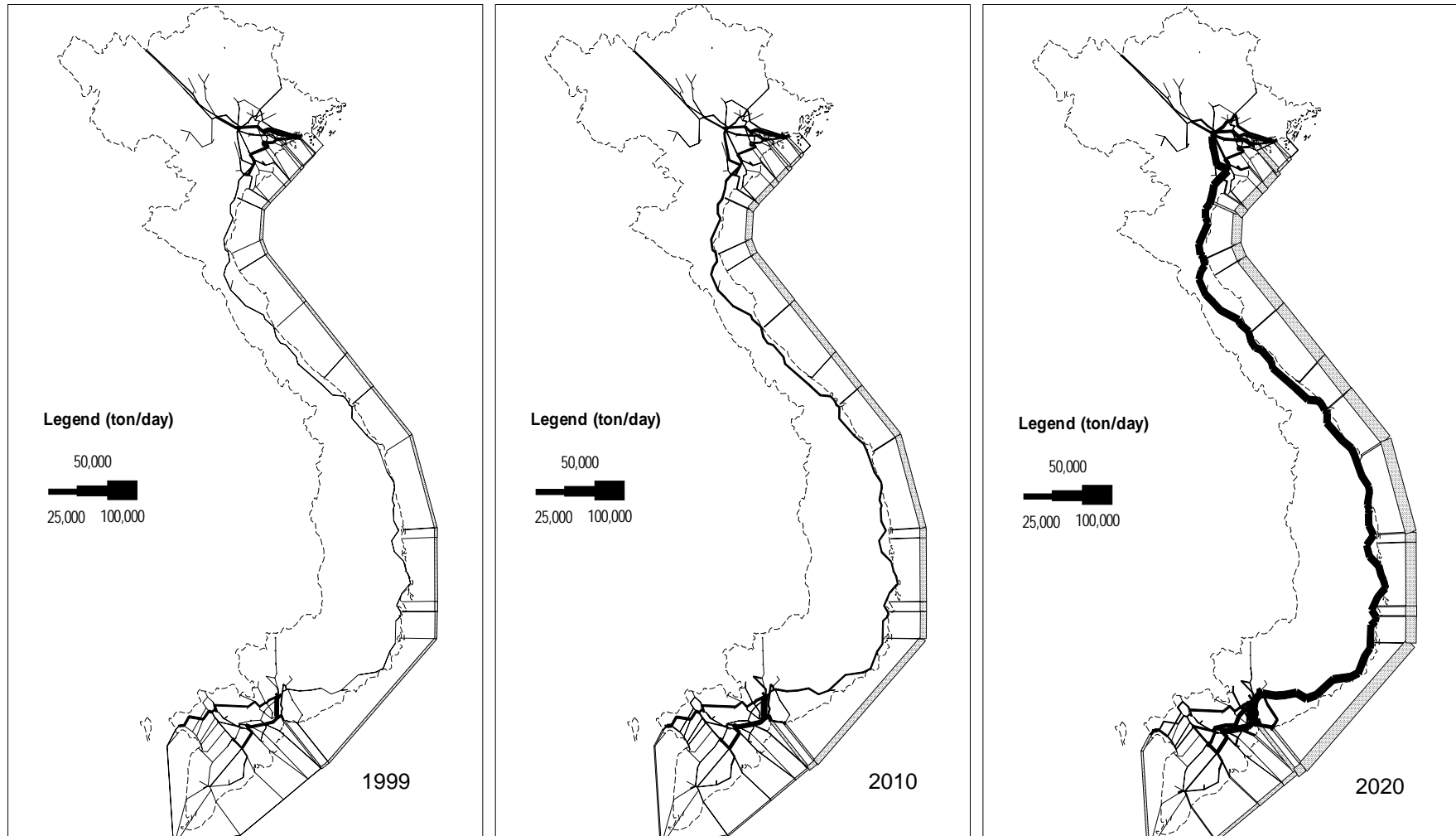


Figure 4.3.14  
Cargo Transport by Rail, Inland Water and Coastal Shipping



## ***Appendices***

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**APPENDIX 2-A NUMBER OF SAMPLES AND SAMPLING RATE  
FOR ROAD AND IWT TRAFFIC**

Table 2A-1  
Traffic Volume Counted and Sampling Rate, Passenger Car

Sta. No.	Road No.	Location	The 1st day	The 2nd day	The 3rd day	Average	Sample Size of I.S.	Sampling Rate(%)
1	6	North of Thuan Chau	58	43	54	52	31	72.1
2	70	South Bao Yen	85	75	72	77	50	66.7
3	2	North of Ham Yen (Tan Yen)	70	81	65	72	52	64.2
4	2	South of cau Viet Tri	728	785	924	812	86	11.0
5	3	Dong Phu (South of Cho Moi)	140	136	161	146	107	78.7
6	3	South of Pho Yen (Ba Hang)	477	462	524	488	45	9.7
7	1	South of Bac Ninh Town	1,305	1,083	1,284	1,224	169	15.6
8	1	North of Kep	487	508	518	504	151	29.7
9	18	East of Sao Do (Chi Linh)	463	498	590	517	133	26.7
10	4B	East of Dinh Lap	12	10	8	10	8	80.0
11	6	NorthEast of Tong Dau	91	51	120	87	47	92.2
12	6	East of Xuan Mai	500	424	536	487	48	11.3
13	37	Thuong Bang La	11	7	15	11	7	100.0
14	1	South of Dong Van	1,407	1,222	1,391	1,340	263	21.5
15	21	North of Lac Thuy (Chi Ne)	10	26	66	34	14	53.8
16	1	North of Ninh Binh town	1,004	776	933	904	196	25.3
17	1	South of Dong Giao	973	762	817	851	84	11.0
18	10	South of Nghin bridge	101	86	97	95	11	12.8
19	5	East of Du Nghia	1,063	1,108	1,126	1,099	189	17.1
20	10	West of Yen Hung (Quang Yen)	137	144	143	141	130	90.3
21	9	West of Dong Ha	162	97	84	114	51	52.6
22	1	Lang Co	210	258	246	238	104	40.3
23	14B	East of Dai Loc (Ai Nghia)	23	8	15	15	7	87.5
24	1	North of Tam Ky	419	396	399	405	101	25.5
25	19	East of An Khe pass (Phu Phong)	171	166	164	167	87	52.4
26	26	East of Phuong Hoang pass	63	43	71	59	34	79.1
27	14	North of Dong Xoai	204	119	121	148	83	69.7
28	20	South of Ma Da Gui	182	99	166	149	16	16.2
29	1	South of Ham Thuan Nam	332	341	258	310	54	15.8
30	51	North of Phu My (Tan Thanh)	948	930	992	957	235	25.3
31	1	North of Dong Nai bridge	4,363	3,428	3,926	3,906	209	6.1
32	13	Suoth of Thu Dau Mot	1,585	1,467	1,468	1,507	102	7.0
33	1	Noth of Tan An	2,024	1,980	1,924	1,976	131	6.6
34	22	East of Trang Bang	777	782	714	758	162	20.7
35	60	South of Rach Mieu ferry	203	174	185	187	141	81.0
36	30	East of Cao Lanh	259	288	282	276	104	36.1
37	1	North of Can Tho Ferry	473	427	420	440	109	25.5
38	80	South of Thach Hung(Lap Vo)	256	231	228	238	45	19.5
39	91	West of Long Xuyen	329	323	411	354	104	32.2

Table 2A-2  
Traffic Volume Counted and Sampling Rate, Bus

Sta. No.	Road No.	Location	The 1st day	The 2nd day	The 3rd day	Average	Sample Size of I.S.	Sampling Rate(%)
1	6	North of Thuan Chau	53	48	60	54	36	75.0
2	70	South Bao Yen	67	65	74	68	52	80.0
3	2	North of Ham Yen (Tan Yen)	180	178	175	178	162	91.0
4	2	South of cau Viet Tri	701	848	1,037	862	135	15.9
5	3	Dong Phu (South of Cho Moi)	176	157	182	172	120	76.4
6	3	South of Pho Yen (Ba Hang)	505	630	541	558	96	15.2
7	1	South of Bac Ninh Town	1,326	998	1,442	1,255	386	38.7
8	1	North of Kep	660	669	677	669	410	61.3
9	18	East of Sao Do (Chi Linh)	624	663	919	735	264	39.8
10	4B	East of Dinh Lap	13	19	13	15	16	84.2
11	6	NorthEast of Tong Dau	123	129	241	165	120	93.0
12	6	East of Xuan Mai	476	421	515	471	180	42.8
13	37	Thuong Bang La	2	4	13	6	3	75.0
14	1	South of Dong Van	1,747	1,755	1,816	1,773	374	21.3
15	21	North of Lac Thuy (Chi Ne)	11	9	15	12	5	55.6
16	1	North of Ninh Binh town	1,015	893	1,122	1,010	274	30.7
17	1	South of Dong Giao	989	952	1,038	993	194	20.4
18	10	South of Nghin bridge	153	158	169	160	85	53.8
19	5	East of Du Nghia	755	762	1,046	854	180	23.6
20	10	West of Yen Hung (Quang Yen)	176	187	191	185	157	84.0
21	9	West of Dong Ha	239	301	246	262	210	69.8
22	1	Lang Co	513	675	498	562	337	49.9
23	14B	East of Dai Loc (Ai Nghia)	116	79	100	98	68	86.1
24	1	North of Tam Ky	751	830	792	791	295	35.5
25	19	East of An Khe pass (Phu Phong)	485	622	504	537	384	61.7
26	26	East of Phuong Hoang pass	113	125	180	139	96	76.8
27	14	North of Dong Xoai	322	254	280	285	218	85.8
28	20	South of Ma Da Gui	811	748	846	801	277	37.0
29	1	South of Ham Thuan Nam	983	955	1,024	987	231	24.2
30	51	North of Phu My (Tan Thanh)	1,261	1,462	1,396	1,373	451	30.8
31	1	North of Dong Nai bridge	5,594	7,123	6,305	6,340	628	8.8
32	13	Suoth of Thu Dau Mot	2,278	1,840	2,261	2,127	374	20.3
33	1	Noth of Tan An	3,861	3,957	4,368	4,062	447	11.3
34	22	East of Trang Bang	846	854	872	858	234	27.4
35	60	South of Rach Mieu ferry	353	359	325	346	308	85.8
36	30	East of Cao Lanh	706	574	605	628	270	47.0
37	1	North of Can Tho Ferry	1,159	1,087	1,122	1,123	442	40.7
38	80	South of Thach Hung(Lap Vo)	627	635	674	646	243	38.3
39	91	West of Long Xuyen	1,141	1,178	1,211	1,177	419	35.6

Table 2A-3  
Traffic Volume Counted and Sampling Rate, Truck

Sta. No.	Road No.	Location	The 1st day	The 2nd day	The 3rd day	Average	Sample Size of I.S.	Sampling Rate(%)
1	6	North of Thuan Chau	91	89	87	89	61	68.5
2	70	South Bao Yen	135	131	123	129	83	63.4
3	2	North of Ham Yen (Tan Yen)	209	275	228	238	182	66.2
4	2	South of cau Viet Tri	2,106	1,991	1,859	1,985	290	14.6
5	3	Dong Phu (South of Cho Moi)	257	243	236	245	145	59.7
6	3	South of Pho Yen (Ba Hang)	1,160	1,291	961	1,137	268	20.8
7	1	South of Bac Ninh Town	2,169	1,635	1,677	1,827	419	25.6
8	1	North of Kep	1,006	1,069	985	1,021	454	42.5
9	18	East of Sao Do (Chi Linh)	1,271	1,376	1,547	1,398	349	25.4
10	4B	East of Dinh Lap	48	28	47	41	28	100.0
11	6	NorthEast of Tong Dau	305	299	401	336	172	57.5
12	6	East of Xuan Mai	1,032	943	1,006	995	364	38.6
13	37	Thuong Bang La	26	41	30	32	21	51.2
14	1	South of Dong Van	3,063	3,518	3,153	3,244	586	16.7
15	21	North of Lac Thuy (Chi Ne)	105	113	143	121	52	46.0
16	1	North of Ninh Binh town	2,238	2,132	2,160	2,177	407	19.1
17	1	South of Dong Giao	2,594	2,684	2,465	2,581	612	22.8
18	10	South of Nghin bridge	297	310	265	291	143	46.1
19	5	East of Du Nghia	2,164	2,117	1,981	2,088	623	29.4
20	10	West of Yen Hung (Quang Yen)	144	150	136	144	114	76.0
21	9	West of Dong Ha	443	453	386	428	274	60.5
22	1	Lang Co	1,415	1,421	1,480	1,439	673	47.4
23	14B	East of Dai Loc (Ai Nghia)	157	138	153	150	97	70.3
24	1	North of Tam Ky	1,953	1,857	1,967	1,926	460	24.8
25	19	East of An Khe pass (Phu Phong)	901	857	1,056	938	406	47.4
26	26	East of Phuong Hoang pass	763	636	836	745	325	51.1
27	14	North of Dong Xoai	959	641	609	736	317	49.5
28	20	South of Ma Da Gui	1,177	1,146	1,220	1,182	304	26.5
29	1	South of Ham Thuan Nam	2,037	2,070	1,810	1,972	363	17.5
30	51	North of Phu My (Tan Thanh)	1,829	2,053	1,923	1,935	396	19.3
31	1	North of Dong Nai bridge	10,999	11,123	10,689	10,937	1,110	10.0
32	13	Suoth of Thu Dau Mot	3,513	2,887	3,160	3,186	485	16.8
33	1	Noth of Tan An	5,655	5,466	5,813	5,645	480	8.8
34	22	East of Trang Bang	1,669	1,669	1,668	1,670	436	26.1
35	60	South of Rach Mieu ferry	388	397	413	400	276	69.5
36	30	East of Cao Lanh	520	469	457	482	145	30.9
37	1	North of Can Tho Ferry	1,123	1,097	988	1,070	278	25.3
38	80	South of Thach Hung(Lap Vo)	1,219	1,292	1,221	1,244	248	19.2
39	91	West of Long Xuyen	733	650	820	735	285	43.8

Table 2A-4  
Traffic Volume Counted and Sampling Rate, Total Traffic

Sta. No.	Road No.	Location	The 1st day	The 2nd day	The 3rd day	Average	Sample Size of I.S.	Sampling Rate(%)
1	6	North of Thuan Chau	202	180	201	195	128	71.1
2	70	South Bao Yen	287	271	269	274	185	68.3
3	2	North of Ham Yen (Tan Yen)	459	534	468	488	396	74.2
4	2	South of cau Viet Tri	3,535	3,624	3,820	3,659	511	14.1
5	3	Dong Phu (South of Cho Moi)	573	536	579	563	372	69.4
6	3	South of Pho Yen (Ba Hang)	2,142	2,383	2,026	2,183	409	17.2
7	1	South of Bac Ninh Town	4,800	3,716	4,403	4,306	974	26.2
8	1	North of Kep	2,153	2,246	2,180	2,194	1,015	45.2
9	18	East of Sao Do (Chi Linh)	2,358	2,537	3,056	2,650	746	29.4
10	4B	East of Dinh Lap	73	57	68	66	52	91.2
11	6	NorthEast of Tong Dau	519	479	762	588	339	70.8
12	6	East of Xuan Mai	2,008	1,788	2,057	1,953	592	33.1
13	37	Thuong Bang La	39	52	58	49	31	59.6
14	1	South of Dong Van	6,217	6,495	6,360	6,357	1,223	18.8
15	21	North of Lac Thuy (Chi Ne)	126	148	224	167	71	48.0
16	1	North of Ninh Binh town	4,257	3,801	4,215	4,091	877	23.1
17	1	South of Dong Giao	4,556	4,398	4,320	4,425	890	20.2
18	10	South of Nghin bridge	551	554	531	546	239	43.1
19	5	East of Du Nghia	3,982	3,987	4,153	4,041	992	24.9
20	10	West of Yen Hung (Quang Yen)	457	481	470	470	401	83.4
21	9	West of Dong Ha	844	851	716	804	535	62.9
22	1	Lang Co	2,138	2,354	2,224	2,239	1,114	47.3
23	14B	East of Dai Loc (Ai Nghia)	296	225	268	263	172	76.4
24	1	North of Tam Ky	3,123	3,083	3,158	3,122	856	27.8
25	19	East of An Khe pass (Phu Phong)	1,557	1,645	1,724	1,642	877	53.3
26	26	East of Phuong Hoang pass	939	804	1,087	943	455	56.6
27	14	North of Dong Xoai	1,485	1,014	1,010	1,169	618	60.9
28	20	South of Ma Da Gui	2,170	1,993	2,232	2,132	597	30.0
29	1	South of Ham Thuan Nam	3,352	3,366	3,092	3,269	648	19.3
30	51	North of Phu My (Tan Thanh)	4,038	4,445	4,311	4,265	1,082	24.3
31	1	North of Dong Nai bridge	20,956	21,674	20,920	21,183	1,947	9.0
32	13	Suoth of Thu Dau Mot	7,376	6,194	6,889	6,820	961	15.5
33	1	Noth of Tan An	11,540	11,403	12,105	11,683	1,058	9.3
34	22	East of Trang Bang	3,292	3,305	3,254	3,286	832	25.2
35	60	South of Rach Mieu ferry	944	930	923	933	725	78.0
36	30	East of Cao Lanh	1,485	1,331	1,344	1,386	519	39.0
37	1	North of Can Tho Ferry	2,755	2,611	2,530	2,633	829	31.8
38	80	South of Thach Hung(Lap Vo)	2,102	2,158	2,123	2,128	536	24.8
39	91	West of Long Xuyen	2,203	2,151	2,442	2,266	808	37.6

**Table 2A-5**  
**Traffic Volume Counted and Sampling Rate, Sea Going Vessel**

Station No.	River	River code	River location	The 1st day	The 2nd day	Average	Sample size of I.S	Sampling Rate (%)
1	Chanh	1	Yen Hung	0	0	0	0	0.0
3	Kinh Thay	3	Ben Trieu	0	0	0	0	0.0
6	Duong	6	Duong Ha	0	0	0	0	0.0
7	Hong	7	Son Tay	0	0	0	0	0.0
8	Lo	8	Viet Tri	0	0	0	0	0.0
11	Hong	7	Khuyen Luong	0	0	0	0	0.0
13	Hong	7	Phu Nha	0	0	0	0	0.0
16	Luoc	12	Ning Giang	0	0	0	0	0.0
18	Nam Dinh	14	Do Quan	0	0	0	0	0.0
21	Can Giuoc - Nuoc Man	17	Phuoc Dong	0	0	0	0	0.0
23	Cho Dem - Ben Luc	19	Ben Luc	3	1	2	0	0.0
26	Rach Soi	22	Tan Hiep	0	0	0	0	0.0
31	Mang Thit	27	Tam Binh	0	0	0	0	0.0
33	Xa No	29	Vi Thanh	0	0	0	0	0.0
34	Ben Tre	30	Ben Tre	0	0	0	0	0.0

**Table 2A-6**  
**Traffic Volume Counted and Sampling Rate, Ship and Barge self propelled**

Station No.	River	River code	River location	The 1st day	The 2nd day	Average	Sample size of I.S	Sampling Rate (%)
1	Chanh	1	Yen Hung	215	167	191	56	29.3
3	Kinh Thay	3	Ben Trieu	869	834	851.5	82	9.6
6	Duong	6	Duong Ha	83	76	79.5	24	30.2
7	Hong	7	Son Tay	283	246	264.5	72	27.2
8	Lo	8	Viet Tri	413	343	378	59	15.6
11	Hong	7	Khuyen Luong	38	74	56	31	55.4
13	Hong	7	Phu Nha	248	157	202.5	46	22.7
16	Luoc	12	Ning Giang	156	133	144.5	34	23.5
18	Nam Dinh	14	Do Quan	175	149	162	40	24.7
21	Can Giuoc - Nuoc Man	17	Phuoc Dong	426	230	328	87	26.5
23	Cho Dem - Ben Luc	19	Ben Luc	391	298	344.5	56	16.3
26	Rach Soi	22	Tan Hiep	1253	972	1112.5	321	28.9
31	Mang Thit	27	Tam Binh	472	250	361	55	15.2
33	Xa No	29	Vi Thanh	1493	826	1159.5	159	13.7
34	Ben Tre	30	Ben Tre	730	496	613	69	11.3



**Table 2A-7**  
Traffic Volume Counted and Sampling Rate, Oil tanker

Station No.	River	River code	River location	The 1st day	The 2nd day	Average	Sample size of I.S	Sampling Rate (%)
1	Chanh	1	Yen Hung	0	1	0.5	1	200.0
3	Kinh Thay	3	Ben Trieu	0	2	1	0	0.0
6	Duong	6	Duong Ha	4	0	2	0	0.0
7	Hong	7	Son Tay	0	2	1	1	100.0
8	Lo	8	Viet Tri	0	0	0	0	0.0
11	Hong	7	Khuyen Luong	0	0	0	0	0.0
13	Hong	7	Phu Nha	0	0	0	0	0.0
16	Luoc	12	Ning Giang	0	0	0	0	0.0
18	Nam Dinh	14	Do Quan	0	0	0	0	0.0
21	Can Giuoc - Nuoc Man	17	Phuoc Dong	19	27	23	7	30.4
23	Cho Dem - Ben Luc	19	Ben Luc	3	1	2	0	0.0
26	Rach Soi	22	Tan Hiep	5	9	7	6	85.7
31	Mang Thit	27	Tam Binh	0	15	7.5	4	53.3
33	Xa No	29	Vi Thanh	4	2	3	2	66.7
34	Ben Tre	30	Ben Tre	1	0	0.5	0	0.0

**Table 2A-8**  
Traffic Volume Counted and Sampling Rate, Tow barge tanker

Station No.	River	River code	River location	The 1st day	The 2nd day	Average	Sample size of I.S	Sampling Rate (%)
1	Chanh	1	Yen Hung	1	1	1	0	0.0
3	Kinh Thay	3	Ben Trieu	8	28	18	3	16.7
6	Duong	6	Duong Ha	7	6	6.5	4	61.5
7	Hong	7	Son Tay	4	3	3.5	3	85.7
8	Lo	8	Viet Tri	8	10	9	6	66.7
11	Hong	7	Khuyen Luong	0	1	0.5	1	200.0
13	Hong	7	Phu Nha	1	4	2.5	2	80.0
16	Luoc	12	Ning Giang	2	6	4	2	50.0
18	Nam Dinh	14	Do Quan	2	2	2	1	50.0
21	Can Giuoc - Nuoc Man	17	Phuoc Dong	15	21	18	4	22.2
23	Cho Dem - Ben Luc	19	Ben Luc	39	33	36	4	11.1
26	Rach Soi	22	Tan Hiep	8	11	9.5	13	136.8
31	Mang Thit	27	Tam Binh	1	5	3	3	100.0
33	Xa No	29	Vi Thanh	1	0	0.5	0	0.0
34	Ben Tre	30	Ben Tre	1	1	1	1	100.0

**Table 2A-9**  
**Traffic Volume Counted and Sampling Rate, Push barge tanker**

Station No.	River	River code	River location	The 1st day	The 2nd day	Average	Sample size of I.S	Sampling Rate (%)
1	Chanh	1	Yen Hung	6	4	5	2	40.0
3	Kinh Thay	3	Ben Trieu	15	66	40.5	11	27.2
6	Duong	6	Duong Ha	3	3	3	3	100.0
7	Hong	7	Son Tay	11	7	9	4	44.4
8	Lo	8	Viet Tri	6	1	3.5	0	0.0
11	Hong	7	Khuyen Luong	2	1	1.5	0	0.0
13	Hong	7	Phu Nha	7	1	4	1	25.0
16	Luoc	12	Ning Giang	3	0	1.5	1	66.7
18	Nam Dinh	14	Do Quan	2	3	2.5	3	120.0
21	Can Giuoc - Nuoc Man	17	Phuoc Dong	50	45	47.5	9	18.9
23	Cho Dem - Ben Luc	19	Ben Luc	122	95	108.5	29	26.7
26	Rach Soi	22	Tan Hiep	7	3	5	6	120.0
31	Mang Thit	27	Tam Binh	6	2	4	4	100.0
33	Xa No	29	Vi Thanh	0	0	0	0	0.0
34	Ben Tre	30	Ben Tre	0	2	1	3	300.0

**APPENDIX 2 - B PASSENGER OD MATRIX BY REGION, 1999**

Region		1	2	3	4	5	6	7	8	Total
1	Car(%)	14.1	13.1	14.6	14.5	6.2	0.2	1.2	1.3	12.9
	Bus(%)	74.7	81.8	84.3	75.2	59.5	99.3	43.0	87.3	77.2
	Inland Waterway(%)	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.3
	Railway(%)	11.2	4.4	0.3	9.5	20.9	0.4	24.6	11.4	8.3
	Air(%)	0.0	0.0	0.7	0.8	13.3	0.1	31.1	0.0	1.3
	Total(passengers/day)	51,641	46,474	5,276	10,150	1,636	2,363	3,831	702	122,073
2	Car(%)	13.0	11.0	11.4	3.2	2.6	0.0	2.0	0.0	11.7
	Bus(%)	81.9	74.1	86.1	80.1	77.8	99.7	68.0	72.5	79.8
	Inland Waterway(%)	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
	Railway(%)	4.4	14.9	0.0	16.7	19.6	0.3	20.2	27.5	7.9
	Air(%)	0.0	0.0	2.5	0.0	0.0	0.0	9.8	0.0	0.2
	Total(passengers/day)	46,421	17,916	638	2,332	618	683	980	193	69,781
3	Car(%)	14.7	11.7	32.0	6.0	11.5	0.0	0.0	0.0	14.4
	Bus(%)	84.2	88.3	68.0	90.0	88.5	0.0	0.0	0.0	84.3
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.3	0.0	0.0	4.0	0.0	0.0	100.0	0.0	0.6
	Air(%)	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
	Total(passengers/day)	5,287	622	194	350	61	0	10	0	6,524
4	Car(%)	14.5	3.2	5.9	6.3	6.7	8.1	3.4	2.1	9.5
	Bus(%)	75.1	80.1	88.0	76.4	55.6	91.4	66.8	51.0	74.3
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	9.4	16.7	3.9	17.3	36.7	0.5	22.6	46.9	15.1
	Air(%)	1.0	0.0	2.2	0.0	1.0	0.0	7.2	0.0	1.1
	Total(passengers/day)	10,167	2,332	358	5,951	1,636	431	1,657	96	22,628
5	Car(%)	6.3	2.6	11.5	6.7	1.1	1.9	4.2	2.1	2.5
	Bus(%)	57.9	77.8	88.5	55.7	93.3	97.4	80.8	96.6	87.6
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	20.3	19.6	0.0	36.8	5.1	0.0	10.2	1.3	7.7
	Air(%)	15.5	0.0	0.0	0.9	0.5	0.6	4.8	0.0	2.2
	Total(passengers/day)	1,683	618	61	1,633	15,287	5,905	7,169	1,278	33,634
6	Car(%)	0.2	0.0	0.0	8.1	1.9	16.1	6.0	0.0	4.4
	Bus(%)	98.5	99.7	0.0	91.4	97.3	83.9	90.3	99.7	94.3
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.4	0.3	0.0	0.5	0.0	0.0	0.2	0.3	0.2
	Air(%)	0.9	0.0	0.0	0.0	0.8	0.0	3.4	0.0	1.1
	Total(passengers/day)	2,381	683	0	431	5,911	2,060	3,242	762	15,470
7	Car(%)	1.4	2.3	0.0	2.2	4.2	6.1	9.7	4.7	8.1
	Bus(%)	43.4	75.3	0.0	66.7	80.8	90.6	89.7	94.4	89.7
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.9	0.5
	Railway(%)	24.8	22.4	100.0	22.6	10.2	0.2	0.2	0.0	1.0
	Air(%)	30.3	0.0	0.0	8.5	4.8	3.1	0.0	0.0	0.7
	Total(passengers/day)	3,800	884	10	1,660	7,168	3,232	174,046	60,536	251,336
8	Car(%)	1.2	0.0	0.0	2.1	2.1	0.0	4.5	3.9	4.2
	Bus(%)	84.1	72.5	0.0	51.0	96.6	99.7	94.5	74.7	90.6
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.9	21.3	4.8
	Railway(%)	11.0	27.5	0.0	46.9	1.3	0.3	0.0	0.0	0.2
	Air(%)	3.7	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1
	Total(passengers/day)	729	193	0	96	1,278	762	60,478	15,308	78,844
Total	Car(%)	12.9	11.8	14.3	9.4	2.5	4.4	8.1	4.4	
	Bus(%)	77.2	79.9	84.1	74.5	87.7	94.5	89.6	90.5	
	Inland Waterway(%)	0.3	0.5	0.0	0.0	0.0	0.0	0.5	4.8	
	Railway(%)	8.3	7.9	0.6	15.1	7.7	0.2	1.0	0.2	
	Air(%)	1.3	0.0	0.9	1.0	2.1	0.9	0.8	0.0	
	Total(passengers/day)	122,361	69,780	6,537	22,699	33,626	15,436	251,413	78,875	

APPENDIX 2-C FREIGHT OD MATRIX BY REGION, 1999

Table 2C-1  
Total Freight OD Matrix by Region, 1999

Region		1	2	3	4	5	6	7	8	Total
1	Road(%)	67.1	57.1	99.6	82.3	20.4	52.3	34.8	31.9	61.5
	Inland Waterway(%)	27.0	33.1	0.0	0.0	0.0	0.0	0.0	0.0	19.9
	Railway(%)	5.9	9.8	0.0	8.0	8.0	0.0	2.1	0.0	6.7
	Coastal Shipping(%)	0.0	0.0	0.4	9.7	71.6	47.7	62.6	68.1	11.8
	Air(%)	0.0	0.0	0.0	0.0	0.1	0.0	0.5	0.0	0.0
	Total(tons/day)	19,766	11,414	1,255	6,177	2,942	220	3,492	634	45,900
2	Road(%)	18.3	29.7	85.7	39.5	18.8	0.0	15.2	44.6	23.0
	Inland Waterway(%)	69.6	57.7	0.0	0.0	0.0	0.0	0.0	0.0	58.7
	Railway(%)	12.1	12.7	9.5	22.5	12.1	0.0	2.6	0.0	12.5
	Coastal Shipping(%)	0.0	0.0	4.8	38.0	69.1	100.0	82.2	55.4	5.7
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	33,050	18,981	21	2,906	959	18	1,785	101	57,821
3	Road(%)	100.0	100.0	100.0	100.0	0.0	0.0	100.0	100.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	963	49	191	117	0	0	5	11	1,336
4	Road(%)	88.9	74.8	100.0	32.8	56.3	0.0	63.9	83.3	73.6
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	7.4	24.4	0.0	67.2	30.2	0.0	1.5	5.6	17.2
	Coastal Shipping(%)	3.7	0.7	0.0	0.0	13.5	100.0	34.6	11.1	9.2
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	4,794	667	129	1,076	1,128	1	1,496	18	9,309
5	Road(%)	55.2	69.4	0.0	81.2	97.1	100.0	87.8	27.2	83.7
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	5.1	7.2	0.0	5.6	2.8	0.0	4.2	0.0	3.5
	Coastal Shipping(%)	39.5	23.4	0.0	13.2	0.1	0.0	7.9	72.8	12.8
	Air(%)	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
	Total(tons/day)	1,810	516	0	1,488	4,066	1,514	2,288	459	12,141
6	Road(%)	100.0	100.0	0.0	100.0	100.0	100.0	100.0	100.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	273	67	0	17	875	19	1,883	80	3,214
7	Road(%)	28.6	15.9	0.0	50.5	92.0	99.9	99.8	37.8	67.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.2	22.9
	Railway(%)	4.9	1.4	4.3	5.9	2.1	0.0	0.2	0.0	0.6
	Coastal Shipping(%)	65.8	82.7	95.7	43.7	5.8	0.1	0.0	0.0	9.3
	Air(%)	0.6	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1
	Total(tons/day)	6,059	3,925	47	939	2,805	1,450	37,974	31,112	84,311
8	Road(%)	21.9	50.7	0.0	36.3	100.0	100.0	57.5	15.9	43.5
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	42.5	84.1	51.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	78.1	49.3	100.0	63.7	0.0	0.0	0.0	0.0	5.5
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	1,285	404	16	411	431	377	15,557	8,484	26,965
Total	Road(%)	40.9	38.7	95.7	65.1	70.0	96.5	82.5	33.2	
	Inland Waterway(%)	41.7	40.9	0.0	0.0	0.0	0.0	10.3	64.8	
	Railway(%)	8.7	10.5	0.2	15.3	6.5	0.0	0.5	0.0	
	Coastal Shipping(%)	8.7	9.9	4.0	19.6	23.4	3.5	6.8	2.0	
	Air(%)	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Total(tons/day)	68,000	36,023	1,659	13,131	13,206	3,599	64,480	40,899	

Table 2C-2  
Paddy/Other Food Crops OD Matrix by Region, 1999

Region		1	2	3	4	5	6	7	8	Total
1	Road(%)	100.0	99.9	100.0	100.0	94.7	100.0	99.2	100.0	99.7
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	5.3	0.0	0.8	0.0	0.3
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	1,153	707	170	341	114	4	264	66	2,819
2	Road(%)	96.2	100.0	100.0	100.0	100.0	0.0	94.0	100.0	97.5
	Inland Waterway(%)	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
	Railway(%)	1.7	0.0	0.0	0.0	0.0	0.0	6.0	0.0	1.5
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	661	476	2	1	9	0	150	41	1,340
3	Road(%)	100.0	100.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	416	22	35	0	0	0	0	0	473
4	Road(%)	100.0	100.0	0.0	100.0	100.0	0.0	100.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	447	85	0	34	122	0	20	0	708
5	Road(%)	100.0	75.6	0.0	99.1	99.3	100.0	100.0	100.0	94.4
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	24.4	0.0	0.9	0.7	0.0	0.0	0.0	5.6
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	462	418	0	112	426	156	215	99	1,888
6	Road(%)	100.0	100.0	0.0	100.0	100.0	0.0	100.0	100.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	179	25	0	13	543	0	246	35	1,041
7	Road(%)	15.0	39.5	0.0	37.6	87.0	100.0	100.0	88.4	68.5
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.6	2.7
	Railway(%)	0.4	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.3
	Coastal Shipping(%)	84.6	57.6	100.0	62.4	13.0	0.0	0.0	0.0	28.5
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	3,376	974	45	572	576	326	4,605	3,188	13,662
8	Road(%)	14.9	45.8	0.0	31.4	100.0	100.0	53.5	18.8	48.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	46.5	81.2	41.5
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	85.1	54.2	100.0	68.6	0.0	0.0	0.0	0.0	10.5
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	1,179	367	16	382	344	205	10,229	1,323	14,045
Total	Road(%)	50.5	71.0	77.2	57.4	96.1	100.0	69.7	69.6	
	Inland Waterway(%)	0.2	0.0	0.0	0.0	0.0	0.0	30.2	30.4	
	Railway(%)	0.3	0.9	0.0	0.0	0.0	0.0	0.1	0.0	
	Coastal Shipping(%)	49.0	28.0	22.8	42.6	3.9	0.0	0.0	0.0	
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Total(tons/day)	7,873	3,074	268	1,455	2,134	691	15,729	4,752	

Table 2C-3  
Sugarcane/Sugar OD Matrix by Region, 1999

Region		1	2	3	4	5	6	7	8	Total
1	Road(%)	100.0	100.0	100.0	100.0	0.0	0.0	0.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	92	206	33	243	0	0	0	0	574
2	Road(%)	100.0	0.0	100.0	100.0	0.0	0.0	0.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	18	0	1	180	0	0	0	0	199
3	Road(%)	100.0	100.0	100.0	100.0	0.0	0.0	0.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	81	16	35	82	0	0	0	0	214
4	Road(%)	100.0	0.0	0.0	100.0	100.0	0.0	100.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	281	0	0	21	49	0	2	0	353
5	Road(%)	100.0	0.0	0.0	100.0	100.0	100.0	100.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	63	0	0	483	160	64	309	0	1,079
6	Road(%)	0.0	0.0	0.0	100.0	100.0	0.0	100.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	0	0	0	4	45	0	34	0	83
7	Road(%)	100.0	0.0	0.0	100.0	100.0	100.0	100.0	85.5	96.1
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.5	3.9
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	48	0	0	2	73	48	2,158	849	3,178
8	Road(%)	0.0	0.0	0.0	0.0	0.0	0.0	100.0	45.1	68.7
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	54.9	31.3
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	0	0	0	0	0	0	333	443	776
Total	Road(%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	71.7	
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.3	
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Total(tons/day)	583	222	69	1,015	327	112	2,836	1,292	

Table 2C-4  
Wood/Forestry Products OD Matrix by Region, 1999

Region		1	2	3	4	5	6	7	8	Total
1	Road(%)	100.0	95.6	100.0	100.0	0.0	0.0	100.0	0.0	99.2
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.8
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	149	68	7	64	0	0	74	0	362
2	Road(%)	59.5	87.1	0.0	0.0	100.0	0.0	100.0	100.0	66.1
	Inland Waterway(%)	37.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.7
	Railway(%)	2.6	12.9	0.0	0.0	0.0	0.0	0.0	0.0	4.2
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	464	101	0	0	15	0	9	4	593
3	Road(%)	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	88	0	0	0	0	0	0	0	88
4	Road(%)	95.7	64.5	0.0	97.1	83.3	0.0	80.9	0.0	92.4
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	4.3	35.5	0.0	2.9	15.0	0.0	6.4	0.0	6.1
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	1.7	0.0	12.7	0.0	1.5
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	763	31	0	34	60	0	110	0	998
5	Road(%)	87.5	0.0	0.0	100.0	98.8	100.0	62.3	0.0	60.9
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	12.5	100.0	0.0	0.0	1.3	0.0	36.1	0.0	7.8
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	1.6	100.0	31.3
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	24	1	0	14	400	58	191	309	997
6	Road(%)	100.0	100.0	0.0	0.0	100.0	0.0	100.0	100.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	36	15	0	0	76	0	203	2	332
7	Road(%)	95.2	94.7	0.0	0.0	0.0	0.0	99.8	81.9	98.5
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.1	1.2
	Railway(%)	4.8	5.3	0.0	0.0	100.0	0.0	0.2	0.0	0.3
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	21	19	0	0	2	0	3,111	226	3,379
8	Road(%)	0.0	0.0	0.0	0.0	100.0	0.0	100.0	54.8	78.1
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	45.2	21.9
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	0	0	0	0	8	0	58	62	128
Total	Road(%)	85.4	87.7	100.0	99.1	97.0	100.0	97.4	37.3	
	Inland Waterway(%)	11.4	0.0	0.0	0.0	0.0	0.0	0.0	11.4	
	Railway(%)	3.2	12.3	0.0	0.9	2.9	0.0	2.2	0.0	
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.2	0.0	0.5	51.2	
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Total(tons/day)	1,545	235	7	112	561	58	3,756	603	

Table 2C-5  
Steel OD Matrix by Region, 1999

Region		1	2	3	4	5	6	7	8	Total
1	Road(%)	93.6	40.4	100.0	92.1	72.5	100.0	17.4	100.0	61.8
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	6.4	59.6	0.0	7.9	26.5	0.0	7.2	0.0	24.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	1.0	0.0	75.3	0.0	14.2
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	753	720	79	177	102	18	430	8	2,287
2	Road(%)	70.3	94.7	0.0	95.6	83.3	0.0	0.0	0.0	80.3
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	29.7	5.3	0.0	4.4	16.7	0.0	100.0	0.0	19.7
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	927	457	0	160	102	0	2	0	1,648
3	Road(%)	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	8	0	0	0	0	0	0	0	8
4	Road(%)	97.1	93.1	0.0	33.3	77.8	0.0	100.0	0.0	89.6
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	2.9	6.9	0.0	66.7	22.2	0.0	0.0	0.0	10.4
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	34	29	0	9	9	0	25	0	106
5	Road(%)	100.0	0.0	0.0	95.8	98.4	100.0	95.1	0.0	94.8
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	100.0	0.0	4.2	1.6	0.0	0.5	0.0	3.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	4.3	0.0	2.2
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	17	7	0	24	126	5	185	0	364
6	Road(%)	0.0	0.0	0.0	0.0	100.0	0.0	100.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	0	0	0	0	8	0	83	0	91
7	Road(%)	6.9	20.0	0.0	83.3	78.3	100.0	99.0	100.0	77.7
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	1.9	6.7	0.0	16.7	21.7	0.0	1.0	0.0	1.6
	Coastal Shipping(%)	91.2	73.3	0.0	0.0	0.0	0.0	0.0	0.0	20.7
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	475	15	0	18	69	19	613	938	2,147
8	Road(%)	0.0	0.0	0.0	0.0	0.0	0.0	88.4	17.9	56.3
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	11.6	82.1	43.7
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	0	0	0	0	0	0	147	123	270
Total	Road(%)	65.4	61.4	100.0	92.0	84.6	100.0	73.8	90.6	
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	1.1	9.4	
	Railway(%)	15.0	37.7	0.0	8.0	15.1	0.0	2.7	0.0	
	Coastal Shipping(%)	19.6	0.9	0.0	0.0	0.2	0.0	22.4	0.0	
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Total(tons/day)	2,214	1,228	79	388	416	42	1,485	1,069	



Table 2C-6  
Construction Materials OD Matrix by Region, 1999

Region		1	2	3	4	5	6	7	8	Total
1	Road(%)	40.1	68.4	100.0	99.5	33.9	100.0	49.1	0.0	46.7
	Inland Waterway(%)	49.6	29.2	0.0	0.0	0.0	0.0	0.0	0.0	40.2
	Railway(%)	10.3	2.3	0.0	0.5	0.4	0.0	0.0	0.0	8.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	65.7	0.0	50.9	100.0	5.2
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	7,390	1,109	100	582	271	33	232	222	9,939
2	Road(%)	19.5	53.1	0.0	99.3	85.7	0.0	93.3	0.0	37.9
	Inland Waterway(%)	78.0	44.5	0.0	0.0	0.0	0.0	0.0	0.0	59.5
	Railway(%)	2.5	2.5	0.0	0.7	14.3	0.0	6.7	0.0	2.5
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	4,607	4,762	0	153	56	0	15	0	9,593
3	Road(%)	100.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	144	0	5	0	0	0	0	0	149
4	Road(%)	97.2	97.7	0.0	5.0	64.2	0.0	56.8	100.0	69.1
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	2.8	2.3	0.0	95.0	35.8	0.0	0.0	0.0	25.6
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	43.2	0.0	5.3
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	505	88	0	238	53	0	125	10	1,019
5	Road(%)	90.0	0.0	0.0	99.1	84.7	100.0	95.9	0.0	90.4
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	10.0	0.0	0.0	0.9	15.3	0.0	4.1	0.0	9.6
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	20	0	0	108	668	20	489	0	1,305
6	Road(%)	0.0	0.0	0.0	0.0	100.0	0.0	100.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	0	0	0	0	39	0	76	0	115
7	Road(%)	90.6	0.0	0.0	100.0	83.1	100.0	99.1	30.1	68.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	69.9	31.3
	Railway(%)	9.4	0.0	0.0	0.0	16.9	0.0	0.9	0.0	0.7
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	32	0	0	5	118	43	6,015	5,042	11,255
8	Road(%)	100.0	0.0	0.0	0.0	0.0	0.0	98.5	4.7	14.8
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	1.5	95.3	85.2
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	7	0	0	0	0	0	332	2,802	3,141
Total	Road(%)	35.8	56.6	100.0	78.7	72.8	100.0	96.5	20.5	
	Inland Waterway(%)	57.1	41.0	0.0	0.0	0.0	0.0	0.1	76.7	
	Railway(%)	7.1	2.5	0.0	21.3	12.4	0.0	1.0	0.0	
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	14.8	0.0	2.4	2.7	
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Total(tons/day)	12,705	5,959	105	1,086	1,205	96	7,284	8,076	

Table 2C-7  
Cement OD Matrix by Region, 1999

Region		1	2	3	4	5	6	7	8	Total
1	Road(%)	77.2	83.1	97.5	25.9	1.0	0.0	2.8	0.0	57.7
	Inland Waterway(%)	22.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.9
	Railway(%)	0.2	16.9	0.0	0.0	0.0	0.0	0.0	0.0	1.3
	Coastal Shipping(%)	0.0	0.0	2.5	74.1	99.0	100.0	97.2	0.0	27.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	5,979	686	201	810	1,714	47	286	0	9,723
2	Road(%)	90.6	86.8	0.0	0.0	9.5	0.0	0.0	0.0	81.9
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	9.4	13.2	0.0	0.0	0.0	0.0	0.0	0.0	10.6
	Coastal Shipping(%)	0.0	0.0	100.0	0.0	90.5	100.0	100.0	0.0	7.5
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	414	515	1	0	74	7	1	0	1,012
3	Road(%)	100.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	70	0	85	0	0	0	0	0	155
4	Road(%)	85.1	100.0	100.0	28.7	67.0	0.0	100.0	0.0	66.6
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	14.9	0.0	0.0	71.3	18.0	0.0	0.0	0.0	31.5
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	15.0	0.0	0.0	0.0	1.9
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	684	13	129	509	200	0	57	0	1,592
5	Road(%)	0.0	0.0	0.0	86.7	100.0	100.0	28.2	0.0	80.8
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	13.3	0.0	0.0	0.6	0.0	0.4
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	71.2	100.0	18.8
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	0	0	0	15	390	186	177	23	791
6	Road(%)	0.0	0.0	0.0	0.0	100.0	100.0	0.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	0	0	0	0	26	10	0	0	36
7	Road(%)	95.8	100.0	0.0	0.0	0.0	100.0	100.0	24.3	69.5
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	75.7	30.5
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	24	6	0	0	0	57	2,436	1,698	4,221
8	Road(%)	0.0	0.0	0.0	0.0	0.0	0.0	4.5	18.9	8.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	95.5	81.1	92.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	0	0	0	0	0	0	1,924	615	2,539
Total	Road(%)	79.0	84.9	98.6	27.7	23.9	82.4	54.0	22.6	
	Inland Waterway(%)	18.9	0.0	0.0	0.0	0.0	0.0	37.6	76.4	
	Railway(%)	2.1	15.1	0.0	27.4	1.5	0.0	0.0	0.0	
	Coastal Shipping(%)	0.0	0.0	1.4	45.0	74.6	17.6	8.3	1.0	
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Total(tons/day)	7,171	1,220	416	1,334	2,404	307	4,881	2,336	

Table 2C-8  
Fertilizer OD Matrix by Region, 1999

Region		1	2	3	4	5	6	7	8	Total
1	Road(%)	55.0	84.2	100.0	82.0	4.7	26.9	4.7	0.0	43.6
	Inland Waterway(%)	22.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7
	Railway(%)	22.3	15.8	0.0	17.8	42.8	0.0	0.1	0.0	14.7
	Coastal Shipping(%)	0.0	0.0	0.0	0.3	52.5	73.1	95.2	100.0	35.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	1,214	651	221	338	404	67	1,069	167	4,131
2	Road(%)	15.1	10.9	0.0	8.5	5.6	0.0	0.0	0.0	12.6
	Inland Waterway(%)	21.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.4
	Railway(%)	63.7	89.1	0.0	58.0	94.4	0.0	100.0	0.0	73.7
	Coastal Shipping(%)	0.0	0.0	0.0	33.5	0.0	0.0	0.0	0.0	3.4
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	2,502	2,007	0	517	72	0	17	0	5,115
3	Road(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	0	0	0	0	0	0	0	0	0
4	Road(%)	16.0	0.0	0.0	0.0	14.0	0.0	45.5	0.0	20.9
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	84.0	100.0	0.0	100.0	55.7	0.0	3.9	100.0	54.2
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	30.3	100.0	50.6	0.0	24.9
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	213	125	0	94	379	1	336	1	1,149
5	Road(%)	0.0	0.0	0.0	16.3	100.0	100.0	96.3	0.0	87.1
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	100.0	0.0	0.0	0.0	0.0	3.7	0.0	0.6
	Coastal Shipping(%)	0.0	0.0	0.0	83.7	0.0	0.0	0.0	0.0	12.3
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	0	3	0	104	170	402	27	0	706
6	Road(%)	0.0	0.0	0.0	0.0	100.0	0.0	100.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	0	0	0	0	61	0	47	0	108
7	Road(%)	4.3	0.0	0.0	0.0	66.7	99.4	100.0	9.5	46.7
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	90.5	48.7
	Railway(%)	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	95.7	0.0	0.0	100.0	32.7	0.6	0.0	0.0	4.6
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	465	0	0	52	159	320	4,527	6,444	11,967
8	Road(%)	0.0	0.0	0.0	0.0	100.0	0.0	100.0	2.0	10.5
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	98.0	89.5
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	0	0	0	0	19	0	55	785	859
Total	Road(%)	25.0	27.5	100.0	30.6	34.2	93.4	79.9	8.5	
	Inland Waterway(%)	18.3	0.0	0.0	0.0	0.0	0.0	0.0	89.2	
	Railway(%)	46.5	72.5	0.0	41.1	35.8	0.0	0.5	0.0	
	Coastal Shipping(%)	10.1	0.0	0.0	28.3	30.0	6.6	19.5	2.3	
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Total(tons/day)	4,394	2,786	221	1,105	1,264	790	6,078	7,397	

Table 2C-9  
Coal OD Matrix by Region, 1999

Region		1	2	3	4	5	6	7	8	Total
1	Road(%)	82.8	7.4	100.0	76.1	100.0	0.0	0.0	0.0	31.4
	Inland Waterway(%)	0.0	90.7	0.0	0.0	0.0	0.0	0.0	0.0	59.1
	Railway(%)	17.2	1.9	0.0	23.9	0.0	0.0	0.0	0.0	8.9
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.7
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	64	3,347	97	1,594	4	0	35	0	5,141
2	Road(%)	6.3	9.2	0.0	6.0	0.0	0.0	0.7	0.0	6.9
	Inland Waterway(%)	85.4	87.7	0.0	0.0	0.0	0.0	0.0	0.0	79.5
	Railway(%)	8.2	3.1	0.0	26.1	1.1	0.0	0.0	0.0	7.2
	Coastal Shipping(%)	0.0	0.0	0.0	67.9	98.9	0.0	99.3	0.0	6.4
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	21,719	9,386	0	1,292	358	0	936	0	33,691
3	Road(%)	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	0	0	13	0	0	0	0	0	13
4	Road(%)	100.0	100.0	0.0	83.3	0.0	0.0	0.0	0.0	29.8
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	16.7	0.0	0.0	0.0	0.0	0.8
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	69.4
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	86	5	0	18	0	0	247	0	356
5	Road(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	0	0	0	0	0	0	0	0	0
6	Road(%)	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	0	0	0	0	16	0	0	0	16
7	Road(%)	0.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0	99.7
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	0	1	0	0	0	0	222	96	319
8	Road(%)	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	0	0	0	0	0	0	12	0	12
Total	Road(%)	6.9	8.8	100.0	45.0	5.3	0.0	16.6	100.0	
	Inland Waterway(%)	84.8	88.4	0.0	0.0	0.0	0.0	0.0	0.0	
	Railway(%)	8.2	2.8	0.0	24.8	1.1	0.0	0.0	0.0	
	Coastal Shipping(%)	0.0	0.0	0.0	30.2	93.7	0.0	83.4	0.0	
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Total(tons/day)	21,869	12,739	110	2,904	378	0	1,452	96	

Table 2C-10  
Petroleum Products OD Matrix by Region, 1999

Region		1	2	3	4	5	6	7	8	Total
1	Road(%)	97.7	62.8	100.0	97.0	0.0	0.0	0.0	100.0	79.8
	Inland Waterway(%)	0.0	30.1	0.0	0.0	0.0	0.0	0.0	0.0	15.4
	Railway(%)	2.3	7.1	0.0	3.0	100.0	0.0	0.0	0.0	4.8
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	644	1,389	156	525	1	0	0	2	2,717
2	Road(%)	43.5	7.9	0.0	0.0	0.0	0.0	0.0	0.0	16.9
	Inland Waterway(%)	56.5	92.1	0.0	0.0	0.0	0.0	0.0	0.0	77.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	100.0	100.0	0.0	100.0	0.0	6.1
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	260	658	0	55	4	0	1	0	978
3	Road(%)	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	35	0	0	0	0	0	0	0	35
4	Road(%)	100.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	208	0	0	46	0	0	0	0	254
5	Road(%)	0.0	0.0	0.0	99.6	99.8	100.0	0.0	0.0	99.8
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.4	0.2	0.0	0.0	0.0	0.2
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	0	0	0	269	1,079	459	0	0	1,807
6	Road(%)	0.0	0.0	0.0	0.0	0.0	100.0	100.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	0	0	0	0	0	9	91	0	100
7	Road(%)	0.0	0.0	0.0	0.0	100.0	100.0	100.0	11.3	33.4
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	88.7	49.6
	Railway(%)	100.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.2
	Coastal Shipping(%)	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	16.8
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	30	2,669	0	3	533	287	3,482	8,896	15,900
8	Road(%)	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	8.1
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	91.9
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	0	0	0	0	0	0	69	787	856
Total	Road(%)	83.7	19.6	100.0	91.6	99.6	100.0	100.0	10.4	
	Inland Waterway(%)	12.5	21.7	0.0	0.0	0.0	0.0	0.0	89.6	
	Railway(%)	3.8	2.1	0.0	2.2	0.2	0.0	0.0	0.0	
	Coastal Shipping(%)	0.0	56.6	0.0	6.1	0.2	0.0	0.0	0.0	
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Total(tons/day)	1,177	4,716	156	898	1,617	755	3,643	9,685	

Table 2C-11  
Industrial Crops OD Matrix by Region, 1999

Region		1	2	3	4	5	6	7	8	Total
1	Road(%)	95.2	22.8	0.0	0.0	0.0	100.0	91.7	0.0	59.5
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	4.8	77.2	0.0	0.0	100.0	0.0	8.3	0.0	40.5
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	62	79	0	0	4	4	24	0	173
2	Road(%)	56.5	0.0	0.0	0.0	60.0	0.0	0.0	0.0	53.1
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	43.5	100.0	0.0	0.0	40.0	0.0	100.0	0.0	46.9
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	147	9	0	0	20	0	3	0	179
3	Road(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	0	0	0	0	0	0	0	0	0
4	Road(%)	100.0	60.9	0.0	100.0	100.0	0.0	100.0	0.0	87.9
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	39.1	0.0	0.0	0.0	0.0	0.0	0.0	12.1
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	31	46	0	5	25	0	42	0	149
5	Road(%)	50.0	90.9	0.0	85.2	100.0	100.0	28.6	0.0	90.5
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	50.0	9.1	0.0	14.8	0.0	0.0	71.4	0.0	9.5
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	8	11	0	27	77	17	7	0	147
6	Road(%)	0.0	100.0	0.0	0.0	100.0	0.0	100.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	0	27	0	0	4	0	895	0	926
7	Road(%)	11.0	77.1	0.0	42.2	92.5	100.0	100.0	100.0	92.4
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	89.0	22.9	0.0	57.8	7.5	0.0	0.0	0.0	7.6
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	164	35	0	64	80	20	1,910	305	2,578
8	Road(%)	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	0	0	0	0	0	0	15	0	15
Total	Road(%)	47.3	53.1	0.0	57.3	91.4	100.0	99.7	100.0	
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Railway(%)	52.7	46.9	0.0	42.7	8.6	0.0	0.3	0.0	
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Total(tons/day)	412	207	0	96	210	41	2,896	305	

Table 2C-12  
Manufacturing Goods OD Matrix by Region, 1999

Region		1	2	3	4	5	6	7	8	Total
1	Road(%)	96.9	92.4	100.0	100.0	92.1	79.5	51.8	66.1	89.3
	Inland Waterway(%)	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
	Railway(%)	0.9	7.6	0.0	0.0	2.5	0.0	3.9	0.0	3.3
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	4.7	20.5	42.3	33.9	6.5
	Air(%)	0.0	0.0	0.0	0.0	0.7	0.0	2.0	0.0	0.3
	Total(tons/day)	1,980	2,324	181	1,366	278	44	971	127	7,271
2	Road(%)	95.4	92.9	88.2	98.8	0.0	0.0	10.4	0.0	69.4
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	4.6	7.1	11.8	1.2	4.4	0.0	2.4	0.0	4.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	95.6	100.0	87.2	100.0	26.6
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	1,205	504	17	502	249	11	615	56	3,159
3	Road(%)	100.0	100.0	100.0	100.0	0.0	0.0	0.0	100.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	113	11	18	35	0	0	0	11	188
4	Road(%)	86.3	94.3	0.0	95.0	94.7	0.0	77.1	0.0	87.1
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.5	2.5	0.0	5.0	1.8	0.0	1.3	0.0	1.0
	Coastal Shipping(%)	13.2	3.1	0.0	0.0	3.5	0.0	21.6	100.0	12.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	1,346	159	0	40	170	0	153	2	1,870
5	Road(%)	29.6	51.3	0.0	57.8	99.8	100.0	90.9	86.7	64.4
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	70.2	48.7	0.0	42.2	0.2	0.0	8.7	13.3	35.4
	Air(%)	0.2	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.2
	Total(tons/day)	1,019	39	0	258	548	130	504	15	2,513
6	Road(%)	100.0	0.0	0.0	0.0	100.0	0.0	100.0	100.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	58	0	0	0	39	0	181	2	280
7	Road(%)	69.0	67.9	0.0	94.9	95.1	100.0	99.9	90.0	94.2
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.9	2.2
	Railway(%)	6.9	21.4	100.0	4.5	1.3	0.0	0.0	0.0	0.9
	Coastal Shipping(%)	20.9	10.7	0.0	0.6	3.4	0.0	0.1	0.0	2.4
	Air(%)	3.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.3
	Total(tons/day)	1,211	56	2	156	1,086	264	7,167	2,786	12,728
8	Road(%)	100.0	100.0	0.0	100.0	0.0	0.0	100.0	37.7	73.7
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.3	26.3
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	54	37	0	18	0	0	1,274	1,013	2,396
Total	Road(%)	80.1	91.7	98.2	94.7	85.9	95.5	89.8	74.8	
	Inland Waterway(%)	0.6	0.0	0.0	0.0	0.0	0.0	0.0	22.6	
	Railway(%)	2.3	7.3	1.8	0.6	1.5	0.0	0.5	0.0	
	Coastal Shipping(%)	16.4	1.0	0.0	4.6	12.4	4.5	9.5	2.6	
	Air(%)	0.6	0.0	0.0	0.0	0.2	0.0	0.2	0.0	
	Total(tons/day)	6,986	3,130	218	2,375	2,370	449	10,865	4,012	

Table 2C-13  
Fishery Products OD Matrix by Region, 1999

Region		1	2	3	4	5	6	7	8	Total
1	Road(%)	100.0	100.0	100.0	100.0	100.0	0.0	100.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	217	55	5	20	29	0	4	0	330
2	Road(%)	100.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	5	0	0	39	0	0	0	0	44
3	Road(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	0	0	0	0	0	0	0	0	0
4	Road(%)	100.0	100.0	0.0	0.0	0.0	0.0	100.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	132	74	0	0	0	0	23	0	229
5	Road(%)	100.0	100.0	0.0	0.0	100.0	100.0	100.0	100.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	113	12	0	0	9	7	66	13	220
6	Road(%)	0.0	0.0	0.0	0.0	100.0	0.0	100.0	100.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	0	0	0	0	8	0	18	41	67
7	Road(%)	100.0	100.0	0.0	100.0	100.0	100.0	100.0	100.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	167	105	0	53	98	66	1,197	330	2,016
8	Road(%)	100.0	0.0	0.0	100.0	100.0	100.0	100.0	20.4	82.1
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	79.6	17.9
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	38	0	0	11	60	172	967	363	1,611
Total	Road(%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	61.3	
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.7	
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Total(tons/day)	672	246	5	123	204	245	2,275	747	



Table 2C-14  
Animal Meat/Others OD Matrix by Region, 1999

Region		1	2	3	4	5	6	7	8	Total
1	Road(%)	60.9	43.8	100.0	82.1	0.0	100.0	100.0	100.0	74.6
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	39.1	56.2	0.0	17.9	100.0	0.0	0.0	0.0	25.4
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	69	73	5	117	21	3	103	42	433
2	Road(%)	59.5	50.0	0.0	57.1	0.0	0.0	100.0	0.0	61.1
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	40.5	50.0	0.0	42.9	0.0	0.0	0.0	0.0	38.9
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	121	106	0	7	0	0	36	0	270
3	Road(%)	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	8	0	0	0	0	0	5	0	13
4	Road(%)	73.4	91.7	0.0	0.0	0.0	0.0	100.0	100.0	79.7
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	26.6	8.3	0.0	100.0	100.0	0.0	0.0	0.0	20.3
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	64	12	0	28	61	0	356	5	526
5	Road(%)	0.0	0.0	0.0	0.0	92.3	100.0	100.0	0.0	43.2
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	100.0	100.0	0.0	100.0	7.7	0.0	0.0	0.0	56.8
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	84	25	0	74	13	10	118	0	324
6	Road(%)	0.0	0.0	0.0	0.0	100.0	0.0	100.0	0.0	100.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	0	0	0	0	10	0	9	0	19
7	Road(%)	76.1	95.6	0.0	64.3	90.9	0.0	100.0	100.0	98.0
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway(%)	23.9	4.4	0.0	35.7	9.1	0.0	0.0	0.0	2.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	46	45	0	14	11	0	531	314	961
8	Road(%)	100.0	0.0	0.0	0.0	0.0	0.0	100.0	73.8	86.1
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.2	13.9
	Railway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total(tons/day)	7	0	0	0	0	0	142	168	317
Total	Road(%)	52.9	53.3	100.0	45.4	27.6	100.0	100.0	91.7	
	Inland Waterway(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.3	
	Railway(%)	47.1	46.7	0.0	54.6	72.4	0.0	0.0	0.0	
	Coastal Shipping(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Air(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Total(tons/day)	399	261	5	240	116	13	1,300	529	

**APPENDIX 2 - D INTERPROVINCIAL PASSENGER AND FREIGHT TRAFFIC  
DISTRIBUTION BY TRANSPORT DISTANCE, 1999**

Table 2D-1  
Passenger Traffic (Total)

Distance (km)	Car		Bus		IW		Railway		Air		Total	
	No/day	%	No/day	%	No/day	%	No/day	%	No/day	%	No/day	%
100	27196	(11.3)	200705	(83.7)	2300	(1.0)	9614	(4.0)	0	(0.0)	239815	(100.0)
200	17076	(8.9)	168297	(87.3)	2350	(1.2)	5062	(2.6)	0	(0.0)	192785	(100.0)
300	4205	(5.3)	72678	(92.1)	600	(0.8)	1322	(1.7)	115	(0.1)	78920	(100.0)
400	1950	(6.3)	27074	(87.9)	376	(1.2)	1196	(3.9)	197	(0.6)	30793	(100.0)
500	656	(4.1)	13726	(86.4)	0	(0.0)	1078	(6.8)	425	(2.7)	15885	(100.0)
600	294	(4.1)	6516	(91.0)	0	(0.0)	250	(3.5)	101	(1.4)	7161	(100.0)
700	262	(6.0)	3444	(78.9)	0	(0.0)	422	(9.7)	238	(5.5)	4366	(100.0)
800	219	(4.8)	2942	(64.3)	0	(0.0)	1038	(22.7)	376	(8.2)	4575	(100.0)
900	48	(3.8)	1012	(79.2)	0	(0.0)	204	(16.0)	13	(1.0)	1277	(100.0)
1000	145	(3.5)	2592	(62.3)	0	(0.0)	776	(18.7)	645	(15.5)	4158	(100.0)
1100	76	(2.4)	2908	(92.2)	0	(0.0)	150	(4.8)	19	(0.6)	3153	(100.0)
1200	50	(4.9)	532	(52.6)	0	(0.0)	308	(30.4)	122	(12.1)	1012	(100.0)
1300	34	(1.5)	2138	(92.3)	0	(0.0)	142	(6.1)	3	(0.1)	2317	(100.0)
1400	34	(1.0)	3166	(90.8)	0	(0.0)	260	(7.5)	25	(0.7)	3485	(100.0)
1500	20	(2.2)	676	(75.1)	0	(0.0)	204	(22.7)	0	(0.0)	900	(100.0)
1600	0	(0.0)	844	(70.9)	0	(0.0)	330	(27.7)	17	(1.4)	1191	(100.0)
1700	88	(1.5)	2132	(35.7)	0	(0.0)	1428	(23.9)	2319	(38.9)	5967	(100.0)
1800	34	(1.7)	1446	(73.1)	0	(0.0)	382	(19.3)	115	(5.8)	1977	(100.0)
1900	0	(0.0)	594	(73.2)	0	(0.0)	210	(25.9)	8	(1.0)	812	(100.0)
2000	18	(7.7)	90	(38.5)	0	(0.0)	126	(53.8)	0	(0.0)	234	(100.0)
*****	0	(0.0)	382	(95.0)	0	(0.0)	20	(5.0)	0	(0.0)	402	(100.0)
Total	52405	(8.7)	513894	(85.5)	5626	(0.9)	24522	(4.1)	4738	(0.8)	601185	(100.0)

Table 2D - 2  
Freight Traffic (Total)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	58460	(69.5)	22189	(26.4)	3424	(4.1)	8	(0.0)	0	(0.0)	84081	(100.0)
200	33026	(61.8)	16243	(30.4)	4147	(7.8)	7	(0.0)	0	(0.0)	53423	(100.0)
300	14982	(29.2)	33721	(65.8)	2486	(4.9)	32	(0.1)	2	(0.0)	51223	(100.0)
400	6599	(56.8)	3007	(25.9)	1163	(10.0)	840	(7.2)	0	(0.0)	11609	(100.0)
500	4049	(63.5)	1015	(15.9)	1155	(18.1)	153	(2.4)	0	(0.0)	6372	(100.0)
600	2095	(77.2)	0	(0.0)	213	(7.9)	404	(14.9)	0	(0.0)	2712	(100.0)
700	1971	(76.3)	0	(0.0)	115	(4.5)	496	(19.2)	0	(0.0)	2582	(100.0)
800	1114	(64.8)	0	(0.0)	146	(8.5)	455	(26.5)	4	(0.2)	1719	(100.0)
900	785	(51.3)	0	(0.0)	77	(5.0)	669	(43.7)	0	(0.0)	1531	(100.0)
1000	1788	(74.0)	0	(0.0)	167	(6.9)	457	(18.9)	4	(0.2)	2416	(100.0)
1100	577	(47.8)	0	(0.0)	63	(5.2)	568	(47.0)	0	(0.0)	1208	(100.0)
1200	637	(52.1)	0	(0.0)	141	(11.5)	445	(36.4)	0	(0.0)	1223	(100.0)
1300	283	(14.4)	0	(0.0)	21	(1.1)	1665	(84.6)	0	(0.0)	1969	(100.0)
1400	670	(35.5)	0	(0.0)	57	(3.0)	1158	(61.4)	0	(0.0)	1885	(100.0)
1500	468	(54.5)	0	(0.0)	61	(7.1)	330	(38.4)	0	(0.0)	859	(100.0)
1600	499	(35.0)	0	(0.0)	55	(3.9)	871	(61.1)	0	(0.0)	1425	(100.0)
1700	2437	(28.3)	0	(0.0)	284	(3.3)	5845	(67.8)	58	(0.7)	8624	(100.0)
1800	949	(19.3)	0	(0.0)	57	(1.2)	3900	(79.5)	0	(0.0)	4906	(100.0)
1900	388	(26.1)	0	(0.0)	1	(0.1)	1098	(73.8)	0	(0.0)	1487	(100.0)
2000	137	(11.3)	0	(0.0)	17	(1.4)	1059	(87.3)	0	(0.0)	1213	(100.0)
*****	124	(77.5)	0	(0.0)	0	(0.0)	36	(22.5)	0	(0.0)	160	(100.0)
Total	132038	(54.4)	76175	(31.4)	13850	(5.7)	20496	(8.4)	68	(0.0)	242627	(100.0)

Table 2D-3  
Freight Traffic (Paddy/Other Food Crops)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	10194	(97.3)	283	(2.7)	0	(0.0)	1	(0.0)	0	(0.0)	10478	(100.0)
200	4322	(87.7)	602	(12.2)	0	(0.0)	2	(0.0)	0	(0.0)	4926	(100.0)
300	2818	(40.1)	4211	(59.9)	2	(0.0)	0	(0.0)	0	(0.0)	7031	(100.0)
400	1321	(56.6)	1001	(42.9)	10	(0.4)	0	(0.0)	0	(0.0)	2332	(100.0)
500	767	(87.1)	113	(12.8)	1	(0.1)	0	(0.0)	0	(0.0)	881	(100.0)
600	668	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	668	(100.0)
700	546	(92.7)	0	(0.0)	0	(0.0)	43	(7.3)	0	(0.0)	589	(100.0)
800	240	(87.9)	0	(0.0)	0	(0.0)	33	(12.1)	0	(0.0)	273	(100.0)
900	234	(97.5)	0	(0.0)	0	(0.0)	6	(2.5)	0	(0.0)	240	(100.0)
1000	546	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	546	(100.0)
1100	249	(91.9)	0	(0.0)	0	(0.0)	22	(8.1)	0	(0.0)	271	(100.0)
1200	289	(78.3)	0	(0.0)	0	(0.0)	80	(21.7)	0	(0.0)	369	(100.0)
1300	162	(88.0)	0	(0.0)	0	(0.0)	22	(12.0)	0	(0.0)	184	(100.0)
1400	100	(25.9)	0	(0.0)	0	(0.0)	286	(74.1)	0	(0.0)	386	(100.0)
1500	165	(35.6)	0	(0.0)	0	(0.0)	299	(64.4)	0	(0.0)	464	(100.0)
1600	167	(19.5)	0	(0.0)	0	(0.0)	688	(80.5)	0	(0.0)	855	(100.0)
1700	584	(18.0)	0	(0.0)	14	(0.4)	2649	(81.6)	0	(0.0)	3247	(100.0)
1800	543	(45.6)	0	(0.0)	28	(2.4)	619	(52.0)	0	(0.0)	1190	(100.0)
1900	252	(29.6)	0	(0.0)	0	(0.0)	599	(70.4)	0	(0.0)	851	(100.0)
2000	45	(28.7)	0	(0.0)	9	(5.7)	103	(65.6)	0	(0.0)	157	(100.0)
****	42	(53.8)	0	(0.0)	0	(0.0)	36	(46.2)	0	(0.0)	78	(100.0)
Total	24254	(67.3)	6210	(17.2)	64	(0.2)	5488	(15.2)	0	(0.0)	36016	(100.0)

Table 2D-4  
Freight Traffic (Sugarcane/Sugar)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	1981	(94.2)	123	(5.8)	0	(0.0)	0	(0.0)	0	(0.0)	2104	(100.0)
200	1538	(99.4)	10	(0.6)	0	(0.0)	0	(0.0)	0	(0.0)	1548	(100.0)
300	1020	(81.4)	233	(18.6)	0	(0.0)	0	(0.0)	0	(0.0)	1253	(100.0)
400	542	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	542	(100.0)
500	271	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	271	(100.0)
600	241	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	241	(100.0)
700	182	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	182	(100.0)
800	29	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	29	(100.0)
900	80	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	80	(100.0)
1000	108	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	108	(100.0)
1100	50	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	50	(100.0)
1200	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1300	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1400	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1500	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1600	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1700	48	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	48	(100.0)
1800	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1900	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
2000	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
Total	6090	(94.3)	366	(5.7)	0	(0.0)	0	(0.0)	0	(0.0)	6456	(100.0)

Table 2D-5  
Freight Traffic (Wood/Forestry Products)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	3385	(99.7)	7	(0.2)	2	(0.1)	0	(0.0)	0	(0.0)	3394	(100.0)
200	1247	(95.7)	28	(2.1)	28	(2.1)	0	(0.0)	0	(0.0)	1303	(100.0)
300	441	(65.7)	210	(31.3)	20	(3.0)	0	(0.0)	0	(0.0)	671	(100.0)
400	122	(82.4)	0	(0.0)	26	(17.6)	0	(0.0)	0	(0.0)	148	(100.0)
500	187	(79.6)	0	(0.0)	48	(20.4)	0	(0.0)	0	(0.0)	235	(100.0)
600	309	(90.9)	0	(0.0)	30	(8.8)	1	(0.3)	0	(0.0)	340	(100.0)
700	102	(83.6)	0	(0.0)	20	(16.4)	0	(0.0)	0	(0.0)	122	(100.0)
800	31	(83.8)	0	(0.0)	4	(10.8)	2	(5.4)	0	(0.0)	37	(100.0)
900	6	(1.9)	0	(0.0)	0	(0.0)	310	(98.1)	0	(0.0)	316	(100.0)
1000	29	(93.5)	0	(0.0)	2	(6.5)	0	(0.0)	0	(0.0)	31	(100.0)
1100	38	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	38	(100.0)
1200	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1300	0	(0.0)	0	(0.0)	1	(100.0)	0	(0.0)	0	(0.0)	1	(100.0)
1400	132	(97.8)	0	(0.0)	3	(2.2)	0	(0.0)	0	(0.0)	135	(100.0)
1500	5	(26.3)	0	(0.0)	0	(0.0)	14	(73.7)	0	(0.0)	19	(100.0)
1600	49	(94.2)	0	(0.0)	3	(5.8)	0	(0.0)	0	(0.0)	52	(100.0)
1700	45	(95.7)	0	(0.0)	2	(4.3)	0	(0.0)	0	(0.0)	47	(100.0)
1800	9	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	9	(100.0)
1900	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
2000	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
****	4	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	4	(100.0)
Total	6141	(89.0)	245	(3.5)	189	(2.7)	327	(4.7)	0	(0.0)	6902	(100.0)

Table 2D-6  
Freight Traffic (Steel)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	1675	(90.8)	118	(6.4)	52	(2.8)	0	(0.0)	0	(0.0)	1845	(100.0)
200	1958	(73.1)	0	(0.0)	721	(26.9)	0	(0.0)	0	(0.0)	2679	(100.0)
300	451	(52.3)	0	(0.0)	411	(47.7)	0	(0.0)	0	(0.0)	862	(100.0)
400	345	(92.0)	0	(0.0)	30	(8.0)	0	(0.0)	0	(0.0)	375	(100.0)
500	135	(84.4)	0	(0.0)	25	(15.6)	0	(0.0)	0	(0.0)	160	(100.0)
600	29	(85.3)	0	(0.0)	5	(14.7)	0	(0.0)	0	(0.0)	34	(100.0)
700	26	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	26	(100.0)
800	48	(78.7)	0	(0.0)	12	(19.7)	1	(1.6)	0	(0.0)	61	(100.0)
900	65	(90.3)	0	(0.0)	7	(9.7)	0	(0.0)	0	(0.0)	72	(100.0)
1000	165	(93.8)	0	(0.0)	3	(1.7)	8	(4.5)	0	(0.0)	176	(100.0)
1100	50	(89.3)	0	(0.0)	6	(10.7)	0	(0.0)	0	(0.0)	56	(100.0)
1200	25	(50.0)	0	(0.0)	25	(50.0)	0	(0.0)	0	(0.0)	50	(100.0)
1300	0	(0.0)	0	(0.0)	1	(100.0)	0	(0.0)	0	(0.0)	1	(100.0)
1400	0	(0.0)	0	(0.0)	2	(100.0)	0	(0.0)	0	(0.0)	2	(100.0)
1500	11	(91.7)	0	(0.0)	1	(8.3)	0	(0.0)	0	(0.0)	12	(100.0)
1600	0	(0.0)	0	(0.0)	9	(100.0)	0	(0.0)	0	(0.0)	9	(100.0)
1700	116	(12.8)	0	(0.0)	30	(3.3)	757	(83.8)	0	(0.0)	903	(100.0)
1800	0	(0.0)	0	(0.0)	2	(15.4)	11	(84.6)	0	(0.0)	13	(100.0)
1900	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
2000	3	(75.0)	0	(0.0)	1	(25.0)	0	(0.0)	0	(0.0)	4	(100.0)
****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
Total	5102	(69.5)	118	(1.6)	1343	(18.3)	777	(10.6)	0	(0.0)	7340	(100.0)

Table 2D-7  
Freight Traffic (Construction Materials)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	12028	(61.3)	6734	(34.3)	869	(4.4)	0	(0.0)	0	(0.0)	19631	(100.0)
200	4163	(38.3)	6165	(56.7)	539	(5.0)	0	(0.0)	0	(0.0)	10867	(100.0)
300	919	(23.2)	3004	(75.9)	35	(0.9)	0	(0.0)	0	(0.0)	3958	(100.0)
400	295	(94.2)	0	(0.0)	18	(5.8)	0	(0.0)	0	(0.0)	313	(100.0)
500	232	(46.3)	0	(0.0)	269	(53.7)	0	(0.0)	0	(0.0)	501	(100.0)
600	30	(75.0)	0	(0.0)	10	(25.0)	0	(0.0)	0	(0.0)	40	(100.0)
700	264	(97.4)	0	(0.0)	7	(2.6)	0	(0.0)	0	(0.0)	271	(100.0)
800	135	(99.3)	0	(0.0)	1	(0.7)	0	(0.0)	0	(0.0)	136	(100.0)
900	98	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	98	(100.0)
1000	92	(33.9)	0	(0.0)	1	(0.4)	178	(65.7)	0	(0.0)	271	(100.0)
1100	42	(97.7)	0	(0.0)	1	(2.3)	0	(0.0)	0	(0.0)	43	(100.0)
1200	56	(86.2)	0	(0.0)	9	(13.8)	0	(0.0)	0	(0.0)	65	(100.0)
1300	6	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	6	(100.0)
1400	38	(41.3)	0	(0.0)	0	(0.0)	54	(58.7)	0	(0.0)	92	(100.0)
1500	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1600	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1700	147	(54.9)	0	(0.0)	3	(1.1)	118	(44.0)	0	(0.0)	268	(100.0)
1800	21	(95.5)	0	(0.0)	1	(4.5)	0	(0.0)	0	(0.0)	22	(100.0)
1900	30	(11.9)	0	(0.0)	0	(0.0)	222	(88.1)	0	(0.0)	252	(100.0)
2000	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
Total	18596	(50.5)	15903	(43.2)	1763	(4.8)	572	(1.6)	0	(0.0)	36834	(100.0)

Table 2D-8  
Freight Traffic (Cement)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	6805	(79.2)	1737	(20.2)	51	(0.6)	0	(0.0)	0	(0.0)	8593	(100.0)
200	3501	(73.2)	903	(18.9)	372	(7.8)	5	(0.1)	0	(0.0)	4781	(100.0)
300	702	(22.9)	2336	(76.2)	27	(0.9)	1	(0.0)	0	(0.0)	3066	(100.0)
400	253	(49.5)	0	(0.0)	85	(16.6)	173	(33.9)	0	(0.0)	511	(100.0)
500	31	(15.2)	0	(0.0)	173	(84.8)	0	(0.0)	0	(0.0)	204	(100.0)
600	32	(39.5)	0	(0.0)	19	(23.5)	30	(37.0)	0	(0.0)	81	(100.0)
700	0	(0.0)	0	(0.0)	4	(0.9)	427	(99.1)	0	(0.0)	431	(100.0)
800	0	(0.0)	0	(0.0)	0	(0.0)	415	(100.0)	0	(0.0)	415	(100.0)
900	0	(0.0)	0	(0.0)	5	(45.5)	6	(54.5)	0	(0.0)	11	(100.0)
1000	76	(76.8)	0	(0.0)	0	(0.0)	23	(23.2)	0	(0.0)	99	(100.0)
1100	19	(4.3)	0	(0.0)	2	(0.5)	421	(95.2)	0	(0.0)	442	(100.0)
1200	4	(2.9)	0	(0.0)	0	(0.0)	134	(97.1)	0	(0.0)	138	(100.0)
1300	12	(1.2)	0	(0.0)	0	(0.0)	968	(98.8)	0	(0.0)	980	(100.0)
1400	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1500	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1600	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1700	31	(10.5)	0	(0.0)	0	(0.0)	263	(89.5)	0	(0.0)	294	(100.0)
1800	6	(27.3)	0	(0.0)	0	(0.0)	16	(72.7)	0	(0.0)	22	(100.0)
1900	0	(0.0)	0	(0.0)	0	(0.0)	1	(100.0)	0	(0.0)	1	(100.0)
2000	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
Total	11472	(57.2)	4976	(24.8)	738	(3.7)	2883	(14.4)	0	(0.0)	20069	(100.0)

Table 2D-9  
Freight Traffic (Fertilizer)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	3279	(58.8)	1959	(35.1)	342	(6.1)	0	(0.0)	0	(0.0)	5580	(100.0)
200	2612	(49.8)	977	(18.6)	1652	(31.5)	0	(0.0)	0	(0.0)	5241	(100.0)
300	2118	(29.6)	3576	(50.0)	1463	(20.4)	0	(0.0)	0	(0.0)	7157	(100.0)
400	465	(21.2)	824	(37.5)	776	(35.4)	130	(5.9)	0	(0.0)	2195	(100.0)
500	193	(26.9)	68	(9.5)	411	(57.2)	46	(6.4)	0	(0.0)	718	(100.0)
600	73	(21.4)	0	(0.0)	76	(22.3)	192	(56.3)	0	(0.0)	341	(100.0)
700	14	(18.2)	0	(0.0)	37	(48.1)	26	(33.8)	0	(0.0)	77	(100.0)
800	85	(55.9)	0	(0.0)	66	(43.4)	1	(0.7)	0	(0.0)	152	(100.0)
900	30	(47.6)	0	(0.0)	22	(34.9)	11	(17.5)	0	(0.0)	63	(100.0)
1000	35	(9.3)	0	(0.0)	98	(26.1)	242	(64.5)	0	(0.0)	375	(100.0)
1100	18	(56.3)	0	(0.0)	14	(43.8)	0	(0.0)	0	(0.0)	32	(100.0)
1200	91	(53.8)	0	(0.0)	77	(45.6)	1	(0.6)	0	(0.0)	169	(100.0)
1300	0	(0.0)	0	(0.0)	14	(22.2)	49	(77.8)	0	(0.0)	63	(100.0)
1400	0	(0.0)	0	(0.0)	7	(13.5)	45	(86.5)	0	(0.0)	52	(100.0)
1500	0	(0.0)	0	(0.0)	3	(50.0)	3	(50.0)	0	(0.0)	6	(100.0)
1600	12	(6.3)	0	(0.0)	8	(4.2)	170	(89.5)	0	(0.0)	190	(100.0)
1700	58	(3.9)	0	(0.0)	0	(0.0)	1420	(96.1)	0	(0.0)	1478	(100.0)
1800	0	(0.0)	0	(0.0)	2	(2.2)	88	(97.8)	0	(0.0)	90	(100.0)
1900	0	(0.0)	0	(0.0)	0	(0.0)	120	(100.0)	0	(0.0)	120	(100.0)
2000	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
*****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
Total	9083	(37.7)	7404	(30.7)	5068	(21.0)	2544	(10.6)	0	(0.0)	24099	(100.0)

Table 2D-10  
Freight Traffic (Coal)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	2342	(15.6)	10629	(70.8)	2041	(13.6)	0	(0.0)	0	(0.0)	15012	(100.0)
200	1641	(21.7)	5480	(72.4)	452	(6.0)	0	(0.0)	0	(0.0)	7573	(100.0)
300	607	(4.1)	13708	(93.5)	353	(2.4)	0	(0.0)	0	(0.0)	14668	(100.0)
400	115	(21.7)	0	(0.0)	31	(5.8)	384	(72.5)	0	(0.0)	530	(100.0)
500	0	(0.0)	0	(0.0)	8	(57.1)	6	(42.9)	0	(0.0)	14	(100.0)
600	0	(0.0)	0	(0.0)	0	(0.0)	152	(100.0)	0	(0.0)	152	(100.0)
700	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
800	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
900	0	(0.0)	0	(0.0)	0	(0.0)	335	(100.0)	0	(0.0)	335	(100.0)
1000	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1100	4	(57.1)	0	(0.0)	0	(0.0)	3	(42.9)	0	(0.0)	7	(100.0)
1200	0	(0.0)	0	(0.0)	0	(0.0)	53	(100.0)	0	(0.0)	53	(100.0)
1300	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1400	0	(0.0)	0	(0.0)	0	(0.0)	545	(100.0)	0	(0.0)	545	(100.0)
1500	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1600	0	(0.0)	0	(0.0)	4	(100.0)	0	(0.0)	0	(0.0)	4	(100.0)
1700	0	(0.0)	0	(0.0)	0	(0.0)	35	(100.0)	0	(0.0)	35	(100.0)
1800	7	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	7	(100.0)
1900	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
2000	0	(0.0)	0	(0.0)	1	(0.1)	929	(99.9)	0	(0.0)	930	(100.0)
*****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
Total	4716	(11.8)	29817	(74.8)	2890	(7.2)	2442	(6.1)	0	(0.0)	39865	(100.0)

Table 2D-11  
Freight Traffic (Petroleum Products)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	4413	(93.8)	276	(5.9)	16	(0.3)	0	(0.0)	0	(0.0)	4705	(100.0)
200	3338	(70.0)	1333	(27.9)	99	(2.1)	0	(0.0)	0	(0.0)	4770	(100.0)
300	1110	(14.9)	6354	(85.0)	10	(0.1)	0	(0.0)	0	(0.0)	7474	(100.0)
400	470	(30.7)	1055	(68.9)	7	(0.5)	0	(0.0)	0	(0.0)	1532	(100.0)
500	421	(32.7)	834	(64.9)	1	(0.1)	30	(2.3)	0	(0.0)	1286	(100.0)
600	77	(77.8)	0	(0.0)	0	(0.0)	22	(22.2)	0	(0.0)	99	(100.0)
700	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
800	0	(0.0)	0	(0.0)	0	(0.0)	3	(100.0)	0	(0.0)	3	(100.0)
900	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1000	74	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	74	(100.0)
1100	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1200	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1300	0	(0.0)	0	(0.0)	1	(100.0)	0	(0.0)	0	(0.0)	1	(100.0)
1400	0	(0.0)	0	(0.0)	2	(33.3)	4	(66.7)	0	(0.0)	6	(100.0)
1500	0	(0.0)	0	(0.0)	1	(100.0)	0	(0.0)	0	(0.0)	1	(100.0)
1600	0	(0.0)	0	(0.0)	0	(0.0)	1	(100.0)	0	(0.0)	1	(100.0)
1700	0	(0.0)	0	(0.0)	30	(100.0)	0	(0.0)	0	(0.0)	30	(100.0)
1800	0	(0.0)	0	(0.0)	0	(0.0)	2669	(100.0)	0	(0.0)	2669	(100.0)
1900	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
2000	2	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	2	(100.0)
*****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
Total	9905	(43.7)	9852	(43.5)	167	(0.7)	2729	(12.0)	0	(0.0)	22653	(100.0)

Table 2D-12  
Freight Traffic (Industrial Crops)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	1406	(99.7)	0	(0.0)	4	(0.3)	0	(0.0)	0	(0.0)	1410	(100.0)
200	648	(91.9)	0	(0.0)	57	(8.1)	0	(0.0)	0	(0.0)	705	(100.0)
300	460	(96.6)	0	(0.0)	16	(3.4)	0	(0.0)	0	(0.0)	476	(100.0)
400	677	(91.0)	0	(0.0)	67	(9.0)	0	(0.0)	0	(0.0)	744	(100.0)
500	259	(78.7)	0	(0.0)	70	(21.3)	0	(0.0)	0	(0.0)	329	(100.0)
600	69	(83.1)	0	(0.0)	14	(16.9)	0	(0.0)	0	(0.0)	83	(100.0)
700	30	(93.8)	0	(0.0)	2	(6.3)	0	(0.0)	0	(0.0)	32	(100.0)
800	0	(0.0)	0	(0.0)	9	(100.0)	0	(0.0)	0	(0.0)	9	(100.0)
900	23	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	23	(100.0)
1000	72	(94.7)	0	(0.0)	4	(5.3)	0	(0.0)	0	(0.0)	76	(100.0)
1100	0	(0.0)	0	(0.0)	8	(100.0)	0	(0.0)	0	(0.0)	8	(100.0)
1200	12	(85.7)	0	(0.0)	2	(14.3)	0	(0.0)	0	(0.0)	14	(100.0)
1300	0	(0.0)	0	(0.0)	2	(100.0)	0	(0.0)	0	(0.0)	2	(100.0)
1400	34	(50.7)	0	(0.0)	33	(49.3)	0	(0.0)	0	(0.0)	67	(100.0)
1500	31	(36.5)	0	(0.0)	54	(63.5)	0	(0.0)	0	(0.0)	85	(100.0)
1600	18	(78.3)	0	(0.0)	5	(21.7)	0	(0.0)	0	(0.0)	23	(100.0)
1700	40	(28.8)	0	(0.0)	99	(71.2)	0	(0.0)	0	(0.0)	139	(100.0)
1800	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1900	5	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	5	(100.0)
2000	0	(0.0)	0	(0.0)	3	(100.0)	0	(0.0)	0	(0.0)	3	(100.0)
*****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
Total	3784	(89.4)	0	(0.0)	449	(10.6)	0	(0.0)	0	(0.0)	4233	(100.0)

Table 2D-13  
Freight Traffic (Manufacturing Products)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	9368	(96.7)	294	(3.0)	18	(0.2)	7	(0.1)	0	(0.0)	9687	(100.0)
200	6783	(91.1)	468	(6.3)	197	(2.6)	0	(0.0)	0	(0.0)	7448	(100.0)
300	2958	(93.5)	89	(2.8)	85	(2.7)	31	(1.0)	2	(0.1)	3165	(100.0)
400	1633	(84.6)	100	(5.2)	44	(2.3)	153	(7.9)	0	(0.0)	1930	(100.0)
500	1319	(87.9)	0	(0.0)	111	(7.4)	71	(4.7)	0	(0.0)	1501	(100.0)
600	391	(96.8)	0	(0.0)	6	(1.5)	7	(1.7)	0	(0.0)	404	(100.0)
700	650	(99.7)	0	(0.0)	2	(0.3)	0	(0.0)	0	(0.0)	652	(100.0)
800	372	(97.6)	0	(0.0)	5	(1.3)	0	(0.0)	4	(1.0)	381	(100.0)
900	227	(95.8)	0	(0.0)	9	(3.8)	1	(0.4)	0	(0.0)	237	(100.0)
1000	472	(95.0)	0	(0.0)	15	(3.0)	6	(1.2)	4	(0.8)	497	(100.0)
1100	78	(38.2)	0	(0.0)	4	(2.0)	122	(59.8)	0	(0.0)	204	(100.0)
1200	91	(34.0)	0	(0.0)	0	(0.0)	177	(66.0)	0	(0.0)	268	(100.0)
1300	69	(9.9)	0	(0.0)	0	(0.0)	626	(90.1)	0	(0.0)	695	(100.0)
1400	197	(46.1)	0	(0.0)	6	(1.4)	224	(52.5)	0	(0.0)	427	(100.0)
1500	55	(77.5)	0	(0.0)	2	(2.8)	14	(19.7)	0	(0.0)	71	(100.0)
1600	142	(78.9)	0	(0.0)	26	(14.4)	12	(6.7)	0	(0.0)	180	(100.0)
1700	1136	(59.9)	0	(0.0)	98	(5.2)	603	(31.8)	58	(3.1)	1895	(100.0)
1800	143	(21.6)	0	(0.0)	22	(3.3)	497	(75.1)	0	(0.0)	662	(100.0)
1900	47	(23.0)	0	(0.0)	1	(0.5)	156	(76.5)	0	(0.0)	204	(100.0)
2000	41	(57.7)	0	(0.0)	3	(4.2)	27	(38.0)	0	(0.0)	71	(100.0)
*****	78	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	78	(100.0)
Total	26250	(85.6)	951	(3.1)	654	(2.1)	2734	(8.9)	68	(0.2)	30657	(100.0)

Table 2D-14  
Freight Traffic (Fishery Products)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	971	(97.1)	29	(2.9)	0	(0.0)	0	(0.0)	0	(0.0)	1000	(100.0)
200	888	(79.2)	233	(20.8)	0	(0.0)	0	(0.0)	0	(0.0)	1121	(100.0)
300	938	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	938	(100.0)
400	298	(91.7)	27	(8.3)	0	(0.0)	0	(0.0)	0	(0.0)	325	(100.0)
500	160	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	160	(100.0)
600	90	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	90	(100.0)
700	142	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	142	(100.0)
800	160	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	160	(100.0)
900	22	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	22	(100.0)
1000	73	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	73	(100.0)
1100	29	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	29	(100.0)
1200	69	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	69	(100.0)
1300	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1400	10	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	10	(100.0)
1500	51	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	51	(100.0)
1600	34	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	34	(100.0)
1700	148	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	148	(100.0)
1800	104	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	104	(100.0)
1900	29	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	29	(100.0)
2000	37	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	37	(100.0)
*****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
Total	4253	(93.6)	289	(6.4)	0	(0.0)	0	(0.0)	0	(0.0)	4542	(100.0)



Table 2D-15  
Freight Traffic (Animal/Meat)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	613	(95.5)	0	(0.0)	29	(4.5)	0	(0.0)	0	(0.0)	642	(100.0)
200	387	(83.9)	44	(9.5)	30	(6.5)	0	(0.0)	0	(0.0)	461	(100.0)
300	440	(87.3)	0	(0.0)	64	(12.7)	0	(0.0)	0	(0.0)	504	(100.0)
400	63	(47.7)	0	(0.0)	69	(52.3)	0	(0.0)	0	(0.0)	132	(100.0)
500	74	(66.1)	0	(0.0)	38	(33.9)	0	(0.0)	0	(0.0)	112	(100.0)
600	86	(61.9)	0	(0.0)	53	(38.1)	0	(0.0)	0	(0.0)	139	(100.0)
700	15	(25.9)	0	(0.0)	43	(74.1)	0	(0.0)	0	(0.0)	58	(100.0)
800	14	(22.2)	0	(0.0)	49	(77.8)	0	(0.0)	0	(0.0)	63	(100.0)
900	0	(0.0)	0	(0.0)	34	(100.0)	0	(0.0)	0	(0.0)	34	(100.0)
1000	46	(51.1)	0	(0.0)	44	(48.9)	0	(0.0)	0	(0.0)	90	(100.0)
1100	0	(0.0)	0	(0.0)	28	(100.0)	0	(0.0)	0	(0.0)	28	(100.0)
1200	0	(0.0)	0	(0.0)	28	(100.0)	0	(0.0)	0	(0.0)	28	(100.0)
1300	34	(94.4)	0	(0.0)	2	(5.6)	0	(0.0)	0	(0.0)	36	(100.0)
1400	159	(97.5)	0	(0.0)	4	(2.5)	0	(0.0)	0	(0.0)	163	(100.0)
1500	150	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	150	(100.0)
1600	77	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	77	(100.0)
1700	84	(91.3)	0	(0.0)	8	(8.7)	0	(0.0)	0	(0.0)	92	(100.0)
1800	116	(98.3)	0	(0.0)	2	(1.7)	0	(0.0)	0	(0.0)	118	(100.0)
1900	25	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	25	(100.0)
2000	9	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	9	(100.0)
*****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
Total	2392	(80.8)	44	(1.5)	525	(17.7)	0	(0.0)	0	(0.0)	2961	(100.0)

Appendix 3-A Estimated Production and Consumption of Major Products by Province

Table 3A-1 Paddy and Other Crops

		2010								2020							
		Low				High				Low				High			
		production	consumption	import	export	production	consumption	import	export	production	consumption	import	export	production	consumption	import	export
1	Hanoi	180.3	748.2	0.0	0.0	180.3	748.2	0.0	0.0	194.9	835.9	0.0	0.0	194.9	835.9	0.0	0.0
2	Hai Phong	332.8	496.7	0.0	150.0	332.8	496.7	0.0	150.0	359.8	512.1	0.0	133.0	359.8	512.1	0.0	133.0
3	Hai Duong	638.8	509.5	0.0	0.0	638.8	509.5	0.0	0.0	690.7	529.7	0.0	0.0	690.7	529.7	0.0	0.0
4	Hung Yen	392.4	325.5	0.0	0.0	392.4	325.5	0.0	0.0	424.3	338.3	0.0	0.0	424.3	338.3	0.0	0.0
5	Thai Binh	744.3	536.9	0.0	0.0	744.3	536.9	0.0	0.0	804.7	554.8	0.0	0.0	804.7	554.8	0.0	0.0
6	Nam Dinh	754.2	573.4	0.0	0.0	754.2	573.4	0.0	0.0	815.4	598.5	0.0	0.0	815.4	598.5	0.0	0.0
7	Ninh Binh	344.5	276.2	0.0	0.0	344.5	276.2	0.0	0.0	372.5	290.8	0.0	0.0	372.5	290.8	0.0	0.0
8	Ha Nam	295.5	247.4	0.0	0.0	295.5	247.4	0.0	0.0	319.5	249.1	0.0	0.0	319.5	249.1	0.0	0.0
9	Ha Tay	693.1	716.8	0.0	0.0	693.1	716.8	0.0	0.0	749.3	752.7	0.0	0.0	749.3	752.7	0.0	0.0
10	Cao Bang	132.8	166.4	0.0	0.0	132.8	166.4	0.0	0.0	150.9	172.3	0.0	0.0	150.9	172.3	0.0	0.0
11	Lang Son	172.3	204.1	0.0	0.0	172.3	204.1	0.0	0.0	195.7	202.9	0.0	0.0	195.7	202.9	0.0	0.0
12	Quang Ninh	163.6	364.4	0.0	150.0	163.6	364.4	0.0	150.0	185.9	429.6	0.0	267.0	185.9	429.6	0.0	267.0
13	Thai Nguyen	256.6	276.4	0.0	0.0	256.6	276.4	0.0	0.0	291.6	275.6	0.0	0.0	291.6	275.6	0.0	0.0
14	Bac Can	72.3	94.9	0.0	0.0	72.3	94.9	0.0	0.0	82.1	97.7	0.0	0.0	82.1	97.7	0.0	0.0
15	Bac Ninh	339.3	283.2	0.0	0.0	339.3	283.2	0.0	0.0	366.9	295.7	0.0	0.0	366.9	295.7	0.0	0.0
16	Bac Giang	413.5	413.0	0.0	0.0	413.5	413.0	0.0	0.0	469.9	420.4	0.0	0.0	469.9	420.4	0.0	0.0
17	Phu Tho	254.1	429.3	0.0	0.0	254.1	429.3	0.0	0.0	288.7	465.3	0.0	0.0	288.7	465.3	0.0	0.0
18	Vinh Phuc	307.7	328.2	0.0	0.0	307.7	328.2	0.0	0.0	349.6	346.3	0.0	0.0	349.6	346.3	0.0	0.0
19	Lao Cai	135.6	184.8	0.0	0.0	135.6	184.8	0.0	0.0	154.0	196.2	0.0	0.0	154.0	196.2	0.0	0.0
20	Yen Bai	157.0	239.0	0.0	0.0	157.0	239.0	0.0	0.0	178.4	262.6	0.0	0.0	178.4	262.6	0.0	0.0
21	Tuyen Quang	203.4	234.7	0.0	0.0	203.4	234.7	0.0	0.0	231.1	259.4	0.0	0.0	231.1	259.4	0.0	0.0
22	Ha Giang	150.5	190.1	0.0	0.0	150.5	190.1	0.0	0.0	171.0	210.9	0.0	0.0	171.0	210.9	0.0	0.0
23	Son La	162.1	259.8	0.0	0.0	162.1	259.8	0.0	0.0	184.2	276.4	0.0	0.0	184.2	276.4	0.0	0.0
24	Lai Chau	133.9	179.4	0.0	0.0	133.9	179.4	0.0	0.0	152.2	192.6	0.0	0.0	152.2	192.6	0.0	0.0
25	Hoa Binh	140.7	252.6	0.0	0.0	140.7	252.6	0.0	0.0	159.8	266.3	0.0	0.0	159.8	266.3	0.0	0.0
26	Thanh Hoa	940.2	1070.2	0.0	0.0	940.2	1070.2	0.0	0.0	1068.2	1106.1	0.0	0.0	1068.2	1106.1	0.0	0.0
27	Nghe An	629.7	868.7	0.0	0.0	629.7	868.7	0.0	0.0	715.5	910.2	0.0	0.0	715.5	910.2	0.0	0.0
28	Ha Tinh	302.7	408.3	0.0	0.0	302.7	408.3	0.0	0.0	343.9	419.6	0.0	0.0	343.9	419.6	0.0	0.0
29	Quang Binh	140.6	247.5	0.0	0.0	140.6	247.5	0.0	0.0	159.8	261.1	0.0	0.0	159.8	261.1	0.0	0.0
30	Quang Tri	141.6	168.8	0.0	0.0	141.6	168.8	0.0	0.0	160.9	178.0	0.0	0.0	160.9	178.0	0.0	0.0
31	Thua Thien - Hue	182.6	314.3	0.0	0.0	182.6	314.3	0.0	0.0	207.5	324.0	0.0	0.0	207.5	324.0	0.0	0.0
32	Quang Nam	335.4	393.6	0.0	0.0	335.4	393.6	0.0	0.0	381.1	392.7	0.0	0.0	381.1	392.7	0.0	0.0
33	Da Nang	48.5	249.7	0.0	0.0	48.5	249.7	0.0	0.0	55.1	283.9	0.0	0.0	55.1	283.9	0.0	0.0
34	Quang Ngai	298.1	364.0	0.0	0.0	298.1	364.0	0.0	0.0	338.7	380.7	0.0	0.0	338.7	380.7	0.0	0.0
35	Binh Dinh	436.6	395.4	0.0	0.0	436.6	395.4	0.0	0.0	449.2	454.8	0.0	0.0	449.2	454.8	0.0	0.0
36	Phu Yen	237.5	232.5	0.0	0.0	237.5	232.5	0.0	0.0	269.8	242.5	0.0	0.0	269.8	242.5	0.0	0.0
37	Khanh Hoa	165.4	297.9	0.0	0.0	165.4	297.9	0.0	0.0	187.9	315.6	0.0	0.0	187.9	315.6	0.0	0.0
38	Kon Tum	90.5	80.8	0.0	0.0	90.5	80.8	0.0	0.0	102.8	83.9	0.0	0.0	102.8	83.9	0.0	0.0
39	Gia Lai	215.9	290.0	0.0	0.0	215.9	290.0	0.0	0.0	245.3	334.2	0.0	0.0	245.3	334.2	0.0	0.0
40	Dac Lac	308.3	485.7	0.0	0.0	308.3	485.7	0.0	0.0	350.3	560.5	0.0	0.0	350.3	560.5	0.0	0.0
41	Ho Chi Minh	181.0	1532.6	0.0	3995.0	181.0	1532.6	0.0	3995.0	205.6	1685.5	0.0	3080.0	205.6	1685.5	0.0	3080.0
42	Lam Dong	145.4	303.0	0.0	0.0	145.4	303.0	0.0	0.0	165.2	372.0	0.0	0.0	165.2	372.0	0.0	0.0
43	Ninh Thuan	119.3	153.9	0.0	0.0	119.3	153.9	0.0	0.0	135.6	169.7	0.0	0.0	135.6	169.7	0.0	0.0
44	Binh Phuoc	39.2	191.0	0.0	0.0	39.2	191.0	0.0	0.0	44.5	211.0	0.0	0.0	44.5	211.0	0.0	0.0
45	Tay Ninh	447.3	285.0	0.0	0.0	447.3	285.0	0.0	0.0	508.2	305.1	0.0	0.0	508.2	305.1	0.0	0.0
46	Binh Duong	69.4	222.3	0.0	0.0	69.4	222.3	0.0	0.0	78.9	249.7	0.0	0.0	78.9	249.7	0.0	0.0
47	Dong Nai	407.6	708.1	0.0	0.0	407.6	708.1	0.0	0.0	463.1	804.5	0.0	0.0	463.1	804.5	0.0	0.0
48	Binh Thuan	292.9	282.8	0.0	0.0	292.9	282.8	0.0	0.0	332.8	294.9	0.0	0.0	332.8	294.9	0.0	0.0
49	Ba Ria - Vung Tau	139.0	279.2	0.0	235.0	139.0	279.2	0.0	235.0	157.9	324.3	0.0	1120.0	157.9	324.3	0.0	1120.0
50	Long An	1384.3	410.1	0.0	0.0	1384.3	410.1	0.0	0.0	1496.7	422.9	0.0	0.0	1496.7	422.9	0.0	0.0
51	Dong Thap	1859.7	480.8	0.0	0.0	1859.7	480.8	0.0	0.0	2010.7	515.3	0.0	0.0	2010.7	515.3	0.0	0.0
52	An Giang	1922.0	635.2	0.0	0.0	1922.0	635.2	0.0	0.0	2078.0	902.5	0.0	0.0	2078.0	902.5	0.0	0.0
53	Tien Giang	1211.0	510.1	0.0	0.0	1211.0	510.1	0.0	0.0	1309.3	530.6	0.0	0.0	1309.3	530.6	0.0	0.0
54	Vinh Long	925.4	354.4	0.0	0.0	925.4	354.4	0.0	0.0	1000.5	368.3	0.0	0.0	1000.5	368.3	0.0	0.0
55	Ben Tre	335.4	424.5	0.0	0.0	335.4	424.5	0.0	0.0	362.6	445.1	0.0	0.0	362.6	445.1	0.0	0.0
56	Kien Giang	1910.1	526.7	0.0	0.0	1910.1	526.7	0.0	0.0	2065.1	602.5	0.0	0.0	2065.1	602.5	0.0	0.0
57	Can Tho	1757.3	605.7	0.0	470.0	1757.3	605.7	0.0	470.0	1899.9	628.1	0.0	1400.0	1899.9	628.1	0.0	1400.0
58	Tra Vinh	756.8	320.2	0.0	0.0	756.8	320.2	0.0	0.0	818.2	337.0	0.0	0.0	818.2	337.0	0.0	0.0
59	Soc Trang	1373.4	400.8	0.0	0.0	1373.4	400.8	0.0	0.0	1484.9	417.8	0.0	0.0	1484.9	417.8	0.0	0.0
60	Bac Lieu	677.8	252.3	0.0	0.0	677.8	252.3	0.0	0.0	732.8	263.5	0.0	0.0	732.8	263.5	0.0	0.0
61	Ca Mau	710.6	350.5	0.0	0.0	710.6	350.5	0.0	0.0	768.3	367.9	0.0	0.0	768.3	367.9	0.0	0.0

		2010								2020							
		Low				High				Low				High			
		production	consumption	import	export	production	consumption	import	export	production	consumption	import	export	production	consumption	import	export
1	Hanoi	5.9	0.0	0.0	0.0	5.9	0.0	0.0	0.0	6.1	0.0	0.0	0.0	6.1	0.0	0.0	0.0
2	Hai Phong	4.6	0.0	0.0	0.0	4.6	0.0	0.0	0.0	4.7	0.0	0.0	0.0	4.7	0.0	0.0	0.0
3	Hai Duong	15.4	0.0	0.0	0.0	15.4	0.0	0.0	0.0	15.8	76.4	0.0	0.0	15.8	95.0	0.0	0.0
4	Hung Yen	49.5	0.0	0.0	0.0	49.5	0.0	0.0	0.0	51.1	0.0	0.0	0.0	51.1	0.0	0.0	0.0
5	Thai Binh	7.5	0.0	0.0	0.0	7.5	0.0	0.0	0.0	7.7	0.0	0.0	0.0	7.7	0.0	0.0	0.0
6	Nam Dinh	68.0	0.0	0.0	0.0	68.0	0.0	0.0	0.0	70.1	0.0	0.0	0.0	70.1	0.0	0.0	0.0
7	Ninh Binh	500.6	0.0	0.0	0.0	500.6	0.0	0.0	0.0	516.2	607.8	0.0	0.0	516.2	756.0	0.0	0.0
8	Ha Nam	43.0	0.0	0.0	0.0	43.0	0.0	0.0	0.0	44.3	76.4	0.0	0.0	44.3	95.0	0.0	0.0
9	Ha Tay	104.5	0.0	0.0	0.0	104.5	0.0	0.0	0.0	107.8	152.0	0.0	0.0	107.8	189.0	0.0	0.0
10	Cao Bang	384.0	70.0	0.0	0.0	384.0	75.0	0.0	0.0	487.6	303.9	0.0	0.0	487.6	378.0	0.0	0.0
11	Lang Son	25.9	0.0	0.0	0.0	25.9	0.0	0.0	0.0	32.9	0.0	0.0	0.0	32.9	0.0	0.0	0.0
12	Quang Ninh	20.8	0.0	0.0	0.0	20.8	0.0	0.0	0.0	26.4	0.0	0.0	0.0	26.4	0.0	0.0	0.0
13	Thai Nguyen	62.1	0.0	0.0	0.0	62.1	0.0	0.0	0.0	78.8	152.0	0.0	0.0	78.8	189.0	0.0	0.0
14	Bac Can	20.8	0.0	0.0	0.0	20.8	0.0	0.0	0.0	26.4	0.0	0.0	0.0	26.4	0.0	0.0	0.0
15	Bac Ninh	2.9	0.0	0.0	0.0	2.9	0.0	0.0	0.0	3.7	0.0	0.0	0.0	3.7	0.0	0.0	0.0
16	Bac Giang	20.4	0.0	0.0	0.0	20.4	0.0	0.0	0.0	25.9	0.0	0.0	0.0	25.9	0.0	0.0	0.0
17	Phu Tho	153.7	61.6	0.0	0.0	153.7	66.0	0.0	0.0	195.2	152.0	0.0	0.0	195.2	189.0	0.0	0.0
18	Vinh Phuc	149.3	0.0	0.0	0.0	149.3	0.0	0.0	0.0	189.6	0.0	0.0	0.0	189.6	0.0	0.0	0.0
19	Lao Cai	172.4	0.0	0.0	0.0	172.4	0.0	0.0	0.0	218.9	0.0	0.0	0.0	218.9	0.0	0.0	0.0
20	Yen Bai	48.8	0.0	0.0	0.0	48.8	0.0	0.0	0.0	62.0	0.0	0.0	0.0	62.0	0.0	0.0	0.0
21	Tuyen Quang	345.7	233.3	0.0	0.0	345.7	250.0	0.0	0.0	439.0	303.9	0.0	0.0	439.0	378.0	0.0	0.0
22	Ha Giang	16.6	0.0	0.0	0.0	16.6	0.0	0.0	0.0	21.1	0.0	0.0	0.0	21.1	0.0	0.0	0.0
23	Son La	249.1	179.1	0.0	0.0	249.1	192.0	0.0	0.0	298.4	154.4	0.0	0.0	298.4	192.0	0.0	0.0
24	Lai Chau	25.7	0.0	0.0	0.0	25.7	0.0	0.0	0.0	30.8	0.0	0.0	0.0	30.8	0.0	0.0	0.0
25	Hoa Binh	413.9	70.0	0.0	0.0	413.9	75.0	0.0	0.0	495.8	152.0	0.0	0.0	495.8	189.0	0.0	0.0
26	Thanh Hoa	2309.7	2267.2	0.0	0.0	2309.7	2430.0	0.0	0.0	2797.0	2250.1	0.0	0.0	2797.0	2798.6	0.0	0.0
27	Nghe An	1367.6	1245.6	0.0	0.0	1367.6	1335.0	0.0	0.0	1656.1	1073.3	0.0	0.0	1656.1	1335.0	0.0	0.0
28	Ha Tinh	269.2	163.3	0.0	0.0	269.2	175.0	0.0	0.0	326.0	303.9	0.0	0.0	326.0	378.0	0.0	0.0
29	Quang Binh	293.7	209.9	0.0	0.0	293.7	225.0	0.0	0.0	355.7	180.9	0.0	0.0	355.7	225.0	0.0	0.0
30	Quang Tri	4.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	4.8	0.0	0.0	0.0	4.8	0.0	0.0	0.0
31	Thua Thien - Hue	122.2	559.8	0.0	0.0	122.2	600.0	0.0	0.0	148.0	482.4	0.0	0.0	148.0	600.0	0.0	0.0
32	Quang Nam	378.8	163.3	0.0	0.0	378.8	175.0	0.0	0.0	445.6	607.8	0.0	0.0	445.6	756.0	0.0	0.0
33	Da Nang	23.2	0.0	0.0	0.0	23.2	0.0	0.0	0.0	27.3	0.0	0.0	0.0	27.3	0.0	0.0	0.0
34	Quang Ngai	1302.4	447.8	0.0	0.0	1302.4	480.0	0.0	0.0	1532.2	1684.1	0.0	0.0	1532.2	2094.7	0.0	0.0
35	Binh Dinh	334.8	195.9	0.0	0.0	334.8	210.0	0.0	0.0	393.9	455.9	0.0	0.0	393.9	567.0	0.0	0.0
36	Phu Yen	1233.8	223.9	0.0	0.0	1233.8	240.0	0.0	0.0	1451.4	579.9	0.0	0.0	1451.4	472.5	0.0	0.0
37	Khanh Hoa	934.8	811.7	0.0	0.0	934.8	870.0	0.0	0.0	1099.6	699.5	0.0	0.0	1099.6	870.0	0.0	0.0
38	Kon Tum	309.3	163.3	0.0	0.0	309.3	175.0	0.0	0.0	362.6	227.9	0.0	0.0	362.6	283.5	0.0	0.0
39	Gia Lai	569.0	419.9	0.0	0.0	569.0	450.0	0.0	0.0	667.1	361.8	0.0	0.0	667.1	450.0	0.0	0.0
40	Dac Lac	465.1	233.3	0.0	0.0	465.1	250.0	0.0	0.0	545.3	201.0	0.0	0.0	545.3	250.0	0.0	0.0
41	Ho Chi Minh	344.5	0.0	0.0	0.0	344.5	0.0	0.0	0.0	401.5	0.0	0.0	0.0	401.5	0.0	0.0	0.0
42	Lam Dong	272.5	0.0	0.0	0.0	272.5	0.0	0.0	0.0	317.6	0.0	0.0	0.0	317.6	0.0	0.0	0.0
43	Ninh Thuan	392.0	195.9	0.0	0.0	392.0	210.0	0.0	0.0	456.8	694.7	0.0	0.0	456.8	864.1	0.0	0.0
44	Binh Phuoc	240.4	0.0	0.0	0.0	240.4	0.0	0.0	0.0	280.2	759.8	0.0	0.0	280.2	945.0	0.0	0.0
45	Tay Ninh	2619.4	2407.1	0.0	0.0	2619.4	2580.0	0.0	0.0	3052.8	2779.3	0.0	0.0	3052.8	3456.8	0.0	0.0
46	Binh Duong	332.3	279.9	0.0	0.0	332.3	300.0	0.0	0.0	387.3	241.2	0.0	0.0	387.3	300.0	0.0	0.0
47	Dong Nai	1293.8	475.8	0.0	0.0	1293.8	510.0	0.0	0.0	1507.9	1552.4	0.0	0.0	1507.9	1930.8	0.0	0.0
48	Binh Thuan	189.7	163.3	0.0	0.0	189.7	175.0	0.0	0.0	221.0	227.9	0.0	0.0	221.0	283.5	0.0	0.0
49	Ba Ria - Vung Tau	4.1	0.0	0.0	0.0	4.1	0.0	0.0	0.0	4.8	0.0	0.0	0.0	4.8	0.0	0.0	0.0
50	Long An	863.3	839.7	0.0	0.0	863.3	900.0	0.0	0.0	1005.5	1056.9	0.0	0.0	1005.5	1314.6	0.0	0.0
51	Dong Thap	52.0	0.0	0.0	0.0	52.0	0.0	0.0	0.0	60.6	0.0	0.0	0.0	60.6	0.0	0.0	0.0
52	An Giang	24.5	0.0	0.0	0.0	24.5	0.0	0.0	0.0	28.6	0.0	0.0	0.0	28.6	0.0	0.0	0.0
53	Tien Giang	57.8	0.0	0.0	0.0	57.8	0.0	0.0	0.0	67.3	0.0	0.0	0.0	67.3	0.0	0.0	0.0
54	Vinh Long	61.0	0.0	0.0	0.0	61.0	0.0	0.0	0.0	71.0	0.0	0.0	0.0	71.0	0.0	0.0	0.0
55	Ben Tre	662.6	195.9	0.0	0.0	662.6	210.0	0.0	0.0	771.8	607.8	0.0	0.0	771.8	756.0	0.0	0.0
56	Kien Giang	401.6	195.9	0.0	0.0	401.6	210.0	0.0	0.0	467.8	168.8	0.0	0.0	467.8	210.0	0.0	0.0
57	Can Tho	1066.8	391.9	0.0	0.0	1066.8	420.0	0.0	0.0	1242.5	607.8	0.0	0.0	1242.5	756.0	0.0	0.0
58	Tra Vinh	540.5	0.0	0.0	0.0	540.5	0.0	0.0	0.0	629.5	0.0	0.0	0.0	629.5	0.0	0.0	0.0
59	Soc Trang	1040.5	195.9	0.0	0.0	1040.5	210.0	0.0	0.0	1211.9	168.8	0.0	0.0	1211.9	210.0	0.0	0.0
60	Bac Lieu	84.6	0.0	0.0	0.0	84.6	0.0	0.0	0.0	98.5	0.0	0.0	0.0	98.5	0.0	0.0	0.0
61	Ca Mau	244.8	195.9	0.0	0.0	244.8	210.0	0.0	0.0	285.1	168.8	0.0	0.0	285.1	210.0	0.0	0.0

Table 3A-2 Sugarcane

		2010								2020							
		Low				High				Low				High			
		production	consumption	import	export	production	consumption	import	export	production	consumption	import	export	production	consumption	import	export
1	Hanoi	0.0	41.8	0.0	0.0	0.0	44.8	0.0	0.0	0.0	64.6	0.0	0.0	0.0	64.9	0.0	0.0
2	Hai Phong	0.0	27.8	0.0	0.0	0.0	29.8	0.0	0.0	0.0	39.6	0.0	0.0	0.0	41.4	0.0	0.0
3	Hai Duong	0.0	28.5	0.0	0.0	0.0	30.5	0.0	0.0	7.6	41.0	0.0	0.0	9.5	42.9	0.0	0.0
4	Hung Yen	0.0	18.2	0.0	0.0	0.0	19.5	0.0	0.0	0.0	26.2	0.0	0.0	0.0	27.6	0.0	0.0
5	Thai Binh	0.0	30.0	0.0	0.0	0.0	32.2	0.0	0.0	0.0	42.9	0.0	0.0	0.0	45.2	0.0	0.0
6	Nam Dinh	0.0	32.1	0.0	0.0	0.0	34.4	0.0	0.0	0.0	46.3	0.0	0.0	0.0	48.6	0.0	0.0
7	Ninh Binh	0.0	15.4	0.0	0.0	0.0	16.6	0.0	0.0	60.8	22.5	0.0	0.0	75.6	23.5	0.0	0.0
8	Ha Nam	0.0	13.8	0.0	0.0	0.0	14.8	0.0	0.0	7.6	19.3	0.0	0.0	9.5	20.6	0.0	0.0
9	Ha Tay	0.0	40.1	0.0	0.0	0.0	42.9	0.0	0.0	15.2	58.2	0.0	0.0	18.9	60.9	0.0	0.0
10	Cao Bang	7.0	9.3	0.0	0.0	7.5	10.0	0.0	0.0	30.4	13.3	0.0	0.0	37.8	14.1	0.0	0.0
11	Lang Son	0.0	11.4	0.0	0.0	0.0	12.2	0.0	0.0	0.0	15.7	0.0	0.0	0.0	16.9	0.0	0.0
12	Quang Ninh	0.0	20.4	0.0	0.0	0.0	21.8	0.0	0.0	0.0	33.2	0.0	0.0	0.0	33.1	0.0	0.0
13	Thai Nguyen	0.0	15.5	0.0	0.0	0.0	16.6	0.0	0.0	15.2	21.3	0.0	0.0	18.9	22.9	0.0	0.0
14	Bac Can	0.0	5.3	0.0	0.0	0.0	5.7	0.0	0.0	0.0	7.6	0.0	0.0	0.0	8.0	0.0	0.0
15	Bac Ninh	0.0	15.8	0.0	0.0	0.0	17.0	0.0	0.0	0.0	22.9	0.0	0.0	0.0	24.0	0.0	0.0
16	Bac Giang	0.0	23.1	0.0	0.0	0.0	24.7	0.0	0.0	0.0	32.5	0.0	0.0	0.0	34.6	0.0	0.0
17	Phu Tho	6.2	24.0	0.0	0.0	6.6	25.7	0.0	0.0	15.2	36.0	0.0	0.0	18.9	37.2	0.0	0.0
18	Vinh Phuc	0.0	18.4	0.0	0.0	0.0	19.7	0.0	0.0	0.0	26.8	0.0	0.0	0.0	28.0	0.0	0.0
19	Lao Cai	0.0	10.3	0.0	0.0	0.0	11.1	0.0	0.0	0.0	15.2	0.0	0.0	0.0	15.9	0.0	0.0
20	Yen Bai	0.0	13.4	0.0	0.0	0.0	14.3	0.0	0.0	0.0	20.3	0.0	0.0	0.0	20.8	0.0	0.0
21	Tuyen Quang	23.3	13.1	0.0	0.0	25.0	14.1	0.0	0.0	30.4	20.1	0.0	0.0	37.8	20.5	0.0	0.0
22	Ha Giang	0.0	10.6	0.0	0.0	0.0	11.4	0.0	0.0	0.0	16.3	0.0	0.0	0.0	16.7	0.0	0.0
23	Son La	17.9	14.5	0.0	0.0	19.2	15.6	0.0	0.0	15.4	21.4	0.0	0.0	19.2	22.3	0.0	0.0
24	Lai Chau	0.0	10.0	0.0	0.0	0.0	10.8	0.0	0.0	0.0	14.9	0.0	0.0	0.0	15.5	0.0	0.0
25	Hoa Binh	7.0	14.1	0.0	0.0	7.5	15.1	0.0	0.0	15.2	20.6	0.0	0.0	18.9	21.6	0.0	0.0
26	Thanh Hoa	226.7	59.9	0.0	0.0	243.0	64.1	0.0	0.0	225.0	85.5	0.0	0.0	279.9	90.6	0.0	0.0
27	Nghe An	124.6	48.6	0.0	0.0	133.5	52.1	0.0	0.0	107.3	70.4	0.0	0.0	133.5	74.0	0.0	94.0
28	Ha Tinh	16.3	22.8	0.0	0.0	17.5	24.5	0.0	0.0	30.4	32.4	0.0	0.0	37.8	34.5	0.0	0.0
29	Quang Binh	21.0	13.8	0.0	0.0	22.5	14.8	0.0	0.0	18.1	20.2	0.0	0.0	22.5	21.1	0.0	0.0
30	Quang Tri	0.0	9.4	0.0	0.0	0.0	10.1	0.0	0.0	0.0	13.8	0.0	0.0	0.0	14.4	0.0	0.0
31	Thua Thien - Hue	56.0	17.6	0.0	0.0	60.0	18.8	0.0	0.0	48.2	25.1	0.0	0.0	60.0	26.5	0.0	0.0
32	Quang Nam	16.3	22.0	0.0	0.0	17.5	23.6	0.0	0.0	60.8	30.4	0.0	0.0	75.6	32.6	0.0	0.0
33	Da Nang	0.0	14.0	0.0	0.0	0.0	15.0	0.0	0.0	0.0	22.0	0.0	36.0	0.0	22.3	0.0	188.0
34	Quang Ngai	44.8	20.4	0.0	0.0	48.0	21.8	0.0	0.0	168.4	29.4	0.0	0.0	209.5	30.9	0.0	0.0
35	Binh Dinh	19.6	24.4	0.0	0.0	21.0	26.2	0.0	0.0	45.6	35.2	0.0	0.0	56.7	36.9	0.0	94.0
36	Phu Yen	22.4	13.0	0.0	0.0	24.0	13.9	0.0	0.0	38.0	18.8	0.0	0.0	47.3	19.6	0.0	0.0
37	Khanh Hoa	81.2	16.7	0.0	0.0	87.0	17.8	0.0	0.0	69.9	24.4	0.0	0.0	87.0	25.7	0.0	94.0
38	Kon Tum	16.3	4.5	0.0	0.0	17.5	4.8	0.0	0.0	22.8	6.5	0.0	0.0	28.4	6.6	0.0	0.0
39	Gia Lai	42.0	16.2	0.0	0.0	45.0	17.4	0.0	0.0	36.2	25.8	0.0	0.0	45.0	25.8	0.0	0.0
40	Dac Lac	23.3	27.2	0.0	0.0	25.0	29.1	0.0	0.0	20.1	43.3	0.0	0.0	25.0	43.5	0.0	0.0
41	Ho Chi Minh	0.0	85.7	0.0	0.0	0.0	91.8	0.0	0.0	0.0	130.3	0.0	0.0	0.0	133.8	0.0	0.0
42	Lam Dong	0.0	16.9	0.0	0.0	0.0	18.2	0.0	0.0	0.0	28.8	0.0	0.0	0.0	25.4	0.0	0.0
43	Ninh Thuan	19.6	8.6	0.0	0.0	21.0	9.2	0.0	0.0	69.5	13.1	0.0	0.0	86.4	13.2	0.0	0.0
44	Binh Phuoc	0.0	10.7	0.0	0.0	0.0	11.4	0.0	0.0	76.0	16.3	0.0	0.0	94.5	16.7	0.0	0.0
45	Tay Ninh	240.7	15.9	0.0	0.0	258.0	17.1	0.0	0.0	277.9	23.6	0.0	0.0	345.7	24.5	0.0	0.0
46	Binh Duong	28.0	12.4	0.0	0.0	30.0	13.3	0.0	0.0	24.1	19.3	0.0	0.0	30.0	19.7	0.0	0.0
47	Dong Nai	47.6	39.6	0.0	0.0	51.0	42.4	0.0	0.0	155.2	62.2	0.0	0.0	193.1	62.6	0.0	0.0
48	Binh Thuan	16.3	15.8	0.0	0.0	17.5	16.9	0.0	0.0	22.8	22.8	0.0	0.0	28.4	23.9	0.0	0.0
49	Ba Ria - Vung Tau	0.0	15.6	0.0	0.0	0.0	16.7	0.0	0.0	0.0	25.1	0.0	0.0	0.0	25.2	0.0	0.0
50	Long An	84.0	22.9	0.0	0.0	90.0	24.6	0.0	0.0	105.7	32.7	0.0	0.0	131.5	34.7	0.0	0.0
51	Dong Thap	0.0	26.9	0.0	0.0	0.0	28.8	0.0	0.0	0.0	39.8	0.0	0.0	0.0	40.5	0.0	0.0
52	An Giang	0.0	35.5	0.0	0.0	0.0	38.1	0.0	0.0	0.0	69.8	0.0	0.0	0.0	53.4	0.0	0.0
53	Tien Giang	0.0	28.5	0.0	0.0	0.0	30.6	0.0	0.0	0.0	41.0	0.0	0.0	0.0	43.1	0.0	0.0
54	Vinh Long	0.0	19.8	0.0	0.0	0.0	21.2	0.0	0.0	0.0	28.5	0.0	0.0	0.0	30.1	0.0	0.0
55	Ben Tre	19.6	23.7	0.0	0.0	21.0	25.4	0.0	0.0	60.8	34.4	0.0	0.0	75.6	35.9	0.0	0.0
56	Kien Giang	19.6	29.5	0.0	0.0	21.0	31.6	0.0	0.0	16.9	46.6	0.0	0.0	21.0	46.9	0.0	0.0
57	Can Tho	39.2	33.9	0.0	0.0	42.0	36.3	0.0	0.0	60.8	48.6	0.0	0.0	75.6	51.4	0.0	0.0
58	Tra Vinh	0.0	17.9	0.0	0.0	0.0	19.2	0.0	0.0	0.0	26.1	0.0	0.0	0.0	27.4	0.0	0.0
59	Soc Trang	19.6	22.4	0.0	0.0	21.0	24.0	0.0	0.0	16.9	32.3	0.0	0.0	21.0	34.1	0.0	0.0
60	Bac Lieu	0.0	14.1	0.0	0.0	0.0	15.1	0.0	0.0	0.0	20.4	0.0	0.0	0.0	21.5	0.0	0.0
61	Ca Mau	19.6	19.6	0.0	0.0	21.0	21.0	0.0	0.0	16.9	28.4	0.0	0.0	21.0	30.0	0.0	0.0

Table 3A-3 Sugar

		2010								2020							
		Low				High				Low				High			
		production	consumption	import	export	production	consumption	import	export	production	consumption	import	export	production	consumption	import	export
1	Hanoi	0.0	193.7	0.0	0.0	0.0	193.7	0.0	0.0	0.0	250.9	0.0	0.0	0.0	250.9	0.0	0.0
2	Hai Phong	0.0	75.2	0.0	0.0	0.0	75.2	0.0	0.0	0.0	77.6	0.0	0.0	0.0	77.6	0.0	0.0
3	Hai Duong	0.0	48.3	0.0	0.0	0.0	48.3	0.0	0.0	0.0	66.9	0.0	0.0	0.0	66.9	0.0	0.0
4	Hung Yen	0.0	22.4	0.0	0.0	0.0	22.4	0.0	0.0	0.0	28.8	0.0	0.0	0.0	28.8	0.0	0.0
5	Thai Binh	0.0	45.1	0.0	0.0	0.0	45.1	0.0	0.0	0.0	60.3	0.0	0.0	0.0	60.3	0.0	0.0
6	Nam Dinh	0.0	49.9	0.0	0.0	0.0	49.9	0.0	0.0	0.0	68.1	0.0	0.0	0.0	68.1	0.0	0.0
7	Ninh Binh	0.0	18.1	0.0	0.0	0.0	18.1	0.0	0.0	0.0	23.9	0.0	0.0	0.0	23.9	0.0	0.0
8	Ha Nam	0.0	18.4	0.0	0.0	0.0	18.4	0.0	0.0	0.0	23.5	0.0	0.0	0.0	23.5	0.0	0.0
9	Ha Tay	0.0	56.3	0.0	0.0	0.0	56.3	0.0	0.0	0.0	72.8	0.0	0.0	0.0	72.8	0.0	0.0
10	Cao Bang	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.0	43.1	4.4	0.0	0.0	43.1	4.4	0.0	
11	Lang Son	0.0	5.1	0.0	0.0	0.0	5.1	0.0	0.0	70.0	7.6	0.0	0.0	70.0	7.6	0.0	
12	Quang Ninh	43.3	40.8	0.0	0.0	43.3	40.8	0.0	0.0	45.0	49.3	0.0	0.0	45.0	49.3	0.0	
13	Thai Nguyen	0.0	11.8	0.0	0.0	0.0	11.8	0.0	0.0	0.0	17.2	0.0	0.0	0.0	17.2	0.0	0.0
14	Bac Can	0.0	1.5	0.0	0.0	0.0	1.5	0.0	0.0	28.5	2.4	0.0	0.0	28.5	2.4	0.0	
15	Bac Ninh	0.0	32.5	0.0	0.0	0.0	32.5	0.0	0.0	0.0	40.7	0.0	0.0	0.0	40.7	0.0	0.0
16	Bac Giang	0.0	20.7	0.0	0.0	0.0	20.7	0.0	0.0	48.1	25.1	0.0	0.0	48.1	25.1	0.0	
17	Phu Tho	0.0	29.3	0.0	0.0	0.0	29.3	0.0	0.0	46.6	42.0	0.0	0.0	46.6	42.0	0.0	
18	Vinh Phuc	0.0	7.4	0.0	0.0	0.0	7.4	0.0	0.0	0.0	10.4	0.0	0.0	0.0	10.4	0.0	0.0
19	Lao Cai	0.0	7.7	0.0	0.0	0.0	7.7	0.0	0.0	23.1	12.0	0.0	0.0	23.1	12.0	0.0	
20	Yen Bai	0.0	9.2	0.0	0.0	0.0	9.2	0.0	0.0	31.8	15.3	0.0	0.0	31.8	15.3	0.0	
21	Tuyen Quang	0.0	7.4	0.0	0.0	0.0	7.4	0.0	0.0	72.9	10.9	0.0	0.0	72.9	10.9	0.0	
22	Ha Giang	0.0	3.3	0.0	0.0	0.0	3.3	0.0	0.0	68.1	5.1	0.0	0.0	68.1	5.1	0.0	
23	Son La	0.0	5.2	0.0	0.0	0.0	5.2	0.0	0.0	101.8	6.7	0.0	0.0	101.8	6.7	0.0	
24	Lai Chau	0.0	12.4	0.0	0.0	0.0	12.4	0.0	0.0	98.6	18.2	0.0	0.0	98.6	18.2	0.0	
25	Hoa Binh	0.0	9.3	0.0	0.0	0.0	9.3	0.0	0.0	35.6	11.5	0.0	0.0	35.6	11.5	0.0	
26	Thanh Hoa	30.3	53.7	0.0	0.0	30.3	53.7	0.0	0.0	31.5	69.2	0.0	0.0	31.5	69.2	0.0	
27	Nghe An	77.9	31.1	0.0	0.0	77.9	31.1	0.0	0.0	81.1	41.7	0.0	0.0	81.1	41.7	0.0	
28	Ha Tinh	121.2	9.3	0.0	0.0	121.2	9.3	0.0	0.0	126.1	11.8	0.0	0.0	126.1	11.8	0.0	
29	Quang Binh	164.4	9.0	0.0	0.0	164.4	9.0	0.0	0.0	171.2	11.0	0.0	0.0	171.2	11.0	0.0	
30	Quang Tri	8.7	2.7	0.0	0.0	8.7	2.7	0.0	0.0	9.0	3.3	0.0	0.0	9.0	3.3	0.0	
31	Thua Thien - Hue	51.9	13.6	0.0	0.0	51.9	13.6	0.0	0.0	54.1	14.4	0.0	0.0	54.1	14.4	0.0	
32	Quang Nam	77.9	21.8	0.0	0.0	77.9	21.8	0.0	0.0	81.1	25.3	0.0	0.0	81.1	25.3	0.0	
33	Da Nang	0.0	37.0	0.0	0.0	0.0	37.0	0.0	0.0	0.0	53.6	0.0	0.0	0.0	53.6	0.0	0.0
34	Quang Ngai	34.6	15.7	0.0	0.0	34.6	15.7	0.0	0.0	36.0	21.5	0.0	0.0	36.0	21.5	0.0	
35	Binh Dinh	43.3	11.6	0.0	0.0	43.3	11.6	0.0	0.0	45.0	14.8	0.0	0.0	45.0	14.8	0.0	
36	Phu Yen	103.9	14.0	0.0	0.0	103.9	14.0	0.0	0.0	108.1	18.5	0.0	0.0	108.1	18.5	0.0	
37	Khanh Hoa	207.7	19.1	0.0	0.0	207.7	19.1	0.0	0.0	216.2	24.4	0.0	0.0	216.2	24.4	0.0	
38	Kon Tum	276.9	3.0	0.0	0.0	276.9	3.0	0.0	0.0	288.3	3.8	0.0	0.0	288.3	3.8	0.0	
39	Gia Lai	406.8	16.5	0.0	0.0	406.8	16.5	0.0	0.0	423.5	24.5	0.0	0.0	423.5	24.5	0.0	
40	Dac Lac	579.8	18.2	0.0	0.0	579.8	18.2	0.0	0.0	603.7	26.7	0.0	0.0	603.7	26.7	0.0	
41	Ho Chi Minh	0.0	593.2	0.0	0.0	0.0	593.2	0.0	0.0	0.0	743.9	0.0	0.0	0.0	743.9	0.0	0.0
42	Lam Dong	173.1	13.2	0.0	0.0	173.1	13.2	0.0	0.0	180.2	19.6	0.0	0.0	180.2	19.6	0.0	
43	Ninh Thuan	34.6	8.8	0.0	0.0	34.6	8.8	0.0	0.0	36.0	13.2	0.0	0.0	36.0	13.2	0.0	
44	Binh Phuoc	51.9	2.6	0.0	0.0	51.9	2.6	0.0	0.0	54.1	3.6	0.0	0.0	54.1	3.6	0.0	
45	Tay Ninh	0.0	27.4	0.0	0.0	0.0	27.4	0.0	0.0	18.0	45.7	0.0	0.0	18.0	45.7	0.0	
46	Binh Duong	0.0	78.4	0.0	0.0	0.0	78.4	0.0	0.0	0.0	114.6	0.0	0.0	0.0	114.6	0.0	0.0
47	Dong Nai	0.0	227.7	0.0	0.0	0.0	227.7	0.0	0.0	47.0	337.1	0.0	0.0	47.0	337.1	0.0	0.0
48	Binh Thuan	51.9	9.0	0.0	0.0	51.9	9.0	0.0	0.0	54.1	13.4	0.0	0.0	54.1	13.4	0.0	
49	Ba Ria - Vung Tau	0.0	221.6	0.0	0.0	0.0	221.6	0.0	0.0	0.0	316.8	0.0	0.0	0.0	316.8	0.0	0.0
50	Long An	0.0	20.7	0.0	0.0	0.0	20.7	0.0	0.0	0.0	29.7	0.0	0.0	0.0	29.7	0.0	0.0
51	Dong Thap	0.0	14.4	0.0	0.0	0.0	14.4	0.0	0.0	0.0	20.7	0.0	0.0	0.0	20.7	0.0	0.0
52	An Giang	0.0	41.8	0.0	0.0	0.0	41.8	0.0	0.0	0.0	57.8	0.0	0.0	0.0	57.8	0.0	0.0
53	Tien Giang	0.0	16.6	0.0	0.0	0.0	16.6	0.0	0.0	0.0	23.5	0.0	0.0	0.0	23.5	0.0	0.0
54	Vinh Long	0.0	15.4	0.0	0.0	0.0	15.4	0.0	0.0	0.0	20.0	0.0	0.0	0.0	20.0	0.0	0.0
55	Ben Tre	0.0	22.4	0.0	0.0	0.0	22.4	0.0	0.0	0.0	30.8	0.0	0.0	0.0	30.8	0.0	0.0
56	Kien Giang	0.0	66.0	0.0	0.0	0.0	66.0	0.0	0.0	36.3	88.2	0.0	0.0	36.3	88.2	0.0	0.0
57	Can Tho	0.0	66.9	0.0	0.0	0.0	66.9	0.0	0.0	0.0	96.7	0.0	0.0	0.0	96.7	0.0	0.0
58	Tra Vinh	0.0	12.0	0.0	0.0	0.0	12.0	0.0	0.0	0.0	17.0	0.0	0.0	0.0	17.0	0.0	0.0
59	Soc Trang	0.0	21.8	0.0	0.0	0.0	21.8	0.0	0.0	0.0	32.0	0.0	0.0	0.0	32.0	0.0	0.0
60	Bac Lieu	0.0	17.5	0.0	0.0	0.0	17.5	0.0	0.0	0.0	25.3	0.0	0.0	0.0	25.3	0.0	0.0
61	Ca Mau	0.0	32.4	0.0	0.0	0.0	32.4	0.0	0.0	0.0	48.1	0.0	0.0	0.0	48.1	0.0	0.0

Table 3A-4 Wood and Forest Products

		2010										2020									
		Low					High					Low					High				
		production	consumption	import	export		production	consumption	import	export		production	consumption	import	export		production	consumption	import	export	
1	Hanoi	100.0	498.8	0.0	0.0	0.0	100.0	533.7	0.0	0.0	0.0	100.0	813.9	0.0	0.0	0.0	100.0	1013.2	0.0	0.0	0.0
2	Hai Phong	1175.0	193.7	255.0	0.0	1175.0	207.2	284.0	0.0	0.0	1175.0	251.6	400.0	0.0	0.0	1175.0	313.2	675.0	0.0	0.0	
3	Hai Duong	0.0	124.3	0.0	0.0	0.0	133.0	0.0	0.0	0.0	0.0	216.9	0.0	0.0	0.0	0.0	270.1	0.0	0.0	0.0	
4	Hung Yen	0.0	57.8	0.0	0.0	0.0	59.4	0.0	0.0	0.0	0.0	93.5	0.0	0.0	0.0	0.0	116.4	0.0	0.0	0.0	
5	Thai Binh	0.0	116.2	0.0	0.0	0.0	119.6	0.0	0.0	0.0	0.0	195.7	0.0	0.0	0.0	0.0	243.6	0.0	0.0	0.0	
6	Nam Dinh	100.0	128.4	0.0	0.0	100.0	132.1	0.0	0.0	0.0	100.0	220.8	0.0	0.0	100.0	274.9	0.0	0.0	0.0	0.0	
7	Ninh Binh	15.0	46.6	0.0	0.0	15.0	48.0	0.0	0.0	0.0	15.0	77.5	0.0	0.0	15.0	96.5	0.0	0.0	0.0	0.0	
8	Ha Nam	0.0	47.3	0.0	0.0	0.0	48.6	0.0	0.0	0.0	0.0	76.3	0.0	0.0	0.0	94.9	0.0	0.0	0.0	0.0	
9	Ha Tay	0.0	144.9	0.0	0.0	0.0	149.1	0.0	0.0	0.0	0.0	236.2	0.0	0.0	0.0	294.1	0.0	0.0	0.0	0.0	
10	Ca Bang	0.0	7.8	0.0	0.0	0.0	8.0	0.0	0.0	0.0	0.0	14.3	0.0	0.0	0.0	17.9	0.0	0.0	0.0	0.0	
11	Lang Son	0.0	13.1	0.0	0.0	0.0	13.5	0.0	0.0	0.0	0.0	24.8	0.0	0.0	0.0	30.8	0.0	0.0	0.0	0.0	
12	Quang Ninh	500.0	105.2	511.0	0.0	500.0	108.2	567.0	0.0	0.0	500.0	160.1	1200.0	0.0	500.0	199.3	2025.0	0.0	0.0	0.0	
13	Thai Nguyen	370.0	30.3	0.0	0.0	370.0	31.1	0.0	0.0	0.0	370.0	55.8	0.0	0.0	370.0	69.5	0.0	0.0	0.0	0.0	
14	Bac Can	0.0	3.8	0.0	0.0	0.0	3.9	0.0	0.0	0.0	0.0	7.8	0.0	0.0	0.0	9.7	0.0	0.0	0.0	0.0	
15	Bac Ninh	10.0	83.7	0.0	0.0	10.0	86.1	0.0	0.0	0.0	10.0	132.2	0.0	0.0	10.0	164.5	0.0	0.0	0.0	0.0	
16	Bac Giang	0.0	53.2	0.0	0.0	0.0	54.8	0.0	0.0	0.0	0.0	81.5	0.0	0.0	0.0	101.5	0.0	0.0	0.0	0.0	
17	Phu Tho	0.0	75.6	0.0	0.0	0.0	77.7	0.0	0.0	0.0	0.0	136.4	0.0	0.0	0.0	169.8	0.0	0.0	0.0	0.0	
18	Vinh Phuc	0.0	19.1	0.0	0.0	0.0	19.6	0.0	0.0	0.0	0.0	33.6	0.0	0.0	0.0	41.8	0.0	0.0	0.0	0.0	
19	Lao Cai	0.0	19.8	0.0	0.0	0.0	20.4	0.0	0.0	0.0	0.0	39.1	0.0	0.0	0.0	48.6	0.0	0.0	0.0	0.0	
20	Yen Bai	0.0	23.6	0.0	0.0	0.0	24.3	0.0	0.0	0.0	0.0	49.7	0.0	0.0	0.0	61.8	0.0	0.0	0.0	0.0	
21	Tuyen Quang	0.0	19.0	0.0	0.0	0.0	19.5	0.0	0.0	0.0	0.0	35.4	0.0	0.0	0.0	44.0	0.0	0.0	0.0	0.0	
22	Ha Giang	0.0	8.6	0.0	0.0	0.0	8.8	0.0	0.0	0.0	0.0	16.6	0.0	0.0	0.0	20.6	0.0	0.0	0.0	0.0	
23	Son La	0.0	13.5	0.0	0.0	0.0	13.9	0.0	0.0	0.0	0.0	21.8	0.0	0.0	0.0	27.1	0.0	0.0	0.0	0.0	
24	Lai Chau	0.0	32.0	0.0	0.0	0.0	33.0	0.0	0.0	0.0	0.0	59.2	0.0	0.0	0.0	73.7	0.0	0.0	0.0	0.0	
25	Hoa Binh	0.0	24.0	0.0	0.0	0.0	24.7	0.0	0.0	0.0	0.0	37.4	0.0	0.0	0.0	46.6	0.0	0.0	0.0	0.0	
26	Thanh Hoa	0.0	138.3	0.0	0.0	0.0	142.3	0.0	0.0	0.0	0.0	224.4	0.0	0.0	0.0	279.4	0.0	0.0	0.0	0.0	
27	Nghe An	0.0	80.2	0.0	0.0	0.0	82.5	0.0	0.0	0.0	0.0	135.3	140.0	0.0	0.0	168.4	204.0	0.0	0.0	0.0	
28	Ha Tinh	0.0	23.9	0.0	0.0	0.0	24.5	0.0	0.0	0.0	2000.0	38.2	0.0	0.0	2000.0	47.6	0.0	0.0	0.0	0.0	
29	Quang Binh	0.0	23.2	0.0	0.0	0.0	23.9	0.0	0.0	0.0	0.0	35.7	0.0	0.0	0.0	44.5	0.0	0.0	0.0	0.0	
30	Quang Tri	0.0	7.0	0.0	0.0	0.0	7.2	0.0	0.0	0.0	0.0	10.8	0.0	0.0	0.0	13.4	0.0	0.0	0.0	0.0	
31	Thua Thien - Hue	0.0	35.0	0.0	0.0	0.0	36.0	0.0	0.0	0.0	0.0	46.7	0.0	0.0	0.0	58.2	0.0	0.0	0.0	0.0	
32	Quang Nam	0.0	56.0	0.0	0.0	0.0	57.6	0.0	0.0	0.0	0.0	81.9	0.0	0.0	0.0	102.0	0.0	0.0	0.0	0.0	
33	Da Nang	1010.0	95.3	0.0	0.0	1010.0	98.1	0.0	0.0	0.0	1010.0	173.9	326.0	0.0	1010.0	216.5	475.0	0.0	0.0	0.0	
34	Quang Ngai	0.0	40.4	0.0	0.0	0.0	41.6	0.0	0.0	0.0	0.0	69.9	0.0	0.0	0.0	87.0	0.0	0.0	0.0	0.0	
35	Binh Dinh	0.0	30.0	0.0	0.0	0.0	30.8	0.0	0.0	0.0	0.0	47.9	0.0	0.0	0.0	59.7	0.0	0.0	0.0	0.0	
36	Phu Yen	0.0	36.0	0.0	0.0	0.0	37.1	0.0	0.0	0.0	0.0	60.0	0.0	0.0	0.0	74.8	0.0	0.0	0.0	0.0	
37	Khanh Hoa	0.0	49.2	0.0	0.0	0.0	50.6	0.0	0.0	0.0	0.0	79.0	0.0	0.0	0.0	98.4	0.0	0.0	0.0	0.0	
38	Kon Tum	0.0	7.8	0.0	0.0	0.0	8.0	0.0	0.0	0.0	0.0	12.4	0.0	0.0	0.0	15.4	0.0	0.0	0.0	0.0	
39	Gia Lai	0.0	42.6	0.0	0.0	0.0	43.8	0.0	0.0	0.0	0.0	79.4	0.0	0.0	0.0	98.8	0.0	0.0	0.0	0.0	
40	Dac Lac	0.0	46.9	0.0	0.0	0.0	48.3	0.0	0.0	0.0	0.0	86.5	0.0	0.0	0.0	107.7	0.0	0.0	0.0	0.0	
41	Ho Chi Minh	50.0	1527.8	383.0	0.0	50.0	1571.7	450.0	0.0	0.0	50.0	2413.6	500.0	0.0	50.0	3004.8	850.0	0.0	0.0	0.0	
42	Lam Dong	0.0	34.0	0.0	0.0	0.0	34.9	0.0	0.0	0.0	0.0	63.7	0.0	0.0	0.0	79.3	0.0	0.0	0.0	0.0	
43	Ninh Thuan	0.0	22.7	0.0	0.0	0.0	23.3	0.0	0.0	0.0	0.0	42.7	0.0	0.0	0.0	53.2	0.0	0.0	0.0	0.0	
44	Binh Phuoc	0.0	6.6	0.0	0.0	0.0	6.8	0.0	0.0	0.0	0.0	11.8	0.0	0.0	0.0	14.7	0.0	0.0	0.0	0.0	
45	Tay Ninh	0.0	70.7	0.0	0.0	0.0	72.7	0.0	0.0	0.0	0.0	148.4	0.0	0.0	0.0	184.7	0.0	0.0	0.0	0.0	
46	Binh Duong	0.0	202.0	0.0	0.0	0.0	207.8	0.0	0.0	0.0	0.0	371.7	0.0	0.0	0.0	462.8	0.0	0.0	0.0	0.0	
47	Dong Nai	440.0	586.4	0.0	0.0	440.0	603.2	0.0	0.0	0.0	440.0	1093.6	0.0	0.0	440.0	1361.4	0.0	0.0	0.0	0.0	
48	Binh Thuan	0.0	23.2	0.0	0.0	0.0	23.9	0.0	0.0	0.0	0.0	43.6	0.0	0.0	0.0	54.2	0.0	0.0	0.0	0.0	
49	Ba Ria - Vung Tau	1240.0	570.6	383.0	0.0	1240.0	587.0	450.0	0.0	0.0	1240.0	1027.8	1500.0	0.0	1240.0	1279.5	2550.0	0.0	0.0	0.0	
50	Long An	0.0	53.4	0.0	0.0	0.0	55.0	0.0	0.0	0.0	0.0	96.5	0.0	0.0	0.0	120.1	0.0	0.0	0.0	0.0	
51	Dong Thap	0.0	37.1	0.0	0.0	0.0	38.1	0.0	0.0	0.0	0.0	67.0	0.0	0.0	0.0	83.4	0.0	0.0	0.0	0.0	
52	An Giang	0.0	107.6	0.0	0.0	0.0	110.7	0.0	0.0	0.0	0.0	187.6	0.0	0.0	0.0	233.6	0.0	0.0	0.0	0.0	
53	Tien Giang	0.0	42.7	0.0	0.0	0.0	44.0	0.0	0.0	0.0	0.0	76.3	0.0	0.0	0.0	94.9	0.0	0.0	0.0	0.0	
54	Vinh Long	0.0	39.8	0.0	0.0	0.0	40.9	0.0	0.0	0.0	0.0	64.9	0.0	0.0	0.0	80.7	0.0	0.0	0.0	0.0	
55	Ben Tre	0.0	57.8	0.0	0.0	0.0	59.4	0.0	0.0	0.0	0.0	99.8	0.0	0.0	0.0	124.2	0.0	0.0	0.0	0.0	
56	Kien Giang	0.0	169.9	0.0	0.0	0.0	174.8	0.0	0.0	0.0	0.0	286.1	0.0	0.0	0.0	356.2	0.0	0.0	0.0	0.0	
57	Can Tho	0.0	172.4	0.0	0.0	0.0	177.4	0.0	0.0	0.0	0.0	313.9	0.0	0.0	0.0	390.8	0.0	0.0	0.0	0.0	
58	Tra Vinh	0.0	30.9	0.0	0.0	0.0	31.8	0.0	0.0	0.0	0.0	55.1	0.0	0.0	0.0	68.6	0.0	0.0	0.0	0.0	
59	Soc Trang	0.0	56.2	0.0	0.0	0.0	57.8	0.0	0.0	0.0	0.0	103.7	0.0	0.0	0.0	129.1	0.0	0.0	0.0	0.0	
60	Bac Lieu	0.0	45.1	0.0	0.0	0.0	46.4	0.0	0.0	0.0	0.0	82.2	0.0	0.0	0.0	102.3	0.0	0.0	0.0	0.0	
61	Ca Mau	0.0	83.4	0.0	0.0	0.0	85.8	0.0	0.0	0.0	0.0	156.0	0.0	0.0	0.0	194.2	0.0	0.0	0.0	0.0	

Table 3A-5 Steel

		2010								2020							
		Low				High				Low				High			
		production	consumption	import	export	production	consumption	import	export	production	consumption	import	export	production	consumption	import	export
1	Hanoi	90.4	2014.2	0.0	0.0	90.4	2159.6	0.0	0.0	112.1	2368.1	0.0	0.0	112.1	2944.6	0.0	0.0
2	Hai Phong	1699.8	782.0	0.0	0.0	1699.8	838.5	0.0	0.0	2107.3	732.1	0.0	0.0	2107.3	910.3	0.0	0.0
3	Hai Duong	1992.8	502.1	0.0	0.0	1992.8	538.3	0.0	0.0	2470.5	631.2	0.0	0.0	2470.5	784.8	0.0	0.0
4	Hung Yen	90.4	233.3	0.0	0.0	90.4	250.1	0.0	0.0	112.1	272.1	0.0	0.0	112.1	338.3	0.0	0.0
5	Thai Binh	90.4	469.4	0.0	0.0	90.4	503.3	0.0	0.0	112.1	569.3	0.0	0.0	112.1	707.9	0.0	0.0
6	Nam Dinh	90.4	518.6	0.0	0.0	90.4	556.1	0.0	0.0	112.1	642.6	0.0	0.0	112.1	799.0	0.0	0.0
7	Ninh Binh	1813.8	188.3	0.0	0.0	1813.8	201.9	0.0	0.0	2248.5	225.5	0.0	0.0	2248.5	280.5	0.0	0.0
8	Ha Nam	2349.2	190.9	0.0	0.0	2349.2	204.7	0.0	0.0	2912.3	221.9	0.0	0.0	2912.3	275.9	0.0	0.0
9	Ha Tay	1283.9	585.2	0.0	0.0	1283.9	627.5	0.0	0.0	1591.7	687.2	0.0	0.0	1591.7	854.6	0.0	0.0
10	Cao Bang	21.5	32.6	0.0	0.0	21.5	34.9	0.0	0.0	26.7	41.0	0.0	0.0	26.7	51.0	0.0	0.0
11	Lang Son	90.4	54.9	0.0	0.0	90.4	58.9	0.0	0.0	112.1	70.8	0.0	0.0	112.1	88.0	0.0	0.0
12	Quang Ninh	90.4	441.8	0.0	0.0	90.4	473.7	0.0	0.0	112.1	457.4	0.0	0.0	112.1	568.8	0.0	0.0
13	Thai Nguyen	418.1	127.1	0.0	0.0	418.1	136.3	0.0	0.0	518.3	159.5	0.0	0.0	518.3	198.3	0.0	0.0
14	Bac Can	90.4	15.8	0.0	0.0	90.4	17.0	0.0	0.0	112.1	22.3	0.0	0.0	112.1	27.8	0.0	0.0
15	Bac Ninh	90.4	351.3	0.0	0.0	90.4	376.7	0.0	0.0	112.1	377.7	0.0	0.0	112.1	469.6	0.0	0.0
16	Bac Giang	90.4	223.6	0.0	0.0	90.4	239.8	0.0	0.0	112.1	232.9	0.0	0.0	112.1	289.6	0.0	0.0
17	Phu Tho	90.4	317.4	0.0	0.0	90.4	340.3	0.0	0.0	112.1	389.7	0.0	0.0	112.1	484.6	0.0	0.0
18	Vinh Phuc	90.4	80.1	0.0	0.0	90.4	85.9	0.0	0.0	112.1	96.0	0.0	0.0	112.1	119.4	0.0	0.0
19	Lao Cai	90.4	83.2	0.0	0.0	90.4	89.2	0.0	0.0	112.1	111.6	0.0	0.0	112.1	138.8	0.0	0.0
20	Yen Bai	90.4	99.0	0.0	0.0	90.4	106.2	0.0	0.0	112.1	141.9	0.0	0.0	112.1	176.5	0.0	0.0
21	Tuyen Quang	90.4	79.8	0.0	0.0	90.4	85.5	0.0	0.0	112.1	101.1	0.0	0.0	112.1	125.7	0.0	0.0
22	Ha Giang	90.4	36.1	0.0	0.0	90.4	38.7	0.0	0.0	112.1	47.4	0.0	0.0	112.1	58.9	0.0	0.0
23	Son La	90.4	88.6	0.0	0.0	90.4	95.0	0.0	0.0	112.1	97.4	0.0	0.0	112.1	121.1	0.0	0.0
24	Lai Chau	45.2	210.5	0.0	0.0	45.2	225.7	0.0	0.0	56.0	264.6	0.0	0.0	56.0	329.0	0.0	0.0
25	Hoa Binh	256.6	157.8	0.0	0.0	256.6	169.2	0.0	0.0	318.1	167.2	0.0	0.0	318.1	208.0	0.0	0.0
26	Thanh Hoa	1343.6	924.6	0.0	0.0	1343.6	991.4	0.0	0.0	1665.7	1087.7	0.0	0.0	1665.7	1352.5	0.0	0.0
27	Nghe An	679.9	536.1	0.0	0.0	679.9	574.8	0.0	0.0	842.9	655.6	0.0	0.0	842.9	815.2	0.0	0.0
28	Ha Tinh	596.8	159.3	0.0	0.0	596.8	171.0	0.0	0.0	739.8	185.2	0.0	0.0	739.8	230.3	0.0	0.0
29	Quang Binh	257.0	155.3	0.0	0.0	257.0	166.5	0.0	0.0	318.6	173.2	0.0	0.0	318.6	215.4	0.0	0.0
30	Quang Tri	314.3	46.8	0.0	0.0	314.3	50.2	0.0	0.0	389.6	52.3	0.0	0.0	389.6	65.0	0.0	0.0
31	Thua Thien - Hue	367.1	234.2	0.0	0.0	367.1	251.1	0.0	0.0	455.1	226.5	0.0	0.0	455.1	281.7	0.0	0.0
32	Quang Nam	175.4	333.6	0.0	0.0	175.4	357.7	0.0	0.0	217.5	338.3	0.0	0.0	217.5	420.6	0.0	0.0
33	Da Nang	292.8	567.7	0.0	0.0	292.8	608.7	0.0	0.0	363.0	717.9	0.0	0.0	363.0	892.6	0.0	0.0
34	Quang Ngai	182.6	240.7	0.0	0.0	182.6	258.1	0.0	0.0	226.4	288.5	0.0	0.0	226.4	358.8	0.0	0.0
35	Binh Dinh	91.9	178.6	0.0	0.0	91.9	191.5	0.0	0.0	113.9	197.9	0.0	0.0	113.9	246.1	0.0	0.0
36	Phu Yen	180.8	214.6	0.0	0.0	180.8	230.1	0.0	0.0	224.2	247.9	0.0	0.0	224.2	308.2	0.0	0.0
37	Khanh Hoa	180.8	292.8	0.0	0.0	180.8	313.9	0.0	0.0	224.2	326.3	0.0	0.0	224.2	405.7	0.0	0.0
38	Kon Tum	90.4	45.8	0.0	0.0	90.4	49.1	0.0	0.0	112.1	46.0	0.0	0.0	112.1	57.2	0.0	0.0
39	Gia Lai	90.4	249.6	0.0	0.0	90.4	267.6	0.0	0.0	112.1	294.6	0.0	0.0	112.1	366.4	0.0	0.0
40	Dac Lac	90.4	275.4	0.0	0.0	90.4	295.3	0.0	0.0	112.1	321.3	0.0	0.0	112.1	399.5	0.0	0.0
41	Ho Chi Minh	90.4	3440.7	0.0	0.0	90.4	3689.1	0.0	0.0	112.1	3672.3	0.0	0.0	112.1	4566.4	0.0	0.0
42	Lam Dong	90.4	76.5	0.0	0.0	90.4	82.0	0.0	0.0	112.1	97.0	0.0	0.0	112.1	120.6	0.0	0.0
43	Ninh Thuan	90.4	51.0	0.0	0.0	90.4	54.7	0.0	0.0	112.1	65.0	0.0	0.0	112.1	80.8	0.0	0.0
44	Binh Phuoc	90.4	14.9	0.0	0.0	90.4	15.9	0.0	0.0	112.1	18.0	0.0	0.0	112.1	22.3	0.0	0.0
45	Tay Ninh	132.0	159.1	0.0	0.0	132.0	170.6	0.0	0.0	163.7	225.8	0.0	0.0	163.7	280.8	0.0	0.0
46	Binh Duong	2464.8	454.9	0.0	0.0	2464.8	487.7	0.0	0.0	3055.6	565.6	0.0	0.0	3055.6	703.3	0.0	0.0
47	Dong Nai	3658.3	1320.5	0.0	0.0	3658.3	1415.9	0.0	0.0	4535.2	1663.9	0.0	0.0	4535.2	2069.0	0.0	0.0
48	Binh Thuan	405.1	52.3	0.0	0.0	405.1	56.1	0.0	0.0	502.2	66.3	0.0	0.0	502.2	82.4	0.0	0.0
49	Ba Ria - Vung Tau	1887.9	1285.1	0.0	0.0	1887.9	1377.9	0.0	0.0	2340.5	1563.8	0.0	0.0	2340.5	1944.5	0.0	0.0
50	Long An	90.4	218.0	0.0	0.0	90.4	233.7	0.0	0.0	112.1	257.1	0.0	0.0	112.1	319.7	0.0	0.0
51	Dong Thap	90.4	151.2	0.0	0.0	90.4	162.1	0.0	0.0	112.1	178.6	0.0	0.0	112.1	222.0	0.0	0.0
52	An Giang	2059.7	438.9	0.0	0.0	2059.7	470.6	0.0	0.0	2553.4	499.9	0.0	0.0	2553.4	621.6	0.0	0.0
53	Tien Giang	90.4	174.3	0.0	0.0	90.4	186.9	0.0	0.0	112.1	203.2	0.0	0.0	112.1	252.7	0.0	0.0
54	Vinh Long	90.4	162.2	0.0	0.0	90.4	173.9	0.0	0.0	112.1	172.8	0.0	0.0	112.1	214.9	0.0	0.0
55	Ben Tre	90.4	235.7	0.0	0.0	90.4	252.7	0.0	0.0	112.1	265.8	0.0	0.0	112.1	330.6	0.0	0.0
56	Kien Giang	524.4	693.0	0.0	0.0	524.4	743.1	0.0	0.0	650.1	762.3	0.0	0.0	650.1	947.9	0.0	0.0
57	Can Tho	90.4	703.3	0.0	0.0	90.4	754.1	0.0	0.0	112.1	836.2	0.0	0.0	112.1	1039.8	0.0	0.0
58	Tra Vinh	90.4	126.1	0.0	0.0	90.4	135.2	0.0	0.0	112.1	146.7	0.0	0.0	112.1	182.5	0.0	0.0
59	Soc Trang	90.4	229.1	0.0	0.0	90.4	245.7	0.0	0.0	112.1	276.2	0.0	0.0	112.1	343.5	0.0	0.0
60	Bac Lieu	90.4	183.9	0.0	0.0	90.4	197.2	0.0	0.0	112.1	218.9	0.0	0.0	112.1	272.2	0.0	0.0
61	Ca Mau	90.4	340.1	0.0	0.0	90.4	364.6	0.0	0.0	112.1	415.6	0.0	0.0	112.1	516.8	0.0	0.0

Table 3A-6 Construction Materials

		2010								2020							
		Low				High				Low				High			
		production	consumption	import	export	production	consumption	import	export	production	consumption	import	export	production	consumption	import	export
1	Hu Noi	40.0	1644.2	0.0	0.0	40.0	1763.0	0.0	0.0	40.0	2375.3	0.0	0.0	40.0	2953.6	0.0	0.0
2	Hai Phong	2897.4	638.4	0.0	1500.0	2897.4	684.5	0.0	1050.0	3596.4	734.3	0.0	1800.0	4297.4	913.1	0.0	1400.0
3	Hai Duong	5543.0	409.9	0.0	0.0	5543.0	439.5	0.0	0.0	5543.0	633.1	0.0	0.0	5543.0	787.2	0.0	0.0
4	Hung Yen	0.0	190.4	0.0	0.0	0.0	204.2	0.0	0.0	0.0	272.9	0.0	0.0	0.0	339.4	0.0	0.0
5	Thai Binh	13.1	383.2	0.0	0.0	13.1	410.9	0.0	0.0	13.1	571.0	0.0	0.0	13.1	710.1	0.0	0.0
6	Nam Dinh	0.0	423.4	0.0	0.0	0.0	453.9	0.0	0.0	0.0	644.5	0.0	0.0	0.0	801.5	0.0	0.0
7	Ninh Binh	1483.9	153.7	0.0	0.0	1483.9	164.8	0.0	0.0	1483.9	226.2	0.0	0.0	1483.9	281.3	0.0	0.0
8	Ha Nam	72.2	155.8	0.0	0.0	72.2	167.1	0.0	0.0	372.2	222.5	0.0	0.0	581.2	276.7	0.0	0.0
9	Ha Tay	0.1	477.7	0.0	0.0	0.1	512.2	0.0	0.0	0.1	689.3	0.0	0.0	0.1	857.2	0.0	0.0
10	Cao Bang	0.0	26.6	0.0	0.0	0.0	28.5	0.0	0.0	0.0	41.1	0.0	0.0	0.0	51.1	0.0	0.0
11	Lang Son	0.0	44.8	0.0	0.0	0.0	48.1	0.0	0.0	0.0	71.0	0.0	0.0	0.0	88.3	0.0	0.0
12	Quang Ninh	2800.0	360.5	0.0	1500.0	2800.0	386.6	0.0	1050.0	2800.0	458.7	0.0	1527.0	2800.0	570.4	0.0	1400.0
13	Thai Nguyen	109.7	103.7	0.0	0.0	109.7	111.2	0.0	0.0	109.7	159.9	0.0	0.0	109.7	198.9	0.0	0.0
14	Bac Can	0.0	12.9	0.0	0.0	0.0	13.8	0.0	0.0	0.0	22.4	0.0	0.0	0.0	27.8	0.0	0.0
15	Bac Ninh	0.0	286.7	0.0	0.0	0.0	307.4	0.0	0.0	0.0	378.7	0.0	0.0	0.0	470.9	0.0	0.0
16	Bac Giang	0.0	182.5	0.0	0.0	0.0	195.7	0.0	0.0	0.0	233.6	0.0	0.0	0.0	290.5	0.0	0.0
17	Phu Tho	0.0	259.0	0.0	0.0	0.0	277.7	0.0	0.0	0.0	390.8	0.0	0.0	0.0	486.0	0.0	0.0
18	Vinh Phuc	0.0	65.4	0.0	0.0	0.0	70.1	0.0	0.0	0.0	96.3	0.0	0.0	0.0	119.8	0.0	0.0
19	Lao Cai	0.0	67.9	0.0	0.0	0.0	72.8	0.0	0.0	0.0	112.0	0.0	0.0	0.0	139.2	0.0	0.0
20	Yen Bai	44.0	80.8	0.0	0.0	44.0	86.7	0.0	0.0	44.0	142.3	0.0	0.0	44.0	177.0	0.0	0.0
21	Tuyen Quang	55.4	65.1	0.0	0.0	55.4	69.8	0.0	0.0	55.4	101.4	0.0	0.0	55.4	126.1	0.0	0.0
22	Ha Giang	17.5	29.4	0.0	0.0	17.5	31.6	0.0	0.0	17.5	47.5	0.0	0.0	17.5	59.1	0.0	0.0
23	Son La	458.8	72.4	0.0	0.0	458.8	77.6	0.0	0.0	458.8	97.6	0.0	0.0	458.8	121.4	0.0	0.0
24	Lai Chau	0.0	171.9	0.0	0.0	0.0	184.3	0.0	0.0	0.0	265.4	0.0	0.0	0.0	330.0	0.0	0.0
25	Hoa Binh	104.5	128.8	0.0	0.0	104.5	138.1	0.0	0.0	104.5	167.8	0.0	0.0	104.5	208.6	0.0	0.0
26	Thanh Hoa	3500.0	754.8	0.0	1486.0	3500.0	809.3	0.0	1039.0	4201.0	1091.4	0.0	3000.0	4900.0	1357.1	0.0	2748.0
27	Nghe An	78.0	437.6	0.0	0.0	78.0	469.2	0.0	0.0	78.0	657.8	0.0	0.0	78.0	817.9	0.0	0.0
28	Ha Tinh	12.6	130.2	0.0	0.0	12.6	139.6	0.0	0.0	12.6	185.8	0.0	0.0	12.6	231.1	0.0	0.0
29	Quang Binh	0.0	126.8	0.0	0.0	0.0	135.9	0.0	0.0	3250.0	173.8	0.0	0.0	4500.0	216.1	0.0	0.0
30	Quang Tri	0.1	38.2	0.0	0.0	0.1	41.0	0.0	0.0	600.1	52.4	0.0	0.0	1200.1	65.2	0.0	0.0
31	Thua Thien - Hue	127.0	191.2	0.0	0.0	127.0	205.0	0.0	0.0	827.0	227.3	0.0	0.0	1527.0	282.6	0.0	0.0
32	Quang Nam	0.0	272.4	0.0	0.0	0.0	292.0	0.0	0.0	700.0	339.3	0.0	0.0	1400.0	421.9	0.0	0.0
33	Da Nang	798.7	463.5	0.0	0.0	798.7	496.9	0.0	0.0	798.7	720.0	0.0	0.0	798.7	895.4	0.0	0.0
34	Quang Ngai	130.0	196.5	0.0	0.0	130.0	210.7	0.0	0.0	630.0	289.4	0.0	0.0	630.0	359.8	0.0	0.0
35	Binh Dinh	108.0	145.8	0.0	0.0	108.0	156.3	0.0	0.0	358.0	198.5	0.0	0.0	608.0	246.8	0.0	0.0
36	Phu Yen	100.0	175.2	0.0	0.0	100.0	187.8	0.0	0.0	100.0	248.6	0.0	0.0	100.0	309.2	0.0	0.0
37	Khanh Hoa	14.0	239.0	0.0	0.0	14.0	256.3	0.0	0.0	14.0	327.3	0.0	0.0	14.0	406.9	0.0	0.0
38	Kon Tum	0.0	37.4	0.0	0.0	0.0	40.1	0.0	0.0	0.0	46.1	0.0	0.0	0.0	57.3	0.0	0.0
39	Gia Lai	39.1	203.9	0.0	0.0	39.1	218.7	0.0	0.0	39.1	295.3	0.0	0.0	39.1	367.2	0.0	0.0
40	Dac Lac	0.0	225.0	0.0	0.0	0.0	241.3	0.0	0.0	0.0	322.0	0.0	0.0	0.0	400.5	0.0	0.0
41	Ho Chi Minh	1503.0	2808.7	0.0	0.0	1503.0	3011.5	0.0	0.0	1503.0	3683.4	0.0	0.0	1503.0	4580.3	0.0	0.0
42	Lam Dong	0.0	62.4	0.0	0.0	0.0	66.9	0.0	0.0	0.0	97.3	0.0	0.0	0.0	120.9	0.0	0.0
43	Ninh Thuan	25.1	41.7	0.0	0.0	25.1	44.7	0.0	0.0	25.1	65.2	0.0	0.0	25.1	81.0	0.0	0.0
44	Binh Phuoc	0.0	12.1	0.0	0.0	0.0	13.0	0.0	0.0	700.0	18.0	0.0	0.0	1400.0	22.4	0.0	0.0
45	Tay Ninh	0.0	129.9	0.0	0.0	0.0	139.3	0.0	0.0	0.0	226.5	0.0	0.0	0.0	281.6	0.0	0.0
46	Binh Duong	0.0	371.3	0.0	0.0	0.0	398.1	0.0	0.0	0.0	567.3	0.0	0.0	0.0	705.5	0.0	0.0
47	Dong Nai	100.0	1078.0	0.0	0.0	100.0	1155.8	0.0	0.0	100.0	1668.9	0.0	0.0	100.0	2075.2	0.0	0.0
48	Binh Thuan	0.0	42.7	0.0	0.0	0.0	45.8	0.0	0.0	500.0	66.5	0.0	0.0	500.0	82.7	0.0	0.0
49	Ba Ria - Vung Tau	0.0	1049.1	0.0	0.0	0.0	1124.8	0.0	0.0	500.0	1568.5	0.0	0.0	500.0	1950.4	0.0	0.0
50	Long An	0.0	177.9	0.0	0.0	0.0	190.8	0.0	0.0	0.0	257.9	0.0	0.0	0.0	320.7	0.0	0.0
51	Dong Thap	0.0	123.4	0.0	0.0	0.0	132.4	0.0	0.0	0.0	179.1	0.0	0.0	0.0	222.7	0.0	0.0
52	An Giang	109.9	358.3	0.0	0.0	109.9	384.2	0.0	0.0	109.9	501.4	0.0	0.0	109.9	623.5	0.0	0.0
53	Tien Giang	0.0	142.3	0.0	0.0	0.0	152.6	0.0	0.0	0.0	203.8	0.0	0.0	0.0	253.4	0.0	0.0
54	Vinh Long	100.0	132.4	0.0	0.0	100.0	142.0	0.0	0.0	100.0	173.3	0.0	0.0	100.0	215.5	0.0	0.0
55	Ben Tre	0.0	192.4	0.0	0.0	0.0	206.3	0.0	0.0	0.0	266.6	0.0	0.0	0.0	331.6	0.0	0.0
56	Kien Giang	2414.5	565.7	0.0	0.0	2414.5	606.6	0.0	0.0	2414.5	764.6	0.0	0.0	2414.5	950.8	0.0	0.0
57	Can Tho	339.4	574.1	0.0	0.0	339.4	615.6	0.0	0.0	439.4	838.8	0.0	0.0	539.4	1043.0	0.0	0.0
58	Tra Vinh	0.0	103.0	0.0	0.0	0.0	110.4	0.0	0.0	0.0	147.2	0.0	0.0	0.0	183.0	0.0	0.0
59	Soc Trang	0.0	187.1	0.0	0.0	0.0	200.6	0.0	0.0	0.0	277.0	0.0	0.0	0.0	344.5	0.0	0.0
60	Bac Lieu	0.0	150.2	0.0	0.0	0.0	161.0	0.0	0.0	0.0	219.5	0.0	0.0	0.0	273.0	0.0	0.0
61	Cu Mau	0.0	277.6	0.0	0.0	0.0	297.7	0.0	0.0	0.0	416.8	0.0	0.0	0.0	518.3	0.0	0.0

Table 3A-7 Cement



Table 3A-8 Fertilizer

		2010								2020							
		Low				High				Low				High			
		production	consumption	import	export	production	consumption	import	export	production	consumption	import	export	production	consumption	import	export
1	Hanoi	200.0	39.2	0.0	0.0	200.0	39.6	0.0	0.0	400.0	20.9	0.0	0.0	400.0	23.5	0.0	0.0
2	Hai Phong	0.0	111.5	0.0	0.0	112.6	112.6	0.0	0.0	0.0	115.2	0.0	0.0	0.0	129.5	0.0	0.0
3	Hai Duong	0.0	124.9	0.0	0.0	126.1	126.1	0.0	0.0	0.0	137.8	0.0	0.0	0.0	154.9	0.0	0.0
4	Hung Yen	0.0	93.5	0.0	0.0	94.4	94.4	0.0	0.0	0.0	102.0	0.0	0.0	0.0	114.7	0.0	0.0
5	Thai Binh	0.0	200.5	0.0	0.0	202.4	202.4	0.0	0.0	0.0	218.3	0.0	0.0	0.0	245.3	0.0	0.0
6	Nam Dinh	0.0	121.3	0.0	0.0	122.5	122.5	0.0	0.0	0.0	137.1	0.0	0.0	0.0	154.1	0.0	0.0
7	Ninh Binh	90.0	60.5	0.0	0.0	90.0	60.9	0.0	0.0	190.0	70.7	0.0	0.0	190.0	79.4	0.0	0.0
8	Ha Nam	0.0	56.1	0.0	0.0	56.7	56.7	0.0	0.0	0.0	62.2	0.0	0.0	0.0	69.9	0.0	0.0
9	Ha Tay	0.0	167.2	0.0	0.0	168.9	168.9	0.0	0.0	0.0	191.8	0.0	0.0	0.0	215.5	0.0	0.0
10	Cao Bang	0.0	67.9	0.0	0.0	68.5	68.5	0.0	0.0	0.0	97.9	0.0	0.0	0.0	110.0	0.0	0.0
11	Lang Son	0.0	91.7	0.0	0.0	92.6	92.6	0.0	0.0	0.0	134.0	0.0	0.0	0.0	150.6	0.0	0.0
12	Quang Ninh	300.0	37.1	230.0	0.0	300.0	37.5	230.0	0.0	500.0	51.9	230.0	0.0	500.0	58.4	300.0	0.0
13	Thai Nguyen	0.0	77.4	0.0	0.0	78.2	78.2	0.0	0.0	0.0	95.5	0.0	0.0	0.0	107.3	0.0	0.0
14	Bac Can	0.0	29.8	0.0	0.0	30.1	30.1	0.0	0.0	0.0	51.3	0.0	0.0	0.0	57.7	0.0	0.0
15	Bac Ninh	0.0	88.1	0.0	0.0	88.9	88.9	0.0	0.0	0.0	92.2	0.0	0.0	0.0	103.6	0.0	0.0
16	Bac Giang	340.0	128.8	0.0	0.0	340.0	130.0	0.0	0.0	460.0	187.9	0.0	0.0	460.0	211.2	0.0	0.0
17	Phu Tho	1000.0	93.8	0.0	0.0	1000.0	94.7	0.0	0.0	1500.0	125.5	0.0	0.0	1500.0	141.1	0.0	0.0
18	Vinh Phuc	0.0	81.6	0.0	0.0	82.4	82.4	0.0	0.0	0.0	108.5	0.0	0.0	0.0	121.9	0.0	0.0
19	Lao Cai	0.0	70.3	0.0	0.0	71.0	71.0	0.0	0.0	0.0	109.3	0.0	0.0	0.0	122.9	0.0	0.0
20	Yen Bai	0.0	64.9	0.0	0.0	65.5	65.5	0.0	0.0	0.0	89.9	0.0	0.0	0.0	101.0	0.0	0.0
21	Tuyen Quang	0.0	71.6	0.0	0.0	72.3	72.3	0.0	0.0	0.0	107.6	0.0	0.0	0.0	120.9	0.0	0.0
22	Ha Giang	0.0	49.8	0.0	0.0	50.2	50.2	0.0	0.0	0.0	76.8	0.0	0.0	0.0	86.3	0.0	0.0
23	Son La	0.0	113.5	0.0	0.0	114.6	114.6	0.0	0.0	0.0	175.5	0.0	0.0	0.0	197.2	0.0	0.0
24	Lai Chau	0.0	57.2	0.0	0.0	57.7	57.7	0.0	0.0	0.0	84.4	0.0	0.0	0.0	94.8	0.0	0.0
25	Hoa Binh	0.0	69.9	0.0	0.0	70.6	70.6	0.0	0.0	0.0	100.9	0.0	0.0	0.0	113.5	0.0	0.0
26	Thanh Hoa	0.0	293.5	0.0	0.0	296.3	296.3	0.0	0.0	0.0	376.3	0.0	0.0	0.0	423.0	0.0	0.0
27	Nghệ An	0.0	283.6	240.0	0.0	286.5	245.0	0.0	0.0	0.0	355.6	242.0	0.0	0.0	399.7	311.0	0.0
28	Ha Tinh	0.0	148.3	0.0	0.0	149.8	149.8	0.0	0.0	0.0	195.1	0.0	0.0	0.0	219.3	0.0	0.0
29	Quang Binh	50.0	75.1	0.0	0.0	50.0	75.9	0.0	0.0	100.0	108.3	0.0	0.0	100.0	121.7	0.0	0.0
30	Quang Tri	0.0	63.6	0.0	0.0	64.2	64.2	0.0	0.0	0.0	89.8	0.0	0.0	0.0	100.9	0.0	0.0
31	Thua Thien - Hue	0.0	94.6	0.0	0.0	95.5	95.5	0.0	0.0	0.0	144.6	0.0	0.0	0.0	162.5	0.0	0.0
32	Quang Nam	0.0	120.7	0.0	0.0	121.9	121.9	0.0	0.0	0.0	149.8	0.0	0.0	0.0	168.4	0.0	0.0
33	Da Nang	170.0	28.2	720.0	0.0	170.0	28.5	734.0	0.0	270.0	32.7	725.0	0.0	270.0	36.8	932.0	0.0
34	Quang Ngai	250.0	94.4	0.0	0.0	250.0	95.3	0.0	0.0	500.0	107.5	0.0	0.0	500.0	120.9	0.0	0.0
35	Binh Dinh	0.0	182.5	320.0	0.0	184.5	326.0	0.0	0.0	0.0	229.5	322.0	0.0	0.0	269.2	414.0	0.0
36	Phu Yen	0.0	73.3	0.0	0.0	74.0	74.0	0.0	0.0	0.0	97.7	0.0	0.0	0.0	109.8	0.0	0.0
37	Khanh Hoa	0.0	206.9	320.0	0.0	208.9	325.0	0.0	0.0	0.0	289.6	321.0	0.0	0.0	325.5	413.0	0.0
38	Kon Tum	0.0	27.5	0.0	0.0	27.7	27.7	0.0	0.0	0.0	40.6	0.0	0.0	0.0	45.6	0.0	0.0
39	Gia Lai	0.0	87.6	0.0	0.0	88.5	88.5	0.0	0.0	0.0	128.3	0.0	0.0	0.0	144.2	0.0	0.0
40	Dac Lac	0.0	320.4	0.0	0.0	323.5	323.5	0.0	0.0	0.0	489.1	0.0	0.0	0.0	549.8	0.0	0.0
41	Ho Chi Minh	350.0	60.0	2197.0	0.0	350.0	60.5	2236.0	0.0	600.0	10.3	1380.0	0.0	600.0	11.6	1772.0	0.0
42	Lam Dong	0.0	135.6	0.0	0.0	136.9	136.9	0.0	0.0	0.0	197.8	0.0	0.0	0.0	222.3	0.0	0.0
43	Ninh Thuan	0.0	85.7	0.0	0.0	86.6	86.6	0.0	0.0	0.0	122.3	0.0	0.0	0.0	137.5	0.0	0.0
44	Binh Phuoc	0.0	82.1	0.0	0.0	82.9	82.9	0.0	0.0	0.0	101.6	0.0	0.0	0.0	114.2	0.0	0.0
45	Tay Ninh	0.0	136.0	0.0	0.0	137.3	137.3	0.0	0.0	0.0	151.0	0.0	0.0	0.0	169.8	0.0	0.0
46	Binh Duong	0.0	88.1	0.0	0.0	89.0	89.0	0.0	0.0	0.0	122.7	0.0	0.0	0.0	137.9	0.0	0.0
47	Dong Nai	200.0	182.5	0.0	0.0	200.0	184.0	0.0	0.0	400.0	227.5	0.0	0.0	400.0	255.8	0.0	0.0
48	Binh Thuan	0.0	120.9	0.0	0.0	122.0	122.0	0.0	0.0	0.0	173.0	0.0	0.0	0.0	194.4	0.0	0.0
49	Ba Ria - Vung Tau	600.0	71.7	137.0	0.0	600.0	72.4	140.0	0.0	1000.0	84.8	552.0	0.0	1000.0	95.4	709.0	0.0
50	Long An	0.0	224.8	0.0	0.0	227.0	227.0	0.0	0.0	0.0	290.5	0.0	0.0	0.0	326.5	0.0	0.0
51	Dong Thap	0.0	261.6	0.0	0.0	264.1	264.1	0.0	0.0	0.0	340.1	0.0	0.0	0.0	382.2	0.0	0.0
52	An Giang	0.0	310.0	0.0	0.0	313.0	313.0	0.0	0.0	0.0	389.4	0.0	0.0	0.0	437.6	0.0	0.0
53	Tien Giang	0.0	324.7	0.0	0.0	327.8	327.8	0.0	0.0	0.0	428.5	0.0	0.0	0.0	481.7	0.0	0.0
54	Vinh Long	0.0	224.0	0.0	0.0	226.2	226.2	0.0	0.0	0.0	298.1	0.0	0.0	0.0	335.0	0.0	0.0
55	Ben Tre	0.0	258.1	0.0	0.0	260.6	260.6	0.0	0.0	0.0	322.6	0.0	0.0	0.0	362.5	0.0	0.0
56	Kien Giang	0.0	290.5	0.0	0.0	293.3	293.3	0.0	0.0	0.0	403.4	0.0	0.0	0.0	453.4	0.0	0.0
57	Can Tho	30.0	228.1	412.0	0.0	30.0	230.3	419.0	0.0	80.0	290.3	827.0	0.0	80.0	326.3	1062.0	0.0
58	Tra Vinh	0.0	201.7	0.0	0.0	203.7	203.7	0.0	0.0	0.0	253.5	0.0	0.0	0.0	284.9	0.0	0.0
59	Soc Trang	0.0	232.2	0.0	0.0	234.5	234.5	0.0	0.0	0.0	308.2	0.0	0.0	0.0	346.4	0.0	0.0
60	Bac Lieu	0.0	112.7	0.0	0.0	113.8	113.8	0.0	0.0	0.0	141.1	0.0	0.0	0.0	158.6	0.0	0.0
61	Ca Mau	0.0	257.2	0.0	0.0	259.7	259.7	0.0	0.0	0.0	352.8	0.0	0.0	0.0	396.5	0.0	0.0

	2010										2020									
	Low					High					Low					High				
	production	consumption	import	export		production	consumption	import	export		production	consumption	import	export		production	consumption	import	export	
1	Hanoi	0.0	133.1	0.0	0.0	0.0	0.0	140.4	0.0	0.0	0.0	0.0	113.1	0.0	0.0	138.4	0.0	0.0	0.0	0.0
2	Hai Phong	0.0	318.4	0.0	0.0	0.0	338.7	0.0	0.0	0.0	0.0	242.9	0.0	0.0	0.0	296.1	0.0	0.0	0.0	0.0
3	Hai Duong	0.0	2912.5	0.0	0.0	0.0	3117.6	0.0	0.0	0.0	0.0	2794.6	0.0	0.0	0.0	3457.3	0.0	0.0	0.0	0.0
4	Hung Yen	0.0	47.2	0.0	0.0	0.0	47.2	0.0	0.0	0.0	0.0	48.1	0.0	0.0	0.0	48.1	0.0	0.0	0.0	0.0
5	Thai Binh	0.0	81.5	0.0	0.0	0.0	81.6	0.0	0.0	0.0	0.0	83.7	0.0	0.0	0.0	83.8	0.0	0.0	0.0	0.0
6	Nam Dinh	0.0	78.6	0.0	0.0	0.0	78.6	0.0	0.0	0.0	0.0	81.9	0.0	0.0	0.0	81.9	0.0	0.0	0.0	0.0
7	Ninh Binh	0.0	224.9	0.0	0.0	0.0	238.4	0.0	0.0	0.0	0.0	467.6	0.0	0.0	0.0	572.7	0.0	0.0	0.0	0.0
8	Ha Nam	0.0	40.2	0.0	0.0	0.0	40.7	0.0	0.0	0.0	0.0	60.7	0.0	0.0	0.0	67.9	0.0	0.0	0.0	0.0
9	Ha Tay	0.0	95.0	0.0	0.0	0.0	95.0	0.0	0.0	0.0	0.0	92.4	0.0	0.0	0.0	92.4	0.0	0.0	0.0	0.0
10	Cao Bang	0.0	22.4	0.0	0.0	0.0	22.4	0.0	0.0	0.0	0.0	22.0	0.0	0.0	0.0	22.0	0.0	0.0	0.0	0.0
11	Lang Son	0.0	26.9	0.0	0.0	0.0	26.9	0.0	0.0	0.0	0.0	25.1	0.0	0.0	0.0	25.1	0.0	0.0	0.0	0.0
12	Quang Ninh	14464.6	1583.0	0.0	4900.0	15024.6	1696.0	0.0	4900.0	15994.0	1802.1	0.0	5300.0	18290.0	2236.4	0.0	5500.0	0.0	0.0	0.0
13	Thai Nguyen	534.9	290.1	0.0	0.0	534.9	309.0	0.0	0.0	651.1	159.2	0.0	0.0	651.1	192.6	0.0	0.0	0.0	0.0	0.0
14	Bac Can	0.0	11.3	0.0	0.0	0.0	11.3	0.0	0.0	0.0	11.5	0.0	0.0	0.0	11.3	0.0	0.0	0.0	0.0	0.0
15	Bac Ninh	0.0	40.8	0.0	0.0	0.0	40.8	0.0	0.0	0.0	40.7	0.0	0.0	0.0	40.7	0.0	0.0	0.0	0.0	0.0
16	Bac Giang	0.0	225.9	0.0	0.0	0.0	237.8	0.0	0.0	0.0	177.8	0.0	0.0	0.0	206.2	0.0	0.0	0.0	0.0	0.0
17	Phu Tho	0.0	543.1	0.0	0.0	0.0	578.1	0.0	0.0	0.0	442.3	0.0	0.0	0.0	535.1	0.0	0.0	0.0	0.0	0.0
18	Vinh Phuc	0.0	48.9	0.0	0.0	0.0	48.9	0.0	0.0	0.0	50.6	0.0	0.0	0.0	50.6	0.0	0.0	0.0	0.0	0.0
19	Lao Cai	0.0	24.1	0.0	0.0	0.0	24.1	0.0	0.0	0.0	23.7	0.0	0.0	0.0	23.7	0.0	0.0	0.0	0.0	0.0
20	Yen Bai	0.0	35.4	0.0	0.0	0.0	35.7	0.0	0.0	0.0	36.6	0.0	0.0	0.0	37.2	0.0	0.0	0.0	0.0	0.0
21	Tuyen Quang	0.0	38.3	0.0	0.0	0.0	38.7	0.0	0.0	0.0	38.3	0.0	0.0	0.0	39.0	0.0	0.0	0.0	0.0	0.0
22	Ha Giang	0.0	28.9	0.0	0.0	0.0	29.0	0.0	0.0	0.0	29.9	0.0	0.0	0.0	30.2	0.0	0.0	0.0	0.0	0.0
23	Son La	7.7	79.6	0.0	0.0	7.7	82.8	0.0	0.0	9.3	60.5	0.0	0.0	9.3	66.2	0.0	0.0	0.0	0.0	0.0
24	Lai Chau	21.4	23.8	0.0	0.0	21.4	23.8	0.0	0.0	26.0	24.5	0.0	0.0	26.0	24.5	0.0	0.0	0.0	0.0	0.0
25	Hoa Binh	23.9	41.9	0.0	0.0	23.9	42.7	0.0	0.0	29.0	37.8	0.0	0.0	29.0	39.1	0.0	0.0	0.0	0.0	0.0
26	Thanh Hoa	0.0	491.7	0.0	0.0	0.0	516.2	0.0	0.0	0.0	1288.7	0.0	0.0	0.0	1564.7	0.0	0.0	0.0	0.0	0.0
27	Nghe An	0.0	131.1	0.0	0.0	0.0	131.6	0.0	0.0	0.0	130.3	0.0	0.0	0.0	131.3	0.0	0.0	0.0	0.0	0.0
28	Ha Tinh	3.1	60.3	0.0	0.0	3.1	60.4	0.0	0.0	3.8	770.3	0.0	0.0	3.8	943.7	0.0	0.0	0.0	0.0	0.0
29	Quang Binh	0.0	57.7	0.0	0.0	0.0	59.5	0.0	0.0	0.0	288.3	0.0	0.0	0.0	350.1	0.0	0.0	0.0	0.0	0.0
30	Quang Tri	0.0	20.5	0.0	0.0	0.0	20.5	0.0	0.0	0.0	81.3	0.0	0.0	0.0	96.2	0.0	0.0	0.0	0.0	0.0
31	Thua Thien - Hue	0.0	43.6	0.0	0.0	0.0	44.5	0.0	0.0	0.0	98.9	0.0	0.0	0.0	117.8	0.0	0.0	0.0	0.0	0.0
32	Quang Nam	0.0	53.2	0.0	0.0	0.0	53.2	0.0	0.0	0.0	50.8	0.0	0.0	0.0	50.8	0.0	0.0	0.0	0.0	0.0
33	Da Nang	0.0	9.9	0.0	0.0	0.0	9.9	0.0	0.0	0.0	8.3	0.0	0.0	0.0	8.3	0.0	0.0	0.0	0.0	0.0
34	Quang Ngai	0.0	51.5	0.0	0.0	0.0	51.5	0.0	0.0	0.0	52.3	0.0	0.0	0.0	52.3	0.0	0.0	0.0	0.0	0.0
35	Binh Dinh	0.0	54.7	0.0	0.0	0.0	54.7	0.0	0.0	0.0	54.3	0.0	0.0	0.0	54.3	0.0	0.0	0.0	0.0	0.0
36	Phu Yen	0.0	28.5	0.0	0.0	0.0	28.5	0.0	0.0	0.0	28.0	0.0	0.0	0.0	28.0	0.0	0.0	0.0	0.0	0.0
37	Khanh Hoa	0.0	25.9	0.0	0.0	0.0	25.9	0.0	0.0	0.0	23.4	0.0	0.0	0.0	23.4	0.0	0.0	0.0	0.0	0.0
38	Kon Tum	0.0	8.9	0.0	0.0	0.0	8.9	0.0	0.0	0.0	8.0	0.0	0.0	0.0	8.0	0.0	0.0	0.0	0.0	0.0
39	Gia Lai	0.0	34.5	0.0	0.0	0.0	34.5	0.0	0.0	0.0	39.8	0.0	0.0	0.0	39.8	0.0	0.0	0.0	0.0	0.0
40	Dac Lac	0.0	64.0	0.0	0.0	0.0	64.0	0.0	0.0	0.0	70.8	0.0	0.0	0.0	70.8	0.0	0.0	0.0	0.0	0.0
41	Ho Chi Minh	0.0	28.6	0.0	0.0	0.0	28.6	0.0	0.0	0.0	23.7	0.0	0.0	0.0	23.7	0.0	0.0	0.0	0.0	0.0
42	Lam Dong	0.0	30.6	0.0	0.0	0.0	30.6	0.0	0.0	0.0	39.0	0.0	0.0	0.0	39.0	0.0	0.0	0.0	0.0	0.0
43	Ninh Thuan	0.0	17.4	0.0	0.0	0.0	17.4	0.0	0.0	0.0	17.5	0.0	0.0	0.0	17.5	0.0	0.0	0.0	0.0	0.0
44	Binh Phuoc	0.0	25.0	0.0	0.0	0.0	25.0	0.0	0.0	0.0	27.0	0.0	0.0	0.0	27.0	0.0	0.0	0.0	0.0	0.0
45	Tay Ninh	0.0	38.7	0.0	0.0	0.0	38.7	0.0	0.0	0.0	40.3	0.0	0.0	0.0	40.3	0.0	0.0	0.0	0.0	0.0
46	Binh Duong	0.0	20.9	0.0	0.0	0.0	20.9	0.0	0.0	0.0	16.2	0.0	0.0	0.0	16.2	0.0	0.0	0.0	0.0	0.0
47	Dong Nai	0.0	73.8	0.0	0.0	0.0	73.8	0.0	0.0	0.0	76.5	0.0	0.0	0.0	76.5	0.0	0.0	0.0	0.0	0.0
48	Binh Thuan	0.0	32.0	0.0	0.0	0.0	32.0	0.0	0.0	0.0	30.4	0.0	0.0	0.0	30.4	0.0	0.0	0.0	0.0	0.0
49	Ba Ria - Vung Tau	0.0	1417.9	0.0	0.0	0.0	1518.9	0.0	0.0	0.0	1221.9	0.0	0.0	0.0	1515.6	0.0	0.0	0.0	0.0	0.0
50	Long An	0.0	52.0	0.0	0.0	0.0	52.0	0.0	0.0	0.0	49.8	0.0	0.0	0.0	49.8	0.0	0.0	0.0	0.0	0.0
51	Dong Thap	0.0	63.2	0.0	0.0	0.0	63.2	0.0	0.0	0.0	67.1	0.0	0.0	0.0	67.1	0.0	0.0	0.0	0.0	0.0
52	An Giang	0.0	81.6	0.0	0.0	0.0	81.6	0.0	0.0	0.0	119.3	0.0	0.0	0.0	119.3	0.0	0.0	0.0	0.0	0.0
53	Tien Giang	0.0	66.3	0.0	0.0	0.0	66.3	0.0	0.0	0.0	66.7	0.0	0.0	0.0	66.7	0.0	0.0	0.0	0.0	0.0
54	Vinh Long	0.0	48.4	0.0	0.0	0.0	48.4	0.0	0.0	0.0	49.2	0.0	0.0	0.0	49.2	0.0	0.0	0.0	0.0	0.0
55	Ben Tre	0.0	62.0	0.0	0.0	0.0	62.0	0.0	0.0	0.0	63.9	0.0	0.0	0.0	63.9	0.0	0.0	0.0	0.0	0.0
56	Kien Giang	0.0	64.0	0.0	0.0	0.0	64.0	0.0	0.0	0.0	71.8	0.0	0.0	0.0	71.8	0.0	0.0	0.0	0.0	0.0
57	Can Tho	0.0	91.6	0.0	0.0	0.0	92.7	0.0	0.0	0.0	93.6	0.0	0.0	0.0	98.6	0.0	0.0	0.0	0.0	0.0
58	Tra Vinh	0.0	46.8	0.0	0.0	0.0	46.8	0.0	0.0	0.0	48.2	0.0	0.0	0.0	48.2	0.0	0.0	0.0	0.0	0.0
59	Soc Trang	0.0	51.8	0.0	0.0	0.0	51.8	0.0	0.0	0.0	52.1	0.0	0.0	0.0	52.1	0.0	0.0	0.0	0.0	0.0
60	Bac Lieu	0.0	31.0	0.0	0.0	0.0	31.0	0.0	0.0	0.0	31.3	0.0	0.0	0.0	31.3	0.0	0.0	0.0	0.0	0.0
61	Ca Mau	0.0	43.9	0.0	0.0	0.0	43.9	0.0	0.0	0.0	45.2	0.0	0.0	0.0	45.2	0.0	0.0	0.0	0.0	0.0

Table 3A-9 Coals and Other Mining Products

		2010								2020							
		Low				High				Low				High			
		production	consumption	import	export	production	consumption	import	export	production	consumption	import	export	production	consumption	import	export
1	Hanoi	0.0	833.7	0.0	0.0	0.0	962.0	0.0	0.0	0.0	1433.0	0.0	0.0	0.0	1892.8	0.0	0.0
2	Hai Phong	0.0	326.0	0.0	0.0	0.0	368.9	0.0	0.0	0.0	517.9	0.0	0.0	0.0	679.8	0.0	0.0
3	Hai Duong	0.0	213.3	0.0	0.0	0.0	237.6	0.0	0.0	0.0	388.3	0.0	0.0	0.0	500.5	0.0	0.0
4	Hung Yen	0.0	115.9	0.0	0.0	0.0	128.4	0.0	0.0	0.0	199.5	0.0	0.0	0.0	256.7	0.0	0.0
5	Thai Binh	0.0	250.2	0.0	0.0	0.0	278.7	0.0	0.0	0.0	433.5	0.0	0.0	0.0	559.3	0.0	0.0
6	Nam Dinh	0.0	260.2	0.0	0.0	0.0	295.6	0.0	0.0	0.0	485.2	0.0	0.0	0.0	636.2	0.0	0.0
7	Ninh Binh	0.0	78.8	0.0	0.0	0.0	86.6	0.0	0.0	0.0	136.5	0.0	0.0	0.0	173.7	0.0	0.0
8	Ha Nam	0.0	93.8	0.0	0.0	0.0	105.5	0.0	0.0	0.0	168.3	0.0	0.0	0.0	219.2	0.0	0.0
9	Ha Tay	0.0	246.1	0.0	0.0	0.0	272.2	0.0	0.0	0.0	424.1	0.0	0.0	0.0	542.8	0.0	0.0
10	Cao Bang	0.0	41.7	0.0	0.0	0.0	45.4	0.0	0.0	0.0	70.8	0.0	0.0	0.0	87.8	0.0	0.0
11	Lang Son	0.0	61.9	0.0	0.0	0.0	67.9	0.0	0.0	0.0	106.2	0.0	0.0	0.0	132.5	0.0	0.0
12	Quang Ninh	0.0	174.9	0.0	0.0	0.0	199.5	0.0	0.0	0.0	288.1	1100.0	0.0	0.0	376.4	1780.0	0.0
13	Thai Nguyen	0.0	69.5	0.0	0.0	0.0	76.0	0.0	0.0	0.0	117.1	0.0	0.0	0.0	147.1	0.0	0.0
14	Bac Can	0.0	15.3	0.0	0.0	0.0	16.1	0.0	0.0	0.0	28.3	0.0	0.0	0.0	33.6	0.0	0.0
15	Bac Ninh	0.0	138.3	0.0	0.0	0.0	153.1	0.0	0.0	0.0	223.0	0.0	0.0	0.0	285.1	0.0	0.0
16	Bac Giang	0.0	114.5	0.0	0.0	0.0	124.7	0.0	0.0	0.0	180.4	0.0	0.0	0.0	223.3	0.0	0.0
17	Phu Tho	0.0	146.2	0.0	0.0	0.0	163.6	0.0	0.0	0.0	265.8	0.0	0.0	0.0	341.3	0.0	0.0
18	Vinh Phuc	0.0	78.1	0.0	0.0	0.0	87.9	0.0	0.0	0.0	135.8	0.0	0.0	0.0	175.3	0.0	0.0
19	Lao Cai	0.0	56.8	0.0	0.0	0.0	62.3	0.0	0.0	0.0	105.1	0.0	0.0	0.0	131.3	0.0	0.0
20	Yen Bai	0.0	50.1	0.0	0.0	0.0	53.8	0.0	0.0	0.0	92.1	0.0	0.0	0.0	113.5	0.0	0.0
21	Tuyen Quang	0.0	58.3	0.0	0.0	0.0	64.1	0.0	0.0	0.0	100.0	0.0	0.0	0.0	124.8	0.0	0.0
22	Ha Giang	0.0	29.8	0.0	0.0	0.0	31.9	0.0	0.0	0.0	52.8	0.0	0.0	0.0	64.3	0.0	0.0
23	Son La	0.0	56.3	0.0	0.0	0.0	59.1	0.0	0.0	0.0	92.5	0.0	0.0	0.0	109.7	0.0	0.0
24	Lai Chau	0.0	60.4	0.0	0.0	0.0	66.1	0.0	0.0	0.0	111.0	0.0	0.0	0.0	139.2	0.0	0.0
25	Hoa Binh	0.0	56.5	0.0	0.0	0.0	61.3	0.0	0.0	0.0	90.9	0.0	0.0	0.0	112.5	0.0	0.0
26	Thanh Hoa	0.0	365.3	0.0	0.0	0.0	411.3	0.0	0.0	0.0	631.5	0.0	0.0	0.0	817.7	0.0	0.0
27	Nghe An	0.0	293.5	0.0	0.0	0.0	331.0	0.0	0.0	0.0	505.3	0.0	0.0	0.0	655.3	0.0	0.0
28	Ha Tinh	0.0	116.0	0.0	0.0	0.0	129.1	0.0	0.0	0.0	192.8	0.0	0.0	0.0	246.2	0.0	0.0
29	Quang Binh	0.0	79.0	0.0	0.0	0.0	88.9	0.0	0.0	0.0	137.3	0.0	0.0	0.0	177.1	0.0	0.0
30	Quang Tri	0.0	44.8	0.0	0.0	0.0	49.7	0.0	0.0	0.0	75.7	0.0	0.0	0.0	96.0	0.0	0.0
31	Thua Thien - Hue	0.0	132.0	0.0	0.0	0.0	151.7	0.0	0.0	0.0	213.5	0.0	0.0	0.0	278.9	0.0	0.0
32	Quang Nam	0.0	141.9	0.0	0.0	0.0	158.9	0.0	0.0	0.0	203.6	0.0	0.0	0.0	259.5	0.0	0.0
33	Da Nang	0.0	198.4	0.0	0.0	0.0	230.7	0.0	0.0	0.0	385.7	0.0	0.0	0.0	513.2	0.0	0.0
34	Quang Ngai	12000.0	13351.2	0.0	0.0	12000.0	13374.7	0.0	0.0	12000.0	13463.2	0.0	0.0	12000.0	13549.0	0.0	0.0
35	Binh Dinh	0.0	173.8	0.0	0.0	0.0	197.4	0.0	0.0	0.0	289.2	0.0	0.0	0.0	375.8	0.0	0.0
36	Phu Yen	0.0	95.1	0.0	0.0	0.0	107.3	0.0	0.0	0.0	161.7	0.0	0.0	0.0	208.9	0.0	0.0
37	Khanh Hoa	0.0	176.0	0.0	0.0	0.0	195.5	0.0	0.0	0.0	284.1	0.0	0.0	0.0	359.4	0.0	0.0
38	Kon Tum	0.0	31.3	0.0	0.0	0.0	35.6	0.0	0.0	0.0	53.3	0.0	0.0	0.0	69.2	0.0	0.0
39	Gia Lai	0.0	110.9	0.0	0.0	0.0	124.9	0.0	0.0	0.0	199.6	0.0	0.0	0.0	256.4	0.0	0.0
40	Dac Lac	0.0	239.9	0.0	0.0	0.0	266.3	0.0	0.0	0.0	424.6	0.0	0.0	0.0	536.1	0.0	0.0
41	Ho Chi Minh	300.0	2582.6	1235.0	0.0	300.0	2920.0	2951.0	0.0	300.0	4069.0	9924.0	0.0	300.0	5235.6	16043.0	0.0
42	Lam Dong	0.0	113.2	0.0	0.0	0.0	125.3	0.0	0.0	0.0	200.3	0.0	0.0	0.0	252.9	0.0	0.0
43	Ninh Thuan	0.0	62.1	0.0	0.0	0.0	67.3	0.0	0.0	0.0	107.5	0.0	0.0	0.0	133.0	0.0	0.0
44	Binh Phuoc	0.0	54.2	0.0	0.0	0.0	60.0	0.0	0.0	0.0	85.6	0.0	0.0	0.0	108.5	0.0	0.0
45	Tay Ninh	0.0	141.9	0.0	0.0	0.0	155.7	0.0	0.0	0.0	235.5	0.0	0.0	0.0	319.9	0.0	0.0
46	Binh Duong	0.0	267.9	0.0	0.0	0.0	297.4	0.0	0.0	0.0	514.2	0.0	0.0	0.0	656.6	0.0	0.0
47	Dong Nai	0.0	815.5	0.0	0.0	0.0	916.1	0.0	0.0	0.0	1536.8	0.0	0.0	0.0	1978.5	0.0	0.0
48	Binh Thuan	0.0	91.5	0.0	0.0	0.0	100.9	0.0	0.0	0.0	155.7	0.0	0.0	0.0	195.5	0.0	0.0
49	Ba Ria - Vung Tau	17000.0	664.9	0.0	3470.0	17000.0	739.9	0.0	3470.0	17000.0	1246.6	0.0	3470.0	17000.0	1594.4	0.0	3470.0
50	Long An	0.0	225.1	0.0	0.0	0.0	254.5	0.0	0.0	0.0	381.7	0.0	0.0	0.0	493.7	0.0	0.0
51	Dong Thap	0.0	172.3	0.0	0.0	0.0	188.3	0.0	0.0	0.0	277.9	0.0	0.0	0.0	347.4	0.0	0.0
52	An Giang	0.0	511.8	0.0	0.0	0.0	596.2	0.0	0.0	0.0	877.1	0.0	0.0	0.0	1166.4	0.0	0.0
53	Tien Giang	0.0	237.3	0.0	0.0	0.0	263.3	0.0	0.0	0.0	385.8	0.0	0.0	0.0	489.0	0.0	0.0
54	Vinh Long	0.0	158.8	0.0	0.0	0.0	174.1	0.0	0.0	0.0	252.3	0.0	0.0	0.0	315.9	0.0	0.0
55	Ben Tre	0.0	231.0	0.0	0.0	0.0	258.6	0.0	0.0	0.0	385.8	0.0	0.0	0.0	495.9	0.0	0.0
56	Kien Giang	0.0	405.6	0.0	0.0	0.0	457.2	0.0	0.0	0.0	688.1	0.0	0.0	0.0	885.7	0.0	0.0
57	Can Tho	0.0	475.5	0.0	0.0	0.0	548.4	0.0	0.0	0.0	845.6	0.0	0.0	0.0	1113.8	0.0	0.0
58	Tra Vinh	0.0	141.0	0.0	0.0	0.0	155.0	0.0	0.0	0.0	230.0	0.0	0.0	0.0	290.4	0.0	0.0
59	Soc Trang	0.0	169.5	0.0	0.0	0.0	184.4	0.0	0.0	0.0	284.3	0.0	0.0	0.0	354.2	0.0	0.0
60	Bac Lieu	0.0	121.0	0.0	0.0	0.0	135.1	0.0	0.0	0.0	196.7	0.0	0.0	0.0	250.6	0.0	0.0
61	Ca Mau	0.0	237.0	0.0	0.0	0.0	262.5	0.0	0.0	0.0	402.0	0.0	0.0	0.0	507.6	0.0	0.0

Table 3A-10 Petroleum Products

		2010								2020							
		Low				High				Low				High			
		production	consumption	import	export	production	consumption	import	export	production	consumption	import	export	production	consumption	import	export
1	Hanoi	31.7	226.7	0.0	0.0	31.7	226.7	0.0	0.0	52.8	264.1	0.0	0.0	52.8	264.1	0.0	0.0
2	Hai Phong	8.8	83.9	0.0	0.0	8.8	83.9	0.0	0.0	14.6	94.8	0.0	0.0	14.6	94.8	0.0	0.0
3	Hai Duong	9.2	55.4	0.0	0.0	9.2	55.4	0.0	0.0	15.4	69.8	0.0	0.0	15.4	69.8	0.0	0.0
4	Hung Yen	23.2	28.8	0.0	0.0	23.2	28.8	0.0	0.0	38.6	35.8	0.0	0.0	38.6	35.8	0.0	0.0
5	Thai Binh	26.8	54.9	0.0	0.0	26.8	54.9	0.0	0.0	44.7	78.0	0.0	0.0	44.7	78.0	0.0	0.0
6	Nam Dinh	19.8	48.7	0.0	0.0	19.8	48.7	0.0	0.0	32.9	88.8	0.0	0.0	32.9	88.8	0.0	0.0
7	Ninh Binh	15.8	17.9	0.0	0.0	15.8	17.9	0.0	0.0	26.4	24.2	0.0	0.0	26.4	24.2	0.0	0.0
8	Ha Nam	9.9	18.1	0.0	0.0	9.9	18.1	0.0	0.0	16.4	30.6	0.0	0.0	16.4	30.6	0.0	0.0
9	Ha Tay	39.3	53.8	0.0	0.0	39.3	53.8	0.0	0.0	65.4	75.7	0.0	0.0	65.4	75.7	0.0	0.0
10	Cao Bang	10.4	10.6	0.0	0.0	10.4	10.6	0.0	0.0	17.2	12.3	0.0	0.0	17.2	12.3	0.0	0.0
11	Lang Son	19.3	19.3	0.0	0.0	19.3	19.3	0.0	0.0	32.1	18.5	0.0	0.0	32.1	18.5	0.0	0.0
12	Quang Ninh	9.8	41.8	0.0	0.0	9.8	41.8	0.0	0.0	16.3	52.5	0.0	0.0	16.3	52.5	0.0	0.0
13	Thai Nguyen	64.6	24.9	0.0	0.0	64.6	24.9	0.0	0.0	107.5	20.5	0.0	0.0	107.5	20.5	0.0	0.0
14	Bac Can	2.8	3.8	0.0	0.0	2.8	3.8	0.0	0.0	4.7	4.7	0.0	0.0	4.7	4.7	0.0	0.0
15	Bac Ninh	6.8	23.1	0.0	0.0	6.8	23.1	0.0	0.0	11.3	39.8	0.0	0.0	11.3	39.8	0.0	0.0
16	Bac Giang	28.7	30.3	0.0	0.0	28.7	30.3	0.0	0.0	47.7	31.2	0.0	0.0	47.7	31.2	0.0	0.0
17	Phu Tho	57.8	31.6	0.0	0.0	57.8	31.6	0.0	0.0	96.2	47.6	0.0	0.0	96.2	47.6	0.0	0.0
18	Vinh Phuc	13.0	24.2	0.0	0.0	13.0	24.2	0.0	0.0	21.6	24.5	0.0	0.0	21.6	24.5	0.0	0.0
19	Lao Cai	18.0	11.0	0.0	0.0	18.0	11.0	0.0	0.0	30.0	18.3	0.0	0.0	30.0	18.3	0.0	0.0
20	Yen Bai	58.6	14.6	0.0	0.0	58.6	14.6	0.0	0.0	97.6	15.8	0.0	0.0	97.6	15.8	0.0	0.0
21	Tuyen Quang	35.2	13.7	0.0	0.0	35.2	13.7	0.0	0.0	58.6	17.4	0.0	0.0	58.6	17.4	0.0	0.0
22	Ha Giang	34.1	6.9	0.0	0.0	34.1	6.9	0.0	0.0	56.9	9.0	0.0	0.0	56.9	9.0	0.0	0.0
23	Son La	24.6	13.9	0.0	0.0	24.6	13.9	0.0	0.0	41.0	15.3	0.0	0.0	41.0	15.3	0.0	0.0
24	Lai Chau	8.2	11.5	0.0	0.0	8.2	11.5	0.0	0.0	13.6	19.4	0.0	0.0	13.6	19.4	0.0	0.0
25	Hoa Binh	20.6	14.1	0.0	0.0	20.6	14.1	0.0	0.0	34.2	15.7	0.0	0.0	34.2	15.7	0.0	0.0
26	Thanh Hoa	122.7	86.6	0.0	0.0	122.7	86.6	0.0	0.0	204.3	114.1	0.0	0.0	204.3	114.1	0.0	0.0
27	Nghe An	105.2	67.1	0.0	0.0	105.2	67.1	0.0	0.0	175.2	91.4	0.0	0.0	175.2	91.4	0.0	0.0
28	Ha Tinh	40.7	29.2	0.0	0.0	40.7	29.2	0.0	0.0	67.7	34.3	0.0	0.0	67.7	34.3	0.0	0.0
29	Quang Binh	11.2	16.9	0.0	0.0	11.2	16.9	0.0	0.0	18.6	24.7	0.0	0.0	18.6	24.7	0.0	0.0
30	Quang Tri	12.3	13.6	0.0	0.0	12.3	13.6	0.0	0.0	20.4	13.4	0.0	0.0	20.4	13.4	0.0	0.0
31	Thua Thien - Hue	14.3	29.7	0.0	0.0	14.3	29.7	0.0	0.0	23.8	38.9	0.0	0.0	23.8	38.9	0.0	0.0
32	Quang Nam	37.2	32.4	0.0	0.0	37.2	32.4	0.0	0.0	62.0	36.2	0.0	0.0	62.0	36.2	0.0	0.0
33	Da Nang	5.6	35.8	0.0	214.0	5.6	35.8	0.0	214.0	9.4	71.6	0.0	444.0	9.4	71.6	0.0	444.0
34	Quang Ngai	79.9	26.7	0.0	0.0	79.9	26.7	0.0	0.0	133.1	48.7	0.0	0.0	133.1	48.7	0.0	0.0
35	Binh Dinh	137.7	37.8	0.0	214.0	137.7	37.8	0.0	214.0	229.3	52.4	0.0	444.0	229.3	52.4	0.0	444.0
36	Phu Yen	77.0	18.0	0.0	0.0	77.0	18.0	0.0	0.0	128.3	29.1	0.0	0.0	128.3	29.1	0.0	0.0
37	Khanh Hoa	23.0	45.5	0.0	642.0	23.0	45.5	0.0	642.0	38.4	50.1	0.0	1332.0	38.4	50.1	0.0	1332.0
38	Kon Tum	13.6	6.3	0.0	0.0	13.6	6.3	0.0	0.0	22.6	9.6	0.0	0.0	22.6	9.6	0.0	0.0
39	Gia Lai	106.8	22.3	0.0	0.0	106.8	22.3	0.0	0.0	177.8	35.8	0.0	0.0	177.8	35.8	0.0	0.0
40	Dac Lac	568.5	46.7	0.0	0.0	568.5	46.7	0.0	0.0	946.6	74.8	0.0	0.0	946.6	74.8	0.0	0.0
41	Ho Chi Minh	52.8	614.8	0.0	742.0	52.8	614.8	0.0	742.0	88.0	685.8	0.0	884.0	88.0	685.8	0.0	884.0
42	Lam Dong	261.3	22.5	0.0	0.0	261.3	22.5	0.0	0.0	435.2	35.3	0.0	0.0	435.2	35.3	0.0	0.0
43	Ninh Thuan	6.6	14.8	0.0	0.0	6.6	14.8	0.0	0.0	10.9	18.6	0.0	0.0	10.9	18.6	0.0	0.0
44	Binh Phuoc	82.2	14.0	0.0	0.0	82.2	14.0	0.0	0.0	136.8	15.1	0.0	0.0	136.8	15.1	0.0	0.0
45	Tay Ninh	294.5	33.0	0.0	0.0	294.5	33.0	0.0	0.0	490.3	44.6	0.0	0.0	490.3	44.6	0.0	0.0
46	Binh Duong	130.8	43.0	0.0	0.0	130.8	43.0	0.0	0.0	217.8	91.6	0.0	0.0	217.8	91.6	0.0	0.0
47	Dong Nai	216.2	106.5	0.0	0.0	216.2	106.5	0.0	0.0	360.0	276.0	0.0	0.0	360.0	276.0	0.0	0.0
48	Binh Thuan	33.6	21.6	0.0	0.0	33.6	21.6	0.0	0.0	55.9	27.3	0.0	0.0	55.9	27.3	0.0	0.0
49	Ba Ria - Vung Tau	52.2	184.5	0.0	318.0	52.2	184.5	0.0	318.0	86.9	222.4	0.0	1326.0	86.9	222.4	0.0	1326.0
50	Long An	132.3	43.9	0.0	0.0	132.3	43.9	0.0	0.0	220.3	68.9	0.0	0.0	220.3	68.9	0.0	0.0
51	Dong Thap	63.3	46.5	0.0	0.0	63.3	46.5	0.0	0.0	105.5	48.5	0.0	0.0	105.5	48.5	0.0	0.0
52	An Giang	85.6	79.6	0.0	0.0	85.6	79.6	0.0	0.0	142.5	162.7	0.0	0.0	142.5	162.7	0.0	0.0
53	Tien Giang	76.9	61.8	0.0	0.0	76.9	61.8	0.0	0.0	128.0	68.2	0.0	0.0	128.0	68.2	0.0	0.0
54	Vinh Long	255.7	36.8	0.0	0.0	255.7	36.8	0.0	0.0	425.7	44.1	0.0	0.0	425.7	44.1	0.0	0.0
55	Ben Tre	383.0	49.0	0.0	0.0	383.0	49.0	0.0	0.0	637.8	69.2	0.0	0.0	637.8	69.2	0.0	0.0
56	Kien Giang	92.7	62.4	0.0	0.0	92.7	62.4	0.0	0.0	154.4	123.6	0.0	0.0	154.4	123.6	0.0	0.0
57	Can Tho	296.8	73.5	0.0	0.0	296.8	73.5	0.0	0.0	494.2	155.4	0.0	0.0	494.2	155.4	0.0	0.0
58	Tra Vinh	296.9	35.8	0.0	0.0	296.9	35.8	0.0	0.0	494.4	40.5	0.0	0.0	494.4	40.5	0.0	0.0
59	Soc Trang	63.5	40.4	0.0	0.0	63.5	40.4	0.0	0.0	105.7	49.4	0.0	0.0	105.7	49.4	0.0	0.0
60	Bac Lieu	73.3	22.0	0.0	0.0	73.3	22.0	0.0	0.0	122.1	35.0	0.0	0.0	122.1	35.0	0.0	0.0
61	Ca Mau	285.2	43.8	0.0	0.0	285.2	43.8	0.0	0.0	474.8	70.8	0.0	0.0	474.8	70.8	0.0	0.0

Table 3A-11 Industrial Products

		2010								2020							
		Low				High				Low				High			
		production	consumption	import	export	production	consumption	import	export	production	consumption	import	export	production	consumption	import	export
1	Hanoi	1213.5	999.4	0.0	0.0	1301.1	1097.3	0.0	0.0	2066.1	1761.1	0.0	0.0	2303.0	2007.6	0.0	0.0
2	Hai Phong	471.1	390.8	908.0	796.0	505.2	420.8	1022.0	857.0	638.7	636.6	1383.0	1251.0	712.0	721.0	1784.0	1483.0
3	Hai Duong	302.5	255.7	0.0	0.0	324.3	271.0	0.0	0.0	550.7	477.2	0.0	0.0	613.8	530.9	0.0	0.0
4	Hung Yen	140.5	138.9	0.0	0.0	150.7	146.5	0.0	0.0	237.4	245.2	0.0	0.0	264.6	272.3	0.0	0.0
5	Thai Binh	282.8	299.9	0.0	0.0	303.2	317.9	0.0	0.0	496.7	532.8	0.0	0.0	553.7	593.2	0.0	0.0
6	Nam Dinh	312.4	311.9	0.0	0.0	335.0	337.1	0.0	0.0	560.6	596.4	0.0	0.0	624.9	674.7	0.0	0.0
7	Ninh Binh	113.4	94.5	0.0	0.0	121.6	98.8	0.0	0.0	196.8	167.8	0.0	0.0	219.3	184.2	0.0	0.0
8	Ha Nam	115.0	112.5	0.0	0.0	123.3	120.4	0.0	0.0	193.6	206.8	0.0	0.0	215.8	232.5	0.0	0.0
9	Ha Tay	352.6	295.0	0.0	0.0	378.0	310.5	0.0	0.0	599.6	521.2	0.0	0.0	668.4	575.7	0.0	0.0
10	Cao Bang	18.9	50.0	0.0	0.0	20.2	51.8	0.0	0.0	36.4	87.0	0.0	0.0	40.6	93.2	0.0	0.0
11	Lang Son	31.8	74.2	0.0	0.0	34.1	77.5	0.0	0.0	62.9	130.5	0.0	0.0	70.1	140.5	0.0	0.0
12	Quang Ninh	255.9	209.7	2721.0	2384.0	274.4	227.6	3064.0	2568.0	406.3	354.1	5534.0	5006.0	452.9	399.3	7133.0	5934.0
13	Thai Nguyen	73.6	83.3	0.0	0.0	78.9	86.7	0.0	0.0	141.7	143.9	0.0	0.0	157.9	156.0	0.0	0.0
14	Bac Can	9.2	18.3	0.0	0.0	9.8	18.4	0.0	0.0	19.8	34.8	0.0	0.0	22.1	35.6	0.0	0.0
15	Bac Ninh	203.5	165.7	0.0	0.0	218.2	174.6	0.0	0.0	335.5	274.1	0.0	0.0	373.9	302.4	0.0	0.0
16	Bac Giang	129.5	137.3	0.0	0.0	138.9	142.2	0.0	0.0	206.9	221.7	0.0	0.0	230.6	236.9	0.0	0.0
17	Phu Tho	183.8	175.2	0.0	0.0	197.1	186.6	0.0	0.0	346.2	326.6	0.0	0.0	385.9	362.0	0.0	0.0
18	Vinh Phuc	46.4	93.6	0.0	0.0	49.8	100.3	0.0	0.0	85.3	167.0	0.0	0.0	95.1	186.0	0.0	0.0
19	Lao Cai	48.2	68.1	0.0	0.0	51.7	71.1	0.0	0.0	99.2	129.1	0.0	0.0	110.5	139.3	0.0	0.0
20	Yen Bai	57.4	60.0	0.0	0.0	61.5	61.4	0.0	0.0	126.1	113.2	0.0	0.0	140.5	120.4	0.0	0.0
21	Tuyen Quang	46.2	69.9	0.0	0.0	49.5	73.2	0.0	0.0	89.8	122.9	0.0	0.0	100.1	132.4	0.0	0.0
22	Ha Giang	20.9	35.7	0.0	0.0	22.4	36.4	0.0	0.0	42.1	64.9	0.0	0.0	46.9	68.2	0.0	0.0
23	Son La	32.8	67.4	0.0	0.0	35.2	67.4	0.0	0.0	55.3	113.7	0.0	0.0	61.6	116.3	0.0	0.0
24	Lai Chau	77.9	72.4	0.0	0.0	83.6	75.3	0.0	0.0	150.3	136.4	0.0	0.0	167.5	147.6	0.0	0.0
25	Ho Binh	58.4	67.7	0.0	0.0	62.6	69.9	0.0	0.0	95.0	111.8	0.0	0.0	105.9	119.3	0.0	0.0
26	Thanh Hoa	336.4	437.9	0.0	0.0	360.7	469.2	0.0	0.0	569.7	776.1	0.0	0.0	635.0	867.3	0.0	0.0
27	Nghe An	195.1	351.8	341.0	305.0	209.1	377.6	389.0	327.0	343.4	621.0	802.0	791.0	382.7	695.1	1039.0	933.0
28	Ha Tinh	58.0	139.0	0.0	0.0	62.2	147.2	0.0	0.0	97.0	236.9	0.0	0.0	108.1	261.1	0.0	0.0
29	Quang Binh	56.5	94.7	0.0	0.0	60.6	101.4	0.0	0.0	90.7	168.8	0.0	0.0	101.1	187.9	0.0	0.0
30	Quang Tri	17.0	53.7	0.0	0.0	18.3	56.7	0.0	0.0	27.4	93.1	0.0	0.0	30.5	101.9	0.0	0.0
31	Thua Thien - Hue	85.2	158.3	0.0	0.0	91.4	173.0	0.0	0.0	118.6	262.4	0.0	0.0	132.2	295.8	0.0	0.0
32	Quang Nam	136.3	170.1	0.0	0.0	146.1	181.3	0.0	0.0	208.0	250.2	0.0	0.0	231.8	275.3	0.0	0.0
33	Da Nang	231.9	237.8	1021.0	916.0	248.7	263.1	1165.0	982.0	441.4	474.0	2406.0	2376.0	492.0	544.3	3116.0	2799.0
34	Quang Ngai	98.3	181.2	0.0	0.0	105.4	199.2	0.0	0.0	177.4	323.5	0.0	0.0	197.8	370.1	0.0	0.0
35	Binh Dinh	72.9	208.4	171.0	153.0	78.2	225.2	194.0	164.0	121.7	355.5	401.6	396.0	135.6	398.6	519.0	467.0
36	Phu Yen	87.6	114.0	0.0	0.0	94.0	122.4	0.0	0.0	152.4	198.8	0.0	0.0	169.9	221.6	0.0	0.0
37	Khanh Hoa	119.6	211.0	170.0	152.0	128.2	223.0	194.0	164.0	200.6	349.2	400.0	396.0	223.6	381.2	520.0	466.0
38	Kon Tum	19.0	37.5	0.0	0.0	20.3	40.6	0.0	0.0	31.4	65.6	0.0	0.0	35.0	73.4	0.0	0.0
39	Gia Lai	103.5	133.0	0.0	0.0	111.0	142.5	0.0	0.0	201.4	245.3	0.0	0.0	224.5	271.9	0.0	0.0
40	Duc Lac	114.2	287.5	0.0	0.0	122.5	303.7	0.0	0.0	219.7	521.8	0.0	0.0	244.8	568.6	0.0	0.0
41	Ho Chi Minh	3716.8	2712.2	4364.0	3964.0	3985.2	2954.4	5019.0	4260.0	6127.3	4607.5	3900.0	3353.0	6829.7	5213.7	5361.0	3937.0
42	Lam Dong	82.6	135.7	0.0	0.0	88.6	142.9	0.0	0.0	161.8	246.2	0.0	0.0	180.3	268.2	0.0	0.0
43	Ninh Thuan	55.1	74.5	0.0	0.0	59.1	76.7	0.0	0.0	108.4	132.2	0.0	0.0	120.8	141.0	0.0	0.0
44	Binh Phuoc	16.1	65.0	0.0	0.0	17.2	68.5	0.0	0.0	30.0	105.1	0.0	0.0	33.4	115.1	0.0	0.0
45	Tay Ninh	171.9	170.1	0.0	0.0	184.3	177.6	0.0	0.0	376.7	311.5	0.0	0.0	419.9	339.3	0.0	0.0
46	Binh Duong	491.4	321.1	0.0	0.0	526.9	339.2	0.0	0.0	943.7	631.9	0.0	0.0	1051.9	696.4	0.0	0.0
47	Dong Nai	1426.5	977.6	0.0	0.0	1529.5	1044.9	0.0	0.0	2776.2	1888.8	0.0	0.0	3094.4	2098.5	0.0	0.0
48	Binh Thuan	56.5	109.7	0.0	0.0	60.6	115.1	0.0	0.0	110.6	191.4	0.0	0.0	123.3	207.4	0.0	0.0
49	Ba Ria - Vung Tau	1388.2	797.0	1504.0	1367.0	1488.5	843.9	1730.0	1470.0	2609.2	1532.1	6885.0	5749.0	2908.3	1691.2	9191.0	6748.0
50	Long An	130.0	269.9	0.0	0.0	139.4	290.3	0.0	0.0	245.0	469.1	0.0	0.0	273.1	523.7	0.0	0.0
51	Dong Thap	90.2	206.5	0.0	0.0	96.7	214.8	0.0	0.0	170.2	341.5	0.0	0.0	189.7	368.5	0.0	0.0
52	An Giang	261.8	613.5	0.0	0.0	280.7	680.1	0.0	0.0	476.4	1078.0	0.0	0.0	531.0	1237.2	0.0	0.0
53	Tien Giang	103.9	284.5	0.0	0.0	111.5	300.4	0.0	0.0	193.6	474.2	0.0	0.0	215.8	518.7	0.0	0.0
54	Vinh Long	96.8	190.4	0.0	0.0	103.7	198.6	0.0	0.0	164.7	310.1	0.0	0.0	183.5	335.1	0.0	0.0
55	Ben Tre	140.6	276.9	0.0	0.0	150.7	295.0	0.0	0.0	253.3	474.1	0.0	0.0	282.3	525.9	0.0	0.0
56	Kien Giang	413.3	486.3	0.0	0.0	443.2	521.5	0.0	0.0	726.4	845.7	0.0	0.0	809.6	939.4	0.0	0.0
57	Can Tho	419.5	570.0	150.0	137.0	449.7	625.5	175.0	147.0	796.8	1039.3	557.0	479.0	888.2	1181.3	766.0	562.0
58	Tra Vinh	75.2	169.1	0.0	0.0	80.7	176.8	0.0	0.0	139.8	282.7	0.0	0.0	155.9	308.0	0.0	0.0
59	Soc Trang	136.7	203.1	0.0	0.0	146.5	210.4	0.0	0.0	263.2	349.4	0.0	0.0	293.4	375.7	0.0	0.0
60	Bac Lieu	109.7	145.1	0.0	0.0	117.6	154.2	0.0	0.0	208.6	241.7	0.0	0.0	232.5	265.8	0.0	0.0
61	Ca Mau	202.8	284.0	0.0	0.0	217.5	299.4	0.0	0.0	396.0	494.0	0.0	0.0	441.4	538.4	0.0	0.0

		2010								2020							
		Low				High				Low				High			
		production	consumption	import	export	production	consumption	import	export	production	consumption	import	export	production	consumption	import	export
1	Ha Noi	14181.8	38554.2	0.0	0.0	14181.8	38554.2	0.0	0.0	16962.7	48469.1	0.0	0.0	19659.2	55649.7	0.0	0.0
2	Hai Phong	55257.9	25597.5	0.0	0.0	55257.9	25597.5	0.0	0.0	66093.3	29694.6	0.0	0.0	74262.2	34093.8	0.0	0.0
3	Hai Duong	16871.6	26252.8	0.0	0.0	16871.6	26252.8	0.0	0.0	20179.9	30716.6	0.0	0.0	22674.0	35267.2	0.0	0.0
4	Hung Yen	10850.3	16773.9	0.0	0.0	10850.3	16773.9	0.0	0.0	12977.9	19618.2	0.0	0.0	14581.9	22524.6	0.0	0.0
5	Thai Binh	51658.8	27669.2	0.0	0.0	51658.8	27669.2	0.0	0.0	61788.5	32173.2	0.0	0.0	69425.3	36939.6	0.0	0.0
6	Nam Dinh	46339.3	29547.5	0.0	0.0	46339.3	29547.5	0.0	0.0	55425.9	34703.1	0.0	0.0	62276.3	39844.3	0.0	0.0
7	Ninh Binh	8378.3	14233.9	0.0	0.0	8378.3	14233.9	0.0	0.0	10021.2	16864.2	0.0	0.0	11259.8	19362.6	0.0	0.0
8	Ha Nam	5979.9	12750.4	0.0	0.0	5979.9	12750.4	0.0	0.0	7152.5	14442.3	0.0	0.0	8036.6	16581.9	0.0	0.0
9	Ha Tay	22387.5	36936.6	0.0	0.0	22387.5	36936.6	0.0	0.0	26777.4	43644.2	0.0	0.0	30087.0	50110.0	0.0	0.0
10	Cao Bang	177.4	4719.4	0.0	0.0	177.4	4719.4	0.0	0.0	212.2	4811.3	0.0	0.0	238.4	6291.7	0.0	0.0
11	Lang Son	251.2	5788.6	0.0	0.0	251.2	5788.6	0.0	0.0	300.4	5666.1	0.0	0.0	337.5	7409.5	0.0	0.0
12	Quang Ninh	36314.2	10335.5	0.0	0.0	36314.2	10335.5	0.0	0.0	43435.0	11994.5	0.0	0.0	48803.4	15685.1	0.0	0.0
13	Thai Nguyen	2558.8	7839.8	0.0	0.0	2558.8	7839.8	0.0	0.0	3060.5	7693.4	0.0	0.0	3438.8	10060.6	0.0	0.0
14	Bac Can	511.4	2690.2	0.0	0.0	511.4	2690.2	0.0	0.0	611.7	2727.4	0.0	0.0	687.3	3566.6	0.0	0.0
15	Bac Ninh	9925.7	8031.5	0.0	0.0	9925.7	8031.5	0.0	0.0	11872.0	8255.7	0.0	0.0	13339.3	10795.9	0.0	0.0
16	Bac Giang	12475.0	11712.9	0.0	0.0	12475.0	11712.9	0.0	0.0	14921.2	11736.4	0.0	0.0	16765.4	15347.6	0.0	0.0
17	Phu Tho	11836.5	12176.5	0.0	0.0	11836.5	12176.5	0.0	0.0	14157.5	12992.2	0.0	0.0	15907.3	16998.8	0.0	0.0
18	Vinh Phuc	13134.5	9308.8	0.0	0.0	13134.5	9308.8	0.0	0.0	15710.1	9667.5	0.0	0.0	17651.8	12642.1	0.0	0.0
19	Lao Cai	885.8	5241.9	0.0	0.0	885.8	5241.9	0.0	0.0	1059.5	5476.9	0.0	0.0	1190.4	7162.1	0.0	0.0
20	Yen Bai	1155.4	6779.1	0.0	0.0	1155.4	6779.1	0.0	0.0	1382.0	7332.7	0.0	0.0	1552.8	9588.9	0.0	0.0
21	Tuyen Quang	2183.3	6656.3	0.0	0.0	2183.3	6656.3	0.0	0.0	2611.4	7243.6	0.0	0.0	2934.1	9472.4	0.0	0.0
22	Ha Giang	1402.0	5392.5	0.0	0.0	1402.0	5392.5	0.0	0.0	1677.0	5887.7	0.0	0.0	1884.2	7699.3	0.0	0.0
23	Son La	6213.0	7368.4	0.0	0.0	6213.0	7368.4	0.0	0.0	7431.3	7716.2	0.0	0.0	8349.7	10094.0	0.0	0.0
24	Lai Chau	867.6	5089.3	0.0	0.0	867.6	5089.3	0.0	0.0	1037.8	5378.1	0.0	0.0	1166.0	7032.9	0.0	0.0
25	Hoa Binh	2285.2	7164.6	0.0	0.0	2285.2	7164.6	0.0	0.0	2733.3	7435.4	0.0	0.0	3071.1	9723.2	0.0	0.0
26	Thanh Hoa	69570.3	73531.7	0.0	0.0	69570.3	73531.7	0.0	0.0	83212.2	88841.8	0.0	0.0	93496.9	98343.6	0.0	0.0
27	Nghe An	59184.7	59685.7	0.0	0.0	59184.7	59685.7	0.0	0.0	70790.2	73105.8	0.0	0.0	79539.6	80924.6	0.0	0.0
28	Ha Tinh	32105.6	28051.5	0.0	0.0	32105.6	28051.5	0.0	0.0	38401.1	33706.8	0.0	0.0	43147.3	37311.8	0.0	0.0
29	Quang Binh	27868.5	17002.2	0.0	0.0	27868.5	17002.2	0.0	0.0	33333.2	20968.3	0.0	0.0	37453.0	23210.9	0.0	0.0
30	Quang Tri	19984.4	11594.5	0.0	0.0	19984.4	11594.5	0.0	0.0	23903.1	14296.2	0.0	0.0	26857.4	15825.2	0.0	0.0
31	Thua Thien - Hue	29143.7	21598.0	0.0	0.0	29143.7	21598.0	0.0	0.0	34858.5	26024.8	0.0	0.0	39166.9	28808.2	0.0	0.0
32	Quang Nam	58348.2	57542.5	0.0	0.0	58348.2	57542.5	0.0	0.0	69789.7	64094.6	0.0	0.0	78415.4	67468.0	0.0	0.0
33	Da Nang	39452.5	36512.2	0.0	0.0	39452.5	36512.2	0.0	0.0	47188.7	46344.8	0.0	0.0	53021.0	48784.0	0.0	0.0
34	Quang Ngai	88480.0	53216.4	0.0	0.0	88480.0	53216.4	0.0	0.0	105830.0	62137.6	0.0	0.0	118910.1	65408.0	0.0	0.0
35	Binh Dinh	115781.3	63837.7	0.0	86.0	115781.3	63837.7	0.0	86.0	138484.7	74240.6	0.0	97.0	155600.8	78148.0	0.0	124.0
36	Phu Yen	54405.1	33986.8	0.0	0.0	54405.1	33986.8	0.0	0.0	65073.4	39588.4	0.0	0.0	73116.2	41672.0	0.0	0.0
37	Khanh Hoa	98832.1	43550.3	0.0	86.0	98832.1	43550.3	0.0	86.0	118212.0	51512.8	0.0	97.0	132822.5	54234.0	0.0	123.0
38	Kon Tum	556.9	4164.1	0.0	0.0	556.9	4164.1	0.0	0.0	666.1	4866.8	0.0	0.0	748.4	5587.8	0.0	0.0
39	Gia Lai	317.8	14945.9	0.0	0.0	317.8	14945.9	0.0	0.0	380.1	19377.9	0.0	0.0	427.1	22248.7	0.0	0.0
40	Dac Lac	7562.2	25028.6	0.0	0.0	7562.2	25028.6	0.0	0.0	9045.1	32498.6	0.0	0.0	10163.0	37313.2	0.0	0.0
41	Ho Chi Minh	77786.3	211219.4	0.0	447.0	77786.3	211219.4	0.0	447.0	93039.4	263528.7	0.0	272.0	104538.6	278008.3	0.0	346.0
42	Lam Dong	4150.3	41755.4	0.0	0.0	4150.3	41755.4	0.0	0.0	4964.1	58163.6	0.0	0.0	5577.7	61359.4	0.0	0.0
43	Ninh Thuan	54751.6	21207.2	0.0	0.0	54751.6	21207.2	0.0	0.0	65487.8	26524.7	0.0	0.0	73581.8	27982.1	0.0	0.0
44	Binh Phuoc	2931.8	26316.6	0.0	0.0	2931.8	26316.6	0.0	0.0	3506.7	32989.3	0.0	0.0	3940.2	34801.9	0.0	0.0
45	Tay Ninh	5323.3	39278.3	0.0	0.0	5323.3	39278.3	0.0	0.0	6367.1	47702.2	0.0	0.0	7154.0	50323.2	0.0	0.0
46	Binh Duong	785.0	30639.5	0.0	0.0	785.0	30639.5	0.0	0.0	938.9	39046.3	0.0	0.0	1055.0	41191.7	0.0	0.0
47	Dong Nai	21649.7	97583.3	0.0	0.0	21649.7	97583.3	0.0	0.0	25894.9	125776.6	0.0	0.0	29095.4	132687.4	0.0	0.0
48	Binh Thuan	209337.3	38974.7	0.0	0.0	209337.3	38974.7	0.0	0.0	250386.0	46104.2	0.0	0.0	281332.6	48637.4	0.0	0.0
49	Ba Ria - Vung Tau	185603.9	38474.4	0.0	103.0	185603.9	38474.4	0.0	103.0	221998.7	50701.6	0.0	232.0	249436.7	53487.4	0.0	297.0
50	Long An	35572.0	75366.4	0.0	0.0	35572.0	75366.4	0.0	0.0	42547.3	87364.0	0.0	0.0	47806.0	90996.6	0.0	0.0
51	Dong Thap	111283.0	88347.6	0.0	0.0	111283.0	88347.6	0.0	0.0	133104.4	106469.4	0.0	0.0	149555.5	110894.4	0.0	0.0
52	An Giang	218664.8	116725.0	0.0	0.0	218664.8	116725.0	0.0	0.0	261542.6	186459.7	0.0	0.0	295868.0	194212.7	0.0	0.0
53	Tien Giang	135834.5	93738.8	0.0	0.0	135834.5	93738.8	0.0	0.0	162470.2	109615.1	0.0	0.0	182550.7	114172.9	0.0	0.0
54	Vinh Long	30696.6	65117.6	0.0	0.0	30696.6	65117.6	0.0	0.0	36715.8	76099.0	0.0	0.0	41253.7	79263.2	0.0	0.0
55	Ben Tre	174057.8	78011.4	0.0	0.0	174057.8	78011.4	0.0	0.0	208188.6	91957.6	0.0	0.0	233919.8	95781.2	0.0	0.0
56	Kien Giang	386571.0	96774.8	0.0	0.0	386571.0	96774.8	0.0	0.0	462373.2	124482.8	0.0	0.0	519520.5	129658.8	0.0	0.0
57	Can Tho	36689.1	111292.4	0.0	138.0	36689.1	111292.4	0.0	138.0	43883.5	129764.2	0.0	272.0	49307.3	135159.8	0.0	346.0
58	Tra Vinh	122995.3	58834.0	0.0	0.0	122995.3	58834.0	0.0	0.0	147113.3	69615.1	0.0	0.0	165295.9	72509.7	0.0	0.0
59	Soc Trang	73216.0	73646.0	0.0	0.0	73216.0	73646.0	0.0	0.0	87572.8	86315.5	0.0	0.0	98396.4	89904.5	0.0	0.0
60	Bac Lieu	94350.5	46363.4	0.0	0.0	94350.5	46363.4	0.0	0.0	112851.6	54444.4	0.0	0.0	126799.5	56708.2	0.0	0.0
61	Ca Mau	247417.2	64404.6	0.0	0.0	247417.2	64404.6	0.0	0.0	295932.9	76012.4	0.0	0.0	332508.9	79173.0	0.0	0.0

Table 3A-13 Fishery Products

		2010								2020							
		Low				High				Low				High			
		production	consumption	import	export	production	consumption	import	export	production	consumption	import	export	production	consumption	import	export
1	Hanoi	24152.5	50807.9	0.0	0.0	24152.5	50807.9	0.0	0.0	36714.8	82935.9	0.0	0.0	41252.5	92629.7	0.0	0.0
2	Hai Phong	31655.1	33733.1	0.0	62.0	31655.1	33733.1	0.0	62.0	48119.6	50810.8	0.0	61.0	54066.9	56749.7	0.0	71.0
3	Hai Duong	44652.1	34596.7	0.0	0.0	44652.1	34596.7	0.0	0.0	67876.5	52559.4	0.0	0.0	76265.7	58702.7	0.0	0.0
4	Hung Yen	27242.2	22105.1	0.0	0.0	27242.2	22105.1	0.0	0.0	41411.5	33568.9	0.0	0.0	46529.7	37492.6	0.0	0.0
5	Thai Binh	42937.1	36463.3	0.0	0.0	42937.1	36463.3	0.0	0.0	65269.5	55051.9	0.0	0.0	73336.5	61486.6	0.0	0.0
6	Nam Dinh	37773.7	38938.5	0.0	0.0	37773.7	38938.5	0.0	0.0	57420.5	59380.9	0.0	0.0	64517.5	66315.1	0.0	0.0
7	Ninh Binh	21077.4	18757.8	0.0	0.0	21077.4	18757.8	0.0	0.0	32040.2	28856.5	0.0	0.0	36000.2	32229.4	0.0	0.0
8	Ha Nam	19075.0	16802.8	0.0	0.0	19075.0	16802.8	0.0	0.0	28996.3	24712.4	0.0	0.0	32580.1	27600.8	0.0	0.0
9	Ha Tay	61832.5	48676.1	0.0	0.0	61832.5	48676.1	0.0	0.0	93992.8	74680.0	0.0	0.0	105609.9	83408.8	0.0	0.0
10	Cao Bang	22196.9	9970.5	0.0	0.0	22196.9	9970.5	0.0	0.0	33741.9	14952.0	0.0	0.0	37912.3	16358.4	0.0	0.0
11	Lang Son	23380.9	12229.5	0.0	0.0	23380.9	12229.5	0.0	0.0	35541.8	17608.3	0.0	0.0	39934.6	19264.6	0.0	0.0
12	Quang Ninh	20315.6	21835.5	0.0	0.0	20315.6	21835.5	0.0	0.0	30882.2	37275.1	0.0	0.0	34699.1	40781.1	0.0	0.0
13	Thai Nguyen	26528.8	16563.0	0.0	0.0	26528.8	16563.0	0.0	0.0	40326.9	23908.7	0.0	0.0	45311.1	26157.6	0.0	0.0
14	Bac Can	11873.6	5683.5	0.0	0.0	11873.6	5683.5	0.0	0.0	18049.3	8475.9	0.0	0.0	20280.1	9273.2	0.0	0.0
15	Bac Ninh	26559.3	16968.0	0.0	0.0	26559.3	16968.0	0.0	0.0	40373.3	25656.0	0.0	0.0	45363.3	28069.2	0.0	0.0
16	Bac Giang	50212.9	24745.5	0.0	0.0	50212.9	24745.5	0.0	0.0	76329.6	36473.1	0.0	0.0	85763.6	39903.8	0.0	0.0
17	Phu Tho	39541.1	25725.0	0.0	0.0	39541.1	25725.0	0.0	0.0	60107.2	40375.8	0.0	0.0	67536.2	44173.5	0.0	0.0
18	Vinh Phuc	35820.2	19666.5	0.0	0.0	35820.2	19666.5	0.0	0.0	54451.1	30043.5	0.0	0.0	61181.0	32869.3	0.0	0.0
19	Lao Cai	15345.0	11074.5	0.0	0.0	15345.0	11074.5	0.0	0.0	23326.2	17020.5	0.0	0.0	26209.2	18621.5	0.0	0.0
20	Yen Bai	20624.8	14322.0	0.0	0.0	20624.8	14322.0	0.0	0.0	31352.2	22787.6	0.0	0.0	35227.1	24931.0	0.0	0.0
21	Tuyen Quang	20167.7	14062.5	0.0	0.0	20167.7	14062.5	0.0	0.0	30657.3	22510.9	0.0	0.0	34446.5	24628.2	0.0	0.0
22	Ha Giang	17921.1	11392.5	0.0	0.0	17921.1	11392.5	0.0	0.0	27242.2	18297.2	0.0	0.0	30609.2	20018.2	0.0	0.0
23	Son La	27765.3	11415.8	0.0	0.0	27765.3	11415.8	0.0	0.0	42206.6	17687.8	0.0	0.0	47423.1	20893.0	0.0	0.0
24	Lai Chau	13966.2	7884.8	0.0	0.0	13966.2	7884.8	0.0	0.0	21230.3	12328.3	0.0	0.0	23854.3	14562.2	0.0	0.0
25	Hoa Binh	22943.5	11100.1	0.0	0.0	22943.5	11100.1	0.0	0.0	34876.9	17044.1	0.0	0.0	39187.5	20152.6	0.0	0.0
26	Thanh Hoa	85210.9	53438.8	0.0	0.0	85210.9	53438.8	0.0	0.0	129530.8	70788.4	0.0	0.0	145540.2	83615.8	0.0	0.0
27	Nghe An	71293.1	43376.3	0.0	0.0	71293.1	43376.3	0.0	0.0	108374.1	58250.1	0.0	0.0	121768.6	68803.4	0.0	0.0
28	Ha Tinh	35558.0	20386.3	0.0	0.0	35558.0	20386.3	0.0	0.0	54052.4	26857.3	0.0	0.0	60733.0	31724.0	0.0	0.0
29	Quang Binh	24306.5	12356.3	0.0	0.0	24306.5	12356.3	0.0	0.0	36948.8	16707.4	0.0	0.0	41515.5	19734.9	0.0	0.0
30	Quang Tri	17251.9	8426.3	0.0	0.0	17251.9	8426.3	0.0	0.0	26225.0	11391.1	0.0	0.0	29466.3	13455.2	0.0	0.0
31	Thua Thien - Hue	15896.8	15696.3	0.0	0.0	15896.8	15696.3	0.0	0.0	24165.1	20736.3	0.0	0.0	27151.8	24493.9	0.0	0.0
32	Quang Nam	41999.8	20438.6	0.0	0.0	41999.8	20438.6	0.0	0.0	63844.7	27155.9	0.0	0.0	71735.6	31710.0	0.0	0.0
33	Da Nang	7901.9	12968.8	0.0	0.0	7901.9	12968.8	0.0	0.0	12011.9	19635.6	0.0	0.0	13496.5	22928.5	0.0	0.0
34	Quang Ngai	35493.4	18902.0	0.0	0.0	35493.4	18902.0	0.0	0.0	53954.3	26326.7	0.0	0.0	60622.8	30741.8	0.0	0.0
35	Binh Dinh	38374.8	22674.6	0.0	0.0	38374.8	22674.6	0.0	0.0	58334.2	31454.6	0.0	0.0	65544.1	36729.6	0.0	0.0
36	Phu Yen	22440.2	12071.8	0.0	0.0	22440.2	12071.8	0.0	0.0	34111.8	16773.0	0.0	0.0	38327.9	19585.8	0.0	0.0
37	Khanh Hoa	11975.7	15468.7	0.0	0.0	11975.7	15468.7	0.0	0.0	18204.5	21825.2	0.0	0.0	20454.5	25485.3	0.0	0.0
38	Kon Tum	10520.1	4035.0	0.0	0.0	10520.1	4035.0	0.0	0.0	15991.8	5371.5	0.0	0.0	17968.3	6344.8	0.0	0.0
39	Gia Lai	27680.8	14482.5	0.0	0.0	27680.8	14482.5	0.0	0.0	42078.2	21387.5	0.0	0.0	47278.8	25263.0	0.0	0.0
40	Dac Lac	27303.5	24252.5	0.0	0.0	27303.5	24252.5	0.0	0.0	41504.6	35868.8	0.0	0.0	46634.4	42368.5	0.0	0.0
41	Ho Chi Minh	19327.1	118160.4	0.0	0.0	19327.1	118160.4	0.0	0.0	29379.6	190406.7	0.0	0.0	33010.7	209954.2	0.0	0.0
42	Lam Dong	15611.2	23358.8	0.0	0.0	15611.2	23358.8	0.0	0.0	23730.9	42024.8	0.0	0.0	26664.0	46339.1	0.0	0.0
43	Ninh Thuan	9532.9	11863.7	0.0	0.0	9532.9	11863.7	0.0	0.0	14491.1	19164.8	0.0	0.0	16282.1	21132.3	0.0	0.0
44	Binh Phuoc	8688.4	14722.0	0.0	0.0	8688.4	14722.0	0.0	0.0	13207.5	23835.7	0.0	0.0	14839.8	26282.7	0.0	0.0
45	Tay Ninh	14625.3	21973.1	0.0	0.0	14625.3	21973.1	0.0	0.0	22322.2	34466.2	0.0	0.0	24980.0	38004.5	0.0	0.0
46	Binh Duong	10198.8	17140.3	0.0	0.0	10198.8	17140.3	0.0	0.0	15503.4	28212.0	0.0	0.0	17419.5	31108.3	0.0	0.0
47	Dong Nai	33963.6	54590.1	0.0	0.0	33963.6	54590.1	0.0	0.0	51628.8	90877.0	0.0	0.0	58009.9	102026.6	0.0	0.0
48	Binh Thuan	21067.7	21803.2	0.0	0.0	21067.7	21803.2	0.0	0.0	32025.4	33311.6	0.0	0.0	35983.6	36731.4	0.0	0.0
49	Ba Ria - Vung Tau	11779.9	21523.4	0.0	0.0	11779.9	21523.4	0.0	0.0	17906.8	36633.3	0.0	0.0	20120.1	40394.1	0.0	0.0
50	Long An	18971.1	27852.8	0.0	0.0	18971.1	27852.8	0.0	0.0	28838.4	41956.5	0.0	0.0	32402.7	46860.5	0.0	0.0
51	Dong Thap	16856.9	32650.2	0.0	0.0	16856.9	32650.2	0.0	0.0	25624.5	51131.9	0.0	0.0	28791.5	57108.3	0.0	0.0
52	An Giang	17401.2	43137.5	0.0	0.0	17401.2	43137.5	0.0	0.0	26451.9	89547.2	0.0	0.0	29721.3	100013.7	0.0	0.0
53	Tien Giang	32033.6	34642.6	0.0	0.0	32033.6	34642.6	0.0	0.0	48694.9	52642.6	0.0	0.0	54713.3	58795.6	0.0	0.0
54	Vinh Long	22418.4	24065.2	0.0	0.0	22418.4	24065.2	0.0	0.0	34078.7	36546.5	0.0	0.0	38290.6	40818.2	0.0	0.0
55	Ben Tre	24559.3	28830.3	0.0	0.0	24559.3	28830.3	0.0	0.0	37333.1	44162.6	0.0	0.0	41947.3	49324.4	0.0	0.0
56	Kien Giang	17268.7	35764.6	0.0	0.0	17268.7	35764.6	0.0	0.0	26250.5	59782.8	0.0	0.0	29494.9	66770.4	0.0	0.0
57	Can Tho	19360.0	41129.8	0.0	0.0	19360.0	41129.8	0.0	0.0	29429.5	62319.2	0.0	0.0	33066.8	69603.2	0.0	0.0
58	Tra Vinh	18070.4	21743.0	0.0	0.0	18070.4	21743.0	0.0	0.0	27469.2	33432.6	0.0	0.0	30864.2	37340.3	0.0	0.0
59	Soc Trang	17333.2	27217.0	0.0	0.0	17333.2	27217.0	0.0	0.0	26348.5	41453.0	0.0	0.0	29605.1	46298.1	0.0	0.0
60	Bac Lieu	16392.0	17134.3	0.0	0.0	16392.0	17134.3	0.0	0.0	24917.9	26146.9	0.0	0.0	27997.6	29203.0	0.0	0.0
61	Ca Mau	15760.1	23801.7	0.0	0.0	15760.1	23801.7	0.0	0.0	23957.2	36504.9	0.0	0.0	26918.2	40771.7	0.0	0.0

**APPENDIX 4-A DISTRIBUTION OF INTERPROVINCIAL TRAFFIC BY TRANSPORT DISTANCE, 2010**

Table 4A-1  
Passenger Traffic

Distance (km)	Car		Bus		IW		Railway		Air		Total	
	No/day	%	No/day	%	No/day	%	No/day	%	No/day	%	No/day	%
100	118799	(25.0)	323908	(68.2)	1292	(0.3)	31284	(6.6)	0	(0.0)	475283	(100.0)
200	45822	(14.7)	241267	(77.3)	2808	(0.9)	21974	(7.0)	134	(0.0)	312005	(100.0)
300	10866	(7.9)	113156	(82.7)	874	(0.6)	11476	(8.4)	528	(0.4)	136900	(100.0)
400	6632	(14.4)	34695	(75.3)	0	(0.0)	4280	(9.3)	460	(1.0)	46067	(100.0)
500	1798	(6.7)	20986	(78.6)	0	(0.0)	3170	(11.9)	760	(2.8)	26714	(100.0)
600	1402	(11.4)	9614	(78.2)	0	(0.0)	1020	(8.3)	264	(2.1)	12300	(100.0)
700	848	(9.0)	6590	(70.3)	0	(0.0)	1420	(15.1)	520	(5.5)	9378	(100.0)
800	556	(5.7)	5796	(59.6)	0	(0.0)	1550	(15.9)	1826	(18.8)	9728	(100.0)
900	182	(5.6)	2504	(77.0)	0	(0.0)	444	(13.7)	122	(3.8)	3252	(100.0)
1000	912	(9.2)	5420	(54.7)	0	(0.0)	1550	(15.7)	2018	(20.4)	9900	(100.0)
1100	542	(8.7)	5194	(83.5)	0	(0.0)	450	(7.2)	34	(0.5)	6220	(100.0)
1200	280	(8.7)	2068	(64.1)	0	(0.0)	692	(21.4)	188	(5.8)	3228	(100.0)
1300	0	(0.0)	2984	(87.3)	0	(0.0)	414	(12.1)	22	(0.6)	3420	(100.0)
1400	314	(5.9)	4418	(82.8)	0	(0.0)	498	(9.3)	104	(1.9)	5334	(100.0)
1500	62	(3.5)	1432	(81.1)	0	(0.0)	272	(15.4)	0	(0.0)	1766	(100.0)
1600	154	(4.0)	3122	(81.5)	0	(0.0)	492	(12.8)	64	(1.7)	3832	(100.0)
1700	1620	(8.7)	6566	(35.4)	0	(0.0)	2868	(15.5)	7508	(40.4)	18562	(100.0)
1800	164	(2.9)	4692	(82.7)	0	(0.0)	626	(11.0)	190	(3.3)	5672	(100.0)
1900	64	(1.4)	3980	(89.5)	0	(0.0)	398	(8.9)	6	(0.1)	4448	(100.0)
2000	112	(4.4)	2128	(84.2)	0	(0.0)	286	(11.3)	0	(0.0)	2526	(100.0)
*****	0	(0.0)	1624	(92.9)	0	(0.0)	124	(7.1)	0	(0.0)	1748	(100.0)
Total	191129	(17.4)	802144	(73.0)	4974	(0.5)	85288	(7.8)	14748	(1.3)	1098283	(100.0)

**Distribution of Interprovincial Traffic by Transport Distance , 2010**

Table 4A-2  
Freight Traffic (Total)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	87744	(67.0)	36031	(27.5)	6790	(5.2)	302	(0.2)	0	(0.0)	130867	(100.0)
200	63939	(69.2)	21431	(23.2)	6403	(6.9)	614	(0.7)	0	(0.0)	92387	(100.0)
300	38083	(46.5)	38587	(47.2)	4506	(5.5)	632	(0.8)	3	(0.0)	81811	(100.0)
400	14442	(63.8)	4889	(21.6)	2073	(9.2)	1245	(5.5)	0	(0.0)	22649	(100.0)
500	7134	(66.4)	1342	(12.5)	1744	(16.2)	521	(4.9)	0	(0.0)	10741	(100.0)
600	4365	(67.2)	89	(1.4)	747	(11.5)	1298	(20.0)	0	(0.0)	6499	(100.0)
700	4009	(79.3)	21	(0.4)	434	(8.6)	589	(11.7)	0	(0.0)	5053	(100.0)
800	3510	(72.9)	0	(0.0)	442	(9.2)	858	(17.8)	6	(0.1)	4816	(100.0)
900	33756	(73.0)	0	(0.0)	641	(1.4)	11820	(25.6)	0	(0.0)	46217	(100.0)
1000	5132	(67.9)	0	(0.0)	781	(10.3)	1644	(21.7)	5	(0.1)	7562	(100.0)
1100	2968	(60.3)	0	(0.0)	223	(4.5)	1727	(35.1)	0	(0.0)	4918	(100.0)
1200	2309	(55.0)	0	(0.0)	369	(8.8)	1517	(36.2)	1	(0.0)	4196	(100.0)
1300	2299	(57.0)	0	(0.0)	161	(4.0)	1570	(39.0)	0	(0.0)	4030	(100.0)
1400	1372	(48.1)	0	(0.0)	252	(8.8)	1228	(43.1)	0	(0.0)	2852	(100.0)
1500	1249	(52.5)	0	(0.0)	218	(9.2)	912	(38.3)	0	(0.0)	2379	(100.0)
1600	1374	(42.8)	0	(0.0)	262	(8.2)	1576	(49.1)	0	(0.0)	3212	(100.0)
1700	6688	(39.7)	0	(0.0)	1605	(9.5)	8420	(50.0)	134	(0.8)	16847	(100.0)
1800	2933	(37.7)	0	(0.0)	359	(4.6)	4473	(57.4)	25	(0.3)	7790	(100.0)
1900	2342	(38.9)	0	(0.0)	276	(4.6)	3401	(56.5)	0	(0.0)	6019	(100.0)
2000	1068	(11.7)	0	(0.0)	74	(0.8)	8025	(87.5)	0	(0.0)	9167	(100.0)
*****	651	(59.9)	0	(0.0)	33	(3.0)	403	(37.1)	0	(0.0)	1087	(100.0)
Total	287367	(61.0)	102390	(21.7)	28393	(6.0)	52775	(11.2)	174	(0.0)	471099	(100.0)



Table 4A-3  
Freight Traffic (Paddy/Other Food Crops)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	15762	(87.0)	2347	(13.0)	4	(0.0)	4	(0.0)	0	(0.0)	18117	(100.0)
200	10035	(74.0)	3517	(25.9)	0	(0.0)	8	(0.1)	0	(0.0)	13560	(100.0)
300	6907	(47.6)	7590	(52.3)	2	(0.0)	0	(0.0)	0	(0.0)	14499	(100.0)
400	2554	(53.5)	1991	(41.7)	231	(4.8)	0	(0.0)	0	(0.0)	4776	(100.0)
500	1415	(66.3)	530	(24.8)	188	(8.8)	0	(0.0)	0	(0.0)	2133	(100.0)
600	981	(84.1)	13	(1.1)	172	(14.8)	0	(0.0)	0	(0.0)	1166	(100.0)
700	1074	(94.6)	3	(0.3)	23	(2.0)	35	(3.1)	0	(0.0)	1135	(100.0)
800	511	(75.5)	0	(0.0)	6	(0.9)	160	(23.6)	0	(0.0)	677	(100.0)
900	687	(79.1)	0	(0.0)	5	(0.6)	177	(20.4)	0	(0.0)	869	(100.0)
1000	999	(81.5)	0	(0.0)	9	(0.7)	218	(17.8)	0	(0.0)	1226	(100.0)
1100	369	(67.6)	0	(0.0)	2	(0.4)	175	(32.1)	0	(0.0)	546	(100.0)
1200	497	(60.5)	0	(0.0)	4	(0.5)	321	(39.1)	0	(0.0)	822	(100.0)
1300	222	(73.5)	0	(0.0)	0	(0.0)	80	(26.5)	0	(0.0)	302	(100.0)
1400	210	(23.4)	0	(0.0)	3	(0.3)	686	(76.3)	0	(0.0)	899	(100.0)
1500	343	(33.1)	0	(0.0)	4	(0.4)	688	(66.5)	0	(0.0)	1035	(100.0)
1600	336	(27.1)	0	(0.0)	3	(0.2)	899	(72.6)	0	(0.0)	1238	(100.0)
1700	961	(21.8)	0	(0.0)	29	(0.7)	3416	(77.5)	0	(0.0)	4406	(100.0)
1800	713	(44.4)	0	(0.0)	21	(1.3)	871	(54.3)	0	(0.0)	1605	(100.0)
1900	512	(18.4)	0	(0.0)	10	(0.4)	2259	(81.2)	0	(0.0)	2781	(100.0)
2000	174	(29.5)	0	(0.0)	12	(2.0)	403	(68.4)	0	(0.0)	589	(100.0)
*****	305	(47.1)	0	(0.0)	1	(0.2)	341	(52.7)	0	(0.0)	647	(100.0)
Total	45567	(62.4)	15991	(21.9)	729	(1.0)	10741	(14.7)	0	(0.0)	73028	(100.0)

Table 4A- 4  
Freight Traffic (Sugarcane/Sugar)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	3497	(87.0)	353	(8.8)	171	(4.3)	0	(0.0)	0	(0.0)	4021	(100.0)
200	2473	(84.4)	372	(12.7)	85	(2.9)	0	(0.0)	0	(0.0)	2930	(100.0)
300	1643	(77.2)	428	(20.1)	58	(2.7)	0	(0.0)	0	(0.0)	2129	(100.0)
400	706	(83.4)	55	(6.5)	86	(10.2)	0	(0.0)	0	(0.0)	847	(100.0)
500	221	(82.2)	0	(0.0)	48	(17.8)	0	(0.0)	0	(0.0)	269	(100.0)
600	283	(82.3)	0	(0.0)	61	(17.7)	0	(0.0)	0	(0.0)	344	(100.0)
700	270	(82.6)	0	(0.0)	57	(17.4)	0	(0.0)	0	(0.0)	327	(100.0)
800	81	(82.7)	0	(0.0)	17	(17.3)	0	(0.0)	0	(0.0)	98	(100.0)
900	128	(83.1)	0	(0.0)	26	(16.9)	0	(0.0)	0	(0.0)	154	(100.0)
1000	64	(81.0)	0	(0.0)	15	(19.0)	0	(0.0)	0	(0.0)	79	(100.0)
1100	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1200	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1300	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1400	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1500	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1600	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1700	141	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	141	(100.0)
1800	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1900	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
2000	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
*****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
Total	9507	(83.8)	1208	(10.7)	624	(5.5)	0	(0.0)	0	(0.0)	11339	(100.0)

Table 4A-5  
Freight Traffic (Wood/Forestry Products)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	5268	(97.5)	0	(0.0)	12	(0.2)	121	(2.2)	0	(0.0)	5401	(100.0)
200	1682	(87.6)	85	(4.4)	29	(1.5)	124	(6.5)	0	(0.0)	1920	(100.0)
300	1085	(68.0)	386	(24.2)	26	(1.6)	98	(6.1)	0	(0.0)	1595	(100.0)
400	305	(67.9)	0	(0.0)	10	(2.2)	134	(29.8)	0	(0.0)	449	(100.0)
500	251	(73.4)	8	(2.3)	43	(12.6)	40	(11.7)	0	(0.0)	342	(100.0)
600	455	(77.6)	36	(6.1)	48	(8.2)	47	(8.0)	0	(0.0)	586	(100.0)
700	122	(71.3)	0	(0.0)	23	(13.5)	26	(15.2)	0	(0.0)	171	(100.0)
800	41	(46.1)	0	(0.0)	9	(10.1)	39	(43.8)	0	(0.0)	89	(100.0)
900	39	(5.8)	0	(0.0)	65	(9.6)	574	(84.7)	0	(0.0)	678	(100.0)
1000	14	(77.8)	0	(0.0)	2	(11.1)	2	(11.1)	0	(0.0)	18	(100.0)
1100	130	(73.4)	0	(0.0)	18	(10.2)	29	(16.4)	0	(0.0)	177	(100.0)
1200	3	(16.7)	0	(0.0)	2	(11.1)	13	(72.2)	0	(0.0)	18	(100.0)
1300	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1400	87	(79.1)	0	(0.0)	11	(10.0)	12	(10.9)	0	(0.0)	110	(100.0)
1500	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1600	156	(70.3)	0	(0.0)	22	(9.9)	44	(19.8)	0	(0.0)	222	(100.0)
1700	266	(75.1)	0	(0.0)	40	(11.3)	48	(13.6)	0	(0.0)	354	(100.0)
1800	76	(51.4)	0	(0.0)	16	(10.8)	56	(37.8)	0	(0.0)	148	(100.0)
1900	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
2000	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
Total	9980	(81.3)	515	(4.2)	376	(3.1)	1407	(11.5)	0	(0.0)	12278	(100.0)

Table 4A-6  
Freight Traffic (Steel)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	3752	(84.3)	234	(5.3)	427	(9.6)	36	(0.8)	0	(0.0)	4449	(100.0)
200	5077	(81.6)	61	(1.0)	1076	(17.3)	8	(0.1)	0	(0.0)	6222	(100.0)
300	2898	(72.5)	59	(1.5)	1020	(25.5)	23	(0.6)	0	(0.0)	4000	(100.0)
400	1114	(87.2)	15	(1.2)	138	(10.8)	10	(0.8)	0	(0.0)	1277	(100.0)
500	431	(79.2)	11	(2.0)	99	(18.2)	3	(0.6)	0	(0.0)	544	(100.0)
600	210	(90.5)	2	(0.9)	19	(8.2)	1	(0.4)	0	(0.0)	232	(100.0)
700	137	(75.7)	0	(0.0)	22	(12.2)	22	(12.2)	0	(0.0)	181	(100.0)
800	127	(69.8)	0	(0.0)	34	(18.7)	21	(11.5)	0	(0.0)	182	(100.0)
900	152	(64.7)	0	(0.0)	55	(23.4)	28	(11.9)	0	(0.0)	235	(100.0)
1000	1007	(73.2)	0	(0.0)	127	(9.2)	241	(17.5)	0	(0.0)	1375	(100.0)
1100	123	(73.7)	0	(0.0)	25	(15.0)	19	(11.4)	0	(0.0)	167	(100.0)
1200	136	(63.3)	0	(0.0)	49	(22.8)	30	(14.0)	0	(0.0)	215	(100.0)
1300	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1400	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1500	34	(77.3)	0	(0.0)	3	(6.8)	7	(15.9)	0	(0.0)	44	(100.0)
1600	2	(4.8)	0	(0.0)	35	(83.3)	5	(11.9)	0	(0.0)	42	(100.0)
1700	264	(15.5)	0	(0.0)	181	(10.6)	1256	(73.8)	0	(0.0)	1701	(100.0)
1800	1	(5.0)	0	(0.0)	2	(10.0)	17	(85.0)	0	(0.0)	20	(100.0)
1900	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
2000	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
Total	15465	(74.0)	382	(1.8)	3312	(15.9)	1727	(8.3)	0	(0.0)	20886	(100.0)

Table 4A-7  
Freight Traffic (Construction Materials)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	11429	(73.0)	4049	(25.9)	176	(1.1)	2	(0.0)	0	(0.0)	15656	(100.0)
200	5225	(55.7)	3765	(40.2)	385	(4.1)	2	(0.0)	0	(0.0)	9377	(100.0)
300	1699	(49.1)	1721	(49.8)	35	(1.0)	2	(0.1)	0	(0.0)	3457	(100.0)
400	614	(93.9)	34	(5.2)	4	(0.6)	2	(0.3)	0	(0.0)	654	(100.0)
500	115	(32.5)	56	(15.8)	183	(51.7)	0	(0.0)	0	(0.0)	354	(100.0)
600	85	(89.5)	4	(4.2)	4	(4.2)	2	(2.1)	0	(0.0)	95	(100.0)
700	419	(80.0)	0	(0.0)	14	(2.7)	91	(17.4)	0	(0.0)	524	(100.0)
800	272	(80.0)	0	(0.0)	11	(3.2)	57	(16.8)	0	(0.0)	340	(100.0)
900	214	(75.4)	0	(0.0)	18	(6.3)	52	(18.3)	0	(0.0)	284	(100.0)
1000	182	(69.2)	0	(0.0)	5	(1.9)	76	(28.9)	0	(0.0)	263	(100.0)
1100	58	(59.8)	0	(0.0)	14	(14.4)	25	(25.8)	0	(0.0)	97	(100.0)
1200	79	(77.5)	0	(0.0)	4	(3.9)	19	(18.6)	0	(0.0)	102	(100.0)
1300	69	(75.0)	0	(0.0)	5	(5.4)	18	(19.6)	0	(0.0)	92	(100.0)
1400	162	(69.5)	0	(0.0)	9	(3.9)	62	(26.6)	0	(0.0)	233	(100.0)
1500	21	(77.8)	0	(0.0)	1	(3.7)	5	(18.5)	0	(0.0)	27	(100.0)
1600	19	(73.1)	0	(0.0)	2	(7.7)	5	(19.2)	0	(0.0)	26	(100.0)
1700	481	(72.4)	0	(0.0)	38	(5.7)	145	(21.8)	0	(0.0)	664	(100.0)
1800	649	(75.5)	0	(0.0)	43	(5.0)	168	(19.5)	0	(0.0)	860	(100.0)
1900	711	(74.1)	0	(0.0)	55	(5.7)	194	(20.2)	0	(0.0)	960	(100.0)
2000	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
Total	22503	(66.1)	9629	(28.3)	1006	(3.0)	927	(2.7)	0	(0.0)	34065	(100.0)

Table 4A-8  
Freight Traffic (Cement)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	10456	(71.1)	4056	(27.6)	139	(0.9)	47	(0.3)	0	(0.0)	14698	(100.0)
200	5344	(71.5)	1654	(22.1)	344	(4.6)	129	(1.7)	0	(0.0)	7471	(100.0)
300	1449	(24.1)	4042	(67.4)	143	(2.4)	366	(6.1)	0	(0.0)	6000	(100.0)
400	1139	(78.5)	216	(14.9)	15	(1.0)	81	(5.6)	0	(0.0)	1451	(100.0)
500	252	(58.5)	70	(16.2)	55	(12.8)	54	(12.5)	0	(0.0)	431	(100.0)
600	111	(33.9)	0	(0.0)	52	(15.9)	164	(50.2)	0	(0.0)	327	(100.0)
700	108	(42.0)	0	(0.0)	37	(14.4)	112	(43.6)	0	(0.0)	257	(100.0)
800	148	(54.4)	0	(0.0)	18	(6.6)	106	(39.0)	0	(0.0)	272	(100.0)
900	202	(38.0)	0	(0.0)	35	(6.6)	294	(55.4)	0	(0.0)	531	(100.0)
1000	449	(57.1)	0	(0.0)	42	(5.3)	296	(37.6)	0	(0.0)	787	(100.0)
1100	225	(51.3)	0	(0.0)	37	(8.4)	177	(40.3)	0	(0.0)	439	(100.0)
1200	363	(38.0)	0	(0.0)	33	(3.5)	560	(58.6)	0	(0.0)	956	(100.0)
1300	1190	(66.1)	0	(0.0)	20	(1.1)	590	(32.8)	0	(0.0)	1800	(100.0)
1400	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1500	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1600	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1700	1387	(75.0)	0	(0.0)	0	(0.0)	462	(25.0)	0	(0.0)	1849	(100.0)
1800	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1900	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
2000	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
Total	22823	(61.2)	10038	(26.9)	970	(2.6)	3438	(9.2)	0	(0.0)	37269	(100.0)

Table 4A-9  
Freight Traffic (Fertilizer)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	5679	(51.5)	4182	(37.9)	1142	(10.4)	17	(0.2)	0	(0.0)	11020	(100.0)
200	4641	(43.7)	3483	(32.8)	2423	(22.8)	80	(0.8)	0	(0.0)	10627	(100.0)
300	5762	(39.4)	6581	(45.0)	2252	(15.4)	28	(0.2)	0	(0.0)	14623	(100.0)
400	979	(26.1)	1583	(42.2)	808	(21.6)	377	(10.1)	0	(0.0)	3747	(100.0)
500	698	(50.8)	127	(9.2)	420	(30.5)	130	(9.5)	0	(0.0)	1375	(100.0)
600	336	(24.7)	6	(0.4)	161	(11.8)	856	(63.0)	0	(0.0)	1359	(100.0)
700	46	(32.9)	3	(2.1)	43	(30.7)	48	(34.3)	0	(0.0)	140	(100.0)
800	358	(64.5)	0	(0.0)	135	(24.3)	62	(11.2)	0	(0.0)	555	(100.0)
900	130	(42.5)	0	(0.0)	105	(34.3)	71	(23.2)	0	(0.0)	306	(100.0)
1000	197	(25.9)	0	(0.0)	271	(35.6)	294	(38.6)	0	(0.0)	762	(100.0)
1100	84	(56.0)	0	(0.0)	26	(17.3)	40	(26.7)	0	(0.0)	150	(100.0)
1200	133	(33.9)	0	(0.0)	182	(46.4)	77	(19.6)	0	(0.0)	392	(100.0)
1300	3	(3.7)	0	(0.0)	39	(48.1)	39	(48.1)	0	(0.0)	81	(100.0)
1400	12	(14.0)	0	(0.0)	28	(32.6)	46	(53.5)	0	(0.0)	86	(100.0)
1500	4	(20.0)	0	(0.0)	12	(60.0)	4	(20.0)	0	(0.0)	20	(100.0)
1600	26	(5.4)	0	(0.0)	54	(11.2)	402	(83.4)	0	(0.0)	482	(100.0)
1700	133	(6.2)	0	(0.0)	178	(8.3)	1824	(85.4)	0	(0.0)	2135	(100.0)
1800	36	(23.1)	0	(0.0)	48	(30.8)	72	(46.2)	0	(0.0)	156	(100.0)
1900	69	(17.6)	0	(0.0)	121	(30.8)	203	(51.7)	0	(0.0)	393	(100.0)
2000	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
*****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
Total	19326	(39.9)	15965	(33.0)	8448	(17.5)	4670	(9.6)	0	(0.0)	48409	(100.0)

Table 4A-10  
Freight Traffic (Coal)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	2512	(10.1)	19125	(77.3)	3079	(12.4)	37	(0.1)	0	(0.0)	24753	(100.0)
200	704	(15.6)	3245	(72.0)	409	(9.1)	149	(3.3)	0	(0.0)	4507	(100.0)
300	456	(3.5)	12109	(93.4)	385	(3.0)	15	(0.1)	0	(0.0)	12965	(100.0)
400	76	(13.9)	81	(14.8)	28	(5.1)	362	(66.2)	0	(0.0)	547	(100.0)
500	7	(24.1)	2	(6.9)	7	(24.1)	13	(44.8)	0	(0.0)	29	(100.0)
600	2	(9.5)	1	(4.8)	0	(0.0)	18	(85.7)	0	(0.0)	21	(100.0)
700	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
800	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
900	0	(0.0)	0	(0.0)	0	(0.0)	154	(100.0)	0	(0.0)	154	(100.0)
1000	5	(29.4)	0	(0.0)	0	(0.0)	12	(70.6)	0	(0.0)	17	(100.0)
1100	0	(0.0)	0	(0.0)	0	(0.0)	11	(100.0)	0	(0.0)	11	(100.0)
1200	11	(73.3)	0	(0.0)	0	(0.0)	4	(26.7)	0	(0.0)	15	(100.0)
1300	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1400	0	(0.0)	0	(0.0)	0	(0.0)	65	(100.0)	0	(0.0)	65	(100.0)
1500	11	(7.7)	0	(0.0)	5	(3.5)	127	(88.8)	0	(0.0)	143	(100.0)
1600	42	(53.2)	0	(0.0)	0	(0.0)	37	(46.8)	0	(0.0)	79	(100.0)
1700	78	(40.8)	0	(0.0)	50	(26.2)	63	(33.0)	0	(0.0)	191	(100.0)
1800	82	(27.1)	0	(0.0)	40	(13.2)	181	(59.7)	0	(0.0)	303	(100.0)
1900	19	(17.9)	0	(0.0)	11	(10.4)	76	(71.7)	0	(0.0)	106	(100.0)
2000	2	(0.0)	0	(0.0)	0	(0.0)	7249	(100.0)	0	(0.0)	7251	(100.0)
*****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
Total	4007	(7.8)	34563	(67.6)	4014	(7.8)	8573	(16.8)	0	(0.0)	51157	(100.0)

Table 4A-11  
Freight Traffic (Petroleum Products)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	7495	(89.6)	773	(9.2)	63	(0.8)	34	(0.4)	0	(0.0)	8365	(100.0)
200	12842	(78.7)	3042	(18.6)	341	(2.1)	100	(0.6)	0	(0.0)	16325	(100.0)
300	4242	(45.0)	5105	(54.1)	61	(0.6)	25	(0.3)	0	(0.0)	9433	(100.0)
400	1852	(74.9)	581	(23.5)	21	(0.8)	18	(0.7)	0	(0.0)	2472	(100.0)
500	975	(58.1)	504	(30.0)	7	(0.4)	193	(11.5)	0	(0.0)	1679	(100.0)
600	970	(80.5)	19	(1.6)	12	(1.0)	204	(16.9)	0	(0.0)	1205	(100.0)
700	390	(73.7)	3	(0.6)	9	(1.7)	127	(24.0)	0	(0.0)	529	(100.0)
800	995	(74.5)	0	(0.0)	11	(0.8)	329	(24.6)	0	(0.0)	1335	(100.0)
900	31727	(74.9)	0	(0.0)	206	(0.5)	10419	(24.6)	0	(0.0)	42352	(100.0)
1000	1122	(70.4)	0	(0.0)	74	(4.6)	398	(25.0)	0	(0.0)	1594	(100.0)
1100	1733	(60.4)	0	(0.0)	37	(1.3)	1100	(38.3)	0	(0.0)	2870	(100.0)
1200	757	(71.8)	0	(0.0)	10	(0.9)	287	(27.2)	0	(0.0)	1054	(100.0)
1300	546	(74.2)	0	(0.0)	1	(0.1)	189	(25.7)	0	(0.0)	736	(100.0)
1400	59	(72.0)	0	(0.0)	1	(1.2)	22	(26.8)	0	(0.0)	82	(100.0)
1500	146	(68.5)	0	(0.0)	1	(0.5)	66	(31.0)	0	(0.0)	213	(100.0)
1600	252	(69.0)	0	(0.0)	3	(0.8)	110	(30.1)	0	(0.0)	365	(100.0)
1700	435	(69.3)	0	(0.0)	25	(4.0)	168	(26.8)	0	(0.0)	628	(100.0)
1800	614	(21.1)	0	(0.0)	15	(0.5)	2286	(78.4)	0	(0.0)	2915	(100.0)
1900	713	(68.4)	0	(0.0)	17	(1.6)	312	(29.9)	0	(0.0)	1042	(100.0)
2000	661	(68.1)	0	(0.0)	31	(3.2)	279	(28.7)	0	(0.0)	971	(100.0)
*****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
Total	68526	(71.3)	10027	(10.4)	946	(1.0)	16666	(17.3)	0	(0.0)	96165	(100.0)

Table 4A-12  
Freight Traffic (Industrial Crops)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	2711	(96.6)	0	(0.0)	96	(3.4)	0	(0.0)	0	(0.0)	2807	(100.0)
200	1167	(88.4)	0	(0.0)	153	(11.6)	0	(0.0)	0	(0.0)	1320	(100.0)
300	1080	(95.9)	0	(0.0)	46	(4.1)	0	(0.0)	0	(0.0)	1126	(100.0)
400	1482	(85.3)	0	(0.0)	256	(14.7)	0	(0.0)	0	(0.0)	1738	(100.0)
500	508	(73.1)	0	(0.0)	187	(26.9)	0	(0.0)	0	(0.0)	695	(100.0)
600	125	(79.1)	0	(0.0)	33	(20.9)	0	(0.0)	0	(0.0)	158	(100.0)
700	117	(83.0)	0	(0.0)	24	(17.0)	0	(0.0)	0	(0.0)	141	(100.0)
800	57	(66.3)	0	(0.0)	29	(33.7)	0	(0.0)	0	(0.0)	86	(100.0)
900	22	(81.5)	0	(0.0)	5	(18.5)	0	(0.0)	0	(0.0)	27	(100.0)
1000	172	(78.2)	0	(0.0)	48	(21.8)	0	(0.0)	0	(0.0)	220	(100.0)
1100	33	(75.0)	0	(0.0)	11	(25.0)	0	(0.0)	0	(0.0)	44	(100.0)
1200	54	(72.0)	0	(0.0)	21	(28.0)	0	(0.0)	0	(0.0)	75	(100.0)
1300	25	(83.3)	0	(0.0)	5	(16.7)	0	(0.0)	0	(0.0)	30	(100.0)
1400	112	(70.4)	0	(0.0)	47	(29.6)	0	(0.0)	0	(0.0)	159	(100.0)
1500	73	(43.7)	0	(0.0)	94	(56.3)	0	(0.0)	0	(0.0)	167	(100.0)
1600	29	(56.9)	0	(0.0)	22	(43.1)	0	(0.0)	0	(0.0)	51	(100.0)
1700	232	(29.9)	0	(0.0)	544	(70.1)	0	(0.0)	0	(0.0)	776	(100.0)
1800	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1900	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
2000	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
*****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
Total	7999	(83.1)	0	(0.0)	1621	(16.9)	0	(0.0)	0	(0.0)	9620	(100.0)

Table 4A-13  
Freight Traffic (Manufacturing Products)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	15467	(89.0)	667	(3.8)	1234	(7.1)	4	(0.0)	0	(0.0)	17372	(100.0)
200	12056	(83.3)	1318	(9.1)	1081	(7.5)	14	(0.1)	0	(0.0)	14469	(100.0)
300	7332	(90.7)	251	(3.1)	419	(5.2)	75	(0.9)	3	(0.0)	8080	(100.0)
400	3035	(78.1)	220	(5.7)	369	(9.5)	261	(6.7)	0	(0.0)	3885	(100.0)
500	1837	(76.4)	18	(0.7)	461	(19.2)	88	(3.7)	0	(0.0)	2404	(100.0)
600	507	(84.1)	2	(0.3)	88	(14.6)	6	(1.0)	0	(0.0)	603	(100.0)
700	956	(79.0)	0	(0.0)	126	(10.4)	128	(10.6)	0	(0.0)	1210	(100.0)
800	584	(78.0)	0	(0.0)	75	(10.0)	84	(11.2)	6	(0.8)	749	(100.0)
900	385	(78.6)	0	(0.0)	54	(11.0)	51	(10.4)	0	(0.0)	490	(100.0)
1000	660	(75.8)	0	(0.0)	99	(11.4)	107	(12.3)	5	(0.6)	871	(100.0)
1100	154	(45.6)	0	(0.0)	33	(9.8)	151	(44.7)	0	(0.0)	338	(100.0)
1200	108	(30.9)	0	(0.0)	36	(10.3)	206	(58.9)	0	(0.0)	350	(100.0)
1300	150	(17.1)	0	(0.0)	71	(8.1)	654	(74.7)	0	(0.0)	875	(100.0)
1400	320	(44.5)	0	(0.0)	64	(8.9)	335	(46.6)	0	(0.0)	719	(100.0)
1500	80	(74.8)	0	(0.0)	12	(11.2)	15	(14.0)	0	(0.0)	107	(100.0)
1600	303	(65.9)	0	(0.0)	83	(18.0)	74	(16.1)	0	(0.0)	460	(100.0)
1700	1521	(49.9)	0	(0.0)	378	(12.4)	1038	(34.1)	110	(3.6)	3047	(100.0)
1800	297	(24.0)	0	(0.0)	105	(8.5)	822	(66.5)	13	(1.1)	1237	(100.0)
1900	147	(26.7)	0	(0.0)	46	(8.4)	357	(64.9)	0	(0.0)	550	(100.0)
2000	106	(47.5)	0	(0.0)	23	(10.3)	94	(42.2)	0	(0.0)	223	(100.0)
*****	346	(78.6)	0	(0.0)	32	(7.3)	62	(14.1)	0	(0.0)	440	(100.0)
Total	46351	(79.3)	2476	(4.2)	4889	(8.4)	4626	(7.9)	137	(0.2)	58479	(100.0)

Table 4A-14  
Freight Traffic (Fishery Products)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	1709	(88.4)	224	(11.6)	0	(0.0)	0	(0.0)	0	(0.0)	1933	(100.0)
200	1514	(69.4)	668	(30.6)	0	(0.0)	0	(0.0)	0	(0.0)	2182	(100.0)
300	1896	(87.0)	284	(13.0)	0	(0.0)	0	(0.0)	0	(0.0)	2180	(100.0)
400	477	(81.0)	112	(19.0)	0	(0.0)	0	(0.0)	0	(0.0)	589	(100.0)
500	259	(94.2)	16	(5.8)	0	(0.0)	0	(0.0)	0	(0.0)	275	(100.0)
600	120	(95.2)	6	(4.8)	0	(0.0)	0	(0.0)	0	(0.0)	126	(100.0)
700	296	(96.1)	12	(3.9)	0	(0.0)	0	(0.0)	0	(0.0)	308	(100.0)
800	259	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	259	(100.0)
900	65	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	65	(100.0)
1000	125	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	125	(100.0)
1100	57	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	57	(100.0)
1200	166	(99.4)	0	(0.0)	0	(0.0)	0	(0.0)	1	(0.6)	167	(100.0)
1300	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1400	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1500	145	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	145	(100.0)
1600	42	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	42	(100.0)
1700	311	(92.8)	0	(0.0)	0	(0.0)	0	(0.0)	24	(7.2)	335	(100.0)
1800	147	(92.5)	0	(0.0)	0	(0.0)	0	(0.0)	12	(7.5)	159	(100.0)
1900	92	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	92	(100.0)
2000	85	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	85	(100.0)
*****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
Total	7765	(85.1)	1322	(14.5)	0	(0.0)	0	(0.0)	37	(0.4)	9124	(100.0)

Table 4A-15  
Freight Traffic (Animal/Meat)

Distance (km)	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	2007	(88.2)	21	(0.9)	247	(10.9)	0	(0.0)	0	(0.0)	2275	(100.0)
200	1179	(79.8)	221	(15.0)	77	(5.2)	0	(0.0)	0	(0.0)	1477	(100.0)
300	1634	(94.8)	31	(1.8)	59	(3.4)	0	(0.0)	0	(0.0)	1724	(100.0)
400	109	(50.2)	1	(0.5)	107	(49.3)	0	(0.0)	0	(0.0)	217	(100.0)
500	165	(78.2)	0	(0.0)	46	(21.8)	0	(0.0)	0	(0.0)	211	(100.0)
600	180	(65.0)	0	(0.0)	97	(35.0)	0	(0.0)	0	(0.0)	277	(100.0)
700	74	(56.9)	0	(0.0)	56	(43.1)	0	(0.0)	0	(0.0)	130	(100.0)
800	77	(44.3)	0	(0.0)	97	(55.7)	0	(0.0)	0	(0.0)	174	(100.0)
900	5	(6.9)	0	(0.0)	67	(93.1)	0	(0.0)	0	(0.0)	72	(100.0)
1000	136	(60.4)	0	(0.0)	89	(39.6)	0	(0.0)	0	(0.0)	225	(100.0)
1100	2	(9.1)	0	(0.0)	20	(90.9)	0	(0.0)	0	(0.0)	22	(100.0)
1200	2	(6.7)	0	(0.0)	28	(93.3)	0	(0.0)	0	(0.0)	30	(100.0)
1300	94	(82.5)	0	(0.0)	20	(17.5)	0	(0.0)	0	(0.0)	114	(100.0)
1400	410	(82.2)	0	(0.0)	89	(17.8)	0	(0.0)	0	(0.0)	499	(100.0)
1500	392	(82.0)	0	(0.0)	86	(18.0)	0	(0.0)	0	(0.0)	478	(100.0)
1600	167	(81.5)	0	(0.0)	38	(18.5)	0	(0.0)	0	(0.0)	205	(100.0)
1700	478	(77.1)	0	(0.0)	142	(22.9)	0	(0.0)	0	(0.0)	620	(100.0)
1800	318	(82.2)	0	(0.0)	69	(17.8)	0	(0.0)	0	(0.0)	387	(100.0)
1900	79	(83.2)	0	(0.0)	16	(16.8)	0	(0.0)	0	(0.0)	95	(100.0)
2000	40	(83.3)	0	(0.0)	8	(16.7)	0	(0.0)	0	(0.0)	48	(100.0)
*****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
Total	7548	(81.3)	274	(3.0)	1458	(15.7)	0	(0.0)	0	(0.0)	9280	(100.0)

**APPENDIX 4-B DISTRIBUTION OF INTERPROVINCIAL TRAFFIC BY TRANSPORT DISTANCE, 2020**

Table 4B-1  
Passenger Traffic

Distance	Car		Bus		IW		Railway		Air		Total	
	No/day	%	No/day	%	No/day	%	No/day	%	No/day	%	No/day	%
100	229970	(25.0)	624112	(67.9)	1992	(0.2)	63516	(6.9)	0	(0.0)	919590	(100.0)
200	84192	(15.0)	432984	(77.1)	5266	(0.9)	39006	(6.9)	238	(0.0)	561686	(100.0)
300	17386	(7.7)	185832	(82.7)	1294	(0.6)	19602	(8.7)	710	(0.3)	224824	(100.0)
400	11571	(15.0)	57814	(74.9)	0	(0.0)	7206	(9.3)	642	(0.8)	77233	(100.0)
500	3332	(8.0)	32046	(77.3)	0	(0.0)	5054	(12.2)	1020	(2.5)	41452	(100.0)
600	2548	(12.2)	16270	(77.8)	0	(0.0)	1726	(8.3)	366	(1.8)	20910	(100.0)
700	1840	(10.7)	11550	(67.0)	0	(0.0)	3094	(18.0)	744	(4.3)	17228	(100.0)
800	966	(5.0)	11920	(61.9)	0	(0.0)	3764	(19.6)	2594	(13.5)	19244	(100.0)
900	308	(5.2)	4610	(78.5)	0	(0.0)	796	(13.5)	162	(2.8)	5876	(100.0)
1000	1840	(10.3)	10168	(57.0)	0	(0.0)	3080	(17.3)	2738	(15.4)	17826	(100.0)
1100	994	(9.4)	8744	(82.8)	0	(0.0)	774	(7.3)	52	(0.5)	10564	(100.0)
1200	608	(10.3)	3614	(61.4)	0	(0.0)	1406	(23.9)	262	(4.4)	5890	(100.0)
1300	0	(0.0)	4668	(86.7)	0	(0.0)	688	(12.8)	28	(0.5)	5384	(100.0)
1400	524	(5.7)	7781	(83.9)	0	(0.0)	818	(8.8)	146	(1.6)	9269	(100.0)
1500	62	(2.4)	2118	(81.3)	0	(0.0)	426	(16.3)	0	(0.0)	2606	(100.0)
1600	216	(2.7)	6782	(84.7)	0	(0.0)	916	(11.4)	94	(1.2)	8008	(100.0)
1700	3574	(9.6)	13236	(35.6)	0	(0.0)	6654	(17.9)	13714	(36.9)	37178	(100.0)
1800	212	(2.2)	7910	(83.8)	0	(0.0)	1006	(10.7)	314	(3.3)	9442	(100.0)
1900	58	(0.8)	6346	(90.1)	0	(0.0)	628	(8.9)	8	(0.1)	7040	(100.0)
2000	256	(5.2)	4062	(81.8)	0	(0.0)	650	(13.1)	0	(0.0)	4968	(100.0)
*****	0	(0.0)	2810	(92.6)	0	(0.0)	224	(7.4)	0	(0.0)	3034	(100.0)
<b>Total</b>	<b>360457</b>	<b>(17.9)</b>	<b>1455377</b>	<b>(72.4)</b>	<b>8552</b>	<b>(0.4)</b>	<b>161034</b>	<b>(8.0)</b>	<b>23832</b>	<b>(1.2)</b>	<b>2009252</b>	<b>(100.0)</b>

Table 4B-2  
Freight Traffic (Total)

Distance	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	128828	(66.2)	50904	(26.1)	14335	(7.4)	633	(0.3)	0	(0.0)	194700	(100.0)
200	98641	(65.4)	35768	(23.7)	15189	(10.1)	1221	(0.8)	0	(0.0)	150819	(100.0)
300	63534	(50.1)	50046	(39.5)	11757	(9.3)	1441	(1.1)	2	(0.0)	126780	(100.0)
400	24083	(54.8)	8794	(20.0)	6146	(14.0)	4926	(11.2)	0	(0.0)	43949	(100.0)
500	12477	(58.7)	3060	(14.4)	4153	(19.5)	1581	(7.4)	2	(0.0)	21273	(100.0)
600	8659	(50.0)	373	(2.2)	2571	(14.8)	5727	(33.0)	0	(0.0)	17330	(100.0)
700	6383	(64.6)	68	(0.7)	1434	(14.5)	1999	(20.2)	2	(0.0)	9886	(100.0)
800	5369	(56.0)	0	(0.0)	1487	(15.5)	2718	(28.4)	9	(0.1)	9583	(100.0)
900	24822	(49.4)	0	(0.0)	1857	(3.7)	23587	(46.9)	0	(0.0)	50266	(100.0)
1000	7267	(52.4)	0	(0.0)	2056	(14.8)	4532	(32.7)	7	(0.1)	13862	(100.0)
1100	4365	(47.9)	0	(0.0)	1002	(11.0)	3753	(41.1)	1	(0.0)	9121	(100.0)
1200	4503	(44.7)	0	(0.0)	1024	(10.2)	4547	(45.1)	1	(0.0)	10075	(100.0)
1300	3173	(42.0)	0	(0.0)	687	(9.1)	3702	(48.9)	1	(0.0)	7563	(100.0)
1400	2481	(41.7)	0	(0.0)	933	(15.7)	2530	(42.6)	0	(0.0)	5944	(100.0)
1500	2389	(46.4)	0	(0.0)	819	(15.9)	1941	(37.7)	1	(0.0)	5150	(100.0)
1600	2460	(36.5)	0	(0.0)	998	(14.8)	3273	(48.6)	0	(0.0)	6731	(100.0)
1700	9030	(35.2)	0	(0.0)	4382	(17.1)	11991	(46.8)	216	(0.8)	25619	(100.0)
1800	5041	(36.7)	0	(0.0)	1375	(10.0)	7223	(52.6)	86	(0.6)	13725	(100.0)
1900	4217	(36.2)	0	(0.0)	1030	(8.8)	6415	(55.0)	3	(0.0)	11665	(100.0)
2000	2324	(19.6)	0	(0.0)	328	(2.8)	9183	(77.6)	2	(0.0)	11837	(100.0)
*****	1410	(52.4)	0	(0.0)	206	(7.7)	1074	(39.9)	1	(0.0)	2691	(100.0)
<b>Total</b>	<b>421456</b>	<b>(56.3)</b>	<b>149013</b>	<b>(19.9)</b>	<b>73769</b>	<b>(9.9)</b>	<b>103997</b>	<b>(13.9)</b>	<b>334</b>	<b>(0.0)</b>	<b>748569</b>	<b>(100.0)</b>



Table 4B-3  
Freight Traffic (Paddy/Other Food Crops)

Distance	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	21945	(78.3)	6032	(21.5)	22	(0.1)	25	(0.1)	0	(0.0)	28024	(100.0)
200	17504	(68.1)	8118	(31.6)	16	(0.1)	60	(0.2)	0	(0.0)	25698	(100.0)
300	11833	(54.1)	9986	(45.7)	15	(0.1)	35	(0.2)	0	(0.0)	21869	(100.0)
400	4036	(53.3)	2446	(32.3)	1034	(13.7)	50	(0.7)	0	(0.0)	7566	(100.0)
500	2364	(59.4)	935	(23.5)	672	(16.9)	8	(0.2)	0	(0.0)	3979	(100.0)
600	1419	(69.6)	57	(2.8)	542	(26.6)	20	(1.0)	0	(0.0)	2038	(100.0)
700	1845	(94.1)	11	(0.6)	73	(3.7)	31	(1.6)	0	(0.0)	1960	(100.0)
800	931	(65.9)	0	(0.0)	22	(1.6)	460	(32.6)	0	(0.0)	1413	(100.0)
900	1111	(64.1)	0	(0.0)	27	(1.6)	596	(34.4)	0	(0.0)	1734	(100.0)
1000	1445	(66.0)	0	(0.0)	33	(1.5)	713	(32.5)	0	(0.0)	2191	(100.0)
1100	597	(58.2)	0	(0.0)	11	(1.1)	417	(40.7)	0	(0.0)	1025	(100.0)
1200	814	(53.2)	0	(0.0)	21	(1.4)	694	(45.4)	0	(0.0)	1529	(100.0)
1300	458	(61.7)	0	(0.0)	6	(0.8)	278	(37.5)	0	(0.0)	742	(100.0)
1400	551	(32.1)	0	(0.0)	22	(1.3)	1141	(66.6)	0	(0.0)	1714	(100.0)
1500	755	(40.1)	0	(0.0)	21	(1.1)	1109	(58.8)	0	(0.0)	1885	(100.0)
1600	712	(33.1)	0	(0.0)	21	(1.0)	1417	(65.9)	0	(0.0)	2150	(100.0)
1700	1941	(29.7)	0	(0.0)	80	(1.2)	4505	(69.0)	0	(0.0)	6526	(100.0)
1800	1249	(46.5)	0	(0.0)	34	(1.3)	1401	(52.2)	0	(0.0)	2684	(100.0)
1900	1213	(27.2)	0	(0.0)	37	(0.8)	3216	(72.0)	0	(0.0)	4466	(100.0)
2000	577	(40.9)	0	(0.0)	23	(1.6)	810	(57.4)	0	(0.0)	1410	(100.0)
*****	709	(47.7)	0	(0.0)	9	(0.6)	767	(51.6)	0	(0.0)	1485	(100.0)
Total	74009	(60.6)	27585	(22.6)	2741	(2.2)	17753	(14.5)	0	(0.0)	122088	(100.0)

Table 4B- 4  
Freight Traffic (Sugarcane/Sugar)

Distance	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	4828	(73.8)	1000	(15.3)	717	(11.0)	0	(0.0)	0	(0.0)	6545	(100.0)
200	3475	(69.5)	959	(19.2)	568	(11.4)	0	(0.0)	0	(0.0)	5002	(100.0)
300	2442	(65.7)	801	(21.5)	476	(12.8)	0	(0.0)	0	(0.0)	3719	(100.0)
400	1030	(68.5)	189	(12.6)	285	(18.9)	0	(0.0)	0	(0.0)	1504	(100.0)
500	348	(68.2)	40	(7.8)	122	(23.9)	0	(0.0)	0	(0.0)	510	(100.0)
600	463	(69.3)	7	(1.0)	198	(29.6)	0	(0.0)	0	(0.0)	668	(100.0)
700	388	(68.2)	0	(0.0)	181	(31.8)	0	(0.0)	0	(0.0)	569	(100.0)
800	227	(67.6)	0	(0.0)	109	(32.4)	0	(0.0)	0	(0.0)	336	(100.0)
900	211	(67.4)	0	(0.0)	102	(32.6)	0	(0.0)	0	(0.0)	313	(100.0)
1000	159	(66.0)	0	(0.0)	82	(34.0)	0	(0.0)	0	(0.0)	241	(100.0)
1100	199	(67.7)	0	(0.0)	95	(32.3)	0	(0.0)	0	(0.0)	294	(100.0)
1200	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1300	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1400	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1500	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1600	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1700	444	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	444	(100.0)
1800	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1900	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
2000	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
*****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
Total	14214	(70.6)	2996	(14.9)	2935	(14.6)	0	(0.0)	0	(0.0)	20145	(100.0)

Table 4B-5  
Freight Traffic (Wood/Forestry Products)

Distance	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	5991	(96.7)	7	(0.1)	11	(0.2)	188	(3.0)	0	(0.0)	6197	(100.0)
200	1819	(81.9)	106	(4.8)	32	(1.4)	264	(11.9)	0	(0.0)	2221	(100.0)
300	1280	(65.5)	425	(21.8)	30	(1.5)	218	(11.2)	0	(0.0)	1953	(100.0)
400	280	(46.1)	0	(0.0)	14	(2.3)	314	(51.6)	0	(0.0)	608	(100.0)
500	312	(58.4)	35	(6.6)	95	(17.8)	92	(17.2)	0	(0.0)	534	(100.0)
600	603	(60.7)	131	(13.2)	136	(13.7)	124	(12.5)	0	(0.0)	994	(100.0)
700	244	(59.1)	4	(1.0)	93	(22.5)	72	(17.4)	0	(0.0)	413	(100.0)
800	110	(50.0)	0	(0.0)	43	(19.5)	67	(30.5)	0	(0.0)	220	(100.0)
900	158	(17.0)	0	(0.0)	166	(17.8)	606	(65.2)	0	(0.0)	930	(100.0)
1000	71	(59.2)	0	(0.0)	26	(21.7)	23	(19.2)	0	(0.0)	120	(100.0)
1100	169	(57.5)	0	(0.0)	63	(21.4)	62	(21.1)	0	(0.0)	294	(100.0)
1200	39	(44.8)	0	(0.0)	16	(18.4)	32	(36.8)	0	(0.0)	87	(100.0)
1300	5	(26.3)	0	(0.0)	4	(21.1)	10	(52.6)	0	(0.0)	19	(100.0)
1400	108	(56.5)	0	(0.0)	41	(21.5)	42	(22.0)	0	(0.0)	191	(100.0)
1500	8	(61.5)	0	(0.0)	3	(23.1)	2	(15.4)	0	(0.0)	13	(100.0)
1600	245	(54.3)	0	(0.0)	95	(21.1)	111	(24.6)	0	(0.0)	451	(100.0)
1700	471	(56.3)	0	(0.0)	178	(21.3)	187	(22.4)	0	(0.0)	836	(100.0)
1800	180	(44.2)	0	(0.0)	82	(20.1)	145	(35.6)	0	(0.0)	407	(100.0)
1900	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
2000	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
*****	11	(57.9)	0	(0.0)	3	(15.8)	5	(26.3)	0	(0.0)	19	(100.0)
<b>Total</b>	<b>12104</b>	<b>(73.3)</b>	<b>708</b>	<b>(4.3)</b>	<b>1131</b>	<b>(6.9)</b>	<b>2564</b>	<b>(15.5)</b>	<b>0</b>	<b>(0.0)</b>	<b>16507</b>	<b>(100.0)</b>

Table 4B-6  
Freight Traffic (Steel)

Distance	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	6086	(78.7)	312	(4.0)	1258	(16.3)	82	(1.1)	0	(0.0)	7738	(100.0)
200	7307	(73.5)	175	(1.8)	2399	(24.1)	61	(0.6)	0	(0.0)	9942	(100.0)
300	5626	(68.5)	168	(2.0)	2372	(28.9)	51	(0.6)	0	(0.0)	8217	(100.0)
400	2374	(69.6)	61	(1.8)	895	(26.3)	79	(2.3)	0	(0.0)	3409	(100.0)
500	949	(67.0)	41	(2.9)	402	(28.4)	25	(1.8)	0	(0.0)	1417	(100.0)
600	680	(71.4)	13	(1.4)	242	(25.4)	18	(1.9)	0	(0.0)	953	(100.0)
700	402	(59.0)	2	(0.3)	168	(24.7)	109	(16.0)	0	(0.0)	681	(100.0)
800	262	(55.4)	0	(0.0)	126	(26.6)	85	(18.0)	0	(0.0)	473	(100.0)
900	332	(51.6)	0	(0.0)	168	(26.1)	143	(22.2)	0	(0.0)	643	(100.0)
1000	1307	(54.1)	0	(0.0)	498	(20.6)	613	(25.4)	0	(0.0)	2418	(100.0)
1100	446	(56.2)	0	(0.0)	174	(21.9)	173	(21.8)	0	(0.0)	793	(100.0)
1200	291	(50.8)	0	(0.0)	146	(25.5)	136	(23.7)	0	(0.0)	573	(100.0)
1300	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1400	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1500	85	(57.0)	0	(0.0)	27	(18.1)	37	(24.8)	0	(0.0)	149	(100.0)
1600	12	(8.9)	0	(0.0)	96	(71.1)	27	(20.0)	0	(0.0)	135	(100.0)
1700	528	(18.2)	0	(0.0)	648	(22.3)	1724	(59.4)	0	(0.0)	2900	(100.0)
1800	2	(9.5)	0	(0.0)	5	(23.8)	14	(66.7)	0	(0.0)	21	(100.0)
1900	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
2000	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
*****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
<b>Total</b>	<b>26689</b>	<b>(66.0)</b>	<b>772</b>	<b>(1.9)</b>	<b>9624</b>	<b>(23.8)</b>	<b>3377</b>	<b>(8.3)</b>	<b>0</b>	<b>(0.0)</b>	<b>40462</b>	<b>(100.0)</b>

Table 4B-7  
Freight Traffic (Construction Materials)

Distance	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	15582	(71.2)	5969	(27.3)	333	(1.5)	1	(0.0)	0	(0.0)	21885	(100.0)
200	7615	(56.4)	5362	(39.7)	528	(3.9)	3	(0.0)	0	(0.0)	13508	(100.0)
300	2400	(49.5)	2370	(48.9)	74	(1.5)	3	(0.1)	0	(0.0)	4847	(100.0)
400	1286	(85.8)	184	(12.3)	26	(1.7)	3	(0.2)	0	(0.0)	1499	(100.0)
500	353	(45.4)	217	(27.9)	203	(26.1)	4	(0.5)	0	(0.0)	777	(100.0)
600	232	(83.5)	25	(9.0)	19	(6.8)	2	(0.7)	0	(0.0)	278	(100.0)
700	644	(66.0)	2	(0.2)	37	(3.8)	293	(30.0)	0	(0.0)	976	(100.0)
800	396	(67.6)	0	(0.0)	21	(3.6)	169	(28.8)	0	(0.0)	586	(100.0)
900	358	(60.8)	0	(0.0)	37	(6.3)	194	(32.9)	0	(0.0)	589	(100.0)
1000	346	(61.3)	0	(0.0)	18	(3.2)	200	(35.5)	0	(0.0)	564	(100.0)
1100	76	(47.5)	0	(0.0)	27	(16.9)	57	(35.6)	0	(0.0)	160	(100.0)
1200	132	(58.4)	0	(0.0)	18	(8.0)	76	(33.6)	0	(0.0)	226	(100.0)
1300	141	(59.2)	0	(0.0)	16	(6.7)	81	(34.0)	0	(0.0)	238	(100.0)
1400	213	(49.0)	0	(0.0)	14	(3.2)	208	(47.8)	0	(0.0)	435	(100.0)
1500	34	(63.0)	0	(0.0)	2	(3.7)	18	(33.3)	0	(0.0)	54	(100.0)
1600	50	(52.6)	0	(0.0)	13	(13.7)	32	(33.7)	0	(0.0)	95	(100.0)
1700	513	(56.0)	0	(0.0)	49	(5.3)	354	(38.6)	0	(0.0)	916	(100.0)
1800	661	(58.8)	0	(0.0)	62	(5.5)	402	(35.7)	0	(0.0)	1125	(100.0)
1900	826	(59.0)	0	(0.0)	67	(4.8)	508	(36.3)	0	(0.0)	1401	(100.0)
2000	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
*****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
<b>Total</b>	<b>31858</b>	<b>(63.5)</b>	<b>14129</b>	<b>(28.2)</b>	<b>1564</b>	<b>(3.1)</b>	<b>2608</b>	<b>(5.2)</b>	<b>0</b>	<b>(0.0)</b>	<b>50159</b>	<b>(100.0)</b>

Table 4B-8  
Freight Traffic (Cement)

Distance	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	15926	(65.7)	7891	(32.6)	318	(1.3)	102	(0.4)	0	(0.0)	24237	(100.0)
200	6805	(68.0)	2453	(24.5)	407	(4.1)	337	(3.4)	0	(0.0)	10002	(100.0)
300	3158	(34.7)	4971	(54.6)	193	(2.1)	788	(8.6)	0	(0.0)	9110	(100.0)
400	1445	(61.3)	510	(21.6)	73	(3.1)	331	(14.0)	0	(0.0)	2359	(100.0)
500	920	(55.3)	317	(19.1)	115	(6.9)	311	(18.7)	0	(0.0)	1663	(100.0)
600	565	(36.4)	2	(0.1)	93	(6.0)	891	(57.4)	0	(0.0)	1551	(100.0)
700	188	(29.7)	0	(0.0)	51	(8.1)	393	(62.2)	0	(0.0)	632	(100.0)
800	232	(32.5)	0	(0.0)	41	(5.8)	440	(61.7)	0	(0.0)	713	(100.0)
900	450	(38.4)	0	(0.0)	23	(2.0)	700	(59.7)	0	(0.0)	1173	(100.0)
1000	946	(44.9)	0	(0.0)	17	(0.8)	1146	(54.3)	0	(0.0)	2109	(100.0)
1100	705	(41.8)	0	(0.0)	18	(1.1)	964	(57.1)	0	(0.0)	1687	(100.0)
1200	1470	(39.6)	0	(0.0)	14	(0.4)	2227	(60.0)	0	(0.0)	3711	(100.0)
1300	1280	(42.7)	0	(0.0)	27	(0.9)	1691	(56.4)	0	(0.0)	2998	(100.0)
1400	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1500	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1600	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1700	391	(50.0)	0	(0.0)	0	(0.0)	391	(50.0)	0	(0.0)	782	(100.0)
1800	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1900	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
2000	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
*****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
<b>Total</b>	<b>34481</b>	<b>(55.0)</b>	<b>16144</b>	<b>(25.7)</b>	<b>1390</b>	<b>(2.2)</b>	<b>10712</b>	<b>(17.1)</b>	<b>0</b>	<b>(0.0)</b>	<b>62727</b>	<b>(100.0)</b>

Table 4B-9  
Freight Traffic (Fertilizer)

Distance	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	8673	(50.7)	5433	(31.7)	2910	(17.0)	99	(0.6)	0	(0.0)	17115	(100.0)
200	7877	(44.2)	5607	(31.5)	4135	(23.2)	204	(1.1)	0	(0.0)	17823	(100.0)
300	9084	(42.6)	7661	(36.0)	4444	(20.9)	112	(0.5)	0	(0.0)	21301	(100.0)
400	1936	(33.4)	2030	(35.0)	1411	(24.3)	428	(7.4)	0	(0.0)	5805	(100.0)
500	1216	(51.5)	294	(12.5)	711	(30.1)	140	(5.9)	0	(0.0)	2361	(100.0)
600	707	(27.6)	33	(1.3)	568	(22.2)	1250	(48.9)	0	(0.0)	2558	(100.0)
700	180	(35.7)	8	(1.6)	170	(33.7)	146	(29.0)	0	(0.0)	504	(100.0)
800	728	(48.4)	0	(0.0)	442	(29.4)	335	(22.3)	0	(0.0)	1505	(100.0)
900	314	(36.9)	0	(0.0)	300	(35.3)	236	(27.8)	0	(0.0)	850	(100.0)
1000	429	(27.6)	0	(0.0)	625	(40.2)	500	(32.2)	0	(0.0)	1554	(100.0)
1100	250	(37.9)	0	(0.0)	197	(29.9)	212	(32.2)	0	(0.0)	659	(100.0)
1200	297	(31.2)	0	(0.0)	388	(40.8)	266	(28.0)	0	(0.0)	951	(100.0)
1300	63	(18.5)	0	(0.0)	145	(42.5)	133	(39.0)	0	(0.0)	341	(100.0)
1400	136	(29.6)	0	(0.0)	164	(35.7)	160	(34.8)	0	(0.0)	460	(100.0)
1500	111	(28.9)	0	(0.0)	145	(37.8)	128	(33.3)	0	(0.0)	384	(100.0)
1600	110	(9.6)	0	(0.0)	277	(24.2)	759	(66.2)	0	(0.0)	1146	(100.0)
1700	372	(10.6)	0	(0.0)	787	(22.5)	2337	(66.8)	0	(0.0)	3496	(100.0)
1800	301	(25.5)	0	(0.0)	426	(36.1)	453	(38.4)	0	(0.0)	1180	(100.0)
1900	235	(16.7)	0	(0.0)	538	(38.3)	633	(45.0)	0	(0.0)	1406	(100.0)
2000	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
*****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
Total	33019	(40.6)	21066	(25.9)	18783	(23.1)	8531	(10.5)	0	(0.0)	81399	(100.0)

Table 4B-10  
Freight Traffic (Coal)

Distance	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	3333	(13.2)	19184	(76.1)	2618	(10.4)	70	(0.3)	0	(0.0)	25205	(100.0)
200	883	(19.2)	3036	(65.9)	565	(12.3)	126	(2.7)	0	(0.0)	4610	(100.0)
300	909	(6.1)	13356	(89.9)	551	(3.7)	41	(0.3)	0	(0.0)	14857	(100.0)
400	583	(11.0)	1273	(24.0)	138	(2.6)	3306	(62.4)	0	(0.0)	5300	(100.0)
500	164	(36.8)	5	(1.1)	145	(32.5)	132	(29.6)	0	(0.0)	446	(100.0)
600	1059	(26.6)	9	(0.2)	33	(0.8)	2884	(72.4)	0	(0.0)	3985	(100.0)
700	51	(41.5)	0	(0.0)	7	(5.7)	65	(52.8)	0	(0.0)	123	(100.0)
800	4	(19.0)	0	(0.0)	7	(33.3)	10	(47.6)	0	(0.0)	21	(100.0)
900	0	(0.0)	0	(0.0)	4	(0.8)	498	(99.2)	0	(0.0)	502	(100.0)
1000	25	(32.5)	0	(0.0)	2	(2.6)	50	(64.9)	0	(0.0)	77	(100.0)
1100	52	(35.1)	0	(0.0)	0	(0.0)	96	(64.9)	0	(0.0)	148	(100.0)
1200	193	(45.5)	0	(0.0)	16	(3.8)	215	(50.7)	0	(0.0)	424	(100.0)
1300	112	(27.1)	0	(0.0)	26	(6.3)	275	(66.6)	0	(0.0)	413	(100.0)
1400	4	(1.8)	0	(0.0)	12	(5.4)	206	(92.8)	0	(0.0)	222	(100.0)
1500	47	(13.3)	0	(0.0)	65	(18.4)	242	(68.4)	0	(0.0)	354	(100.0)
1600	62	(19.7)	0	(0.0)	34	(10.8)	218	(69.4)	0	(0.0)	314	(100.0)
1700	28	(23.3)	0	(0.0)	23	(19.2)	69	(57.5)	0	(0.0)	120	(100.0)
1800	35	(17.3)	0	(0.0)	30	(14.9)	137	(67.8)	0	(0.0)	202	(100.0)
1900	13	(11.6)	0	(0.0)	7	(6.3)	92	(82.1)	0	(0.0)	112	(100.0)
2000	0	(0.0)	0	(0.0)	0	(0.0)	6806	(100.0)	0	(0.0)	6806	(100.0)
*****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
Total	7557	(11.8)	36863	(57.4)	4283	(6.7)	15538	(24.2)	0	(0.0)	64241	(100.0)

Table 4B-11  
Freight Traffic (Petroleum Products)

Distance	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	14720	(80.0)	3377	(18.3)	257	(1.4)	57	(0.3)	0	(0.0)	18411	(100.0)
200	19995	(72.8)	6678	(24.3)	676	(2.5)	123	(0.4)	0	(0.0)	27472	(100.0)
300	9348	(50.1)	9030	(48.4)	241	(1.3)	54	(0.3)	0	(0.0)	18673	(100.0)
400	3479	(67.1)	1574	(30.4)	92	(1.8)	37	(0.7)	0	(0.0)	5182	(100.0)
500	1664	(47.8)	1058	(30.4)	34	(1.0)	728	(20.9)	0	(0.0)	3484	(100.0)
600	1328	(68.7)	67	(3.5)	36	(1.9)	501	(25.9)	0	(0.0)	1932	(100.0)
700	555	(48.8)	11	(1.0)	36	(3.2)	535	(47.1)	0	(0.0)	1137	(100.0)
800	955	(49.2)	0	(0.0)	56	(2.9)	929	(47.9)	0	(0.0)	1940	(100.0)
900	21038	(49.9)	0	(0.0)	655	(1.6)	20447	(48.5)	0	(0.0)	42140	(100.0)
1000	982	(48.1)	0	(0.0)	81	(4.0)	977	(47.9)	0	(0.0)	2040	(100.0)
1100	1298	(44.4)	0	(0.0)	100	(3.4)	1528	(52.2)	0	(0.0)	2926	(100.0)
1200	618	(47.9)	0	(0.0)	29	(2.2)	644	(49.9)	0	(0.0)	1291	(100.0)
1300	495	(49.0)	0	(0.0)	14	(1.4)	502	(49.7)	0	(0.0)	1011	(100.0)
1400	309	(48.2)	0	(0.0)	15	(2.3)	317	(49.5)	0	(0.0)	641	(100.0)
1500	316	(46.7)	0	(0.0)	14	(2.1)	347	(51.3)	0	(0.0)	677	(100.0)
1600	446	(46.4)	0	(0.0)	18	(1.9)	498	(51.8)	0	(0.0)	962	(100.0)
1700	849	(45.2)	0	(0.0)	95	(5.1)	935	(49.8)	0	(0.0)	1879	(100.0)
1800	1234	(25.8)	0	(0.0)	83	(1.7)	3462	(72.4)	0	(0.0)	4779	(100.0)
1900	1223	(46.7)	0	(0.0)	67	(2.6)	1327	(50.7)	0	(0.0)	2617	(100.0)
2000	1149	(46.2)	0	(0.0)	73	(2.9)	1267	(50.9)	0	(0.0)	2489	(100.0)
*****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
Total	82001	(57.9)	21795	(15.4)	2672	(1.9)	35215	(24.9)	0	(0.0)	141683	(100.0)

Table 4B-12  
Freight Traffic (Industrial Crops)

Distance	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	3547	(87.1)	0	(0.0)	527	(12.9)	0	(0.0)	0	(0.0)	4074	(100.0)
200	2124	(75.7)	0	(0.0)	680	(24.3)	0	(0.0)	0	(0.0)	2804	(100.0)
300	1710	(82.9)	0	(0.0)	352	(17.1)	0	(0.0)	0	(0.0)	2062	(100.0)
400	1794	(75.4)	0	(0.0)	585	(24.6)	0	(0.0)	0	(0.0)	2379	(100.0)
500	926	(65.9)	0	(0.0)	479	(34.1)	0	(0.0)	0	(0.0)	1405	(100.0)
600	316	(66.5)	0	(0.0)	159	(33.5)	0	(0.0)	0	(0.0)	475	(100.0)
700	216	(68.4)	0	(0.0)	100	(31.6)	0	(0.0)	0	(0.0)	316	(100.0)
800	200	(53.6)	0	(0.0)	173	(46.4)	0	(0.0)	0	(0.0)	373	(100.0)
900	165	(60.9)	0	(0.0)	106	(39.1)	0	(0.0)	0	(0.0)	271	(100.0)
1000	267	(59.7)	0	(0.0)	180	(40.3)	0	(0.0)	0	(0.0)	447	(100.0)
1100	158	(53.0)	0	(0.0)	140	(47.0)	0	(0.0)	0	(0.0)	298	(100.0)
1200	210	(50.4)	0	(0.0)	207	(49.6)	0	(0.0)	0	(0.0)	417	(100.0)
1300	167	(52.7)	0	(0.0)	150	(47.3)	0	(0.0)	0	(0.0)	317	(100.0)
1400	231	(55.8)	0	(0.0)	183	(44.2)	0	(0.0)	0	(0.0)	414	(100.0)
1500	187	(43.4)	0	(0.0)	244	(56.6)	0	(0.0)	0	(0.0)	431	(100.0)
1600	100	(49.3)	0	(0.0)	103	(50.7)	0	(0.0)	0	(0.0)	203	(100.0)
1700	539	(31.1)	0	(0.0)	1195	(68.9)	0	(0.0)	0	(0.0)	1734	(100.0)
1800	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1900	16	(64.0)	0	(0.0)	9	(36.0)	0	(0.0)	0	(0.0)	25	(100.0)
2000	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
*****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
Total	12873	(69.8)	0	(0.0)	5572	(30.2)	0	(0.0)	0	(0.0)	18445	(100.0)

Table 4B-13  
Freight Traffic (Manufacturing Products)

Distance	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	22913	(79.9)	1030	(3.6)	4741	(16.5)	9	(0.0)	0	(0.0)	28693	(100.0)
200	19380	(74.5)	1814	(7.0)	4766	(18.3)	43	(0.2)	0	(0.0)	26003	(100.0)
300	10752	(77.3)	409	(2.9)	2616	(18.8)	139	(1.0)	2	(0.0)	13918	(100.0)
400	4809	(69.8)	295	(4.3)	1409	(20.4)	378	(5.5)	0	(0.0)	6891	(100.0)
500	2620	(67.3)	66	(1.7)	1062	(27.3)	141	(3.6)	2	(0.1)	3891	(100.0)
600	839	(69.2)	8	(0.7)	329	(27.1)	37	(3.1)	0	(0.0)	1213	(100.0)
700	1152	(60.7)	0	(0.0)	389	(20.5)	355	(18.7)	1	(0.1)	1897	(100.0)
800	725	(60.1)	0	(0.0)	251	(20.8)	223	(18.5)	7	(0.6)	1206	(100.0)
900	521	(60.0)	0	(0.0)	180	(20.7)	167	(19.2)	0	(0.0)	868	(100.0)
1000	843	(57.3)	0	(0.0)	313	(21.3)	310	(21.1)	6	(0.4)	1472	(100.0)
1100	297	(43.9)	0	(0.0)	135	(20.0)	244	(36.1)	0	(0.0)	676	(100.0)
1200	176	(32.1)	0	(0.0)	116	(21.1)	257	(46.8)	0	(0.0)	549	(100.0)
1300	328	(25.3)	0	(0.0)	235	(18.1)	732	(56.5)	1	(0.1)	1296	(100.0)
1400	405	(38.0)	0	(0.0)	205	(19.2)	456	(42.8)	0	(0.0)	1066	(100.0)
1500	117	(53.9)	0	(0.0)	42	(19.4)	58	(26.7)	0	(0.0)	217	(100.0)
1600	408	(48.9)	0	(0.0)	216	(25.9)	211	(25.3)	0	(0.0)	835	(100.0)
1700	1676	(39.8)	0	(0.0)	894	(21.3)	1489	(35.4)	148	(3.5)	4207	(100.0)
1800	674	(28.7)	0	(0.0)	410	(17.5)	1209	(51.5)	54	(2.3)	2347	(100.0)
1900	395	(31.3)	0	(0.0)	226	(17.9)	639	(50.7)	1	(0.1)	1261	(100.0)
2000	309	(41.7)	0	(0.0)	132	(17.8)	300	(40.5)	0	(0.0)	741	(100.0)
*****	650	(56.7)	0	(0.0)	194	(16.9)	302	(26.3)	1	(0.1)	1147	(100.0)
Total	69989	(69.7)	3622	(3.6)	18861	(18.8)	7699	(7.7)	223	(0.2)	100394	(100.0)

Table 4B-14  
Freight Traffic (Fishery Products)

Distance	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	2348	(79.4)	609	(20.6)	0	(0.0)	0	(0.0)	0	(0.0)	2957	(100.0)
200	2021	(63.4)	1167	(36.6)	0	(0.0)	0	(0.0)	0	(0.0)	3188	(100.0)
300	2314	(74.8)	780	(25.2)	0	(0.0)	0	(0.0)	0	(0.0)	3094	(100.0)
400	793	(78.1)	223	(21.9)	0	(0.0)	0	(0.0)	0	(0.0)	1016	(100.0)
500	366	(88.6)	47	(11.4)	0	(0.0)	0	(0.0)	0	(0.0)	413	(100.0)
600	176	(89.8)	20	(10.2)	0	(0.0)	0	(0.0)	0	(0.0)	196	(100.0)
700	417	(93.1)	30	(6.7)	0	(0.0)	0	(0.0)	1	(0.2)	448	(100.0)
800	467	(99.6)	0	(0.0)	0	(0.0)	0	(0.0)	2	(0.4)	469	(100.0)
900	146	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	146	(100.0)
1000	253	(99.6)	0	(0.0)	0	(0.0)	0	(0.0)	1	(0.4)	254	(100.0)
1100	110	(99.1)	0	(0.0)	0	(0.0)	0	(0.0)	1	(0.9)	111	(100.0)
1200	244	(99.6)	0	(0.0)	0	(0.0)	0	(0.0)	1	(0.4)	245	(100.0)
1300	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
1400	23	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	23	(100.0)
1500	261	(99.6)	0	(0.0)	0	(0.0)	0	(0.0)	1	(0.4)	262	(100.0)
1600	91	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	91	(100.0)
1700	588	(89.6)	0	(0.0)	0	(0.0)	0	(0.0)	68	(10.4)	656	(100.0)
1800	262	(89.1)	0	(0.0)	0	(0.0)	0	(0.0)	32	(10.9)	294	(100.0)
1900	145	(98.6)	0	(0.0)	0	(0.0)	0	(0.0)	2	(1.4)	147	(100.0)
2000	151	(98.7)	0	(0.0)	0	(0.0)	0	(0.0)	2	(1.3)	153	(100.0)
*****	40	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	40	(100.0)
Total	11216	(79.0)	2876	(20.2)	0	(0.0)	0	(0.0)	111	(0.8)	14203	(100.0)

Table 4B-15  
Freight Traffic (Animal/Meat)

Distance	Truck		Inland		Railway		Coastal		Air		Total	
	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%	Tons/day	%
100	2936	(81.1)	60	(1.7)	623	(17.2)	0	(0.0)	0	(0.0)	3619	(100.0)
200	1836	(72.1)	293	(11.5)	417	(16.4)	0	(0.0)	0	(0.0)	2546	(100.0)
300	2678	(84.7)	89	(2.8)	393	(12.4)	0	(0.0)	0	(0.0)	3160	(100.0)
400	238	(55.2)	9	(2.1)	184	(42.7)	0	(0.0)	0	(0.0)	431	(100.0)
500	275	(70.0)	5	(1.3)	113	(28.8)	0	(0.0)	0	(0.0)	393	(100.0)
600	272	(55.6)	1	(0.2)	216	(44.2)	0	(0.0)	0	(0.0)	489	(100.0)
700	101	(43.9)	0	(0.0)	129	(56.1)	0	(0.0)	0	(0.0)	230	(100.0)
800	132	(40.2)	0	(0.0)	196	(59.8)	0	(0.0)	0	(0.0)	328	(100.0)
900	18	(16.8)	0	(0.0)	89	(83.2)	0	(0.0)	0	(0.0)	107	(100.0)
1000	194	(51.7)	0	(0.0)	181	(48.3)	0	(0.0)	0	(0.0)	375	(100.0)
1100	8	(16.0)	0	(0.0)	42	(84.0)	0	(0.0)	0	(0.0)	50	(100.0)
1200	19	(26.4)	0	(0.0)	53	(73.6)	0	(0.0)	0	(0.0)	72	(100.0)
1300	124	(66.0)	0	(0.0)	64	(34.0)	0	(0.0)	0	(0.0)	188	(100.0)
1400	501	(64.4)	0	(0.0)	277	(35.6)	0	(0.0)	0	(0.0)	778	(100.0)
1500	468	(64.6)	0	(0.0)	256	(35.4)	0	(0.0)	0	(0.0)	724	(100.0)
1600	224	(64.2)	0	(0.0)	125	(35.8)	0	(0.0)	0	(0.0)	349	(100.0)
1700	690	(61.4)	0	(0.0)	433	(38.6)	0	(0.0)	0	(0.0)	1123	(100.0)
1800	443	(64.6)	0	(0.0)	243	(35.4)	0	(0.0)	0	(0.0)	686	(100.0)
1900	151	(65.7)	0	(0.0)	79	(34.3)	0	(0.0)	0	(0.0)	230	(100.0)
2000	138	(58.0)	0	(0.0)	100	(42.0)	0	(0.0)	0	(0.0)	238	(100.0)
*****	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)	0	(---)
Total	11446	(71.0)	457	(2.8)	4213	(26.1)	0	(0.0)	0	(0.0)	16116	(100.0)