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

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

# **Technical Report No. 2** MAIN COMMODITIES ANALYSIS AND FREIGHT TRASPORT

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ALMEC CORPORATION PACIFIC CONSULTANTS INTERNATIONAL

### PREFACE

During the period of the Study on the National Transport Development Strategy in Vietnam (VITRANSS), various technical papers have been prepared by different Study Team members in various occasions to facilitate the discussions with counterpart team, concerning subsector agencies and to document major findings and outputs produced in the process of the Study. These papers have been organized into a series of technical reports (See Table A below) which intend to provide more detailed background information for descriptions and discussions made on key study components and issues. These technical reports are working documents of the Study which, however, will be useful for further reference, by the counterpart team and related subsector agencies.

### Table A List of Technical Reports

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

### Technical Report No. 2 MAIN COMMODITY ANALYSIS AND FREIGHT TRANSPORT

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### Glossary

APEC	Asia Pacific Economic Cooperation
AFTA	ASEAN Free Trade Area
ASCOBIPS	Association of Shippers' Councils of Bangladesh, India, Pakistan and Sri Lanka
ASEAN	Association of South East Asian Nations
CAAV	Civil Aviation Administration of Vietnam
CFS	Container Freight Station
CIF	Cost, Insurance and Freight
EDI	Electronic Data Interchange
EEZ	Exclusive Economic Zone
EPZ	Export Processing Zones
ESC	European Shippers' Councils
ESCAP	Economic and Social Commissions for Asia and the Pacific
FASC	Federation of EASEAN Shippers' Councils
FCL	Full Container Load
FOB	Free on Board
GDP	Gross Domestic Product
GEMADEPT	General Forwarding and Agency Co., Ltd.
ICD	Inland Container Depot
ITS	Intelligent Transport System
IWT	Inland Waterway Transport
JICA	Japan International Cooperation Agency
LCL	Less than Container Load
LTL	Less than Truck Load
MARD	Ministry of Agriculture and Rural Development
MOC	Ministry of Construction
MOF	Ministry of Finance
MOT	Ministry of Transport
MT Document	Multimodal Transport Document
MTO	Multimodal Transport Operation
NGO	Non-government Organization
NVOCC	Non Vessel Operating Common Carrier
NVO-MIO	Non Vessel Operating Multimodal Transport Operation
PCC	Pure Car Carriers
PSC	Port State Control
SDR	Special Drawing Right
SKRL	Singapore-Kunming Rail Link
SOE	State Owned Enterprise
IAR	I rans-Asian Railway
UNDP	United Nations Development Programme
	Vietnam Cement Corporation
	Vietnam Freight Forwarders Association
	Vietnam Snipping Lines
	Vietnam Maritime Bureau
	Vietnam Transport Strategy Study
	Vietnam Transport Strategy Study
VR	Vietnam Railwave
VRΔ	Vietnam Road Administration
WCO	World Customs Organization
WTO	World Trade Organization
	wond trade Organization

## **APPENDICES**

## PART I

## MAIN COMMODITY ANALYSIS

### 1 INTRODUCTION

### 1.1 Objectives

Cargo transport planning must start from commodity analysis. Unlike passenger transport, cargo must be analyzed by commodity since each commodity has a particular package style (bagged, tank, bulk, etc.) and consignment size, and some commodities have inherent seasonality. It is likewise important to understand cargo flow. Specific commodity analysis is required, including production sites, consumption sites and suitable haulage methods.

The Study on the National Transport Development Strategy (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 are analyzed at provincial level, using provincial statistics, trade statistics, government documents, and results of various VITRANSS surveys. As a next step, future production and consumption by commodity are forecast to specify possible cargo traffic demand in future. The socio-economic framework prepared by the VITRANSS is a main indicator, and relevant government policies, such as agriculture/industry development, area development/preservation, trade facilitation, etc., are examined in depth. (Refer to Figure 1.1.1)



#### 1.2 **Classification of Main Commodities**

When shippers and consignees choose a transport mode, cargo characteristics are affected by their decision. The decisive factors are consignment size, package style, durability, urgency, and market value. Although they have a limited range of choices at present, it is expected for shippers and consignees to buy various transport services in future in line with Vietnam's transport system development.

Taking the above aspect into account, the VITRANSS prepared the commodity classification list consisting of nine major and 39 minor commodities (refer to Table 1.2.1) and conducted road traffic surveys, river traffic surveys and passenger/driver interview surveys at transport terminals.

To come up with a commodity analysis, cargo is divided into 13 main commodities after reviewing the results of traffic surveys and related economic statistics. Table 1.2.2 indicates them in comparison with previous studies.

Table 1.2.2
Comparison of the Commodity Classification for Traffic Demand Analysis
between VITRANSS and Previous Studies

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

<sup>1</sup> National Transport Sector Review, 1992, UNDP and MOTCP <sup>2</sup> Transport Master Plan for the Central Region of Vietnam, 1998, France and MOT

Code	Commodity Classification	Examples
	Agriculture Products	
11	Paddy	
12	Maize	
13	Milled Rice. Maize	
14	Sugarcane	
15	Fresh fruit	
19	Other Agricultural Products	Potatoes, sweet potatoes, cassava, ground-nut.
		cotton, sown (sedge), jute, soya curd
	Wood and Forestry Products	
21	Timber	
22	Firewood	
29	Other Wood and Forestry Products	Bamboo and other tree like bamboo, woodwork
	Construction Materials (excluding Cement)	•
31	Stone	
32	Sands, Pebbles	
33	Iron, Steel	
39	Other Construction Materials	Brick, tiles, cover plate
	Cement	
41	Lime Stone	
42	Clinker	
43	Cement	
49	Other Cement-related Products	
-	Fertilizer	
51	Fertilizer	Chemical fertilizer, phosphate fertilizer, anti-insect
•		chemicals
59	Other Fertilizer-related Products	
	Coal, Peat, Ore	
61	Coal	
62	Ore	
63	Peat	
69	Other Coal/Peat/Ore-related Products	
	Petroleum Products	
71	Crude Oil	
72	Asphalt	
73	Refined Petroleum Products	Gasoline, diesel, mazout, kerosene, lubricant oil
79	Other Petroleum-related Products	
	Industrial and Manufacturing Products	
81	Sugar, Sugar Syrups	
82	Coffee	
83	Теа	
84	Wheat Flower	
85	Rubber Products	
86	Chemicals	
89	Other Industrial and Manufacturing	Paper, textile material, tobacco, machinery,
	Products	computer, medical instrument, gas, salt, etc.
	Products for Daily Consumption	
91	Fishery Products	Fish, shrimp etc.
92	Livestock, Meat	
99	Other Products for Daily Consumption	Cake etc.
0	Unknown Commodity Type	

 Table 1.2.1

 Classification of Commodity in the VITRANSS Traffic Surveys

### 1.3 Forecast Method

Table 1.3.1 shows the methods used in forecasting the production and consumption of each of the main commodities. Necessary remarks related to forecasting are addressed below:

- In the transition to a market economy, liberalized policies intensified domestic productions much faster than GDP growth. But they could not meet domestic demand. Therefore, domestic manufacturers embarked on expansion plans and considerably invested in expanding production capacity. After the onset of the regional economic crisis, many domestic industrial products have remained unsold in warehouses, such as coal, steel, sugar, and cement, prompting a careful review of development/investment plans formulated before the crisis. High growth rates experienced before the crisis are also unlikely to be achieved in the near future.
- As economy grows, the people's living standards will be changed. For instance, nutritious components will be diversified and per capita consumption of fish, meat and sugar will increase. As for energy, many of the 30 million residents who had no access to electricity in 1997 will soon have access to electricity partly due to the construction of thermal power plants. The improvement of living standard in future is considered as a national minimum requirement.
- Generally speaking, the forecast deficit/surplus of main commodities at provincial and national levels will comprise the possible cargo demand on interprovincial and international traffic, respectively. Liberalized trade regimes which 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 for domestic trade to some extent, since buyers do not need to follow suppliers' suggestions and can choose the best suited products from a wide range of selection including imported products.
- Government will have to elaborate its export policy to earn hard currencies as necessary. Current strategic export commodities are rice, coffee, rubber, fish products, textile and garment, chemical shoes, crude oil, and coal. Vietnam must export such commodities to the international market even at the expense of domestic demand. For instance, the Association of Coffee Producing Countries (ACPC) has not admitted Vietnam because it cannot comply with one of the requirements -- to store 20% of national production, or 60,000 tons of coffee beans. It is not affordable in the domestic market, at least, at the export price. Therefore, government's export policy needs to be carefully re-examined.

Table 1.3.1
Methods 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	Government's woodcutting 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 fish products, Potential analysis of catching and breeding fish, 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 plants	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 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 ESTIMATE OF PRODUCTION AND CONSUMPTION OF GOODS

### 2.1 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 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. It 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 has 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 percent 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) projects 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 satisfied with its self-sufficiency 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 2.1.1).

Production of other food crops such as maize, sweet potatoes and cassava, initiated by the MARD, is likewise expected to increase (see Table 2.1.2).

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

					•	('000 to	ns)
Denier		Production			Consumption		
	Region	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.	Northeast South	1,479.1	1841.0	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

Table 2.1.1				
Rice and Other Food Crops				

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.	Northeast 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		

(paddy equivalent, 000t)					
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				

### 2.2 Sugarcane and Sugar

### **Present Situation**

The gross output of sugarcane has substantially increased from 5.4 million tons in 1990 to 13.8 million tons in 1998 because of the increase in cultivated area by 116% as well as yield improvement by 18%. About 54% of output are processed in sugar mills. Sugarcane is popular for its juice and sugar.

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

After government banned imported sugar, smuggling of the product increased allegedly through China and Thailand. Due to its low price, ranging from US\$ 0.32 to 0.39 a kilo compared with local products selling at US\$ 0.46-50, smuggled sugar may rise to 150,000 tons or 20% of domestic demand in 1999. Consequently, warehouses stockpiled 290,000 tons of local sugar 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, and Vietnam is not exceptional. Thus, the Institute of Agricultural Planning and Statistics predicts that every Vietnamese will consume 13-20 kg of sugar in 2010.

Although government's sugar production plan is temporarily suspended, it still intends to operate 47 mills mostly located in the north to produce about 2.5 million tons in 2020. Table 2.2.2 shows that if sugar consumption per person would be 20 kg in 2020, Vietnam could export 470,000 tons.

				0		('000	tons)
	Pagion	Gross Output			Processed in Factories		
	Region	1997	2010	2020	1997	2010	2020
1.	Red River Delta	130.1	799.0	824.0	0.0	0.0	1,135.01
2.	North East	476.3	1,423.5	1,807.5	195.5	391.0	1,134.0
3.	North West	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.	North East 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 2.2.1 Forecast of Sugarcane

### Table 2.2.2 Forecast of Sugar

					('000 tons)		
	Pagion		Production			Consumption	•
	Region	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.	Northeast 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

Pagion		Surplus/Deficit					
	Region	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.	Northeast 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 2.2.3	
Sugarcane Factories (Existing	and Planned)

No.         Factory name         Location         Processing Capacity (tor/day)         Intent-ougan Production (ton/gap)         Topset of Construction Schedule Construction Schedule           1         Lam Son         Thanh Hoa         6,000         108,000         8,640           2         Viet Tin         Phu Tho         5000         17,550         8,750           3         Xuan Duong         Tuyen Quang         700         7,500         6,750           5         Hoa Binh         700         7,500         6,000         16,800           6         Song Con         Nge An         1,200         21,000         16,800           7         Go Bang         700         7,500         3,750         3,750           10         Song Lam NA         Nghe An         6,000         108,000         54,000           11         Viet Dir H         Thanh Hoa         6,000         108,000         54,000           12         TEXALine         Nghe An         6,000         17,500         8,750           13         Quang Binh         Quang Mani         1,000         17,500         8,750           12         TEXALine         Nghe An         1,000         17,500         8,250				Designed Sugarcane	Planned Sugar	Actual Sugar Production in
Image: Construction Schedule         Instruction Schedule         Construction Schedule           1         Lam Son         Thanh Hoa         6.000         108.000         6.660         3.30           2         Vier Tri         Tuyen Quang         1.000         1.750         8.750           4         Tuyen Quang         7.00         7.500         6.000         6.000           5         Koa Binh         Hoa Binh         1.200         21.000         16.800           6         Song Con         Hya An         1.220         21.000         15.500           9         Cao Bang         Cao Bang         7.00         7.500         3.750           10         Song Lam NA         Nyle An         6.000         108.000         54.000           11         Viet Dai TH         Thanh Hoa         6.000         108.000         54.000           12         TEXALine         Nyle An         6.000         108.000         54.000           12         TEXALine         Nyle An         1.000         17.500         8.750           13         Quang Binh         1.500         21.000         24.000         24.000           14         CCP         Hue         3.000 <td< td=""><td>No.</td><td>Factory name</td><td>Location</td><td>Processing Capacity</td><td>Production (ton/year)</td><td>1998 or Factory</td></td<>	No.	Factory name	Location	Processing Capacity	Production (ton/year)	1998 or Factory
1         Lam Son         Thanh Hoa         6,000         108,000         8,840           3         Xuan Duong         Tuyen Quang         1,000         1,750         8,750           3         Kuan Duong         Tuyen Quang         700         7,500         3,750           5         Hota Binin         700         7,500         6,000         15,869           5         Linh Cam         Hota Binin         1000         17,500         15,850           8         Luinh Cam         Hai Tinh         1,000         17,500         3,750           9         Cao Bang         Cao Bang         700         7,500         3,750           10         Song Lam NA         Nghe An         6,000         108,000         5,400           11         Viet Di H         Tianh Hoa         6,000         108,000         5,400           12         TEXALine         Nghe An         6,000         17,500         8,750           14         CCP         Hue         3,000         60,000         21,000           16         Dac Lac         Dak Lak         1,000         17,500         14,000           17         Quang Magi         Quang Magi         2,000				(ton/day)		Construction Schedule
2         With IT         FTU PIR Obang         Tuyen Chang         Tuyen	1	Lam Son	Thanh Hoa	6,000	108,000	8,640
4         Tuyen Quang         Tuyen Quang         7:500         7:500         8:750           6         Song Con         Nge An         1.250         21.000         16:800           6         Son La         Son La         1.000         17:500         5:600           7         Son La         Son La         1.000         17:500         5:250           9         Cao Bang         Cao Bang         Tuyen Auang         7:00         7:500         3:750           10         Song Lam NA         Nghe An         3:00         4:500         3:600           11         Viet Dai H         Thanh Hoa         6:000         108:000         5:400           12         TEXALine         Nghe An         6:000         108:000         5:400           12         TEXALine         Nghe An         6:000         108:000         5:400           13         Quang Binh         Quang Magi 1         Quang Ngai 1         Quang Ngai 1         Quang Ngai 1         Quang Ngai 2         2:000         24:000         21:000         21:000         21:000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000	23	Xuan Duong		1 000	0,000 1,750	8 750
is         Hoa Binh         Proa         Trico         Trico         Trico         Econo           6         Song Con         Nge An         1.250         21.000         16.800           7         Son La         10.000         19.200         15.860           8         Linh Cam         Ha Tinh         10.000         17.500         5.250           9         Cao Bang         Cao Bang         700         7.500         3.750           10         Song Lam NA         Nghe An         6.000         108.000         5.400           11         Viet Dai TH         Thanh Hoa         6.000         108.000         5.400           12         TEXALine         Nghe An         1.000         17.500         8.760           14         CCP         Hue         3.000         6.000         30.000           15         Kontum         Kontum         1.000         17.500         8.750           16         Dac Lac         Dak Lak         1.000         17.500         24.000         24.000           19         Quang Ngai 1         Quang Ngai 2         Quon0         24.000         24.000         24.000         21.000         21.000         21.000         21.00	4	Tuven Quang	Tuyen Quang	700	7,500	3,750
6         Song Con         Nge An         1,250         21,000         16,800           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 H         Thanh Hoa         6,000         108,000         5,400           12         TEXALine         Nghe An         6,000         108,000         5,400           12         TEXALine         Nghe An         6,000         108,000         5,400           14         CCP         Hue         3,000         60,000         30,000           15         Kontum         Kon Tum         1,000         17,500         14,000           10         Dac Lac         Dak Lak         1,000         24,000         24,000           19         Quang Ngai 1         Quang Ngai 2         2,000         24,000         21,000           21         Dink Khah Hba         1,250         21,000         21,000         21,000           22         Ninh Hba         Khah Hba         1,250	5	Hoa Binh	Hoa Binh	700	7,500	6,000
7         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         Nyhe An         6,000         108,000         54,000           11         Viet Dai TH         Thanh Hoa         6,000         108,000         54,000           13         Quang Binh         1,500         22,500         11,250           14         CCP         Hue         3,000         60,000         30,000           15         Kontum         Kontum         1,000         17,500         8750           16         Dac Lac         Dak Lak         1,000         17,500         5250           Quang Ngai 1         Quang Ngai 2         Quo0         24,000         21,000         21,000           21         Dien Khanh         Khanh Hoa         1,250         21,000         21,000         21,000           21         Dien Khanh         Khan Hoa         1,250         21,000         21,000         21,000           23         Pana Rang         Ninh Thuan         1,000	6	Song Con	Nge An	1,250	21,000	16,800
8         Linh Cam         Ha Tinh         1,000         17,500         5,250           9         Cao Bang         Cao Bang         7,000         7,500         3,750           10         Song Lam NA         Nghe An         300         4,600         3,600           11         Viet Dai H         Thanh Hoa         6,000         108,000         5,400           12         TEXALine         Nghe An         6,000         108,000         5,400           12         TEXALine         Nghe An         6,000         108,000         5,400           14         CCP         Hue         3,000         60,000         30,000           15         Kontum         Kon Tum         1,000         17,500         14,000           10         Quang Ngai 1         Quang Ngai 2         Quong Ngai 2         Quong Ngai 2         2,000         24,000         21,600           21         Dien Knach         Khanh Hoa         1,250         21,000         21,000         21,000           21         Dien Knach         Khanh Hoa         1,250         21,000         21,000         21,000           22         Tuy Hoa         Phu Yen         1,250         21,000         21,000 <t< td=""><td>7</td><td>Son La</td><td>Son La</td><td>1,000</td><td>19,200</td><td>15,360</td></t<>	7	Son La	Son La	1,000	19,200	15,360
9         Cao Bang         Cao Bang         700         7,500         3,750           11         Viet Dai TH         Thanh Hoa         6,000         106,000         54,000           12         TEXALine         Nghe An         6,000         106,000         54,000           13         Quang Binh         1,500         22,500         11,250           14         CCP         Hue         3,000         60,000         30,000           16         Kontum         Kon Tum         1,000         17,500         8,750           17         Quang Ngai 1         Quang Ngai 2         2,000         24,000         24,000           19         Quang Ngai 1         Quang Ngai 2         2,000         24,000         21,000           21         Ninh Hoa         1,500         21,000         21,000         21,000           22         Ninh Hoa         1,250         21,000         21,000         21,000           22         Ninh Hoa         1,250         21,000         21,000         21,000           23         Phan Rang         Pin Yen         1,250         21,000         21,000           24         Dong Xua PY Phu Yen         1,250         21,000         24,	8	Linh Cam	Ha Tinh	1,000	17,500	5,250
10         Song Lam NA         Ngne An         300         4,000         54,000           12         TEXALine         Nghe An         6,000         108,000         54,000           12         TEXALine         Nghe An         6,000         108,000         54,000           14         CCP         Hue         3,000         60,000         30,000           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         5,250           18         Quang Ngai 1         Quang Ngai 2         2,000         24,000         21,000           20         Binh Dinh         Binh Dinh         1,500         21,000         6,000           21         Dien Khanh Hoa         1,250         21,000         21,000         24,000           22         Ninh Haa         1,000         21,000         4,000         1,500           23         Phan Rang         Ninh Thuan         1,000         1,500         21,000           26         Gia Lai         3,000         46,000         9,00	9	Cao Bang	Cao Bang	700	7,500	3,750
11         Unstruct         0.000         34.000           13         Quang Binh         0.000         108.000         54.000           13         Quang Binh         1.500         22,500         11.280           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         5.280           10         Quang Ngai 1         Quang Ngai 2         2.000         24.000         24.000           20         Binh Dinh         1.500         21.000         21.000         21.000           21         Ninh Hoa         Khanh Hoa         1.250         21.000         21.000           22         Ninh Hoa         Khanh Hoa         1.250         21.000         21.000           22         Ninh Hoa         Khanh Hoa         1.250         21.000         21.000           23         Phan Rang         Phu Yen         1.250         21.000         21.000           24         Binh Thuan         1.000         30.000         14.000         30.000           25         T	10	Song Lam NA	Ngne An Thanh Haa	300	4,500	3,600
13         Coung Binh         Coung Binh         Coung Binh         Coung Binh         1220           14         CCP         Hue         3,000         60,000         30,000           16         Dac Lac         Dak Lak         1,000         17,500         8,750           16         Dac Lac         Dak Lak         1,000         17,500         14,000           17         Quang Ngai         Quang Ngai         2,000         24,000         24,000         24,000           20         Binh Dinh         Binh Dinh         1,500         21,000         21,000         21,000           21         Dien Khanh         Khanh Hoa         300         6,000         6,000         6,000           22         Ninh Hoa         Khanh Hoa         1,250         21,000         21,000         21,000           23         Phan Rang         Ninh Thuan         1,000         21,000         21,000         21,000           24         Dong Xuan PY         Phu Yen         1,000         27,000         3,750         32           25         Tuy Hoa         Phu Yen         1,000         21,000         3,000         3,750           28         Binh Thuan         1,000         1,00	12	TEXAL ine	Nahe An	6,000	108,000	54,000
14         CCP         Hue         annot         3000         E0000         30000           15         Kontum         Kon Tum         1,000         17,500         8,750           16         Dac Lac         Dak Lak         1,000         17,500         8,750           17         Quang Ngai         Quang Ngai         2,000         24,000         24,000           19         Quang Ngai         2,000         24,000         24,000         21,600           20         Binh Dinh         Binh Dinh         1,500         21,000         21,000         6,000           21         Dien Khanh         Khanh Hoa         1,250         21,000         21,000         6,300           22         Ninh Hoa         Khanh Hoa         1,250         21,000         21,000         21,000           23         Dag Xuan PY         Phu Yen         1,250         21,000         21,000         21,000           24         Dong Xuan PY         Phu Yen         1,250         21,000         21,000         21,000           25         Tuy Hoa         Phu Yen         1,250         21,000         3,750         3,750           28         Binh Thuan         1,000         1,600	13	Quang Binh	Quang Binh	1,500	22,500	11,250
15         Kontum         Kontum         1,000         17,500         8,750           16         DacLac         Dak Lak         1,000         17,500         14,000           17         Quang Ngai 1         Quang Ngai 2         2,000         24,000         24,000           19         Quang Ngai 2         Quang Ngai 2         2,000         24,000         24,000           20         Bin Dinh         Bin Dinh         Bin Dinh         1,500         21,000         21,000           21         Dien Khanh         Khanh Hoa         300         6,000         6,000         21,000           22         Ninh Hoa         Khanh Hoa         1,000         21,000         21,000         21,000           23         Phan Rang         Ninh Thuan         1,000         21,000         21,000         21,000           26         Gia Lai         Gia Lai         3,000         45,000         9,000         14,400           27         333 Dac Lac         Dak Lak         500         7,500         3,750         33,750           28         Binh Duong         Binh Duong         2,000         30,000         30,000         30,000           30         Tri A         Dong Nai	14	CCP	Hue	3,000	60,000	30,000
16         Dac Lac         Dak Lak         1,000         17,500         14,000           17         Quang Nam         Quang Ngai         Quang Ngai         2,000         24,000         24,000           18         Quang Ngai         Quang Ngai         2,000         24,000         24,000           20         Binh Dinh         Binh Dinh         1500         21,000         21,000           21         Dien Khanh         Khanh Hoa         300         6,000         6,000           22         Ninh Hoa         Khanh Hoa         1,000         21,000         21,000           23         Phan Rang         Ninh Thuan         1,000         21,000         21,000           24         Dong Xuan PY         Phu Yen         1,250         21,000         21,000           25         Tuy Hoa         Phu Yen         1,250         21,000         3,750           28         Binh Thuan         1,000         17,500         5,250           29         Nuoc Trong         Tay Ninh         900         18,000         14,400           31         La Nga         Dong Nai         2,000         30,000         30,000           30         Binb Duong         Binb Duong	15	Kontum	Kon Tum	1,000	17,500	8,750
17       Quang Ngai 1       Quang Ngai 2       Quang Ngai 3       Quang Ngai 4       Quon0       24.000       21.000       21.000       21.000       21.000       25.00         28       Ninh Thuan       1.000       1.250       21.000       21.000       21.000       23.000       3.000       45.000       3.750       5250         28       Binh Thuan       1.000       17.500       5.250       33.020       5.250       33.020       5.250       33.000       14.6400       3.000       30.000       30.000       30.000       30.000       30.000       30.000       30.000       30.000       30.000       30.000       30.000       30.000	16	Dac Lac	Dak Lak	1,000	17,500	14,000
18         Quang Ngai	17	Quang Nam	Quang Nam	1,000	17,500	5,250
19         Quang Ngai         2,000         24,000         21,600           21         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         Gia Lai         3,000         45,000         9,000           26         Gia Lai         Gia Lai         3,000         18,000         14,400           28         Nuc Crong         Tay Ninh         900         18,000         14,400           30         Tri An         Dong Nai         2,000         30,000         30,000           32         Binh Duong         Einh Duong         2,000         30,000         30,000           33         Haip Hoa         Long An         2,000         30,000         30,000           34         Buc Bong         Tay Ninh         8,000         60,000 <td>18</td> <td>Quang Ngai 1</td> <td>Quang Ngai</td> <td>2,000</td> <td>24,000</td> <td>24,000</td>	18	Quang Ngai 1	Quang Ngai	2,000	24,000	24,000
Low Brith Junit         Diam Junit         1,300         21,000         21,000           21         Dien Khanh         Khanh Hoa         1,250         21,000         21,000           22         Phan Rang         Ninh Thuan         1,000         21,000         6,300           24         Dong Xuan PY         Phu Yen         100         3,000         1,500           25         Tuy Hoa         Gia Lai         3,000         45,000         9,000           27         333 Dac Lac         Dak Lak         500         7,500         3,750           28         Binh Thuan         1,000         17,500         5,250           29         Nuoc Trong         Tay Ninh         900         18,000         14,400           30         Tri An         Dong Nai         2,000         30,000         30,000           31         La Nga         Dong Nai         2,000         30,000         30,000           32         Binh Duong         Binh Duong         2,000         30,000         30,000           34         Buc Bong         Tay Ninh         8,000         180,000         P2,000           35         Norng Cong         Thah Hoa         1,500         22,000	19	Quang Ngai 2 Binh Dinh	Quang Ngai Binh Dinh	2,000	24,000	21,600
1         Den Rang         Ninh Thuan         1,000         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 Dac Lac         Dak Lak         500         7,500         3,750           28         Binh Thuan         Binh Thuan         1,000         14,400         14,400           30         Tri An         Dong Nai         2,000         30,000         30,000           31         La Nga         Dong Nai         2,000         30,000         30,000           33         Hiep Hoa         Long An         2,000         30,000         30,000           34         Buce Bong         Tay Ninh         8,000         180,000         Hey Para 2010           35         Nong Cong         Thanh Hoa         1,500         27,000         -do-           35         Nong Cong         Thanh Hoa         3,	20 21	Dinn Dinn Dien Khanh	Khanh Hoa	1,500	21,000	21,000
23         Phan Rang Dong Xuan PY 24         Ninh Thuan Phu Yen         1,000         21,000         6,300           24         Dong Xuan PY Phu Yen         1,000         3,000         1,500           25         Tuy Hoa         Gia Lai         Gia Lai         3,000         45,000         9,000           26         Gia Lai         Gia Lai         3,000         45,000         9,000         3,750           28         Binh Thuan         Binh Thuan         1,000         17,500         5,250           29         Nuoc Trong         Tay Ninh         900         18,000         14,400           31         La Nga         Dong Nai         2,000         30,000         30,000           30         Tri An         Dong Nai         2,000         30,000         30,000           33         Buc Bong         Tay Ninh         8,000         180,000         B0,000         30,000           34         Buc Bong         Tay Ninh         8,000         100,000         -40-         -           35         Nong Cong         Thanh Hoa         1,500         27,000         -         -           35         Kien Giang         1,000         21,000         -do-         -	22	Ninh Hoa	Khanh Hoa	1.250	21,000	21.000
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         3,000         45,000         9,000           27         333 Dac Lac         Dak Lak         500         7,500         3,750           28         Binh Thuan         1,000         17,500         5,250           29         Nuoc Trong         Tay Ninh         900         18,000         14,400           30         Tri An         Dong Nai         2,000         30,000         30,000           32         Binh Duong         Binh Duong         2,000         30,000         30,000           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-           36         Rong Cong         Thanh Hoa         1,000         21,000         -do-           37         Soc Trang         Soc Trang         1,0000         21,000         -do-	23	Phan Rang	Ninh Thuan	1,000	21,000	6.300
25         Tuy Hoa         Pu Yen         1,250         21,000         21,000           26         Gia Lai         Gia Lai         3,000         45,000         9,000           27         333 Dac Lac         Binh Thuan         Binh Thuan         Binh Thuan         Binh Thuan         1,000         17,500         3,750           28         Binc Trong         Tay Ninh         900         18,000         14,400           30         Tri An         Dong Nai         1,000         21,000         30,000         30,000           31         La Nga         Dong Nai         2,000         30,000         30,000         30,000           32         Binh Duong         Long An         2,000         30,000         30,000         72,000           34         Buc Bong         Tay Ninh         8,000         180,000         By Year 2010         35           35         Nong Cong         Thanh Hoa         1,500         27,000         -do-           35         Nong So Trang         1,000         21,000         -do-           36         Kien Giang         1,000         21,000         -do-           37         Soc Trang         1,000         21,000         -do- <td>24</td> <td>Dong Xuan PY</td> <td>Phu Yen</td> <td>100</td> <td>3.000</td> <td>1.500</td>	24	Dong Xuan PY	Phu Yen	100	3.000	1.500
26         Gia Lai         Gia Lai         3.000         45,000         9.000           27         333 Dac Lac         Dak Lak         500         7,500         3,750           28         Binh Thuan         1,000         17,500         5,250           29         Nuoc Trong         Tay Ninh         900         18,000         14,400           30         Ti An         Dong Nai         1,000         21,000         30,000         30,000           31         La Nga         Dong Nai         2,000         30,000         30,000         30,000           32         Binh Duong         E,000         18,000         18,000         30,000         30,000           34         Buc Bong         Tay Ninh         8,000         180,000         By Year 2010           35         Nong Cong         Thanh Hoa         1,500         27,000         -do-           35         Nong Cong         Sc Trang         1,000         21,000         -do-           38         Kien Giang         1,000         21,000         -do-           38         Ben Tre         Ben Tre         1,000         21,000         -do-           41         Phung Hiep         Can Tho	25	Tuy Hoa	Phu Yen	1,250	21,000	21,000
27         333 Dac Lac         Dak Lak         500         7,500         3,750           28         Binh Thuan         1,000         17,500         5,250           29         Nuoc Trong         Tay Ninh         900         18,000         14,400           30         Tri An         Dong Nai         2,000         30,000         30,000           31         La Nga         Dong Nai         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-           36         Frang         Soc Trang         1,000         21,000         -do-           37         Soc Trang         1,000         21,000         -do-           41         Phong Hiep         Can Tho         1,000         21,000         -do-           42         Tho Binh         Can Tho         1,000         21,000         -do-	26	Gia Lai	Gia Lai	3,000	45,000	9,000
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         2,000         30,000         30,000         72,000           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-           35         Nong Cong         Scc Trang         Scc Trang         1,000         21,000         -do-           38         Kien Giang         1,000         21,000         -do-         -do-           41         Phung Hiep         Can Tho         1,000         21,000         -do-           42         Thoi Binh         Ca Anu         1,000         21,000         -do-           42         Thoi Binh         Ca Anu </td <td>27</td> <td>333 Dac Lac</td> <td>Dak Lak</td> <td>500</td> <td>7,500</td> <td>3,750</td>	27	333 Dac Lac	Dak Lak	500	7,500	3,750
29         Nuöc Iröng         Iay Ninh         900         18,000         14,400           30         Tri An         Dong Nai         1,000         21,000         30,000         30,000           31         La Nga         Dong Nai         2,000         30,000         30,000         30,000           32         Binh Duong         Binh Duong         An         2,000         30,000         30,000           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-           36         An Do         Long An         3,000         60,000         -do-           37         Soc Trang         Soc Trang         1,000         21,000         -do-           38         Kien Giang         1,000         21,000         -do-         -do-           40         Vi Thanh         Can Tho         1,000         21,000         -do-           41         Phung Hiep         Can Tho         1,000         21,000         -do-           42         Thoi	28	Binh Thuan	Binh Thuan	1,000	17,500	5,250
31         La Nga         Dong Nai         1,000         21,000         12,000           32         Binh Duong         Binh Duong         Binh Duong         2,000         30,000         30,000           33         Hiep Hoa         Long An         2,000         30,000         30,000           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         1,000         21,000         -do-           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-           43         Cam Ranh         Khanh Hoa         3,000         60,000         -do-           44         Phong Hiep         Can Tho         1,000         21,000         -do-           45         Hai Duong         n.a         75,600	29	Nuoc Irong	Tay Ninh Dang Nai	900	18,000	14,400
Jack Nga         Doing Nat         2,000         30,000         30,000           32         Binh Duong         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-           36         An Do         Long An         3,000         60,000         -do-           37         Soc Trang         Soc Trang         1,000         21,000         -do-           38         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-           42         Thoi Binh         Ca Mau         1,000         21,000         -do-           42         Thoi Binh         Ca Mau         1,000         20,000         -do-           43         Cam Ranh         Khanh Hoa         3,000         60,000         -do-           44 <td>30 31</td> <td>I II AN</td> <td>Dong Nai Dong Nai</td> <td>2,000</td> <td>21,000</td> <td>30,000</td>	30 31	I II AN	Dong Nai Dong Nai	2,000	21,000	30,000
Bin Plan         Ling An         2,000         30,000         72,000           34         Hiep Hoa         Long An         2,000         30,000         By Cong         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-           36         An Do         Long An         3,000         60,000         -do-           37         Soc Trang         Soc Trang         1,000         21,000         -do-           38         Kien Giang         Kien Giang         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         Can Mau         1,000         21,000         -do-           43         Cam Ranh         Khanh Hoa         3,000         60,000         -do-           44         Duong         n.a         9,450         By Year 2020           46         Ninh Binh	32	Binh Duong	Binh Duong	2,000	30,000	30,000
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-           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         Khan Hoa         3,000         60,000         -do-           44         Duong Tho         Tay Ninh         2,500         60,000         -do-           45         Hai Duong         n.a         18,900         -do-           46         Ninh Binh         n.a         18,900         -do- <tr< td=""><td>33</td><td>Hiep Hoa</td><td>Long An</td><td>2,000</td><td>30,000</td><td>72,000</td></tr<>	33	Hiep Hoa	Long An	2,000	30,000	72,000
35         Nong Cong An Do         Thanh Hoa Long An         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-           38         Kien Giang         Kien Giang         1,000         21,000         -do-           39         Ben Tre         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         n.a         9,450         By Year 2020         -do-           46         Ninh Binh         Nina         n.a         18,900         -do-           47         Ha Nam         n.a <td< td=""><td>34</td><td>Buc Bong</td><td>Tay Ninh</td><td>8,000</td><td>180,000</td><td>By Year 2010</td></td<>	34	Buc Bong	Tay Ninh	8,000	180,000	By Year 2010
36         An Do         Long An         3,000         60,000         -do-           37         Soc Trang         Soc Trang         1,000         21,000         -do-           38         Kien Giang         Kien Giang         1,000         21,000         -do-           39         Ben Tre         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         n.a         9,450         By Year 2020         -do-           46         Ninh Binh         n.a         18,900         -do-         -do-           47         Ha Nam         Ha Tay         n.a         18,900         -do-           48         Ha Tay         Na         18,900 <t< td=""><td>35</td><td>Nong Cong</td><td>Thanh Hoa</td><td>1,500</td><td>27,000</td><td>-do-</td></t<>	35	Nong Cong	Thanh Hoa	1,500	27,000	-do-
37         Soc Trang         Soc Trang         1,000         21,000         -do-           38         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-           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         n.a         9,450         By Year 2020           46         Ninh Binh         n.a         18,900         -do-           47         Ha Nam         n.a         18,900         -do-           48         Ha Tay         n.a         18,900         -do-           50         Phu Tho         n.a         18,900 </td <td>36</td> <td>An Do</td> <td>Long An</td> <td>3,000</td> <td>60,000</td> <td>-do-</td>	36	An Do	Long An	3,000	60,000	-do-
38         Kien Giang         Nien 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         Khan Hoa         3,000         60,000         -do-           43         Cam Ranh         Khan Hoa         3,000         60,000         -do-           44         Duong Tho         Tay Ninh         2,500         60,000         -do-           45         Hai Duong         n.a         9,450         By Year 2020           46         Ninh Binh         n.a         18,900         -do-           47         Ha Nam         n.a         18,900         -do-           48         Ha Tay         n.a         18,900         -do-           50         Phu Tho         n.a         18,900         -do-           51         Thanh Hoa         Than Hoa         n.a<	37	Soc Trang	Soc Trang	1,000	21,000	-do-
35         Definitie         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-           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         n.a         9,450         By Year 2020         46           46         Ninh Binh         n.a         75,600         -do-         40-           47         Ha Nam         Ha Tay         n.a         18,900         -do-           48         Ha Tay         Ha Tay         n.a         18,900         -do-           50         Phu Tho         n.a         18,900         -do-         51           51         Thanh Hoa         Thanh Hoa         n.a         18,900         -do-	38	Kien Glang	Rien Glang	1,000	21,000	-00-
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 Tay       n.a       18,900       -do-         48       Ha Tay       Ha Tay       n.a       18,900       -do-         49       Thai Nguyen       Thai Nguyen       n.a       18,900       -do-         51       Thanh Hoa       Thanh Hoa       n.a       18,900       -do-         51       Thanh Hoa       Thanh       n.a       18,900       -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       18,900 <td>39 40</td> <td>Vi Thanh</td> <td>Can Tho</td> <td>1,000</td> <td>21,000</td> <td>-00-</td>	39 40	Vi Thanh	Can Tho	1,000	21,000	-00-
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 Tay         n.a         18,900         -do-           48         Ha Tay         Ha Tay         n.a         18,900         -do-           48         Ha Tay         n.a         18,900         -do-           49         Thai Nguyen         Thai Nguyen         n.a         18,900         -do-           50         Phu Tho         Phu Tho         n.a         18,900         -do-           51         Thanh Hoa         n.a         18,900         -do-           52         Ha Tinh         n.a         18,900         -do-           53         Quang Nam         Quang Ngai         n.a         18,900         -do-           54         Quang Ngai </td <td>41</td> <td>Phung Hiep</td> <td>Can Tho</td> <td>1,000</td> <td>21,000</td> <td>-do-</td>	41	Phung Hiep	Can Tho	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 Tay         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         18,900         -do-           51         Thanh Hoa         n.a         18,900         -do-           52         Ha Tinh         Na         18,900         -do-           53         Quang Nam         Quang Nam         n.a         37,800         -do-           53         Quang Ngai         Quang Ngai         n.a         94,500         -do-           54         Quang Ngai         Quang Ngai         n.a         18,900         -do-	42	Thoi Binh	Ca Mau	1,000	21,000	-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-           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         18,900         -do-           51         Thanh Hoa         Thanh Hoa         n.a         18,900         -do-           52         Ha Tinh         Ha Tinh         n.a         18,900         -do-           53         Quang Nam         Quang Nam         n.a         18,900         -do-           54         Quang Ngai         Quang Ngai         n.a         18,900         -do-           55         Binh Dinh         Binh Din         n.a         18,900 <t< td=""><td>43</td><td>Cam Ranh</td><td>Khanh Hoa</td><td>3,000</td><td>60,000</td><td>-do-</td></t<>	43	Cam Ranh	Khanh Hoa	3,000	60,000	-do-
45Hai DuongHai Duongn.a9,450By Year 202046Ninh BinhNinh Binhn.a75,600-do-47Ha NamHa Namn.a9,450-do-48Ha TayHa Tayn.a18,900-do-49Thai NguyenThai Nguyenn.a18,900-do-50Phu ThoPhu Thon.a1,890-do-51Thanh HoaThanh Hoan.a18,900-do-52Ha TinhHa Tinhn.a18,900-do-53Quang NamQuang Namn.a37,800-do-54Quang NgaiQuang Ngain.a94,500-do-55Binh DinhBinh Dinhn.a18,900-do-56Gia LaiGia Lain.a18,900-do-57Ninh ThuanNinh Thuann.a85,050-do-58Binh PhuocBinh Phuocn.a113,400-do-59Tay NinhTay Ninhn.a113,400-do-60Dong NaiDong Nain.a170,100-do-61Binh Thuann.a14,200-do-	44	Duong Tho	Tay Ninh	2,500	60,000	-do-
46Ninh Binhn.a75,600-do-47Ha NamHa Namn.a9,450-do-48Ha TayHa Tayn.a18,900-do-49Thai NguyenThai Nguyenn.a18,900-do-50Phu ThoPhu Thon.a1,890-do-51Thanh HoaThanh Hoan.a18,900-do-52Ha TinhHa Tinhn.a18,900-do-53Quang NamQuang Namn.a37,800-do-54Quang NgaiQuang Ngain.a94,500-do-55Binh DinhBinh Dinhn.a28,350-do-56Gia LaiGia Lain.a18,900-do-57Ninh ThuanNinh Thuann.a94,500-do-58Binh PhuocBinh Phuocn.a94,500-do-59Tay NinhTay Ninhn.a113,400-do-60Dong NaiDong Nain.a170,100-do-61Binh ThuanBinh Thuann.a14,200-do-	45	Hai Duong	Hai Duong	n.a	9,450	By Year 2020
47Ha NamHa Namh.a9,450-d0-48Ha TayHa Tayn.a18,900-do-49Thai NguyenThai Nguyenn.a18,900-do-50Phu ThoPhu Thon.a1,890-do-51Thanh HoaThanh Hoan.a18,900-do-52Ha TinhHa Tinhn.a18,900-do-53Quang NamQuang Namn.a37,800-do-54Quang NgaiQuang Ngain.a94,500-do-55Binh DinhBinh Dinhn.a18,900-do-56Gia LaiGia Lain.a18,900-do-57Ninh ThuanNinh Thuann.a85,050-do-58Binh PhuocBinh Phuocn.a113,400-do-59Tay NinhTay Ninhn.a170,100-do-60Dong NaiDong Nain.a14,200-do-	46	Ninh Binh	Ninh Binh	n.a	75,600	-do-
ToThat RayThatToTo-do49Thai NguyenThai Nguyenn.a18,900-do-50Phu ThoPhu Thon.a1,890-do-51Thanh HoaThanh Hoan.a18,900-do-52Ha TinhHa Tinhn.a18,900-do-53Quang NamQuang Namn.a37,800-do-54Quang NgaiQuang Ngain.a94,500-do-55Binh DinhBinh Dinhn.a18,900-do-56Gia LaiGia Lain.a18,900-do-57Ninh ThuanNinh Thuann.a85,050-do-59Tay NinhTay Ninhn.a113,400-do-60Dong NaiDong Nain.a170,100-do-61Binh ThuanBinh Thuann.a14,200-do-	47 ⊿Ջ	⊓a ivani Ha Tav	Ha Nam Ha Tay	n.a	9,40U 18 000	-uo- -do-
10Phu Thon.a1,890-do-50Phu Thon.a1,890-do-51Thanh HoaThanh Hoan.a18,900-do-52Ha TinhHa Tinhn.a18,900-do-53Quang NamQuang Namn.a37,800-do-54Quang NgaiQuang Ngain.a37,800-do-55Binh DinhBinh Dinhn.a28,350-do-56Gia LaiGia Lain.a18,900-do-57Ninh ThuanNinh Thuann.a85,050-do-58Binh PhuocBinh Phuocn.a113,400-do-59Tay NinhTay Ninhn.a170,100-do-61Binh ThuanBinh Thuann.a14,200-do-	40 49	Thai Nouven	Thai Nguyen	n a	18,900	-00- -do-
51Thanh HoaThanh Hoan.a88,200-do-52Ha TinhHa Tinhn.a18,900-do-53Quang NamQuang Namn.a37,800-do-54Quang NgaiQuang Ngain.a94,500-do-55Binh DinhBinh Dinhn.a28,350-do-56Gia LaiGia Lain.a18,900-do-57Ninh ThuanNinh Thuann.a85,050-do-58Binh PhuocBinh Phuocn.a94,500-do-59Tay NinhTay Ninhn.a113,400-do-60Dong NaiDong Nain.a170,100-do-61Binh Thuann.a14,200-do-	50	Phu Tho	Phu Tho	n.a	1.890	-do-
52Ha TinhHa Tinhn.a18,900-do-53Quang NamQuang Namn.a37,800-do-54Quang NgaiQuang Ngain.a94,500-do-55Binh DinhBinh Dinhn.a28,350-do-56Gia LaiGia Lain.a18,900-do-57Ninh ThuanNinh Thuann.a85,050-do-58Binh PhuocBinh Phuocn.a94,500-do-59Tay NinhTay Ninhn.a113,400-do-60Dong NaiDong Nain.a170,100-do-61Binh Thuann.a14,200-do-	51	Thanh Hoa	Thanh Hoa	n.a	88,200	-do-
53Quang NamQuang Namn.a37,800-do-54Quang NgaiQuang Ngain.a94,500-do-55Binh DinhBinh Dinhn.a28,350-do-56Gia LaiGia Lain.a18,900-do-57Ninh ThuanNinh Thuann.a85,050-do-58Binh PhuocBinh Phuocn.a94,500-do-59Tay NinhTay Ninhn.a113,400-do-60Dong NaiDong Nain.a170,100-do-61Binh Thuann.a14,200-do-	52	Ha Tinh	Ha Tinh	n.a	18,900	-do-
54Quang NgaiQuang Ngain.a94,500-do-55Binh DinhBinh Dinhn.a28,350-do-56Gia LaiGia Lain.a18,900-do-57Ninh ThuanNinh Thuann.a85,050-do-58Binh PhuocBinh Phuocn.a94,500-do-59Tay NinhTay Ninhn.a113,400-do-60Dong NaiDong Nain.a170,100-do-61Binh Thuann.a14,200-do-	53	Quang Nam	Quang Nam	n.a	37,800	-do-
55Binn DinnBinn Dinnn.a28,350-do-56Gia LaiGia Lain.a18,900-do-57Ninh ThuanNinh Thuann.a85,050-do-58Binh PhuocBinh Phuocn.a94,500-do-59Tay NinhTay Ninhn.a113,400-do-60Dong NaiDong Nain.a170,100-do-61Binh Thuann.a14,200-do-	54	Quang Ngai	Quang Ngai	n.a	94,500	-do-
50Gia LaiII.a18,900-d0-57Ninh ThuanNinh Thuann.a85,050-do-58Binh PhuocBinh Phuocn.a94,500-do-59Tay NinhTay Ninhn.a113,400-do-60Dong NaiDong Nain.a170,100-do-61Binh ThuanBinh Thuann.a14,200-do-	55	Binn Dinh Cia Lai	Binn Dinh Cia Lai	n.a	28,350	-do-
57Ninh ThuanNinh Thuann.a85,050-do-58Binh PhuocBinh Phuocn.a94,500-do-59Tay NinhTay Ninhn.a113,400-do-60Dong NaiDong Nain.a170,100-do-61Binh ThuanBinh Thuann.a14.200-do-	50			n.a	10,900	-uo-
binn Phuoc         Binn 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         n.a         14,200         -do-	57	Ninh Thuan	Ninh Thuan	n.a	85,050	-do-
Se ray Nimit         Tay Nimit         T.a         T13,400         -d0-           60         Dong Nai         n.a         170,100         -do-           61         Binh Thuan         n.a         14,200         -do-	58	BINN PNUOC	BINN PNUOC	n.a	94,500	-d0-
61 Binh Thuan Binh Thuan n.a 14.200 -do-	60	Dong Nai	Dong Nai	n.a na	170 100	-uu- -do-
	61	Binh Thuan	Binh Thuan	n.a	14.200	-do-

### 2.3 Wood

The country has long been an exporter of timber, notably to Thailand, the former USSR and other socialist countries. Due to such commercial deforestation and wartime 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 was limited to 525,000 m<sup>3</sup> in 1997 and will be reduced to 300,000 m<sup>3</sup> in the coming years. Government has decided to afforest 5 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 park. Government has also ordered reforestation to be started at least 5-10 years before exploitation.

So far, Vietnam has no record of wood import besides limited 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 grow 500,000 hectares of forests 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.

Although cutting wood is 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 met by the central region. Cutting wood at its present level would thus be possible only during the period 2000-2010 and will be allowed a steady increase of 3% yearly in 2011-2020. There will be almost no possibility to meet overseas demand as Vietnam used to do in the 1980s.

With regard to firewood, the MARD projects 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 likely within a province. Firewood will be gradually replaced with other energy sources due to environmental reasons and the progress of electrification throughout the country.

				5		00 tons)			
	Pagion		Production			Consumption			
	Region	1997	2010	2020	1997	2010	2020		
1.	Red River Delta	153.6	0	0	440.0	527.3	672.7		
2.	North East	486.7	43.3	477.2	165.2	179.6	242.6		
3.	North West	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.	North East 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		

Surplus/Deficit

### Table 2.3.1 Forecast of Cutting Wood

Table 2.3.2 Trend in Cutting Wood

2.823

2,793

1994

1995

	rtegion	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.	Northeast South	-1,070.1	-870.3	-1,218.7
8.	Mekong River Delta	+287.4	-348.0	-453.4
	ΤΟΤΑΙ	+75.0	0	0

 $(000 \text{ m}^3)$ Year Exploitation Consumption 1988 3,356 3,164 1989 3,007 3,262 1990 4,446 4,182 1991 3,210 1,868 1992 2,687 1,997 1993 2,884 2,187

2,769

2,785

### 2.4 Industrial Crops

Pegion

Since 1989 crop diversification has begun in rice-producing regions to cash in on higher-earning food crops in local markets as well as through export. 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 these amounts, 0.6 million tons were exported. In fact, most of coffee, rubber and pepper harvests were exported, limiting domestic consumption.

Coffee is the second hard-currency earner in the agriculture 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 world markets where demand for it (12-13 million tons a year) may not be satisfied by the year 2010.

Coffee and rubber plantations are concentrated in the central highlands and northeastern south region. Since they are located on mid to uplands, access roads to ports are very important.

					('00	0 tons)
Pagion		Gross Output			Consumption	•
Region	1997	2010	2020	1997	2010	2020
9. Red River Delta	97.8	184.5	307.2	410.7	588.1	761.9
10. North East	190.4	359.0	597.8	178.7	255.9	312.0
11. North West	28.3	53.4	88.9	27.6	39.5	50.4
12. North Central Coast	162.4	306.3	510.0	169.8	243.2	316.9
13. South Central Coast	191.2	360.6	600.4	137.1	196.3	288.2
14. Central Highlands	365.3	688.9	1,147.1	52.6	75.4	120.2
15. North East South	599.3	1,130.1	1,881.8	736.7	1,054.8	1,416.7
16. 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

Surplus/Deficit

### Table 2.4.1 Forecast of Industrial Crops

Table 2.4.2 Trend in Coffee & Rubber

Pagion		Surplus/Deficit				Table 2.4.2 Trend in Coffee & Rubber		
	Region	1997	2010	2020				('000 tons)
1.	Red River Delta	-312.9	-403.6	-454.7	I	Year	Coffee	Rubber
2.	North East	+11.7	+103.1	+285.8		1990	92.0	57.9
3.	North West	+0.7	+13.9	+38.5		1991	100.0	64.6
4.	North Central Coast	-7.4	+63.1	+193.1		1992	119.0	67.0
5.	South Central Coast	+54.1	+164.3	+312.2		1993	136.0	96.9
6.	Central Highlands	+312.7	+613.5	+1,026.9	Ī	1994	180.0	128.8
7.	North East South	+137.3	+75.3	+465.0	Ī	1995	218.1	122.7
8.	Mekong River Delta	+700.6	+1,509.8	+2,569.0		1996	254.2	142.5
	TOTAL	+622.2	2,139.4	+4,435.9	Ι	1997	294.6	185.7

#### 2.5 **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 greater 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 are 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, 19% to collectives and 3% to state enterprises.

There are at present 508,000 ha for aquaculture. In the 1990s, the area has expanded by 72%, equally divided into fish and shrimp culture. At present, however, the are for shrimp culture has remarkably expanded by 2.5 times (93,544 ha in 1990 to 235,498 ha in 1998).

### Consumption and Trade

The fishery sector is estimated to contribute 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 develops.

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 there is 3.6 million tons of pelagic stock in the sea area of Vietnam, 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 expected to increase faster than fish breeding.

With an increase rate of 3-5%, per capita fishery consumption will reach 29 kg on the average in 2020, while export volume will be five times higher than the 1997 figure. To strengthen export, however, there are some issues that need improvement such as providing chilled warehouses and containers and developing fleet and ports. Qui Nhon, Nha Trang and Can Tho provinces are suitably located for export bases.

			-			('000 tons)		
Pagion		Gross Output		(	Consumption			
Region	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. Northeast 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		

### Table 2.5.1 Forecast of Fishery Products

Pagion	Surplus / Deficit					
Region	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. Northeast 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 2.5.2 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

### 2.6 Animal Husbandry

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 to reach 8 kg per capita. 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. Most pigs are raised in small-scale farms and in conjunction with cropping activities, while poultry farming is widespread throughout Vietnam and provides a relatively small but constant income to farmers. There is a large room to introduce advance technologies for efficient mass production.

Production of processed meat for export steadily increased from 16,000 tons in 1990 to 32,000 tons in 1997, likely because of domestic consumption increase. Export of meat, pork in particular, is deemed as a possible source of foreign

exchange.

Government believes that animal husbandry could occupy about 30% of the total agricultural gross value by the year 2010 (19.5% in 1997), with 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 meats 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. Compared with fishery products, the regional disparity in per capita meat consumption is small.

The VITRANSS forecasts that the subsector will produce nearly 2.7 million tons of various animal meats in 2020. With expected growth rates of 5.5-7.5% until the year 2020, the capital meat consumption will be 24 kg on the average. 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 northeast south and the Mekong River Delta.

					('000	tons)		
Pagion	Gross Output			(	Consumption			
Ttegion	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. Northeast 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		

Table 2.6.1 Forecast of Animal Meat

Pagion	Surplus / Deficit				
Region	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. Northeast South	-60.8	-160.3	-302.8		
8. Mekong River Delta	-45.2	-121.5	-239.1		
TOTAL	+32.7	+62.4	+71.2		

### 2.7 Steel

Over the period 1992-1997 the demand for steel increased 134% yearly. 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 grow due to weak domestic demand and available supply of other steel products. Domestic production in 1998 is estimated at 853,000 tons, the first decrease since the "Doi Moi" initiatives.

Before the crisis, Vietnam Steel Corporation predicted that domestic steel demand in 2010 would be 7.7 million tons, where 7.0 million tons would be supplied by 18 domestic plants. In the face of current weak domestic demand and the economic slowdown in future, 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 has 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 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 the fact that the magnitude of imported steel products in future 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.

No. Diant Nama		Leasting	Estimated S	teel Production ('00	0 tons/year)
INO	Plant Name	Location	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	Haiphong	25.1	45	45
4	VPS	Haiphong	112.0	200	200
5	Vina Steel	Haiphong	100.0	180	180
6	Thep Phoi – Tam Vua	Haiphong	0	0	600
7	Phoi Thep Cai Lan	Quang Ninh	0	500	500
8	Ong Han Co Lon HP	Haiphong	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	Baria - 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	Baria - 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

### Table 2.7.1 Steel Plants (Existing and Planned)

Reference:

GSO, SCID

### Table 2.7.2 Forecast of Steel

('000 tons)							
Region	egion 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. Northeast 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	

Pagion	Surplus /Deficit			
Region	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. Northeast 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 2.7.3 Supply of Steel

(*000 tons					
Year	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			

### 2.8 Construction Materials

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 these main construction materials, while cement and steel are discussed separately and 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. 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 is concluded that the supply and consumption of these materials will be done by short-distance haulage which 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 not a few long-distance trips 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 northeast 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, Haiphong and Ha Tay (Hoa Lac-Xuan Mai New Town) will need to bring in considerable amount of stones and sand from other provinces.

					('00'	)0 m <sup>°</sup> )	
Pagion	0	Gross Output			Consumption		
Region	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. Northeast 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	

### Table 2.8.1 Construction Materials (Stone, Sand)

Pagion	Surplus / Deficit				
Region	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. Northeast 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 2.8.2 Consumption of Construction Materials

2

('000 n					
Year	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			

### 2.9 Cement

### **Present Situation**

In the early 1990s domestic cement production did not keep pace with the 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 foreign investors. Vietnam Cement Corporation (VCC) dominates the local market and now holds 52% market share. Regardless of stiff competition from the private sector, the VCC is investing in its facilities to gain more market share while other foreign-invested cement plants 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 have remained unsold.

With such fierce competition among cement producers and an emerging oversupply problem, 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 Perspectives**

In theory industrialization intensifies cement demand. Table 2.9.1 clearly shows that a less industrialized country needs to produce less amount of cement. The anticipated GDP of the secondary sector, including industry and construction, up to the year 2020 is applied to obtain the forecast demand. As a result, per capita cement consumption is projected at 304 kg, more than 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, in addition to numerous small mills, will meet domestic demand and 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 mainly located in the south.

	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

Table 2.9.1 Cement Production in Neighboring Countries

Source: ADB Socio-economic Indicators

No	Coment Diant	Location	Designed Production Capacity ('000 tons/year)				
INO	Cement Plant	Location	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			

Table 2.9.2Large Cement Plants (Existing and Planned)

Source: Vietnam Cement Corporation

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

### Table 2.9.3 Forecast of Cement

	-				('00	0 tons)	
Pegion		Gross Output			Consumption		
Region	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	

	Surplus / Deficit				
Region	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 2.9.4 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

### 2.10 Fertilizer

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%.

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 the 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 patronage 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%.

No	Feeters	Location	Productio	on Capacity ('000 t	ons/year)
INO	Factory	Location	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	Melted Van Dien	Hanoi	192.0	200	400
4	Melted 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

 Table 2.10.1

 Location and Production Capacity of State-owned Fertilizer Factories

Source: GSO, Vietnam Chemical Corporation

<sup>1</sup> Forecast figures made by the Study Team.

					('000	0 tons)
Pagion		Gross Output		Consumption		
Region	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. North East 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

### Table 2.10.2 Forecast of Fertilizer Production and Consumption

	1				
Pagion	Surplus / Deficit				
Region	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. Northeast 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 2.10.3 Trend in Fertilizer

		(000 10115)
Year	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

### 2.11 Coal and Other Mining Products

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 viewpoint, the most important question is how to transport coal economically to consumers within Vietnam to compete with other energy sources, such as fire-wood and petroleum products, or to transport Chinese anthracite coal in the global market. Coal is now distributed in the north by rail and barge to/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>, failing in

<sup>&</sup>lt;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).

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.

According to 1997 World Bank 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. World Bank 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 on 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
- 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 seaport is not yet disclosed. The sector's alumina 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.

					('000 ton	s)	
Pagion		Gross Output			Consumption		
Region	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. Northeast 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	

### Table 2.11.1 Forecast of Coal

Region	Surplus / Deficit				
Region	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. Northeast 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 2.11.2 Trend in Coal

		('000 tons)
Year	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

### 2.12 Crude Oil and Refined Oil

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 Cons 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 condense, 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 Ho Chi Minh City. In the north, a pipeline network has been developed for refined oil haulage, stretching from B 12 Oil Port to Haiphong, 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.

It is reported that a second oil refinery will be constructed by the year 2010 with capacity of 6.5 million tons. But its location is uncertain but it is assumed to be built beside the first one based on the original scheme.

According to the World Bank'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.

					( 000 1011	0)
Pagion	Gross Output			Consumption		
Region	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. Northeast 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

Table 2.12.1 Forecast of Refined Oil

Ragion	Surplus / Deficit				
Region	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. Northeast 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 2.12.2 Trend in Oil

(1000 topo)

		('000 tons)
	Crude Oil	Refined Oil
Year	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

### 2.13 Manufacturing Goods

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, a portion of about 50% of industrial output is not covered by the aforementioned analyses, as shown in Table 2.13.1. The rest consisting of machinery, cellulose part, paper industries, beverage, salt, textile, garment, printing, etc. is called "manufacturing goods" in this study.

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 (EPZ) in Ho Chi Minh City shipped out their machinery products for export, making an average of US\$ 4,400 of cargo 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. It results 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	ן =	5.61 millions tons

Inductrial Dranches		Of which manufacturing Goods		
Industrial Branches	Gross Output	Value	%	
Energy Combustible	23,871	0	0	
Metallurgy	4,548	0	0	
Machinery	14,589	14,589	100	
Chemicals	10,422	0	0	
Other maufacturing <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 Others	2,685	2,685	100	
	7,071	7,071	100	
TOTAL	133,685	66,825	50	

Table 2.12.3 Estimated Gross Output of Industry by Branch, 1997

Note: <sup>1</sup> including construction materials, wood, forest products, cellulose part and paper industries Source: General Statistical Service, World Bank

### Table 2.12.4 Manufacturing Goods

					('000 ton:	s)	
Region		Gross Output		Consumption			
itegion	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. Northeast 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	

# 3 ANALYSIS OF AGGREGATED SURPLUS AND DEFICIT OF COMMODITIES

### 3.1 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) <u>High and low assumptions</u>: 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) <u>Other miscellaneous goods</u>: 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 endusers 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:

	1007	High Assumption		Low Assumption	
	1997		2020	2010	2020
Export	3.7 %	10 %	20 %	9 %	16 %
Import	16.2 %	25 %	30 %	22.5 %	24 %

Table 3.1.1 Ratio of Other Miscellaneous Goods to the National Balance

3) <u>Transit/Transshipment</u>: 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:

- (1) <u>Lao PDR</u>: 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 socioeconomic 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.
- (2) <u>Cambodia-Mekong River</u>: 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 3.1.1)
- (3) <u>Cambodia-Ho Chi Minh City to Phnom Penh Highway</u>: 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.

- (4) <u>North Cambodia to Qui Nhon Port</u>: 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.
- (5) <u>Yunnan Province, China PR</u>: 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.
- (6) <u>Transshipment</u>: 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 3.1.1 Trend in Cargo Volume at Phnom Penh Port and Sihanoukville Port

					('000 tons)
	High Ass		sumption	Low Assumption	
	1337	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
<ul> <li>Road to HCM City Port</li> </ul>	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
TOTAL	3,151	5,767	9,306	5,251	7,654

### Table 3.1.2 Transit/Transshipments

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)

		, ,		,	,		('000 ton	s)
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 and 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 and Other Mining	Coal	11,388	15,616	19,009	7,934	11,080	14,508
	Products	Other Mining	1,200	5,000	10,000	0	0	0
12	Crude Oil and Refined	Crude Oil	10,090	17,000	17,000	330	13,530	13,530
	Oil	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
TOTAL			120,320	232,892	318,630	93,872	198,444	303,088

### Table 3.1.3 Summary of Main Commodity Survey

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('000 tons, +: export, -: Import)							
	Commodity Type	1997	High Ass	High Assumption		Low Assumption	
			2010	2020	2010	2020	
	<ol> <li>Rice and Other Food Crops</li> </ol>	+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	
nce	4. Industrial Crops	+611	+2,130	+4,430	+2,130	+4,430	
ala	5. Fishery Products	+259	+860	+1,236	+860	+970	
B	6. Animal Meat	+32	+62	+71	+62	+61	
ona	7. Steel	-1,401	-1,751	-6,779	-1,532	-4,066	
lati	8. Construction Materials	-144	0	0	0	0	
Z Z	9. Cement, Clinker	-1,740	+3,139	+5,548	+4,486	+6,027	
late	10. Fertilizer	-2,680	-4,655	-5,913	-4,576	-4,599	
Estim	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	
		-6,101	-2,951	-17,823	-1,235	-11,024	
	13. Manufacturing Goods	+2,630	+8,157	+14,987	+7,608	+13,440	
		-2,737	-8,489	-15,596	-7,917	-13,987	
Oth	ner Miscellaneous Goods	+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	
Imp	port Subtotal	17,285	22,308	59,944	18,694	41,758	
Tra	insit/Transshipment	3,151	5,767	9,306	5,251	7,654	
Cargo Throughput Total		41,618	58,674	119,305	55,027	95,504	

### Table 3.1.4 Forecast of National Trade Balance

### 3.2 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 3.2.1.

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 3.2.1
Aggregate Volume of Surplus and Deficit at Provincial Level

	Commodity		Amount of Sur	plus and Deficit	at Provincial Lev	/el
Groups		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	1 Crude Oil	10,090	17,000	17,000	17,000	17,000
12-2	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
	TOTAL	75,359	141,992	203,279	149,755	246,266