

## **Chapter 5**

# **DEMAND FORECAST FOR COASTAL SHIPPING**

## QUESTION

1. The following table shows the number of people who attended a concert in each of the years 2000 to 2004.

Year	Number of people
2000	1200
2001	1500
2002	1800
2003	2100
2004	2400

(a) Draw a line graph to show the number of people who attended the concert in each of the years 2000 to 2004.

(b) How many more people attended the concert in 2004 than in 2000?

(c) How many more people attended the concert in 2003 than in 2001?

(d) How many more people attended the concert in 2002 than in 2000?

(e) How many more people attended the concert in 2004 than in 2002?

(f) How many more people attended the concert in 2003 than in 2002?

(g) How many more people attended the concert in 2004 than in 2001?

(h) How many more people attended the concert in 2002 than in 2001?

(i) How many more people attended the concert in 2003 than in 2000?

## ANSWER

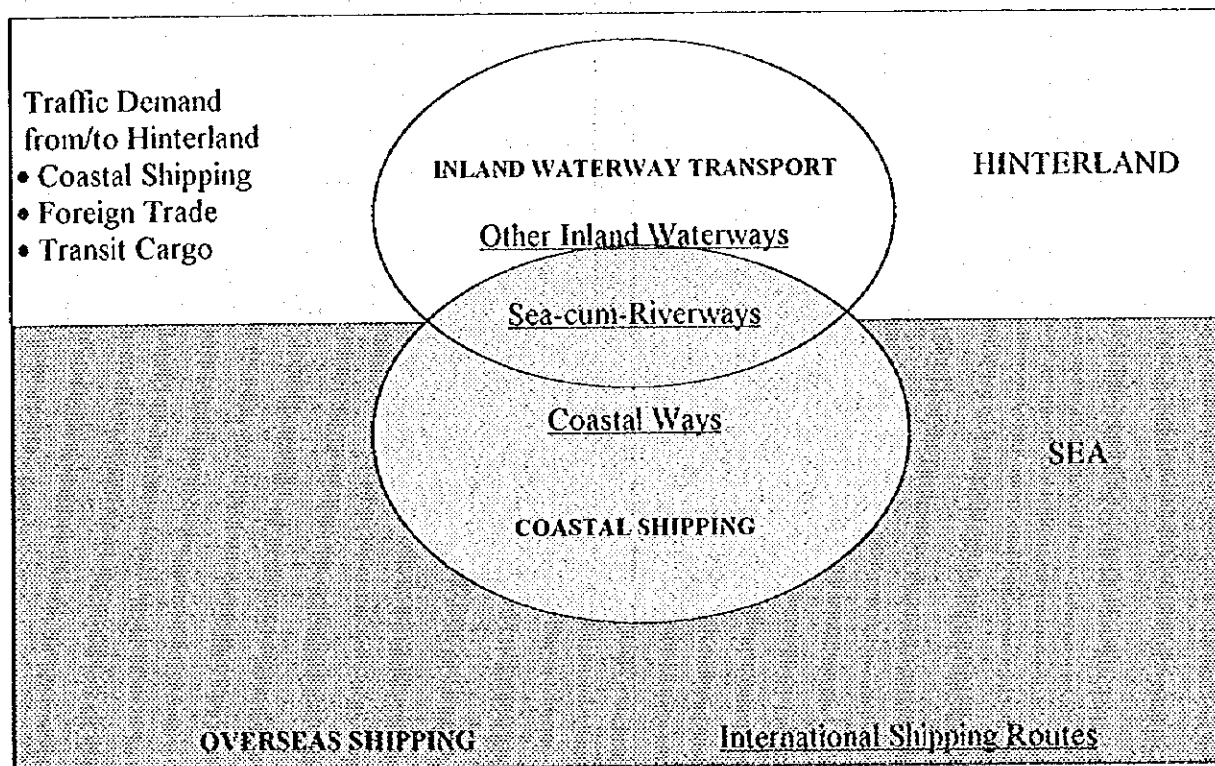
## Chapter 5 DEMAND FORECAST FOR COASTAL SHIPPING

### 5.1 Forecasting Framework

#### (a) Target Area

Coastal shipping in Vietnam is still a vague idea since its traffic is small and does not have distinct transport characteristics from overseas shipping and inland waterways transport. The demand forecast work in this study, therefore, encompasses domestic traffic demand, foreign trade with Vietnam and transit cargo of adjoining countries through Vietnam ports. The work also determines the shipping network, which consists mainly of coastal waterways and sea-cum-river waterways. Whenever appropriate and necessary, the study refers to other inland waterways and international shipping routes. Figure 5.1.1 illustrates the above-mentioned principle diagrammatically.

Figure 5.1.1  
DIAGRAM OF DEMAND FORECAST FOR COASTAL SHIPPING



#### (b) Zoning System

To determine the zoning system of the study, the following aspects were duly considered:

- A province or combined provinces within the same Socio-economic Development Region (SDR) that divides the country into seven,
- Port hierarchy such as a major port and supportive minor ports within a zone; and

- Port hierarchy such as a major port and supportive minor ports within a zone; and
- Each adjoining country, amalgamations of other countries in East and South-East Asia, and other countries along international routes.

As a result, the zoning system consisting of 20 domestic zones and 10 foreign ones has been prepared, as shown in Table 5.1.1 and Figure 5.1.2.

Table 5.1.1  
ZONING SYSTEM FOR TRAFFIC DEMAND FORECAST

Zone	Province	Existing Port	Planned
1.	Ha Giang Tuyen Quang Lao Cai Yen Bai Vinh Phu	- - - - Viet Tri	-
2.	Cao Ban Lang Son  Bac Thai  Ha Bac	- - - - Ha Bac (Dap Cau, A Lu)	-
3.	Lai Chau Son La  Hoa Binh	- - - Hoa Binh	-
4.	Quang Ninh	Hong Gai Hong Gai Transshipment Cai Lan Cua Ong (Cam Pha) Dien Cong B12	-
5.	Hanoi	Hanoi	-
6.	Haiphong  Ha Tai Hai Hung	Haiphong Cua Cam Hoang Thach Pha Lai - -	Chinh Fong
7.	Thai Binh Nam Ha Ninh Binh	- - Nam Dinh Ninh Binh	-
8.	Thanh Hoa	Thanh Hoa (Le Men)	Nghi Son
9.	Nghe An	Cua Lo Ben Thuy	-
10.	Ha Tinh Quang Binh	Xuan Hai Nhat Le	Vung Ang (Mui Ron)
11.	Quang Tri T.T.-Hue	- Thuan An	Cua Viet (Dong Ha) Chan May
12.	Q.N.-Danang	Danang	Lien Chieu
13.	Quang Ngai Binh Dinh  Gia Lai Kon Tum	Sa Ki Qui Nhon Thi Nai - -	Dung Quat
14.	Phu Yen Khanh Hoa  Ninh Thuan Binh Thuan Dac Lac Lam Dong	Nha Trang Ba Ngei Hon Khoi - - - -	Van Phong

Zone	Province	Existing Port	Planned Port
15.	HCMC  Song Be Tay Ninh	Saigon Ben Nghe Tan Cang (New Port) Nha Be Oil - -	-
16.	Dong Nai  B.R.-Vung Tau	Dong Nai Thu Duc Vung Tau (Cat Lo Dist.)	Vung Tau (Ben Dinh, Sao Mai) Thi Vai (Phu My, Cai Mep.)
17.	Long An  Tie Giang Ben Tre	- - My Tho	-
18.	Dong Thap Vinh Long Tra Vinh	Dong Thap (Cao Lanh) Vinh Long -	-
19.	An Giang Kien Giang	My Thoi (Long Xuyen) Kien Luong Hong Chong	-
20.	Can Tho Soc Trang Minh Hai	Can Tho - Nam Can Ca Mau	-

Zone	Foreign Countries
21.	China
22.	Laos
23.	Cambodia
24.	Thailand
25.	Myanmar
26.	Singapore Malaysia Indonesia
27.	Hong Kong Taiwan Philippines
28.	Japan North South Korea Russia
29.	North South America Australia
30.	India Africa Europe



(c) Commodity Classification

In general, commodities loaded on seaborne transportation have a variety of physical characteristics which require different vessel types and forms of handling. In Vietnam, major commodities in coastal shipping are rice, coal, cement, fertilizer and oil. Taking the characteristics of commodities: such as size, weight, bulkiness, vulnerability and physical state, commodities can be classified into six categories.

In order to cope with the growth in passenger traffic, vessels that can accommodate passengers are required. They could include passenger ships, passenger cargo ships and Ro-Ro (roll-on, roll-off) ships.

Table 5.1.2 defines commodities and possible vessel types by classification.

Table 5.1.2.  
COMMODITY CLASSIFICATION AND VESSEL TYPE

Classification	Commodity	Package Size	Seasonality	Consignment Size	Ship Type
Agricultural Products	Rice, wheat, bran, manioc, sugar molasses, rubber, etc.	Bag, case, drum, carton	Varies greatly	Various, not so large	General Cargo/Bulk Ship
Construction Materials and Mining Products	Clinker, sand, stone, coal, ore, apatite, sulfur, lead, zinc, glass, titanium, tin, magnesium, etc.	Break-bulk	Fairly constant meeting industrial needs, but less constant meeting building needs	Depends on consumer's facility	Bulk Ship General Cargo/Bulk Ship
Oil	Crude oil, petroleum oil	Liquid	Constant	Depends on consumer's facility	Tanker
Bulk Cargo	Steel, wood, iron, cable, etc. fertilizer, asphalt, plaster, urea, etc.	Bag, break-bulk	Fairly constant	No so large	General Cargo/Bulk Ship
Cement	Cement	Mainly in case, carton, drum or loose	Fairly constant	Depends on port facility (silo, exclusive berth, etc.)	General Cargo/Bulk Ship Specialized ship
Other cargo	Machinery, equipment, chemical, electric appliances food, car Other industrial products	(construction equipment, vehicles)	Fairly constant, although composition may change	Various	General Cargo/Bulk Ship Container Ship Ro-Ro Ship
Passenger					Passenger Ship Passenger-Cargo Ship Ro-Ro Ship

(d) Freight and Passenger subject to Coastal Shipping

1) Possible Shippers

In many provinces in Vietnam, cargo can be transported by rail, road, inland waterway and coastal shipping. These are compared in Table 5.1.3.

Table 5.1.3  
COMPARISON OF EXISTING TRANSPORT MODES IN VIETNAM

Modes	Average Trip Distance (km)	Maximum Loadable Capacity	Transport Cost (VND / ton-km)
Coastal Shipping	1,280	Some thousand tons	60-130
Road	42	30 tons	500-950
Rail	345	410 tons	150-190
Inland Waterways	104	1,000 tons	135-405

Coastal shipping has the advantage of carrying cargo in bulk at a cheap price. But it needs seaports, and navigation routes are limited.

Road transport is the most convenient means, e.g., door-to-door access to any destination and has rather opposing characteristics to coastal shipping. Therefore there may be only limited areas of competition between these two modes. In combination with road transport, coastal shipping can improve its service via Ro-Ro operation.

Inland waterway transport is not locationally competitive with coastal shipping and further, it can become the best suited secondary means of transportation of coastal shipping.

Railway transport is competitive with coastal shipping on the Hanoi-Ho Chi Minh City line, and with inland waterways transport on the northern lines.

Careful attention should be paid to the demarcation between coastal shipping and railway transport. From experience in many countries, choice of mode may be foreseeable based on the trip distance. For example, in Japan, domestic shipping and rail shared long-distance cargoes equally around 1960, then most cargoes shifted to shipping. Today they have different markets according to trip distance. More, specifically, the average transport distance for domestic shipping is 435 km, which is double that of rail.

JICA development study in the railway sector, "F/S on the Rehabilitation and Development of the Railway in Vietnam", gave the following demarcation between these two modes:

- Principal railway cargoes are cement (trip distance: 100 - 346 km), coal (less than 175 km), stone / gravel (180 - 425 km) and wood / furniture (220 - 530 km).
- Most of the long distance cargoes such as fertilizers and foodstuff may shift to coastal shipping.
- For other products, the freight movement of more than 600 km will be served by coastal shipping.

Based on the above-mentioned analyses, the Study proposes that coastal shipping in Vietnam is responsible for mainly two kinds of freight traffic as follows:

1. Carrying bulk, bulky and wet cargoes to distant places in accordance with Vietnam's socio-economic development scenario. Assumed cargoes are agricultural, mining products and industrial materials.
2. Distributing various industrial products from production areas to consumption areas over distances of more than 600 km.

## 2) Passenger

Coastal shipping plays only a minor role in serving passenger traffic. In 1994 its modal share was only 0.2% and the average trip distance was as short as 30 km. Some shipping routes are essential and cannot be substituted, such as those to islands, while some are exclusively used for tourists. There are a few inter-provincial shipping routes linking only neighboring provinces such as Haiphong - Quang Ninh, Qui Nhon - Nha Trang, Binh Thuan - Ninh Thuan, etc. VINASHIP had been operating two 6,000 DWT ships with a capacity of 900 passengers, 120 cars and 2,000 DWT cargo between Haiphong and Saigon between 1976 and 1991. Due to operational deficit, it was forced to suspend the service and there is no certainty that it will be resumed. It seems that it is not competitive with railways and buses which can provide reasonable, speedy and frequent services at lower cost.

By contrast to the long-distance services, operating tourist ships appears more promising. In Vietnam, there are enormous maritime tourism resources in areas such as Ha Long Bay, Cat Ba Island, Danang, Nha Trang, Qui Nhon, etc.

In conclusion, the Study proposes that coastal shipping in Vietnam is responsible for mainly three kinds of passenger traffic as follows:

1. Inter-provincial shipping service linking only neighboring provinces,
2. Remote island shipping service, and
3. Tourism shipping service

## 5.2 Present Traffic Demand

### (a) Overview of Existing Statistics

#### 1) Overseas Shipping Traffic

Table 5.2.1 indicates the imported and exported cargo volume through the centrally managed ports in 1993. Saigon Port and Haiphong Port assume the dominant role in overseas shipping traffic. For instance, various cargoes of 2,360 thousand tons were exported from Saigon Port while 416 thousand tons were exported from Haiphong Port. Regarding exported commodities, there are some specialized ports for goods such as rice in Saigon Port and coal in Quang Ninh Port. Although crude oil is the largest export commodity in Vietnam, it is shipped out at other ports such as Thi Vai and B-12.



Table 5.2.1  
**IMPORTED AND EXPORTED CARGOES  
 THROUGH CENTRALLY MANAGED PORTS IN 1993**

Exported Cargo	3,897.9	Imported Cargo	4,173.8
- Rice	1,603.0	- Fertilizers	953.0
- Coal	695.0	- Metallic Products	751.9
- Timber	292.3	- Machinery, Equipment	196.0
- Other Agricultural Products	133.9	- Food	186.6
- Others	1,172.9	- Chemical Products	113.2
		- Pyrite Ore	41.7
		- Others	1,931.4

Note: Including seaports - Haiphong, Saigon, Danang, Quang Ninh, Qui Nhon, Nha Trang, Nghe Tinh

As for importation, fertilizer is the largest commodity, and Saigon Port and Haiphong Port handle a dominant share. For instance, fertilizer weighing 953 thousand tons was imported in 1993. Of this amount, Saigon Port handled 461 thousand tons while Haiphong Port 371 handled thousand tons.

## 2) Coastal Shipping

Seven centrally managed ports handled 1,973 thousand tons in total in 1993. The cargo volume (in thousand tons), divided by major commodity, was as follows: cement (851.4), coal (201.0), food (139.4), plaster (32.5), and others(74.9).

Port traffic statistics are not only confusing, they are also insufficient for the following reasons:

- In ports open to sea-going vessels, international traffic is not the sole activity; domestic coastal shipping traffic and inland waterway traffic also play important roles. It is noted that sea-going vessels can carry domestic cargo in Vietnam and it is thus difficult to account for all domestic cargo.
- It is a common practice in Vietnam ports for loading and unloading to be separately counted and, a load which is transshipped is counted twice. Therefore, cargo traffic might be double-counted.
- Unfortunately, official statistics are not available in minor ports, while at others, are not under the control of VINAMARINE. VINAMARINE H.Q. receives monthly reports although not in a uniform format. There is no effort made to prepare statistics.

### (b) Conduct of Port Traffic Survey

In the past, coastal shipping traffic has not been clearly defined. This can be partly explained by insufficient statistics but it is mainly attributed to government's disregard of coastal shipping. "National Transport Sector Review" conducted by UNDP dealt with coastal shipping as follows:

"In the NTSR, only the traffic between the main ports is taken into account, keeping however in mind that a marginal traffic is developing along the coast between the main and secondary ports."

Under such a situation, the Study Team established close contact with relevant agencies such as VINAMARINE, Inland Waterways Bureau, TEDI and TESI. However available data were not sufficient, and discrepancies were somewhat confusing. The Study Team, therefore, conducted a port traffic survey covering some 50 ports in order to check the existing statistics and to establish an original database. As a result, the Study collected port traffic data from 44 ports as shown in Table 5.2.2. The results are summarized below.

- International Cargo :10,492,135 tons (export) / 12,664,468 tons (import)
- Domestic Cargo : 7,809,976 tons (loaded) / 5,237,199 tons (unloaded)

It is noted that port managers do not understand the concept of coastal shipping and some managers refused to disclose data. The port traffic can be divided only into international and domestic, and since numerous small river ports have not been studied, there is a large discrepancy between loaded and unloaded cargo in domestic shipping.

Table 5.2.2  
PORT TRAFFIC SURVEY IN 1995

Zone	Port	Province	International Cargo		Domestic Cargo		Total Volume	
			Export	Import	Loaded	Unloaded	Int'l	Domestic
1	Viet Tri	Vinh Phu	0	0	30,000	130,000	0	160,000
2	Ha Bac (Dap Cau, A Lu)	Ha Bac	0	0	0	148,000	0	148,000
3	Hoa Binh	Hoa Binh	0	0	5,000	13,000	0	18,000
4	Hong Gai	Quang Ninh	1,404,500	769,900	301,100	350,000	2,174,400	651,100
	Cai Lan	Quang Ninh					0	0
	Cua Ong	Quang Ninh	1,976,900	1,300	118,400	0	1,978,200	118,400
	B12	Quang Ninh	0	814,412	27,545	72,678	814,412	100,223
	Hong Gai Transshipment	Quang Ninh	477,136	184,954	20,644	4,149	662,090	24,793
	Dien Cong	Quang Ninh	0	0	350,000	0	0	350,000
5	Hanoi	Hanoi	0	0	0	723,415	0	723,415
6	Haiphong	Haiphong	493,588	2,361,658	514,490	1,145,686	2,855,246	1,660,176
	Cua Cam	Haiphong	0	114,586	6,560	19,000	114,586	25,618
	Hoan Thach	Haiphong	0	0	191,600	20,000	0	211,600
	Pha Lai	Haiphong	0	0	3,000	1,010,000	0	1,013,000
7	Nam Dinh	Nam Ha	0	0	0	130,000	0	130,000
	Ninh Binh	Ninh Binh	0	100,000	192,000	225,000	100,000	417,000
8	Thanh Hoa (Le Mon)	Thanh Hoa	12,000	0	36,000	72,000	12,000	108,000
9	Nghe Tinh (Cua Lo, Ban Thuy)	Nghe An	56,163	68,522	100,790	52,483	124,685	153,273
10	Xuan Hai	Ha Tinh	45,000	4,000	3,000	22,500	49,000	25,500
	Nhat Le	Quang Binh	5,800	0	200	10,000	5,800	10,200
11	Thuan An	T.T.-Hue	9,500	7,000	0	66,000	16,500	66,000
12	Danang	Q.N.-Danang	149,424	631,657	23,000	216,888	781,081	239,888
13	Sa Ky	Quang Ngai	0	0	5,000	5,000	0	10,000
	Qui Nhon	Binh Dinh	171,289	151,801	29,356	94,584	323,090	123,940
	Thi Nai	Binh Dinh	3,500	0	34,400	20,000	3,500	54,400
14	Nha Trang	Khanh Hoa	16,558	214,245	18,836	93,473	230,803	112,309
	Ba Ngoi	Khanh Hoa	213,546	500	57,964	4,295	214,046	62,259
	Hon Kohoi	Khanh Hoa	5,500	0	31,500	6,000	5,500	37,500
15	Saigon	HCMC	2,308,202	4,259,198	546,903	97,324	6,567,400	644,227
	Ben Nghe	HCMC	630,000	780,000	246,820	105,780	1,410,000	352,600
	Tan Cang	HCMC	1,500,000	1,500,000	0	0	3,000,000	0
	Nha Be Oil	HCMC	750,000	249,579	1,780,000	0	999,579	1,780,000
	Nha Be Vegetable	HCMC	46,929	255,000	0	5,856	301,929	5,856
16	Thu Duc	Dong Nai	0	0	900,000	100,000	0	1,000,000
	Vung Tau (Cat Lo dist.)	B.R.-Vung Tau	19,000	47,000	7,000	3,000	66,000	10,000
17	My Tho	Tien Giang	16,446	4,558	117,489	65,242	21,004	182,731
18	Dong Thap (Cao Lanh)	Dong Thap	40,000	110,000	100,000	0	150,000	100,000
	Vinh Long	Vinh Long	18,000	7,000	65,000	4,000	25,000	69,000
19	My Thoi (Long Xuyen)	An Giang	48,000	0	112,000	0	48,000	112,000
	Kien Luong	Kien Giang	0	0	1,800,000	200,000	0	2,000,000
	Hong Chong	Kien Giang	0	4,000	0	0	4,000	0
20	Can Tho	Can Tho	66,154	23,598	34,379	1,788	89,752	36,167
	Nam Can	Minh Hai	5,000	0	0	0	5,000	0
	Ca Mau	Minh Hai	4,000	0	0	0	4,000	0
Total			10,492,135	12,664,468	7,809,976	5,237,199	23,156,603	13,047,175

Source: JICA Study Team

(c) Preparation of 1995 O-D Tables

Eight O-D tables in total (6 commodity groups, 1 total cargo, 1 passenger) have been prepared and the desire lines of them are illustrated in Figure 5.2.4. Salient characteristics are analyzed separately for domestic seaborne traffic, overseas traffic and passenger traffic below.

1) Domestic Seaborne Traffic

In Vietnam, domestic seaborne traffic can be physically defined as that using coastal seaways and sea-cum-riverways and functionally as domestic traffic that uses seaborne vessels. The traffic is further divided geographically into three: traffic movements within the Red River Delta and within the Mekong River Delta, and coastal movement (possibly inclusive of both the delta areas).

The 1995 OD tables reveal that present domestic seaborne traffic is estimated at 5,336 thousand tons, comprising coastal shipping (2,738 thousand or 51.2%), the Red River Delta (1,326 thousand or 24.8%) and the Mekong River Delta (1,277 thousand or 23.0%). Refer to Table 5.2.3.

According to the data released from the Inland Waterways Bureau, both the delta areas have about 6 millions of freight traffic each and the 1995 O-D tables, therefore, imply more or less 20% of the river traffic is functionally regarded as seaborne traffic.

Table 5.2.3

**SUMMARY OF DOMESTIC SEABORNE TRAFFIC IN 1995**

	Commodity Group	Coastal Shipping		Red River Delta		Mekong River Delta		Domestic Total	
		Tons	%	Tons	%	Tons	%	Tons	%
1	Agricultural products	725,251	26.5%	0	0.0%	142,000	11.1%	867,251	16.6%
2	Construction materials & Mining products in bulk	398,159	14.6%	798,320	60.2%	676,168	52.9%	1,872,647	37.1%
3	Wet cargo	360,623	13.2%	18,000	1.4%	150,000	11.7%	528,623	11.3%
4	Bulk cargo	482,388	17.6%	162,500	12.3%	0	0.0%	644,888	12.1%
5	Cement	403,854	14.8%	187,200	14.1%	151,000	11.8%	742,054	10.2%
6	Other cargoes	363,454	13.3%	159,500	12.0%	158,053	12.4%	681,007	12.7%
	Total	2,733,729	100%	1,325,520	100%	1,277,221	100%	5,336,470	100%

Source: JICA Study Team

The traffic features by commodity type are described as follows:

Agricultural products: These products predominantly come from the South to the North. In the year, there was a shortage of rice in the North and about 600,000 tons were shipped out from the Mekong Delta during the period of emergency. Other products included wheat, palm oil, etc.

Construction materials and mining products in bulk: Coal in bulk is shipped out from Quang Ninh (Zone 4) to many ports and from Viet Tri (Zone 1) to Cua Lo (Zone 16). The biggest unloading port is Ninh Binh (Zone 7) where many factories have been historically located. Long Xuyen (Zone 19) ships out clinker in bulk mainly to Ho Chi Minh City (Zone 15).

Wet cargo: Compared with foreign trade, domestic wet cargo movement is small but tangible. Petroleum oil is transported from Nha Be (Zone 15) to B12 (Zone 4) to meet the demand in the North. A large cement plant in Kien Luong (Zone 19) needs petroleum oil for fuel use.

Bulky cargoes: Haiphong (Zone 6) ships out steel to various industrial areas such as Hanoi (Zone 5), Danang (Zone 12) and Ho Chi Minh City (Zone 15). Ninh Binh (Zone 7) has many factories engaged in production and distributes fertilizer to the central region and to the South.

Cement: Hoang Thach Port and Haiphong Port (both located in Zone 6) and Kien Luong Port (Zone 19) are the major shipment ports of cement nationwide.

Other cargoes: Haiphong Port (Zone 6) and Saigon Port (Zone 15) ship out various industrial products all over the country. On the other hand, salt is usually shipped out from Nha Trang port (Zone 14) while beverages are shipped from My Tho port (Zone 17).

## 2) Overseas Traffic

Based on foreign trade statistics and the results of port traffic surveys, overseas traffic through Vietnamese ports in 1995 was estimated in Table 5.2.4. The total overseas traffic was 33,655 thousand tons consisting of export (18,016 thousand tons) and import (15,639 thousand tons).

Table 5.2.4

## SUMMARY OF OVERSEAS TRAFFIC THROUGH VIETNAMESE PORTS IN 1995

(Unit: tons)

	Commodity Group	Export		Import		Foreign Trade Total	
1	Agriculture products	2,067,102	11.5%	357,500	2.3%	2,424,602	10.5%
2	Construction materials & Mining products	4,241,531	27.5%	1,461,866	9.3%	5,703,397	17.0%
3	Wet cargo	8,260,000	45.9%	4,896,600	31.3%	13,156,000	39.1%
4	Bulky cargoes	189,553	1.1%	2,433,791	15.6%	2,623,344	7.8%
5	Cement	41,520	0.2%	1,006,114	6.4%	1,047,934	3.1%
6	Other cargoes	3,216,353	17.9%	5,483,571	35.1%	8,699,924	25.9%
	Total	18,016,059	100%	15,639,142	100%	33,655,201	100%

Source: JICA Study Team

The most significant trade flows to/ from other countries, by commodity group, are as follows:

Agriculture products: China, Indonesia, the Philippines and Malaysia as major rice importers.

Construction materials and mining products: Major coal importers are China and Japan while various kinds of sand and stone come from Russia and Japan.

Wet cargo: Crude oil is exported to Japan, Taiwan and Singapore while petroleum oil is mainly imported from Singapore.

Bulky cargoes: Vietnam exports some wood products, imports fertilizer from Indonesia, Malaysia, the Philippines, etc., and imports steel from Indonesia, Japan, Bangladesh, etc.

Other cargoes: A strong economic connection can be observed between Vietnam and other ASEAN countries in trading other cargoes.

### 3) Passenger Traffic

To offset the lack of data regarding passenger shipping service, the Study Team selected some passenger shipping routes and conducted onboard passenger interview surveys. (Refer to Table 5.2.5)

The shipping routes in Haiphong and/or Quang Ninh Province belong to interprovincial and remote island services while the one between HCMC and Vung Tau is a typical tourism service.

In the Haiphong and Quang Ninh area, the responses can be generalized as follows:

- fare is reasonable and frequency of service is satisfactory, but
- there is much anxiety about risk of accident due to doubtful seaworthiness of the vessel;

According to TESI and the Inland Waterways Bureau, there are some other inter-provincial shipping services although the traffic volume is negligible. In addition, Vietnam has 31 inhabited islands with between 44 and 26,000 residents. These islands need shipping service to and from the mainland to maintain the communities.

The Study estimates that the current passenger shipping service serves more or less one million passengers at the national level.

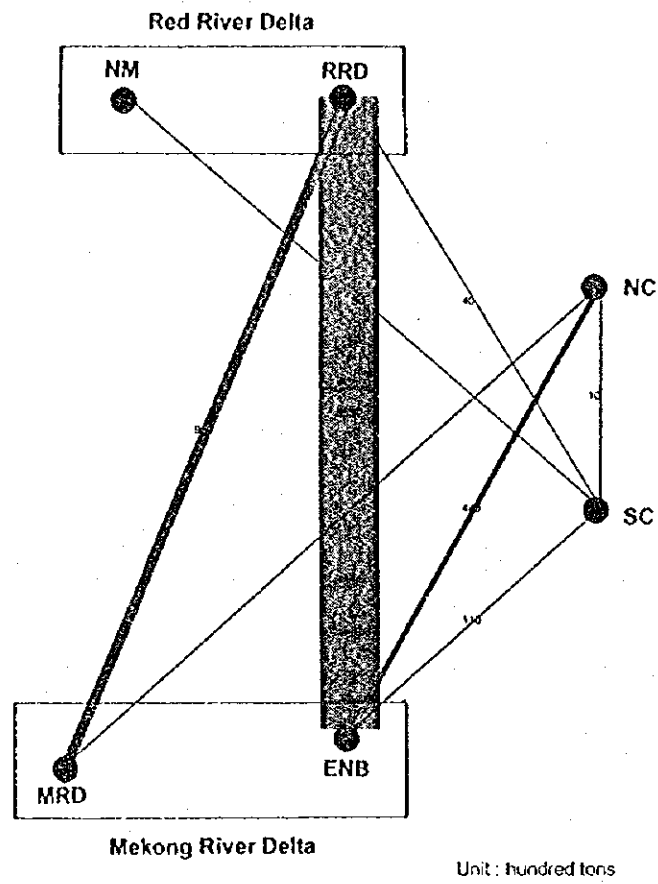
Table 5.2.5

**RESULTS OF PASSENGER SHIPPING SURVEY**

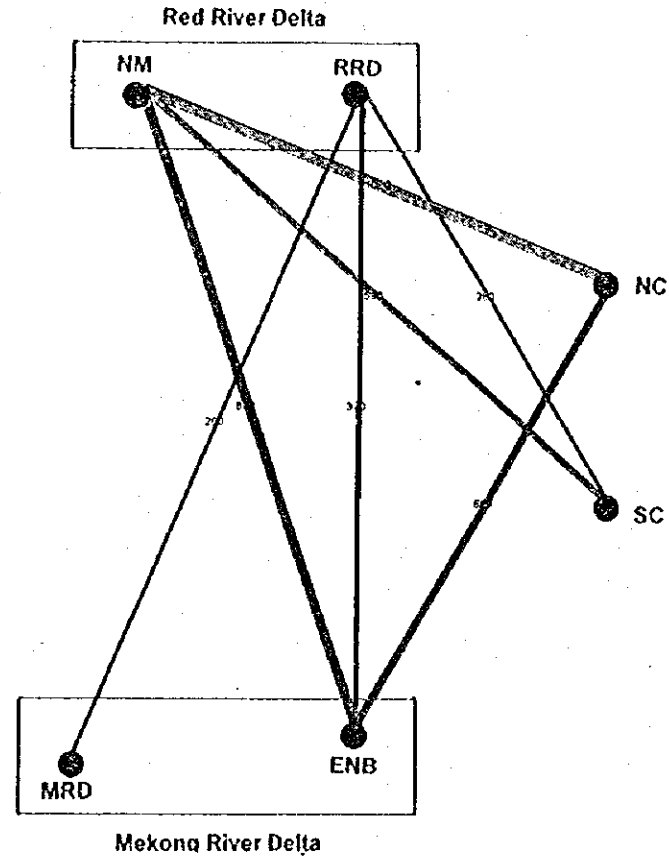
Route	Distance (in km)	Travel Time and Frequency	Fare	Capacity and Occupancy
Haiphong - Hong Gai	61	2h30m 2 round trips /day	16,000 VND - 14,000 VND	200 seats 40-65%
Haiphong - Bai Chay	50	3h 1 round trip/day	14,000 VND	100 seats 80%
Haiphong - Dan Tien	171	8h 1 round trip/day	30,000 VND - 27,000 VND	200 seats 40%
Haiphong - Cat Hai Island	25	1h30m 2 round trips/day	8,500 VND	100 seats 80%
Haiphong - Cat Ba Island	60	3h 1 round trip/day	18,000 VND	100 seats 80%
HCMC - Vung Tau	70 km	1h15m 2 round trips/day	110,000 VND	116 seats 50-60% on weekdays 80-90% on weekends

Source: JICA Study Team

**Group 1 Agricultural Products**



**Group 2 Construction Material and Mining Products**



**Group 3 Wet Cargoes**

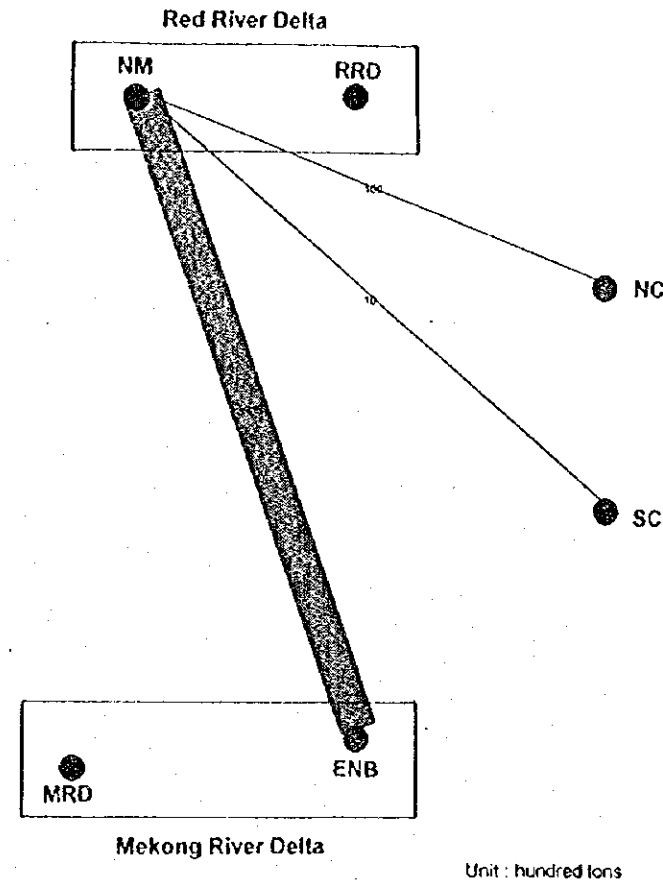
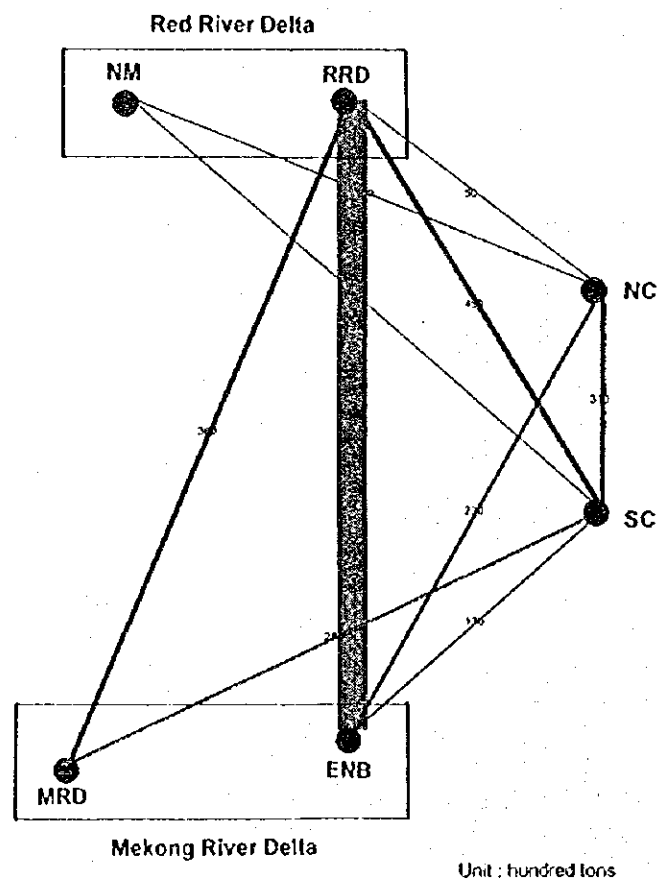


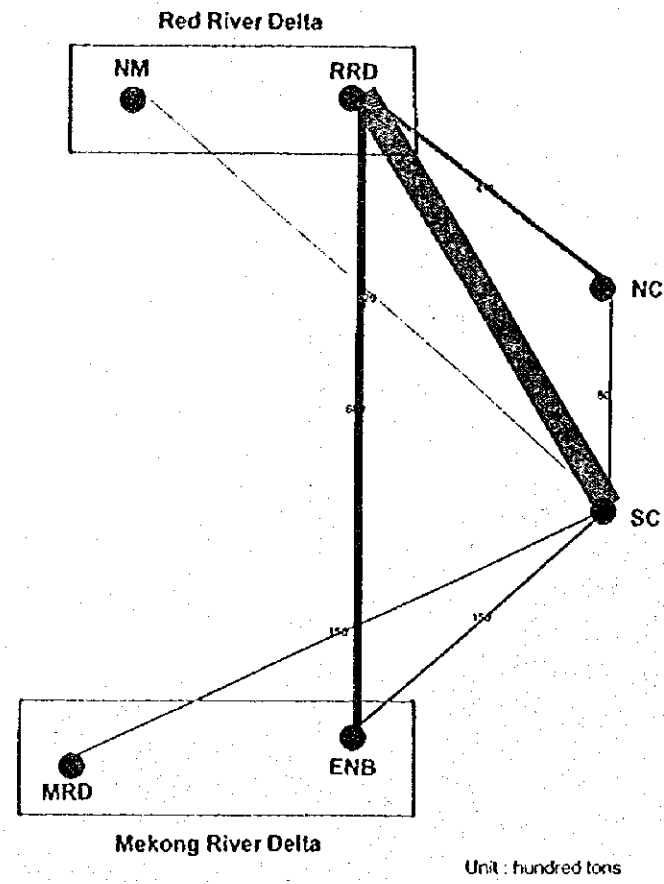
Figure 5.2.1  
COASTAL SHIPPING TRAFFIC FLOW  
BY COMMODITY TYPE IN 1995

- Legend:
- NM: North Mountain and Midland (Zone 1-4)
  - RRD: Red River Delta (Zone 5-7)
  - NC: North Central Coast (Zone 8-11)
  - SC: South Central Coast (Zone 12-14)
  - ENB: Eastern Nam Bo (Zone 15-16)
  - MRD: Mekong River Delta (Zone 17-20)

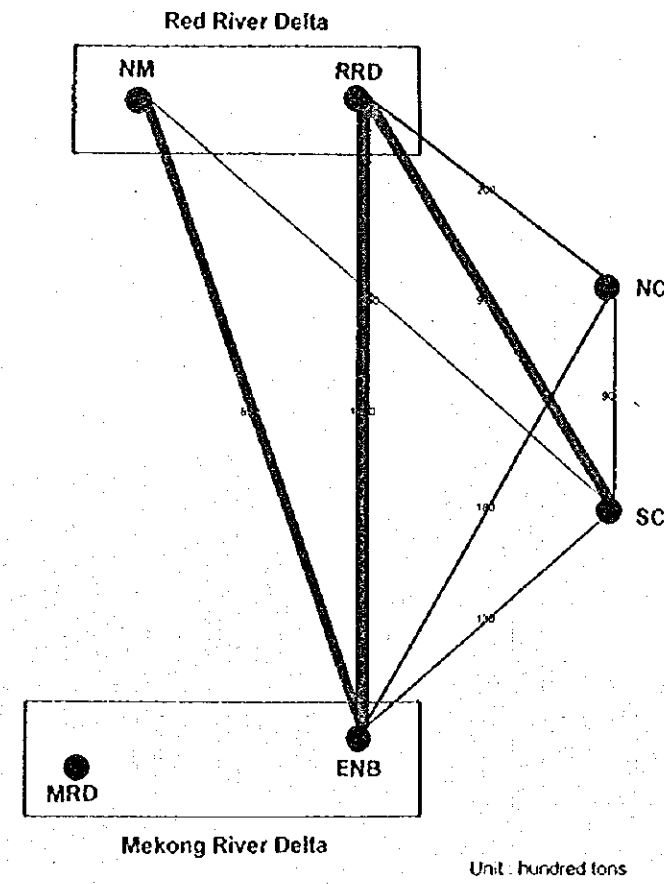
**Group 4 Bulky Cargoes**



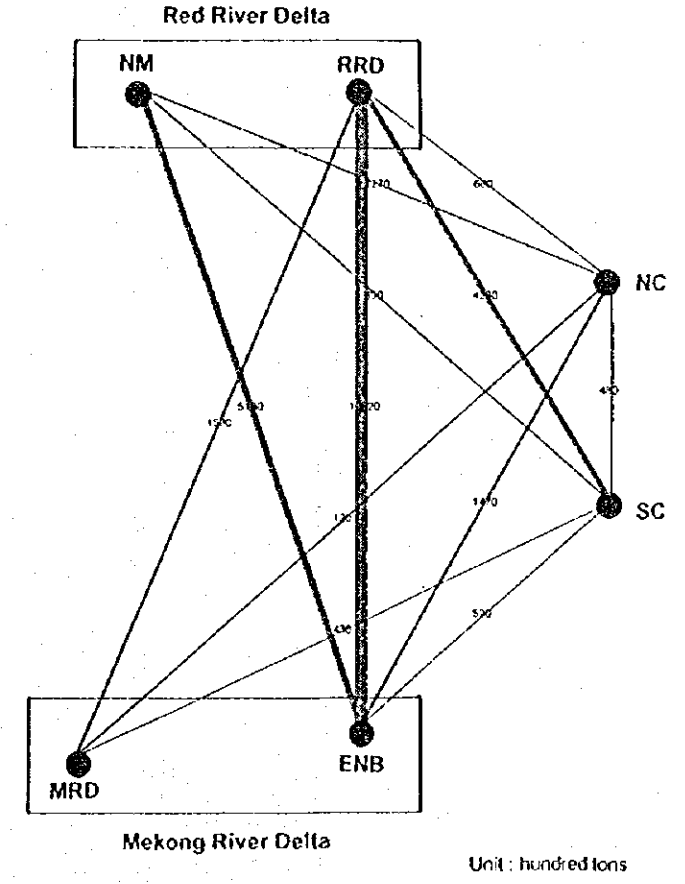
**Group 5 Cement**



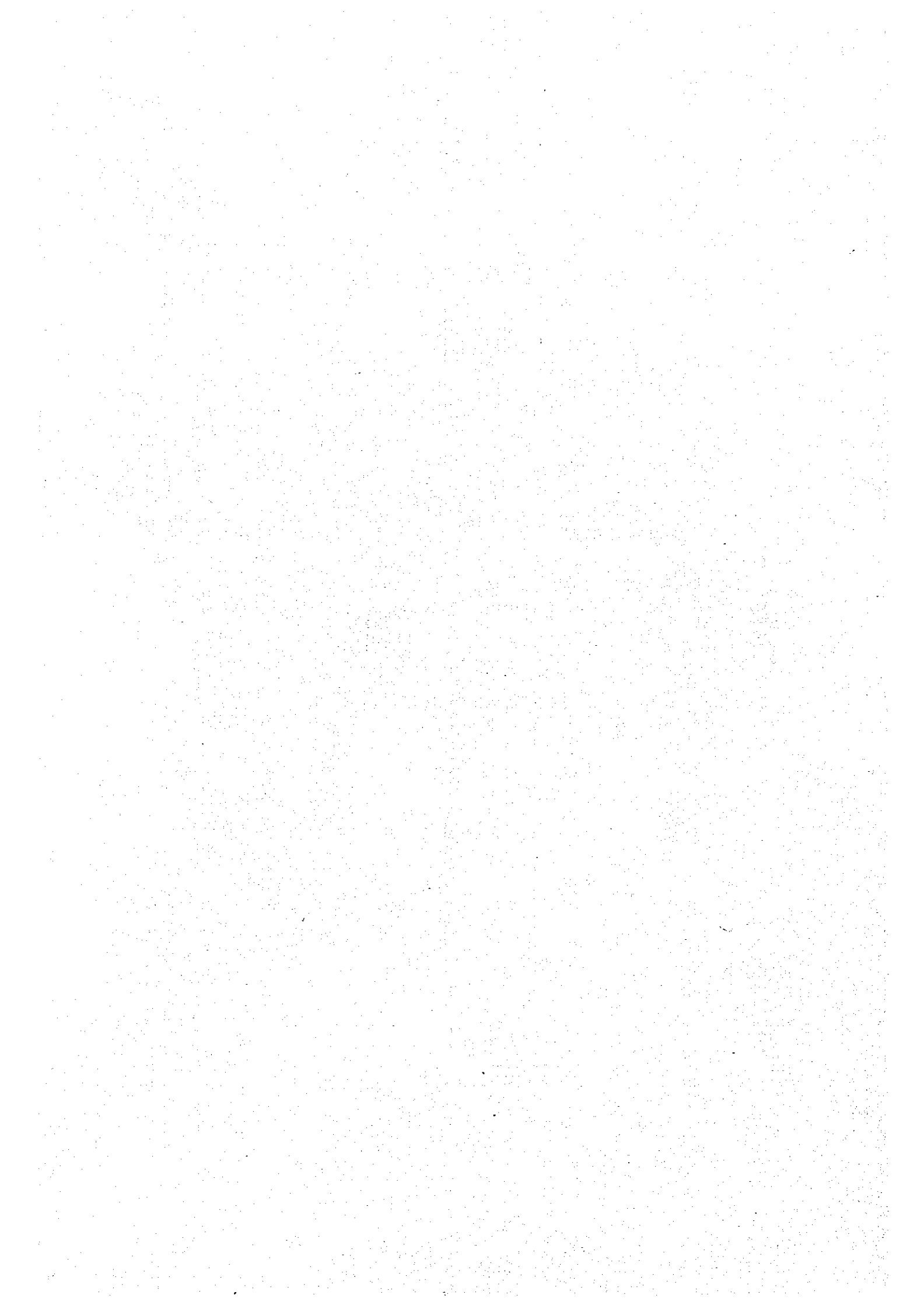
**Group 6 Other Cargoes**



**All Cargo**







### 5.3 Future Traffic Demand

#### 5.3.1 National Traffic Demand Forecast

##### (a) MOT's Traffic Demand Forecast

MOT has prepared not a few policy papers regarding transport development, and "Master Plan for Development of Transport Infrastructure to The Year 2010" (Hanoi, Nov.1995) is the one which can provide the Study with meaningful traffic demand forecasts. In the paper, traffic demand was forecast based on an elasticity model wherein traffic demand varies in relation with Gross Domestic Product(GDP). The modal assumptions in case of an increase in 1 % of GDP are as follows:

- Freight volume by all modes = 1.1 - 1.2% up
- Freight volume by sea and coastal shipping = 1.2 - 1.5% up
- Passenger volume by all modes = 1.3 - 1.4% up
- Passenger volume by waterways = 0.4 - 0.6% up
- 

The results are summarized in Table 5.3.1.

Table 5.3.1  
TRAFFIC DEMAND FORECAST 2000 - 2010

Forecast Item	Unit	Year 2000	Year 2010
Total Freight Volume	mil. tons	121.5 - 140.1	388.2 - 576.0
Sea Transport	mil. tons	49.3 - 59.8	177.0 - 268.3
Sea Foreign Trade	mil. tons	46.0 - 56.0	159.0 - 247.0
Sea Domestic Trade	mil. tons	3.3 - 3.8	18.0 - 21.3
Total Passenger Volume	mil. passengers	1,084 - 1,258	4,978 - 5,827
Sea Transport	mil. passengers	1.7	3.7

Source: "Master Plan for Development of Transport Infrastructure to The Year 2010", MOT

##### (b) Revised Traffic Demand Forecast

The national traffic demand as shown in Table 5.3.1 can in principal be accepted. However, there are two modifications that need to be made for the following reasons:

- 1) Development impact of the Dung Quat project on national transport network  
The Dung Quat project is a mega project and thus it will bring about considerable and various net benefits at national and provincial levels. We consider that net benefits at national level will depend on the relative costs, after allowing for transport, of local and foreign refining. From a transport planning viewpoint, implementing the project means

that a large amount of crude oil and refinery products will be domestically transported instead of these products being transported by current ocean-going vessels.

Table 5.3.2 shows the development impact of the Dung Quat project on transportation. The project site will be the location for the largest deep sea port of Vietnam, with a throughput capacity of 20 - 30 million tons yearly during the first phase (up to 2010). The refined wet cargo will be distributed by coastal shipping vessels and this amount of wet cargo should be included in the traffic demand forecast.

**Table 5.3.2  
COMPARISON OF TRAFFIC PATTERNS  
WITH / WITHOUT THE DUNG QUAT PROJECT**

	With the Dung Quat project	Without the Dung Quat project
1995	(N/A)	<ul style="list-style-type: none"> <li>• Exported crude oil: 7.7 mil.tons</li> <li>• Imported petroleum oil: 5.0 mil.tons</li> </ul>
2000	<ul style="list-style-type: none"> <li>• Dung Quat refinery center: 5 mil.tons</li> <li>• Exported crude oil: 15 mil.tons</li> <li>• Imported petroleum oil: 2 mil.tons</li> </ul>	<ul style="list-style-type: none"> <li>• Exported crude oil: 20 mil.tons</li> <li>• Imported petroleum oil: 7 mil.tons</li> </ul>
2010	<ul style="list-style-type: none"> <li>• Dung Quat refinery center: 12 mil.tons</li> <li>• Exported crude oil: 28 mil.tons</li> <li>• Imported petroleum oil: 5 mil.tons</li> </ul>	<ul style="list-style-type: none"> <li>• Exported crude oil: 40 mil.tons</li> <li>• Imported petroleum oil: 17 mil.tons</li> </ul>

Source: JICA Study Team

## 2) Assessing the actual amount of coastal shipping

As already mentioned, the MOT paper employed an elasticity model to forecast future traffic, based on the existing traffic volume and future anticipated GDP increase. However only statistics from centrally managed ports (six under VINAMARINE and two under VINALINES) are available in general.

However, the study conducted a port traffic survey covering some 50 ports and prepared an original database. This reveals that the actual coastal shipping volume was 2,734 thousand tons inclusive of dedicated ports and local ports, in addition to centrally managed ports. It should be noted that forecast work must be done based on the actual coastal shipping volume.

With these two modifications, the study worked out the revised traffic demand forecast as shown in Table 5.3.3.

Table 5.3.3  
REVISED TRAFFIC DEMAND FORECAST 2000 - 2010

	Unit	Year 2000	Year 2010
Total Freight Volume	mil. tons	121.5 - 140.1	388 - 576
Sea Transport	mil. tons	50.2 - 60.4	167 - 258
Sea Foreign Trade	mil. tons	36.0 - 46.0	135 - 223
Sea Domestic Trade	mil. tons	14.2 - 14.4	32 - 35
Total Passenger Volume	mil. passengers	1,084 - 1,258	4,978 - 5,827
Sea Transport	mil. passengers	1.7	3.7

Source: JICA Study Team, based on MOT data

### 5.3.2 Forecast of Future Demand

In this section, freight traffic and passenger traffic in coastal shipping, foreign trade and transit cargo through Vietnamese ports is projected. The approach to forecasting coastal shipping relies upon a synthesis of macro-economic development scenarios and individual development plans concerning land use and industrialization. The balance of production and consumption on a national level is duly considered to forecast foreign trade, while the economies of neighboring countries and the political relationship with them are considered for transit cargo.

#### (a) Freight Traffic in Coastal Shipping

Details of the socio-economic framework are discussed in Chapter 2. Highlights relevant to the traffic demand are the expansion of production of coal, oil, cement, steel, fertilizer, etc. and the increase in GDP per capita. Coastal shipping is a suitable mode to convey mineral products and industrial materials and therefore the related industry projects should be included. On the other hand, increase in GDP per capita will be the fruits of "industrialization and modernization" and it will drive the country into a society of mass-production and mass consumption. Coastal shipping will have to adopt a new role to achieve it.

As discussed in Section 5.3.1, the freight traffic in coastal shipping is expected to be 14.2 - 14.4 million tons in the year 2000 and 32 - 35 million tons in year 2010 on condition that the government implements the Dung Quat Oil Refinery Project.

As a result of the combination of "top-down" and "bottom-up" forecasting procedures, the Study has determined the future traffic demand by commodity group as shown in Table 5.3.4.

Table 5.3.4

**FUTURE COASTAL SHIPPING TRAFFIC DEMAND BY COMMODITY GROUP**

Unit: thousand tons

Commodity Group	Year 1995	Year 2000	Year 2010
1. Agriculture Products	725	670	880
2. Construction Materials & Mining Products	398	851	4,941
3. Wet Cargo	361	9,694	19,422
4. Bulky Cargoes	482	695	1,871
5. Cement	404	1,314	4,919
6. Other Cargoes	363	1,174	2,246
<b>TOTAL</b>	<b>2,734</b>	<b>14,398</b>	<b>34,279</b>

Source: JICA Study Team, TESI

Implications for forecasting traffic demand are described below.

**Agricultural product:** Rice cargo of some 600 thousand tons was urgently shipped out from the South to the North to relieve its shortage in 1995. In 1996, rice production is assumed to return to normal so that rice cargo reduces to about 300 thousand tons. However, the inherent problem of the North with too many people on insufficient arable land, will not be fundamentally solved in the long run. Although the year 1995 is exceptional, the Study projects that the North will need continuous food supply from the South.

**Mining products and construction materials in bulk:** To accelerate industrialization, abundant coal resources will be fully utilized. Quang Ninh Coalfield, one of the largest and most profitable coal fields in Vietnam, has good accessibility to sea transport for distribution to the central region and the South. Phosphate fertilizer factories need a lot of apatite which is plentiful around Lao Cai in the northern mountainous area. But one factory is to be located in Dong Nai Province and will inevitably need long haulage service. Thach Khe Ore Field will start operation before the year 2010. It will yield a huge production of 10 million tons of ore yearly and coastal shipping will distribute a considerable amount from an exclusive ore port to remote steel mills.

**Wet cargo:** Most of the oil distribution patterns will be internalized after the operation of the Dung Quat Refinery Center. Coastal shipping will carry most of it. Nha Be, My Khe and B12 will still be in operation with major storage facilities for petroleum oil.

**Bulky cargoes:** Considerable and continuous supply of steel and wood is essential to maintain the current boom in civil and building construction works. Ha Tinh Steel Mill will be constructed with a capacity of 2 million tons per year and it will ship out various steel products all over the country. Provinces in the central region will send wood to both delta areas.

Phosphate fertilizer factories will be concentrated in the North and some of the output will have to be transported to the South.

Cement: Although Vietnam imports cement in ever increasing quantities, in the near future Vietnam will be able to supply all consumers with domestically produced cement. This means that the haulage of imported cement will give way to a huge increase in domestic cement distribution. Some of this will be carried by coastal shipping.

Other cargoes: This is considered as a new market for coastal shipping. Large cities are considered to have a strong gravitational attraction for such traffic and will consume a wide variety of industrial products.

#### (b) Foreign Trade

Based on the commodity analysis of national production and consumption and the national traffic demand forecast, foreign trade through Vietnamese ports in the years 2000 and in 2010 has been projected as shown in Table 5.3.5.

Table 5.3.5

#### PROJECTION OF FOREIGN TRADE THROUGH VIETNAMESE PORTS

Commodity group	Export		Import	
	2000	2010	2000	2010
<b>1. Agricultural Products</b>	3,560	4,910	0	0
Rice	2,000	2,500	0	0
Rubber	170	430	0	0
Coffee	200	300	0	0
Peanut	160	280	0	0
Meat products	50	120	0	0
Cashew nuts	130	180	0	0
Vegetables, fruits	500	600	0	0
Maize	200	300	0	0
Fish and fish products	150	200	0	0
<b>2. Construction Materials and Mining Products in Bulk</b>	1,500	14,000	0	0
Coal	1,500	1,500	0	0
Ore	0	12,500	0	0
<b>3. Wet Cargo</b>	15,000	30,000	3,000	7,000
Crude oil	15,000	30,000	1,000	2,000
Petroleum oil	0	0	2,000	5,000
<b>4. Bulky Cargoes</b>	5,600	11,000	2,000	7,300
Wood chip	5,000	10,000	0	0
Round wood	600	1,000	0	0
Fertilizer	0	0	700	800
Bulk iron and steel	0	0	1,300	6,500
<b>5. Cement</b>	0	0	0	0
<b>6. Other Cargoes</b>	3,340	30,290	12,000	49,000
<b>Total Cargo</b>	<b>29,000</b>	<b>90,200</b>	<b>17,000</b>	<b>63,300</b>

Source JICA Study Team, TESI

The characteristics by commodity group are outlined below.

Agricultural products: Vietnam will achieve self-sufficiency in food supply and then remain a major rice exporter.

Construction materials and mining products in bulk: Vietnam is rich in mineral resources such as coal, apatite, silica and iron ore. A new mining field in Ha Tinh will yield iron ore after year 2001. This will become a large export commodity by year 2010.

Wet cargo: Besides Bach Ho Oilfield, Ron and Dai Hung are expected to be fully developed. The surplus oil beyond the capacity of the Dung Quat Refinery Center will be exported mainly to Japan.

Bulk cargoes: During the projection period, wood chip production will be developed while urea, fertilizer and some iron and steel products will still be imported.

Cement: Vietnam will achieve self-sufficiency in cement production around the year 2000.

Other cargoes: Exchange of various industrial products will rapidly grow, in line with modernization and industrialization.

#### (c) Transit Cargoes from Adjoining Countries

Vietnam is adjacent to Laos, Cambodia, Thailand and China which suffer from lack of seaports. Therefore, it is expected that these countries will ship out their cargoes through Vietnamese ports. This needs subregional infrastructure, adequate custom formalities and, of course, political stability. Nowadays all these countries constantly discuss cross-border cooperation to strengthen trade links, investment and environmental management, especially as part of an initiative of the United Nations, i.e., the Forum for the Comprehensive Development of Indo-China. The Study has reflected these developments in the demand forecasting work.

##### 1) Laos

Laos is a landlocked country and, in the case of shipment outside Indo-China, must use either railway and port in Bangkok or road and ports in central Vietnam.

With calculations of transport cost and distance, TESI estimated future foreign trade of Laos through Vietnamese ports as shown in Table 5.3.6. The amount is 584 thousand tons in year 2000 and 1,524 thousand tons in year 2010, respectively. Assumed transit ports are Cua Lo, Mui Ron (Vung Ang) and Danang.

Table 5.3.6

## ESTIMATION OF FOREIGN TRADE OF LAOS THROUGH VIETNAMESE SEAPORTS

Unit: thousand tons

Item	2000	2010
<b>Export:</b>	360	1,025
Wood	341	956
Ore	9	9
Others	10	60
<b>Import:</b>	225	499
Fertilizer	89	142
Metal	105	232
Food	16	24
Others	35	101
<b>Total</b>	<b>585</b>	<b>1,524</b>

Source: TESI

## 2) Thailand

Shipping distance originating from Bangkok Port and Vietnamese ports to East Asian countries are quite different. For example, sailing from southern Vietnamese ports is at least 1,200 km shorter than from Bangkok Port (more than 2,000 km from the northern ports). However, the road distances from North-East Thailand to Bangkok and to central Vietnamese ports are almost equal. This is the reason why Thai traders expect Vietnamese ports to accommodate its transit cargoes.

With consideration of the socio-economic characteristics of North-East Thailand, export-import goods carried by East Asian shipping lines, and anticipated growth trends, TESI projected the volume of transit cargo as follows:

Year 2000: 1,300 thousand tons

Year 2010: 4,500 thousand tons

This cargo is mostly agricultural exports such as rice, maize, cassava and kenap. Assumed transit ports are Cua Lo, Mui Ron (Vung Ang) and Danang.

## 3) Cambodia

Cambodia can be served by international freight services along the Mekong River. For example, the foreign trade with Phnom Penh along the Mekong River was some 200,000 tons in 1995 excluding trade with Vietnam. Major export cargoes were rubber and wood while general cargo was imported.

On the other hand, some records indicate that wood was in transit at Qui Nhon Port. The amount was 50 thousand tons in 1992 and 100 thousand tons in 1993, respectively. In



1994, however, wood could not be exported from Qui Nhon Port due to political obstruction.

Taking account of the growth of the forestry industry in Cambodia and with the assumption of a good political relationship between both countries, TESI projected the possible wood volume in transit at Qui Nhon Port as follows:

Year 2000: 300 thousand tons

Year 2010: 600 thousand tons

#### 4) China

Yunnan Province of PR China is connected with the north of Vietnam through the Red River and by railway. However, there is no evidence of China utilizing Vietnamese ports for transit purposes in the past. As far as the Study Team knows, there is neither policy nor future vision on the part of government to introduce transit movements. Therefore, no forecasting work has been done in the Study

#### 5) Summary

The above mentioned forecasts are combined and summarized by Vietnamese port in Table 5.3.7. Danang will be a provincial port handling transit cargo.

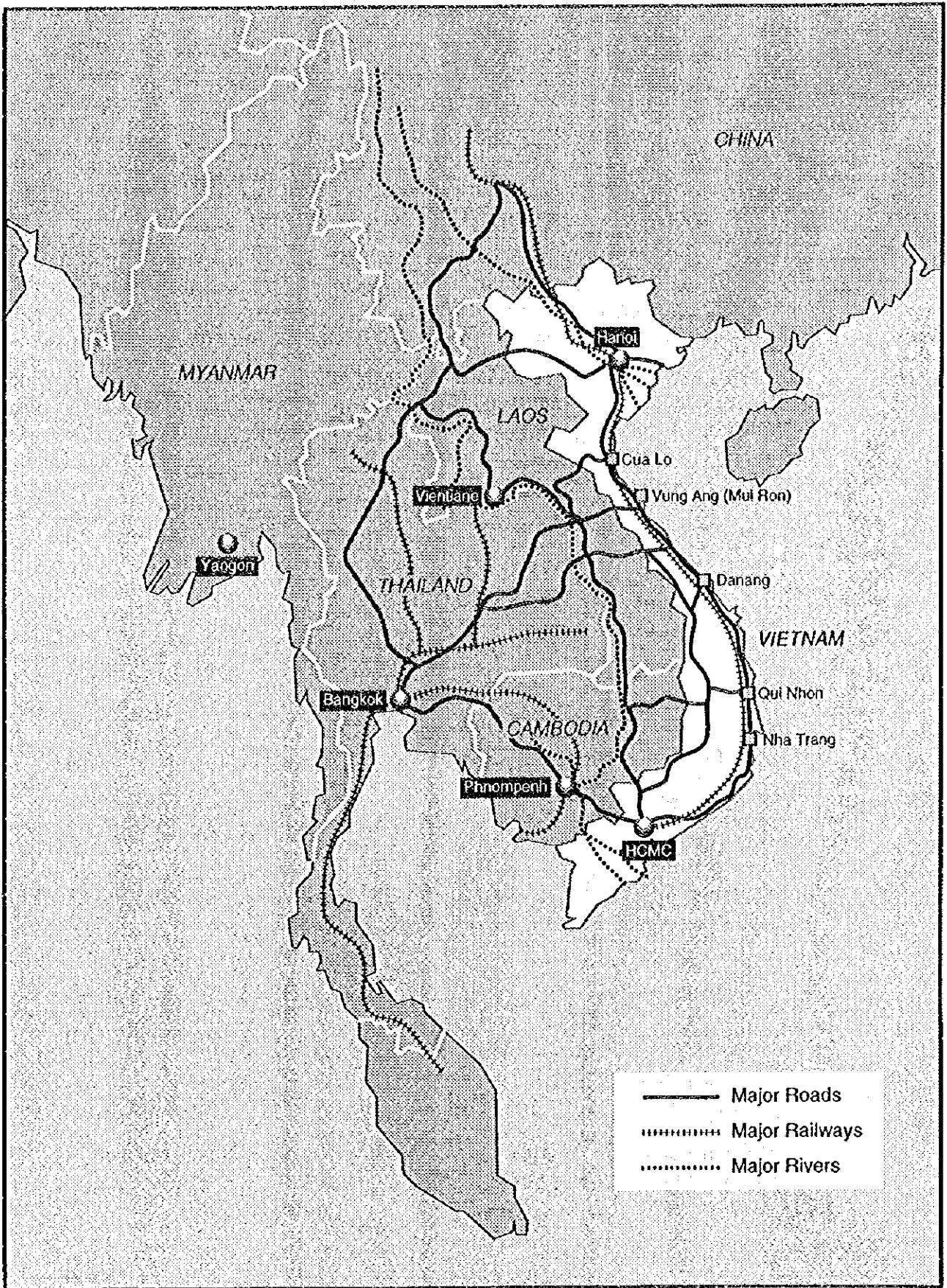
Table 5.3.7  
SUMMARY OF TRANSIT CARGO BY PORT

Unit: thousand tons

	Cua Lo	Mui Ron (Vung Ang)	Danang	Qui Nhon	Total
Year 2000	815	0	1,070	300	2,185
Year 2010	1,650	312	2,562	600	5,124

Source: TESI

Figure 5.3.1  
SUBREGIONAL COUNTRIES



(d) Passenger Traffic

Passenger traffic by coastal shipping can be divided into:

- inter-provincial service
- remote island service, and
- tourism service

Some inter-provincial routes are conventional transport means among local people, used because of the lack of road network. However, it can be expected that the road network will get better, not only the primary roads but also the secondary roads. Therefore shipping traffic demand will either stabilize or decline.

Remote island routes are important life lines for islanders. Although air transport such as a helicopter flight would be useful in an emergency, daily traffic demand is expected to rely on shipping services. Traffic demand will change in relation to population and economic activity on the islands.

With tourism development in Vietnam, tourism shipping service is expected to provide tourists with more comfortable and diversified operations. The market will become large, like in other neighboring countries as shown in Table 5.3.8. Ha Long Bay will become an international tourism destination and Danang, Qui Nhon, Nha Trang will be developed as maritime resorts.

Table 5.3.8

**TARGET OF VIETNAM TOURISM DEVELOPMENT**

Projection Item	1995	2000	2010
Number of International visitors	1.4 mil.	3.5 - 3.8 mil.	9 mil.
Number of Domestic Tourists	4.5 mil.	11 mil.	25 mil.
Share of Tourism Sector in GDP	3.5 %	9.6 %	12%

Source: Vietnam Economic News (No.24,1995)

In forecasting future traffic demand, the following annual increase rates are basically assumed in accordance with the factors discussed above..

Shipping Type	1995 - 2000	2000 - 2010	Explanatory Parameters
Inter-Provincial Shipping	5% and more	5% and more	Population & GDP
Remote Island Shipping	2%	2%	Population
Tourism Shipping	10% and more	Mostly 10% and more	Number of Tourists

Table 5.3.9 indicates the forecast results. The Study cannot consider all the existing shipping routes but the current passenger traffic is estimated at more or less 1 million. It is forecast to be 1,750 thousand persons in 2000 and 3,590 thousand in 2010.

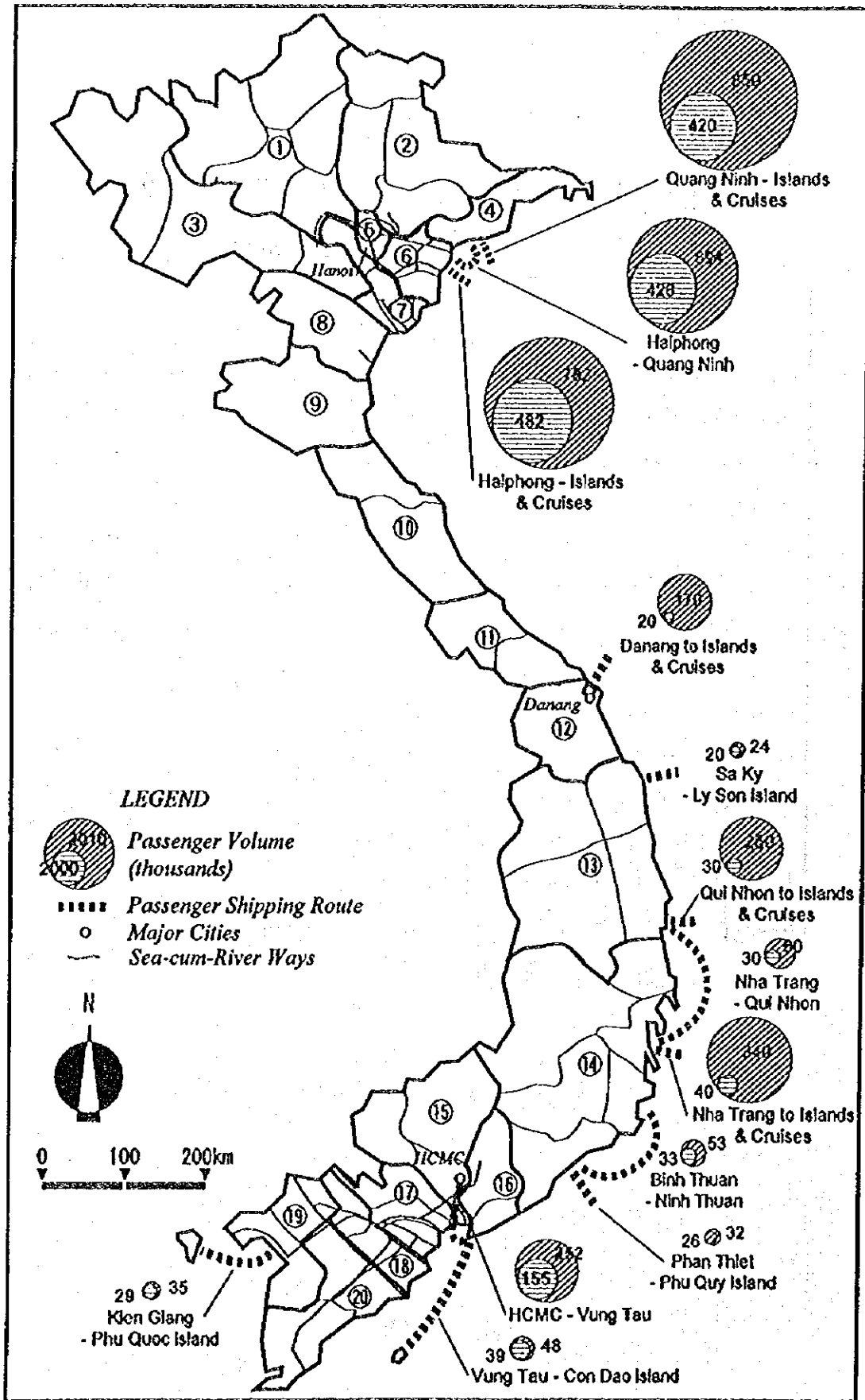
Table 5.3.9  
PASSENGER TRAFFIC DEMAND FORECAST (2000 -2010)

Route	Number of Passengers (thousands)			Route Type
	1995	2000	2010	
Haiphong - Quang Ninh	336	426	694	Inter - province
Nha Trang - Qui Nhon	21	30	60	Inter - province
Binh Thuan - Ninh Thuan	26	33	53	Inter - province
HCMC - Vung Tau	122	155	252	Inter - province
Sa Ky - Ly Son island	18	20	24	Remote Island
Phan Thiet - Phu Quy island	24	26	32	Remote Island
Vung Tau - Con Dao island	35	39	48	Remote Island
Kien Giang - Phu Quoc island	26	29	35	Remote Island
Quang Ninh to Islands & cruises	112	420	850	Tourism
Haiphong to Islands & cruises	266	482	782	Tourism
Danang to Islands & cruises	Unknown	20	170	Tourism
Nha Trang to Islands & cruises	Unknown	40	340	Tourism
Qui Nhon to Islands & cruises	Unknown	30	250	Tourism
<b>TOTAL</b>	<b>986</b>	<b>1,750</b>	<b>3,590</b>	

Source: JICA Study Team, TESI

Figure 5.3.2

TRAFFIC VOLUME OF PASSENGER SHIPPING BY ZONE



### 5.3.3 Commodity Flows

#### (a) Methodology

The development of future commodity flows has been done based on the following major work:

- Analysis of NTSR work for freight flows (15 commodities) by all modes,
- Analysis of existing coastal shipping movement, and
- Physical translation of the national socio-economic development scenario, and identification of the relationship between major producers and consumers.

In forecasting commodity flows, each commodity group took a different approach. In other words, it selected a different basis. (Refer to Table 5.3.10)

Commodity group 1: Agricultural products are the major cargoes in coastal shipping. Their regional balance pertaining to production and consumption will remain. The Study therefore applied the existing coastal shipping flow to the future traffic situation.

Commodity group 2, 3, 4, 5: Coastal shipping serves the respective commodity groups. But major industrial projects will produce and attract huge cargo traffic in accordance with the national socio-economic development scenario. The Study added such new trip patterns to the existing coastal shipping movement.

Commodity group 6: Various and plentiful industrial products will be spread and distributed all over the country. Although coastal shipping should take the role of transporting long-distance cargo in the group, the existing cargo is still limited and it is quite a new market in which numerous small and irregular shippers and consignees will participate.

To improve the poor state of information, the Study examined the NTSR work, particularly, the freight flows of chemical products, other manufactured products and general cargo. These commodity flows, particularly those that are more than 600 km, were incorporated into the existing coastal shipping movement.

Table 5.3.10

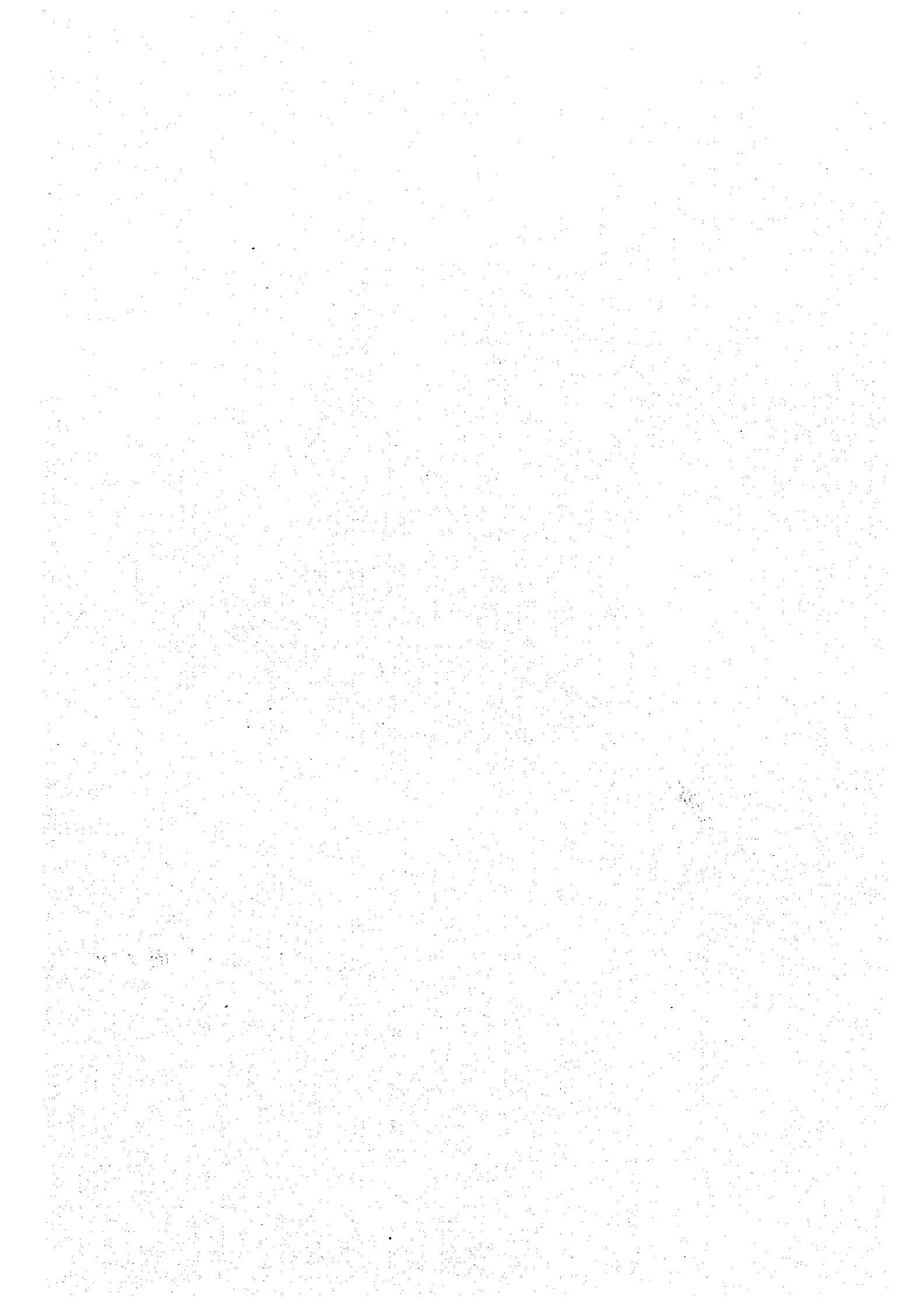
#### BASIS FOR COMMODITY FLOW ESTIMATION

Commodity Group	Basis for Flow Estimation		
	NTSR Works	Existing Coastal Shipping	National Socio-economic Development Scenario
1. Agriculture Products		X	
2. Construction Materials & Mining Products in Bulk		X	X
3. Wet Cargo		X	X
4. Bulky Cargoes		X	X
5. Cement		X	X
6. Other Cargoes	X	X	

**(b) Results**

The future O-D tables by commodity group (and all cargoes) in year 2000 and 2010 have been prepared. The future commodity flows are illustrated in Figure 5.3.3.

Compared with the 1995 O-D tables, commodity flows from the North as well as the central region will be significant in future. For example, the traffic flow between the North and the South accounts for 67.4% of traffic in 1995 but it will substantially reduce to 47.3% in 2000 and 32.6% in 2010, respectively. The Haiphong - Saigon Route which has the busiest traffic, i.e., 993 thousand tons or 37.6% of the total dry cargo in 1995, will be doubled in future but not maintain its dominant status, i.e., 1,868 thousand tons or 12.6% of the total dry cargo in 2010.





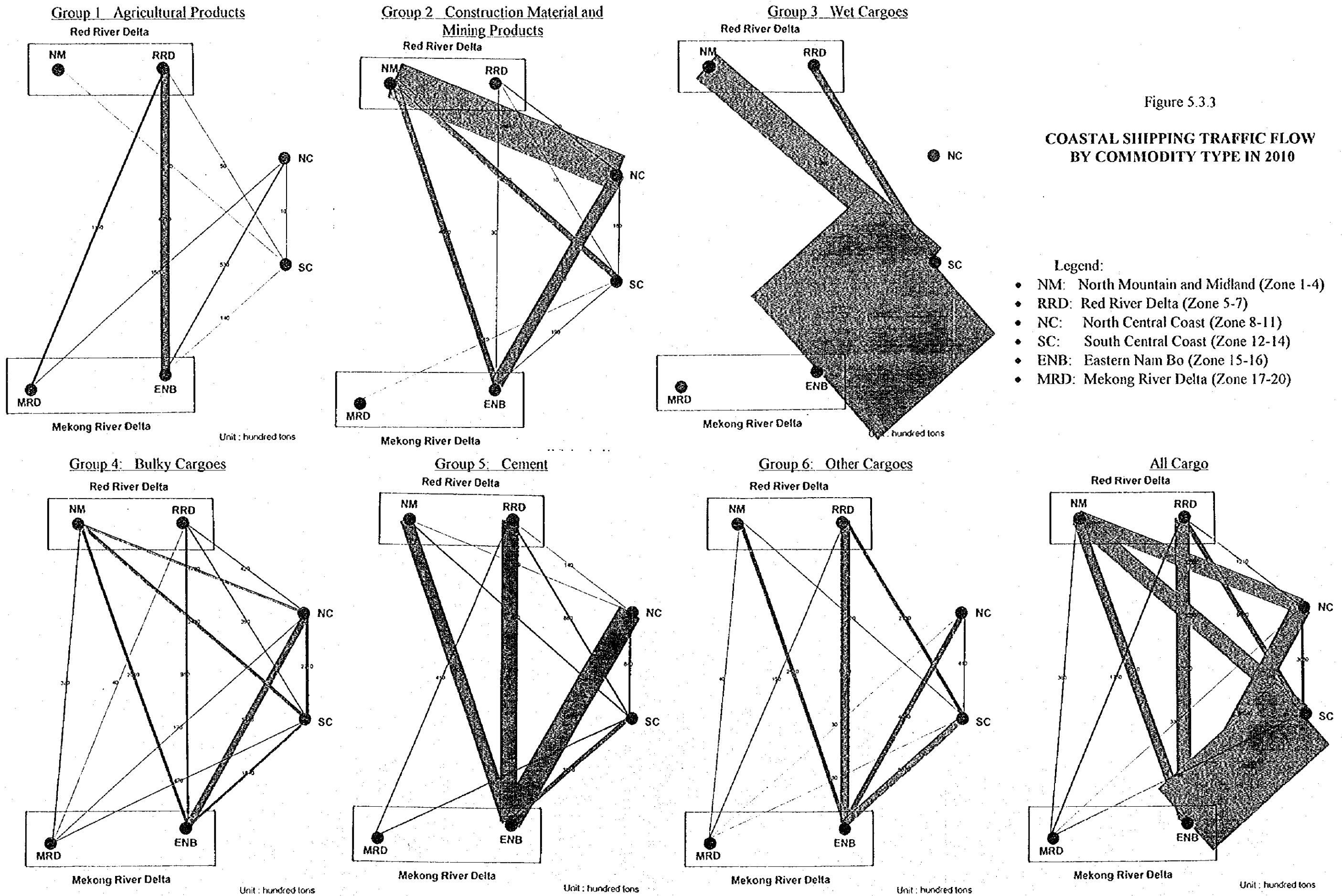
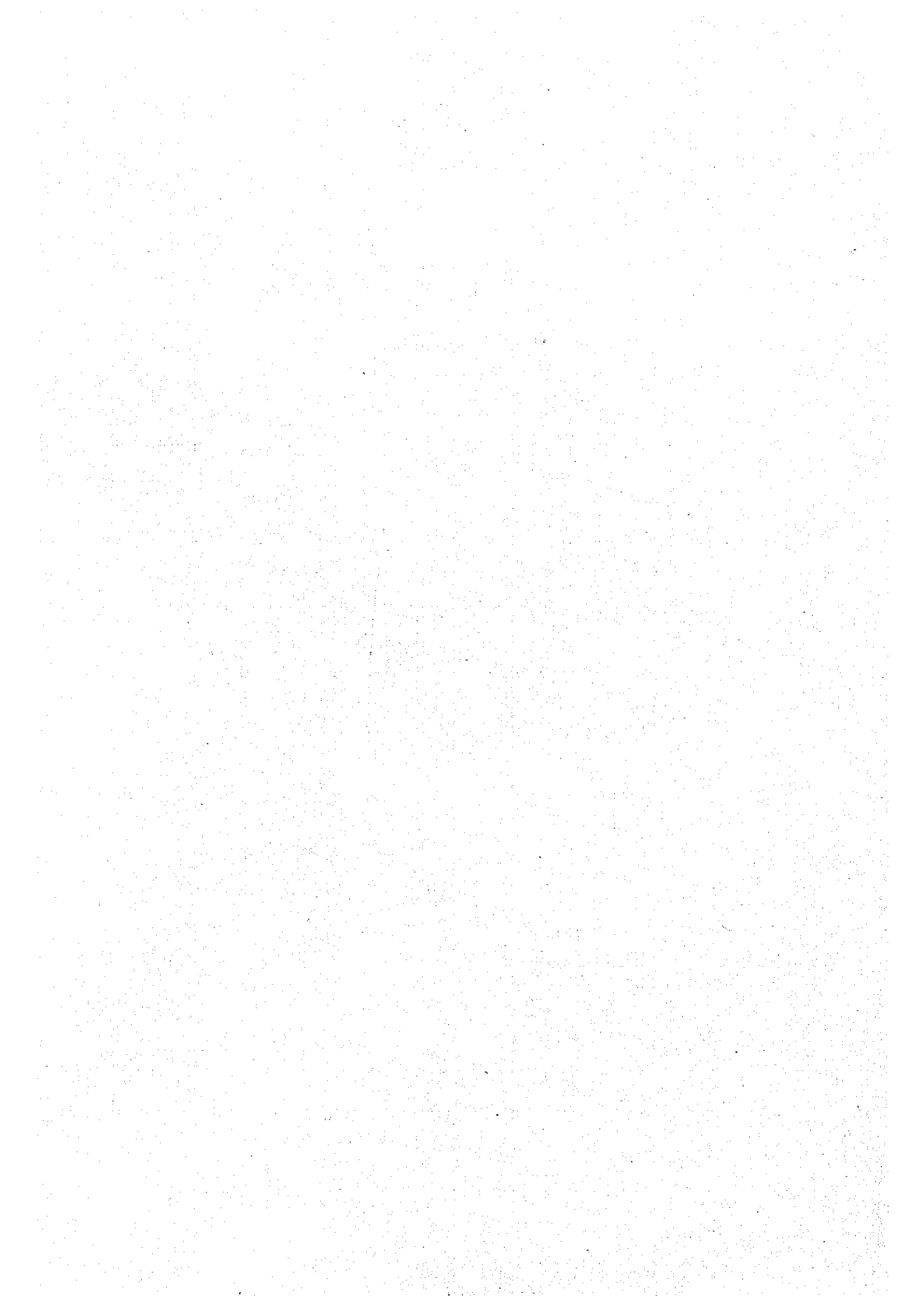


Figure 5.3.3

COASTAL SHIPPING TRAFFIC FLOW BY COMMODITY TYPE IN 2010

- Legend:**
- NM: North Mountain and Midland (Zone 1-4)
  - RRD: Red River Delta (Zone 5-7)
  - NC: North Central Coast (Zone 8-11)
  - SC: South Central Coast (Zone 12-14)
  - ENB: Eastern Nam Bo (Zone 15-16)
  - MRD: Mekong River Delta (Zone 17-20)



### (c) Traffic Assignment

This section aims at loading the projected traffic demand on the waterway network in accordance with the various OD matrices, so as to estimate sectional traffic volume and overall traffic movement in terms of ton-mile.

#### 1) Waterway network

The study prepared three waterway networks for the years 1995, 2000 and 2010. These networks consist of nodes and links. Nodes mean ports and traffic junctions while links are seaways and sea-cum-riverways.

The Inland Waterways Bureau is responsible for planning and developing the sea-cum-riverways. In consultation with the Inland Waterways Bureau, the Study proposes a set of 801 km routes in total which will be upgraded to accommodate self-propelled seaborne vessels by 2010.

#### 2) Results

The results of the traffic assignment work excluding oil haulage are depicted in Table 5.3.11 and Figure 5.3.4. The busiest link is and will be the coastal way off the provinces of Ha Tinh and Quang Binh. The results also indicate that sectional traffic volume on the coastal way will become five times bigger than the existing one. Regarding sea-cum-riverways, the access to Saigon Port will have to bear more than 6 million tons of coastal shipping cargo movement in addition to sea going vessels.

Short distance conveyance of oil products plying between Vung Tau and Dung Quat will considerably reduce the overall trip distance, i.e., 691 miles in 1995 to 457 miles in 2010. The average haulage distance of construction materials, mining products and bulky cargoes will be shortened while that of cement will be lengthened due to the many cement plants to be located in the North.

Table S.3.11  
**FORECAST TRAFFIC MOVEMENT BY CARGO TYPE**

	Year 1995 Traffic Movement				Year 2000 Traffic Movement				Year 2010 Traffic Movement			
	Thousand Tons	Million Ton-Miles	Average Trip Miles	Thousand Tons	Million Ton-Miles	Average Trip Miles	Thousand Tons	Million Ton-Miles	Average Trip Miles	Thousand Tons	Million Ton-Miles	Average Trip Miles
1. Agricultural Products	725	588	811	670	543	810	880	714	811			
2. Construction Materials & Mining Products in Bulk	598	278	698	851	497	584	4,941	1,804	365			
3. Wet Cargo	361	293	812	9,694	3,684	380	19,422	7,611	392			
4. Bulky Cargoes	482	326	676	695	454	653	1,871	1,014	542			
5. Cement	404	204	505	1,314	952	725	4,919	3,631	738			
6. Other Cargoes	363	251	691	1,174	784	668	2,246	1,474	656			
All Cargoes	2,734	1,889	691	14,398	6,913	480	34,279	16,249	474			
All Dry Cargoes	2,373	1,596	673	4,704	3,230	687	14,857	8,637	581			

Source: JICA Study Team

Figure 5.3.4  
RESULTS OF TRAFFIC ASSIGNMENT WORKS (EXCEPT OIL HAULAGE)

