

## Chapter 2 FUTURE COASTAL SHIPPING TRAFFIC

### 2.1 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 2.1.

Table 2.1  
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 2.2 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 2.2**  
**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 2.3.

Table 2.3  
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

## 2.2 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 2.1, 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 2.4.

Tabl 2.4

**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 2.5

Table 2.5

#### 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 2.6. 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 2.6

## ESTIMATION OF FOREIGN TRADE OF LAOS THROUGH VIETNAMESE SEAPORTS

Unit: thousand tons

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

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 2.7. Danang will be a provincial port handling transit cargo.

Table 2.7  
SUMMARY OF TRANSIT CARGO BY PORT

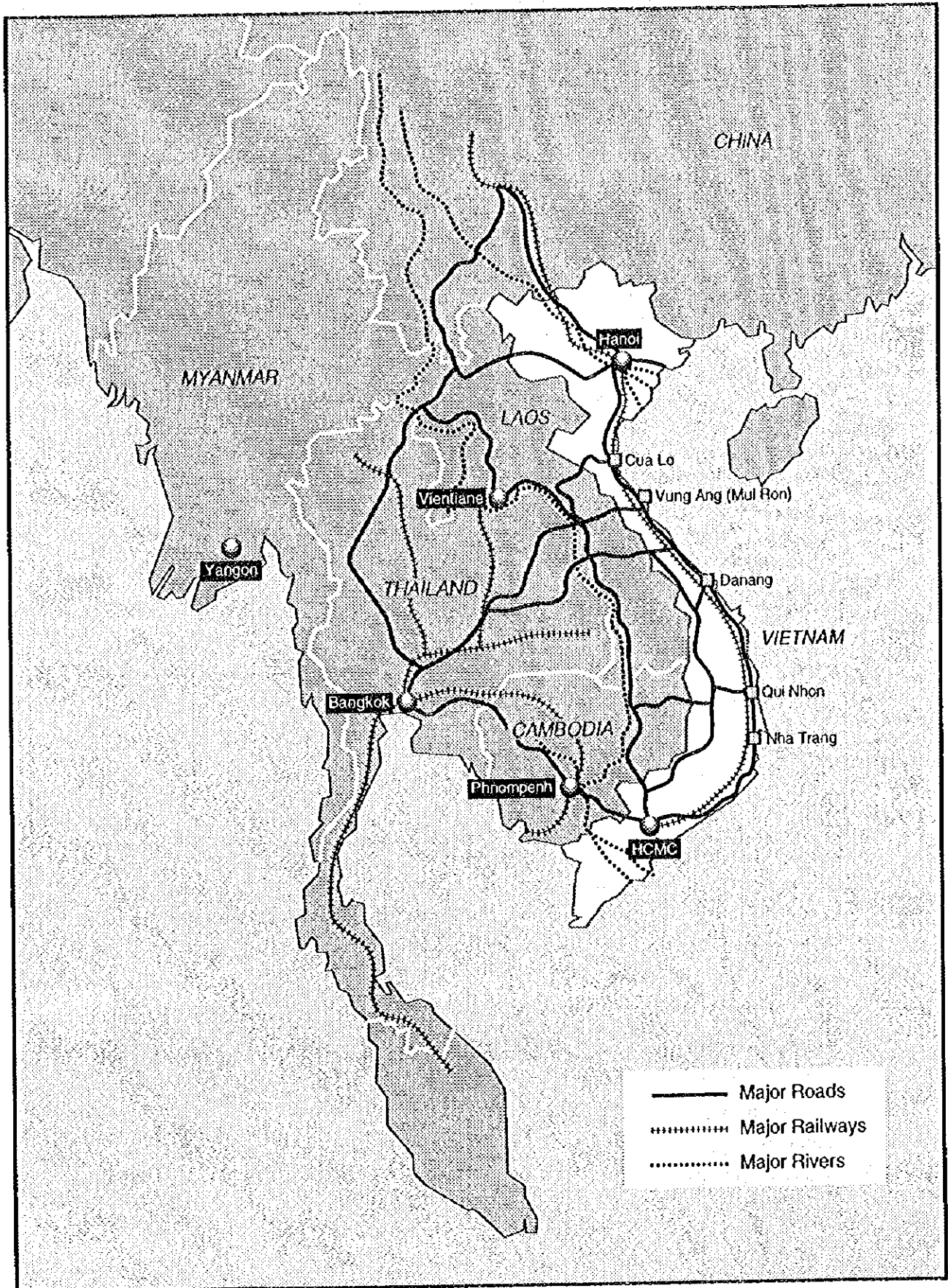
Unit: thousand tons

	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 2.1  
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 2.8. Ha Long Bay will become an international tourism destination and Danang, Qui Nhon, Nha Trang will be developed as maritime resorts.

Table 2.8

**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 2.9 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.

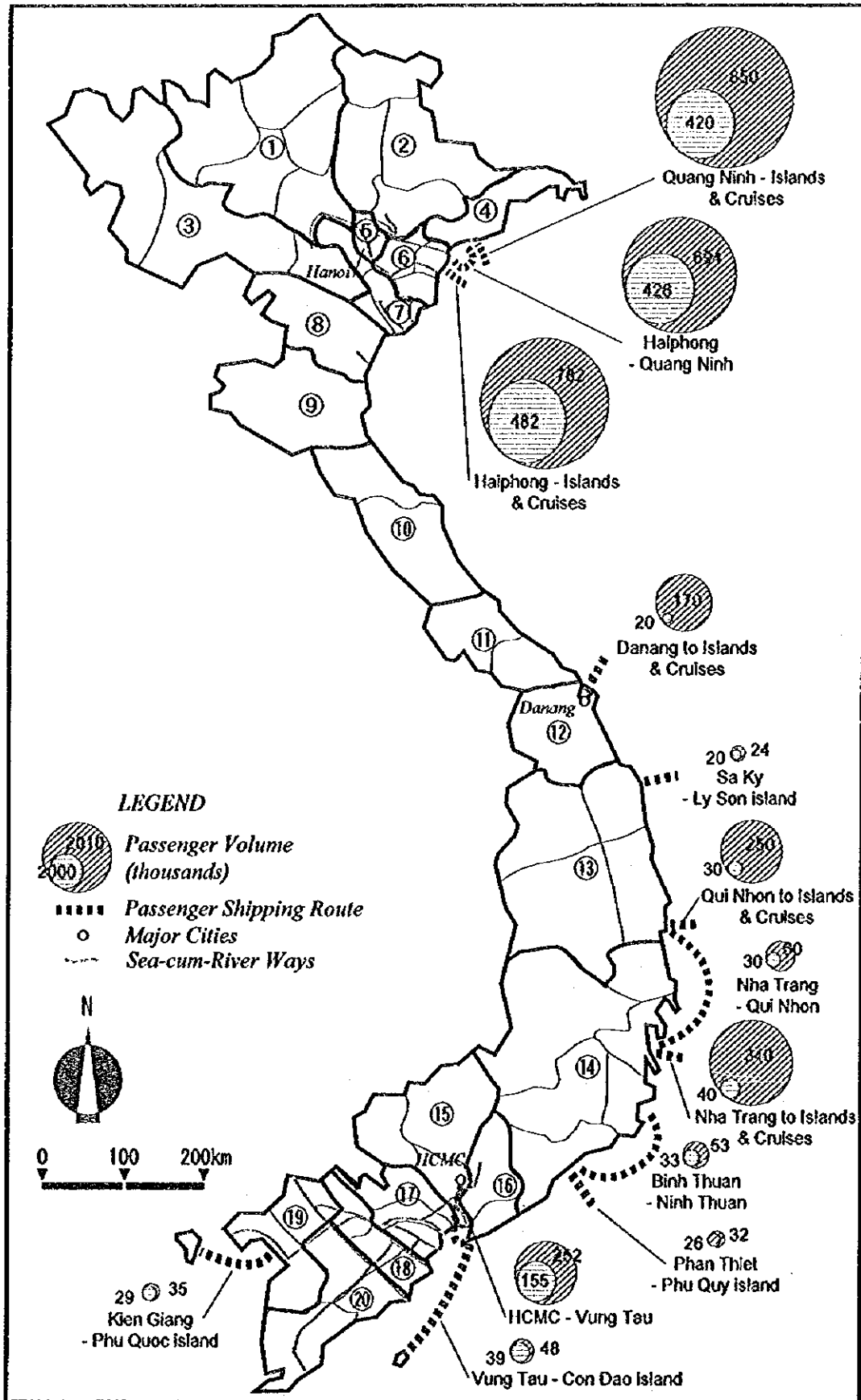
Table 2.9  
PASSENGER TRAFFIC DEMAND FORECAST (2000 -2010)

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 2.2

TRAFFIC VOLUME OF PASSENGER SHIIPPING BY ZONE



## 2.3 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 2.3.1)

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 2.10

### 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 2.3&4

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.

Table 2.11

2000 CARGO O-D TABLE (All Cargoes)

O-D	(unit: tons)																																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	D-Port	21	22	23	24	25	26	27	28	29	30	T-Port	
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D-Port	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
T-Port	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: ... within Delta Area

Table 2.12

2000 CARGO O-D TABLE (Agricultural Products)

O-D	Agricultural Products																														Total			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		P-Pro		
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
D-All	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
P-All	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: within DeLa Area



Table 2.13

2000 CARGO O-D TABLE (Construction Material & Mining Products)

O-D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	F-Pre						
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
D-All	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F-All	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: ... within Delta Area

Table 2.14  
2000 CARGO O-D TABLE (Wet Cargo)

O-D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	(unit: Ton)					
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Totals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: ... within Delta Area

Table 2.15  
2000 CARGO O-D TABLE (Bulkly Cargoes)

O-D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	D.Pro	21	22	23	24	25	26	27	28	29	30	P.Tra						
1								2,500	2,500	12,500	12,500	37,500	37,500	125,000	125,000	1,000	1,000	1,000	1,000	1,000	1,000	3,500,000	0	0	0	0	0	0	0	0	0	0	0	0				
2																						0	0	0	0	0	0	0	0	0	0	0	0	0	0			
3																						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
4								1,500	1,500	7,500	7,500	15,000	15,000	75,000	75,000	3,000	3,000	3,000	3,000	3,000	3,000	150,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
5								200	200	700	700	900	2,300	2,700	9,000	700	400	400	400	400	400	15,200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6																						23,000	10,000	0	0	0	0	0	0	0	0	0	0	0	0	0		
7								200	200	700	700	900	2,300	2,700	9,000	700	400	400	400	400	400	18,200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8																						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
9																						3,900	19,000	0	0	0	0	0	0	0	0	0	0	0	0	0		
10								100	100	100	100	100	100	200	4,200	1,000	200	200	200	200	200	31,500	12,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11																						0	1,000	0	0	0	0	0	0	0	0	0	0	0	0	0		
12								200	200	300	200	200	200	300	5,000	1,300	300	300	300	300	3,900	15,900	60,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
13								1,700	1,700	3,400	1,700	1,700	3,400	6,800	13,400	3,400	3,400	3,400	3,400	3,400	3,400	165,600	110,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
14																						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
15																						27,000	2,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
16																						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
17																						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
18																						0	4,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
19																						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
20																						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Totals	0	0	0	0	0	0	0	6,400	8,400	9,200	23,000	24,700	61,000	69,500	318,000	20,700	12,300	18,300	18,300	12,800	12,800	699,300	214,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
21								6	11,000	0	0	50,000	1,300	1,900	300,000	2,700	0	0	0	0	0	5,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
22																						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23																						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24																						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25																						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26																						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27																						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28																						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29																						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30																						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Note: ... within Delta Areas

Table 2.16

2000 CARGO-D TABLE (Cement)

Cargo OD Matrix (2000) - Cement

O.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	D-Prp	F-Act						
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
4	0	0	0	0	0	0	0	0	0	515	1,204	1,720	3,440	6,880	111,800	12,340	10,320	8,600	4,800	3,600	171,000	0	0	0	0	0	0	0	0	0	0	0	0	0				
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D-Act	0	0	0	0	0	0	0	0	0	1,631	3,139	4,770	8,540	17,080	1,100,000	31,300	22,820	18,800	15,000	11,800	21,800	131,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F-Act	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
F-Act	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Note: ... within Delta Area

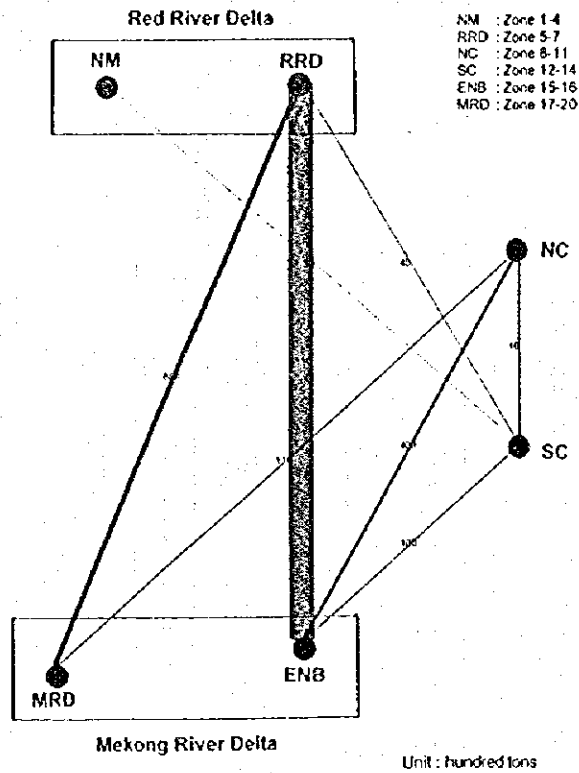
Table 2.17  
2000 CARGO O-D TABLE (Other Cargoes)

Cargo OD Matrix (2000) - Other Cargoes		(units/ton)																																				
O-D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	DP	21	22	23	24	25	26	27	28	29	30	F-Tot						
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>D-Tot</b>	<b>9,013</b>	<b>4,399</b>	<b>0</b>	<b>0</b>	<b>34,381</b>	<b>115,244</b>	<b>16,262</b>	<b>3,057</b>	<b>2,439</b>	<b>9,811</b>	<b>1,177</b>	<b>102,891</b>	<b>21,159</b>	<b>35,734</b>	<b>760,314</b>	<b>14,371</b>	<b>9,374</b>	<b>1,764</b>	<b>319</b>	<b>908</b>	<b>1,174,072</b>	<b>170,000</b>	<b>147,000</b>	<b>147,000</b>	<b>147,000</b>	<b>147,000</b>	<b>147,000</b>	<b>147,000</b>	<b>147,000</b>	<b>147,000</b>	<b>147,000</b>	<b>147,000</b>	<b>147,000</b>	<b>147,000</b>	<b>147,000</b>	<b>147,000</b>		
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>F-Tot</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	

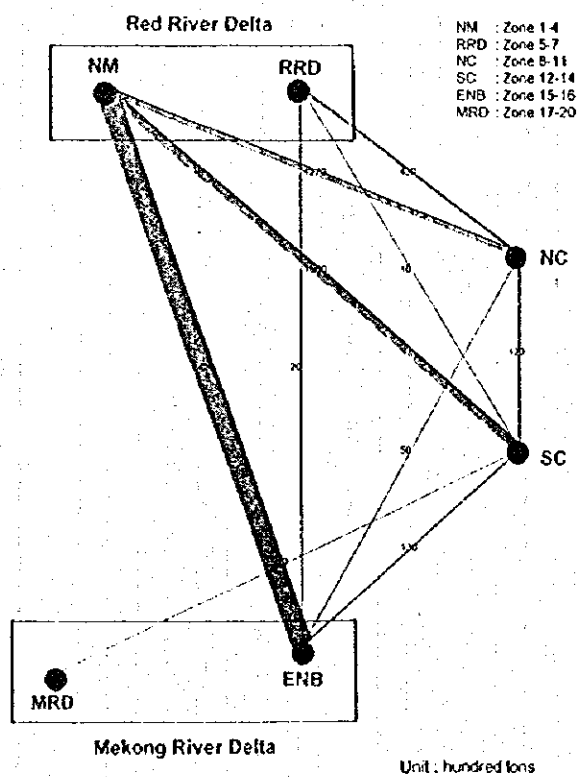
Note: within Deter Area

Figure 2.3  
**COASTAL SHIPPING TRAFFIC FLOW BY COMMODITY TYPE IN 2000**

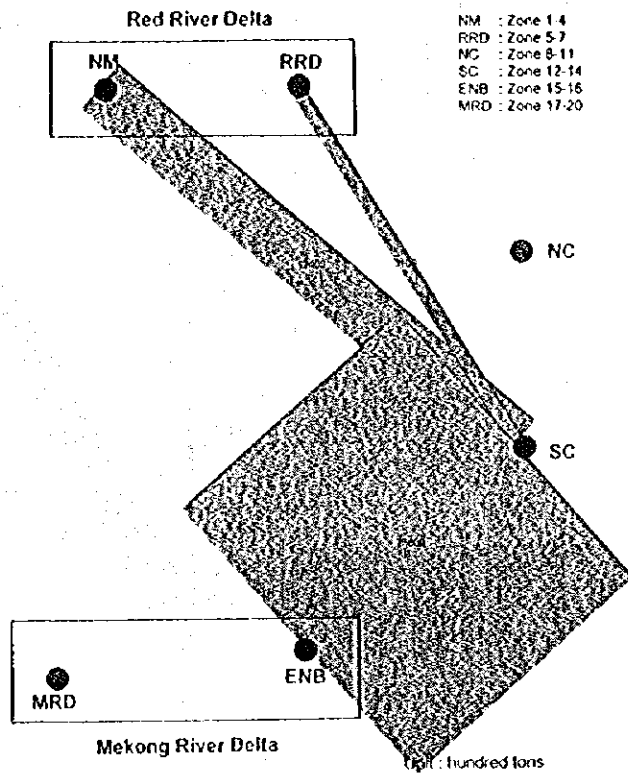
Group 1: Agricultural Products



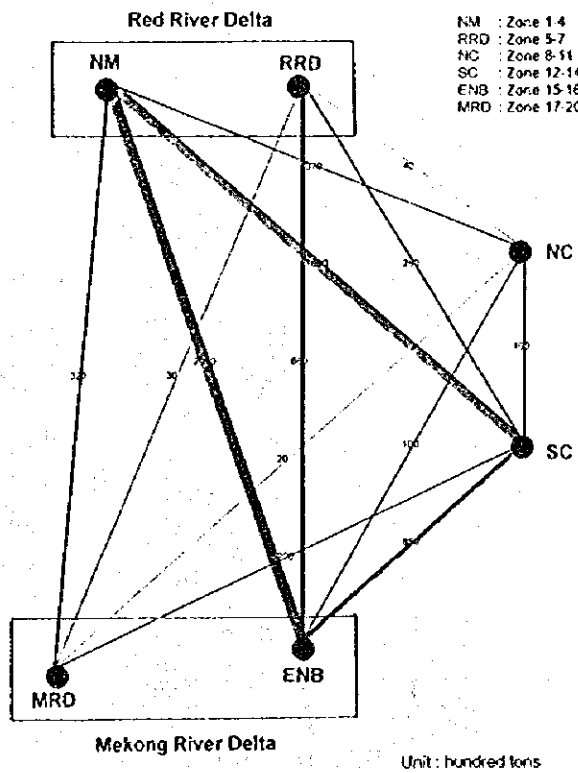
Group 2: Construction Material and Mining Products



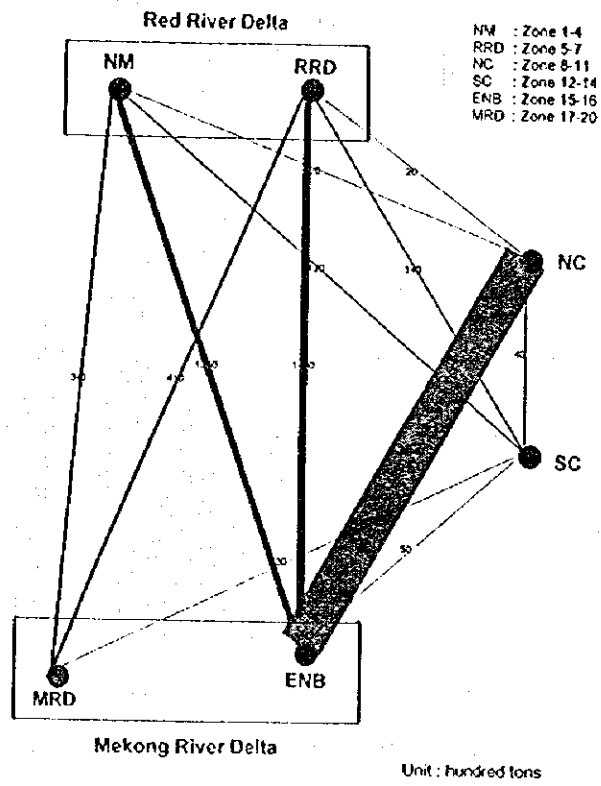
Group 3: Wet Cargoes



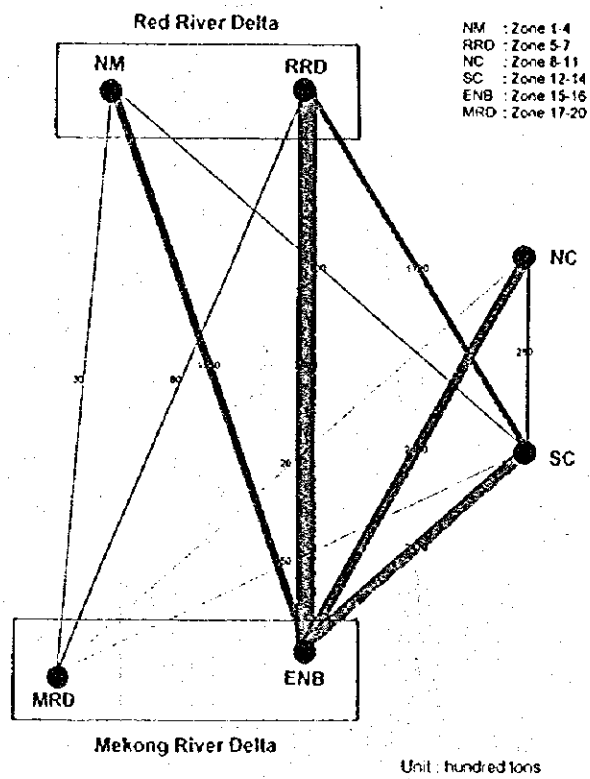
Group 4: Bulky Cargoes



Group 5: Cement







Group 6: Other Cargoes





All Cargoes

LEGEND : 6Z00ALL IRE  
Traffic Flow  
( Mode: + 1 )

-  VCR<1.00
-  VCR<1.00
-  VCR<1000.00
-  1000.00<VCR

scale: 1mm =5000(pcu)

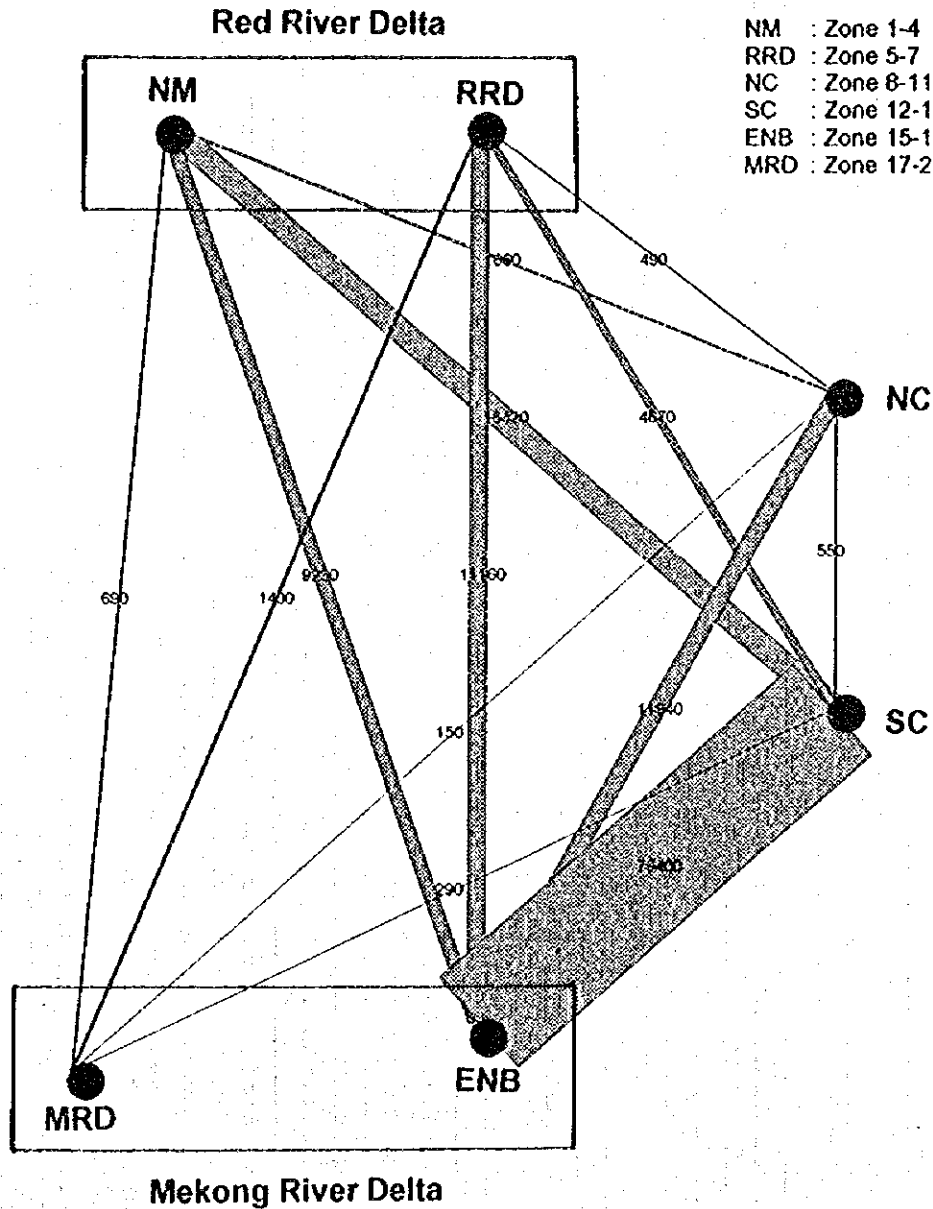


Table 2.18

201 CARGO O-D TABLE (All Cargoes)

O-D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Totals				
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: ... within Delta Area

Table 2.19

2010 CARGO O-D TABLE (Agricultural Products)

O-D	Cargo OD Matrix (2010) - Agricultural Products																																Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total		
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
T-All	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: ... within Delta Area

Table 2.20

2010 CARGO O-D TABLE (Construction Material & Mining Products)

O-D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D-AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: within Delta Areas



Table 2.22

2010 CARGO O-D TABLE (Bulky Cargoes)

O-D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	D-Pre	21	22	23	24	25	26	27	28	29	30	P-Pre						
1								1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	2,000	2,000	2,000	2,000	100,000	0	0	0	0	0	0	0	0	0	0	0	0				
2																						0	0	0	0	0	0	0	0	0	0	0	0	0				
3																						0	0	0	0	0	0	0	0	0	0	0	0	0	0			
4								3,000	3,000	3,000	15,000	15,000	30,000	45,000	150,000	3,000	6,000	6,000	6,000	6,000	6,000	300,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
5								200	200	200	2,000	2,000	2,000	2,000	2,000	200	200	200	200	200	200	400	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
6								200	200	200	1,000	1,000	1,000	1,000	1,000	200	200	200	200	200	18,200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
7								200	200	200	2,000	2,000	2,000	2,000	2,000	200	200	200	200	200	200	200	10,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8																						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
9						100										200						2,000	30,000	0	0	0	0	0	0	0	0	0	0	0	0	0		
10						20,000										188,800	2,000	4,000	1,900	4,800	4,800	96,000	40,000	0	0	0	0	0	0	0	0	0	0	0	0			
11								9,700	9,700	9,700	29,000	29,000	29,000	141,500	349,000																							
12								300	300	300	300	300	300	300	300	2,700	700	1,700	700	700	700	33,700	130,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
13								3,300	3,300	3,300	3,200	3,200	3,200	6,500	11,400	26,000	6,400	16,200	6,400	6,400	6,400	6,400	270,800	189,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14																						45,000	4,900	0	0	0	0	0	0	0	0	0	0	0	0	0		
15																																						
16																																						
17																																						
18																																						
19																																						
20																																						
D-All																																						
21																																						
22																																						
23																																						
24																																						
25																																						
26																																						
27																																						
28																																						
29																																						
30																																						
P-All																																						

Note: Cells with values within Delta Areas



Table 2.24

2010 CARGO O-D TABLE (Other Cargoes)

(units/ton)

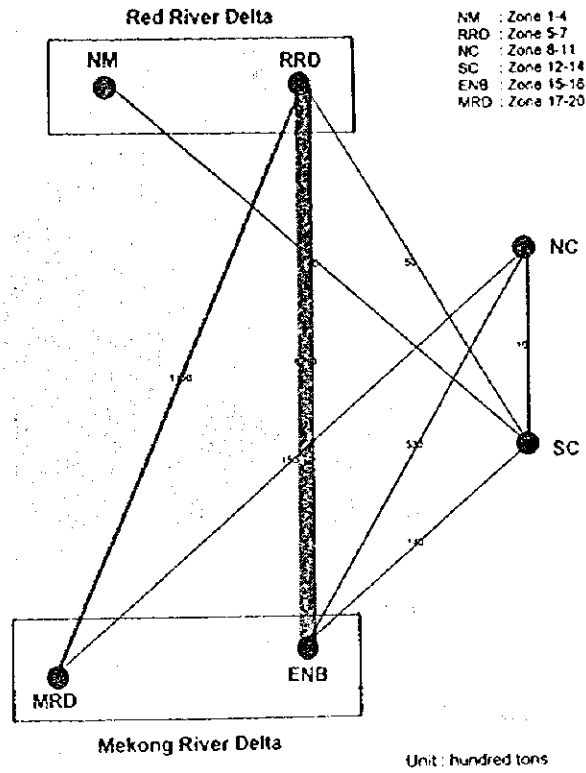
O-D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	D-Prod	21	22	23	24	25	26	27	28	29	30	%				
1	0	0	0	0	0	0	0	0	0	0	0	1,666	0	0	33,600	0	0	0	0	0	0	3,516	0	0	0	0	0	0	0	0	0	0	0			
2	0	0	0	0	0	0	0	0	0	0	0	2,665	0	2,977	42,111	9,695	3,111	0	0	0	0	66,374	0	0	0	0	0	0	0	0	0	0	0			
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
6	0	0	0	0	0	0	0	0	0	0	0	7,661	295	1,485	110,792	9,316	3,971	1,341	0	0	0	0	156,708	0	0	0	0	0	0	0	0	0	0	0	0	
7	0	0	0	0	0	0	0	0	0	0	0	29,790	0	3,326	286,794	0	87	0	0	0	0	0	187,790	187,790	187,790	187,790	187,790	187,790	187,790	187,790	187,790	187,790	187,790	187,790		
8	0	0	0	0	0	0	0	0	0	0	0	38,424	0	2,025	128,333	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
9	0	0	0	0	0	0	0	0	0	0	0	0	0	1,435	36,433	16,902	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
10	0	0	0	0	0	0	0	0	0	0	0	0	0	3,993	126,810	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
12	0	1,219	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
13	0	5,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
14	290	1,307	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
15	24,335	5,676	0	0	0	0	0	0	0	0	0	143,725	33,097	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
17	0	1,100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
D-AR	34,673	13,174	0	0	0	0	0	0	0	0	34,335	225,425	46,312	46,318	1,363,868	19,613	31,143	2,016	344	958	2,346,491	1,629,600	1,374,900	1,374,900	1,374,900	1,374,900	1,374,900	1,374,900	1,374,900	1,374,900	1,374,900	1,374,900	1,374,900	1,374,900		
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
T-AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Note: wrbun Delta Area

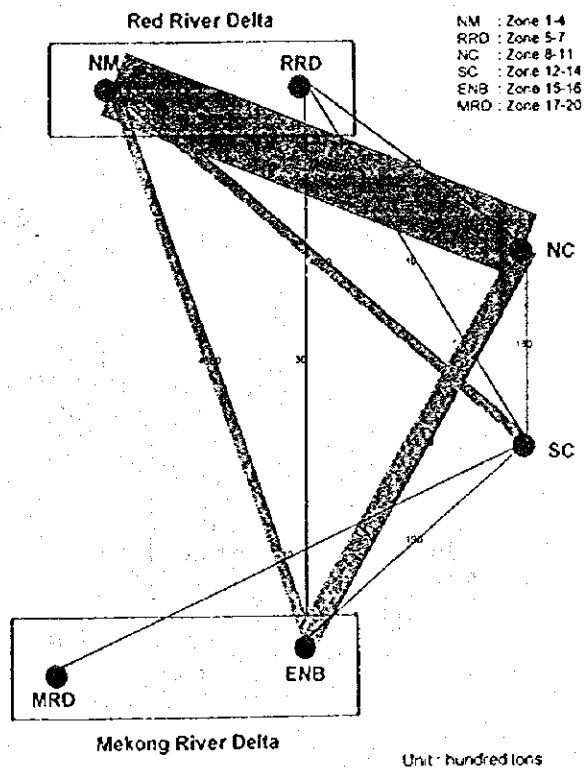


Figure 2.4  
 COASTAL SHIPPING TRAFFIC FLOW BY COMMODITY TYPE IN 2010

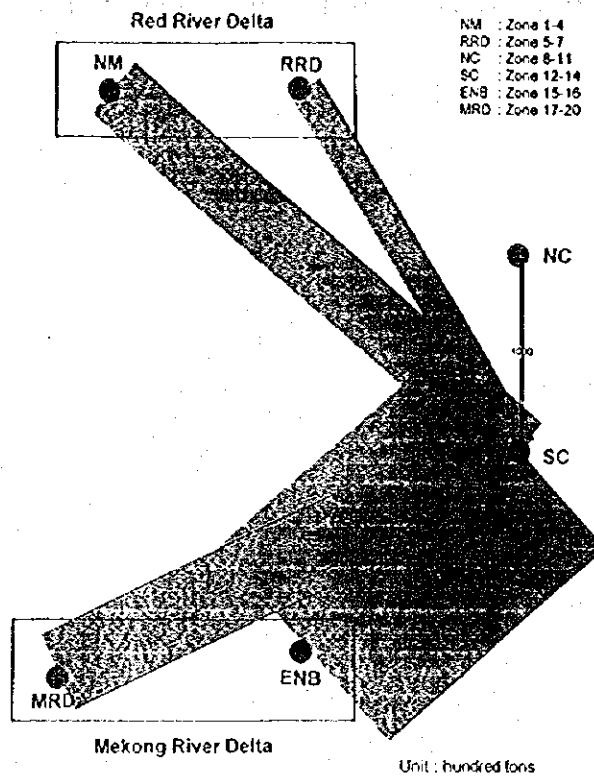
Group 1: Agricultural Products



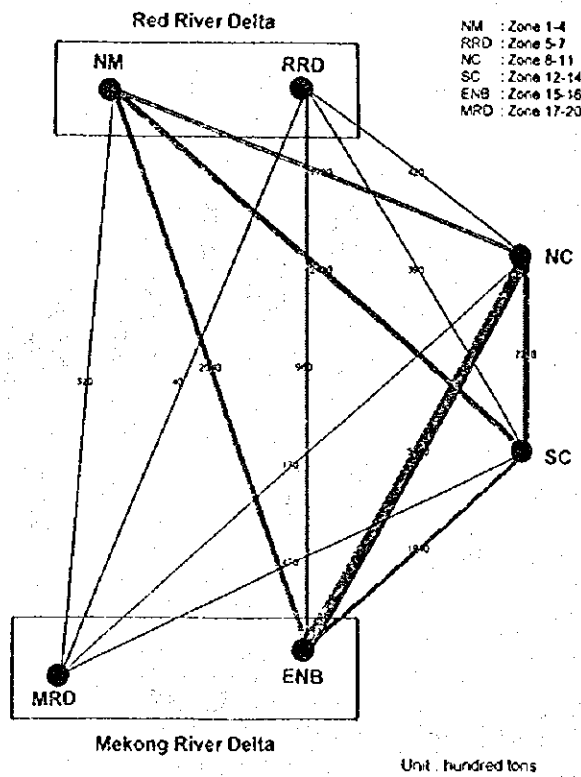
Group 2: Construction Material and Mining Products



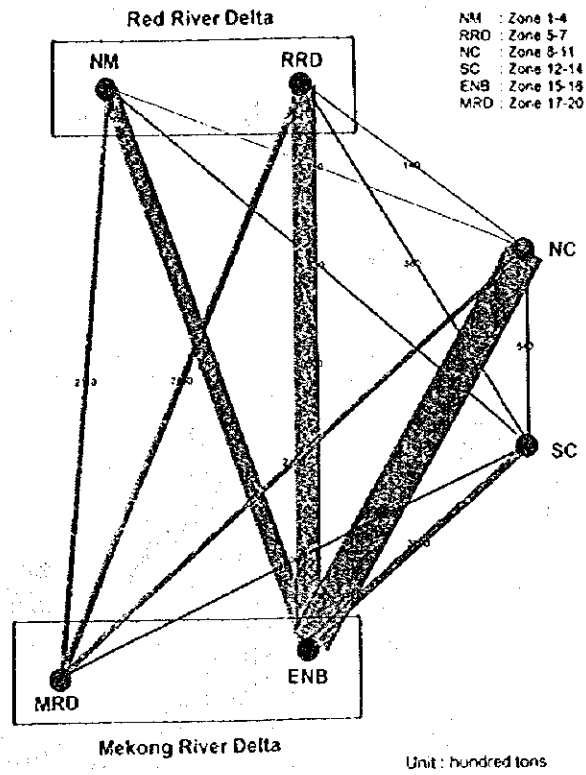
Group 3: Wet Cargoes



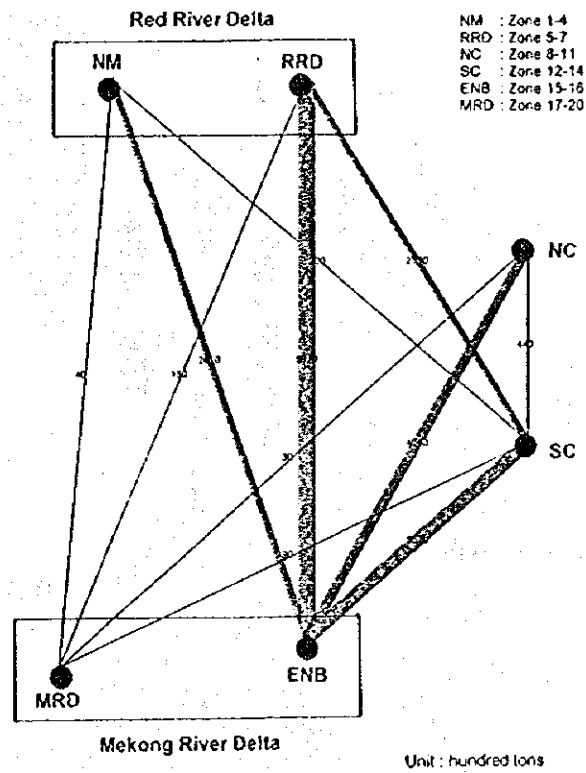
Group 4: Bulkey Cargoes



Group 5: Cement

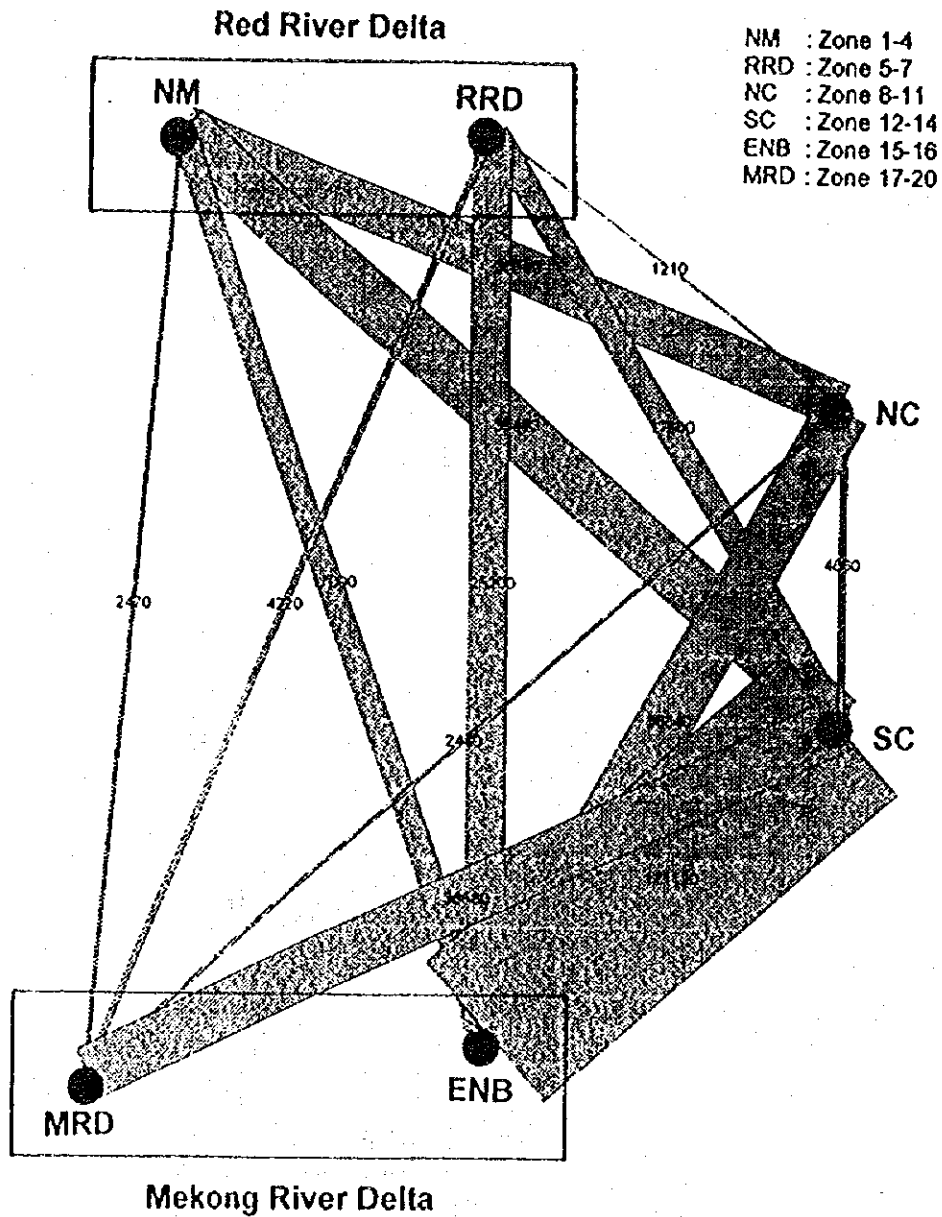


Group 6: Other Cargoes



All Cargoes

Overall Cargo Traffic Flow (Year 2010)



### (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 2.3.16 and Figure 2.3.3. 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 2.25  
**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
1. Agricultural Products	725	588	811	670	543	810	880	714	811
2. Construction Materials & Mining Products in Bulk	398	278	698	851	497	584	4,941	1,804	365
3. Wet Cargo	361	295	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 2.5  
ASSIGNMENT OF FREIGHT TRAFFIC FLOW (except Oil Haulage)

