

3 EXISTING TRANSPORT DEMAND

3.1 Transport Surveys and Database¹

One of the key concerns in the Study is to prepare a set of updated database with particular regard to transport demand to provide a reliable basis in transport planning. The latest comprehensive demand data was basically that of the National Transportation Sector Review (NTSR) which was conducted in 1990-1992.

The VITRANSS' attempt is to know the current level and characteristics of interprovincial passenger and goods traffic demand in a limited time available for the Study. For this, a number of transport and traffic surveys were carefully designed in close cooperation with and assistance of the TDSI to supplement already available data in the most effective manner (see Tables 3.1.1 and 3.1.2).

Table 3.1.1
Major Existing Transport Data Sources

Mode	Agency	Existing Data Source	Remarks
Road	VRA/MOT	<ul style="list-style-type: none"> National Transport Sector Review, UNDP (42 stations, February & August 1991) Master Plan Study on Transport Development in North Vietnam, JICA (34 stations, August 1993) Transport Master Plan for the Central Region of Vietnam, French Protocol (28 stations, September 1997 and January 1998) 	<ul style="list-style-type: none"> Passenger and cargo OD data for limited areas and in different years Needs to conduct OD interview survey to update/supplement data
Railway	VNR/MOT	<ul style="list-style-type: none"> Feasibility Study on the Rehabilitation and Development of the Railway in Vietnam, JICA 	<ul style="list-style-type: none"> Passenger/cargo OD by type available Needs to collect updated data from VR
Inland Water-way	VIWA/MOT	<ul style="list-style-type: none"> National Transport Sector Review, UNDP Master Plan Study on Transport Development in North Vietnam, JICA Master Plan Study on Coastal Shipping Rehabilitation and Development Project in Vietnam, JICA 	<ul style="list-style-type: none"> Traffic data available only for 7 major river ports Needs to conduct OD interview survey
Sea	Vinamarine/MOT	<ul style="list-style-type: none"> Master Plan Study on Coastal Shipping Rehabilitation and Development Project in Vietnam, JICA Study on Port Development Plan in the Key Area of the Central Region in the Socialist Republic of Vietnam, JICA 	<ul style="list-style-type: none"> No coastal shipping passengers 1995 OD by cargo type available Needs to update based on present port traffic
Air	CAAV	<ul style="list-style-type: none"> Feasibility Study on New Development Plan of Hanoi International Airport in the Socialist Republic of Vietnam, JICA 	<ul style="list-style-type: none"> Data available only for Hanoi and national total Needs to collect updated data from CAAV
Pipeline	Petro Vietnam	<ul style="list-style-type: none"> Dung Quat Refinery Development Plan 	<ul style="list-style-type: none"> Needs to collect updated data from Petro Vietnam

¹ Details are explained in Technical Report No. 1 (Transport Surveys and Database).

Table 3.1.2
Outline of Transport Surveys Conducted in VITRANSS

Survey	Objectives	Coverage	Method	Implementation
Road Traffic Survey	<ul style="list-style-type: none"> Current traffic volume Travel characteristics of passengers and cargoes 	<ul style="list-style-type: none"> 39 on-road stations (20 in the north, 6 in the central and 13 in the south) 	<ul style="list-style-type: none"> 3-day vehicle traffic count 1 day (14 hr) OD interview at roadside 	<ul style="list-style-type: none"> Field survey: Mar 25-27 (north), Apr 13-15 (south) Data obtained May 15
River Traffic Survey	<ul style="list-style-type: none"> Current vessel traffic volume Travel characteristics of river vessels in Red River and Mekong River deltas 	<ul style="list-style-type: none"> 40 stations at river sections (20 in Red River Delta and 20 in Mekong River Delta) 	<ul style="list-style-type: none"> 2-day (24 or 14 hr/day) vessel traffic count 1 day (14 hr) OD interview at 15 selected stn. (9 in the north and 6 in the south) 	<ul style="list-style-type: none"> Field survey Apr 19-20 (north), Apr 26-27 (south) Data obtained Jun 20
Supplemental Road/River Traffic Survey	<ul style="list-style-type: none"> Current road/river traffic volume during rainy season 	<p><i>Road Traffic</i></p> <ul style="list-style-type: none"> 18 selected on-road stations (8 in the north and 10 in the south) <p><i>River Traffic</i></p> <ul style="list-style-type: none"> 6 river sections (3 in the north and 3 in the south) 	<p><i>Road Traffic</i></p> <ul style="list-style-type: none"> 1 day (14 hr) traffic count 3-day (24 hr) traffic count at 3 stn. in the south <p><i>River Traffic</i></p> <ul style="list-style-type: none"> 1 day (14 hr) vessel traffic count 	<ul style="list-style-type: none"> Field Survey Sep 8 for road, Sep 10 for river Data obtained Sep 24
Passenger/Driver Interview Survey at Transport Terminals	<ul style="list-style-type: none"> Characteristics of passengers and cargoes 	<ul style="list-style-type: none"> Selected major transport terminals of rail, bus, air, and truck 	<ul style="list-style-type: none"> Direct interview with passengers and truck drivers 	<ul style="list-style-type: none"> Field survey May 10-21 Data obtained Jun 11
Transport Industry Survey	<ul style="list-style-type: none"> Characteristics of transport industry (operation, finance, management, labor force, etc.) 	<ul style="list-style-type: none"> Bus operators Truck operators Coastal shipping operators Inland waterway transport operators 	<ul style="list-style-type: none"> Preparation of operators' list Distribution of questionnaire to sampled operators 	<ul style="list-style-type: none"> Questionnaires were sent in July 1999 Answered questionnaire were returned from 11 bus, 10 truck, 7 shipping and 12 inland waterway operators as of Sept. 1999

Source: VITRANSS

3.2 Passenger Transport Demand²

Generation/Attraction of Interprovincial Passengers Transport Demand

The overall level of interprovincial passenger traffic demand can be expressed in terms of traffic generation and attraction. Traffic generation/attraction of interprovincial passengers aggregated at the regional level on the basis of OD matrices is outlined as follows:

- Most passengers make interprovincial trips via road. Bus plays the most significant role.
- Only a few passengers use inland waterway, largely due to the fact that most inland waterways are limited to the delta areas and serve intraprovincial traffic.
- In regions where railway services are available, they are relatively well used.
- Red River delta and the southeast have great generation and attraction of interprovincial passengers.
- Air transport use is still very limited.

Table 3.2.1

Generation/Attraction of Interprovincial Passenger Transport Demand by Mode^{1/}

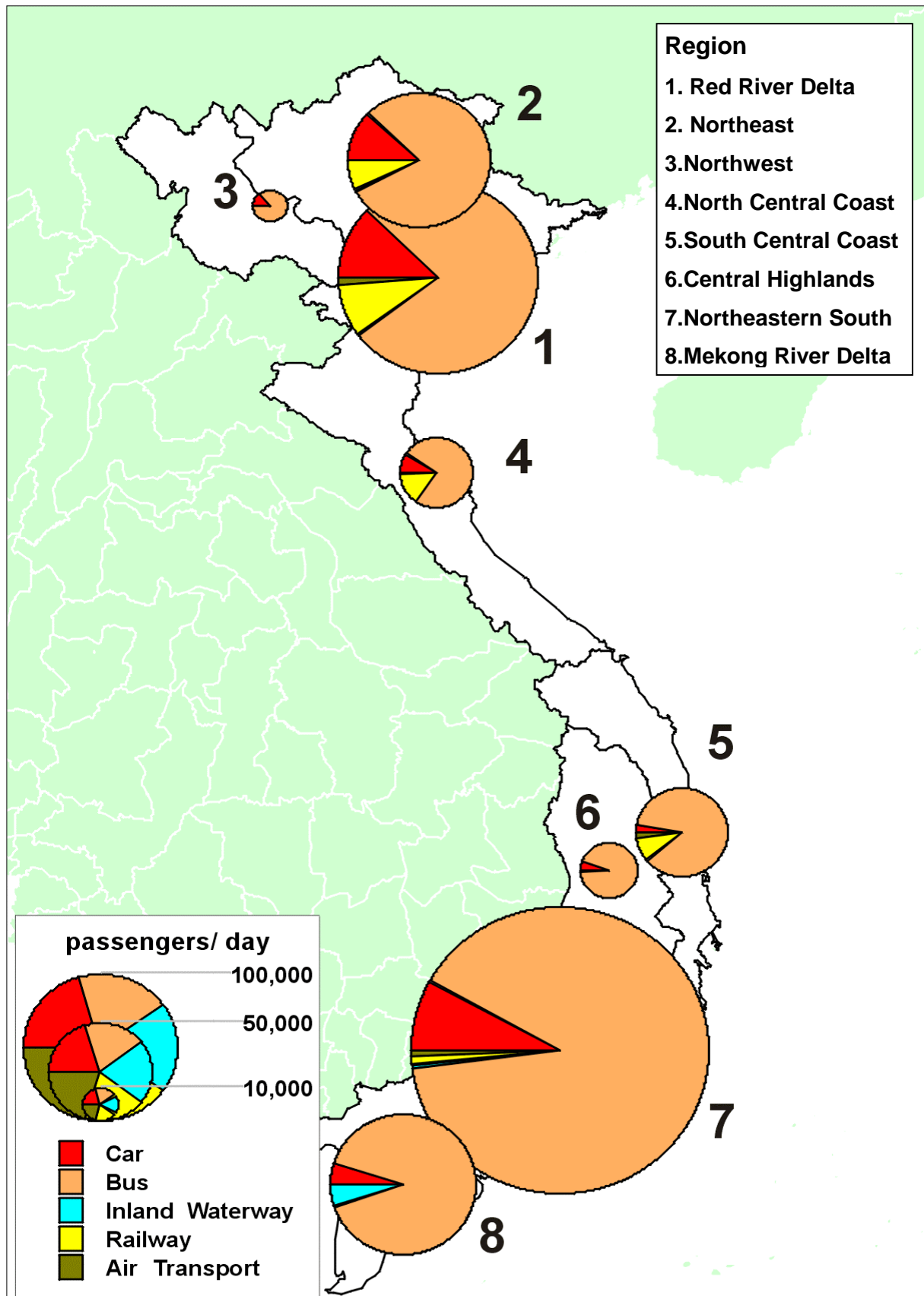
Region		Road		Inland Waterway	Railway	Air Transport	Total
		Car	Bus				
1. Red River Delta	No./day (%)	31,900 (12.3)	200,146 (77.4)	650 (0.3)	22,734 (8.8)	3,266 (1.3)	258,696 (100.0)
2. Northeast	No./day (%)	16,490 (12.1)	109,728 (80.3)	650 (0.5)	9,830 (7.2)	0 (0.0)	136,698 (100.0)
3. Northwest	No./day (%)	1,880 (15.1)	10,494 (84.2)	0 (0.0)	0 (0.0)	84 (0.7)	12,458 (100.0)
4. North Central Coast	No./day (%)	4,300 (9.5)	34,240 (75.3)	0 (0.0)	6,462 (14.2)	454 (1.0)	45,456 (100.0)
5. South Central Coast	No./day (%)	1,790 (2.8)	56,066 (86.3)	0 (0.0)	5,570 (8.6)	1,532 (2.4)	64,958 (100.0)
6. Central Highlands	No./day (%)	1,364 (4.8)	26,838 (94.1)	0 (0.0)	0 (0.0)	308 (1.1)	28,510 (100.0)
7. Northeastern South	No./day (%)	41,434 (8.0)	467,110 (89.9)	2,350 (0.5)	4,674 (0.9)	3,794 (0.7)	519,362 (100.0)
8. Mekong River Delta	No./day (%)	6,930 (4.7)	131,750 (90.0)	7,602 (5.2)	0 (0.0)	42 (0.0)	146,324 (100.0)
Total	No./day (%)	106,088 (8.7)	1,036,372 (85.5)	11,252 (0.9)	49,270 (4.1)	9,480 (0.8)	1,212,462 (100.0)

Source: VITRANSS, 1999

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

² Note that the analysis excludes intraprovincial and urban traffic.

Figure 3.2.1
 Generation/Attraction of Interprovincial Passenger Transport Demand, 1999



Source: VITRANSS

Interprovincial Movement of Passengers

The movement of passengers between provinces by mode (see Figure 3.2.2) is summarized as follows:

- The interprovincial movement of passengers is dominated by inter-city buses, covering the whole country. More than 80% of total passengers are transported by bus.
- Passengers using cars are mainly moving around big cities such as Hanoi and HCMC.
- Passengers using inland waterways are more significant in the Mekong delta than Red River delta.
- Railway is used between the north and south and for interprovincial movement along the north-south corridor.
- Air movement is limited between large urban centers and major tourism destinations.

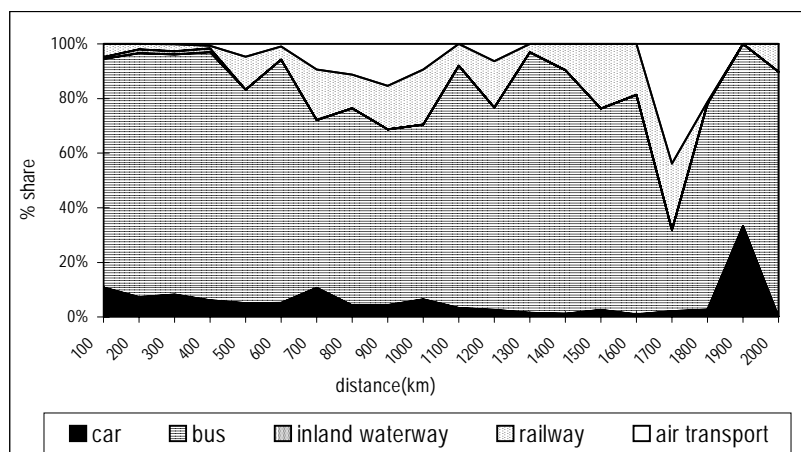
Modal Share by Trip Distance

The usage of transport mode (see Figure 3.2.3 and Appendix A) varies by travel distance. Road transport, composed of car and bus, plays an important role in passenger transport regardless of travel distance. It is especially more significant in short-distance travel within 500 km. In addition, road transport allows passengers to move between provinces where the service of other transport modes, such as railway and air, is not available. This causes another peak in road transport usage in the travel distance between 1,300 km and 1,500 km.

In general, railway and air transport modes are used for medium and long-distance travel. They have two peaks, one between 800 km and 1,000 km, and the other between 1,600 km and 1,800 km. This is because passengers traveling between Hanoi and Danang, between Danang and HCMC and between Hanoi and HCMC use these two modes (together with road transport).

Figure 3.2.2

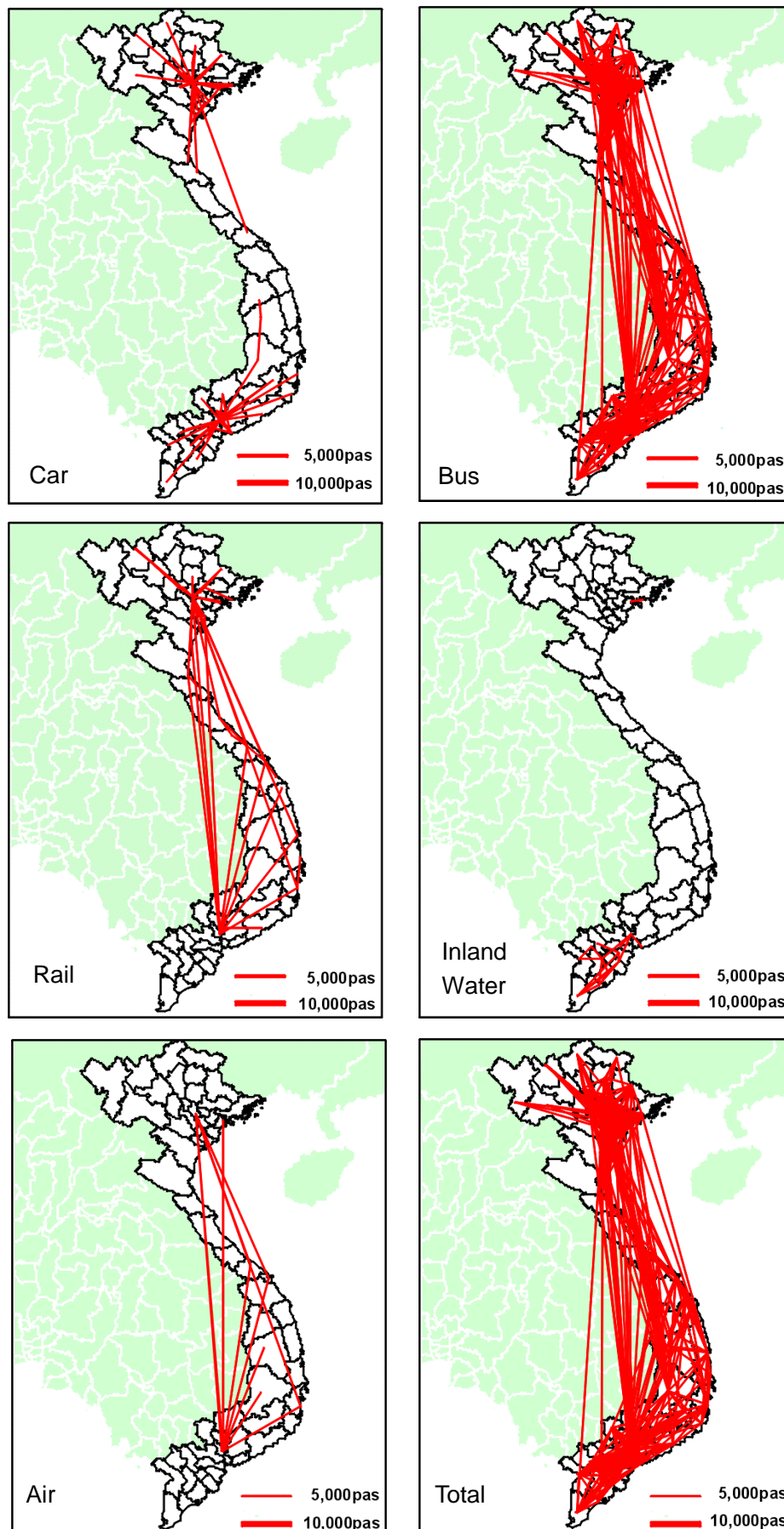
Modal Share by Trip Distance of Inter-city passenger Transport Demand, 1999



Source: VITRANSS, 1999

1/ calculated based on the shortest road route between provinces.

Figure 3.2.3
Interprovincial Passenger Movement, 1999



Source: VITRANSS

Modal Share Between Main Provinces

Further analysis was made on the modal share between major provinces such as Hanoi, HCMC, Danang, and Hai Phong. These could be selected as leading provinces in terms of population and regional economy. The movement between Hanoi and Lao Cai and between HCMC and Can Tho were also included in the analysis (see Table 3.2.2 and Figure 3.2.4).

In long-distance travel, such as between Hanoi and HCMC and between Hai Phong and HCMC, the share of air transport is very high and amounts to about 50%. Railway and road transport is more frequently used in short and medium travel distance. At the same time, railway and road transport compete with each other, depending on price/service quality. For example, the share of railway is high between Hanoi and Lao Cai because the service of railway is better than that of road. In contrast, road transport is more frequently used between Hanoi and Hai Phong because of better road service.

Table 3.2.2

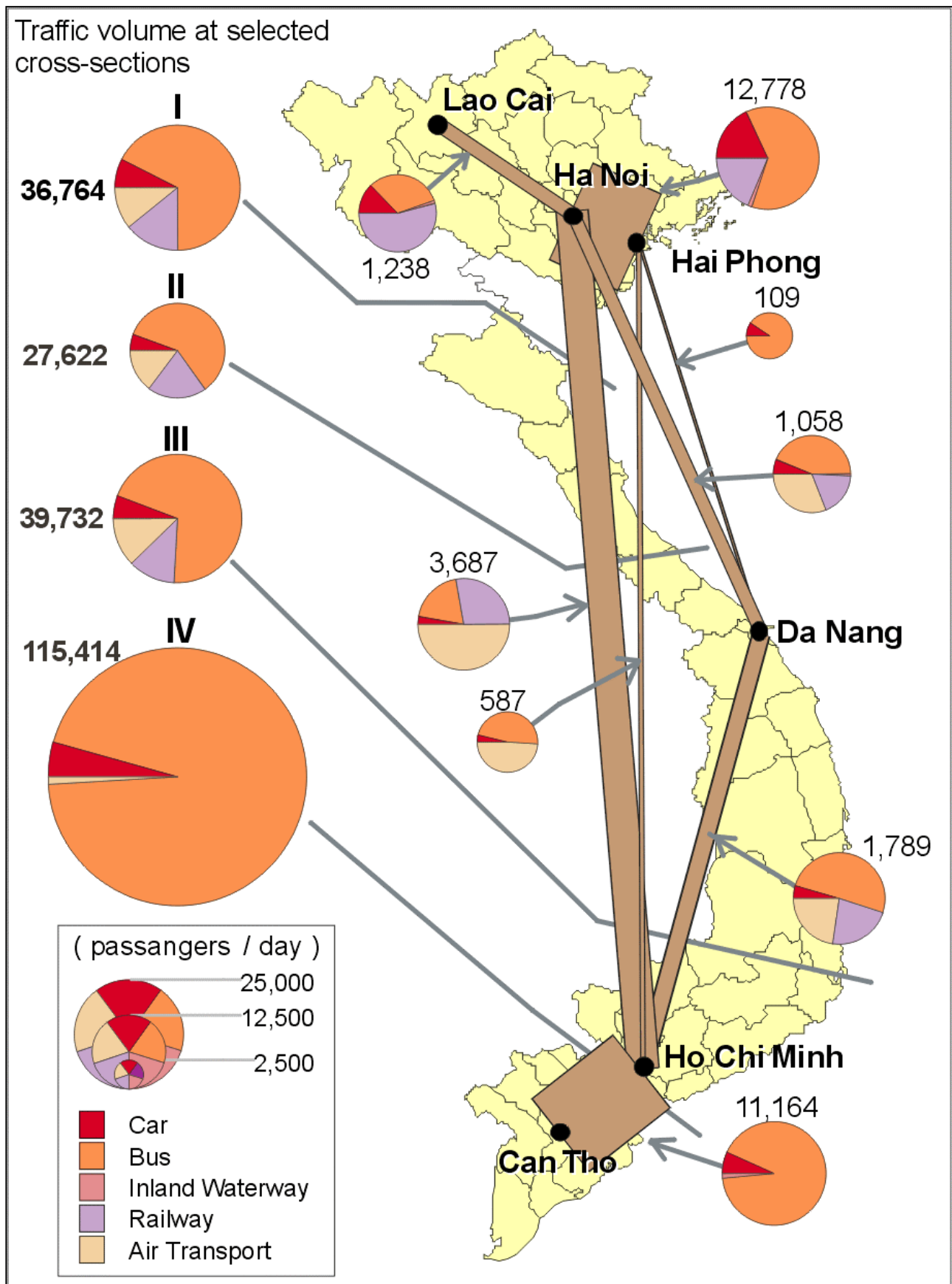
Modal Share Between Main Provinces of Interprovincial Passenger Transport Demand

Distance	Between Provinces	Road		IWT	Rail	Air
		Car	Bus			
Long Distance (1000km <)	Hanoi and HCMC	1.5	21.3	0.0	27.4	49.7
	Hai Phong and HCMC	2.6	48.1	0.0	0.0	49.3
Medium Distance (500 – 1000km)	Hanoi and Danang	6.8	43.3	0.0	20.5	29.4
	Hai Phong and Danang	10.6	89.4	0.0	0.0	0.0
	HCMC and Danang	3.6	52.4	0.0	20.2	23.8
Short Distance (< 500km)	Hanoi and Hai Phong	18.3	62.4	0.0	19.3	0.0
	Hanoi and Lao Cai	11.8	34.1	0.0	54.1	0.0
	HCMC and Can Tho	4.5	94.1	1.4	0.0	0.0

Source: VITRANSS, 1999

Modal shares are analyzed at four cross-sections (see Figure 3.2.4 and table 3.2.2). In terms of mode usage, a similar pattern is found at sections I, II and III. Road transport serves about 75%, the rest by railway and air transport. On the other hand, the share of road transport amounts to 90% at section IV because there is no railway and few airlines cross section IV.

Figure 3.2.4
 Characteristics of Interprovincial Passenger Movement, 1999



Source: VITRANSS

Table 3.2.3

Modal Share of Interprovincial Passenger Transport Demand by Cross-section

Section	Road		IWT	Rail	Air
	Car	Bus			
Section I	6.2	69.5	0.0	13.9	10.4
Section II	4.6	61.7	0.0	17.9	15.8
Section III	4.1	72.3	0.0	12.4	11.2
Section IV	4.2	95.0	0.8	0.0	0.0

Source: VITRANSS, 1999

Findings from Field Surveys

Other major findings obtained from VITRANSS field surveys are briefly as follows:

1) Road

Vehicle Type: In the north, the share of car is comparatively higher than other regions. Bus usage is more common. Large buses are more often used in central Vietnam, and minibuses are more often used in the south.

Table 3.2.4

Road Traffic by Vehicle Type

Area	Car	Mini Bus	Large Bus
North	35.9	27.3	36.8
Central	21.7	28.4	49.9
South	24.8	43.1	32.1
Total	28.7	34.9	36.4

Source: VITRANSS Roadside Interview Survey, March-April 1999

Average Occupancy: The load factor (number of onboard passengers per vehicle) for car is 3.5 which is similar in all regions. That of the minibus and large bus is 9.4 and 28.4, respectively (see Table 3.2.5).

Table 3.2.5

Average Occupancy of Road Vehicle

	Car	Bus		
		Minibus	Large Bus	Average
North	3.5	9.1	27.7	19.8
Central	3.6	10.2	25.1	19.7
South	3.6	9.5	30.6	18.5
Total	3.5	9.4	28.4	19.1

Source: VITRANSS Roadside Interview Survey, March-April 1999

Vehicle Ownership: The ownership pattern of vehicles by state, private and joint-venture enterprises varies by vehicle type and region (see Table 3.2.6). More cars are owned by state enterprises in the north and central areas, while 70% are owned by the private sector in the south. Minibuses are mostly owned by the private sector.

Table 3.2.6
Vehicle Ownership by Public/Private Sector

	Car			Mini Bus			Large Bus		
	State	JV	Private	State	JV	Private	State	JV	Private
North	63.0	3.5	33.4	28.7	3.3	68.0	49.9	5.0	45.1
Central	62.8	4.4	32.8	23.2	7.5	69.2	32.8	10.0	57.1
South	24.0	6.1	69.9	10.0	4.6	85.4	9.0	4.5	86.5
Total	47.2	4.6	48.1	17.2	4.5	78.2	29.7	5.8	64.5

Source: VITRANSS Roadside Interview Survey, March-April 1999

2) Inland Waterway

Based on the VITRANSS riverside interview survey, the average number of passenger vessels is 20 in the north and 16 in the south. Most passenger vessels belong to private individuals and companies.

3) Passenger Movement at Passenger Terminals

Based on the passenger terminal interview survey carried out at 30 passenger terminals, including 10 railway stations, 10 bus terminals and 10 airports, terminals mainly serve the province in which they are located. For example, about 85% of arriving passengers have origins in that province and about 94% of departing passengers make trips with destinations in that province (see Table 3.2.7).

Table 3.2.7
Share of Intra/Interprovincial Passengers at Transport Terminals

Terminal	Origin → Terminal		Terminal → Destination	
	Intraprovince	Interprovince	Intraprovince	Interprovince
Railway Station	84.0	16.0	90.1	9.9
Bus Terminal	83.0	17.0	96.6	3.4
Airport	87.0	13.0	94.9	5.1
Total	84.0	16.0	93.7	6.3

Source: VITRANSS Passenger Terminal Interview Survey, May 1999.

Many passengers use bus and motorcycle to reach the railway station and bus terminal. On the other hand, the usage of car and taxi to reach the airport is very significant, at about 50% of trips (see Table 3.2.8).

Table 3.2.8
Access/Egress Mode to/from Transport Terminals, 1999

	Access Mode					Egress Mode					%
	Motor-cycle	Car/taxi	Bus	Others	n.k	Motor-cycle	Car/taxi	Bus	Others	n.k	
Railway Station	32.7	9.0	43.2	13.9	1.2	25.4	10.9	58.2	3.5	2.0	
Bus Terminal	16.7	0.9	69.0	8.2	5.3	16.2	2.9	27.9	8.8	44.1	
Airport	7.0	40.3	46.2	4.8	1.6	0.0	52.1	39.4	0.0	8.5	
Total	20.7	12.6	54.2	9.6	2.9	18.2	17.9	48.2	3.8	11.8	

Source: VITRANSS Passenger Terminal Interview Survey, May 1999

3.3 Freight Transport Demand

Generation/Attraction of Interprovincial Freight Transport Demand

The generation and attraction of interprovincial freight traffic demand by commodity group and region was analyzed. Its characteristics (see Table 3.3.1) are summarized as follows:

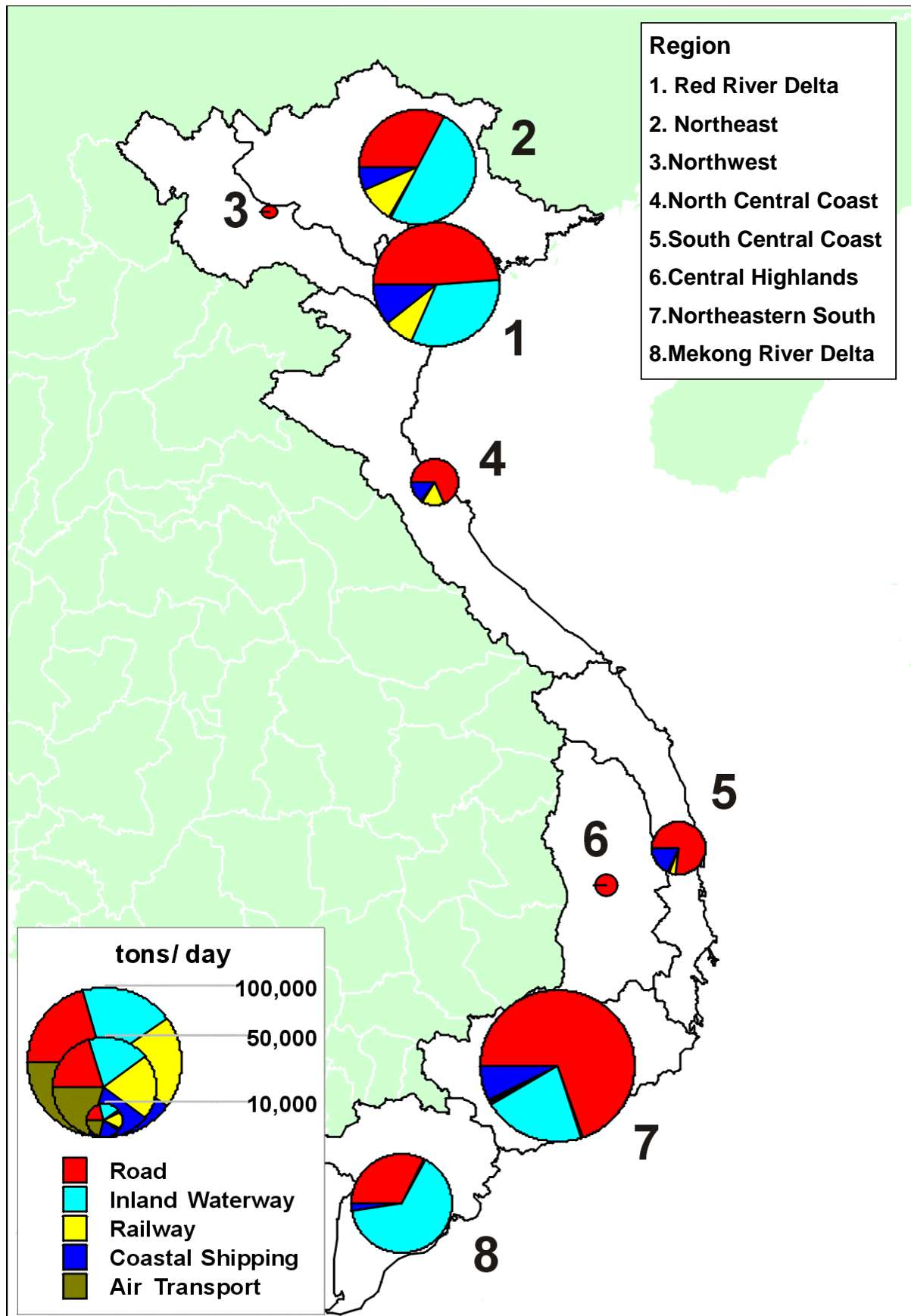
- Similar to passenger traffic demand, road transport plays a significant role in carrying freight.
- Inland waterway has a large share in carrying certain commodity items such as coal, sand/stone and cement.
- Compared to road transport, freight volume transported by railway, coastal shipping and air transport is small (in terms of tons carried).

Interprovincial Movement of Freight

Interprovincial movement of total freight is shown in Figure 3.3.2, and that of the 13 commodities is shown in Appendix 3-C. In general, freight movement tends to be determined by commodity and strongly affected by provincial characteristics. Also, the transport mode chosen tends to be influenced by travel distance and travel cost (see Figure 3.3.2 and Appendix 3-C).

Road transport plays an important role in distributing freight throughout the country. A lot of freight volume is carried over short distances. Inland waterway also transports a big volume of freight over short distances in the Red River delta and Mekong delta. Meanwhile, comparatively long-distance travel is found on the railway and especially in coastal shipping. Freight volume carried by air transport is very small.

Figure 3.3.1
 Generation/Attraction of Interprovincial Freight Transport Demand (All Cargoes), 1999



Source: VITRANSS

Table 3.3.1
Generation/Attraction of Interprovincial Freight Transport Demand by Mode^{1/}

Commodity Group		Road	IWT	Railway	Coastal Shipping	Air	Total
1. Paddy/Other Food Crops	Ton/day (%)	49,352 (67.7)	12,420 (17.0)	126 (0.2)	10,974 (15.1)	0 (0.0)	72,872 (100.0)
2. Sugarcane-Sugar	Ton/day (%)	11,796 (94.2)	732 (5.8)	0 (0.0)	0 (0.0)	0 (0.0)	12,528 (100.0)
3. Wood/Forest Products	Ton/day (%)	12,298 (89.2)	490 (3.6)	352 (0.0)	654 (0.0)	0 (0.0)	13,794 (100.0)
4. Steel	Ton/day (%)	10,448 (59.8)	236 (1.4)	5,232 (0.0)	1,554 (8.9)	0 (0.0)	17,470 (100.0)
5. Sand, Stone, Iron Ore and Others	Ton/day (%)	37,306 (50.9)	31,806 (43.4)	2,976 (0.0)	1,144 (1.6)	0 (0.0)	73,232 (100.0)
6. Cement	Ton/day (%)	25,252 (40.8)	29,436 (47.5)	1,476 (0.0)	5,764 (0.0)	0 (0.0)	61,928 (100.0)
7. Fertilizer	Ton/day (%)	19,464 (44.8)	14,808 (34.1)	4,092 (9.4)	5,088 (11.7)	0 (0.0)	43,452 (100.0)
8. Coal	Ton/day (%)	8,810 (11.1)	59,634 (75.4)	5,768 (7.3)	4,884 (0.0)	0 (0.0)	79,096 (100.0)
9. Petroleum Products	Ton/day (%)	19,842 (43.8)	19,704 (43.5)	334 (0.7)	5,458 (12.0)	0 (0.0)	45,338 (100.0)
10. Industrial Crops	Ton/day (%)	7,562 (90.8)	0 (0.0)	766 (9.2)	0 (0.0)	0 (0.0)	8,328 (100.0)
11. Manufacturing Goods	Ton/day (%)	42,560 (80.1)	1,902 (3.6)	3,026 (5.7)	5,502 (10.4)	136 (0.3)	53,126 (100.0)
12. Fishery Products	Ton/day (%)	8,406 (93.6)	578 (6.4)	0 (0.0)	0 (0.0)	0 (0.0)	8,984 (100.0)
13. Animal Meat and Others	Ton/day (%)	17,186 (94.2)	0 (0.0)	1,050 (5.8)	0 (0.0)	0 (0.0)	18,236 (100.0)
Total	Ton/day (%)	270,282 (53.2)	171,746 (33.8)	25,198 (5.0)	41,022 (8.1)	136 (0.0)	508,384 (100.0)

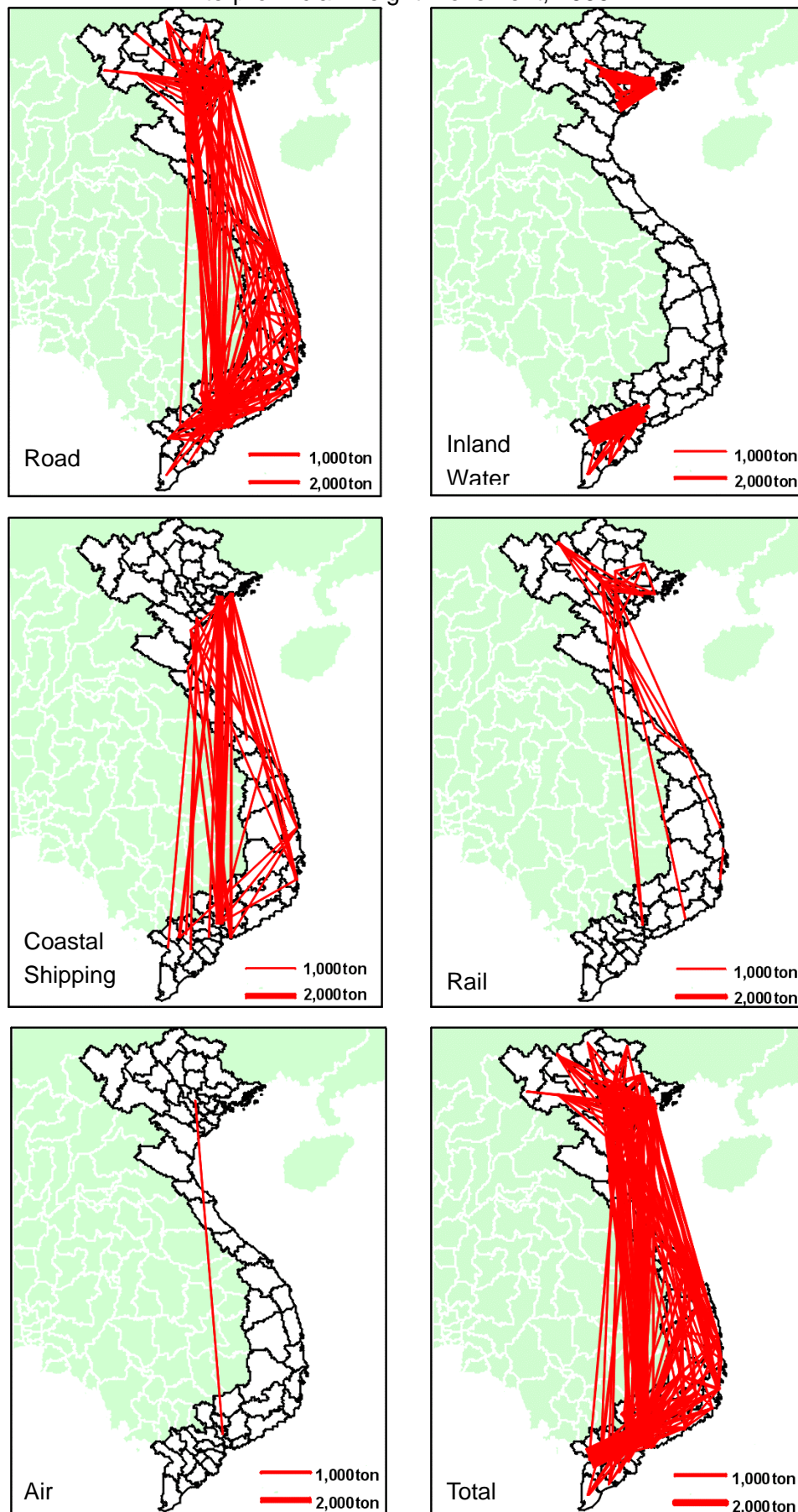
Source: VITRANSS, 1999

1/ OD matrix of road and inland waterway is derived from VITRANSS traffic survey, whereas that of railway is from VR, and that of air was estimated based on the number of flights and average loading factor.

Modal Share by Travel Distance

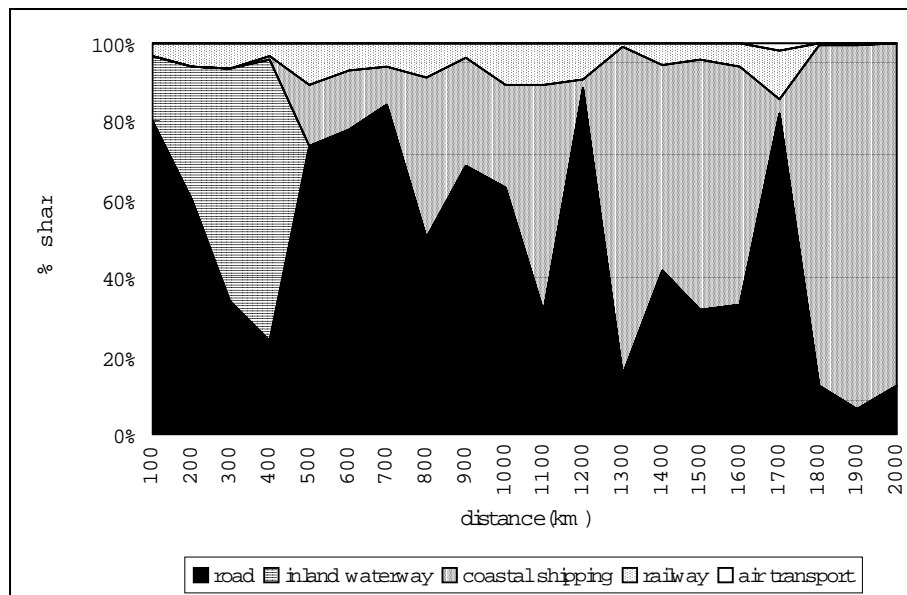
Figure 3.3.3 shows the modal share of total freight by travel distance, while that of the 13 commodity groups is shown in Appendix 2-D of Volume 2. More than 60% of total freight is transported by road within a travel distance of 200 km. Exceeding this, inland waterway is preferred. In fact, around 70% of total freight is carried by inland waterway for distances of between 300 km and 400 km. Farther than this, freight volume carried by inland waterway rapidly reduces, and the majority of freight is carried by road again. Coastal shipping is appropriate for long-distance travel. It carries most goods for distances of more than 1,000 km. Freight volume transported by railway amounts to only about 10% of total freight, regardless of travel distance.

Figure 3.3.2
 Interprovincial Freight Movement, 1999



Source: VITRANSS

Figure 3.3.3
Modal Share by Trip Distance, Total Cargo^{1/}



Modal Share Between Main Provinces

The modal share of freight strongly depends on transport service. For long-distance travel, for example between Hanoi and HCMC, about 80% of total freight is transported by road. By contrast, the usage of coastal shipping is extremely high between Hai Phong and HCMC, reaching about 98%. As travel distance shortens, the share of coastal shipping decreases slowly. For instance, between Hai Phong and Danang where road and coastal shipping compete, the latter's share diminishes up to 58%, as compared to its 98% share in long-distance transport. More significantly, only 8% of total freight is carried by coastal shipping between HCMC and Danang. Railway carries a comparatively high amount of freight between Hanoi and Lao Cai, amounting to 62%. Also, inland waterway is an important mode of freight transport between HCMC and Can Tho, and its share is almost 80% (see Table 3.3.2 and Figure 3.3.4).

Table 3.3.2
Modal Share Between Main Provinces

						%
Distance	Between Provinces	Road	IWT	Railway	Coastal Shipping	Air
Long Distance (1000km <)	Hanoi and HCMC	81.0	0.0	16.6	0.0	2.4
	Hai Phong and HCMC	2.1	0.0	0.3	97.5	0.1
Medium Distance (500-1000km)	Hanoi and Danang	91.5	0.0	7.2	0.0	1.3
	Hai Phong and Danang	40.6	0.0	1.6	57.9	0.0
	HCMC and Danang	89.9	0.0	2.1	7.6	0.4
Short Distance (<500km)	Hanoi and Hai Phong	91.8	0.0	8.2	0.0	0.0
	Hanoi and Lao Cai	38.0	0.0	62.0	0.0	0.0
	HCMC and Can Tho	20.1	79.9	0.0	0.0	0.0

Source: VITRANSS, 1999

In the same way as passenger transport was analyzed, four cross-sections are defined for freight, as shown in Figure 3.3.4. In terms of mode usage, a similar pattern is found at sections I, II and III. Priority is given to coastal shipping, whose share comes to more than 50%. The rest is carried by road and railway. The use of air transport is very low. Inland waterway carries 58% of freight volume at section IV, indicating that inland waterway functions as a pivotal mode in freight transport in the Mekong delta.

Table 3.3.3

Modal Share of Interprovincial Freight Transport Demand by Cross-section

%

Section	Road	Inland Waterway	Railway	Coastal Shipping	Air
Section I	36.2	0.0	7.2	56.4	0.2
Section II	31.5	0.0	6.1	62.2	0.2
Section III	49.8	0.0	2.9	47.1	0.2
Section IV	37.3	58.6	0.0	4.1	0.0

Findings from Traffic Surveys

Other major findings obtained from VITRANSS field surveys are briefly as follows:

1) Road

- a) Vehicle Type: Table 3.3.4 shows the truck types observed in the traffic survey. In the south, the use of pick-up is comparatively high.

Table 3.3.4

Truck Traffic by Vehicle Type^{1/}

%

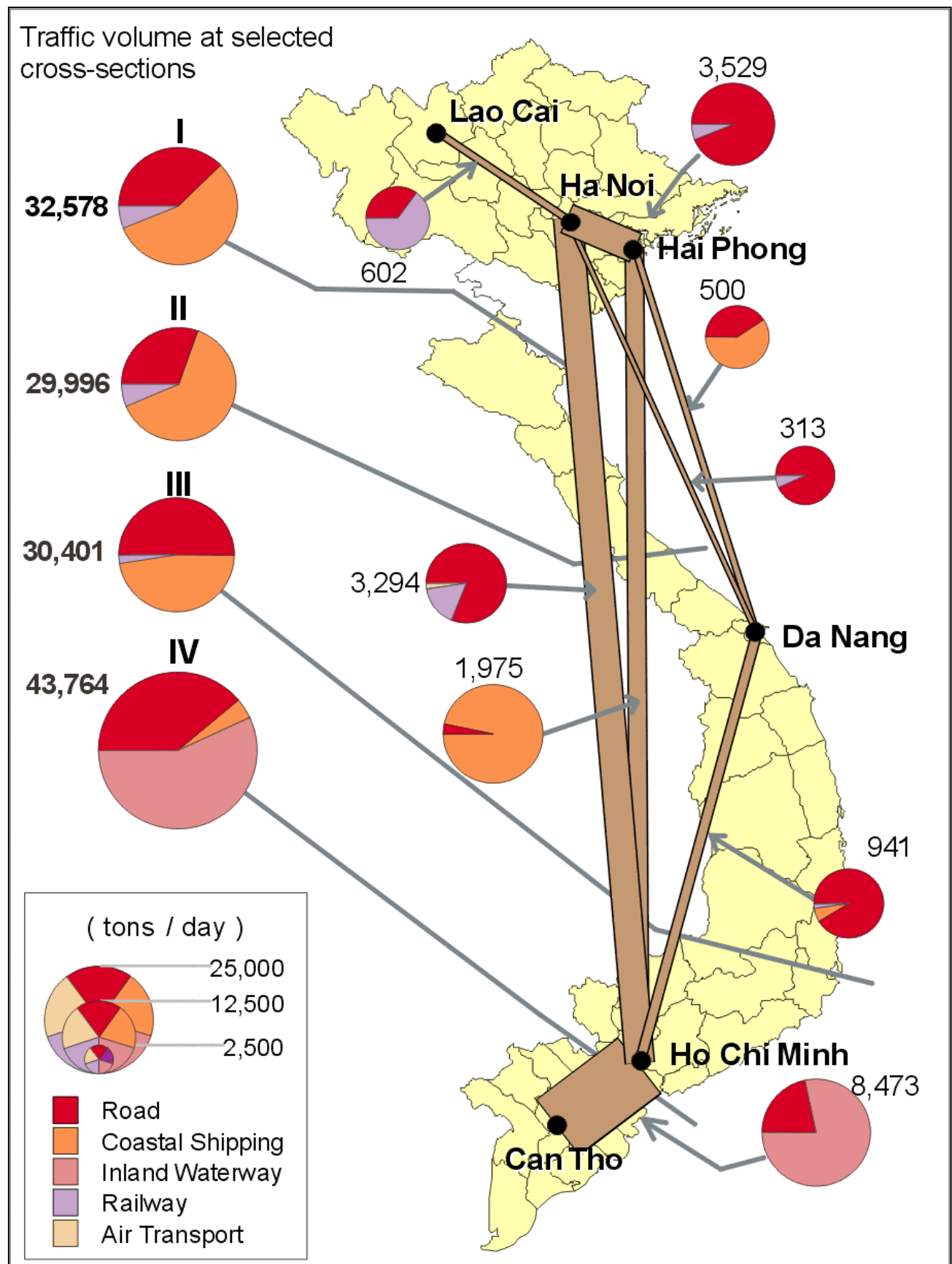
	Pick-up	2-Axle Truck	3-Axle Truck	4 or more Axle Truck
North	19.6	80.7	5.1	2.1
Central	7.6	74.6	8.3	3.6
South	33.7	81.5	4.6	0.7
Total	23.2	79.7	5.4	1.7

Source: VITRANSS Roadside Interview Survey, March-April 1999.

1/ Calculated by simple aggregation of the number of surveyed vehicles.

- b) Average Load: Average load is shown in Table 3.3.5. Average load for loaded trucks is 5.7 tons or 4.0 tons/truck when empty trucks are included.

Figure 3.3.4
 Characteristics of Interprovincial Freight Movement, 1999



Source: VITRANSS

Table 3.3.5
Average Load Factor of Trucks^{1/}

	Pick-up	2-Axle Truck	3-Axle Truck	4 or more Axle Truck	Total
North	1.5	5.2	10.4	15.0	5.5
Central	1.7	5.8	11.0	15.9	7.0
South	2.1	5.9	10.7	21.1	5.3
Total	1.9	5.6	10.7	16.4	5.7

Source: VITRANSS Roadside Interview Survey, March-April 1999

1/ Calculated by simple aggregation of the number of surveyed vehicles.

- c) Vehicle Ownership: Vehicle ownership of truck is shown in Table 3.3.6. In the south, most trucks belong to private individuals and companies while only a few trucks are owned by the state.

Table 3.3.6
Vehicle Ownership of Truck^{1/}

	State	JV	Private
North	29.3	2.6	68.1
Central	27.8	5.5	66.7
South	8.5	3.0	88.4
Total	20.7	3.3	76.0

Source: VITRANSS Roadside Interview Survey, March-April 1999

1/ Calculated by simple aggregation of the number of surveyed vehicles.

- d) Packing by Commodity: Packing type, as shown below, varies by commodity.

Table 3.3.7
Packing Type by Commodity^{1/}

	Bulk	Bag/Parcel	Container	Others
Paddy/Other Food Crops	27.6	68.2	0.4	3.8
Sugarcane-Sugar	34.8	40.9	1.6	22.7
Wood/Forest Products	57.3	6.5	1.5	34.7
Steel	74.6	10.8	0.0	14.6
Sand, Stone, Iron Ore and Others	84.4	9.0	0.1	6.5
Cement	12.0	84.9	1.5	1.6
Fertilizer	9.2	86.7	0.4	3.6
Coal	95.7	3.5	0.0	0.7
Petroleum Products	5.0	14.5	27.8	52.7
Industrial Crops	13.4	85.8	0.5	0.2
Manufacturing Goods	28.0	49.2	8.3	14.5
Fishery Products	19.6	61.2	7.3	11.9
Animal Meat and Others	29.8	49.6	1.0	19.6
Total	38.8	44.6	3.8	12.7

Source: VITRANSS Roadside Interview Survey, March-April 1999

1/ Calculated by simple aggregation of the number of surveyed vehicles.

2) Inland Waterway

- a) Vessel Type: As shown in Table 3.3.8, the majority of vessels are self-propelled and its share amounts to 84%.

Table 3.3.8
Vessel Type^{1/}

	Seagoing Vessel	Self-propelled Ship	Oil Tanker	Tow Barge	Push Barge	Nonmotor'd Boat	Passenger Vessel
North	0.0	89.9	0.4	4.4	5.1	0.0	0.2
South	1.1	80.3	2.1	2.7	5.5	0.2	8.1
Total	0.7	83.7	1.5	3.3	5.3	0.1	5.3

%

Source: VITRANSS Riverside Interview Survey, April- May 1999

1/ Calculated by simple aggregation of the number of surveyed vehicles.

- b) Average Load: Average load of vessel is shown in Table 3.3.9. Tow barge has the highest loading volume of 310 tons. The average load for all the vessels is 69 tons.

Table 3.3.9
Average Load^{1/}

	Seagoing Vessel	Self-propelled Ship	Oil Tanker	Tow Barge	Push Barge	Nonmotor'd Boat	Subtotal
North	0.0	60.5	200.0	293.6	500.0	0.0	93.7
South	61.2	34.7	172.2	324.0	158.6	2.8	53.9
Total	61.2	44.4	174.9	309.8	270.9	2.8	68.5

Tons/vessel

Source: VITRANSS Riverside Interview Survey, April- May 1999

1/ Calculated by simple aggregation of the number of surveyed vehicles.

- c) Vessel Ownership: Table 3.3.10 shows that most vessels belong to the private sector.

Table 3.3.10
Vessel Ownership^{1/}

	State	JV	Private
North	13.5	0.8	85.7
South	5.8	0.5	93.6
Total	8.5	0.6	90.9

%

Source: VITRANSS Riverside Interview Survey, April- May 1999

1/ Calculated by simple aggregation of the number of surveyed vehicles.

3) Freight Movement at Truck Terminal

The truck terminal survey was carried out at five ports and five railway freight

stations. As shown in Table 3.3.11, 35% of total freight arriving at truck terminals is transported to other provinces.

Table 3.3.11
Share of Intra/Interprovincial Movement of Total Freight^{1/}

	Intraprovince	Interprovince
Ports	61	39
Railway Station	78	22
Total	65	35

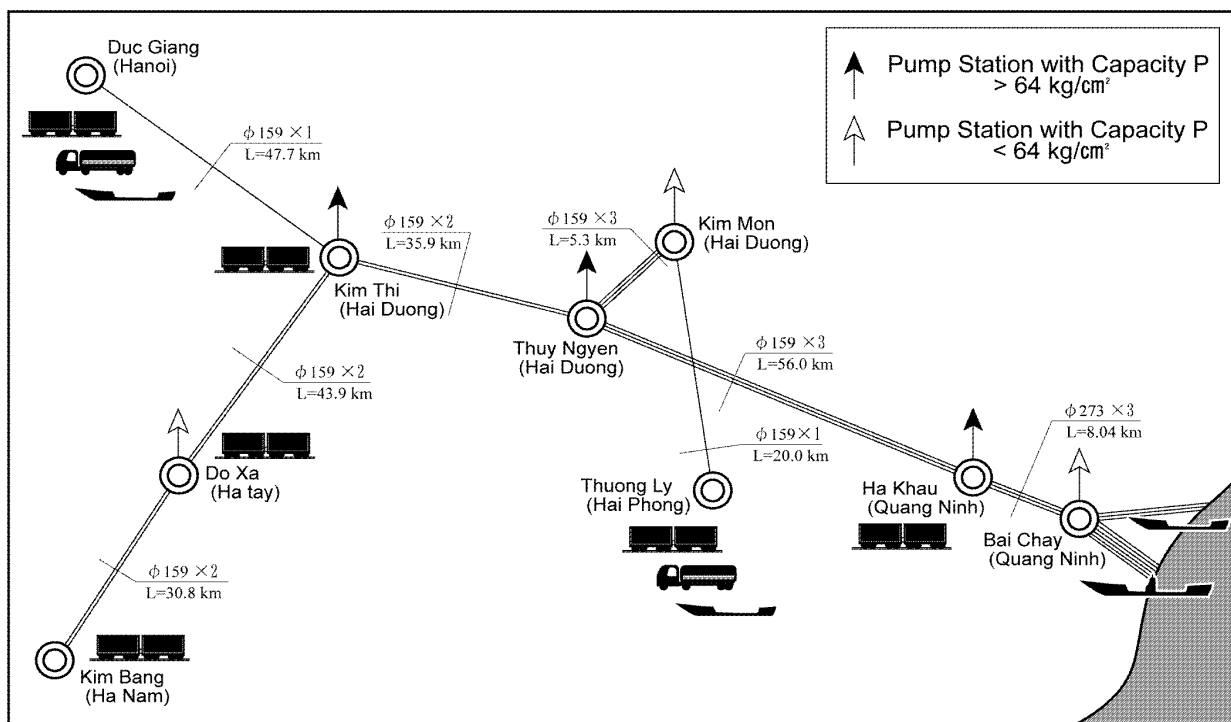
Source: VITRANSS Truck Terminal Interview Survey, May 1999

1/ Calculated by simple aggregation of the number of surveyed vehicles.

4) Oil Products Haulage Plan

The pipeline network plays an important role in transporting oil products, especially in the north. Figure 3.3.5 shows the oil products haulage plans. To illustrate, oil products arrive at Bai Quay Port via maritime or coastal shipping. These are then transported by the pipeline network to an intermediate destination from which it is transported to the final destination by road, rail or inland waterway. As regards oil products, linkage with other transport modes could contribute to transport cost reduction. Even though the VITRANSS does not deal with the pipeline transport system, the oil products haulage plan map is introduced herein because its role is very important in transporting oil products.

Figure 3.3.5
Oil Products Haulage Plan



3.4 Comparison with NTSR (1992)

The National Transport Sector Review (NTSR), in response to a request from the Socialist Republic of Vietnam, was undertaken by the UNDP in 1992. The project reviewed all aspects of Vietnam's transport system by conducting comprehensive transport surveys, forecasting transport demand and assessing the present situation.

Compared with the NTSR, the VITRANSS aggregated interprovincial traffic flows into seven regions and included coastal shipping.

Table 3.4.1 and Figure 3.4.1 compare the NTSR and VITRANSS data on interprovincial movement of passenger and freight at regional level. Some characteristics can be pointed out, as follows:

- Interprovincial traffic flow of passenger increased by 2.1 times and that of freight, 2.5 times during the period 1992-1999.
- The increase in interprovincial traffic flows is more remarkable in the north and south than in central Vietnam. This indicates that the economy has been developed around the two extremities of the north and south.

Table 3.4.1
Change in Interprovincial Traffic Flows, 1992-1999

	NTSR 1992 (A)	VITRANSS 1999 (B)	B/A
Passenger (million)	106	221	2.1
Freight (million tons)	30	86	2.9

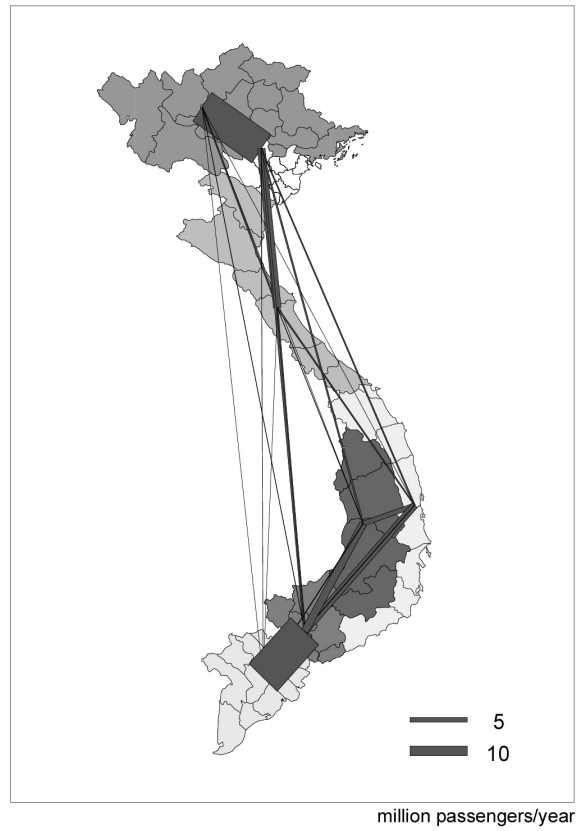
Sources: NTSR and VITRANSS

Figure 3.4.1
Interprovincial Traffic Flows, NTSR (1992) and VITRANSS (1999)

(a) Passenger, NTSR



(b) Passenger, VITRANSS



(c) Freight, NTSR



(d) Freight, VITRANSS

