2.5 Candidate Projects and Investment Costs on Inter-City Transport for the Master Plan

The Study Team has proposed the candidate projects from the recommendations mentioned in the above Table 2.4.1 for the Master Plan of Inter-City Road Transport. A list of candidate projects and required costs are summarized in Table 2.5.1.

The table shows that total investment cost on road transport sector for the Master Plan period will be Rs.399,378 million in which investment cost on public sector including costs of driving instructor training school, expansion of highway patrol, installation of kilometer stones, capital investments of Semi-Public Bus Corporations, maintenance of existing NLC fleet and future study will be Rs. 10,714 million.

On the other hand private sector is required to invest Rs. 388,664 million on motor vehicle fleets from 1988 up to 2005 including 10 percent of other investment.

Table 2.5.1 Candidate Projects and Investment Costs for Master Plan Period

Candidate Project	Quantity	Unit Cost (Rs. million)	Cost (Rs. million)
I Public Secotor			
1. Highway Safety			
• Establishment of Driving Instructor Training School at Federal Level under the 4th Highway project	• One Unit at Islamabad	• 32	• 32
• Expansion of Highway Patrol on N-5 and N-65 of 1900 km excluding Section between Peshawar and Attock.	• 1,900 km/50 km = 38 stations	• 6	• 228
• Installstion of Kilometer Stones on the Road Network of 18,270 km	• 18,270 km	(Rs. 300x2 per Km)	• 11
			Highway Safety Subtotal (271)
2. Motor, Vehicle Fleet			
• Strengthening of Semi-Public Bus Corporations for Intercity Services	• Ordinary Bus 11,256 unit	• 0.54	• 6,078
1) Share between Public and Private will be 10% and 90%.	• Other Investment (20% of Bus Cost)		• 1,216
			Semi-Public Subtotal (7,294)
• Maintenance of Existing NLC Fleet Size as National Asset	• Truck Trailer 3,150 unit	• 0.90	• 2,835
	• Other Investment (10% of Vehicle Cost)		• 284
			NLC Subtotal (3,119)
3. Required Study			
• Detailed Study for Private Sector Bus Industry	• Full Study		• 30
			Public Sector Total 10,714
II Private Sector			
1. Motor Vehicle Fleet			
• Required Investment Cost on vehicles for Inter-City Operations			
Passenger Vehicle			
01 Buses	• 101,301	• 0.54	54,702
02 Mini Buses	• 12,628	• 0.38	4,799
03 Wagon	• 109,024	• 0.36	39,249
04 Pickup	• 112,309	• 0.23	25,831
05 Car	• 517,938	• 0.24	124,305
06. Jeep	• 53,357	• 0.37	19,742
07 Motorcycle	• 291,986	• 0.02	5,840
Total	1,198,543 unit		274,468
	• Other Investments (10% of Vehicle Cost)		• 27,447
			Passenger Vehicle Subtotal (301,915)
Freight Vehicle			
08 Conventional Truck	108,350	• 0.43	46,591
09 Truck Trailer	35,858	• 0.90	32,272
Total	144,208 unit		78,863
	• Other Investment (10% of Vehicle Cost)		• 7,886
			Freight Vehicle Subtotal (86,749)
			Private Sector Total 388,664
			Total Investment Cost 399,378

CHAPTER 3 THE SEVENTH PLAN

3.1 General

This chapter discusses the Seventh Five Year Plan for intercity road transport. Studies are made on items; Basic policy and recommendations, Comparison study of recommendations proposed by the Team and the Sub-Working Group, Candidate projects and investment costs and Annual allocation plan of motor vehicle fleets.

In addition to above, investment plan for the semi-public corporations is conducted.

Apart from the proposed Seventh Five Year Plan, the Team also gave ideas on the policy options which can be envisaged in road transport sector based on the state-of-the-art as applicable to Pakistan.

3.2 Basic Policy and Recommendations for Inter-City Transport

Basic policies for road planning are already discussed and listed in Table 2.4.1 in terms of Safety, Quality control, Vehicle control, Institutional arrangement and Required study respectively. Recommendations and candidate projects are also presented in Table 2.4.1 and 2.5.1 for the Master Plan.

The Study Team follows the planning policy and recommendations proposed for the inter-city road transport Master Plan so as to set up the action plan for the Seventh Five Year Plan.

3.3 Study Team and the Sub-Working Group Recommendations for the Seventh Five Year Plan

Recommendations made on road transport sector for the Seventh Five Year Plan by the Group and the Team are summarized in Table 3.3.1. No differences are observed in these recommendations between the Group and the Study Team besides the target share of semi-public inter-city bus operations, investment plan on NLC fleet and finances for semi-public inter-city corporations.

As far as the target share of semi-public inter-city bus operations is concerned, the Group recommended 16 percent and the Team recommended 10 percent out of the total allocated inter-city passenger·km against the present share of about 5 percent in terms of passenger·km.

The Study Team recommended that all capital investments for the Seventh Five Year Plan on semi-public inter-city bus corporations to be financed by Provincial and Federal Governments at Grant-in-Aid in the ratio of 50:50. It was also found through present vehicle fleet capacity analysis that shortage of large size vehicles and unappropriated vehicle composition on road due to the over-supply of smaller vehicles. The Team, therefore, recommended to revise the axle load limit and the encouragement of induction of large size buses so as to cater for allocated road traffic in the Seventh Plan and to minimize the total transport cost from national economy and vehicle efficiency points of view.

Table 3.3.1 Recommendation of the SWG and the Study Team for Seventh Five Year Plan (Inter-City Transport)

Items	SWG Recommendation	Study Team Recommendation
(1) Motor Vehicle Fleet		
Total new induction of bus (1988-93) for Semi-Public bus corporations	4,566 units (Target Share 16%)	2,790 units (Target Share of 10% against present Share of 5%)
Replacement of truck trailer units (1988-93) for NLC to maintain existing fleet size	--	875 units
(2) Capital Outlays for Semi-Public Sector	Rs 3,014 million	Rs 1,808 million
(3) Capital Outlays for NLC	--	Rs 866 million
(4) Critical Impediments		
1) Clear Cut Policy	Mixed Approach	Mixed Approach
2) Finances for Public	Only for Urban Transport Corporations	Including Inter-City Operation
3) Over Regulation on Fare	Structure determined on VOC	Structure determined on VOC
4) Oversupply of Transport Vehicles	The Group observed that all indicators show that there is no shortage of road transport requirement and Over-Supply of smaller vehicles	The Team found shortage of large size vehicles and unappropriated Composition of Vehicle on Road due to the Over-Supply of smaller vehicles
	a) Import of mini-buses should be banned for a limited period of 2 years b) Duty on Mini-buses may be further enhanced	a), b) Detail study will be required
5) Credit Facilities for Private Sector	a) Transport Development Bank b) Transport as Industry c) Transport Credit Guarantee Scheme d) National Transport Leasing Corporation	Institutional Arrangement on Credit Facilities for Inducement of Private Sector investment
6) Lack of Coordination	Establishment of National Transport Council	To be Established
7) Road Safety	a) Traffic safety education campain b) Establishment of Driving Instructor Training School at the Federal Level c) Equipping and Training of the Traffic Police	a) Traffic Safety education campain b) Establishment of Driving Instructor Training School at the Federal Level under the the 4th Highway Project c) Expansion of Highway Patrol under the 4th Highway Project d) Installation of kilometer stones all along N-5 under the 4th highway project
8) Accident Compensation	No Fault Accident Compensation Insurance	Institutional Arrangement on Insurance
9) Large Size Buses	a) Reduced import duties b) Loan facilities only for Large Buses	Encouragement of Induction of Large Size 52 seater Buses
10) Fleet Maintenance	Contract base for semi-public Bus Corporations	Institutional Arrangement on Mechanic Training
11) Environmented Impact Assessment	National Environmental Standard	To be Formulated
12) Vehicle Control	--	a) Legal axle load limit of 6 ton will be revised to 13 tons for single and 20 tons for tandem axles
	--	b) Formulation of Study Team in NTRC for Revision of Vehicle Registration System on the basis of axle loads

3.4 Candidate Projects and Investment Costs for Inter-City Transport

All candidate projects for the Seventh Plan are extracted from candidate projects of the Master Plan for inter-city transport giving priority from the urgent requirement point of view.

As far as motor vehicle fleets to be induced during the Seventh Plan is concerned, the Study Team has already estimated required number of vehicles and investment costs by type on the basis of allocated passenger·km and ton·km, figures are presented in Table 3.5.1 of annual allocation plan and App. Table 2-3 of Case 2 for inter-city operations. As a total, 293,316 vehicles are required of which passenger vehicles are 245,287 units and trucks are 48,029 units. Investment costs of motor vehicle fleets including other investment of 10 percent will be Rs. 94,561 million.

In order to strengthen the semi-public intercity bus operations, the Study Team estimated required number of buses for semi-public inter-city buses of 2,790 units on the basis of recommended share between public and private which will be 10:90. Investment costs on semi-public inter-city bus corporations including other investment will become Rs. 1,808 million.

As far as investment plan on NLC is concerned, the Study Team already assumed that existing fleet size of NLC will be maintained as a national asset in the future. In order to maintain an existing fleet size of NLC, 10 percent of existing fleet of 175 triler units will be replaced annually. As a result, NLC share in terms of ton·km during the seventh plan period which will become 5 percent against present share of 5.4 percent in 1986 accordingly.

As for highway safety, candidate projects for the Seventh Plan are including establishment of Driving Instructor Training School at Islamabad, expansion of Highway Patrol on N-5 from Attock to Jhelum and installation of Kilometer stones all along N-5 under the 4th Highway Project.

The Study Team also recommended to carry out full scale study on private bus industry operations in order to understand the requirement of sub-sector and the factors affecting the sub sector.

Total project costs including public and private sector investment for inter-city road transport sector will be Rs. 94,647 million for the Seventh Plan. Details are cited in Table 3.4.1.

It must be noted, that the Sub-Working Group recommended to induce 4,566 buses for inter-city semi-public bus services for the seventh Plan as period as against 2,790 buses of the Study Team estimation.

As mentioned earlier, the Study Team found the share of semi-public bus operations in terms of passenger·km assigned on the Network and cross checked by the figures of vehicle on roads. The share of inter-city bus operations covered by semi-public

excluding urban traffic is only 5.1 percent and recommended the target share of 10 percent.

In order to induce the proper number of buses during the Seventh Plan period, production capacity of PACO subsidy has to be improved in advance for with-drawal of the Bedford production.

An investment requirement for inter-city passenger transport during Seventh Plan by semi-public corporation is estimated in Table 3.4.2.

Table 3.4.1 Candidate Projects and Investment Costs for the Seventh Plan

Candidate Project	Quantity	Unit Cost (Rs. million)	Cost (Rs. million)
I Public Sector			
1. Highway Safety			
· Establishment of Driving Instructor Training School at Federal Level under the 4th Highway Project	· One Unit at Islamabad	· 32	· 32
· Expansion of Highway Patrol on N-5 from Attock Bridge to Jhelum Bridge of 198 km under the 4th Highway Project	· 4 Sectors	· 6	· 24
· Installation of Kilometer Stones all along N-5 of 1,728 km under the 4th Highway Project	· 1,728 km	(Rs. 300x2 per Km)	· 1
			Highway Safety Subtotal (57)
2. Motor Vehicle Fleet			
· Strengthening of Semi-public Bus Corporations for Inter-city Services	· Ordinary Bus 2,790 units	· 0.54	· 1,507
1) Share between public and Private will be 10% and 90%	· Other Investment (20% of Bus Cost)		· 301
			Semi-Public Subtotal (1,808)
· Maintenance of Existing NLC Fleet Size as National Asset	· Truck Trailer 875 units	· 0.90	· 788
	· Other Investment (10% of Vehicle Cost)		· 78
			NLC Subtotal (866)
3. Required Study			
· Detailed study for Private Sector Bus Industry	· Full Study		· 30
			Public Sector Total 2,761
II Private Sector			
1. Motor Vehicle Fleet			
· Required Investment Cost on vehicles for Inter-City Operations			
Passenger Vehicle			
01 Buses	· 25,118	· 0.54	13,564
02 Mini Buses	· 2,756	· 0.38	1,047
03 Wagon	· 23,616	· 0.36	8,502
04 Pickup	· 21,802	· 0.23	5,014
05 Car	· 112,221	· 0.24	26,933
06 Jeep	· 11,570	· 0.37	4,281
07 Motorcycle	· 45,414	· 0.02	908
Total	242,497 units		60,249
	· Other Investments (10% of Vehicle Cost)		· 6,024
			Passenger Vehicle Subtotal (66,273)
Freight Vehicle			
08 Conventional Truck	40,753	· 0.43	17,524
09 Truck Trailer	6,401	· 0.90	5,761
Total	47,154 units		23,285
	· Other Investment (10% of Vehicle Cost)		· 2,328
			Freight Vehicle Subtotal (25,613)
			Private Sector Total 91,886
			Total Investment Cost 94,647

Table 3.4.2 Investment Requirement of Semi-Public Bus Corporation for Inter-Zonal and Inter-City Transport During the Seventh Plan

Semi-Public Bus-Corporation	Fleet in 1986	Average Age	Induction Plan 1987-88	Existing Share of Semi-Public Bus Corporation in Terms of Bus Pass.-Km		Target Share for Inter-Zonal Transport	Fleet Size in 1992	Road Worth Fleet in 1992 From 1986	New Induction
				Inter-Zonal	Inter-City				
				(%)	(%)	(%)			
1) PRTC	379 Rev(35)	13.0	-	3.99	1.88	3.70	1,355	40	1,315
2) SRTC	185	8.5	88	1.52	0.72	1.40	513	200	313
3) MPP RTB	564	4.5	181	5.30	2.50	4.90	1,794	632	1,162
Total	1,128		267	10.81	5.10	10.00	3,662	872	2,790
				Inter-Zonal Total Pass.Km in 1986; 45969 Million	Inter-City Total Pass.Km in 1986; 97374 Million				

1 Source; DAWN 29 Sep. 1987 Advertizement Supplement " Sind Road Transport Corporation"

2 Mefp Rtb has plan to expand inter-city fleet to 745 by the end of 6th Five Year Plan

3 10% of fleet in 1986 will be road worth in 7th Plan

4 60% of fleet in 1986 will be road worth in 7th Plan

5 80% of fleet in 1986 will be road worth in 7th Plan

CROSS CHECK

Inter-City Bus Operating Share By Semi-Public Bus Corporation in Terms of Existing Fleet Size

1128 Buses Belong to Semi-Public Bus Corporation and Total Fleet of Buses in 1986 of 20483

1128 / 20483 = 5.5 %

3.5 Annual Investment Allocation Plan of Motor Vehicle Fleets for Inter-City Transport

The annual investment allocation plan for the Seventh Plan on motor vehicle fleets for intercity transport is shown in Table 3.5.1 including public and private sectors investments.

Table 3.5.1 Annual Investment Allocation Plan on Motor Vehicles for Inter-City Transport

Required Number of Vehicles to be Induced and Investment Costs for Intercity Operation for 7th Five Year Plan Period

No.	Vehicle Type	Unit Cost (Rs Million)	Required No. of Vehicle 1988	1989	1990	1991	1992	total	Investment Cost for 7th Five Year Plan Period: On Vehicle (Rs Million) 1988	1989	1990	1991	1992	Total	Total Investment (Rs Million) 1988	1989	1990	1991	1992	Total
A.	Passenger Traffic																			
I	Public Sector																			
01	Buses Semi Public	0.54	455	502	553	609	671	2,790	246	271	299	329	362	1,507	295	325	358	395	435	1,808
II	Private Sector																			
02	Buses Private	0.54	4,100	4,516	4,976	5,483	6,042	25,117	2,214	2,439	2,687	2,961	3,263	13,563	2,635	2,683	2,956	3,257	3,589	14,919
03	Mini Buses	0.38	497	523	550	578	608	2,756	189	199	209	220	231	1,047	208	219	230	242	254	1,152
04	Wagon	0.36	3,974	4,318	4,691	5,096	5,537	23,616	1,431	1,554	1,689	1,835	1,993	8,502	1,574	1,710	1,858	2,018	2,193	9,352
05	Pickup	0.23	3,838	4,083	4,344	4,621	4,916	21,802	883	939	999	1,063	1,131	5,016	971	1,033	1,099	1,169	1,244	5,516
	Personal																			
06	Car	0.24	18,882	20,515	22,290	24,219	26,314	112,220	4,532	4,924	5,350	5,813	6,315	26,933	4,985	5,416	5,885	6,394	6,947	29,626
07	Jeep	0.37	1,945	2,114	2,298	2,498	2,715	11,570	720	782	850	924	1,005	4,281	792	860	935	1,017	1,105	4,709
08	Motorcycle	0.02	9,870	9,876	9,883	9,889	9,896	49,414	181	182	182	182	182	908	200	200	200	200	200	999
	Total		42,761	46,047	48,785	52,193	55,899	245,285	10,395	11,289	12,264	13,325	14,482	61,755	11,459	12,445	13,520	14,691	15,966	68,081
B.	Freight Traffic																			
I	Public Sector																			
09	NLC Trailer	0.90	175	175	175	175	175	875	158	158	158	158	158	788	173	173	173	173	173	866
II	Private Sector																			
10	Conventional Truck	0.43	7,475	7,799	8,136	8,488	8,855	40,753	3,214	3,354	3,498	3,650	3,808	17,524	3,535	3,689	3,848	4,015	4,188	19,276
11	Truck Trailer	0.90	753	963	1,223	1,538	1,928	6,403	678	867	1,099	1,384	1,733	5,761	745	953	1,209	1,523	1,907	6,337
	Total		8,403	8,937	9,532	10,201	10,956	48,029	4,049	4,378	4,755	5,192	5,699	24,072	4,454	4,816	5,230	5,711	6,268	26,479
	Grand Total		51,164	54,984	58,317	62,394	66,855	293,314	14,444	15,667	17,019	18,517	20,180	85,827	15,913	17,261	18,751	20,401	22,235	94,561

Note: NLC Truck Trailer Unit Cost is including 27 percent of Tax on Vehicle

3.6 Future Research Component, Follow-Up Studies and Required Data to be Collected

During the course of field survey, the Team had been faced many difficulties in collection of required data for road transport planning due to the insufficient compilation and lack of data from authorities concerned. List of data recommended to be collected on a continuous basis is summarized by data source in Table 3.6.1.

Essential research components in road transport plannings those have not been conducted so far in Pakistan are presented in Table 3.6.2 for the candidate research component.

In addition to the above, "Comprehensive Study of Inter-City Bus Operation" and "Construction of Road Transport Data Base" are recommended to be carried out as soon as possible as the follow up studies of NTPS. Objectives of follow up studies are mentioned in Table 3.6.3.

Table 3.6.1 List of Data to be Collected on a Continuous Basis

I General Information

1) Vehicle on Road; Excise and Taxation Office and Post Office

Vehicle Type should be devided into 12 types as follows;

• Bus Mode	01 Bus 02 Mini Bus
• Motor Car Mode	03 Wagon 04 Pick-up 05 Taxi 06 Car 07 Jeep
• Other Passenger Mode	08 Rickshaw 09 Motorcycle
• Truck Mode	10 Conventional Truck 11 Truck Trailer 12 Delivery Van

If possible Truck Trailers should further divided by number of Axles

2) Fuel Consumption on Road; Ministry of Petroleum & National Resources

3) Vehicle Production & Sale; Pakistan Automobile Corporation

- Information on Number of Vehicle Import, Production and sale by Make

4) Traffic Count Data on Provincial Roads; Provincial Governments

- Vehicle Type should be incorporated
- Traffic count data of sind province is not available since 1984.

5) Traffic Accident Records; Traffic police

- Traffic Accident Records with Information of Exact Location

(Cont'd)

II Freight Traffic

1) Public; NLC

- Vehicle Inventory (Make, Usage, Load Factor, Age, Axle Weight, etc.)
- Essential Commodity Carried by NLC's Own Trucks in Terms of Ton·Km including Container
- Essential Commodity Carried by HMT in Terms of Ton·Km
- Freight Traffic by Commodity
- Accident Records

2) Private

- Vehicle Inventory by Goods Carrior Associations
- Daily Variation of Truck Tariff by Commodity

3) Terminal; Municipality

- Location and Scale of Truck Stands

III Passenger Traffic

1) Semi-Public; Government Bus Service

- Vehicle Inventory
- Inventory of Depot
- Time Table and Actual Operating Number of Bus by Route
- Balance Sheet
- Accident Records

2) Private; PTA & RTA and Bus Owners Associations

- Number of Route Permits issued by Type of Vehicle and Route
- List of Classified Route for the Operation of Stage Carriage Permit (Inter- & Intra-Provincial Route)
- Vehicle Inventory by Bus Owners Associations

3) Terminal; Municipality

- Location & Scale of General Bus Stands
- Operating Number of Buses to/from each Bus Stand

Table 3.6.2 List of Future Research Components which can be Envisaged

I Vehicle Use

1) Car Ownership and Use
2) Choice between Private and Public Transport
3) Alternative Study on Demolition of Railway Branch Line and Bus Operations

II Safety

1) Safety of Two Wheelers
2) Reducing Drugs in Road Accident
3) Safety of Trucks in Night Operation by Type of Road

III Road Facilities

1) Evaluation of Load Carring of Rail Road-cum-Bridges

Table 3.6.3 List of Follow up Studies of NTPS

I Comprehensive Study of Inter-City Bus Operation

Objectives;

- In order to find the actual role and function of inter-provincial and inter-city bus operations out of total passenger movement.
- To understand the requirement of sub-sector
- To find the factors affecting the sub-sector
- To determine policies and strategies to rationalyze inter-city bus industry
- To determine the present and future required number of route permit to be issued by type of bus on each bus operating route
- To find the candidate location and scale of combined bus terminals in principal cities

II Construction of Road Transport Data Base

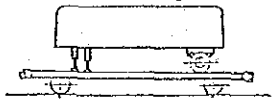
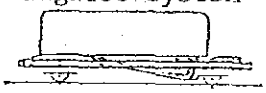
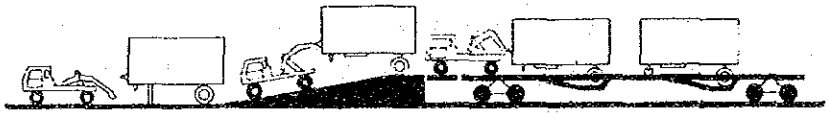
Objectives;

- In order to understand the sub-sector and to find the actual role and function of road transport industries
- To determine methodology of data collection, compilation and processing suitable for Pakistan
- To Compile Data Base for Road/Road Transport plannings
- To recommend data processing facilities and software applicable
- Training of the NTRC staff as well as transfer of technology

* Required Data to be collected on continuous basis are discussed in item 3.

3.7 Policy Options

Policy options can be envisaged in road transport sector based on the state-of-the-art as applicable to Pakistan are shown by items given in the Scope of Work.

Items	Policy Options
1) Better Quality of Service and Recovery of Cost for Long Distance Haul	• Intermodal transportation system can be introduced to provide a better quality of service and minimize the total transport cost both for railway and road transport between Karachi and Samasata section.
	Explanation;
Piggyback System  Kangaroo System 	Piggyback system consists in mounting the whole road vehicle including the tructor unit on a rail flatcar. This technique was initially developed in the U.S.A. so as to provide better quality of service for long distance haul. However, piggyback system demands a height clearance some 40 to 50 cm greater than for other forms of combined transport. In order to get rid of this disadvantage, "KAN GAROO" system was introduced in France for inland container transport illustrated as follows;
	Kangaroo System 
2) Maintenance Practice	• Vehicle Inspection System at interval of every two-three years should be introduced.
	Explanation;
	Motor vehicles are now indispensable for economic activities. On the other hand, serious social problems have arison such as accidents, and pollution caused by exhaust gas, noise, etc. The vehicle inspection system plays an important role as one of measures to solve those problems.

3)	Manpower Training	• Professional licence system should be introduced so as to grade up the quality of mechanics Explanation; In Japan, motor vehicle which has been inspected and repaired by a designated motor vehicle maintenance and repair shop, the presentation of the motor vehicle is omitted at renewal inspection.
4)	Institutional Requirement of R&D	• Monitoring Team for semi-public bus corporations can be established in NTRC 1) Inventory of Vehicle, parts and Facilities 2) Staff performance 3) Vehicle Efficiency and Maintenance Practice 4) Revenue/Expenditure by route, etc. In order to set up improvement plan of terminal and operational practice.
5)	Role of Private Sector	• Bonded sea born container and cargoes will be carried out by private tructor.

APPENDIX FOR

ROAD TRANSPORT PLANNING

TABLE OF CONTENTS

ROAD TRANSPORT PLANNING

App. Table 1-1 Fleet Strength of National Logistic Cell in 1982, 1986 and 1987

	Make Load Carrior	Capacity Ton	1982 1/ No.	1982 1/ Total Capacity	1986 1/ No.	1986 1/ Total Capacity	1987 2/ No.	1987 2/ Total Capacity
1)	Mercedes Benz with Trailer	22.3	499	11,128	500	11,150	500	11,150
2)	Saviem	7.3	229	1,672	136	993	12	88
3)	Dodge	5.0	66	330	-	-	-	-
4)	Ford	7.0	98	686	12	84	2	14
5)	March Trailer	-	30	-	27	-	-	-
6)	Hino Truck Tractor HE335E with Semi Trailer	20.0	53	1,060	82	1,640	80	1,600
7)	Hino Truck ZH 100	8.5	50	425	50	425	50	425
8)	Hino Flat Bed Semi Trailer HH330E for Container	30.5	28	854	28	854	26	793
9)	Hino Low Bed Semi Trailer HE345E	25.0	-	-	6	150	3	75
10)	Hino Truck with Flat Bed Semi Trailer KB122	16.0	-	-	65	1,040	65	1,040
11)	Bedford Truck	10.0	26	260	-	-	-	-
12)	Fiat Truck Tractor with Flat Bed Semi Trailer	35.0	-	-	248	8,680	1	35
13)	Fiat Truck Tractor and Zorzi	23.5	199	4,677	199	4,677	218	5,123
14)	Fiat	25.0	-	-	-	-	135	3,375
15)	Fiat (Grain Container)	25.0	-	-	-	-	99	2,475
16)	Calabrese Truck Semi Trailer	30.5	-	-	113	3,447	-	-
17)	Flat Bed Semi Trailer	30.5	-	-	25	763	-	-
18)	Mitsubishi Fuso Tractor FP-415	35.0	-	-	23	805	40	1,400
19)	Bedford Tractor TM-2500	16.0	-	-	39	624	40	640
20)	Renault Trailer	30.0	-	-	-	-	1	30
21)	Bulk Cement Carrier	60.0	-	-	1	60	1	60
22)	Volvo	35.0	-	-	-	-	129	4,515
23)	Car Carrier	21.3	-	-	-	-	2	43
		Total	1,278	21,092	1,554	35,392	1,404	32,881

	Bowzeis	Capacity Liter	No.	Total Capacity	No.	Total Capacity	No.	Total Capacity
1)	Hino Water Tank	7,500	-	-	20	150,000	-	-
2)	Hino Bowser HH330E	28,000	15	420,000	14	392,000	14	392,000
3)	Fiat Boweser	28,000	114	3,192,000	142	3,976,000	270	7,560,000
4)	Fiat Bowser	35,000	-	-	224	7,840,000	-	-
5)	Mitsubishi	28,000	-	-	-	-	21	588,000
6)	Hino LPG	22,350	-	-	6	134,100	6	134,100
7)	Volvo	35,000	-	-	-	-	50	1,750,000
	Total		129	3,612,000	406	12,492,100	361	10,424,100
	G. Total		1,407		1,960		1,765	

Source: 1/ NLC

2/ ADB Transport Sector Profile, TECNECON

App. Table 1-2 NLC: Transport of Dry Cargoes 1979/80 - 1986/87

DRY CARGO

YEARS	TONNAGE	TON (KM)
1979/80	1,846,840	1,012,676,593
1980/81	1,852,139	945,160,181
1981/82	1,415,293	641,152,363
1982/83	1,530,468	924,435,241
1983/84	1,889,575	883,434,775
1984/85	1,952,123	1,275,314,444
1985/86	1,276,656	996,740,381
1986/87	1,359,606	1,105,885,107

Source: NLC

App. Table 1-3 NLC: Transport of Liquid Cargoes 1979/80 - 1986/87

LIQUID CARGO

YEARS	BARRELS (CRUDE)	KILO LITRES (POL PRODUCT)	TONS (EDIBLE OIL)	TOTAL KILO LITRES/ KILOMETERS
1979/80	-	15,007	-	33,523,800
1980/81	119,283	54,128	31,936	70,135,542
1981/82	789,315	84,446	39,999	111,647,756
1982/83	1,460,135	116,672	8,541	186,703,898
1983/84	1,920,192	415,699	2,475	213,644,754
1984/85	5,931,621	321,773	1,454	274,016,922
1985/86	8,054,379	135,492	1,589	365,718,762
1986/87	7,225,076	86,787	10,636	337,144,571

Source: NLC

App. Table 1-4 Production of Pakistan Automobile Corporation in 1985/86 and 1986/87

	Production			
	1985-86		1986-87	
	Capacity	Production	Capacity	Production
1) Millat Tractors				
Tractors	10,000	10,195	10,000	9987
2) National Motors				
Trucks/Bus Chassis	6,000	-	6,000	-
Trucks - Bedford		864		884
- Isuzu JCR 460				
JTR 114		629		473
TDJ-72		101		-
		1594		1357
Bus - Bedford		373		217
- Isuzu JCR 520		128		148
		465		365
3) Naya Daur Motors				
4x4 Vehicles	2400			
Suzuki (SJ 410)		2291		2121
Pickups(Mini) Suzuki		579		909
		2870		3030
4) Pak - Suzuki Motor				
Suzuki Mini Vehicles	20,000			
Suzuki Pickup		3319		2551
Van		1308		1953
Cars (800 cc)		16067		13690
		20694		18194
5) Republic Motors/Hino Pak Motors				
Trucks - Hino (FF 173)	1,000	852		1016**
Bus - Hino (BX/A 174)		120		177**
LCVs - Suzuki Pickup		3148		2416**
		4120		3609
6) Sind Engineering				
Motorcycles	15,000		15,000	
Suzuki A-50		406		376
A-80		2287		2297
A-100 N		1303		89
A-100 X		2966		1824
GP-100		369		-
SB-200		75		-
GS-500		60		-
		7466		4586
LCVs Mazda 1-3000	1,200	1365	1,200	1074
Suzuki Pickup		1718*		1565*
7) Baluchistan Wheels				
Wheel Rims	376,000	115,315	376,000	197,531
8) Bolan Castings				
Automotive Castings (Tons)	5,600	-	5,600	1071.4
9) Bela Engines				
Engines - Bedford				
(Single Shift)	6,000	1170	6,000	868
- Fiat		9824		6076
10) Al-Ghazi Tractors				
Tractors	15,000	8500	15,000	7175
* TOTAL SUZUKI PICKUP PRODUCTION		8764		7441

** HINO PAK MOTORS TOOK OVER FROM REPUBLIC IN JANUARY 1985 THEREFORE PRODUCTION DURING 1985-86 IS ENTIRELY ON ACCOUNT OF HINO PAK MOTORS.

Source: Pakistan Automobile Corporation.

App. Table 1-5 Production of Vehicles in Pakistan

Year	1973/74	74/75	75/76	76/77	77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85
Trucks	5402	6324	4179	3162	3273	4171	5089	2892	3076	3563	2883	2797
Buses	2798	2802	1983	1037	520	1176	1930	513	285	737	624	619
LCV's	1603	2623	2112	1927	1395	8347	5763	8818	11170	11532	11718	12458
4 X 4	1160	2480	2694	2199	1620	1220	1619	1687	1526	2101	2160	1715
Tractors	632	2796	5766	6941	8238	5260	11719	10464	13381	13894	13456	13949
M/C	4223	6191	7475	5631	6015	9489	8866	12002	11257	N/A	7124	7343
Cars (800cc)										4120	9267	13146
Total	15818	23276	24109	20897	20961	25163	34986	36371	40697	35947	47232	52027

LCV - Light Commercial Vehicles, 4x4 - Four Wheel Drive Vehicles Produced vehicles are marketed mostly, but partly into stock/inventory.

Source: Transport Statistics 1984 VOL. II

App. Table 1-6 Imports of Motor Vehicles

Years	1973/74	74/75	75/76	76/77	77/78	78/79	79/80	80/81	81/82	82/83	83/84
Trucks [1]	966	1117	3136	7509	7356	11990	19002	18409	24419	36818	13844
Buses [2]	6089	3530	3306	2823	1468	1545	4030	1930	3030	757	2554
4 X 4	1479	1306	1798	1587	1148	970	1422	1951	1476	2133	1859
M/C	9738	11674	21103	1048	30496	43989	58941	62883	74954	65946	50298
Cars [3]	2355	10715	3857	11174	11848	23074	12095	14255	19848	17003	43370
Tractors Agri.	5865	7633	8895	17771	15095	18056	25597	15796	-	-	-
Others	5978	14163	10588	13776	18653	20579	16879	15929	6840	8564	10758
Total	32470	50138	52683	85688	86064	120203	137966	130353	130567	131221	122683

Notes: 1) Including chassis, special trucks, and road tractors and vans
2) Buses including trolley buses and chassis
3) Cars and Car chassis

Source: Transport Statistics 1984 Vol. 2.

App. Table 1-7 Sales of Motor Vehicles in Pakistan

Year	1973/74	74/75	75/76	76/77	77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85
Trucks	4929	6322	3837	3525	3277	4301	4696	2688	3719	3256	3149	2734
Buses	2445	1901	2438	953	805	1320	1138	777	627	593	701	658
LCV's	2399	5109	8142	12027	7733	5914	9564	8216	7744	7281	7337	10084
4 X 4	1158	2295	2734	2136	1681	1095	1555	1513	1868	2193	2233	1925
Tractors	2255	5730	9578	12030	15156	12671	12046	16537	16774	20597	13215	14072
M/C	3994	5187	7389	5757	5768	5198	7990	12876	10806	10074	7476	9822
Cars	1679	9651	1025	2807	3372	707	261	-		3984	9239	12874
Total	18859	36195	35143	39335	37792	31206	37250	42607	41538	47978	43350	52169

Source: Transport Statistics 1984 VOL. 2.

App. Table 1-8 Vehicle·Km in Pakistan between 1980 and 1985 (Total)

No.	Vehicle Type	Average Load (Passenger)	Annual Average Kms	1980			1981			1982			1983			1984			1985		
				No. of Vehicle	Vehicle-Km per Year (Million)	Pass.-Km per Year (Million)	No. of Vehicle	Vehicle-Km per Year (Million)	Pass.-Km per Year (Million)	No. of Vehicle	Vehicle-Km per Year (Million)	Pass.-Km per Year (Million)	No. of Vehicle	Vehicle-Km per Year (Million)	Pass.-Km per Year (Million)	No. of Vehicle	Vehicle-Km per Year (Million)	Pass.-Km per Year (Million)	No. of Vehicle	Vehicle-Km per Year (Million)	Pass.-Km per Year (Million)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
I.	PASSENGER TRAFFIC(MPK)																				
A.	Bus																				
	01. Busses	43.7	65,000	20,439.0	1,328.5	58,057.0	21,716.0	1,411.5	61,684.3	21,590.0	1,403.4	61,326.4	23,550.0	1,530.8	66,895.8	25,115.0	1,632.5	71,339.2	26,789.0	1,741.3	76,094.2
	02. Mini Busses	18.0	55,000	5,109.0	281.0	5,057.9	5,428.0	298.5	5,373.7	5,397.0	296.8	5,343.0	5,750.0	316.3	5,692.5	6,278.0	345.3	6,215.2	6,697.0	368.3	6,630.0
B.	Motor Car																				
	03. Wagon	12.0	50,000	14,695.0	734.8	8,817.0	15,149.0	757.5	9,089.4	16,622.0	831.1	9,973.2	19,168.0	958.4	11,500.8	20,308.0	1,015.4	12,184.8	22,340.0	1,117.0	13,404.0
	04. Pickup	8.0	25,000	11,552.0	288.8	2,310.4	15,351.0	383.8	3,070.2	18,634.0	465.9	3,726.8	19,880.0	497.0	3,976.0	16,348.0	408.7	3,269.6	12,021.0	300.5	2,404.2
	05. Taxi	3.0	30,000	16,819.0	504.6	1,513.7	17,699.0	531.0	1,592.9	19,245.0	577.4	1,732.1	20,364.0	610.9	1,832.8	21,436.0	643.1	1,929.2	22,508.0	675.2	2,025.7
	06. Car	3.0	14,000	152,467.0	2,134.5	6,403.6	157,181.0	2,200.5	6,601.6	172,460.0	2,414.4	7,243.3	189,213.0	2,649.0	7,946.9	210,707.0	2,949.9	8,849.7	231,788.0	3,245.0	9,735.1
	07. Jeep	3.0	14,000	16,532.0	231.4	694.3	17,043.0	238.6	715.8	18,780.0	261.8	785.4	20,082.0	281.1	843.4	22,847.0	319.9	959.6	25,133.0	351.9	1,055.6
C.	Others																				
	08. Rickshaw	2.0	30,000	32,226.0	966.8	1,933.6	34,001.0	1,020.0	2,040.1	34,682.0	1,040.5	2,080.9	36,521.0	1,095.6	2,191.3	38,459.0	1,153.8	2,307.5	40,398.0	1,211.9	2,423.9
	09. Motorcycle	1.0	10,000	289,328.0	2,893.3	2,893.3	328,346.0	3,283.5	3,283.5	370,189.0	3,701.9	3,701.9	418,684.0	4,186.8	4,186.8	495,495.0	4,955.0	4,955.0	519,959.0	5,199.6	5,199.6
	Total(Passenger Traffic)			559,167.0	9,363.7	87,680.8	611,914.0	10,124.9	93,451.5	677,519.0	10,993.1	95,913.0	753,212.0	12,125.9	105,064.3	856,993.0	13,423.4	112,009.8	907,633.0	14,210.8	118,972.3

No.	Vehicle Type	Average Load (Cargo.Ton)	Annual Average Kms	No. of Vehicle	Vehicle-Km per Year (Million)	ton-Km per Year (Million)	No. of Vehicle	Vehicle-Km per Year (Million)	ton-Km per Year (Million)	No. of Vehicle	Vehicle-Km per Year (Million)	ton-Km per Year (Million)	No. of Vehicle	Vehicle-Km per Year (Million)	ton-Km per Year (Million)	No. of Vehicle	Vehicle-Km per Year (Million)	ton-Km per Year (Million)	No. of Vehicle	Vehicle-Km per Year (Million)	ton-Km per Year (Million)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
B.	FREIGHT TRAFFIC(MTK)																				
10	Conventional Trucks	5.68	75,000	35,070.0	2,630.3	14,939.8	37,394.0	2,804.6	15,929.8	40,803.0	3,060.2	17,382.1	43,066.0	3,230.0	18,346.1	48,128.0	3,609.6	20,502.5	52,376.0	3,928.2	22,312.2
11	Truck Trailers	16.00	65,000	1,271.0	82.6	1,321.8	1,356.0	88.1	1,410.2	1,479.0	96.1	1,538.2	1,473.0	95.7	1,531.9	1,279.0	83.1	1,330.2	1,899.0	123.4	1,975.0
12	Delivery Vans	0.50	40,000	8,300.0	332.0	166.0	10,069.0	402.8	201.4	11,996.0	479.8	239.9	13,134.0	525.4	262.7	15,448.0	617.9	309.0	17,762.0	710.5	355.2
	Total(Freight Traffic)			44,641.0	3,044.9	16,427.7	48,819.0	3,295.5	17,541.5	54,278.0	3,636.2	19,160.2	57,673.0	3,851.1	20,140.7	64,855.0	4,310.7	22,141.6	72,037.0	4,762.1	24,642.4
	Grand Total			603,808.0	12,408.6		660,733.0	13,420.4		731,797.0	14,629.3		810,885.0	15,977.0		921,848.0	17,734.1		979,670.0	18,972.9	

App. Table 1-9 Traffic Growth Rate between 1980/81 and 1985/86 (Panjub) (1)

Road No.	Provincial No.	Serial No.	Node No.	1980/81 Motor Cycles	Cars	Buses	Trucks	Others	Total	1985/86 Motor Cycles	Cars	Buses	Trucks	Others	Total	Annual Growth Rate (%) Motor Cycles	Cars	Buses	Trucks	Others	Total
5	1	1	150- 27	183	359	352	2,752	111	3,757	118	223	235	4,934		5,510	-8.40%	-9.08%	-7.76%	12.39%		7.96%
5	1	2	27- 79																		
5	1	3	79- 80																		
5	1	4	80- 25	366	363	319	1,508	65	2,621	352	583	400	4,630		5,965	-0.78%	9.94%	4.63%	25.15%		17.88%
5	1	5	25-121	187	281	396	1,479	56	2,399	230	500	407	4,007		5,144	4.23%	12.22%	0.55%	22.06%		16.48%
5	1	6	121- 23	424	447	595	1,539	104	3,109	820	927	575	1,156		3,478	14.10%	15.71%	-0.68%	-5.56%		2.27%
5	1	7	23- 75	151	422	740	1,633	69	3,015	213	1,359	668	943	20	3,203	7.12%	26.35%	-2.03%	-10.40%	-21.94%	1.22%
5	1	8	75-119	189	333	526	922	45	2,015	498	339	275	1,305		2,417	21.38%	0.36%	-12.16%	7.20%		3.71%
5	1	9	119- 72	301	333	603	954	109	2,300	436	949	578	1,632	32	3,627	7.69%	23.30%	-0.84%	11.34%	-21.74%	9.54%
5	1	10	72- 24	115	305	566	908	60	1,954	301	829	608	1,422	18	3,178	21.22%	22.14%	1.44%	9.39%	-21.40%	10.22%
5	1	11	24- 71	268	601	652	1,491	128	3,140	342	1,404	631	1,547	17	3,941	5.00%	18.49%	-0.65%	0.74%	-33.22%	4.65%
5	1	12	71- 17	245	888	862	2,178	290	4,463	415	1,899	734	2,074	103	5,223	11.01%	16.42%	-3.16%	-0.97%	-18.70%	3.19%
5	1	13	17- 19	679	3,752	1,973	1,869	89	8,362	1,333	9,569	2,145	2,248	21	15,316	14.44%	20.59%	1.69%	3.76%	-25.09%	12.87%
5	1	14	19- 61	683	2,610	1,156	2,143	79	6,671	2,051	5,820	1,230	1,862	57	11,020	24.60%	17.40%	1.25%	-2.77%	-6.32%	10.56%
5	1	15	61- 12	175	1,484	1,296	2,038	50	5,043	355	4,385	1,515	3,765	14	10,034	15.20%	24.20%	3.17%	13.06%	-22.48%	14.75%
5	1	16	11-204	547	1,649	903	2,159	20	5,278	424	2,658	1,400	3,086		7,568	-4.97%	10.02%	9.17%	7.41%		7.47%
5	1	111	204- 12																		
5	1	17	11- 93	307	2,179	1,008	2,239	15	5,748	137	3,082	956	3,306	4	7,485	-14.90%	7.18%	-1.05%	8.11%	-23.23%	5.42%
5	1	18	93- 57	121	2,145	1,047	2,011	16	5,340	85	2,999	857	3,028	7	6,956	-6.82%	6.93%	-4.38%	8.53%	-15.24%	5.43%
5	1	19	57- 10																		
5	1	20	10-117	175	3,152	1,352	3,307	17	8,003	496	7,067	1,576	5,368	16	14,523	23.17%	17.52%	3.11%	10.17%	-1.21%	12.66%
5	1	21	117- 55	206	2,515	2,372	1,065	24	6,182	479	5,012	1,134	4,231	45	10,901	18.38%	14.79%	-13.72%	31.77%	13.40%	12.01%
5	1	22	55- 9	35	1,021	477	1,210	4	2,747	729	3,888	1,077	3,133	65	8,892	83.54%	30.66%	17.69%	20.96%	74.65%	26.48%
Subtotal for Route No.5				5,357	24,839	17,195	33,405	1,351	82,147	9,812	53,492	16,981	53,677	419	134,381	12.87%	16.58%	-0.25%	9.95%	-20.88%	10.34%
35	1	23	55-152																		
Subtotal for Route No.35				0	0	0	0	0	0	0	0	0	0	0	0						
0	1	24	10-155	80	1,418	256	258		2,012	91	2,035	240	319		2,685	2.61%	7.49%	-1.28%	4.34%		5.94%
0	1	26	156- 95																		
0	1	27	95-14	145	307	183	335	36	1,006	470	664	163	472		1,769	26.52%	16.68%	-2.29%	7.10%		11.95%
0	1	28	157- 95																		
0	1	29	158- 68	2	95	94	180	4	375	29	207	130	205		571	70.72%	16.86%	6.70%	2.64%		8.77%
0	1	30	68- 56	21	129	116	141	2	409	82	549	160	253		1,044	31.32%	33.60%	6.64%	12.40%		20.61%
0	1	31	56-117	28	425	270	353	2	1,078	104	981	359	658		2,102	30.01%	18.21%	5.86%	13.26%		14.29%
Subtotal for Route No.0				276	2,374	919	1,267	44	4,880	776	4,436	1,052	1,907	0	8,171	22.97%	13.32%	2.74%	8.52%		10.86%
55	1	32	159- 21	207	84	111	126	30	558	280	149	123	277		829	6.23%	12.15%	2.07%	17.06%		8.24%
55	1	33	21- 74	115	120	203	460	35	933	417	185	157	232		991	29.39%	9.04%	-5.01%	-12.79%		1.21%
55	1	34	74-160	14	37	122	216	5	394	157	149	102	153		561	62.16%	32.13%	-3.52%	-6.66%		7.32%
Subtotal for Route No.55				336	241	436	802	70	1,885	854	483	382	662	0	2,381	20.51%	14.92%	-2.61%	-3.76%		4.78%

App. Table 1-9 Traffic Growth Rate between 1980/81 and 1985/86 (Panjub) (2)

Road No.	Provincial No.	Serial No.	Node No.	1980/81 Motor Cycles	Cars	Buses	Trucks	Others	Total	1985/86 Motor Cycles	Cars	Buses	Trucks	Others	Total	Annual Growth Rate (%) Motor Cycles	Cars	Buses	Trucks	Others	Total
0	1	35	17- 18	1,034	2,272	1,145	1,618	116	6,185	567	2,108	728	846		4,249	-11.32%	-1.49%	-8.66%	-12.16%		-7.23%
0	1	36	18- 15	218	749	889	565	30	2,451	434	1,390	1,324	865		4,013	14.76%	13.16%	8.29%	8.89%		10.36%
0	1	37	15- 16	610	579	617	829	216	2,851	618	870	826	1,257		3,571	0.26%	8.48%	6.01%	8.68%		4.61%
0	1	38	16- 66	35	160	375	623	19	1,212	78	417	445	773		1,713	17.38%	21.12%	3.48%	4.41%		7.16%
0	1	39	66- 65	6	36	83	65	10	200	28	93	98	171		390	36.08%	20.90%	3.38%	21.34%		14.29%
0	1	40	65-213	17	49	189	75	27	357	32	150	182	162		526	13.49%	25.08%	-0.75%	16.65%		8.06%
0	1	134	212-213																		
0	1	122	161-212																		
0	1	42	97- 21	143	121	59	652		975	88	70	25	645		828	-9.25%	-10.37%	-15.78%	-0.22%		-3.22%
0	1	43	79- 22	63	121	199	1,414	13	1,810	412	520	276	760		1,968	45.58%	33.86%	6.76%	-11.68%		1.69%
0	1	44	22-191	26	50	54	192	3	325	101	117	97	375		690	31.18%	18.53%	12.43%	14.33%		16.25%
0	1	45	191- 66	18	23	45	318	4	408	59	78	53	319		509	26.80%	27.67%	3.33%	0.06%		4.52%
0	1	46	66- 62	54	150	144	97	50	495	198	249	143	223		813	29.67%	10.67%	-0.14%	18.12%		10.43%
0	1	47	62- 60	88	170	207	378	52	895	245	388	282	798		1,713	22.73%	17.94%	6.38%	16.12%		13.86%
0	1	48	60- 92	80	219	119	132	11	561	399	717	177	341		1,634	37.90%	26.77%	8.26%	20.90%		23.84%
0	1	49	92- 57	49	511	214	204	10	988	136	1,250	291	380		2,057	22.65%	19.59%	6.34%	13.25%		15.80%
0	1	50	17- 50	1,770	1,540	530	705	332	4,877	4,284	4,254	563	1,054		10,155	19.34%	22.53%	1.22%	8.38%		15.80%
0	1	51	21- 85	18	97	69	159	4	347	121	493	148	674		1,436	46.39%	38.43%	16.49%	33.49%		32.85%
0	1	52	85- 22	51	127	290	376	10	854	157	580	267	750		1,754	25.22%	35.50%	-1.64%	14.81%		15.48%
0	1	53	22- 23	126	404	696	1,082	11	2,319	369	1,351	667	1,142		3,529	23.97%	27.31%	-0.85%	1.09%		8.76%
0	1	54	75- 16	14	129	255	790	15	1,203	171	432	272	1,597		2,472	64.96%	27.34%	1.30%	15.12%		15.49%
0	1	55	16- 13	297	430	283	295	90	1,395	761	775	390	395		2,321	20.71%	12.50%	6.62%	6.01%		10.72%
0	1	56	13-208																		
0	1	112	208-207																		
0	1	113	207-206																		
0	1	114	206- 12																		
0	1	57	18- 63	334	760	482	1,073	67	2,716	945	1,588	675	1,479		4,687	23.12%	15.88%	6.97%	6.63%		11.53%
0	1	58	13-209	384	308	265	278	215	1,450	750	582	222	379		1,933	14.33%	13.57%	-3.48%	6.39%		5.92%
0	1	118	209- 63																		
0	1	59	13- 62	83	384	692	628	40	1,827	319	924	737	1,276		3,256	30.90%	19.20%	1.27%	15.23%		12.25%
0	1	60	14-210	43	144	208	229	38	662	142	397	193	316		1,048	26.99%	22.49%	-1.49%	6.65%		9.62%
0	1	119	210- 62																		
0	1	61	18- 19	300	344	549	795	365	2,353	390	745	606	1,440		3,181	5.39%	16.71%	2.00%	12.62%		6.22%
0	1	62	19- 20	456	839	608	432	157	2,492	702	1,541	930	636		3,809	9.01%	12.93%	8.87%	8.04%		8.86%
0	1	63	20- 61	305	271	398	286	52	1,312	925	573	165	149		1,812	24.84%	16.15%	-16.15%	-12.23%		6.67%
0	1	64	15-215	186	185	484	178	45	1,078	1,199	1,036	563	570		3,368	45.16%	41.14%	3.07%	26.21%		25.59%
0	1	127	215- 17																		
0	1	65	25- 78	73	105	137	140	22	477	347	289	186	194		1,016	36.58%	22.45%	6.31%	6.74%		16.33%
0	1	66	78- 26	133	103	283	195	39	753	316	328	318	270		1,232	18.90%	26.07%	2.36%	6.72%		10.35%
0	1	67	26- 76	31	67	49	13	8	168	88	105	63	52		308	23.20%	9.40%	5.15%	31.95%		12.89%
0	1	68	76- 24	418	250	327	281	42	1,318	1,134	670	306	610		2,720	22.09%	21.79%	-1.32%	16.77%		15.59%
0	1	69	67- 15	737	453	814	735	106	2,845	1,642	1,177	1,047	1,452		5,318	17.58%	21.04%	5.16%	14.59%		13.33%
0	1	70	15- 64	163	432	518	1,234	47	2,394	2,131	1,979	718	2,002		6,830	67.22%	35.58%	6.75%	10.16%		23.33%
0	1	71	64- 13	84	567	705	1,444	59	2,859	545	1,221	803	3,056		5,625	45.35%	16.58%	2.64%	16.18%		14.49%
0	1	72	27- 60	260	180	138	163	85	826	838	645	221	595		2,299	26.37%	29.08%	9.86%	29.56%		22.72%
Subtotal 2 for Route No.0				8,707	13,329	13,119	18,673	2,410	56,238	21,671	30,102	15,007	28,003	0	94,783	20.01%	17.70%	2.73%	8.44%		11.00%

App. Table 1-9 Traffic Growth Rate between 1980/81 and 1985/86 (Panjub) (3)

Road No.	Provincial No.	Serial No.	Node No.	1980/81 Motor Cycles	Cars	Buses	Trucks	Others	Total	1985/86 Motor Cycles	Cars	Buses	Trucks	Others	Total	Annual Growth Rate (%) Motor Cycles	Cars	Buses	Trucks	Others	Total
0	1	73	26- 73	73	70	164	96	54	457	218	209	226	235		888	24.46%	24.45%	6.62%	19.61%		14.21%
0	1	74	69- 71	287	155	289	296	88	1,115	1,175	653	431	743		3,002	32.57%	33.33%	8.32%	20.21%		21.91%
0	1	75	77- 78	27	58	217	115	14	431	89	193	265	253		800	26.94%	27.18%	4.08%	17.08%		13.17%
0	1	76	119-120																		
0	1	77	120-121																		
0	1	78	25-120	401	347	493	603	38	1,882	1,105	859	573	568		3,105	22.47%	19.88%	3.05%	-1.19%		10.53%
0	1	79	120- 77	88	141	309	339	37	914	213	407	280	462		1,362	19.34%	23.62%	-1.95%	6.39%		8.30%
0	1	80	77- 98	143	193	466	335	63	1,200	315	457	435	458		1,665	17.11%	18.82%	-1.37%	6.45%		6.77%
0	1	81	98- 76	312	173	356	273	122	1,236	863	430	388	471		2,152	22.57%	19.97%	1.74%	11.52%		11.73%
0	1	82	76-216																		
0	1	131	216- 73	128	94	179	119	61	581	301	222	192	299		1,014	18.65%	18.75%	1.41%	20.23%		11.78%
0	1	83	73- 69																		
0	1	84	69- 17	142	109	199	170	52	672	341	235	173	403		1,152	19.15%	16.61%	-2.76%	18.84%		11.38%
0	1	85	67- 70	138	173	566	289	42	1,208	440	289	507	464		1,700	26.10%	10.81%	-2.18%	9.93%		7.07%
0	1	86	98- 72	289	155	308	256	82	1,090	683	295	280	414		1,672	18.77%	13.74%	-1.89%	10.09%		8.93%
0	1	87	72- 70	73	134	521	254	28	1,010	378	329	551	504		1,762	38.94%	19.68%	1.13%	14.69%		11.77%
0	1	88	70- 16	282	263	205	265	92	1,107	546	390	173	529		1,638	14.13%	8.20%	-3.34%	14.83%		8.15%
0	1	89	16- 64	166	165	156	655	70	1,212	202	281	187	1,301		1,971	4.00%	11.24%	3.69%	14.71%		10.21%
0	1	90	64- 63	128	399	355	1,178	49	2,109	363	641	392	1,501		2,897	23.18%	9.95%	2.00%	4.97%		6.56%
0	1	91	63- 19	86	81	186	228	85	666	364	157	137	293		951	33.45%	14.15%	-5.93%	5.14%		7.38%
0	1	92	22-100	11	57	131	373	3	575	75	107	130	491		803	46.80%	13.42%	-0.15%	5.65%		6.91%
0	1	93	100- 65	49	64	189	496	20	818	185	249	196	662		1,292	30.44%	31.22%	0.73%	5.94%		9.57%
0	1	94	65-211	3	24	12	432	29	500	39	123	156	560		878	67.03%	38.66%	67.03%	5.33%		11.92%
0	1	121	211- 14																		
0	1	95	14- 58	57	185	113	437	4	794	661	635	140	670		2,106	63.25%	28.25%	4.38%	8.92%		21.54%
0	1	96	60- 58	30	134	66	136	6	372	167	424	98	290		979	40.97%	25.91%	8.23%	16.35%		21.35%
0	1	97	58- 68	383	457	165	492	63	1,560	47	273	38	177		535	-34.27%	-9.79%	-25.45%	-18.49%		-19.27%
0	1	98	68- 9		73	34	56	1	164	225	798	27	235		1,285		61.34%	-4.51%	33.22%		50.94%
0	1	99	58- 56	27	244	147	416	8	842	136	1,249	230	872		2,487	38.18%	38.62%	9.37%	15.95%		24.19%
0	1	100	93- 92	31	152	115	151	3	452	148	426	117	182		873	36.70%	22.89%	0.35%	3.81%		14.07%
0	1	101	92- 58	99	325	110	148	14	696	499	908	155	328		1,890	38.20%	22.81%	7.10%	17.25%		22.12%
0	1	102	16- 67	212	82	99	81	50	524	468	216	138	266		1,088	17.16%	21.37%	6.87%	26.85%		15.73%
0	1	103	67- 71	51	93	218	154	12	528	99	265	224	312		900	14.19%	23.30%	0.54%	15.17%		11.26%
0	1	104	74- 99	33	109	164	512	11	829	55	107	129	290		581	10.76%	-0.37%	-4.69%	-10.75%		-6.86%
0	1	105	99-214																		
0	1	126	214-100	32	22	100	192	14	360	95	67	109	122		393	24.31%	24.95%	1.74%	-8.67%		1.77%
0	1	106	100-101	39	19	25	148	12	243	152	84	32	147		415	31.27%	34.62%	5.06%	-0.14%		11.30%
0	1	107	65- 99	41	134	233	421	7	836	99	191	165	727		1,182	19.28%	7.35%	-6.67%	11.55%		7.17%
Subtotal 3 for Route No.0				3,861	4,882	6,890	10,116	1,234	26,983	10,746	12,169	7,274	15,229	0	45,418	22.72%	20.04%	1.09%	8.53%		10.98%

App. Table 1-9 Traffic Growth Rate between 1980/81 and 1985/86 (Panjub) (4)

Road No.	Provincial No.	Serial No.	Node No.	1980/1981 Motor Cycles	Cars	Buses	Trucks	Others	Total	1985/1986 Motor Cycles	Cars	Buses	Trucks	Others	Total	Annual Growth Rate (%) Motor Cycles	Cars	Buses	Trucks	Others	Total
Subtotal for Route No.5				5,504	25,079	17,491	37,891	1,499	97,032	10,205	60,316	19,216	59,766	448	149,951	13.14%	19.19%	1.90%	9.54%	-21.46%	9.10%
Subtotal for Route No.35																					
Subtotal for Route No.55				336	241	436	802	70	1,885	854	483	382	662	0	2,381	20.51%	14.92%	-2.61%	-3.76%		4.78%
Subtotal 1 for Route No.0				276	2,374	919	1,267	44	4,880	861	4,790	1,140	2,298	0	9,089	25.55%	15.07%	4.40%	12.65%		13.25%
Subtotal 2 for Route No.0				8,872	13,500	13,432	19,079	2,452	63,789	23,899	33,706	16,863	31,260	0	105,728	21.92%	20.08%	4.65%	10.38%		10.63%
Subtotal 3 for Route No.0				3,861	4,882	6,890	10,116	2,246	28,537	12,005	13,650	8,512	21,081	0	55,248	25.47%	22.83%	4.32%	15.82%		14.13%
Subtotal for Route No.0				13,009	20,756	21,241	30,462	4,742	97,206	36,765	52,146	26,515	54,639	0	170,065	23.09%	20.23%	4.54%	12.40%		11.84%
Grand total of Province Panjub				18,849	46,076	39,168	69,155	6,311	196,123	47,824	112,945	46,113	115,067	448	322,397	20.47%	19.64%	3.32%	10.72%	-41.08%	10.45%

App. Table 1-9 Traffic Growth Rate between 1980/81 and 1985/86 (Sind) (5)

Link Number				1980/81						1985/86						Annual Growth Rate (%)					
Road No.	Provincial No.	Serial No.	Node No.	Motor Cycles	Cars	Buses	Trucks	Others	Total	Motor Cycles	Cars	Buses	Trucks	Others	Total	Motor Cycles	Cars	Buses	Trucks	Others	Total
5	2	1	39-118	153	1,915	692	5,351		8,111	77	2,410	619	6,149	5	9,260	-12.83%	4.71%	-2.20%	2.82%		2.69%
5	2	2	118- 33																		
5	2	3	33- 87	311	1,478	404	3,130		5,323	188	1,153	383	3,691	30	5,445	-9.58%	-4.85%	-1.06%	3.35%		0.45%
5	2	4	87- 86	352	1,371	293	2,771		4,787	175	1,248	387	3,661	51	5,522	-13.04%	-1.86%	5.72%	5.73%		2.90%
5	2	5	86-102	452	466	190	3,416		4,524	605	858	307	3,876	38	5,684	6.00%	12.98%	10.07%	2.56%		4.67%
5	2	6	102- 32	440	1,433	318	2,886		5,077	336	706	205	3,610	28	4,885	-5.25%	-13.20%	-8.41%	4.58%		-0.77%
5	2	7	32- 29	149	1,160	412	3,434		5,155	510	1,031	310	5,951		7,802	27.90%	-2.33%	-5.53%	11.62%		8.64%
5	2	8	29- 82	58	217	212	2,910	46	3,443	839	1,124	313	4,527		6,803	70.63%	38.95%	8.10%	9.24%		14.59%
5	2	9	82-150																		
Subtotal for Route No.5				1,915	8,040	2,521	23,898	46	36,420	2,730	8,530	2,524	31,465	152	45,401	7.35%	1.19%	0.02%	5.66%	27.00%	4.51%
25	2	10	39-151																		
Subtotal for Route No.25																					
65	2	11	29- 28	382	475	143	742		1,742	262	1,754	394	1,300	46	3,756	-7.26%	29.86%	22.47%	11.87%		16.61%
65	2	12	28- 83	329	403	176	939		1,847	68	643	153	654	12	1,530	-27.04%	9.79%	-2.76%	-6.98%		-3.70%
65	2	13	83-154	122	342	182	1,077		1,723	247	710	262	839	28	2,086	15.15%	15.73%	7.56%	-4.87%		3.90%
Subtotal for Route No.65				833	1,220	501	2,758	0	5,312	577	3,107	809	2,793	86	7,372	-7.08%	20.56%	10.06%	0.25%		6.77%
55	2	14	118-34	12	270	69	971		1,322	27	320	126	1,312		1,785	17.61%	3.46%	12.80%	6.20%		6.19%
55	2	15	34- 30																		
55	2	16	30- 28																		
55	2	17	28- 84	286	383	83	783		1,535	406	799	164	1,789		3,158	7.26%	15.84%	14.59%	17.97%		15.52%
55	2	18	84- 81	90	124	75	606		895	187	320	123	814		1,444	15.75%	20.88%	10.40%	6.08%		10.04%
55	2	19	81-159																		
Subtotal for Route No.55				388	777	227	2,360	0	3,752	620	1,439	413	3,915	0	6,387	9.83%	13.12%	12.72%	10.65%		11.23%
0	2	24	37- 33	248	570	126	728		1,672	81	443	369	1,394		2,287	-20.05%	-4.92%	23.97%	13.87%		6.46%
0	2	33	109- 37	143	249	69	399		860	103	185	175	428		891	-6.35%	-5.77%	20.46%	1.41%		0.71%
0	2	34	33-107																		
0	2	35	107- 88																		
Subtotal 1 for Route No.0				391	819	195	1,127	0	2,532	184	628	544	1,822	0	3,178	-13.99%	-5.17%	22.78%	10.08%		4.65%
0	2	41	107-109	121	220	88	293		722	93	183	106	295		677	-5.13%	-3.62%	3.79%	0.14%		-1.28%
Subtotal 2 for Route No.0				121	220	88	293	0	722	93	183	106	295	0	677	-5.13%	-3.62%	3.79%	0.14%		-1.28%
Subtotal for Route No.0				512	1,039	283	1,420	0	3,254	277	811	650	2,117	0	3,855	-11.56%	-4.83%	18.09%	8.31%		3.45%
Grand-total for Province Sind				3,648	11,076	3,532	30,436	46	48,738	4,204	13,887	4,396	40,290	238	63,015	2.88%	4.62%	4.47%	5.77%	38.92%	5.27%

App. Table 1-9 Traffic Growth Rate between 1980/81 and 1985/86 (NWFP) (6)

Link Number				1980/81						1985/86						Annual Growth Rate (%)					
Road No.	Provincial No.	Serial No.	Node No.	Motor Cycles	Cars	Buses	Trucks	Others	Total	Motor Cycles	Cars	Buses	Trucks	Others	Total	Motor Cycles	Cars	Buses	Trucks	Others	Total
5	3	1	9-116	14	1,184	863	844		2,905	13	1,979	607	2,137	9	4,745	-1.47%	10.82%	-6.80%	20.42%		10.31%
5	3	2	116- 53																		
5	3	3	53- 2	785	2,062	1,148	1,114		5,109	466	5,004	1,204	1,771	52	8,499	-9.83%	19.40%	0.96%	9.72%		10.71%
5	3	4	2-201	4	397	216	222		839		961	5	180	1	1,147		19.34%	-52.91%	-4.11%		6.45%
Subtotal for Route No.5				803	3,643	2,227	2,180		8,853	481	7,944	1,816	4,088	62	14,391	-9.74%	16.87%	-4.00%	13.40%		10.20%
35	3	5	152- 90	259	3	142	264		1,158	79	2,825	483	1,071	21	4,479	-21.14%	293.35%	27.74%	32.32%		31.07%
35	3	6	90- 4	205	2,116	563	713		3,597	166	3,138	463	806	7	4,580	-4.13%	8.20%	-3.84%	2.48%		4.95%
35	3	7	4- 54	201	669	432	431		1,733	116	2,990	306	573	15	4,000	-10.41%	34.91%	-6.66%	5.86%		18.21%
35	3	8	54- 89		165	33	121		319	23	557	32	122		734		27.55%	-0.61%	0.16%		18.14%
35	3	9	89- 47		13	10	126		149		115	16	143		274		54.65%	9.86%	2.56%		12.96%
Subtotal for Route No.35				665	2,966	1,180	1,655		6,956	384	9,625	1,300	2,715	43	14,067	-10.40%	26.55%	1.96%	10.41%		15.12%
50	3	10	5-153	1	8	9	9		27												
Subtotal for Route No.50				1	8	9	9		27												
0	3	11	155- 4	145	643	360	407		1,555	20	219	33	53		325	-32.71%	-19.38%	-37.99%	-33.48%		-26.88%
0	3	12	59-156	5	40	56	197		298	65	441	30	318		854	67.03%	61.61%	-11.74%	10.05%		23.44%
0	3	13	94-157																		
0	3	14	5-202	99	355	329	187		970	12	1,008	113	184		1,317	-34.43%	23.21%	-19.24%	-0.32%		6.31%
0	3	15	3-158	496	1,438	185	306		2,425	56	1,283	245	511		2,095	-35.35%	-2.26%	5.78%	10.80%		-2.88%
Subtotal 1 for Route No.0				745	2,476	930	1,097		5,248	153	2,951	421	1,066		4,591	-27.14%	3.57%	-14.66%	-0.57%		-2.64%
55	3	16	160- 5		2	9	29		40	114	327	151	360		952		177.14%	75.77%	65.49%		88.50%
55	3	17	5- 59	76	163	167	257		663	92	644	153	717		1,606	3.90%	31.63%	-1.74%	22.78%		19.36%
55	3	18	59- 6	56	543	396	358	57	1,410	136	862	268	694		1,960	19.42%	9.68%	-7.51%	14.16%		6.81%
55	3	19	6- 94																		
55	3	20	94- 3																		
55	3	21	3- 2	1,418	2,270	1,002	1,029		5,719	768	1,558	1,212	1,345		4,883	-11.54%	-7.25%	3.88%	5.50%		-3.11%
Subtotal for Route No.55				1,550	2,978	1,574	1,673	57	7,832	1,110	3,391	1,784	3,116		9,401	-6.46%	2.63%	2.54%	13.25%		3.72%

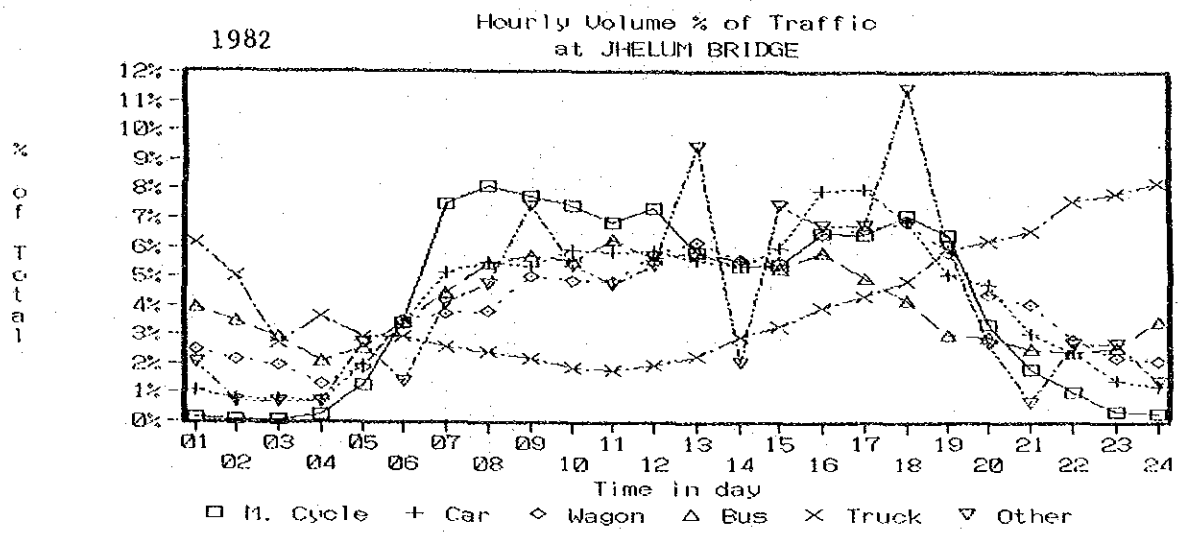
App. Table 1-9 Traffic Growth Rate between 1980/81 and 1985/86 (NWFP) (7)

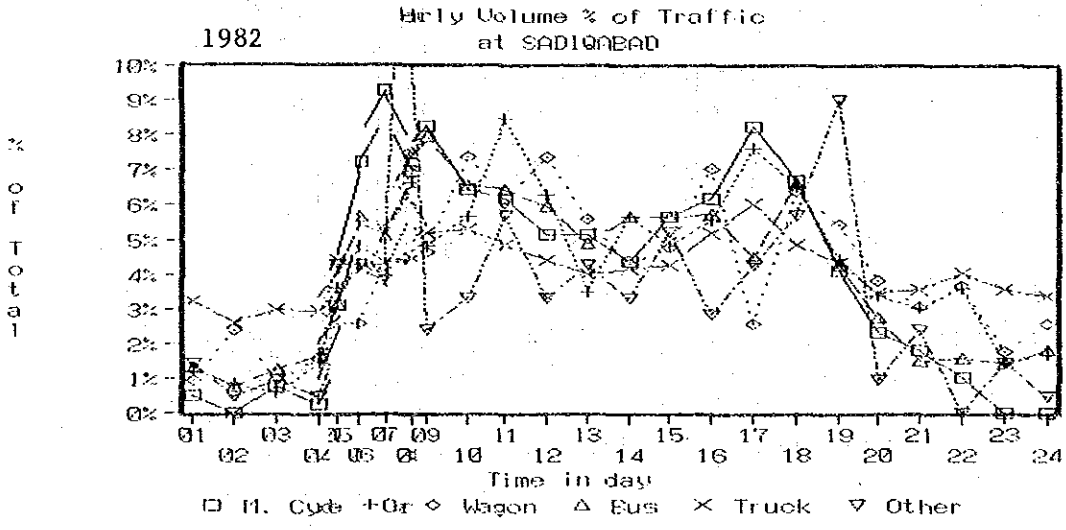
Link Number				1980/81						1985/86						Annual Growth Rate (%)					
Road No.	Provincial No.	Serial No.	Node No.	Motor Cycles	Cars	Buses	Trucks	Others	Total	Motor Cycles	Cars	Buses	Trucks	Others	Total	Motor Cycles	Cars	Buses	Trucks	Others	Total
0	3	22	161- 5	1,964	505	248	469		3,186	84	190	29	61		364	-46.76%	-17.76%	-34.90%	-33.50%		-35.20%
0	3	23	53- 1	933	1,091	764	746		3,534	261	1,612	845	1,156		3,874	-22.49%	8.12%	2.04%	9.16%		1.85%
0	3	24	1- 52	254	1,229	574	681		2,738	182	1,656	768	889		3,495	-6.45%	6.15%	6.00%	5.48%		5.00%
0	3	25	52-230																		
0	3	26	2- 91	305	1,368	920	814		3,407	877	5,589	1,033	864		8,363	23.52%	32.51%	2.34%	1.20%		19.67%
0	3	27	91- 1																		
0	3	28	1-115	471	985	404	359		2,217	948	2,223	512	782		4,465	15.02%	17.73%	4.85%	16.85%		15.03%
0	3	29	115- 90	88	405	66	101	60	720	100	648	54	405		1,207	2.59%	9.86%	-3.93%	32.02%		10.89%
0	3	30	52- 8																		
0	3	31	8- 89																		
0	3	32	116-115	80	614	290	269		1,253	111	879	222	436		1,648	6.77%	7.44%	-5.20%	10.14%		5.63%
0	3	33	2- 1																		
Subtotal 2 for Route No.0				4,095	6,195	3,266	3,439	60	17,055	2,563	12,797	3,463	4,593		23,416	-8.95%	15.61%	1.18%	5.96%		6.54%
Subtotal for Route No.0				4,840	8,671	4,196	4,536	60	22,303	2,716	15,748	3,884	5,659		28,007	-10.91%	12.68%	-1.53%	4.52%		4.66%
Grand total for Province NWFP				7,859	18,266	9,186	10,053	117	45,971	4,691	36,708	8,784	15,578	105	65,866	-9.81%	14.98%	-0.89%	9.15%	-2.14%	7.46%

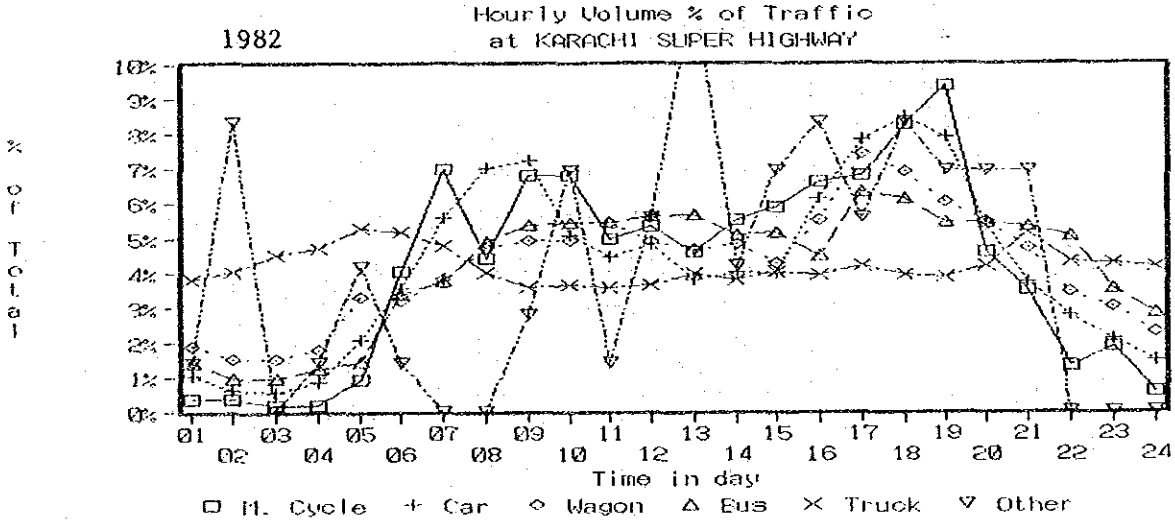
App. Table 1-9 Traffic Growth Rate between 1980/81 and 1985/86 (Baluchistan) (8)

Link Number				1980/81						1985/86						Annual Growth Rate (%)					
Road No.	Provincial No.	Serial No.	Node No.	Motor Cycles	Cars	Buses	Trucks	Others	Total	Motor Cycles	Cars	Buses	Trucks	Others	Total	Motor Cycles	Cars	Buses	Trucks	Others	Total
65	4	9	154- 45	87	360	184	601		1,232	158	320	145	712	5	1,340	12.68%	-2.33%	-4.65%	3.45%		1.69%
65	4	10	45- 40	10	157	31	595		793	200	393	51	720	11	1,375	82.06%	20.14%	10.47%	3.89%		11.64%
Subtotal for Route No.65				97	517	215	1,196		2,025	358	713	196	1,432	16	2,715	29.84%	6.64%	-1.83%	3.67%		6.04%
0	4	11	40-218	11	24	4	22		61	58	46	12	75		191	39.45%	13.90%	24.57%	27.80%		25.64%
0	4	27	218- 41																		
0	4	12	41- 97		12	12	286	10	320	85	43	29	313		470		29.08%	19.30%	1.82%		7.99%
Subtotal 1 for Route No.0				11	36	16	308	10	381	143	89	41	388		661	67.03%	19.84%	20.71%	4.73%		11.65%
Grand total for Province Baluchistan				108	553	231	1,504	10	2,406	501	802	237	1,820	16	3,376	35.92%	7.72%	0.51%	3.89%	9.86%	7.01%

App. Fig. 1-1 Hourly Variation







From App. Table 1-10

App. Table 1-10 Distribution of Hourly Traffic Volume

Jhelum Bridge

Time	Motor[1] Cycle	Cars[2]	Wagons[3]	Buses	Trucks	Others
01	0.12%	1.08%	2.49%	3.94%	6.17%	2.03%
02	0.04%	0.77%	2.14%	3.44%	4.98%	0.68%
03	0.06%	0.77%	1.96%	2.93%	2.69%	0.68%
04	0.20%	0.71%	1.29%	2.08%	3.63%	0.68%
05	1.22%	1.95%	1.88%	2.53%	2.90%	2.70%
06	3.40%	3.36%	3.48%	3.40%	2.93%	1.35%
07	7.47%	5.12%	3.74%	4.44%	2.58%	4.05%
08	8.12%	5.48%	3.81%	5.46%	2.37%	4.73%
09	7.75%	5.38%	5.02%	5.72%	2.15%	7.43%
10	7.44%	5.94%	4.86%	5.53%	1.84%	5.41%
11	6.85%	5.85%	4.83%	6.30%	1.78%	4.73%
12	7.35%	5.89%	5.80%	5.61%	1.94%	5.41%
13	5.86%	5.59%	6.21%	5.90%	2.24%	9.46%
14	5.36%	5.35%	5.58%	5.55%	2.92%	2.03%
15	5.42%	5.96%	5.47%	5.29%	3.26%	7.43%
16	6.50%	7.97%	6.46%	5.84%	3.95%	6.76%
17	6.45%	8.01%	6.66%	4.97%	4.33%	6.76%
18	7.12%	6.92%	6.89%	4.22%	4.87%	11.49%
19	6.46%	5.08%	5.85%	2.99%	5.93%	6.08%
20	3.36%	4.75%	4.40%	2.93%	6.22%	2.70%
21	1.83%	3.04%	4.05%	2.53%	6.61%	0.68%
22	1.02%	2.40%	2.83%	2.37%	7.60%	2.70%
23	0.33%	1.42%	2.22%	2.59%	7.88%	2.70%
24	0.28%	1.21%	2.09%	3.45%	8.23%	1.35%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Note: 1) including scooters and rickshaws
2) including jeeps and taxis
3) including mini buses and pickups

Sadigabad

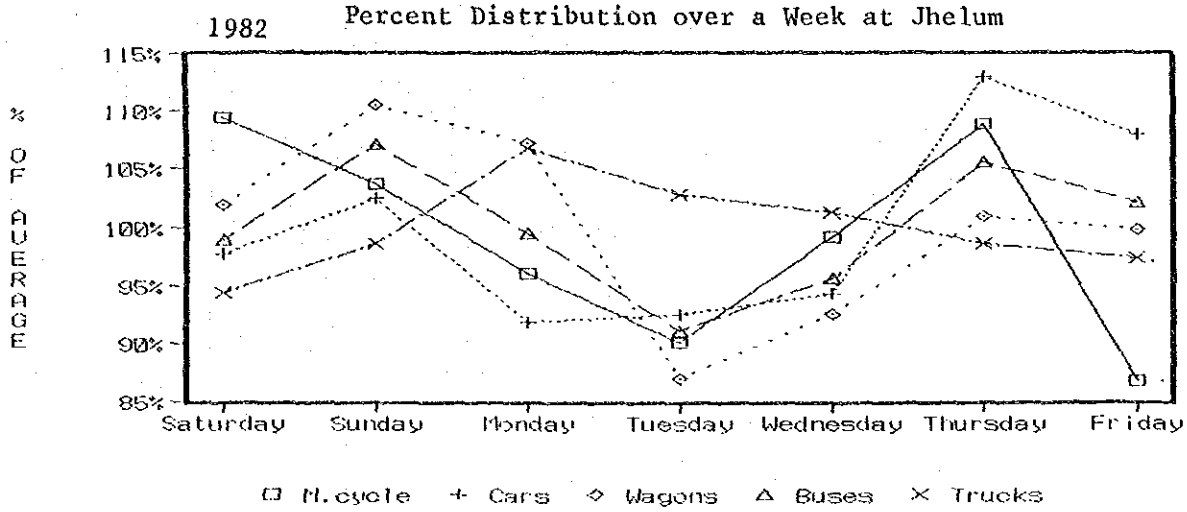
Time	Motor Cycle	Cars	Wagons	Buses	Trucks	Others
01	0.52%	1.21%	0.96%	1.32%	3.26%	1.43%
02	0.00%	0.85%	2.41%	0.76%	2.62%	0.48%
03	0.78%	0.61%	0.96%	1.25%	2.97%	0.95%
04	0.26%	1.45%	1.61%	1.66%	2.95%	0.48%
05	3.10%	3.63%	2.57%	3.12%	4.41%	4.29%
06	7.24%	4.84%	2.57%	5.68%	4.17%	4.29%
07	9.30%	4.00%	5.30%	5.13%	4.33%	3.81%
08	6.98%	6.66%	6.90%	7.48%	4.46%	29.52%
09	8.27%	4.84%	4.65%	7.97%	5.19%	2.38%
10	6.46%	5.69%	7.38%	6.58%	5.33%	3.33%
11	6.20%	8.47%	6.10%	6.44%	4.85%	5.71%
12	5.17%	6.30%	7.38%	5.96%	4.43%	3.33%
13	5.17%	3.51%	5.62%	4.92%	4.02%	4.29%
14	4.39%	5.69%	4.33%	5.68%	4.17%	3.33%
15	5.68%	4.84%	4.82%	5.68%	4.29%	5.24%
16	6.20%	5.57%	7.06%	5.75%	5.20%	2.86%
17	8.27%	7.63%	2.57%	4.50%	6.05%	4.29%
18	6.72%	6.54%	6.42%	6.65%	4.86%	5.71%
19	4.13%	4.48%	5.46%	4.30%	4.36%	9.05%
20	2.33%	3.39%	3.85%	2.77%	3.46%	0.95%
21	1.81%	3.03%	3.05%	1.52%	3.59%	2.38%
22	1.03%	3.63%	3.69%	1.59%	4.07%	0.00%
23	0.00%	1.45%	1.77%	1.46%	3.56%	1.43%
24	0.00%	1.69%	2.57%	1.80%	3.39%	0.48%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

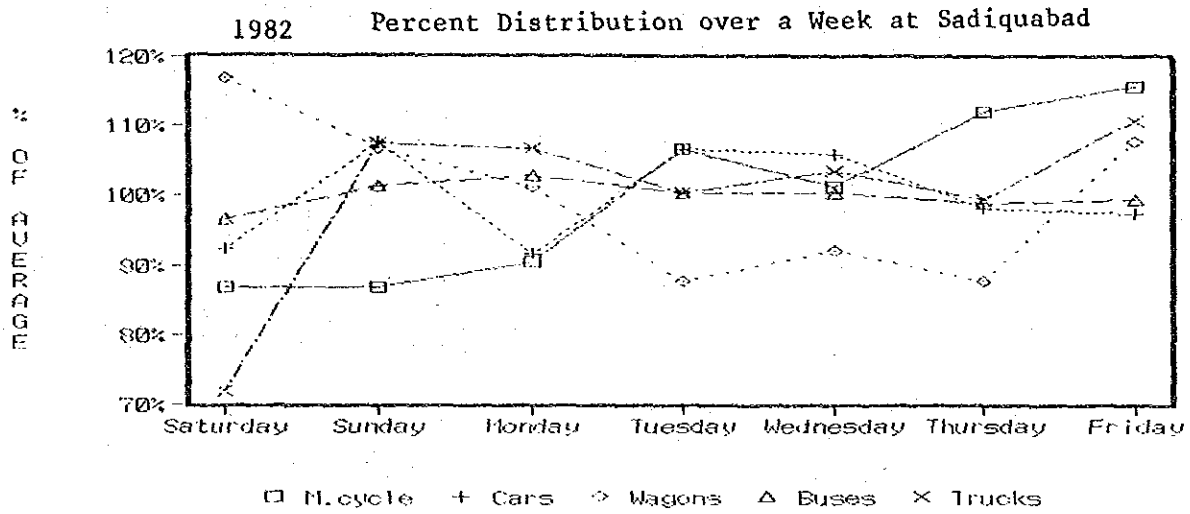
Karachi Super Highway

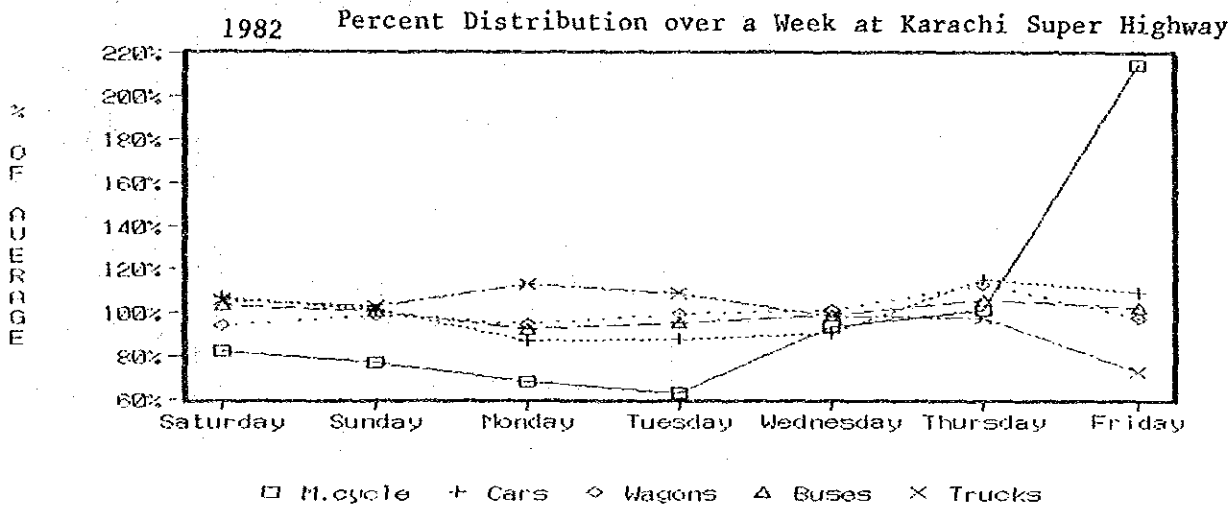
Time	Motor Cycle	Cars	Wagons	Buses	Trucks	Others
01	0.37%	1.03%	1.87%	1.39%	3.79%	1.39%
02	0.37%	0.62%	1.52%	0.96%	4.04%	8.33%
03	0.18%	0.54%	1.52%	0.96%	4.51%	0.00%
04	0.18%	0.87%	1.78%	1.21%	4.68%	1.39%
05	0.92%	2.08%	3.30%	1.44%	5.28%	4.17%
06	4.04%	3.55%	3.18%	3.34%	5.18%	1.39%
07	6.97%	5.59%	3.79%	3.72%	4.75%	0.00%
08	4.40%	7.00%	4.70%	4.88%	3.99%	0.00%
09	6.79%	7.23%	4.90%	5.36%	3.53%	2.78%
10	6.79%	5.05%	4.90%	5.41%	3.62%	6.94%
11	4.95%	4.42%	5.42%	5.41%	3.53%	1.39%
12	5.32%	4.80%	4.87%	5.59%	3.62%	5.56%
13	3.49%	3.76%	4.64%	5.64%	3.96%	12.50%
14	5.50%	3.98%	4.78%	5.06%	3.75%	4.17%
15	5.87%	3.93%	4.26%	5.14%	3.97%	6.94%
16	6.61%	6.12%	5.48%	4.48%	3.93%	8.33%
17	6.79%	7.83%	7.41%	6.30%	4.16%	5.56%
18	8.26%	8.48%	6.91%	6.12%	3.92%	8.33%
19	9.36%	7.89%	6.01%	5.44%	3.84%	6.94%
20	4.59%	5.34%	5.45%	5.44%	4.19%	6.94%
21	3.49%	3.70%	4.70%	5.31%	5.12%	6.94%
22	1.28%	2.71%	3.38%	5.04%	4.28%	0.00%
23	1.83%	2.08%	3.00%	3.52%	4.24%	0.00%
24	0.55%	1.42%	2.25%	2.81%	4.15%	0.00%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Note: Duration of the Survey
Jhelum : from 15 May '82 to 21 May '82
Sadiqabad : from 23 May '82 to 29 May '82
Karachi Super Highway: from 31 May '82 to 7 June '82

App. Fig. 1-2 Weekday Variation







From App. Table 1-11

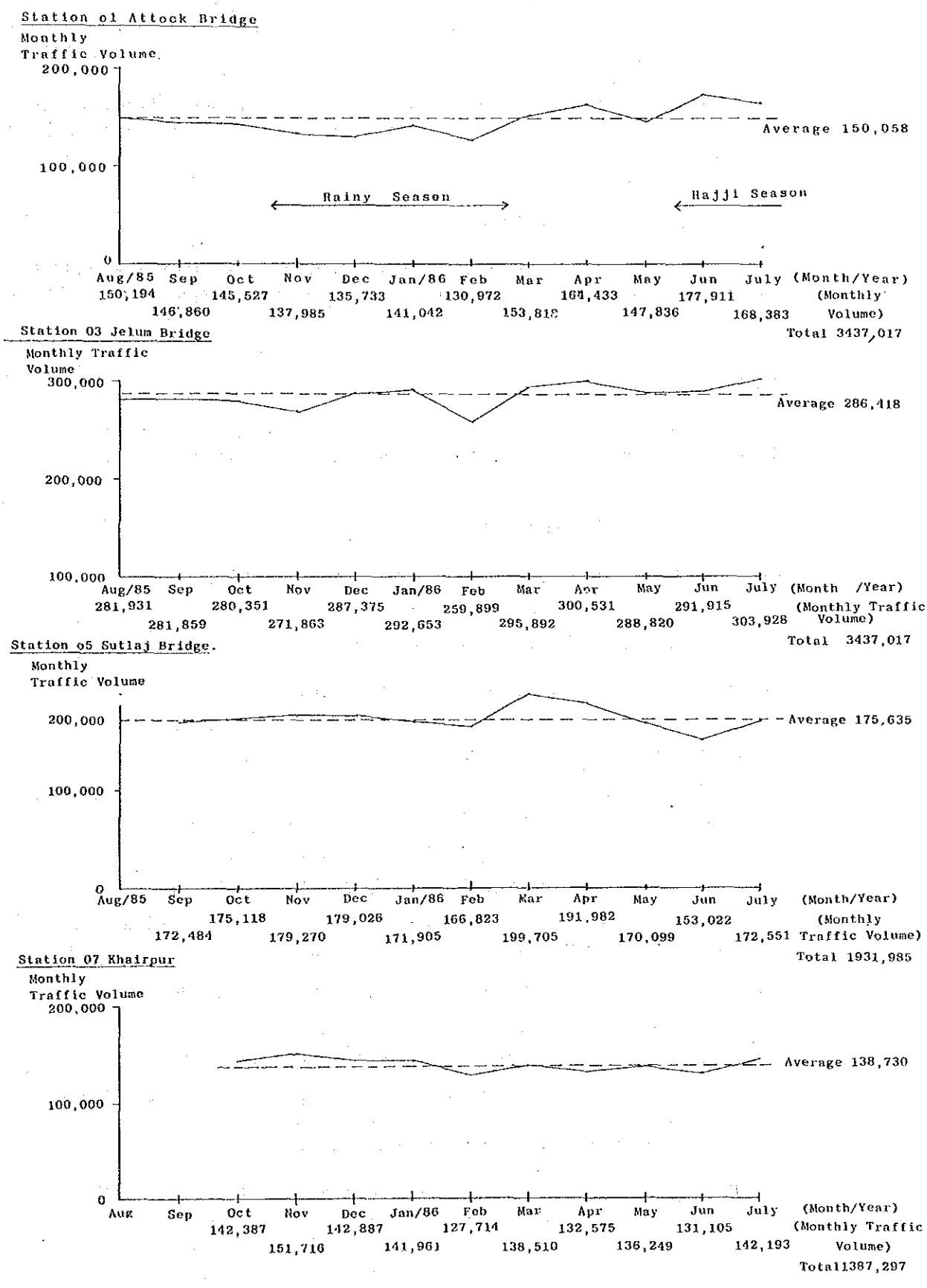
App. Table 1-11 Variation According to Day of the Week

Location	Day	M.cycle	(%)	Cars	(%)	Wagons	(%)	Buses	(%)	Trucks	(%)	Others	(%)	Total	
	Saturday	1307	109.45%	1324	97.71%	884	101.94%	978	98.92%	2414	94.46%	26	122.97%	6938	99.94%
	Sunday	1238	103.67%	1389	102.51%	959	110.59%	1059	107.11%	2521	98.65%	24	113.51%	7195	102.98%
	Monday	1147	96.05%	1245	91.88%	930	107.25%	984	99.52%	2729	106.79%	22	104.05%	7062	101.07%
Jhelum	Tuesday	1076	90.11%	1254	92.55%	754	86.95%	901	91.13%	2628	102.83%	17	80.41%	6635	94.96%
Bridge	Wednesday	1184	99.15%	1278	94.32%	802	92.49%	945	95.58%	2589	101.31%	25	118.24%	6828	97.72%
	Thursday	1301	108.95%	1531	112.99%	875	100.91%	1044	105.59%	2520	98.61%	21	99.32%	7297	104.44%
	Friday	1106	86.82%	1464	108.04%	866	99.87%	1010	102.15%	2488	97.36%	13	61.49%	6952	99.45%
	Average	1194	100.00%	1355	100.00%	867	100.00%	989	100.00%	2556	100.00%	21	100.00%	6987	100.00%
	Saturday	48	86.82%	109	92.37%	104	116.85%	199	96.53%	1901	71.77%	15	50.00%	2381	75.54%
	Sunday	48	86.82%	127	107.63%	95	106.74%	209	101.39%	2845	107.40%	35	116.67%	3364	106.73%
	Monday	50	90.44%	108	91.53%	90	101.12%	212	102.84%	2827	106.73%	28	93.33%	3320	105.33%
Sadiqabad	Tuesday	59	106.72%	126	106.78%	78	87.64%	207	100.42%	2659	100.38%	70	233.33%	3204	101.65%
	Wednesday	56	101.29%	125	105.93%	82	92.13%	207	100.42%	2744	103.59%	19	63.33%	3238	102.73%
	Thursday	62	112.14%	116	98.31%	78	87.64%	204	98.96%	2634	99.44%	23	76.67%	3122	99.05%
	Friday	64	115.76%	115	97.46%	96	107.87%	205	99.45%	2932	110.69%	20	66.67%	3437	109.04%
	Average	55	100.00%	118	100.00%	89	100.00%	206	100.00%	2649	100.00%	30	100.00%	3152	100.00%
	Saturday	64	82.20%	1045	107.31%	463	94.52%	584	103.44%	5688	105.84%	6	58.33%	7855	104.79%
	Sunday	60	77.06%	988	101.45%	485	99.01%	568	100.61%	5528	102.86%	6	58.33%	7640	101.92%
	Monday	53	68.07%	849	87.18%	465	94.93%	523	92.64%	6075	113.04%	13	126.39%	7983	106.50%
Karachi	Tuesday	49	62.94%	856	87.90%	488	99.62%	538	95.29%	5861	109.06%	7	68.06%	7804	104.11%
Super	Wednesday	73	93.76%	886	90.98%	497	101.46%	560	99.19%	5274	98.13%	20	194.44%	7315	97.59%
Highway	Thursday	79	101.47%	1127	115.73%	553	112.89%	599	106.10%	5270	98.06%	17	165.28%	7650	102.05%
	Friday	167	214.50%	1066	109.46%	478	97.58%	580	102.73%	3924	73.01%	3	29.17%	6224	83.03%
	Average	78	100.00%	974	100.00%	490	100.00%	565	100.00%	5374	100.00%	10	100.00%	7496	100.00%
	Saturday	473	106.88%	826	101.26%	484	100.41%	587	100.07%	3334	94.55%	16	78.32%	5725	97.38%
	Sunday	449	101.45%	835	102.36%	513	106.43%	612	104.34%	3631	102.97%	22	107.69%	6067	103.20%
	Monday	417	94.22%	734	89.98%	495	102.70%	573	97.69%	3877	109.95%	21	102.80%	6122	104.13%
Average	Tuesday	395	89.25%	745	91.33%	440	91.29%	549	93.59%	3716	105.38%	31	151.75%	5881	100.03%
	Wednesday	438	98.97%	763	93.54%	460	95.44%	571	97.35%	3536	100.28%	21	102.80%	5794	98.55%
	Thursday	480	108.46%	925	113.40%	502	104.15%	616	105.02%	3475	98.55%	20	97.90%	6023	102.45%
	Friday	446	100.77%	882	108.13%	480	99.59%	598	101.95%	3115	88.34%	12	58.74%	5538	94.42%
	Average	443	100.00%	816	100.00%	482	100.00%	587	100.00%	3526	100.00%	20	100.00%	5879	100.00%

Note: Duration of the Survey

Jhelum from 15 May '82 to 21 May '82
Sadiqabad from 23 May '82 to 29 May '82
Karachi Super Highway from 31 May '82 to June '82

App. Fig. 1-3 Seasonal Traffic Variation in Terms of Mixed Traffic



Source: NTRC Automatic Traffic count data

Appendix Vehicle Operation Cost

(1) Vehicle Types

As shown in Table 1, eight types are determined and when necessary two types of bus and truck-trailer are further divided into public and private.

(2) Prices of Vehicle and Component

As shown in Table 2, prices of vehicle and component are studied. Import duties and sales tax are in Table 3 and tax components in Table 4.

(3) Fuel Consumption

Comparative table of fuel consumption is shown in Table 5. NTRC-54 is used with some breakdown figures in this study.

(4) Average Annual Mileage and Speed

Average annual mileage by speed is shown in Table 6.

(5) Vehicle Operating Costs Equation Models

Model formulas and parameters are shown below:

A. Equation of Fuel Consumption on Level Tangent Road

Motor Cycle	$Y = 0.0077381\ S^2 - 0.582143S + 29.4048$
Sedan	$Y = 0.0280952\ S^2 - 2.18571\ S + 107.333$
Pick-up	$Y = 0.0227381\ S^2 - 2.26071\ S + 129.119$
Jeep, Wagon	$Y = (0.0227381\ S^2 - 2.26071\ S + 129.119) \times 1.25$
Mini Bus	$Y = (0.0785714\ S^2 - 6.94288\ S + 353.286) \times 0.5$
Bus	$Y = 0.0785714\ S^2 - 6.94286\ S + 353.286$
Truck 2-Axle	$Y = 0.22643\ S^2 - 26.6673\ S + 980.375$
Truck 3-Axle	$Y = (0.22643\ S^2 - 26.6673\ S + 980.375) \times 1.2$
Truck Trailer	$Y = (0.22643\ S^2 - 26.6673\ S + 980.375) \times 1.5$

Source: NTRC-54 Fuel Consumption Study

where, Y = Volume of fuel consumption, as liter per 1000 km
S = Running speed (km/hr)

Table 1 Characteristics of Representative Vehicles

Specifications	Passenger Traffic							Freight Traffic			
	Motor Cycle	Sedan	Jeep	Pick-up	Wagon	Mini-Bus	Bus	2 Axle Truck	3 Axle Truck	Truck Trailer	
	Suzuki 100	Toyota Corolla 1300	Toyota Land Cruiser LJ70RV-KR	Toyota Hilux	Toyota Hiace LH-51RB-QR	Mazda T3500	(Hino AK176KA)	(Hino FF173)	Hino FL176KA	Hino HE345E	
										Truck	Trailer
Length (m)	1.915	4.185	4.060	4.730	4.725	5.879	11.105	7.560		5.320	12.610
Width (m)	0.735	1.635	1.690	1.620	1.690	1.995	2.490	2.385	2.385	2.490	2.490
Hight (m)	1.025	1.385	1.915	1.945	1.945	2.000	3.040	2.565	2.565	2.980	1.600
Number of Axles	2	2	2	2	2	2	2	2	3	4	
Number of Wheels	2	4	4	4	4	6	6	6	10	14	
Tyre Size	3.00	615-13 -6PR	750-16 -8PR	650-14 -6PR	650-14 -8PR	7.00-16	900-20 -14PR	1000-20 14PR	1000-20 14PR	1100-20 14PR	
Engine Capacity (cc)	98	1295	2,446	2,237	2,446	3,445	6443	6443	6443	13,267	
Gross Horse Power	12	71	79	70	79	90	165	165	165	270	
Loading Capacity	2	5	7	8	15	26	45 - 64	11	13.7	25	
Curb Weight		0.85	1.55	1.12	1.52	3.0	4.3	4.00	6.9	4.9 + 8.0	
Gross Vehicle Weight		1.10 (F 0.6, R 0.5)	2.21 (F 1.0, R 1.21)	2.48 (F 1.0, R 1.48)	2.75 (F 1.30, R 1.45)	5.64 (F 2.30, R 3.34)	14.0 (F 5.0, R 9.0)	15.0 (F 5, R 10)	20.6 (F 4.3, R 16.3)	37.9(5.0+9.5+23.3)	
Type of Fuel	Gasoline	Gasoline	Diesel	Diesel	*Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	
Vehicle Service Life	13	10	12	12	10	10	Private 11 Public 8	12	12	12	
Average Year Round Speed (km/hr)	40	50	45		45	45	50	40	40	40	
Annual Usage (km)	10,000	14,000	14,000	25,000	50,000	55,000	65,000	75,000	75,000	65,000	
Axle Equivalence Factor		-	0.0003	0.0005	0.0006	0.0208	1.6282	2.5504	2.2646	12.96	

Table 2 Summary of Vehicle Costs

(Unit: Rs)

Vehicle Group	Passenger Traffic							Freight Traffic		
	Motor Cycle	Sedan	Jeep	Pick-up	Wagon	Mini Bus	Bus	2-Axle	3-Axle	Truck Trailer
Financial Costs										
Vehicle (Less Tyres)	21,000	240,000	365,000	225,000	358,000	Mazda 375,000 Coaster 750,000	Hino 540,000 Aircon 950,000 Bedford 470,000	450,000	554,000	NLC: 657,000 900,000
Fuel/Liter	8.58	8.58	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85
Oil/Liter	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50
Tyre	140	550	2,000	2,000	1,300	1,700	2,750	4,000	4,000	4,500
Maintenance Labour/hr	10	10	10	10	10	10	10	10	10	10
Crew/hr					20	20	20	20	20	20
Interest %	25	25	25	25	25	25	Private: 25 Public: 16	25	25	Private: 25 NLC: 16
Passenger Time/hr	1.31	1.31	1.31	1.31	1.31	1.31	1.31			
Economic Costs										
Vehicle (Less Tyres)	8,800	88,800	186,000	114,750	218,000	Mazda 301,000 Coaster 410,000	Hino 513,000 Aircon 902,500 Bedford 446,500	349,000	426,000	657,000
Fuel/Liter	3.81	3.81	2.00	2.0	2.00	2.00	2.00	2.00	2.00	2.00
Oil/Liter	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50
Tyre	80	320	1,150	1,150	750	980	1,600	2,320	2,320	2,320
Maintenance Labour/hr	10	10	10	10	10	10	10	10	10	10
Crew/hr					20	20	20	20	20	20
Interest %	12	12	12	12	12	12	12	12	12	12
Passenger Time/hr	1.31	1.31	1.31	1.31	1.31	1.31	1.31			

Table 3 Rates of Import Duties and Sales Tax on Motor Vehicles and Parts by Federal Govt.

Percent of Value

No.	Item	Import Duty		Sales Tax	
		Old Rate	New Rate from May 1986	Old Rate	New Rate from May 1986
		%	%	%	%
1.	Motor Cycle	120	125	20	12.5
2.	Car 1300cc	120	150	30	12.5
3.	4 Wheel Drive				
	(Built up)	100	80	-	12.5
	(CKD)	30	30	-	-
4.	Light Commercial (Hiance)				
	(Built up)	60	80	20	12.5
	(CKD)	60	60	-	-
5.	Trucks & Buses				
	(Built up)	60	40(20)	-	12.5
	(CKD)	30	30(0)	-	-
6.	Truck Trailer (Road Trucker)	60	20	-	12.5
7.	Tyres	100	80	10	12.5
8.	Bodies				

Source: Customs Tariff and Trade Controls Eighth Edition 1986 - 87

1/ ( ) shows Import Duty on Large Size Buses

Table 4 Tax Component on Vehicles

	Vehicle Group	Motor Cycle	Sedan	Jeep/ pick-up	Wagon	Mini Bus	Bus	2-Axle Truck	3-Axle Truck	Truck Trailer
①	CIF	1.000	1.000	1.000	1.000	1,000	1.000	1.000	1.000	1.000
②	Fix Freight ①x 0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077
*③	Import Duty ②x Duty	1.346 (125%)	1.616 (150%)	0.862 (80%)	0.646 (60%)	0.323 (30%)	- (0%)	0.323 (30%)	0.323 (30%)	0.215 (30%)
*④	Sales Tax 12.5% (①+②+③) x Tax	0.303	0.337	0.242	-	-	-	-	-	0.162
*⑤	Surcharge 5% (①+②) x 5%	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053
*⑥	Iqra 5% (①+②) x 5%	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053
⑦	①+②+③+④+⑤+⑥	2.832	3.136	2.287	1.829	1.506	1.183	1.506	1.506	1.560
*⑧	Octroi 1.5% ⑦x 1.5%	0.043	0.047	0.034	0.028	0.023	0.018	0.023	0.023	0.023
⑨	Import Licence Fee ①x 2.5%	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
⑩	Others Warehouse, Undertaking, etc. ①x 20%	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
Total		3.100	3.408	2.546	2.081	1.754	1.426	1.754	1.754	1.808
Tax Component		1.798 (58%)	2,106 (63%)	1.244 (49%)	0.780 (39%)	0.542 (26%)	0.071 (5%)	0.452 (26%)	0.452 (26%)	0.508 (27%)
						Local Body 90,000	Local Body 125,000	Local Body 60,000	Local Body 60,000	300,000
Market Price		21,000	240,000	Jeep 365,000 Pick-up 225,000	358,000	Mazda 375,000 Causter 750,000	540,500	450,000	554,000	900,000
Economic Price		8,800	88,800	Jeep 186,150 Pick-up 114,750	218,380	Mazda 300,900 Causter 410,000	513,000	348,600	425,560	657,000

Source: Study Team

Table 5 Average Fuel Consumption by Type of Vehicle on Level Tangent Road

(Unit: liter/km)

Source	Vehicle Type	Speed km per hour							
		20	30	40	50	60	70	80	90
NTRC-54 Fuel Consumption Study 1981	Sedan Average		68	62	70	79	91	111	139 Petrol
	Mini Bus Toyota Hiace		101	98	102	108	115	124	137 Petrol
	Bus Bedford NJM		237	193	164	201	303	323	336 Diesel
	Truck Bedford CJQ		394	253	226	196	226	293	- Disel

Source	Vehicle Type	Speed km per hour						
		32	40	48	64	72	80	88
Vehicle User Cost Pakistan 1977 Ministry of Communication	Sedan	81	81	83	92	98	105	112
	Mini Bus	94	95	98	111	121	132	144
	Bus	213	215	224	247	263	281	302
	Truck	264	267	274	298	314	332	353

Source	Vehicle Type	Speed km per hour						
		32	40	48	64	72	80	88
Vehicle User Cost 1982 National Highway Board	Sedan	83	83	85	94	101	109	119
	Mini Bus	96	96	100	113	122	135	149
	Bus	216	218	226	252	271	295	323
	Truck	267	270	290	303	323	348	376

Source	Vehicle Type	Speed km per hour						
		30	40	50	60	70	80	90
NTRC-79 Vehicle Operating Costs 1985	Sedan Toyota	87	80	89	98	112	133	164
	Mini Bus Ford Transit	(84) 120	(75) 108	(67) 100	(75) 108	(86) 119	(98) 132	(106)* 141
	Bus Bedford	289	245	216	255	360	388	408
	Truck Bedford	445	304	278	250	282	460	

Source	Vehicle Type	Speed km per hour							
		20	30	40	50	60	70	80	90
TRRL 674 Kenya Study (National Highway Maintenance Study)	Sedan	87	81	81	84	89	96	104	114
	Bus	201	184	175	170	167	164	163	161
	2-Axle Truck	281	264	255	250	247	244	243	241
	3-Axle Truck	410	393	384	379	376	373	371	370
	4 - 6 Axle Truck	444	427	418	413	410	407	406	404

( ) NTRC Fuel Consumption Study

* are estimated on the basis of equation model of Kenya Study

Heavy Goods Vehicle and Buses: $FL = (-48.57 + 69.2\sqrt{GVW}) + 902.53/V + 0.0143V^2 - 2.396PW) \times 1.13$

Table 6 Average Annual Speed and Annual Usage

(Unit: km)

Year Round Average Speed (km/hr)	Passenger Traffic						Freight Traffic	
	Motor Cycle	Sedan/Jeep	Pick-up	Wagon	Mini Bus	Bus	(2-Axle) Tuck	(Multi Axle) Truck Trailer
10	2,500	2,800	5,555	11,111	12,222	13,000	18,750	16,250
20	5,000	5,600	11,111	22,222	24,444	26,000	37,500	32,500
30	7,500	8,400	16,666	33,333	34,666	39,000	56,250	48,750
40	(10,000)	11,200	22,222	44,441	48,888	52,000	(75,000)	(65,000)
(45)			(25,000)	(50,000)	(55,000)			
50	12,500	(14,000)	27,778	55,555	61,111	(65,000)	93,750	81,250
60	15,000	16,800	33,333	66,666	73,333	78,000	112,500	97,500
70	17,500	19,600	38,888	77,777	85,555	91,000	131,250	113,750
80	20,000	22,400	44,444	88,888	97,777	104,000	150,000	130,000
90	22,500	25,200	50,000	99,999	110,000	117,000	168,750	146,250

Fuel Consumption and Terrain (Rise and Fall)

	Flat	Hilly	Mountanious
Motor Cycle	1.00	1.03	1.10
Sedan	1.00	1.03	1.10
Jeep, Pick-up Wagon, Mini Bus	1.00	1.04	1.13
Bus	1.00	1.30	1.90
Truck 2-3 Axle	1.00	1.30	1.90
Truck Trailer	1.00	1.40	2.00

Source: Quantification of Road User Savings, Jan de Weille

Fuel Consumption and Road Condition

	Gravel	Earth
Motor Cycle Sedan, Jeep Pick-up, Wagon Mini Bus	1.2	1.4
Bus Trucks	1.3	1.6

Source: Quantification of Road User Savings, Jan de Weille

B. Equation of Engine Oil Consumption

Motor Cycle	$Y = 0.00008\ S^2 - 0.01312\ S + 1.47393$
Sedan, Jeep, Pick-up	$Y = 0.00036\ S^2 - 0.03897\ S + 2.14048$
Wagon	$Y = (0.00036\ S^2 - 0.03897\ S + 2.14048) \times 1.25$
Mini Bus	$Y = (0.00118\ S^2 - 0.13770\ S + 7.54073) \times 0.5$
Bus	$Y = 0.00118\ S^2 - 0.13770\ S + 7.54073$
Truck 2 Axle	$Y = 0.00131\ S^2 - 0.15257\ S + 8.30869$
Truck 3 Axle	$Y = (0.00131\ S^2 - 0.15257\ S + 8.30869) \times 1.2$
Truck Trailer	$Y = (0.00131\ S^2 - 0.15257\ S + 8.30869) \times 1.5$

where, Y = Volume of engine oil consumption, as liter per 1000 km

Source: Quantification of Road User Savings, Jan de Weille

C. Equation of Type Wear

Motor Cycle	$Y = (0.000464308\ S^2 + 0.0410687\ S + 0.250076) \times 0.25$
Sedan, Jeep, Pick-up	$Y = 0.000464308\ S^2 + 0.0410687\ S + 0.250076$
Wagon	$Y = 0.000892857\ S^2 + 0.0074999\ S + 1.22143$
Mini Bus	$Y = (0.00254759\ S^2 - 0.0728531\ S + 3.65227) \times 0.5$
Bus	$Y = 0.00254759\ S^2 - 0.0728531\ S + 3.65227$
Truck 2-Axle	$Y = 0.00254759\ S^2 - 0.0728531\ S + 3.65227$
Truck 3-Axle	$Y = (0.00254759\ S^2 - 0.0728531\ S + 3.65227) \times 1.7$
Truck Trailer	$Y = (0.00254759\ S^2 - 0.0728531\ S + 3.65227) \times 2.3$

Where: Total % of tyre wear of vehicle, equated as wear of one tyre, per 1000 km

Source: NTRC-79 Vehicle Operating Cost, Jan. 1985

Tyre Weat on Paved Road Condition

	Good	Fairly Good	Faire	Poor	Very Poor
	R=2500	3000	3500	5000 (Good Gravel)	7000 (Good Earth)
Motor Cycle Sedan, Jeep, Pick-up, Wagon Mini Bus	1.00	1.46	1.95	3.34	5.21
Bus, Truck	1.00	1.05	1.10	1.25	1.45

Source: TRRL 723 "Tables for Estimating Vehicle Operating Costs on Rural Roads in Developing Countries"

D. Equation of Maintenance Cost

1. Maintenance Cost on Parts

Motor Cycle	Y = 0.05	% per 1,000 km
Sedan, Jeep, Pick-up, Wagon	Y = 0.11	"
Mini Bus	Y = 0.17	"
Bus, Truck	Y = 0.18	"

Where: Y = Maintenance parts, equated as the % of depreciable value of the vehicle, per 1000 km

Source: NTRC-79 Vehicle Operating Cost

Maintenance Cost on Parts and Paved Road Condition

	Good	Fairly Good	Faire	Poor	Very Poor
	R=2500	3000	3500	5000 (Good Gravel)	7000 (Good Earth)
Motor Cycle Sedan, Pick-up, Jeep Wagon, Mini Bus	1.00	1.36	1.73	2.82	4.28
Bus	1.00	1.36	1.72	2.81	4.25
Truck	1.00	1.13	1.26	1.66	2.19

Source: TRRL 723 "Tables for Estimating Vehicle Operating Costs on Rural Roads in Developing Countries"

2. Maintenance Hours of Labour

Motor Cycle	Y = 2.0	hours per 1,000 km
Sedan Jeep, Pick-up	Y = 3.8	"
Wagon, Mini Bus	Y = 18.3	"
Bus, Truck	Y = 21.9	"

Source: NTRC 79

Maintenance Hours of Labour and Paved Road Condition

	Good	Fairly Good	Faire	Poor	Very Poor
	R=2500	3000	3500	5000 (Good Gravel)	7000 (Good Earth)
Motor Cycle Sedan Jeep, Pick-up, Wagon, Mini Bus	1.00	1.06	1.13	1.42	1.71
Bus	1.00	1.02	1.03	1.09	1.13
Truck	1.00	1.01	1.03	1.08	1.11

Source: TRRL 723

E. Equation of Depreciation

Motor Cycle $Y = \frac{1}{1.63\ S + 65}$

Sedan $Y = \frac{1}{1.40\ S + 70}$

Jeep $Y = \frac{1}{1.68\ S + 85}$

Pick-up $Y = \frac{1}{3.36\ S + 150}$

Wagon $Y = \frac{1}{5.50\ S + 275}$

Mini Bus $Y = \frac{1}{4.90\ S + 220}$

Bus

Private: $Y = \frac{1}{7.15\ S + 360}$

Public: $Y = \frac{1}{5.20\ S + 260}$

Trucks $Y = \frac{1}{11.25\ S + 450}$

Truck Trailer $Y = \frac{1}{9.75\ S + 390}$

Van $Y = \frac{1}{5.00\ S + 200}$

Where: Y = Depreciation as % per 1000 km, equated as the depreciable value of the vehicle.

Source: Quantification of Road User Savings, Jan de Weille P.61, Method of Calculation of Depreciation

F. Equation of Interest In Terms of Economic and Financial

	Economic	Financial	
		Public	Private
Motor Cycle	$Y = \frac{12 \times 0.5}{0.25\ S}$		$Y = \frac{25 \times 0.5}{0.25\ S}$
Sedan, Jeep	$Y = \frac{12 \times 0.5}{0.28\ S}$		$Y = \frac{25 \times 0.5}{0.28S}$

Pick-up	$Y = \frac{12 \times 0.5}{0.55\ S}$		$Y = \frac{25 \times 0.5}{0.55\ S}$
Wagon	$Y = \frac{12 \times 0.5}{1.22\ S}$		$Y = \frac{25 \times 0.5}{1.22\ S}$
Mini Bus	$Y = \frac{12 \times 0.5}{1.11\ S}$		$Y = \frac{25 \times 0.5}{1.11\ S}$
Bus	$Y = \frac{12 \times 0.5}{1.30\ S}$	$Y = \frac{16 \times 0.5}{1.30\ S}$	$Y = \frac{25 \times 0.5}{1.30\ S}$
Trucks	$Y = \frac{12 \times 0.5}{1.88\ S}$	$Y = \frac{16 \times 0.5}{1.88\ S}$	$Y = \frac{25 \times 0.5}{1.88\ S}$
Truck Trailer	$Y = \frac{12 \times 0.5}{1.62\ S}$	$Y = \frac{16 \times 0.5}{1.62\ S}$	$Y = \frac{25 \times 0.5}{1.62\ S}$

Where: Y = Interest as % per 1000 km, equated at the depreciable value of the vehicle

Social Discount Rate	12% p.a. ..... adopted
Interest	16% p.a. ..... adopted
Loan Within One Year	25% p.a. ..... adopted
Loan Over One Year	40% p.a.

G. Equation of Insurance

Motor Cycle	$Y = \frac{4.5}{0.25\ S} \times \alpha$
Sedan, Jeep	$Y = \frac{4.5}{0.28\ S} \times \alpha$
Pick-up	$Y = \frac{4.5}{0.55\ S} \times \alpha$
Wagon	$Y = \frac{2.2}{1.22\ S} \times \alpha$
Mini Bus	$Y = \frac{2.2}{1.11\ S} \times \alpha$
Bus	$Y = \frac{2.2}{1.30\ S} \times \alpha$
Truck	$Y = \frac{2.2}{1.88\ S} \times \alpha$
Truck Trailer	$Y = \frac{2.2}{1.62\ S} \times \alpha$

Where: Y = Insurance as % per 1000 km, equated as the new value of Vehicle, = Insured vehicle ratio of 10%

Insurance Rate: sedan 4.5% p.a., truck, bus 2.2% p.a.

H. Equation of Travelling Hours for Wage

Wagon, Mini Bus, Bus $Y = \frac{1000}{S}$

Truck $Y = \frac{1000}{S}$

Where, Y = Traveling hour per 1000 km

Average No. of crew per vehicle

Bus:	Driver 1	Conductor 1
Truck:	Driver 2	Assistant 1

I. Over Head

Wagon, Mini Bus	10% of above total			
Bus	Private: 10% "		Public:	2.5% of above total
Truck	Private: 10% "		NLC :	25.0% of above total

Source: Sub Working Group Report for Seventh Plan and NLC

(6) Results

The calculated results are summarized in Table 7 and 8. The detailed list of computer output is edited separately.

Table 7 VOC Summary

Financial VOC (Good Level)

Speed	Motor cycle	Sedan	Jeep	Pickup	Wagon	Mini bus	Air-Mini bus	Bus (Private)	Bus (Public)	Air-Bus (Private)	Air-Bus (Public)	Truck (2Axle)	Truck (3Axle)	Trailer (Private)	Trailer (NLC)
10	1,565	14,733	12,775	7,082	8,786	9,688	16,281	10,958	9,772	18,211	14,462	11,100	13,068	19,074	15,881
15	1,174	10,852	9,707	5,245	6,554	7,252	12,202	8,362	7,710	13,827	11,434	8,654	10,238	14,925	12,764
20	966	8,815	8,068	4,284	5,387	5,981	10,073	6,996	6,599	11,535	9,802	7,231	8,587	12,535	10,866
25	835	7,534	7,014	3,678	4,654	5,186	8,743	6,138	5,884	10,099	8,751	6,255	7,450	10,912	9,525
30	742	6,643	6,270	3,260	4,146	4,642	7,825	5,551	5,385	9,114	8,014	5,531	6,611	9,723	8,515
35	677	5,989	5,708	2,951	3,773	4,244	7,150	5,126	5,018	8,393	7,464	4,979	5,973	8,823	7,743
40	628	5,489	5,268	2,714	3,486	3,944	6,634	4,817	4,748	7,854	7,049	4,556	5,487	8,142	7,160
45	592	5,101	4,914	2,530	3,263	3,710	6,229	4,588	4,546	7,442	6,728	4,235	5,125	7,635	6,736
50	567	4,793	4,623	2,384	3,089	3,533	5,908	4,426	4,401	7,128	6,483	4,004	4,874	7,281	6,456
55	549	4,552	4,380	2,266	2,948	3,395	5,652	4,319	4,304	6,893	6,301	3,857	4,722	7,061	6,308
60	541	4,361	4,179	2,173	2,837	3,291	5,445	4,255	4,247	6,720	6,168	3,781	4,661	6,962	6,284
65	538	4,214	4,009	2,100	2,751	3,215	5,279	4,235	4,228	6,607	6,085	3,776	4,686	6,981	6,379
70	540	4,107	3,867	2,044	2,686	3,166	5,152	4,249	4,240	6,538	6,039	3,838	4,793	7,109	6,589
75	548	4,031	3,748	2,003	2,638	3,136	5,053	4,299	4,286	6,515	6,033	3,966	4,980	7,345	6,913
80	561	3,986	3,649	1,973	2,609	3,130	4,984	4,380	4,359	6,532	6,061	4,153	5,244	7,680	7,345
85	579	3,968	3,568	1,958	2,593	3,139	4,939	4,491	4,460	6,585	6,119	4,403	5,585	8,118	7,886
90	603	3,972	3,503	1,950	2,593	3,166	4,915	4,630	4,588	6,672	6,209	4,714	6,002	8,655	8,534

Table 8 SVC Summary

Economic VOC (Good level)

Speed	Motor cycle	Sedan	Jeep	Pickup	Wagon	Mini bus	Air-Mini bus	Bus (Private)	Bus (Public)	Air-Bus (Private)	Air-Bus (Public)	Truck (2Axle)	Truck (3Axle)	Trailer (Private)	Trailer (NLC)
10	452	3,484	4,346	2,294	4,969	6,136	7,350	7,508	8,057	11,888	11,898	6,920	7,910	10,649	12,101
15	363	2,730	3,515	1,807	3,753	4,697	5,667	5,870	6,377	9,390	9,506	5,446	6,278	8,527	9,690
20	313	2,313	3,043	1,540	3,114	3,941	4,780	4,998	5,471	8,056	8,209	4,596	5,328	7,290	8,284
25	280	2,043	2,728	1,368	2,712	3,465	4,217	4,450	4,892	7,209	7,373	4,018	4,679	6,438	7,316
30	256	1,849	2,494	1,244	2,431	3,133	3,826	4,066	4,482	6,613	6,775	3,594	4,201	5,809	6,601
35	240	1,704	2,312	1,150	2,225	2,890	3,534	3,788	4,181	6,174	6,330	3,271	3,837	5,327	6,054
40	228	1,592	2,165	1,078	2,068	2,704	3,311	3,579	3,951	5,838	5,984	3,022	3,559	4,962	5,639
45	220	1,507	2,047	1,023	1,943	2,558	3,134	3,423	3,774	5,577	5,712	2,833	3,353	4,689	5,329
50	214	1,441	1,949	978	1,845	2,444	2,995	3,306	3,640	5,371	5,495	2,695	3,209	4,494	5,106
55	210	1,391	1,864	942	1,769	2,355	2,884	3,225	3,539	5,214	5,325	2,606	3,120	4,369	4,965
60	210	1,357	1,796	917	1,705	2,286	2,795	3,168	3,467	5,093	5,191	2,553	3,076	4,311	4,899
65	211	1,334	1,738	897	1,657	2,234	2,727	3,138	3,419	5,006	5,090	2,542	3,086	4,314	4,902
70	216	1,323	1,692	885	1,619	2,196	2,674	3,131	3,395	4,948	5,017	2,569	3,137	4,376	4,973
75	223	1,320	1,653	877	1,593	2,173	2,636	3,142	3,390	4,913	4,968	2,630	3,233	4,490	5,103
80	230	1,330	1,623	876	1,574	2,158	2,610	3,172	3,404	4,903	4,945	2,726	3,372	4,661	5,296
85	241	1,346	1,599	879	1,564	2,156	2,598	3,220	3,437	4,915	4,942	2,852	3,550	4,885	5,551
90	253	1,373	1,582	887	1,562	2,165	2,595	3,286	3,485	4,946	4,958	3,015	3,770	5,159	5,863

App. Table 2-1 Base Case: Estimated Vehicle on Road by Regression Model

No.	Vehicle Type	Average Load (Passenger)	Annual Average Kms	1986 Total No. of Vehicle	1986 Total Vehicle-Km per Year (Million)	1986 Total Pass.-Km per Year (Million)	1986 Inter City No. of Vehicle	1986 Inter City Vehicle-Km per Year (Million)	1986 Inter City Pass.-Km per Year (Million)	1992 Total No. of Vehicle	1992 Total Vehicle-Km per Year (Million)	1992 Total Pass.-Km per Year (Million)	1992 Inter City No. of Vehicle	1992 Inter City Vehicle-Km per Year (Million)	1992 Inter City Pass.-Km per Year (Million)	2005 Total No. of Vehicle	2005 Total Vehicle-Km per Year (Million)	2005 Total Pass.-Km per Year (Million)	2005 Inter City No. of Vehicle	2005 Inter City Vehicle-Km per Year (Million)	2005 Inter City Pass.-Km per Year (Million)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
I.	PASSENGER TRAFFIC(MPK)																				
A.	Bus																				
01.	Busses	43.7	65,000	26,951.0	1,751.8	76,554.3	20,483.0	1,331.4	58,182.0	36,476.0	2,370.9	103,610.1	27,722.0	1,801.9	78,744.3	61,138.0	3,974.0	173,662.5	46,464.0	3,020.2	131,981.8
02.	Mini Busses	18.0	55,000	8,177.0	449.7	8,095.2	3,107.0	170.9	3,075.9	11,081.0	609.5	10,970.2	4,211.0	231.6	4,168.9	18,573.0	1,021.5	18,387.3	7,058.0	388.2	6,987.4
B.	Motor Car																				
03.	Wagon	12.0	50,000	22,053.0	1,102.7	13,231.8	19,627.0	981.4	11,776.2	36,257.0	1,812.9	21,754.2	32,269.0	1,613.5	19,361.4	68,119.0	3,406.0	40,871.4	60,626.0	3,031.3	36,375.6
04.	Pickup	8.0	25,000	25,322.0	633.1	5,064.4	22,030.0	550.8	4,406.0	36,697.0	917.4	7,339.4	31,926.0	798.2	6,385.2	75,616.0	1,840.4	14,723.2	64,046.0	1,601.2	12,809.2
05.	Taxi	3.0	30,000	24,259.0	727.8	2,183.3	0.0	0.0	0.0	35,180.0	1,055.4	3,166.2	0.0	0.0	0.0	61,619.0	1,848.6	5,545.7	0.0	0.0	0.0
06.	Car	3.0	14,000	232,933.0	3,261.1	9,783.2	93,173.0	1,304.4	3,913.3	383,219.0	5,365.1	16,095.2	153,288.0	2,146.0	6,438.1	719,987.0	10,079.8	30,239.5	287,995.0	4,031.9	12,095.8
07.	Jeep	3.0	14,000	23,939.0	335.1	1,005.4	9,576.0	134.1	402.2	39,469.0	552.6	1,657.7	15,788.0	221.0	663.1	74,154.0	1,038.2	3,114.5	29,662.0	415.3	1,245.8
C.	Others																				
08.	Rickshaw	2.0	30,000	42,368.0	1,271.0	2,542.1	0.0	0.0	0.0	65,127.0	1,953.8	3,907.6	0.0	0.0	0.0	115,242.0	3,457.3	6,914.5	0.0	0.0	0.0
09.	Motorcycle	1.0	10,000	563,365.0	5,633.7	5,633.7	90,000.0	900.0	900.0	903,820.0	9,038.2	9,038.2	90,382.0	903.8	903.8	1,747,730.0	17,477.3	17,477.3	174,773.0	1,747.7	1,747.7
Total(Passenger Traffic)				969,367.0	15,165.9	124,093.4	257,996.0	5,372.9	82,655.5	1,547,326.0	23,675.7	177,538.8	355,586.0	7,716.0	116,664.8	2,940,178.0	44,142.9	310,935.8	670,624.0	14,235.7	203,242.5

No.	Vehicle Type	Average Load (Cargo.Ton)	Annual Average Kms	1986 Total No. of Vehicle	1986 Total Vehicle-Km per Year (Million)	1986 Total Ton-Km per Year (Million)	1986 Inter City No. of Vehicle	1986 Inter City Vehicle-Km per Year (Million)	1986 Inter City Ton-Km per Year (Million)	1992 Total No. of Vehicle	1992 Total Vehicle-Km per Year (Million)	1992 Total Ton-Km per Year (Million)	1992 Inter City No. of Vehicle	1992 Inter City Vehicle-Km per Year (Million)	1992 Inter City Ton-Km per Year (Million)	2005 Total No. of Vehicle	2005 Total Vehicle-Km per Year (Million)	2005 Total Ton-Km per Year (Million)	2005 Inter City No. of Vehicle	2005 Inter City Vehicle-Km per Year (Million)	2005 Inter City Ton-Km per Year (Million)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
B.	FREIGHT TRAFFIC(MTK)																				
10	Conventional Trucks	5.68	75,000	55,572.0	4,167.9	23,673.7	50,015.0	3,751.1	21,306.4	73,957.0	5,545.3	31,497.2	66,543.0	4,990.7	28,347.3	108,101.0	8,107.6	46,051.0	97,290.0	7,296.8	41,445.5
11	Truck Trailers	16.00	65,000	2,316.0	150.5	2,408.6	2,316.0	150.5	2,408.6	7,313.0	475.3	7,605.5	7,313.0	475.3	7,605.5	36,033.0	2,342.1	37,474.3	36,033.0	2,342.1	37,474.3
12	Delivery Vans	0.50	40,000	19,789.0	791.6	395.8	0.0	0.0	0.0	35,026.0	1,401.0	700.5	0.0	0.0	0.0	72,158.0	2,886.3	1,443.2	0.0	0.0	0.0
Total(Freight Traffic)				77,677.0	5,110.0	26,478.1	52,331.0	3,901.7	23,715.0	116,276.0	7,421.7	39,803.2	73,856.0	5,466.1	35,952.8	216,292.0	13,336.0	84,968.5	133,323.0	9,638.9	78,919.9

App. Table 2-2 Case 2. Readjusted Vehicle on Road by Allocated Traffic

No.	Vehicle Type	Average Load (Passenger)	Annual Average Kms	1986 Total No. of Vehicle	1986 Total Vehicle-Km per Year (Million)	1986 Total Pass.-Km per Year (Million)	1986 Inter City No. of Vehicle	1986 Inter City Vehicle-Km per Year (Million)	1986 Inter City Pass.-Km per Year (Million)	1992 Total No. of Vehicle	1992 Total Vehicle-Km per Year (Million)	1992 Total Pass.-Km per Year (Million)	1992 Inter City No. of Vehicle	1992 Inter City Vehicle-Km per Year (Million)	1992 Inter City Pass.-Km per Year (Million)	2005 Total No. of Vehicle	2005 Total Vehicle-Km per Year (Million)	2005 Total Pass.-Km per Year (Million)	2005 Inter City No. of Vehicle	2005 Inter City Vehicle-Km per Year (Million)	2005 Inter City Pass.-Km per Year (Million)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
I.	PASSENGER TRAFFIC(MPK)																				
A.	Bus																				
01.	Busses	43.7	65,000	26,951.0	1,751.8	76,554.3	20,483.0	1,331.4	58,182.0	45,402.0	2,951.1	128,964.4	36,648.0	2,382.1	104,098.6	75,258.0	4,891.8	213,770.3	60,584.0	3,938.0	172,088.9
02.	Mini Busses	18.0	55,000	8,177.0	449.7	8,095.2	3,107.0	170.9	3,075.9	11,081.0	609.5	10,970.2	4,211.0	231.6	4,168.9	18,573.0	1,021.5	18,387.3	7,058.0	388.2	6,987.4
B.	Motor Car																				
03.	Wagon	12.0	50,000	22,053.0	1,102.7	13,231.8	19,627.0	981.4	11,776.2	36,257.0	1,812.9	21,754.2	32,269.0	1,613.5	19,361.4	68,119.0	3,406.0	40,871.4	60,626.0	3,031.3	36,375.6
04.	Pickup	8.0	25,000	25,322.0	633.1	5,064.4	22,030.0	550.8	4,406.0	36,697.0	917.4	7,339.4	31,926.0	798.2	6,385.2	73,616.0	1,840.4	14,723.2	64,046.0	1,601.2	12,809.2
05.	Taxi	3.0	30,000	24,259.0	727.8	2,183.3	0.0	0.0	0.0	35,180.0	1,055.4	3,166.2	0.0	0.0	0.0	61,619.0	1,848.6	5,545.7	0.0	0.0	0.0
06.	Car	3.0	14,000	232,933.0	3,261.1	9,783.2	93,173.0	1,304.4	3,913.3	383,219.0	5,365.1	16,095.2	153,288.0	2,146.0	6,438.1	719,987.0	10,079.8	30,239.5	287,995.0	4,031.9	12,095.8
07.	Jeep	3.0	14,000	23,939.0	335.1	1,005.4	9,576.0	134.1	402.2	39,469.0	552.6	1,657.7	15,788.0	221.0	663.1	74,154.0	1,038.2	3,114.5	29,662.0	415.3	1,245.8
C.	Others																				
08.	Rickshaw	2.0	30,000	42,368.0	1,271.0	2,542.1	0.0	0.0	0.0	65,127.0	1,953.8	3,907.6	0.0	0.0	0.0	115,242.0	3,457.3	6,914.5	0.0	0.0	0.0
09.	Motorcycle	1.0	10,000	563,365.0	5,633.7	5,633.7	90,000.0	900.0	900.0	903,820.0	9,038.2	9,038.2	90,382.0	903.8	903.8	1,747,730.0	17,477.3	17,477.3	174,773.0	1,747.7	1,747.7
Total(Passenger Traffic)				969,367.0	15,165.9	124,093.4	257,996.0	5,372.9	82,655.5	1,556,252.0	24,255.9	202,893.1	364,512.0	8,296.2	142,019.1	2,954,298.0	45,060.7	351,043.7	684,744.0	15,153.5	243,350.4

No.	Vehicle Type	Average Load (Cargo,Ton)	Annual Average Kms	No. of Vehicle	Vehicle-Km per Year (Million)	Ton-Km per Year (Million)	No. of Vehicle	Vehicle-Km per Year (Million)	Ton-Km per Year (Million)	No. of Vehicle	Vehicle-Km per Year (Million)	Ton-Km per Year (Million)	No. of Vehicle	Vehicle-Km per Year (Million)	Ton-Km per Year (Million)	No. of Vehicle	Vehicle-Km per Year (Million)	Ton-Km per Year (Million)	No. of Vehicle	Vehicle-Km per Year (Million)	Ton-Km per Year (Million)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
B.	FREIGHT TRAFFIC(MTK)																				
10	Conventional Trucks	5.68	75,000	55,572.0	4,167.9	23,673.7	50,015.0	3,751.1	21,306.4	71,547.0	5,366.0	30,479.0	64,486.0	4,836.5	27,471.0	64,542.0	4,840.7	27,494.9	54,453.0	4,084.0	23,197.0
11	Truck Trailers	16.00	65,000	2,316.0	150.5	2,408.6	2,316.0	150.5	2,408.6	7,889.0	512.8	8,204.6	7,889.0	512.8	8,204.6	22,302.0	1,449.6	23,194.1	22,302.0	1,449.6	23,194.1
12	Delivery Vans	0.50	40,000	19,789.0	791.6	395.8	0.0	0.0	0.0	35,026.0	1,401.0	700.5	0.0	0.0	0.0	72,158.0	2,886.3	1,443.2	0.0	0.0	0.0
Total(Freight Traffic)				77,677.0	5,110.0	26,478.1	52,331.0	3,901.7	23,715.0	114,462.0	7,279.8	39,384.1	72,375.0	5,349.2	35,682.0	159,002.0	9,176.6	52,132.1	76,755.0	5,533.6	46,391.1

App. Table 2-3 Required Number of Vehicles for Inter-City Operation: Case-2 (1)

No.	Vehicle Type	1986	1987			1988			1989			1990			1991			1992		
		No. of Vehicle	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought
A.	PASSENGER TRAFFIC(MPK)																			
01	Busses	20,483	22,569	18,435	4,134	24,866	20,312	4,555	27,398	22,380	5,018	30,188	24,658	5,529	33,261	27,169	6,092	36,648	29,935	6,713
02	Mini Busses	3,107	3,269	2,796	472	3,438	2,942	497	3,617	3,095	523	3,805	3,255	550	4,003	3,425	578	4,211	3,603	608
03	Wagon	19,627	21,323	17,664	3,658	23,165	19,190	3,974	25,166	20,848	4,318	27,341	22,650	4,691	29,703	24,607	5,096	32,269	26,732	5,537
04	Pickup	22,030	23,435	19,827	3,608	24,930	21,092	3,838	26,520	22,437	4,083	28,212	23,868	4,344	30,012	25,391	4,621	31,926	27,010	4,916
05	Taxi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06	Rickshaw	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07	Car	93,173	101,234	83,856	17,378	109,992	91,111	18,882	119,509	98,993	20,515	129,848	107,558	22,290	141,082	116,863	24,219	153,288	126,974	26,314
08	Jeep	9,576	10,408	8,618	1,790	11,313	9,367	1,945	12,296	10,181	2,114	13,364	11,066	2,298	14,526	12,028	2,498	15,788	13,073	2,715
09	Motorcycle	90,000	90,064	81,000	9,064	90,127	81,057	9,070	90,191	81,114	9,076	90,254	81,172	9,083	90,318	81,229	9,089	90,382	81,286	9,096
	Total	257,996	272,301	232,196	40,104	287,832	245,071	42,761	304,697	259,049	45,648	323,012	274,227	48,785	342,905	290,711	52,194	364,512	308,614	55,898

No.	Vehicle Type	1986	1987			1988			1989			1990			1991			1992		
		No. of Vehicle	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought
B.	FREIGHT TRAFFIC(MTK)																			
10	Conventional Trucks	50015	52,179	45,014	7,165	54,436	46,961	7,475	56,791	48,993	7,799	59,248	51,112	8,136	61,812	53,324	8,488	64486	55,631	8,855
11	Truck Trailers	2316	2,841	2,084	756	3,485	2,557	928	4,274	3,136	1,138	5,243	3,847	1,396	6,431	4,719	1,713	7889	5,788	2,101
12	Delivery Vans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	52,331	55,020	47,098	7,922	57,921	49,518	8,403	61,066	52,129	8,937	64,492	54,959	9,532	68,243	58,042	10,201	72,375	61,419	10,956
	Grand Total	310327	327320.43	279294.3	48026.138	345753.09	294588.39	51164.703	365763.04	311177.78	54585.253	387504.06	329186.73	58317.327	411147.93	348753.65	62394.273	436887	370033.13	66853.860

App. Table 2-3 Required Number of Vehicles for Inter-City Operation: Case-2 (2)

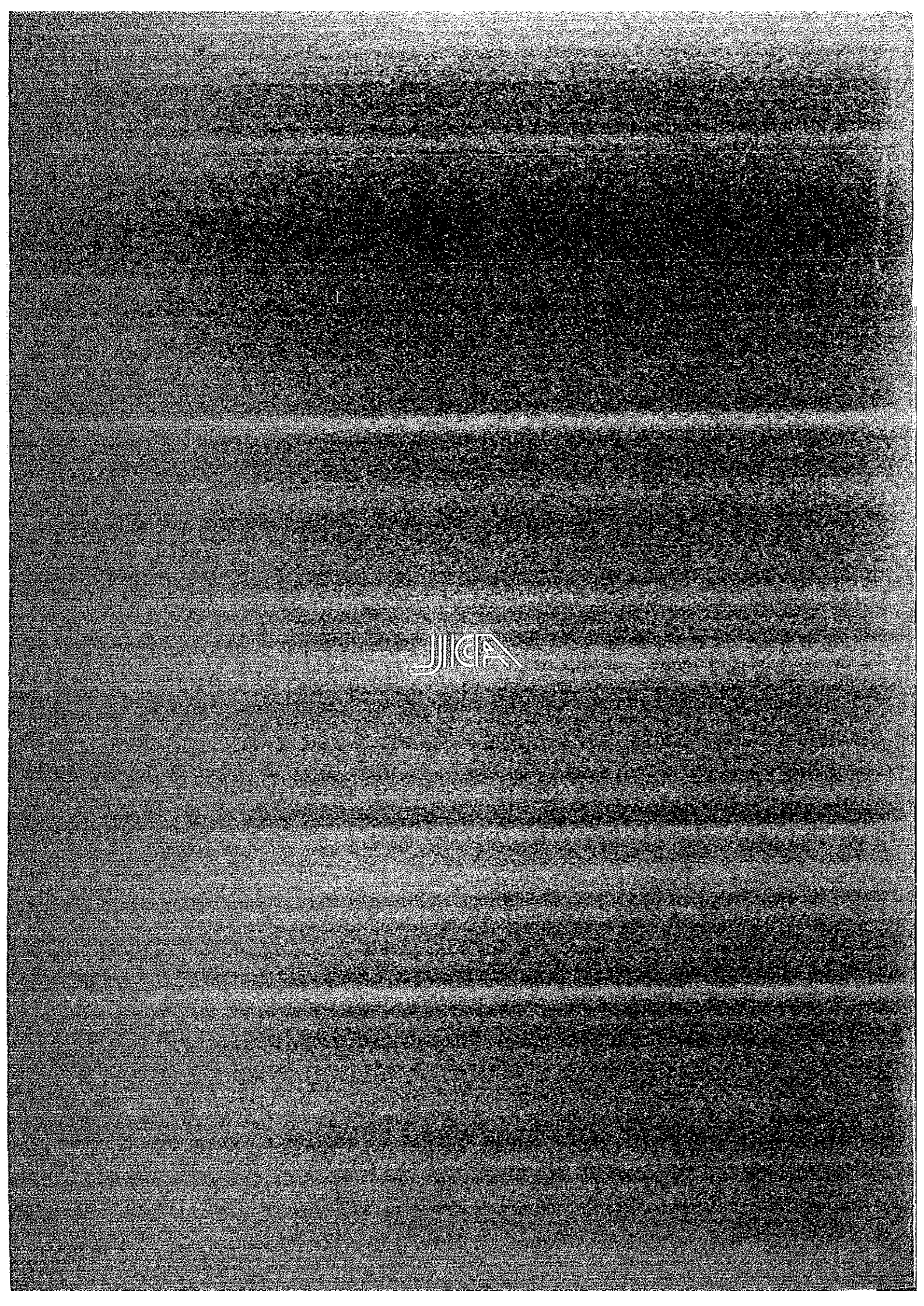
1993			1994			1995			1996			1997			1998			1999		
No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought
38,093	32,983	5,110	39,595	34,284	5,311	41,156	35,635	5,520	42,778	37,040	5,738	44,465	38,500	5,964	46,218	40,018	6,199	48,040	41,596	6,444
4,382	3,790	592	4,559	3,943	616	4,744	4,103	641	4,936	4,270	667	5,136	4,443	694	5,344	4,623	722	5,561	4,810	751
33,873	29,042	4,831	35,557	30,486	5,071	37,324	32,001	5,323	39,179	33,592	5,588	41,126	35,261	5,865	43,171	37,014	6,157	45,316	38,854	6,463
33,682	28,733	4,949	35,535	30,314	5,221	37,490	31,982	5,508	39,553	33,741	5,811	41,728	35,597	6,131	44,024	37,556	6,468	46,446	39,622	6,824
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160,907	137,959	22,948	168,905	144,817	24,089	177,301	152,015	25,286	186,114	159,571	26,543	195,364	167,502	27,862	205,075	175,828	29,247	215,268	184,568	30,701
16,573	14,209	2,364	17,396	14,915	2,481	18,261	15,657	2,604	19,169	16,435	2,734	20,122	17,252	2,870	21,122	18,109	3,012	22,172	19,010	3,162
95,085	81,344	13,741	100,033	85,577	14,456	105,238	90,029	15,208	110,714	94,714	16,000	116,475	99,643	16,832	122,536	104,828	17,708	128,912	110,282	18,630
382,595	328,061	54,534	401,580	344,335	57,245	421,514	361,422	60,091	442,442	379,362	63,080	464,417	398,198	66,219	487,489	417,975	69,514	511,715	438,740	72,975

1993			1994			1995			1996			1997			1998			1999		
No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought
63,653	58,037	5,615	62,830	57,287	5,543	62,018	56,547	5,471	61,216	55,816	5,400	60,425	55,095	5,330	59,644	54,383	5,262	58,873	53,680	5,194
8,546	7,100	1,445	9,257	7,691	1,566	10,027	8,331	1,696	10,862	9,024	1,837	11,765	9,775	1,990	12,745	10,589	2,156	13,805	11,470	2,335
0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
72,198	65,138	7,061	72,087	64,978	7,108	72,045	64,878	7,167	72,078	64,840	7,237	72,191	64,870	7,321	72,389	64,972	7,417	72,679	65,150	7,529
454792.84	393198.3	61594.541	473666.75	409313.55	64353.199	493558.45	426300.08	67258.372	514520.30	444202.60	70317.697	536607.49	463068.27	73539.222	559878.17	482946.74	76931.431	584393.63	503890.36	80503.271

App. Table 2-3 Required Number of Vehicles for Inter-City Operation: Case-2 (3)

2000			2001			2002			2003			2004			2005			Required Number of Vehicles Between	
No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	1988-92	1988-2005
49,934	43,236	6,698	51,902	44,940	6,962	53,948	46,712	7,236	56,075	48,554	7,522	58,286	50,468	7,818	60,584	52,457	8,127	27,908	112,557
5,786	5,005	781	6,021	5,208	813	6,265	5,419	846	6,519	5,638	880	6,783	5,867	916	7,058	6,105	953	2,756	12,628
47,569	40,785	6,784	49,933	42,812	7,121	52,415	44,940	7,475	55,021	47,174	7,847	57,755	49,518	8,237	60,626	51,980	8,646	23,616	109,024
49,001	41,801	7,200	51,697	44,101	7,596	54,541	46,527	8,014	57,541	49,086	8,454	60,706	51,787	8,920	64,046	54,636	9,410	21,802	112,309
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
225,968	193,742	32,227	237,200	203,372	33,829	248,990	213,480	35,510	261,367	224,091	37,275	274,358	235,230	39,128	287,995	246,922	41,073	112,221	517,938
25,274	19,954	3,319	24,430	20,946	3,484	25,645	21,987	3,657	26,919	23,080	3,839	28,257	24,227	4,030	29,662	25,432	4,230	11,570	53,357
135,620	116,021	19,599	142,677	122,058	20,619	150,101	128,409	21,692	157,912	135,091	22,821	166,129	142,120	24,008	174,773	149,516	25,257	45,414	291,986
537,152	460,544	76,608	563,861	483,437	80,424	591,905	507,475	84,431	621,353	532,715	88,638	652,275	559,218	93,057	684,744	587,047	97,697	245,286	1,209,799

2000			2001			2002			2003			2004			2005			Required Number of Vehicles Between	
No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	No. of Vehicle	90% of Last Year	Newly be Bought	1988-92	1988-2005
58,112	52,986	5,126	57,361	52,301	5,060	56,620	51,625	4,995	55,888	50,958	4,930	55,166	50,299	4,867	54453	49,649	4,804	40,754	108,350
14,954	12,425	2,529	16,199	13,459	2,740	17,547	14,579	2,968	19,007	15,792	3,215	20,589	17,106	3,482	22302	18,530	3,772	7,276	39,008
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
73,067	65,411	7,656	73,560	65,760	7,800	74,167	66,204	7,963	74,895	66,750	8,145	75,755	67,406	8,349	76,755	68,179	8,576	48,029	147,358
610218.44	525954.26	84264.176	637420.69	549196.60	88224.094	666072.14	573678.62	92393.518	696248.44	599464.92	96783.515	728029.36	626623.60	101405.76	761499	655226.42	106272.57	293,315	1,357,157


JICA