2.3 Financial Framework for Investment

2.3.1 Projection of Scale of Investment

(1) Methodology

The growth of commodity producing sector is projected based on the result of analysis on past trend using constant price of 1980-81. The scale of investment is projected using a similar methodology adopted for the projection of growth of commodity producing sector. The projection of expenditure and scale of investment were carried out by the following process and method:

1) Analyze the past trends of expenditure of the national economy;

"Obtain total value of expenditure with respect to the FYP period and obtain share of each type of expenditure such as private consumption, general government, current consumption, gross domestic fixed capital formation (GFCF); and change in stocks in current market price; then convert them to 1980-81 prices to check the trends."

2) Projection of total expenditure at 1980-81 price;

"Projection of total expenditure at 1980-81 prices is carried out in accordance with the growth trend and projection of national economy using forecasted GNP at 1980 - 81 prices in conjunction with projected increase/decrease of share of total expenditure in GNP."

3) Projection of total expenditure at 1992-93 price;

Projection of total expenditure at 1992-93 prices is carried out by similar process as in 2).

4) Obtain projected GFCF;

"The share of GFCF in GDP is obtained from the preceding process and projection of such share is to be conducted taking into account of government policy, marginal co-efficiency and projected GDP."

5) Analyze past trend of GFCF;

"The share of GFCF by private sector and public sector and general government should be checked on the past record based on constant price in 1980-81 and projection of share by sector is to obtain projected share of GFCF by sector for each FYP periods."

(2) Projection of investment in transport sector

Through above process the scale of investment (GFCF) is projected. This projection of investment is further broken down by public sector and private sector, by mode of transport and investment under public development programme by mode of transport as follows:

1) Analyze the past trends of GFCF in Transport Sector;

"The past share of GFCF in transport sector by public sector and private sector is examined and projected."

2) Analyze past trend of GFCF in Transport Sector by mode of transport; and

"The share of GFCF by mode of transport is examined and projected, with consideration of government policy and trend of economic structure."

3) Obtain scale of investment in the transport sector by mode of transport.

"The projected GFCF at 1992-93 prices is broken down by public and private sector, transport sector in total and by public and private sector respectively, and by mode of transport sector in public sector transport economy."

Table 2.3.2.1 Expenditure on Gross National Products and Each Share (at Current Market Price)

	Years	1983/84	1984/85	1985/86	1986/87	1987/88	Total Amount 6th FYP	Average GR/Year 6th FYP	Average Share 6th FYP	1988/89	1989/90	1990/91	1991/92	1992/93	Total Amount 7th FYP	Average GR/Year 7th FYP	Average Share 7th FYP
1	Private Consumption Expenditure	336,747	385,346	392,532	415,674	486,565	2,016,864	9.6	70.7	543,297	611,015	697,448	849,954	968,164	3,669,878	15.5	67.5
		72.5	72.8	70.8	69.0	68.2				66.4	67.7	67.3	68.0	68.2			
2	General Govmt Current Consumption Expenditure	50,741	57,126	65,662	77,482	104,754	**355,765**	19.9	12.2	129,201	129,562	145,575	155,567	174,680	**734,585**	7.8	13.8
		10.9	10.8	11.8	12.9	14.7				15.8	14.4	14.0	12.4	12.3			
3	Gross Domestic Capital Formation	69,212	77,925	87,545	100,040	111,266	**445,988**	12.6	15.5	133,170	148,076	177,646	225,360	256,644	**940,896**	17.8	17.2
		14.9	14.7	15.8	16.6	15.6				16.3	16.4	17.1	18.0	18.1			
4	Change in Stocks	7,489	8,600	9,000	9,500	10,400	44,989	8.6	1.6	12,400	14,000	15,800	18,700	21,100	82,000	14.2	1.5
		1.6	1.7	1.6	1.6	1.5				1.6	1.6	1.5	1.5	1.6			
5	Total (1+2+3+4)	464,189	528,997	554,739	602,696	**712,985**	**2,863,606**	11.3	100.0	818,068	902,653	1,036,469	1,249,581	**1,420,588**	**5,427,359**	14.8	100.0
		100.0	100.0	100.0	100.0	100.0				100.0	100.0	100.0	100.0	100.0			
6	Export of Goods and Non-factor Services	47,835	49,889	63,268	79,056	93,601		18.3	12.8	108,318	126,583	172,812	209,215	217,418		19.0	17.3
		11.6	10.8	12.5	14.3	14.9				15.2	15.9	18.5	19.2	17.9			
7	(Less) import of Goods and Non-factor Services	92,222	106,729	103,475	109,273	131,179		9.2	21.3	156,641	173,293	188,681	247,411	296,051		17.3	22.2
		22.3	23.0	20.4	19.8	20.8				22.0	21.7	20.2	22.7	24.4			
8	Expenditure on GDP at Market Prices	419,802	472,157	514,532	572,479	675,407		12.6	103.1	769,745	855,943	1,020,600	1,211,385	1,341,955		14.9	109.3
		101.4	101.9	101.4	103.7	107.2				108.2	107.4	109.5	111.1	110.4			
9	Plus Net Factor Income from abroad	39,595	38,311	41,359	36,378	29,095		-7.4	7.4	28,005	36,900	23,908	12,537	14,938		-14.5	2.7
		9.6	8.3	8.1	6.6	4.6				3.9	4.6	2.6	1.1	1.2			
10	Expenditure on GNP at Market Prices	459,397	510,468	555,891	608,857	704,502		11.3	110.6	797,750	892,843	1,044,508	1,223,922	1,356,893		14.2	112.0
		111.0	110.2	109.5	110.3	111.8				112.2	112.1	112.0	112.2	111.6			
11	Less indirect tax	53,557	56,396	58,205	64,422	84,494		12.1	12.3	99,361	108,641	123,473	144,815	151,300		11.1	13.3
		12.9	12.2	11.5	11.7	13.4				14.0	13.6	13.2	13.3	12.4			
12	Plus Subsidies	8,104	9,303	9,992	7,374	10,130		5.7	1.8	12,754	12,549	11,211	11,373	9,800		-6.4	1.3
		2.0	2.0	2.0	1.3	1.6				1.8	1.6	1.2	1.0	0.8			
13	GNP at Factor Cost	413,944	463,375	507,678	551,809	630,138		11.1	100.0	711,143	796,751	932,246	1,090,480	1,215,393		14.3	100.0
		100.0	100.0	100.0	100.0	100.0				100.0	100.0	100.0	100.0	100.0			

Source: (1) Economic Survey 1993-94, Economic Advisor's Wing, Finance Division
(2) JICA Study Team

Table 2.3.2.2 (a) Expenditure on Gross National Product (Trend) (at Constant 1980-81 Price, Rs. million)

	Flows	1983/84	1984/85	1985/86	1986/87	1987/88	Average GR/Year 6th FYP	Average Share 6th FYP	1988/89	1989/90	1990/91	1991/92	1992/93	Average GR/Year 7th FYP	Average Share 7th FYP
1	Private Consumption Expenditure	243,703	258,725	278,194	288,006	317,345	6.8		319,912	334,306	329,866	375,700	377,990	4.3	
		71.0	70.7	69.1	68.3	70.1		69.8	67.7	68.4	67.7	70.0	69.3		68.6
2	General Govmt Current Consumption Expenditure	36,288	40,716	47,826	54,158	56,518	11.7		68,052	65,896	65,566	60,407	63,440	-1.7	
		10.6	11.1	11.9	12.8	12.5		11.8	14.4	13.5	13.5	11.3	11.6		12.8
3	Gross Domestic Capital Formation (GFCF)	57,502	60,441	69,807	72,969	71,977	5.8		77,300	81,271	83,871	92,456	95,536	5.4	
		16.7	16.5	17.3	17.3	15.9		16.8	16.4	16.6	17.2	17.2	17.5		17.0
4	Change in Stocks	5,924	6,018	6,572	6,606	6,574	2.6		7,147	7,520	7,596	8,228	8,678	5.0	
		1.8	1.7	1.8	1.7	1.6		1.7	1.7	1.7	1.7	1.7	1.7		1.7
5	Total (1+2+3+4)	343,417	365,900	402,399	421,739	452,414	7.1		472,411	488,993	486,899	536,791	545,644	3.7	
		100.0	100.0	100.0	100.0	100.0		100.0	100.0	100.0	100.0	100.0	100.0		100.0
6	Export of Goods and Non-factor Services	41,819	40,275	53,296	59,868	57,112	8.1		64,979	65,710	87,700	99,821	108,831	13.8	
		12.8	11.5	14.3	15.4	14.2		13.6	15.5	14.9	19.3	20.6	21.9		18.4
7	(Less) import of Goods and Non-factor Services	68,703	73,762	78,266	79,825	77,107	2.9		83,524	80,601	74,639	97,660	101,346	5.0	
		21.0	21.0	21.0	20.5	19.2		20.5	19.9	18.3	16.4	20.1	20.4		19.0
8	Expenditure on GDP at Market Prices	316,533	332,413	377,429	401,782	432,419	8.1		453,866	474,102	499,960	538,952	553,129	5.1	
		96.6	94.8	101.1	103.4	107.4		100.7	108.4	107.8	109.8	111.1	111.3		109.7
9	Plus Net Factor Income from abroad	33,000	31,630	31,292	26,575	17,100	-15.2		14,933	17,163	9,457	4,948	5,893	-20.7	
		10.1	9.0	8.4	6.8	4.2		7.7	3.6	3.9	2.1	1.0	1.2		2.4
10	Expenditure on GNP at Market Prices	349,533	364,133	408,711	428,357	449,519	6.5		468,799	491,265	509,417	543,900	559,022	4.5	
		106.7	103.9	109.4	110.2	111.7		108.4	111.9	111.7	111.8	112.1	112.5		112.0
11	Less indirect tax	38,447	43,038	42,501	44,800	53,406	8.6		57,269	58,359	59,345	63,722	61,772	1.9	
		11.7	12.3	11.4	11.5	13.3		12.0	13.7	13.3	13.0	13.1	12.4		13.1
12	Plus Subsidies	6,641	6,512	9,276	5,128	6,403	-0.9		7,351	6,741	5,390	5,004	3,463	-17.2	
		2.0	1.9	2.5	1.3	1.6		1.9	1.8	1.5	1.2	1.0	0.7		1.2
13	GNP at Factor Cost	327,609	350,565	373,506	388,685	402,516	5.3		418,881	439,647	455,462	485,182	496,946	4.4	
		100.0	100.0	100.0	100.0	100.0		100.0	100.0	100.0	100.0	100.0	100.0		100.0
14	GDP at Factor Cost	295,977	321,751	342,224	362,110	385,416	6.8		403,948	422,284	446,005	480,234	491,345	5.0	
15	Marginal Co-efficiency	11.5	17.9	17.7	19.3	18.9	**17.0**		17.8	18.3	18.2	17.5	18.8	**18.1**	

Source: National Economic Survey 1993-94, Economic Advisor's Wing, Finance Division

Table 2.3.2.2 (b) Expenditure on Gross National Product (Projection) (at Constant 1980-81 Prioce, Rs. million)

	Flows	1993/94	1994/95	1995/96	1996/97	1997/98	Average GR/Year 8th FYP	Average Share 8th FYP	1998/99	1999/2000	2000/01	2001/02	2002/03	Average GR/year 9th FYP	Average Share 9th FYP
1	Private Consumption Expenditure	403,315	430,337	459,170	489,934	522,760	6.7		556,217	591,815	629,691	669,991	712,870	6.4	
		69.7	69.9	70.2	70.3	70.4		70.1	71.1	71.5	72.0	72.4	72.8		72.0
2	General Government Consumption Expenditure	61,537	59,691	57,900	56,163	54,478	-3.0		53,933	53,394	52,860	52,331	51,808	-1.0	
		10.6	9.7	8.8	8.1	7.3		8.9	6.9	6.5	6.0	5.7	5.3		6.1
3	Gross Domestic Capital Formation	105,090	115,599	127,158	139,874	153,862	10.0		162,324	171,252	180,671	190,608	201,091	5.5	
		18.2	18.8	19.4	20.1	20.7		19.4	20.7	20.7	20.7	20.6	20.5		20.6
4	Change in Stocks	9,025	9,644	10,310	11,026	11,797	6.9		10,322	10,968	11,658	12,394	13,180	6.0	
		1.7	1.7	1.7	1.7	1.7		1.7	1.4	1.4	1.4	1.4	1.4		1.4
5.1	Total (1+2+3+4)	578,967	615,271	654,539	696,998	742,896	6.4		782,796	827,429	874,880	925,324	978,949	5.7	
		100.0	100.0	100.0	100.0	100.0		100.0	100.0	100.0	100.0	100.0	100.0		100.0
6	Export of Goods and Non-factor Services	122,435	137,739	154,957	174,326	196,117	12.5		215,729	237,302	261,032	287,135	315,848	10.0	
		23.1	24.3	25.5	26.9	28.3		25.6	29.3	30.3	31.3	32.4	33.6		31.4
7	Less import of Goods and Non-factor Services	108,947	117,118	125,902	135,344	145,495	7.5		157,135	169,706	183,282	197,945	213,780	8.0	
		20.5	20.6	20.8	20.9	21.0		20.8	21.3	21.7	22.0	22.4	22.7		22.0
8	Expenditure on GDP at Market Prices	592,454	635,892	683,594	735,980	793,518	7.0		841,389	895,025	952,630	1,014,515	1,081,017	6.5	
		111.6	112.1	112.7	113.5	114.4		112.8	114.1	114.2	114.4	114.6	114.8		114.4
9	Plus Net Factor Income from abroad	5,657	5,714	5,771	5,828	5,887	1.0		6,034	6,185	6,339	6,498	6,660	2.5	
		1.1	1.0	1.0	0.9	0.8		1.0	0.8	0.8	0.8	0.7	0.7		0.8
10	Expenditure on GNP at Market Prices	595,201	636,461	680,799	728,463	779,717	7.0		828,742	881,012	936,753	996,204	1,059,621	6.3	
		112.1	112.2	112.3	112.3	112.4		112.2	112.4	112.5	112.5	112.5	112.6		112.5
11	Less indirect tax	68,278	73,009	78,094	83,562	89,444	7.0		95,058	101,046	107,433	114,246	121,516	6.3	
		12.9	12.9	12.9	12.9	12.9		12.9	12.9	12.9	12.9	12.9	12.9		12.9
12	Plus Subsidies	3,948	3,869	3,792	3,716	3,642	-2.0		3,569	3,498	3,428	3,359	3,292	-2.0	
		0.7	0.7	0.6	0.6	0.5		0.6	0.5	0.4	0.4	0.4	0.3		0.4
13	GNP at Factor Cost	530,871	567,321	606,497	648,617	693,915	6.9		737,253	783,464	832,748	885,317	941,397	6.3	
		100.0	100.0	100.0	100.0	100.0		100.0	100.0	100.0	100.0	100.0	100.0		100.0
14	GDP at Factor Cost	525,214	561,608	600,727	642,788	688,028	7.0		731,219	777,280	826,409	878,819	934,737	6.3	
15	Marginal Co-efficiency	18.2	18.7	19.2	19.8	20.3	**19.3**		21.0	20.9	20.7	20.6	20.4	**20.7**	

Source: National Economic Survey 1993-94, Economic Advisor's Wing, Finance Division

Table 2.3.2.2 (c) Expenditure on Gross National Product (Projection) (at Constant 1980-81 Price, million Rs.)

	Flows	2003/04	2004/05	2005/06	2006/07	2007/08	Average GR/Year 10th FYP	Average Share 10th FYP
1	Private Consumption Expenditure	758,494 73.2	807,038 73.6	858,688 74.0	913,644 74.4	972,117 74.7	6.4	74.0
2	General Government Consumption Expenditure	51,808 5.0	51,808 4.7	51,808 4.5	51,808 4.2	51,808 4.0	0.0	4.5
3	Gross Domestic Capital Formation	211,548 20.4	222,548 20.3	234,121 20.2	246,295 20.0	259,102 19.9	5.2	20.2
4	Change in Stocks	13,989 1.4	14,852 1.4	15,772 1.4	16,752 1.4	17,798 1.4	6.2	1.4
5	Total (1+2+3+4)	1,035,839 100.0	1,096,246 100.0	1,160,389 100.0	1,228,500 100.0	1,300,826 100.0	5.9	100.0
6	Export of Goods and Non-factor Services	341,116 34.1	368,406 34.7	397,878 35.3	429,708 35.9	464,085 36.5	8.0	35.3
7	Less import of Goods and Non-factor Services	228,745 22.9	244,757 23.1	261,890 23.2	280,222 23.4	299,838 23.6	7.0	23.2
8	Expenditure on GDP at Market Prices	1,148,210 114.9	1,219,895 115.0	1,296,377 115.1	1,377,986 115.2	1,465,073 115.2	6.3	115.1
9	Plus Net Factor Income from abroad	6,793 0.7	6,929 0.7	7,068 0.6	7,209 0.6	7,353 0.6	2.0	0.6
10	Expenditure on GNP at Market Prices	1,125,017 112.6	1,194,709 112.6	1,268,995 112.6	1,348,189 112.7	1,432,630 112.7	6.2	112.6
11	Less indirect tax	129,016 12.9	137,011 12.9	145,534 12.9	154,621 12.9	164,312 12.9	6.2	12.9
12	Plus Subsidies	3,226 0.3	3,162 0.3	3,098 0.3	3,036 0.3	2,976 0.2	-2.0	0.3
13	GNP at Factor Cost	999,227 100.0	1,060,860 100.0	1,126,559 100.0	1,196,604 100.0	1,271,294 100.0	6.2	100.0
14	GDP at Factor Cost	992,433	1,053,931	1,119,492	1,189,395	1,263,949	6.2	
15	Marginal Co-efficiency	20.3	20.1	19.9	19.7	19.5	19.9	

Source: National Economic Survey 1993-94, Economic Advisor's Wing, Finance Division

2.3.2 Expenditure

Expenditure on Gross National Product at current market prices is shown in Table 2.3.2.1 "Expenditure on GNP at Current Market Price". Total expenditure during the 6th FYP was Rs. 2.86 billion and Rs. 5.43 billion in the 7th FYP periods respectively. It expanded almost 1.89 times in two FYP periods. Total GFCF was Rs. 446.0 million in the 6th FYP and Rs. 940.9 million in the 7th FYP period. It expanded 2.10 times in two FYP period. As shown therein an average share of GFCF in the 6th FYP and 7th FYP were 15.5 % and 17.2 % of GNP and have grown at average annual growth rate of 12.6 % and 17.8 % in respective periods.

The past trend and projections of average annual growth rates of GFCF for the 6th and 7th FYPs, and 8th FYP - 10th FYP are shown in Table 2.3.2.2 (a), (b) and (c) compared by constant price of 1980-81. Table 2.3.2.3 "Trend and Projection of Expenditure" summarizes a trend and projection of expenditure as well as GFCF.

Table 2.3.2.3 Trend and Projection of Expenditure
(Unit: Percent)

Growth Rate	6th FYP	7th FYP	8th FYP	9th FYP	10th FYP
GFCF	5.8	5.4	6.5	6.4	5.7
Private Consumption Expenditure	6.8	4.3	5.0	6.0	4.3
General Government Consumption	11.7	-1.7	2.0	-5.0	-3.0
Change in Stocks	2.6	5.0	4.9	5.6	6.0
GNP	4.9	4.5	4.9	5.6	6.0

The expenditure for the 8th -10th FYP periods was projected taking into account the above method of projection. The expenditure was projected based on constant 1992-93 price as shown in Table 2.3.2.4 (a), (b) and (c) "Expenditure on GNP and each Share (At constant 1992-93 price)" to obtain the projection of GFCF (investment) for transport sector development. The total expenditure projected for the 8th - 10th FYPs are Rs. 8.5 billion, Rs. 11.3 billion and Rs. 15.1 billion respectively. The total GFCF for the same period is projected to be Rs. 1.72 billion, Rs.2.43 billion and Rs. 3.15 billion. Table 2.3.2.5 "Expenditure on GNP and each Share" summarized the share of expenditure by type taking factors of projected export/import and net factor income from abroad, which are previously analyzed and projected.

Table 2.3.2.4 (a) Expenditure on Gross National Product and Each Share (at Constant 1992-93 Price, Rs. million)

	Flows	1988/89	1989/90	1990/91	1991/92	1992/93	Total Amount 7th FYP	Average GR/Year 7th FYP	Average Share 7th FYP	1993/94	1994/95	1995/96	1996/97	1997/98	Total Amount 8th FYP	Average GR/Year 8th FYP	Average Share 8th FYP
1	Private Consumption Expenditure	819,406	856,247	844,902	962,299	968,164	4,451,044	4.3	68.6	1,033,031	1,102,244	1,176,094	1,254,893	1,338,971	5,905,233	6.7	69.2
		67.2	68.0	66.9	68.6	68.2				68.5	68.9	69.2	69.6	70.0			
2	General Govmt Current Consumption Expenditure	187,379	181,443	180,534	166,329	174,680	890,364	-1.7	12.8	169,440	164,356	159,426	154,643	150,004	797,868	-3.0	9.5
		15.4	14.4	14.3	11.9	12.3				11.2	10.3	9.4	8.6	7.8			
3	Gross Domestic Fixed Capital Formation (GFCF)	207,656	218,323	225,308	248,370	256,644	1,156,300	5.4	17.0	282,308	310,539	341,593	375,752	413,328	1,723,521	10.0	20.1
		17.0	17.3	17.8	17.7	18.1				18.7	19.4	20.1	20.8	21.6			
4	Change in Stocks	17,377	18,284	18,469	20,006	21,100	95,237	5.0	1.7	22,066	23,574	25,194	26,936	28,807	126,578	6.9	1.7
		1.7	1.7	1.7	1.7	1.7				1.7	1.7	1.7	1.7	1.7			
4-a	Total Investment (3+4) (Share of GDP mp)	225,033	236,607	243,777	268,376	277,744	1,251,537	5.4	20.4	304,374	334,113	366,788	402,688	442,135	1,850,099	9.8	22.4
5	Total (1+2+3+4)	1,220,261	1,258,791	1,262,877	1,401,858	1,420,588	6,592,945	3.7	100.0	1,507,334	1,600,456	1,698,956	1,803,080	1,913,070	8,522,897	6.1	100.3
		100.9	101.2	100.5	99.7	100.0				100.0	100.0	100.2	100.5	100.9			
6	Export of Goods and Non-factor Services	129,812	131,273	175,203	199,418	217,418		13.8	18.4	244,595	275,170	309,566	348,262	391,794		12.5	20.9
		12.7	12.2	15.7	16.8	17.9				18.8	19.8	20.9	22.0	23.1			
7	(Less) import of Goods and Non-factor Services	243,990	234,451	218,035	285,283	296,051		5.0	19.0	318,255	342,124	367,783	395,367	425,019		7.5	24.8
		24.7	22.7	20.0	24.3	24.4				24.5	24.7	24.8	25.0	25.1			
8	Expenditure on GDP at Market Prices	1,106,083	1,155,613	1,220,045	1,315,993	1,341,955		5.1	109.7	1,433,674	1,533,502	1,640,739	1,755,975	1,879,845		7.0	110.7
		108.0	107.5	109.5	110.9	110.4				110.5	110.6	110.7	110.8	110.9			
9	Plus Net Factor Income from abroad	37,853	43,506	23,972	12,543	14,938		-20.7	2.4	15,087	15,238	15,391	15,545	15,700		1.0	1.0
		3.7	4.0	2.2	1.1	1.2				1.2	1.1	1.0	1.0	0.9			
10	Expenditure on GNP at Market Prices	1,143,936	1,199,119	1,244,017	1,328,536	1,356,893		4.5	112.0	1,448,761	1,548,740	1,656,130	1,771,520	1,895,545		7.0	111.7
		111.7	111.5	111.7	112.0	111.6				111.6	111.7	111.7	111.8	111.9			
11	Less indirect tax	140,271	142,940	145,335	156,076	151,300		1.9	13.1	160,364	171,435	183,329	196,113	209,856		7.0	12.4
		13.7	13.3	13.0	13.2	12.4				12.4	12.4	12.4	12.4	12.4			
12	Plus Subsidies	20,803	19,076	15,253	14,161	9,800		-17.2	1.2	9,604	9,412	9,224	9,039	8,858		-2.0	0.6
		2.0	1.8	1.4	1.2	0.8				0.7	0.7	0.6	0.6	0.5			
13	GNP at Factor Cost	1,024,468	1,075,255	1,113,935	1,186,621	1,215,393		4.4	100.0	1,298,001	1,386,717	1,482,025	1,584,446	1,694,547		6.9	100.0
		100.0	100.0	100.0	100.0	100.0				100.0	100.0	100.0	100.0	100.0			
14	GDP at Factor Cost	986,926	1,031,725	1,089,680	1,173,309	1,200,455	5,482,095	5.0		1,282,913	1,371,479	1,466,634	1,568,902	1,678,847	7,368,775	7.0	
15	GDP at Market Price	1,106,394	1,155,589	1,219,762	1,315,224	1,341,955	6,138,924			1,433,673	1,533,502	1,640,739	1,755,976	1,879,845	8,243,735		

Source:
(1) *Economic Survey* 1993-94, Economic Advisor's Wing, Finance Division
(2) JICA Study Team

Table 2.3.2.4 (b) Expenditure on Gross National Product and Each Share (at Constant 1992-93 Price, Rs. million)

	Flows	1998/99	1999/2000	2000/01	2001/02	2002/03	Total Amount 9th FYP	Average GR/Year 9th FYP	Average Share 9th FYP	2003/04	2004/05	2005/06	2006/07	2007/08	Total Amount 10th FYP	Average GR/Year 10th FYP	Average Share 10th FYP
1	Private Consumption	1,424,665	1,515,843	1,612,857	1,716,080	1,825,909	8,095,354	6.4		1,942,767	2,067,104	2,199,399	2,340,161	2,489,931	11,039,363	6.4	
	Expenditure	70.3	70.7	71.0	73.0	72.3			71.5	72.6	72.9	73.3	73.6	73.9			73.2
2	General Government	148,504	147,019	145,548	144,093	142,652	727,816	-1.0		142,652	142,652	142,652	142,652	142,652	713,260	0.0	
	Consumption Expenditure	7.3	6.9	6.4	6.1	5.6			6.5	5.3	5.0	4.8	4.5	4.2			4.8
3	Gross Domestic Capital	436,061	460,044	485,347	512,041	540,203	2,433,695	5.5		568,293	597,845	628,933	661,637	696,042	3,152,750	5.2	
	Formation (GFCF)	21.5	21.4	21.4	21.8	21.4			21.5	21.2	21.1	20.9	20.8	20.6			20.9
4	Change in Stocks	25,196	26,765	28,438	29,469	31,864	141,731	6.0		33,809	35,882	38,091	40,446	42,957	191,185	6.2	
		1.4	1.4	1.4	1.4	1.4			1.4	1.4	1.4	1.4	1.4	1.4			1.4
4-a	Total Investment (3+4)	461,256	486,809	513,785	541,510	572,066	2,575,426	5.5		602,102	633,726	667,023	702,083	738,999	3,343,934	5.3	
	(Share of GDP mp)								22.8								22.0
5	Total (1+2+3+4)	2,025,911	2,145,355	2,271,767	2,349,484	2,525,984	11,318,502	5.7		2,675,285	2,833,858	3,002,303	3,181,252	3,371,383	15,064,080	6.0	
		100.4	100.2	100.0	102.2	100.6			100.7	100.5	100.3	100.2	100.1	100.0			100.2
6	Export of Goods and	430,974	474,071	521,478	573,626	630,989		10.0		681,468	735,985	794,864	858,453	927,129		8.0	
	Non-factor Services	23.9	24.8	25.7	27.3	27.7			25.9	28.2	28.7	29.2	29.7	30.2			29.2
7	(Less) import of Goods	459,021	495,743	535,402	578,234	624,493		8.0		668,208	714,982	765,031	818,583	875,884		7.0	
	and Non-factor Services	25.5	25.9	26.4	27.5	27.4			26.5	27.7	27.9	28.1	28.3	28.5			28.1
8	Expenditure on GDP at	1,997,864	2,123,683	2,257,843	2,344,876	2,532,480		6.1		2,688,545	2,854,861	3,032,136	3,221,122	3,422,628		6.2	
	Market Prices	111.0	111.1	111.2	111.4	111.3			111.2	111.3	111.4	111.4	111.5	111.5			111.4
9	Plus Net Factor Income	16,092	16,495	16,907	17,330	17,763		2.5		18,118	18,481	18,850	19,227	19,612		2.0	
		0.9	0.9	0.8	0.8	0.8			0.8	0.8	0.7	0.7	0.7	0.6			0.7
10	Expenditure on GNP at	2,013,956	2,140,178	2,274,750	2,362,206	2,550,243		6.1		2,706,663	2,873,342	3,050,986	3,240,349	3,442,240		6.2	
	Market Prices	111.9	111.9	112.0	112.2	112.1			112.0	112.1	112.1	112.1	112.2	112.2			112.1
11	Less indirect tax	222,949	236,910	251,798	265,450	282,276		6.1		299,599	318,061	337,741	358,723	381,096		6.2	
		12.4	12.4	12.4	12.6	12.4			12.4	12.4	12.4	12.4	12.4	12.4			12.4
12	Plus Subsidies	8,681	8,508	8,337	8,171	8,007		-2.0		7,847	7,690	7,536	7,386	7,238		-2.0	
		0.5	0.4	0.4	0.4	0.4			0.4	0.3	0.3	0.3	0.3	0.2			0.3
13	GNP at Factor Cost	1,799,688	1,911,776	2,031,289	2,104,927	2,275,974		6.0		2,414,911	2,562,971	2,720,781	2,889,012	3,068,382		6.2	
		100.0	100.0	100.0	100.0	100.0			100.0	100.0	100.0	100.0	100.0	100.0			100.0
14	GDP at Factor Cost	1,783,995	1,895,281	2,014,382	2,123,597	2,258,211	10,075,466	6.1		2,396,793	2,544,491	2,701,931	2,869,784	3,048,770	13,561,769	6.2	
15	GDP at Market Price	1,998,263	2,123,683	2,257,843	2,380,876	2,532,480	11,293,145			2,688,545	2,854,862	3,032,136	3,221,121	3,422,628	15,219,292		

Source:
(1) Economic Survey 1993-94, Economic Advisor's Wing, Finance Division
(2) JICA Study Team

Table 2.3.2.5 Expenditure on Gross National Product and Each Share (Trend and Projection of Share)

Flows	Average Share				
	6th FYP	7th FYP	8th FYP	9th FYP	10th FYP
1 Private Consumption Expenditure	69.8	68.6	70.1	72.0	74.0
2 General Government Current Consumption Expenditure	11.8	12.8	8.9	6.1	4.5
3 Gross Domestic Capital Formation (GFCF)	16.8	17.0	19.4	20.6	20.2
4 Change in Stocks	1.7	1.7	1.7	1.4	1.4
5 Export of Goods and Non-factor Services	13.6	18.4	25.6	31.4	35.3
6 Less import of Goods and Non-factor Services	20.5	19.0	20.8	22.0	23.2
7 Expenditure on GDP at Market Prices	100.7	109.7	112.8	114.4	115.1
8 Plus Net Factor Income from abroad	7.7	2.4	1.0	0.8	0.6
9 Expenditure on GNP at Market Prices	108.4	112.0	112.2	112.5	112.6
10 Less indirect tax	12.0	13.1	12.9	12.9	12.9
11 Plus Subsidies	1.9	1.2	0.6	0.4	0.3
12 GNP at Factor Cast	100.0	100.0	100.0	100.0	100.0

Source: JICA Study Team

As shown therein the share of the private-consumption expenditure will grow constantly during 8th - 10th FYP. On the other hand, the share of the expenditure of general government in GNP will decrease constantly. Share of GFCF per GNP is projected to grow constantly to lead the development economy. Table 2.3.2.6 "Trend and Projection of Share of Expenditure" summarizes a share of expenditure in GNP by type of expenditures which is based the analysis of growth of expenditure as shown in Table 2.3.2.7.

Table 2.3.2.6 Trend and Projection of Share of Expenditure

(Unit : Percent)

Growth Rate	6th FYP	7th FYP	8th FYP	9th FYP	10th FYP
Private Consumption Expenditure	69.8	68.6	70.1	72.0	74.0
General Government Consumption	11.8	12.8	8.9	6.1	4.5
GFCF	16.8	17.0	19.4	20.6	20.2
Change in Stocks	1.6	1.6	1.6	1.3	1.3

2.3.3 Gross Domestic Fixed Capital Formation

Past trend of GFCF growth is shown in Table 2.3.3.1 "GFCF by Economic Activity (At Current Market Price)". As shown therein the total GFCF in 1992-93 was Rs. 256.6 million. In order to forcast GFCF growth and the changes of share of GFCF by economic activity, Table 2.3.3.2 "GFCF by Economic Activity (Trend - At constant price in 1980-81)" was prepared. The share of private sector has increased from 42.0 % of total GFCF in the 6th FYP to 47.6 % in the 7th FYP. This trend of increasing share of private sector in total GFCF will continue as vitalization of private sector development and investment is encouraged by the government in line with the economic

Table 2.3.3.1 Gross Fixed Capital Formation (GFCF) by Economic Activity (at Current Price)

Fiscal Year	1983/84	Sector Share	GDP Share	1984/85	Sector Share	GDP Share	1985/86	Sector Share	GDP Share	1986/87	Sector Share	GDP Share	1987/88	Sector Share	GDP Share	6th FYP Total	Sector Share	GDP Share	GFCF Share
1.0 GFCF (A+B+C)	61,761	100.0	14.7	69,212	100.0	14.7	87,545	100.0	17.0	100,040	100.0	17.5	111,266	100.0	16.5	429,824	100.00	16.19	
A Private Sector	26,758	43.3	6.4	31,419	45.4	6.7	39,959	45.6	7.8	44,349	44.3	7.7	51,769	46.5	7.7	194,254	45.19	7.32	
B Public Sector	21,864	35.4	5.2	23,291	33.7	4.9	29,117	33.3	5.7	34,374	34.4	6.0	34,886	31.4	5.2	143,532	33.39	5.41	
C General Government	13,140	21.3	3.1	14,503	21.0	3.1	18,470	21.1	3.6	21,317	21.3	3.7	24,611	22.1	3.6	92,041	21.41	3.47	
2.0 SECTOR-WISE																			
2.1 Agriculture	7,292		1.74	8,718		1.85	9,970		1.94	10,873		1.90	12,274		1.82	49,127		1.85	11.43
2.2 Mining and quarrying	291		0.07	902		0.19	2,152		0.42	2,873		0.50	2,090		0.31	8,308		0.31	1.93
2.3 Manufacturing	11,949		2.85	14,266		3.02	16,890		3.28	16,762		2.93	19,605		2.90	79,472		2.99	18.49
2.3 Large Scale	10,595		2.52	12,759		2.70	14,887		2.89	14,607		2.55	16,966		2.51	69,814		2.63	16.24
2.3 Small Scale	1,354		0.32	1,507		0.32	2,002		0.39	2,155		0.38	2,639		0.39	9,657		0.36	2.25
2.4 Construction	3,666		0.87	2,693		0.57	3,097		0.60	3,884		0.68	4,592		0.68	17,932		0.68	4.17
2.5 Electricity and gas	6,195		1.48	6,136		1.30	8,356		1.62	11,687		2.04	13,226		1.96	45,600		1.72	10.61
2.6 Transport and communication	6,412		1.53	7,758		1.64	11,289		2.19	13,308		2.32	12,461		1.85	51,228		1.93	11.92
2.7 Wholesale and retail trade	445		0.11	500		0.11	656		0.13	713		0.12	935		0.14	3,249		0.12	0.76
2.8 Financial institution	9,245		2.20	10,307		2.18	12,263		2.38	13,304		2.32	15,054		2.23	60,173		2.27	14.00
2.9 Services	3,127		0.74	3,429		0.73	4,467		0.87	5,318		0.93	6,419		0.95	22,760		0.86	5.30
			11.58			14.61			16.72			16.68			15.73			15.72	100.00
3.0 GDP Market Price	419,802			472,157			514,532			572,479			675,389			2,654,359			

Fiscal Year	1988/89	Sector Share	GDP Share	1989/90	Sector Share	GDP Share	1990/91	Sector Share	GDP Share	1991/92	Sector Share	GDP Share	1992/93	Sector Share	GDP Share	7th FYP Total	Sector Share	GDP Share	GFCF Share
1.0 GFCF (A+B+C)	133,170	100.0	17.3	148,076	100.0	17.3	177,646	100.0	17.4	225,360	100.0	18.6	256,644	100.0	19.1	940,896	100.00	18.10	
A Private Sector	64,162	48.2	8.3	76,563	51.7	8.9	91,226	51.4	8.9	118,878	52.8	9.8	134,768	52.5	10.0	485,597	51.61	9.34	
B Public Sector	43,105	32.4	5.6	42,577	28.8	5.0	49,514	27.9	4.9	63,504	28.2	5.2	73,405	28.6	5.5	272,105	28.92	5.23	
C General Government	25,903	19.5	3.4	28,936	19.5	3.4	36,906	20.8	3.6	42,978	19.1	3.5	48,471	18.9	3.6	183,194	19.47	3.52	
2.0 SECTOR-WISE																			
2.1 Agriculture	13,537		1.76	15,537		1.82	17,684		1.73	18,057		1.49	20,523		1.53	85,338		1.64	9.07
2.2 Mining and quarrying	3,286		0.43	1,889		0.22	2,561		0.25	3,799		0.31	3,379		0.25	14,914		0.29	1.59
2.3 Manufacturing	25,915		3.37	31,875		3.72	38,898		3.81	58,540		4.83	63,433		4.73	218,661		4.21	23.24
2.3 Large Scale	22,592		2.93	28,048		3.28	34,084		3.34	52,598		4.34	56,536		4.21	193,858		3.73	20.60
2.3 Small Scale	3,323		0.43	3,827		0.45	4,814		0.47	5,942		0.49	6,897		0.51	24,803		0.48	2.64
2.4 Construction	4,894		0.64	5,835		0.68	5,127		0.50	8,043		0.66	9,942		0.74	33,841		0.65	3.60
2.5 Electricity and gas	22,411		2.91	23,455		2.74	24,103		2.36	30,881		2.55	33,647		2.51	134,497		2.59	14.29
2.6 Transport and communication	13,434		1.75	13,969		1.63	20,558		2.01	25,801		2.13	34,908		2.60	108,670		2.09	11.55
2.7 Wholesale and retail trade	1,028		0.13	1,189		0.14	1,708		0.17	1,955		0.16	1,998		0.15	7,878		0.15	0.84
2.8 Financial institution	16,418		2.13	18,579		2.17	21,659		2.12	24,960		2.06	29,177		2.17	110,793		2.13	11.78
2.9 Services	6,344		0.82	6,812		0.80	8,442		0.83	10,346		0.85	11,166		0.83	43,110		0.83	4.58
			17.30			17.64			17.60			19.89			20.24			18.78	0.00
3.0 GDP Market Price	769,745			855,943			1,020,600			1,211,385			1,341,955			5,199,628			

Source: Economic Survey 1993-94, Economic Advisor's Wing, Finance Division

Table 2.3.3.2 Gross Fixed Capital Formation (GFCF) by Ecocnnmic Activity (Trend) (at Constant Price in 1980-81)

Fiscal Year	1983/84	Sector Share	GDP Share	1984/85	Sector Share	GDP Share	1985/86	Sector Share	GDP Share	1986/87	Sector Share	GDP Share	1987/88	Sector Share	GDP Share	6th FYP Total	GDP Share	GFCF Share	AAGR 6th FYP
1.0 GFCF (A+B+C)	33,897	100.00	10.19	37,987	100.00	10.62	48,049	100.00	12.73	54,907	100.00	13.67	61,068	100.00	14.12	235,908	12.40	100.00	15.9
A Private Sector	13,650	40.27	4.11	16,028	42.19	4.48	20,384	42.42	5.40	22,624	41.20	5.63	26,409	43.25	6.11	99,095	5.21	42.01	17.9
B Public Sector	12,479	36.81	3.75	13,293	34.99	3.72	16,618	34.59	4.40	19,619	35.73	4.88	19,911	32.60	4.60	81,920	4.31	34.73	12.4
C General Government	7,768	22.92	2.34	8,666	22.81	2.42	11,047	22.99	2.93	12,664	23.06	3.15	15,235	24.15	3.52	55,380	2.91	23.48	18.3
D GFCF(A+B)	26,129			29,321			37,002			42,243			46,320			181,015			
A' Private Sector	13,650	52.24	4.11	16,028	54.66	4.48	20,384	55.09	5.40	22,624	53.56	5.63	26,409	57.01	6.11	99,095	5.21	54.74	17.9
B' Public Sector	12,479	47.76	3.75	13,293	45.34	3.72	16,618	44.91	4.40	19,619	46.44	4.88	19,911	42.99	4.60	81,920	4.31	45.26	12.4
																	9.52	100.00	
2.0 SECTOR-WISE																			
2.1 Agriculture	4,145		1.25	4,956		1.39	5,667		1.50	6,181		1.54	6,977		1.61	27,926	1.47	11.84	13.9
2.2 Mining and quarrying	175		0.05	543		0.15	1,295		0.34	1,729		0.43	1,258		0.29	5,000	0.26	2.12	63.7
2.3 Manufacturing	4,567		1.37	5,453		1.52	6,456		1.71	6,407		1.59	7,494		1.73	30,377	1.60	12.88	13.2
2.3 Large Scale	3,741		1.13	4,505		1.26	5,256		1.39	5,157		1.28	5,990		1.39	24,649	1.30	10.45	12.5
2.3 Small Scale	807		0.24	898		0.25	1,193		0.32	1,284		0.32	1,572		0.36	5,754	0.30	2.44	18.1
2.4 Construction	974		0.29	715		0.20	823		0.22	1,032		0.26	1,220		0.28	4,764	0.25	2.02	5.8
2.5 Electricity and gas	3,744		1.13	3,709		1.04	5,050		1.34	7,064		1.76	7,994		1.85	27,561	1.45	11.68	20.9
2.6 Transport and communication	4,261		1.28	5,155		1.44	7,501		1.99	8,843		2.20	8,280		1.91	34,040	1.79	14.43	18.1
2.7 Wholesale and retail trade	268		0.08	301		0.08	395		0.10	429		0.11	563		0.13	1,956	0.10	0.83	20.4
2.8 Financial institution	5,641		1.70	6,289		1.76	7,483		1.98	8,118		2.02	9,186		2.12	36,717	1.93	15.56	13.0
2.9 Services	1,902		0.57	2,085		0.58	2,717		0.72	3,234		0.80	3,904		0.90	13,842	0.73	5.87	19.7
			9.09			9.67			11.61			12.31			12.59		11.18		
3.0 GDP Market Price	332,503			357,747			377,429			401,782			432,419			1,901,880			6.8

Fiscal Year	1988/89	Sector Share	GDP Share	1989/90	Sector Share	GDP Share	1990/91	Sector Share	GDP Share	1991/92	Sector Share	GDP Share	1992/93	Sector Share	GDP Share	7th FYP Total	GDP Share	GFCF Share	AAGR 6th FYP
1.0 GFCF (A+B+C)	73,090	100.00	16.10	81,271	100.00	17.14	83,871	100.00	16.78	92,512	100.00	17.16	96,420	100.00	17.55	427,164	16.97	100.00	7.2
A Private Sector	32,731	44.78	7.21	39,057	48.06	8.24	40,203	47.93	8.04	44,903	48.54	8.33	46,551	48.28	8.47	203,445	8.08	47.63	9.2
B Public Sector	24,602	33.66	5.42	24,301	29.90	5.13	24,580	29.31	4.92	27,679	29.92	5.13	29,471	30.57	5.36	130,633	5.19	30.58	4.6
C General Government	15,757	21.56	3.47	17,913	22.04	3.78	19,088	22.76	3.82	19,930	21.54	3.70	20,398	21.16	3.71	93,086	3.70	21.79	6.7
D GFCF(A+B)	57,333			63,358			64,783			72,582			76,022			334,078			
A' Private Sector	32,731	57.09	7.21	39,057	61.64	8.24	40,203	62.06	8.04	44,903	61.87	8.33	46,551	61.23	8.47	203,445	8.08	60.90	9.2
B' Public Sector	24,602	42.91	5.42	24,301	38.36	5.13	24,580	37.94	4.92	27,679	38.13	5.13	29,471	38.77	5.36	130,633	5.19	39.10	4.6
																	13.28	100.00	
2.0 SECTOR-WISE																			
2.1 Agriculture	7,695		1.70	8,832		1.86	8,712		1.74	7,911		1.47	8,279		1.51	41,429	1.65	9.70	1.8
2.2 Mining and quarrying	1,978		0.44	1,137		0.24	1,309		0.26	1,714		0.32	1,447		0.26	7,585	0.30	1.78	-7.5
2.3 Manufacturing	9,906		2.18	12,184		2.57	13,090		2.62	18,010		3.34	17,862		3.25	71,052	2.82	16.63	15.9
2.3 Large Scale	7,977		1.76	9,904		2.09	10,544		2.11	15,292		2.84	14,917		2.71	58,634	2.33	13.73	16.9
2.3 Small Scale	1,980		0.44	2,280		0.48	2,546		0.51	2,718		0.50	2,945		0.54	12,469	0.50	2.92	10.4
2.4 Construction	1,300		0.29	1,550		0.33	2,714		0.54	2,621		0.49	1,939		0.35	10,124	0.40	2.37	10.5
2.5 Electricity and gas	13,545		2.98	14,176		2.99	12,458		2.49	14,036		2.60	14,266		2.60	68,481	2.72	16.03	1.3
2.6 Transport and communication	8,927		1.97	9,283		1.96	9,864		1.97	11,140		2.07	14,265		2.60	53,479	2.13	12.52	12.4
2.7 Wholesale and retail trade	619		0.14	716		0.15	880		0.18	905		0.17	866		0.16	3,986	0.16	0.93	8.8
2.8 Financial institution	10,018		2.21	11,337		2.39	11,450		2.29	11,774		2.18	12,348		2.25	56,927	2.26	13.33	5.4
2.9 Services	3,858		0.85	4,143		0.87	4,306		0.86	4,471		0.83	4,751		0.86	21,529	0.86	5.04	5.3
			14.94			15.93			15.58			16.80			17.09		16.12		
3.0 GDP Market Price	453,866			474,102			499,960			539,131			549,475			2,516,534			4.9

Source: (1) Economic Survey 1993-94, Economic Advisor's Wing, Finance Division
(2) Economic Survey 1992-93, Economic Advisor's Wing, Finance Division
(3) JICA Study Team

development policy set out for 8th FYP and for successive FYPs. Marginal co-efficiency of investment and gross products were 17.0 % and 18.0 % for the 6th and the 7th FYPs respectively. The share of GFCF in GDP is a determining factor of economic growth as a whole. The investment effectively as appeared in terms of marginal co-efficiency is measured by projected growth of GFCF and its correlation with GDP. The projected growth of GFCF per GDP is 19.3 %, 20.7 % and 19.9 % for the periods of 8th - 10th FYPs.

2.3.4 Share of Transport Sector in GDP

During 1960's and 1970's the share of transport sector in GDP was between 6 and 7 %. However, an average growth rate of value added of transport and communication sectors has always, more or less, been around 7.0 % and shown an overall upwards which exceeds the growth rate of GDP at every respective years. These form a reason of significant share in GDP by the transport and communication sectors.

The share of transport sector in GDP in the 5th, 6th and 7th FYP period in annual average were tabulated in Table 2.3.4.1 "Trend and Projection of Share of Transport Sector in GDP" which is based on sectional share in GDP as shown in Table 2.2.1.2 and Table 2.2.3.5.

In order to estimate capital stock assets and investment in transport sector data concerned to sectional capital stock series are indispensable, however, it is not readily available from existing data. National Transport Research Center studied the same in 1993 and published a report with reference No. NTRC-163. In accordance with this report, the scale of investment and capital stock of transport sector is projected, and the growth rate were projected as in Table 2.3.4.1 "Trend and Projection of Share of Transport Sector in GDP".

Table 2.3.4.1 Trend and Projection of Share of Transport Sector in GDP

(unit : percent)

Period	5th FYP	6th FYP	7th FYP	8th FYP	9th FYP	10th FYP
Share of Transport & Communication Sector	9.8	10.2	9.7	9.9	9.7	9.8
Growth Rate	-	6.7	7.4	5.8	6.5	6.5

2.3.5 Expenditure of Transport Sector

Expenditure on transport sector in terms of GFCF in the 6th FYP was Rs.51.2 million and Rs. 108.7 million in 7th FYP at current market price. Total GFCF for transport sector has expanded 2.1 times as much from the 6th FYP to 7th FYP. The share of expenditure in transport sector by sector and mode of transport is shown in Table 2.3.5.1 "Share of Expenditure in Transport Sector". Table 2.3.5.2 "Trend and Projection of Share of Expenditure in Transport Sector" shows that the share of private sector in the expenditure will grow constantly through the 8th to 10th FYPs.

Table 2.3.5.2 Trend and Projection of Share of Expenditure in Transport Sector

(unit : percent)

Period	6th FYP	7th FYP	8th FYP	9th FYP	10th FYP
Public Sector	67.5	67.7	65.2	62.0	60.0
Private Sector	32.5	32.3	34.8	38.0	40.0

As appeared in the above table, expenditure of private sector in transport and communication sector will grow continuously from 8th FYP as privatization process of public sector enterprise proceeds.

Gross Capital Formation of Transport Sector in the past is shown in Table 2.3.5.3 "GFCF of Transport Sector 1978 - 1991". As seen in the table the average capital stock in transport sector in real terms has been increasing at compound rate of about 7 % per annum. Table 2.3.5.4 "Share of GFCF by Transport Sector (Trend)" shows the changes of share of GFCF by transport sector 1.93 % in the 6th FYP and 2.09 % in the 7th FYP.

Table 2.3.5.1 Share of Expenditure in Transport Sector

		6th FYP (Utilized)			Share
		Public Sector (PSDP)	Enterprise Non-Budgetary	Total	(%)
I	PUBLIC SECTOR	28,573	12,400	40,973	**67.5**
1	Railways	7,404	0	7,404	12.2
2	Roads	4,045	550	4,595	39.0
3	Others	2,456	0	2,456	4.0
4	Civil Aviation	429	11,408	11,837	19.5
5	Provincial Roads	4,765	0	4,765	7.9
6	Ports & shipping	867	442	1,309	2.2
7	Post & PTC	8,607	0	8,607	14.2
II	PRIVATE SECTOR			19,706	**32.5**
1	Shipping			0	0.0
2	Road Transport			19,706	32.5
3	Telephone			0	0.0
III	GRAND TOTAL			60,679	100.0

		7th FYP (Planned)			Share
		Public Sector (PSDP)	Enterprise Non-Budgetary	Total	(%)
I	PUBLIC SECTOR	70,647	0	70,647	**67.7**
1	Railways	8,485	0	8,485	8.1
2	Roads	29,717	0	29,717	28.5
3	Others	225	0	225	0.2
4	Civil Aviation	5,364	0	5,364	5.1
5	Ports & shipping	4,486	0	4,486	4.3
6	Post & PTC	22,370	0	22,370	21.4
II	PRIVATE SECTOR			33,680	**32.3**
1	Shipping			1,440	1.4
2	Road Transport			32,240	30.9
3	Telephone			0	0.0
III	GRAND TOTAL			104,327	100.0

		8th FYP (Planned)			Share
		Public Sector (PSDP)	Enterprise Non-budgetary	Total	(%)
I	PUBLIC SECTOR	120,470	10,106	130,576	**65.2**
1	Railways	40,041	0	40,041	20.0
2	Roads	74,687	0	74,687	37.3
3	Others	250	0	250	0.1
4	Civil Aviation	1,092	5,706	6,798	3.4
6	Ports & shipping	3,256	4,400	7,656	3.8
7	Post & PTC	1,144	0	1,144	0.6
II	PRIVATE SECTOR			69,660	**34.8**
1	Shipping			3,000	1.5
2	Road Transport			48,360	24.2
3	Telephone			18,300	9.1
III	GRAND TOTAL			200,236	100.0

Source:
(1) 7th Five Year Plan
(2) 8th Five Year Plan

The share of transport sector investment as percent of total investment are shown in the Table 2.3.5.3. Investment for the economy has been regularly growing over the past several decades, and the average annual growth rate of total investment has been about 7.1 %.

Table 2.3.5.3 "GFCF of Transport Sector 1978 - 1991".

(Unit: million Rs.)

Year	Gross Capital Formation	Capital Stock	Depreciation	Share in Total Investment
1978	3,583.8	21,770.0	1,959.5	9.1%
1979	4,272.0	23,394.5	5,105.5	10.5%
1980	9,162.7	25,561.0	2,300.5	20.0%
1981	5,875.0	32,423.2	2,300.5	12.3%
1982	5,638.7	35,380.1	2,918.1	11.3%
1983	4,406.8	37,834.5	3,184.2	8.2%
1984	4,811.5	38,836.2	3,405.1	8.8%
1985	6,730.6	40,152.5	3,495.3	11.5%
1986	6,859.8	43,270.6	3,613.7	10.7%
1987	7,177.3	46,235.1	3,894.3	10.2%
1988	6,344.8	49,251.3	4,161.2	8.9%
1989	5,923.9	51,163.5	4,432.6	7.5%
1990	5,616.1	52,482.8	4,604.7	6.8%
1991	6,907.3	53,375.4	4,723.4	8.1%

Source:NTRC-163, 1993)

Table 2.3.5.4 Share of Gross Fixed Capital Formation (GFCF) of Transport and Communication Sector by Mode of Transport

	Fiscal Year	1983/84	Sector Share	GDP Share	1984/85	Sector Share	GDP Share	1985/86	Sector Share	GDP Share	1986/87	Sector Share	GDP Share	1987/88	Sector Share	GDP Share	6th FYP Total	Sector Share	GDP Share	GFCF Share
1.0	GFCF (A+B+C)	61,761	100.00	14.71	69,212	100.00	14.66	87,545	100.00	17.01	100,040	100.00	17.47	111,266	100.00	16.47	429,824	100.00	16.19	
A	Private Sector	26,758	43.33	6.37	31,419	45.40	6.65	39,959	45.64	7.77	44,349	44.33	7.75	51,769	46.53	7.67	194,254	45.19	7.32	
B	Public Sector	21,864	35.40	5.21	23,291	33.65	4.93	29,117	33.26	5.66	34,374	34.36	6.00	34,886	31.35	5.17	143,532	33.39	5.41	
C	General Government	13,140	21.28	3.13	14,503	20.95	3.07	18,470	21.10	3.59	21,317	21.31	3.72	24,611	22.12	3.64	92,041	21.41	3.47	
2.0	TRANSPORT SECTOR																			
2.1	Private and Public	6,412	100.00	1.53	7,758	100.00	1.64	11,289	100.00	2.19	13,308	100.00	2.32	12,461	100.00	1.85	51,228	100.00	1.93	11.92
2.2	Private	1,936	30.19	0.46	2,390	30.81	0.51	3,676	32.56	0.71	4,373	32.86	0.76	5,197	41.71	0.77	17,572	34.30	0.66	4.09
2.3	Public including General Govmt.	4,476	69.81	1.07	5,368	69.19	1.14	7,613	67.44	1.48	8,935	67.14	1.56	7,264	58.29	1.08	33,656	65.70	1.27	7.83
2.3.1	Railways	1,350	21.05	0.32	993	12.80	0.21	1,790	15.86	0.35	1,734	13.03	0.30	1,410	11.32	0.21	7,277	14.21	0.27	1.69
2.3.2	Others	1,788	27.89	0.43	2,692	34.70	0.57	3,886	34.42	0.76	4,120	30.96	0.72	3,303	26.51	0.49	15,789	30.82	0.59	3.67
2.3.3	Post Office & PTC	1,338	20.87	0.32	1,684	21.71	0.36	1,938	17.17	0.38	3,081	23.15	0.54	2,551	20.47	0.38	10,592	20.68	0.40	2.46
3.0	GDP Market Price	419,802			472,157			514,532			572,479			675,389			2,654,359			

	Fiscal Year	1988/89	Sector Share	GDP Share	1989/90	Sector Share	GDP Share	1990/91	Sector Share	GDP Share	1991/92	Sector Share	GDP Share	1992/93	Sector Share	GDP Share	7th FYP Total	Sector Share	GDP Share	GFCF Share
1.0	GFCF (A+B+C)	133,170	100.00	17.30	148,076	100.00	17.30	177,646	100.00	17.41	225,360	100.00	18.60	256,644	100.00	19.12	940,896	100.00	18.10	
A	Private Sector	64,162	48.18	8.34	76,563	51.71	8.94	91,226	51.35	8.94	118,878	52.75	9.81	134,768	52.51	10.04	485,597	51.61	9.34	
B	Public Sector	43,105	32.37	5.60	42,577	28.75	4.97	49,514	27.87	4.85	63,504	28.18	5.24	73,405	28.60	5.47	272,105	28.92	5.23	
C	General Government	25,903	19.45	3.37	28,936	19.54	3.38	36,906	20.78	3.62	42,978	19.07	3.55	48,471	18.89	3.61	183,194	19.47	3.52	
2.0	TRANSPORT SECTOR																			
2.1	Private and Public	13,434	100.00	1.75	13,969	100.00	1.63	20,558	100.00	2.01	25,801	100.00	2.13	34,908	100.00	2.60	108,670	100.00	2.09	11.55
2.2	Private	6,365	47.38	0.83	6,120	43.81	0.72	8,737	42.50	0.86	10,001	38.76	0.83	11,246	32.22	0.84	42,469	39.08	0.82	4.51
2.3	Public including General Govmt.	7,069	52.62	0.92	7,849	56.19	0.92	11,821	57.50	1.16	15,800	61.24	1.30	23,662	67.78	1.76	66,201	60.92	1.27	7.04
2.3.1	Railways	196	1.46	0.03	572	4.09	0.07	1,257	6.11	0.12	2,191	8.49	0.18	2,188	6.27	0.16	6,404	5.89	0.12	0.68
2.3.2	Others	3,486	25.95	0.45	3,449	24.69	0.40	4,115	20.02	0.40	7,319	28.37	0.60	8,251	23.64	0.61	26,620	24.50	0.51	2.83
2.3.3	Post Office & PTC	3,387	25.21	0.44	3,828	27.40	0.45	6,449	31.37	0.63	6,290	24.38	0.52	13,223	37.88	0.99	33,177	30.53	0.64	3.53
3.0	GDP Market Price	769,745			855,943			1,020,600			1,211,385			1,341,955			5,199,628			

Source: Economic Survey 1993-94, Economic Advisor's Wing, Finance Division

Table 2.3.5.5 "Trend and Projection of Share of Expenditure in Transport Sector and by Mode of Transport" summarizes changes of share of GFCF by mode of transport further to prepare the projection of GFCF for the 8th - 10th FYP periods based on the analyses conducted as shown in the Table 2.3.5.1 "Share of Investment in Transport Sector".

The share of private sector in the annual investment in the transport sector has continuously increased in total transport sector investment. On the other hand, there is significant fall in share of railways and was only 2.0 % in 1989. However, the situation of investment in railways has reversed during 1989 - 1991. In line with the privatization process of public corporation of which expenditure was based on the government budget, GFCF of private sector will increase and it will replace with the decrease of public sector expenditure. However, railways will remain in the category of public sector its share of GFCF in the public sector will increase moderately. During the period of 8th FYP massive investment into railways is planned to revive the importance of railways which has been almost neglected in the past.

Table 2.3.5.5 "Trend and Projection of Share of Expenditure in Transport Sector by Mode of Transport "

(Unit : percent)

Period	6th FYP	7th FYP	8th FYP	9th FYP	10th FYP
PUBLIC SECTOR	67.5	67.5	65.2	62.0	60.0
Railways	12.2	8.1	20.0	17.5	17.0
Roads	39.0	28.5	37.3	36.5	35.0
Others	4.0	0.2	0.1	0.1	0.1
Civil Aviation	19.5	5.1	3.4	3.5	3.5
Provincial Roads	7.9	-	-	-	-
Ports and Shipping	2.2	4.3	3.8	4.0	4.0
Post and Telecommunication	14.2	21.3	0.6	0.4	0.4
PRIVATE SECTOR	32.5	32.5	34.8	38.0	40.0
Shipping	0.0	1.4	1.5	2.0	3.0
Road Transport	32.5	30.9	24.2	23.0	20.0
Telecommunication	0.0	0.0	9.1	14.0	17.0

By incompilating various projections of expenditure, GFCF and share of transport sector in GDP as well as GFCF, share of GFCF by mode of transport, the projection of GFCF of transport sector for 8th - 10th FYP periods is delineated and summarized as per Table 2.3.5.6 "Projection of Gross Capital Formation (GFCF) of Transport and Communication Sector (at Constant 1992-93 price)".

Table 2.3.5.6 Projection of Gross Fixed Capital Formation (GFCF) Transport and Communication Sector (8th - 10th FYP) (at Cunstant Price 1992-93)

	Fiscal Year	Total 7th FYP	Share	GFCF Share	GDP Share	Total 8th FYP	Share	GFCF Share	GDP Share	Total 9th FYP	Sector Share	GFCF Share	GDP Share	Total 10th FYP	Sector Share	GFCF Share	GDP Share	Total 8th-10th	Sector Share
1.0	GFCF (A+B+C)	1,156,300	100.00		18.84	1,723,521	100.00		20.91	2,443,695	100.00		21.64	3,152,750	100.00		20.72		
A	Private Sector	550,746	47.63		8.97	962,931	55.87		11.68	1,466,217	60.00		12.98	2,080,815	66.00		13.67		
B	Public Sector (PSDP)	353,597	30.58		5.76	413,328	23.98		5.01	610,924	25.00		5.41	662,078	21.00		4.35		
C	General Government	251,958	21.79		4.10	347,262	20.15		4.21	366,554	15.00		3.25	409,858	13.00		2.69		
D	Budgetary Allocation (B+C)	605,554	52.37		9.86	760,590	44.13		9.23	977,478	40.00		8.66	1,071,935	34.00		7.04		
2.0	TRANSPORT SECTOR																		
2.1	Private and Public	130,759	100.00	11.31	2.13	197,850	100.00	11.48	2.40	248,449	100.00	10.17	2.20	304,386	100.00	9.65	2.00	750,685	100.00
2.2	Private	42,497	32.50	3.68	0.69	67,274	34.00	3.90	0.82	99,380	40.00	4.07	0.88	136,974	45.00	4.34	0.90	303,627	40.45
2.3	Public including General Govmt.	88,262	67.50	7.63	1.44	130,576	66.00	7.58	1.58	149,070	60.00	6.10	1.32	167,412	55.00	5.31	1.10	447,058	59.55
2.3.1	Railways	10,591	12.00	0.92	0.17	40,041	30.66	2.32	0.49	53,665	36.00	2.20	0.48	66,965	40.00	2.12	0.44	160,671	35.94
2.3.2	Roads	37,266	42.22	3.22	0.61	74,687	57.20	4.33	0.91	68,572	46.00	2.81	0.61	58,594	35.00	1.86	0.39	201,853	45.15
2.3.3	Civil Aviation	6,669	7.56	0.58	0.11	6,798	5.21	0.39	0.08	13,416	9.00	0.55	0.12	16,741	10.00	0.53	0.11	36,955	8.27
2.3.4	Ports and Shipping	5,623	6.37	0.49	0.09	7,656	5.86	0.44	0.09	10,435	7.00	0.43	0.09	16,741	10.00	0.53	0.11	34,832	7.79
2.3.3	Transport Others	262	0.30	0.02	0.00	250	0.19	0.01	0.00	298	0.20	0.01	0.00	1,674	1.00	0.05	0.01	2,222	0.50
2.3.4	Post Office & PTC	27,852	31.56	2.41	0.45	1,144	0.88	0.07	0.01	2,683	1.80	0.11	0.02	6,696	4.00	0.21	0.04	10,524	2.35
			100.00				100.00				100.00				100.00				100.00
3.0	GDP Market Price	6,138,924				8,243,735				11,293,145				15,219,292					

Source JICA Study Team
(1) Economic Survey 1993-94, Economic Advisor's Wing
(2) 7th Five Year Plan
(3) 8th Five Year Plan
(4) JICA Study Team

2.3.6 Share of Transport and Communications in ADP

Annual Development Programme (ADP) has expended during the periods of the 6th and 7th FYPs as from 7.8 % to 8.4 % as shown in Table 2.3.6.1 "Expenditure and Share Under ADP by Sector". In 1992-93 a share given to transport and communication sector in ADP has increased so quickly that lead to a drastic expansion of ADP allocation to transport and communication sector as appeared in the average annual growth of ADP share from 4.6 % to 50.4 % on current market price basis. The budget allocation and expenditure for the Public Sector Development Programme (hereinafter refereed to as the PSDP) of 7th FYP period is shown in Appendix Table 2.3.6.1. The budget allocation and expenditure for transport and communication sector in PSDP is summarized in Appendix Table 2.3.6.2. As shown therein the total amount allocated for PSDP during 7th FYP was Rs. 37,215 million which is 9.4 % of total GNP at Current Market price.

Share of transport and communication sector in terms of budget allocation in administrated by the Federal Government were 16.1 % next to 24.4 % allocated for the power sector. The rate of foreign aid allocated in PSDP during 7th FYP period was analyzed as 26.1 % in total allocation for PSDP as shown in Table 2.3.6.4 "Aid Dependency by sector in 7th FYP". The same was 33.2 % for transport and communication sector. The rate of dependency on foreign aid for transport and communication sector was next to the water sector which was 48.4 %. The utilization rate of allocated budget as for PSDP was analyzed in view of expenditure by progress all projects. A number of projects to which budget was allocated under PSDP are shown in the Table 2.3.6.5 "Progress of PSDP in Transport Sector".

Table 2.3.6.5 Progress of PSDP in Transport Sector

	Status				
Sub-sector	(A)	(B)	(C)	(D)	(E)
Road Bridge and Highway	125	61	31	9	1
Ports and Shipping	15	7	1	3	2
Railways	21	7	0	9	3
Aviation	146	54	90	2	0
Grand Total	307	129	122	23	8
Rate of Progress in nos.	100%	42%	40%	7%	11%

Legends: (A) Total, (B)Completed, (C) Suspended, (D) On-going, (E) New

Although the number of the projects planned to be completed or start to be implemented beyond the 7th FYP period were counted, whatever the size and the estimated project cost, a simple calculation on utilization or progress of the projects were carried out despite a lack of confirmation by each executing agencies. The progress of the projects in terms of number of projects completed was 42 %. And in terms of utilization between total estimated cost of projects under PSDP Rs. 121.4 million, expenditure Rs.37.2 million (30.6 %) during the 7th FYP and Rs. 45.7 million (37.6 %) during 1986 - 1993. Therefore, about 35 - 45 % of planned budgetary allocation were utilized each year.

In view of the effective utilization of budget allocated for the development of public economy, it is suggested that implementation planning and monitoring of projects are to be more carefully conducted to avoid not only waste of budget but also timely completion of the project or works to be implemented in accordance with the financial schedule.

Table 2.3.6.1 Expenditure Amount and Share Under ADP by Section

	Fiscal Years	1983/84	1984/85	1985/86	1986/87	1987/88	Growth pa 6th FYP	Total 6th FYP	Share (%)
1	Agriculture	2,798	2,920	4,435	3,221	3,493	5.7	16,867	9.00
2	Water	3,381	3,541	4,589	4,129	4,538	7.6	20,178	10.76
3	Power	5,759	7,805	9,325	11,802	11,782	19.6	46,473	24.79
4	Industry	1,040	1,139	526	378	355	-23.6	3,438	1.83
5	Fuel and Minerals	1,772	2,644	2,791	2,680	2,627	10.3	12,514	6.68
6	Transport and Communication	5,024	5,542	5,859	6,276	6,004	4.6	28,705	15.31
7	Physical Planning	2,612	2,748	2,952	3,975	5,439	20.1	17,726	9.46
8	Education and Training	1,549	1,976	2,244	3,669	3,882	25.8	13,320	7.11
9	Health and Nutrition	1,571	1,706	1,822	2,501	2,761	15.1	10,361	5.53
10	Population Planning	202	321	388	335	441	21.6	1,687	0.90
11	Social Welfare	60	73	58	122	148	25.3	461	0.25
12	Manpower	320	207	143	94	191	-12.1	955	0.51
13	Rural Development	952	1,042	1,180	1,956	2,666	29.4	7,796	4.16
14	Indus Basin/Tarbela	481	364	386	395	211	-18.6	1,837	0.98
15	Miscellaneous	309	272	493	645	690	22.2	2,409	1.29
16	Spcial Development Program	331	306	385	401	1,320	41.3	2,743	1.46
17	Operation Shortfall	0	0	0	0	0	0.0	0	0.00
18	Total	28,161	32,606	37,576	42,579	46,548	13.4	187,470	100.00
	GDP	374,349	424,064	466,319	545,431	601,025	12.6	2,411,188	100.00
	Share in GDP (%)	7.5	7.7	8.1	7.8	7.7		7.8	

	Fiscal Years	1988/89	1989/90	1990/91	1991/92	1992/93	Growth pa 7th FYP	Total 7th FYP	Share (%)
1	Agriculture	3,990	3,012	3,042	3,692	3,461	-3.5	17,197	4.26
2	Water	3,389	5,440	6,815	5,554	8,461	25.7	29,659	7.35
3	Power	13,293	16,399	22,204	27,410	34,414	26.8	113,720	28.19
4	Industry	230	166	2,032	2,650	2,183	75.5	7,261	1.80
5	Fuel and Minerals	3,102	2,347	6,494	10,140	11,976	40.2	34,059	8.44
6	Transport and Communication	6,924	8,158	15,608	22,365	35,460	50.4	88,515	21.94
7	Physical Planning	3,755	3,813	5,853	4,550	5,122	8.1	23,093	5.72
8	Education and Training	3,456	4,627	3,451	3,861	5,387	11.7	20,782	5.15
9	Health and Nutrition	2,671	2,668	2,739	2,402	2,152	-5.3	12,632	3.13
10	Population Planning	424	444	653	763	703	13.5	2,987	0.74
11	Social Welfare	115	150	162	138	157	8.1	722	0.18
12	Manpower	258	250	519	319	365	9.1	1,711	0.42
13	Rural Development	1,859	2,428	6,405	4,746	5,345	30.2	20,783	5.15
14	Indus Basin/Tarbela	166	141	43	94	77	-17.5	521	0.13
15	Miscellaneous	1,185	4,134	7,092	5,182	4,619	40.5	22,212	5.51
16	Spcial Development Program	3,027	3,528	5,300	1,663	0	-100.0	13,518	3.35
17	Operation Shortfall	0	0	0	-5,900	0	0.0	-5,900	-1.46
18	Total	47,844	57,705	88,412	89,629	119,882	25.8	403,472	100.00
	GDP	863,138	759,851	908,374	1,077,803	1,217,456	9.0	4,826,622	100.00
	Share in GDP (%)	5.5	7.6	9.7	8.3	9.8		8.4	

Table 2.3.6.2 7th FYP PSDP, Aid Dependency by Sector

Sl. No.	Sector	1st Year Allocation 1988/89 Total	1st Year Forex Aid Total	1st Year Allocation Total in Rupee	1st Year AID Dependency (%)	2nd Year Allocation 1989/90 Total	2nd Year Forex Aid Total	2nd Year Allocation Total in Rupee	2nd Year AID Dependency (%)	3rd Year Allocation 1990/91 Total	3rd Year Forex Aid Total	3rd Year Allocation Total in Rupee	3rd Year AID Dependency (%)
A													
A1	Production	3,978,520	1,460,232	5,438,752	26.8%	3,797,500	990,800	4,788,300	20.7%	2,680,852	926,952	3,607,804	25.7%
	1 Agriculture	1,230,390	938,215	2,168,605	43.3%	1,244,200	856,600	2,100,800	40.2%	1,254,206	892,827	2,147,033	41.6%
	2 Subsidy on Fertilizer	1,401,873	0	1,401,873	0.0%	2,100,000	0	2,100,000	0.0%	1,250,600	0	1,250,600	0.0%
	3 Industry	935,591	505,559	1,441,150	35.1%	158,600	54,200	212,800	25.5%	114,185	24,125	138,310	17.4%
	4 Minerals	410,666	16,458	427,124	3.9%	294,700	100,000	394,700	25.3%	61,861	10,000	71,861	13.9%
A2	Infrastructure	40,358,257	15,296,441	55,646,698	27.5%	30,180,700	12,176,700	42,357,400	28.7%	34,847,439	16,616,082	51,463,521	32.3%
	5 Water	2,966,193	1,411,293	4,377,586	32.2%	3,154,000	1,252,600	4,406,600	28.4%	5,476,099	3,353,155	8,829,254	38.0%
	6 Power	15,977,337	7,820,286	23,797,623	32.9%	16,325,200	7,785,200	24,110,400	32.3%	16,603,362	8,000,000	24,603,362	32.5%
	7 Fuels	6,932,542	2,768,023	9,700,565	28.5%	2,492,500	1,095,200	3,587,700	30.5%	3,232,173	454,838	3,667,011	11.9%
	8 Transport and Communication	7,937,080	2,102,102	10,039,182	20.9%	6,891,900	1,761,700	8,653,600	20.4%	8,107,113	4,513,400	12,620,513	35.8%
	9 Physical Planning and Housing	766,619	0	766,619	0.0%	788,300	0	788,300	0.0%	797,356	0	797,356	0.0%
	10 Rural Development	263,257	81,249	344,506	23.6%	528,800	282,000	810,800	34.8%	631,336	314,689	946,025	33.3%
A3	Social Development and Human Resources	3,959,608	817,349	4,776,957	17.1%	11,447,100	700,200	12,147,300	5.8%	14,276,053	1,441,428	15,717,481	9.2%
	11 Education and Training	1,172,749	287,255	1,460,004	19.7%	1,971,200	72,200	2,043,400	3.5%	1,578,055	77,098	1,655,153	4.7%
	12 Science and Technology	374,772	8,884	383,656	2.3%	300,000	8,100	308,100	2.6%	400,981	27,100	428,081	6.3%
	13 Health and Nutrition	676,735	94,880	771,615	12.3%	855,200	309,300	1,164,500	26.6%	1,723,515	364,869	2,088,384	17.5%
	14 Mass Media	152,576	22,908	175,484	13.1%	277,800	0	277,800	0.0%	378,096	0	378,096	0.0%
	15 Culture, Sports and Tourism	129,567	0	129,567	0.0%	129,800	0	129,800	0.0%	602,507	0	602,507	0.0%
	16 Manpower and Employment	199,561	165,335	364,896	45.3%	517,100	108,700	625,800	17.4%	308,321	187,367	495,688	37.8%
	17 Population Welfare	433,828	217,636	651,464	33.4%	445,500	181,900	627,400	29.0%	598,364	185,262	783,626	23.6%
	18 Social Welfare Programme	276,280	500	276,780	0.2%	109,600	0	109,600	0.0%	110,726	0	110,726	0.0%
	19 RES/STAT & Planing	37,152	19,951	57,103	34.9%	51,400	20,000	71,400	28.0%	63,848	29,521	93,369	31.6%
	20 Human Development Fund	444,200	0	444,200	0.0%	0	0	0	0.0%	0	0	0	0.0%
	21 Women's Development	0	0	0	0.0%	162,500	0	162,500	0.0%	211,640	0	211,640	0.0%
	22 Special Development Programme	0	0	0	0.0%	3,627,000	0	3,627,000	0.0%	5,300,000	570,211	5,870,211	9.7%
	23 NGO's/Peoples Programme	62,188	0	62,188	0.0%	3,000,000	0	3,000,000	0.0%	3,000,000	0	3,000,000	0.0%
	24 Special Grant for Sindh Programme	0	0	0	0.0%	0	0	0	0.0%	0	0	0	0.0%
	25 NWFP adversly affected by Afgan Refugee	0	0	0	0.0%	0	0	0	0.0%	0	0	0	0.0%
	26 Tameer-e-Watan Programme	0	0	0	0.0%	0	0	0	0.0%	0	0	0	0.0%
	27 Tameer-e-Sindh Programme	0	0	0	0.0%	0	0	0	0.0%	0	0	0	0.0%
	28 Additional funding for special areas	0	0	0	0.0%	0	0	0	0.0%	0	0	0	0.0%
	29 Block prov special fund for contingencies	0	0	0	0.0%	0	0	0	0.0%	0	0	0	0.0%
	30 Afgan Refugee Rehabilitation Programme	0	0	0	0.0%	0	0	0	0.0%	0	0	0	0.0%
	31 Environment	0	0	0	0.0%	0	0	0	0.0%	0	0	0	0.0%
	Total (Grant Federal PSDP)	48,288,385	17,574,022	65,862,407	26.7%	45,425,300	13,867,700	59,293,000	23.4%	51,804,344	18,984,462	70,788,806	26.8%
	Less-operational shortfall	0	0	0	0.0%	2,258,400	0	2,258,400	0.0%	3,504,344	0	3,504,344	0.0%
	Total (Net Federal PSDP)	48,288,385	17,574,022	65,862,407	26.7%	43,166,900	13,867,700	57,034,600	24.3%	48,300,000	18,984,462	67,284,462	28.2%
B.	BUDGETARY SUPPORT FOR PROVINCES												
	1 Special Development Programme	3,627,337	1,010,000	4,637,337	21.8%	0	0	0	0.0%	0	0	0	0.0%
	2 Provincial Programme	12,833,218	347,000	13,180,218	2.6%	12,833,000	350,000	13,183,000	2.7%	14,700,000	120,585	14,820,585	0.8%
	3 Provincial Corporation	2,000,000	150,000	2,150,000	7.0%	0	0	0	0.0%	0	0	0	0.0%
	4 Additional Foreign Aid for Prov. Devs. Progra	0	0	0	0.0%	0	0	0	0.0%	0	0	0	0.0%
	Total (Province PSDP)	18,460,555	1,507,000	19,967,555	7.5%	12,833,000	350,000	13,183,000	2.7%	14,700,000	120,585	14,820,585	0.8%
	GRAND TOTAL (PSDP)	66,748,940	19,081,022	85,829,962	22.2%	55,999,900	14,217,700	70,217,600	20.2%	63,000,000	19,105,047	82,105,047	23.3%
	GNP Current Factor Cost			711,143,000				796,751,000				932,282,000	
	PSDP/GNP (%)			12.1%				8.8%				8.8%	

4th Year				5th Year				7th FYP Total				
Allocation 1991/92 Total	Forex Aid Total	Allocation Total in Rupee	AID Dependency (%)	Allocation 1992/93 Total	Forex Aid Total	Allocation Total in Rupee	AID Dependency (%)	Allocation 1988/93 Grand Total	Forex Aid Grand Total	Allocation Total in Rupee	AID Dependency (%)	Sectoral Share 7th FYP
6,869,563	2,915,649	9,785,612	29.8%	3,069,452	1,552,276	4,621,728	33.6%	28,396,287	7,945,909	28,342,196	27.8%	6.2%
1,672,813	350,895	2,024,708	17.3%	1,462,138	1,151,032	2,613,170	44.0%	6,864,747	4,169,569	11,034,316	37.8%	2.1%
589,000	0	589,000	0.0%	810,000	0	810,000	0.0%	6,151,473	0	6,151,473	0.0%	1.9%
3,664,672	2,209,369	5,874,041	37.6%	77,331	32,512	109,843	29.6%	4,950,379	2,825,765	7,776,144	36.3%	1.5%
942,478	355,385	1,297,863	27.4%	719,993	368,732	1,088,715	33.9%	2,429,688	850,575	3,280,263	25.9%	0.7%
63,917,368	31,910,735	95,828,103	33.3%	21,087,225	22,849,666	43,936,891	52.1%	190,302,989	98,849,624	289,152,613	34.2%	57.7%
3,516,678	1,750,845	5,267,523	33.2%	6,681,596	12,712,575	19,394,171	65.5%	21,794,666	20,480,468	42,275,134	48.4%	6.6%
27,442,511	15,339,380	42,781,891	35.9%	3,998,741	1,131,300	5,130,041	22.1%	80,347,151	40,076,166	120,423,317	33.3%	24.4%
9,876,511	2,976,219	12,852,730	23.2%	711,987	1,752,237	2,464,224	71.1%	23,243,713	9,026,517	32,272,230	28.0%	7.0%
21,778,404	11,345,934	33,124,338	34.3%	8,494,497	6,757,363	15,251,860	44.3%	53,208,994	26,480,499	79,689,493	33.2%	16.1%
709,701	56,838	766,539	7.4%	562,289	10,800	573,089	1.9%	3,634,265	67,638	3,691,903	1.8%	1.1%
593,563	441,519	1,035,082	42.7%	558,115	485,391	1,043,506	46.5%	2,575,071	1,604,848	4,179,919	38.4%	0.8%
7,897,859	684,603	8,582,462	8.0%	10,108,754	932,413	11,121,167	8.4%	47,769,374	4,575,993	52,345,367	8.7%	14.5%
679,961	64,511	744,472	8.7%	433,853	105,281	539,134	19.5%	5,835,818	606,345	6,442,163	9.4%	1.8%
238,438	40,813	279,251	14.6%	302,589	6,300	308,889	2.0%	1,616,780	91,197	1,707,977	5.3%	0.5%
496,731	67,570	564,301	12.0%	329,402	77,837	407,269	19.1%	4,081,613	914,456	4,996,069	18.3%	1.2%
260,711	183,347	444,058	41.3%	121,500	0	121,500	0.0%	1,190,685	206,255	1,396,938	14.8%	0.4%
62,219	5,300	67,519	7.8%	384,053	6,507	390,560	1.7%	1,308,126	11,807	1,319,933	0.9%	0.4%
88,800	78,950	167,750	47.1%	139,783	121,788	261,571	46.6%	1,253,565	662,140	1,915,705	34.6%	0.4%
436,265	224,550	660,815	34.1%	828,900	189,000	1,017,900	18.6%	2,942,857	998,348	3,941,205	25.3%	0.9%
64,829	0	64,829	0.0%	82,782	0	82,782	0.0%	644,217	500	644,717	0.1%	0.2%
43,905	7,562	51,467	14.7%	35,586	18,900	54,486	34.7%	231,891	95,934	327,825	29.3%	0.1%
0	0	0	0.0%	0	0	0	0.0%	444,200	0	444,200	0.0%	0.1%
204,000	12,000	216,000	5.6%	137,700	0	137,700	0.0%	715,840	12,000	727,840	1.6%	0.2%
0	0	0	0.0%	0	0	0	0.0%	8,927,000	570,211	9,497,211	6.0%	2.7%
0	0	0	0.0%	0	0	0	0.0%	6,062,188	0	6,062,188	0.0%	1.8%
2,500,000	0	2,500,000	0.0%	0	0	0	0.0%	2,500,000	0	2,500,000	0.0%	0.8%
200,000	0	200,000	0.0%	0	0	0	0.0%	200,000	0	200,000	0.0%	0.1%
1,600,000	0	1,600,000	0.0%	2,916,000	0	2,916,000	0.0%	4,516,000	0	4,516,000	0.0%	1.4%
0	0	0	0.0%	2,025,000	0	2,025,000	0.0%	2,025,000	0	2,025,000	0.0%	0.6%
522,000	0	522,000	0.0%	2,451,596	406,800	2,858,396	14.2%	2,973,596	406,800	3,380,396	12.0%	0.9%
300,000	0	300,000	0.0%	0	0	0	0.0%	300,000	0	300,000	0.0%	0.1%
0	0	0	0.0%	162,000	0	162,000	0.0%	162,000	0	162,000	0.0%	0.0%
0	0	0	0.0%	81,000	0	81,000	0.0%	81,000	0	81,000	0.0%	0.0%
78,685,190	35,510,987	114,196,177	31.1%	34,265,431	25,334,355	59,599,786	42.5%	258,468,650	111,271,536	369,740,176	30.1%	78.3%
0	0	0	0.0%	719,000	0	719,000	0.0%	6,481,744	0	6,481,744	0.0%	2.0%
78,685,190	35,510,987	114,196,177	31.1%	33,546,431	25,334,355	58,880,786	43.0%	251,986,906	111,271,536	363,258,432	30.6%	76.4%
0	0	0	0.0%	0	0	0	0.0%	3,627,337	1,010,000	4,637,337	21.8%	1.1%
14,700,000	538,500	15,238,500	3.5%	14,700,000	538,500	15,238,500	3.5%	69,766,218	1,894,585	71,660,803	2.6%	21.1%
0	0	0	0.0%	0	0	0	0.0%	2,000,000	150,000	2,150,000	7.0%	0.6%
1,099,400	1,099,400	2,198,800	50.0%	1,099,400	1,099,400	2,198,800	50.0%	2,198,800	2,198,800	4,397,600	50.0%	0.7%
15,799,400	1,637,900	17,437,300	9.4%	16,313,963	1,651,151	17,765,115	9.3%	77,906,918	5,366,637	83,173,555	6.5%	23.6%
94,484,590	37,148,887	131,633,477	28.2%	49,860,394	26,985,507	76,645,901	35.2%	329,893,824	116,638,163	446,431,987	26.1%	100.0%
		1,090,338,000				1,234,856,000				4,763,370,000		
		12.1%				6.2%				9.4%		

CHAPTER 3 Transport Demand Projections

CHAPTER 3 TRANSPORT DEMAND PROJECTIONS

List of Tables

List of Figures

Chapter 3 Transport Demand Projections

3.1 Methodology

3.1.1 Zoning

As a basis of transport demand projections, zoning was set as shown in Figure 3.1.1.1 and Table 3.1.1.1. In this zoning, zones 1 to 46 are within the Pakistan borders while zones 47 to 51 are in the countries including the disputed areas.

This zoning is the same as the previous NTPS(1988, JICA). Districts and agencies included in each zone are presented in Appendix 3.1.1.1.

Figure 3.1.1.1 Zoning

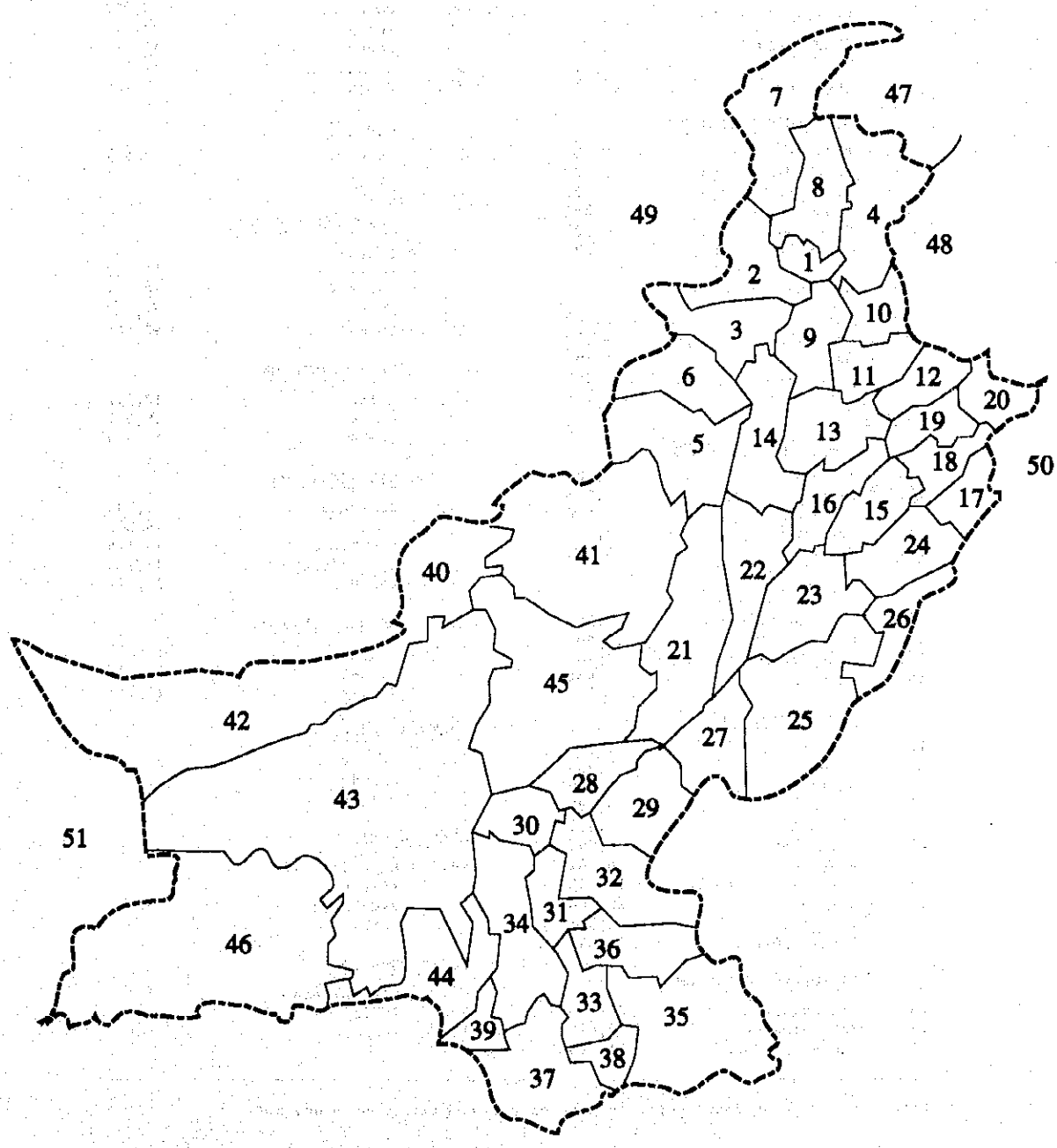


Table 3.1.1.1 List of Zones

Zone No.			Area (Km^2)
N.W.F.P.			
		PESHAWAR DIVISION	
1.		Mardan	3,137
2.	*	Peshawar	4,001
		Khyber Agency	2,576
		Bajour & Mohammad	3,586
		Other Tribal Area	261
3.	*	Kohat/Karak	7,012
		Khurrum Agency	3,380
		Orakzai Agency	1,538
		Other Tribal Area	446
		HAZARA DIVISION	
4.	*	Abbottabad	3,730
		Mansehra	5,792
		Kohistan	7,581
		D.I. KHAN DIVISION	
5.	*	D.I. Khan	9,005
		South Waziristan	6,620
		Other Tribal Area	3,229
6.	*	Bannu	4,391
		North Waziristan	4,707
		Other Tribal Area	877
		MALAKAND DIVISION	
7.	*	Dir	5,282
		Chitral	14,850
8.	*	Swat	8,788
		Malakand	952
PUNJAB			
		RAWALPINDI DIVISION	
9.		Attock	9,789
10.	*	Rawalpindi	5,286
		Islamabad	906
11.		Jhelum	7,179
12.		Gujrat	5,865
		SARGODHA DIVISION	
13.		Sargodha/Khushab	12,367
14.		Mianwali/Bhakkar	13,993
15.		Faisalabad/T.T. Singh	9,108
16.		Jhang	8,809
		LAHORE DIVISION	
17.	*	Lahore	1,772
		Kasur	3,995
18.		Sheikhupura	5,959
19.		Gujranwala	5,988
20.		Sialkot	5,353
21.	*	D.G. Khan	16,098
		Rajampur	8,142
22.		Muzaffargarh/Leiah	14,538
23.	*	Multan	10,848
		Vehari	4,365
24.		Sahiwal/Okara	10,303
		BAHAWALPUR DIVISION	
25.		Bahawalpur	24,830
26.		Bahawalnagar	8,878
27.		Rahim Yar Khan	11,880

Zone No.			Area (Km^2)
SIND			
		SUKKUR DIVISION	
28.		Jacobabad	5,278
	*	Shikarpur	2,841
29.		Sukkur (Rohri)	11,093
30.		Larkana	7,423
31.		Nawabshah	7,501
32.		Khairpur	15,736
		HYDERABAD DIVISION	
33.		Hyderabad	5,519
34.		Dadu	19,017
35.		Tharparkar	28,170
36.		Sanghar	10,728
37.		Thatta	17,355
38.		Badin	6,726
		KARACHI	
39.		Karachi	3,527
BALUCHISTAN			
		QUETTA DIVISION	
40.	*	Quetta	2,653
		Pishin	11,112
41.	*	Loralai	19,071
		Zhob	27,129
42.		Chagai	50,545
		KALAT DIVISION	
43.	*	Kalat	12,517
		Kharan	48,051
44.		Lasbela	12,574
		SIBI DIVISION	
45.		Nasirabad	5,832
	*	Sibi	9,285
		Kachhi	11,114
		Kohlu/Dera Bugti	17,770
		Khuzdar	64,891
		MEKRAN DIVISION	
46.		Panjgur	16,891
		Turbat	22,539
	*	Gwadar	15,216
NORTHERN AREAS			
47.	*	Gilgit	
		Skardu	
		Diamer	
AZAD KASHMIR			
48.	*	Muzaffarabad	
		Mirpur	
		Rawalakot	
		Kotli	
OTHER COUNTRIES			
49.		Afghanistan	
50.		India	
51.		Iran	

Note: "*" shows zone centre in case of plural districts in one zone.

3.1.2 Outline of Methodology

Figure 3.1.2.1 presents the outline of transport demand projections.

(1) Preparatory Works

Prior to transport demand projections, some preparatory works have been done.

1) Compilation of Existing Traffic Data

In any transport planning, analysis of current situation based on existing traffic data is the starting point. In this study, existing traffic data were collected from relevant government agencies and private companies.

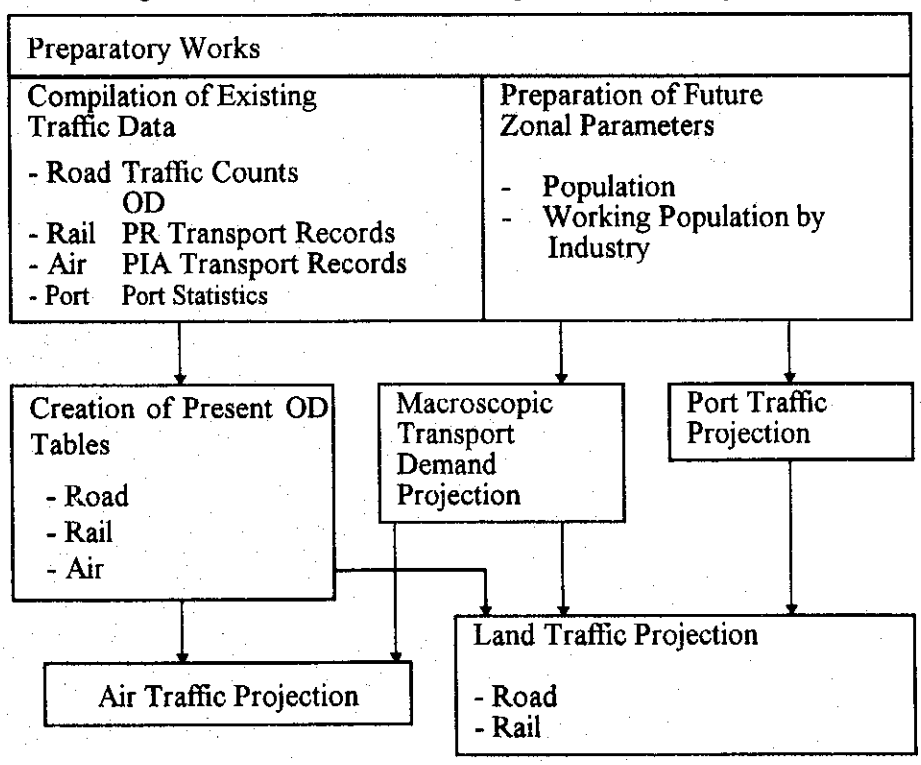
2) Preparation of Future Zonal Parameters

Based on the future national/regional socio-economic framework mentioned in the previous chapter, some parameters have been broken down into zones so that they can be used to determine future distribution of traffic. Zonal population and working population are presented in Appendix 3.1.2.1 and 3.1.2.2.

(2) Creation of Present OD Tables

Based on the compiled traffic data, the present OD tables were formulated for road, rail and air (domestic only), as explained in Section 3.2.

Figure 3.1.2.1 Outline of Transport Demand Projections



(3) Projection of Macroscopic Transport Demand

Although this study deals with intercity(interzonal) transport, macroscopic transport indicators expressed in passenger-kms and ton-kms are useful to discuss overall traffic demand as well as the modal split including urban(intrazonal) traffic. Hence, the overall future transport demand in terms of passenger-kms and ton-kms were projected vis-a-vis future socio-economic framework for land(road and rail) and air(domestic), as explained in Section 3.3.

(4) Projection of Port Traffic

In accordance with the future commodity-wise production and consumption projected in the previous chapter, future import and export were estimated by commodity. This is explained in Section 3.4.

(5) Projection of Land Traffic

After analysing the current intermodal relation between road and rail, future traffic demand was projected for the "do-nothing" case and the "economically desirable" case. In the latter case, the impact of multimodal transport for containers to/from inland dry ports was taken into account. This is explained in Section 3.5

(6) Projection of Air Traffic

For domestic air traffic, future trip distribution was estimated considering the proposed new airports. International air traffic demand was projected by direction mainly in relation to future socio-economic framework. Explanation is given in Section 3.6.

3.2 Creation of Present OD Tables

3.2.1 Road

(1) Vehicle OD

The NTRC conducted a nation-wide OD survey in 1990. The results were compiled into 33-zone OD tables for seven vehicle types. In order to use these OD tables as the study basis, the following procedures have been taken:

1) Reclassification of Vehicle Types

The NTRC-seven-vehicle types were reclassified into five-vehicle types as follows:

NTRC	This Study
Motorcycle	Motorcycle
Car	Car
Wagon	Wagon
Pickup	Car
Bus	Bus
Truck	Truck
Others	Truck

This classification is different from the previous NTPS(1988, JICA) where motorcycle was ignored and wagon was included in the "car" category. This change was made due to the increasing importance of motorcycle and wagon in Pakistan.

2) Conversion of Zoning

The NTRC 33 zones were divided into 51 zones of this study. In this process, a certain number of trips were added between zones which were a single zone in the NTRC zoning, using the 1985-86 OD tables of the previous NTPS(1988, JICA).

3) Update of OD Tables from 1990 to 1992-93

According to the traffic count data collected by NTRC, traffic volume has been rapidly increasing in recent years. Using these average growth rates observed on national highways, the 1990 OD tables were updated to 1992-93.

Table 3.2.1.1 compares number of trips between 1985-86(JICA), 1990(NTRC) and 1992-93(JICA, this study).

Table 3.2.1.1 Comparison of Vehicle OD Tables

(trip/day)

Year		Car	Bus	Truck	Total
1985-86	(JICA)	33,100	17,587	19,209	69,896
		14.2%	-2.0%	20.1%	12.9%
1990	(NTRC)	60,054	16,026	44,563	120,643
		10.1%	14.3%	7.8%	9.8%
1992-93	(JICA)	76,377	22,389	53,736	152,502

Note: 1) Figures with % show average annual growth rates.
2) Motorcycle is not included. Car includes pickup and wagon.
3) Zoning is different between NTRC and JICA.

(2) Passenger OD

Given the 1992-93 vehicle OD tables, passenger OD tables were prepared by multiplying the average numbers of passengers by number of vehicles. Average numbers of passengers was obtained by vehicle type from the 1990 NTRC OD Survey. They are:

1.8	for motorcycle
3.2	for car (weighted average of 3.3 of car and 2.7 of pickup)
14.1	for wagon
42.7	for bus

Table 3.2.1.2 compares passenger trips between 1985-86 and 1992-93.

Table 3.2.1.2 Comparison of Passenger OD Tables

Year		1000 trips/day
1985-86	(JICA)	851
		8.2%
1992-93	(JICA)	1,479

Note: Figure with "%" shows average annual growth rate.

(3)Commodity OD

Average load of truck was 6.00 tons/vehicle according to the 1990 NTRC OD Survey. Using this, commodity OD in terms of tonnage was created from the 1992-93 OD table created as described previously. This OD table represents, however, the total movement of all commodity items. Item breakdown could not be carried out in the absence of reliable data.

Table 3.2.1.3 compares commodity tonnage between 1985-86 and 1992-93.

Table 3.2.1.3 Comparison of Commodity OD Tables

Year		1000 tons/day
1985-86	(JICA)	116
		15.7%
1992-93	(JICA)	322

Note: Figure with "%" shows average annual growth rate.

3.2.2 Railway

(1) Passenger OD

Travel-pattern data of passengers in the form of OD table or station-to-station ticket sales records were not available with PR. Therefore, 1992-93 PR passenger OD table has been estimated assuming the same travel pattern as the JICA 1985-86 PR OD table rectified by the data of the number of passengers classified by class and by travel distance as presented in Table 3.2.2.1.

A comparison between the fiscal years, 1985-86 and 1992-93, is presented in Table 3.2.2.2.

Table 3.2.2.1 Number of PR Passengers by Class and by Travel Distance, 1992-93

(passengers/year)

Distance (kms)	Upper	Lower	Total
1 - 40	227	18,607,620	18,607,847
41 - 100	6,940	10,176,007	10,182,947
101 - 250	56,233	6,951,875	7,008,108
251 - 500	179,729	5,659,928	5,839,657
501 -	817,285	10,056,161	10,873,446
Total	1,060,414	51,451,591	52,512,005

Source :PR

Note : "Upper Class" includees AC Sleeper, AC Sitter, AC lower and First Sleeper.

Table 3.2.2.2 Comparison of PR Passenger OD

Year		1000 trips/day
1985-86	(JICA)	134
		2.7%
1992-93	(JICA)	162

Note: Figure with "%" shows average annual growth rate.

(2) Commodity OD

With regard to PR's commodity transport, detailed records as of 1992-93 were obtained. By compiling these records, commodity OD tables were created by item (19 items). Comparison of the total OD tables between the fiscal years, 1985-86 and 1992-93, is shown in Table 3.2.2.3. Appendix 3.2.2.1 gives its itemized detail. It should be noted that the transported volume of PR has decreased remarkably during this period.

Table 3.2.2.3 Comparison of PR Commodity OD

Year		1000 tons/day
1985-86	(JICA)	33
		-4.4%
1992-93	(JICA)	24

Note: Figure with "%" shows average annual growth rate.

3.2.3 Air

(1) Passenger OD (Domestic)

Domestic air passenger OD table was created from PIA transport records as of 1992-93. The movements between airports were integrated to those between zones. A comparison between 1985-86 and 1992-93 results is given in Table 3.2.3.1.

Table 3.2.3.1 Comparison of Air Domestic Passenger OD

Year		1000 tons/day
1985-86	(JICA)	2,300
		7.7%
1992-93	(JICA)	3,861

Note: Figure with "%" shows average annual growth rate.

(2)Commodity OD (Domestic)

Domestic air cargo OD table was created from PIA transport records as of 1992- 93, similarly to that of passengers.

Table 3.2.3.2 Comparison of Air Domestic Cargo OD

Year		1000 tons/day
1985-86	(JICA)	30
		4.9%
1992-93	(JICA)	42

Note: Figure with "%" shows average annual growth rate.

3.3 Projection of Macroscopic Transport Demand

3.3.1 General

This paper deals with projections of macroscopic transport demand expressed in passenger-kms or ton-kms. In Pakistan, these macro-indicators have been used traditionally as national plan targets or parameters to determine modal split among various modes of transport. It should be noted, however, that there are some limitations in using these macro-indicators in transport planning. They are:

(1) Passenger-kms and ton-kms are a product of transported volume and transport distance. Therefore, for instance, carrying 100 persons for 1,000 kms is the same as carrying 10,000 persons for 10 kms, although the nature of transport is completely different. In usual transport demand forecast, there are four stages, i.e. generation/attraction, distribution, modal split and assignment. Passenger-kms and ton-kms stand for the former two stages altogether. In actual transport planning, it is important to further breakdown these macro-indicators into transport volume and transport distance.

(2) Macro-indicators for railway and air can be accurately estimated based on the operation records of Pakistan Railway and Pakistan International Airways. For road transport, however, some statistical method must be applied to arrive at the estimated figures, because macro-indicators are not directly measurable due to wide-spread individual features of road traffic. Hence, if these macro-indicators are to be projected by some statistical method particularly in relation to road transport, it is somewhat of a vicious circle. Attention must be paid in using these macro-indicators.

(3) This study handles only interzonal trips. In other words, intrazonal or urban trips are excluded from the scope of this study. Due to the recent rapid urbanization, however, the proportion of urban traffic is steadily increasing. Under this situation, there comes out a methodological difficulty in splitting overall transport demand expressed in passenger-kms or ton-kms into interzonal and intrazonal trips. Another assumption would have to be inevitably introduced at this stage of projection.

3.3.2 Land Transport (Road and Railway)

(1) Overall Demand

Table 3.3.2.1 shows the past trends and future projections of land traffic in terms of passenger-kms and ton-kms. Regression analyses were carried out in relation to GDP, because these macro-indicators usually have a strong correlation with the scale of national economy (for more details, refer to "Transport Sector in Pakistan", Ghiasul Haq, NTRC, Sept.1993).

As a result, land passenger traffic demand will grow at an annual rate of 7.0 percent from 1992-93 to 1997-98 and 5.9 percent thereafter upto 2005-06. For the same period, land freight traffic demand will grow at an annual rate of 6.2 and 5.5 percent, respectively.

(2) Interzonal Transport Demand

The next step is to determine the proportion of interzonal trips based on the JICA 51 zoning system in order to define the scope of the projections of this study as compared to the macro-indicators frequently used in the Eighth Five Year Plan and other transport-related documents.

Table 3.3.2.1 Past Trends and Future Projections of Land Transport Demand

Year	Passenger kms (million)			Ton kms (million)			GDP (Rs.million,
	Road	Rail	Total	Road	Rail	Total	1980-81 Price)
1980-81	65,991	16,387	82,378	18,207	7,918	26,125	247,831
1981-82	72,752	16,502	89,254	19,704	7,066	26,770	266,571
1982-83	79,513	18,031	97,544	21,200	7,323	28,523	284,667
1983-84	83,363	18,287	101,650	22,620	7,385	30,005	295,977
1984-85	89,952	17,806	107,758	24,126	7,203	31,329	321,751
1985-86	97,181	16,850	114,031	26,888	8,270	35,158	342,224
1986-87	102,685	16,920	119,605	27,953	7,820	35,773	362,110
1987-88	108,501	18,541	127,042	29,060	8,033	37,093	385,416
1988-89	114,646	19,732	134,378	30,210	8,364	38,574	403,948
1989-90	121,139	20,373	141,512	32,450	7,226	39,676	422,484
1990-91	128,000	19,964	147,964	35,211	5,709	40,920	446,005
1991-92	131,352	18,158	149,510	36,088	5,962	42,050	480,413
1992-93	135,000	17,082	152,082	37,000	6,180	43,180	491,345
			7.0%			6.2%	7.0%
1997-98			213,632			58,275	688,028
			5.9%			5.5%	6.3%
2005-06			338,757			89,341	1,119,492

Note: Figures with "%" shows annual growth rates.
Source: Economic Survey for past trends.

Summary of Regression Analyses

Passenger-kms vs GDP		Ton-kms vs GDP	
Constant	14103.85	Constant	8737.40
Std Err of Y Est	3341.02	Std Err of Y Est	984.86
R Squared	0.98	R Squared	0.97
No of Observations	13.00	No of Observations	13.00
Degrees of Freedom	11.00	Degrees of Freedom	11.00
X Coefficient	0.29	X Coefficient	0.072
Std Err of Coef.	0.01	Std Err of Coef.	0.004

Table 3.3.2.2 shows the proportion of interzonal trips measured for the years 1980-81, 1985-86 and 1992-93 in the National Transport Plan Study (JICA). Inter-zonal passenger-kms and ton-kms were calculated based on the OD tables and distances between zones. The proportion of interzonal traffic is higher in freight traffic than in passenger traffic, and railway seems to be more specialized in inter-zonal transport than road. Although there are some fluctuations, the share of interzonal traffic is gradually declining both in passenger and freight traffic.

Table 3.3.2.2 Share of Interzonal Traffic in Land Passenger and Freight Transport

Year		Passenger kms (million)			Ton kms (million)		
		Road	Rail	Total	Road	Rail	Total
1980-81	Total	65,991	16,387	82,378	18207	7918	26,125
(JICA,1983)	Interzonal	36,590	14,950	51,540	16514	7791	24,305
	Ratio	0.554	1.912	0.626	0.907	0.984	0.930
1985-86	Total	97,181	16,850	114,031	26888	8270	35,158
(JICA,1988)	Interzonal	45,969	15,803	61,772	21198	8270	29,468
	Ratio	0.473	0.938	0.542	0.789	1.000	0.838
1992-93	Total	135,000	17,082	152,082	37000	6180	43,180
(This Study)	Interzonal	71,071	16,511	87,582	28636	6051	34,687
	Ratio	0.526	0.967	0.576	0.774	0.979	0.803

Source: NTPS JICA in 1983,1988 and this study

Using this table, future shares of interzonal traffic was estimated according to the following procedure:

a. Between the years 1980-81,1985-86 and 1992-93, increments were calculated for total passenger-kms, interzonal passenger-kms, total ton-kms and inter-zonal ton-kms. Also, between the years 1992-93, 1997-98 and 2005-06, increments were calculated for total passenger-kms and total ton-kms.

b. The ratios of the interzonal increments in passenger-kms and ton-kms to the total were calculated.

c. On the assumption that interzonal traffic increases hold the same proportion to the increase of total traffic, increments of future interzonal traffic were calculated. The proportion was obtained as an average of the past two periods.

This process is shown in Table 3.3.2.3 for passenger traffic and in Table 3.3.2.4 for freight traffic. Table 3.3.2.5 summarizes the projection results for both passenger traffic and freight traffic.

Table 3.3.2.3 Estimate of Future Interzonal Land Transport Demand (Passenger) - Increment Only

Period	Increment of Pass-kms (million)		Ratio
	Total	Interzonal	
1980-81 to 1985-86	31,653	10,232	0.32
1985-86 to 1992-93	38,051	25,810	0.68
Average			0.52
1992-93 to 1997-98	61,550	31,823	0.52
1997-98 to 2005-06	125,125	64,720	0.52

Table 3.3.2.4 Estimate of Future Interzonal Land Transport Demand (Freight) - Increment Only

Period	Increment of Ton-kms (million)		Ratio
	Total	Interzonal	
1980-81 to 1985-86	9,033	5,163	0.57
1985-86 to 1992-93	8,022	5,219	0.65
Average			0.61
1992-93 to 1997-98	15,095	9,185	0.61
1997-98 to 2005-06	31,066	18,898	0.61

Table 3.3.2.5 Summary of Future Land Transport Demand (Total and Interzonal)

Year	Passenger-kms (million)		Ratio of	Ton-kms (million)		Ratio of
	Total	Interzonal	Interzonal	Total	Interzonal	Interzonal
1992-93	152,082	87,582	0.576	43,180	34,687	0.803
	7.0%	6.4%		6.2%	4.8%	
1997-98	213,632	119,405	0.559	58,275	43,872	0.753
	5.9%	5.6%		5.5%	4.6%	
2005-06	338,757	184,125	0.544	89,341	62,770	0.703

Note: Figures with "%" shows average growth rates.

3.3.3Air Transport

Table 3.3.3.1 shows the past trends and future projections of domestic air transport demand in terms of passenger-kms and ton-kms. Similarly to land transport, regression analyses were carried out in relation to GDP.

Passenger transport demand will grow at an annual rate of 7.9 percent and 6.6 percent, for the Eighth Five Year Plan period and thereafter, respectively. Cargo transport demand will show an annual growth of 6.6 percent upto the year 2005-06. It is to be noted that air transport demand is mostly inter-zonal.

Table 3.3.3.1 Past Trends and Future Projections of Domestic Air Transport Demand

Year	Passenger-kms (million)	Ton-kms (million)	GDP (Rs. million in 1980-81 price)
1980-81	1,205	16	247,831
1981-82	1,245	17	266,571
1982-83	1,341	19	284,667
1983-84	1,465	19	295,977
1984-85	1,618	23	321,751
1985-86	1,791	25	342,224
1986-87	1,926	25	362,110
1987-88	2,091	26	385,416
1988-89	2,268	29	403,948
1989-90	2,249	32	422,484
1990-91	2,206	32	446,005
1991-92	2,488	31	480,413
1992-93	2,545	37	491,345
	7.9%	6.6%	7.0%
1997-98	3,716	51	688,028
	6.6%	6.6%	6.3%
2005-06	6,176	85	1,119,492

Note: Figures with "%" shows average annual growth rates.
Source:Economic Survey for past trends.

Summary of Regression Analyses

Passenger-kms vs GDP		Ton-kms vs GDP		
Constant	-205.56	Constant	-3.33	
Std Err of Y Est	86.80	Std Err of Y Est	1.48	
R Squared	0.97	R Squared		0.95
No of Observations	13.00	No of Observations	13.00	
Degrees of Freedom	11.00	Degrees of Freedom	11.00	
X Coefficient	0.0057	X Coefficient	0.000079	
Std Err of Coef.	0.0003	Std Err of Coef.	0.000005	

3.4 Projection of Port Traffic

3.4.1 Import/Export of Major Commodities

For the 13 major commodities, production and consumption were projected by commodity according to the future economic framework, and import/export was calculated as the difference between production and consumption. They are:

a. Wheat
b. Rice
c. Cotton
d. Edible Oil
e. Sugar
f. Fertilizer
g. Rock Phosphate
h. Cement
i. Coal
j. Crude Oil
k. Petroleum Product
l. Iron and Steel
m. Iron Ore

The results are summarized in Table 3.4.1.1.

3.4.2 Import/Export of Other Miscellaneous Commodities

Aside from the above 13 commodities, there are many other items being exported or imported. In order to estimate future import/export volumes of these commodities, which fall in the "others" category, the following three sub- categories have been taken:

(1) Miscellaneous Dry Import
(2) Miscellaneous Dry Export
(3) Miscellaneous Liquid Export

(1) Miscellaneous Dry Import

This category includes chemicals, jute, paper, tea, timber, vehicles and so on. For some of these items, import volumes can be obtained from the port statistics; however, each of these is small in terms of tonnage and the "others" category impossible to classify further. Therefore, this sub-category was dealt with as one group, and a regression analysis was carried out in relation to GDP considering the wide coverage of this sub-category. Data used and the regression details are shown in Table 3.4.2.1.

(2) Miscellaneous Dry Export

This category includes textile, cowdung, various grains, footwears, leather goods and so on. Most of the commodity items that fall in this category are produced by different manufacturing industries in Pakistan. Similarly to "Miscellaneous Dry Import" mentioned above, this sub-category could not effectively sub-divided into meaningful groups, although export volumes of some minor items could be obtained in port statistics. For this sub-category, regression analysis was conducted in relation to the GDP of manufacturing industry, as shown in Table 3.4.2.1.

Table 3.4.1.1 Production, Consumption and Import/Export of 13 Major Commodities

Sectors	Commodities	Years / Categolies	1992-93	1997-98	2005-06
Agriculture	Wheat	Production	16,157	18,280	23,157
		Consumption	17,409	19,304	24,497
		I/E	-2,868	-2,852	-3,656
Agriculture	Rice	Production	3,116	4,249	5,595
		Consumption	1,772	2,269	2,880
		I/E	1,032	1,555	2,156
Agriculture	Cotton	Production	1,540	2,110	3,443
		Consumption	1,277	1,589	2,097
		I/E	263	521	1,346
Industry	Edible Oil	Production	672	858	1,285
		Consumption	1,902	2,837	2,804
		I/E	-1,230	-1,980	-1,519
Industry	Sugar	Production	2,070	2,770	4,251
		Consumption	2,137	2,837	4,293
		I/E	-67	-67	-22
Industry	Fertilizer	Production	3,204	4,089	5,596
		Consumption	4,357	5,749	6,902
		I/E	-1,153	-1,659	-1,306
Mining	Rock Phosphate	Production	0	0	0
		Consumption	280	309	309
		I/E	-280	-309	-309
Mining	Cement	Production	8,551	12,917	20,001
		Consumption	8,595	13,224	19,907
		I/E	-44	-307	94
Mining	Coal	Production	3,266	6,713	13,431
		Consumption	4,311	7,514	14,049
		I/E	-1,045	-801	-618
Mining	Crude Oil	Production	2,936	6,038	12,249
		Consumption	6,882	8,193	21,954
		I/E	-3,945	-2,155	-9,705
Industry	Petroleum products	Production	6,180	7,305	19,574
		Consumption	12,792	19,351	31,439
		I/E	-6,612	-12,047	-11,866
Industry	Iron and Steel	Production	2,382	2,974	4,590
		Consumption	3,134	3,906	6,524
		I/E	-752	-857	-1,934
Mining	Iron Ore	Production	1,922	2,453	3,107
		Consumption	3,623	4,621	6,059
		I/E	-1,701	-2,168	-2,952
Total		**Production**	51,996	70,756	116,279
		Consumption	68,471	91,703	143,714
		I/E	-18,402	-23,126	-30,291

Note:
(1) I/E means Import or Export where import is shown by figure with minus.

Table 3.4.2.1 Past Trends and Future Projection of Miscellaneous Dry Import/Export

Year	Miscellaneous		GDP	
	Dry Import (000 tons)	Dry Export (000 tons)		Manufacturing
			(Rs. million, 1980-81 price)	
1980-81	2,078	765	247,831	37,446
1981-82	2,403	899	266,571	42,596
1982-83	2,615	1,224	284,667	45,592
1983-84	2,572	1,259	295,977	49,187
1984-85	2,291	1,088	321,751	53,166
1985-86	2,526	1,288	342,224	57,180
1986-87	2,640	1,320	362,110	61,484
1987-88	2,728	1,421	385,416	67,622
1988-89	3,042	1,865	403,948	70,300
1989-90	2,918	2,032	422,484	74,324
1990-91	3,104	2,111	446,005	78,969
1991-92	3,478	2,337	480,413	85,324
1992-93	3,967	2,645	491,345	89,916
1997-98	4,831	4,205	688,028	143,499
2005-06	7,420	7,728	1,119,492	250,269

Source: KPT and PQA for past trends.

Summary of Regression Analyses

Miscellaneous Dry Import -- GDP		Miscellaneous Dry Export -- GDP Manufacturing Industry	
Constant	703.148	Constant	-530.474
Std Err of Y Est	219.208	Std Err of Y Est	160.831
R Squared	0.830	R Squared	0.930
No of Observations	13	No of Observations	13
Degrees of Freedom	11	Degrees of Freedom	11
X Coefficient	0.006	X Coefficient	0.033
Std Err of Coef.	0.001	Std Err of Coef.	0.003

(3) Miscellaneous Liquid Export

This sub-category comprises a single item: molasses. Production and export of molasses usually have a strong relationship with sugar production. As seen in Table 3.4.2.2, however, export of molasses has been largely fluctuating and little correlation is observed with sugar production. This is presumably due to the speculative practices of molasses' exporters. Hence, the proportion of molasses export to sugar production was calculated for the last five years, and 47.9 percent was applied to projected sugar production for the years 1997-98 and 2005-06. The result is shown in Table 3.4.2.2.

Table 3.4.2.2 Past Trends and Future Projection of Miscellaneous Liquid Export (Molasses)

Year	Miscellaneous Liquid Export -Molasses (000 tons)	Sugar Production (000 tons)
1980-81	264	851
1981-82	434	1,301
1982-83	640	1,127
1983-84	389	1,149
1984-85	670	1,313
1985-86	736	1,116
1986-87	698	1,283
1987-88	750	1,781
1988-89	756	1,850
1989-90	1,135	1,855
1990-91	705	1,932
1991-92	1,081	2,086
1992-93	1,013	2,070
1997-98	1,236	2,580
2005-06	1,878	3,921

Ratio of Molasses Export/Sugar Product 47.90%

Source: KPT and Economic Survey for past trends

3.4.3 Summary

According to the above mentioned procedure, import/export projections by commodity item can be summarized as presented in Table 3.4.3.1.

Table 3.4.3.1 Summary of Port Traffic Projections

(000tonnes)

		1992-93	1997-98	2005-06
IMPORT		**23,644**	**30,033**	**41,307**
Dry		11,877	13,851	18,217
	- Wheat	2,868	2,852	3,656
	- Sugar	67	67	22
	- Cement	44	307	-
	- Fertilizer	1,153	1,659	1,306
	- Iron/Steel	752	857	1,934
	- Minerals (Ore)	1,701	2,168	2,952
	- Coal/Coke	1,045	801	618
	- Rock Phosphate	280	309	309
	- Miscellaneous	3,967	4,831	7,420
Liquid		11,787	16,182	23,090
	- Edible Oil	1,230	1,980	1,519
	- Crude Oil	3,945	2,155	9,705
	- Petroleum Product	6,612	12,047	11,866
EXPORT		**4,953**	**7,517**	**13,202**
Dry		3,940	6,281	11,324
	- Rice	1,032	1,555	2,156
	- Cotton	263	521	1,346
	- Cement	-	-	94
	- Miscellaneous	2,645	4,205	7,728
Liquid		1,013	1,236	1,878
	- Molasses	1,013	1,236	1,878

3.5 Projection of Land Traffic

3.5.1 General

This section describes the process of land traffic projections. In Section 3.3, land transport demand (road and railway combined) was projected in terms of passenger-kms and ton-kms both for interzonal and total (including intrazonal). This section, therefore, intends to further breakdown these macroscopic demand indicators into traffic volume and transport distance in the form of OD matrices. Further, modal split between road and railway is examined, and after allocating certain traffic demand to railway, vehicle OD matrices are created to meet the remaining traffic demand.

3.5.2 Projection of Land Traffic Demand (Road and Railway Combined)

(1) Trip Generation/Attraction

In order to approximate land traffic generation/attraction by zone, regression analyses were conducted. Among available zonal parameters (population and working population by industry), population and non-agricultural working population were chosen as explanatory variables to best fit the current tendency of generation/attraction of passengers and freight, respectively. The result is shown in Table 3.5.2.1.

Due to possible large deviation of calculated values from the actual situation, future theoretical values were not used immediately. They were calibrated using the ratio of actual value to the theoretical value calculated the present figures by regression equations. In addition, an average growth rate was assumed for outside zones, 47 to 51, where zonal parameters are unavailable.

(2) Trip Distribution

The Fratar convergence calculation was applied to obtain future OD matrices using future trip generation/attraction by zone estimated above and 1992-93 OD tables as the present pattern.

(3) Calibration to Macro Demand Forecast

As mentioned earlier, land traffic demand (road and railway combined) has been projected in accordance with the future economic framework in terms of passenger-kms and ton-kms. Hence, the OD matrices created above should be calibrated as against the macro transport demand indicators, i.e. passenger-kms and ton-kms (those of interzonal). This work includes:

a. to calculate passenger-kms and ton-kms based on the future OD matrices and distances between zones;

b. to multiply the ratio of target passenger-kms or ton-kms to calculated passenger-kms or ton-kms by the future OD matrices.

The OD matrices thus created have the features as presented in Table 3.5.2.2. The number of passengers and the tonnage of commodity will increase at a slightly lower rate than passenger-kms and ton-kms. This implies that average trip length would gradually increase in the future. However, this should not be understood that the overall traffic demand tends to be longer, since the share of urban (intra-zonal) traffic is also expected to be larger.

Table 3.5.2.1 Land Traffic Generation/Attraction, Population and Non-Agricultural Working Population by Zone as of 1992-93

Zone No.	No. of Passenger (/ day)	Cargo Tonnnage (ton/d)	Population (000)	Non-Agri Working (000)	Zone No.	No. of Passenger (/ day)	Cargo Tonnnage (ton/d)	Population (000)	Non-Agri Working (000)
1	109,773	10,922	2,053	166	24	103,692	29,250	5,445	614
2	143,592	18,588	4,087	497	25	69,288	10,353	2,219	252
3	57,237	8,235	1,435	136	26	40,366	5,421	1,932	186
4	48,536	7,301	3,873	235	27	57,281	12,775	2,695	248
5	21,273	4,992	1,249	122	28	66,505	10,971	2,369	127
6	22,357	5,742	1,493	107	29	89,722	20,339	1,580	186
7	8,044	1,344	1,547	80	30	29,920	6,833	1,511	107
8	31,561	5,855	2,282	143	31	25,598	5,662	2,136	125
9	74,724	9,800	1,415	150	32	25,909	6,498	1,477	97
10	168,120	29,876	3,360	539	33	114,002	27,465	2,729	351
11	65,271	12,233	1,350	161	34	19,838	6,447	1,587	141
12	84,266	11,727	2,866	355	35	60,236	9,341	2,548	156
13	88,340	32,028	3,340	433	36	34,431	9,183	1,353	80
14	43,386	12,972	1,888	188	37	21,641	11,008	883	54
15	170,340	32,217	5,372	841	38	25,803	3,372	1,077	55
16	102,210	17,180	2,741	284	39	115,832	81,184	9,243	2,084
17	393,892	61,400	7,621	1,464	40	34,994	14,369	1,288	184
18	99,765	8,398	2,936	448	41	7,383	3,142	1,592	80
19	123,359	16,474	3,832	605	42	3,542	633	233	26
20	93,803	10,091	3,299	487	43	11,539	2,358	1,041	42
21	30,952	12,888	2,484	198	44	10,656	2,454	324	13
22	65,483	27,585	3,387	302	45	24,279	6,114	2,424	87
23	210,626	43,362	7,762	902	46	761	156	1,597	109

Note: Zones 47-51 are Northern Area, azad Kashmir and other countries.

Summary of Regression Analyses

Gen./Att. Land Passenger
-- Population (000)

Constant	-3262.50
Std Err of Y Est	44935.87
R Squared	0.584
No of Observations	46
Degrees of Freedom	44
X Coefficient	28.111
Std Err of Coef.	3.573

Gen./Att. Land Commodity
-- Non-Agri. Wrk Pop.(000)

Constant	3031.014
Std Err of Y Est	5507.444
R Squared	0.879
No of Observations	46
Degrees of Freedom	44
X Coefficient	38.415
Std Err of Coef.	2.149

Table 3.5.2.2 Summary of Interzonal Land Traffic Projections (Road and Railway Combined)

Year	Passenger			Commodity		
	Passenger No. (000/day)	Passenger Kms (million/Yr)	Average Trip Length (kms)	Tonnage (000/day)	Ton Kms (million/Yr)	Average Trip Length (kms)
1992-93	1,638	87,582	162	347	34,687	303
	6.1%	6.4%		3.9%	4.8%	
1997-98	2,199	119,405	165	421	43,872	316
	5.2%	5.6%		3.9%	4.6%	
2005-06	3,304	184,125	169	573	62,770	332

Note: Figures with "%" show average annual growth rates.

3.5.3 Modal Split between Road and Rail

(1) Modal Split as of 1992-93

1) Passenger Traffic

In 1992-93, modal shares of road and railway in passenger transport were as shown in Table 3.5.3.1. From this table, the following can be pointed out:

a. A strong and steady patronage exists for Pakistan Railway (PR) in longer distance travel. The motivation of using PR is reported to be safety and comfort. However, judging from the fact that PR's patronage sharply decreased after 1989-90 when its fare rose remarkably, a part of PR users may be quite sensitive to fare levels.

b. PR is playing a major role in longer distances while road carries a number of passengers in shorter distances. This tendency is approximated by the following logic equation:

$$P = 1 / (1 + \exp(0.840 - 0.00087 * D))$$

where, P: share of railway
D: distance (kms)

c. Based on the above equation, the break-even distance where road and railway are equally chosen can be calculated at 966 kms. Namely, passengers who travel more than this distance tend to use PR on average. However, if zones where railway service is unavailable are excluded from this analysis, this break- even distance will go down to 775 kms (for details, see Section 4.2). The latter probably reflects more precisely the actual mode choice behavior of passengers, though still very long compared to the economically desirable break-even distance analyzed by the previous NTPS. Anyway, this is the current break-even distance actually perceived by passengers in Pakistan. In the following section, a comparison will be made with the economic break-even distance.

Figure 3.5.2.1 Desired Lines of Land Passenger Traffic Demand

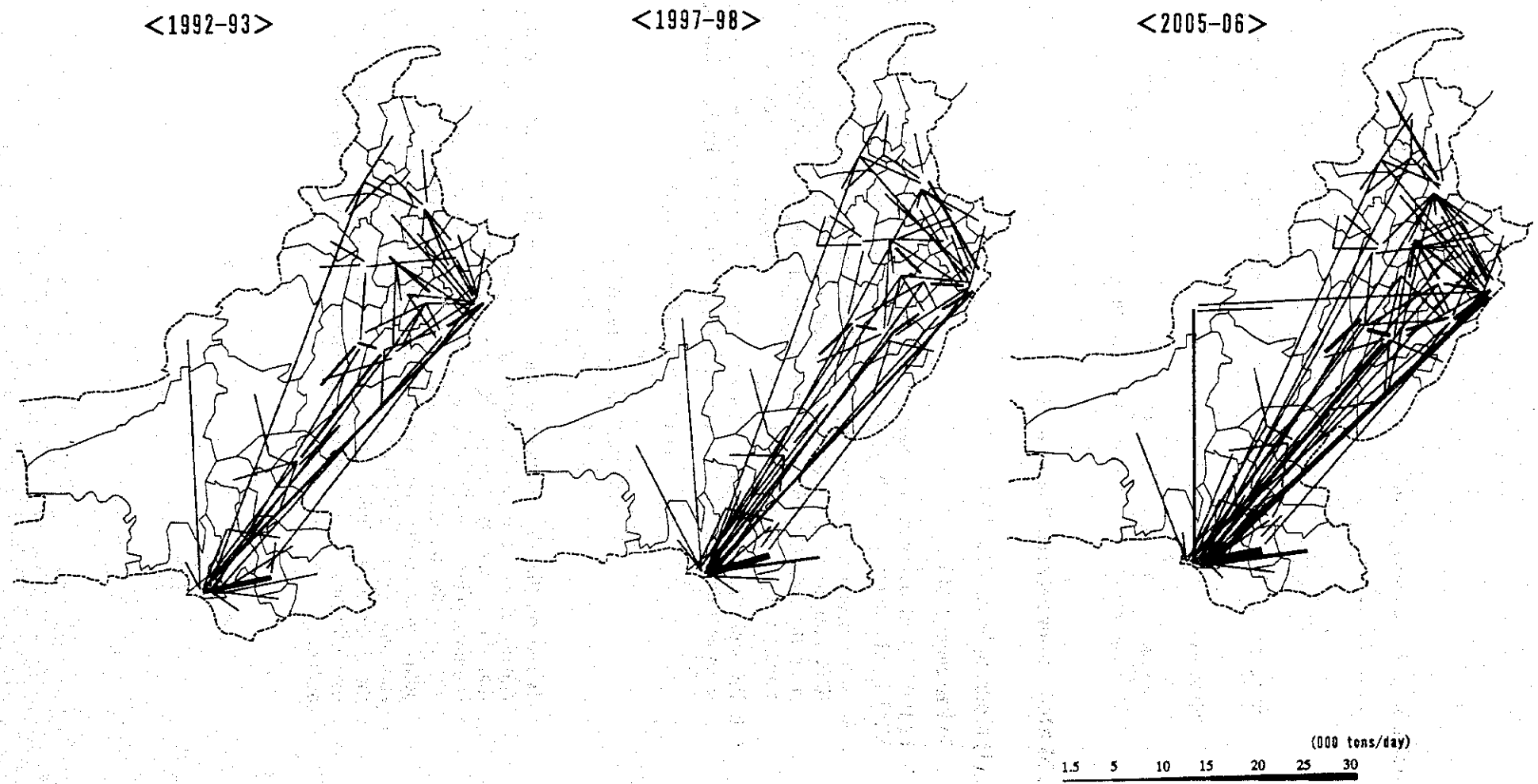


Figure 3.5.2.2 Desired Lines of Land Freight Traffic Demand

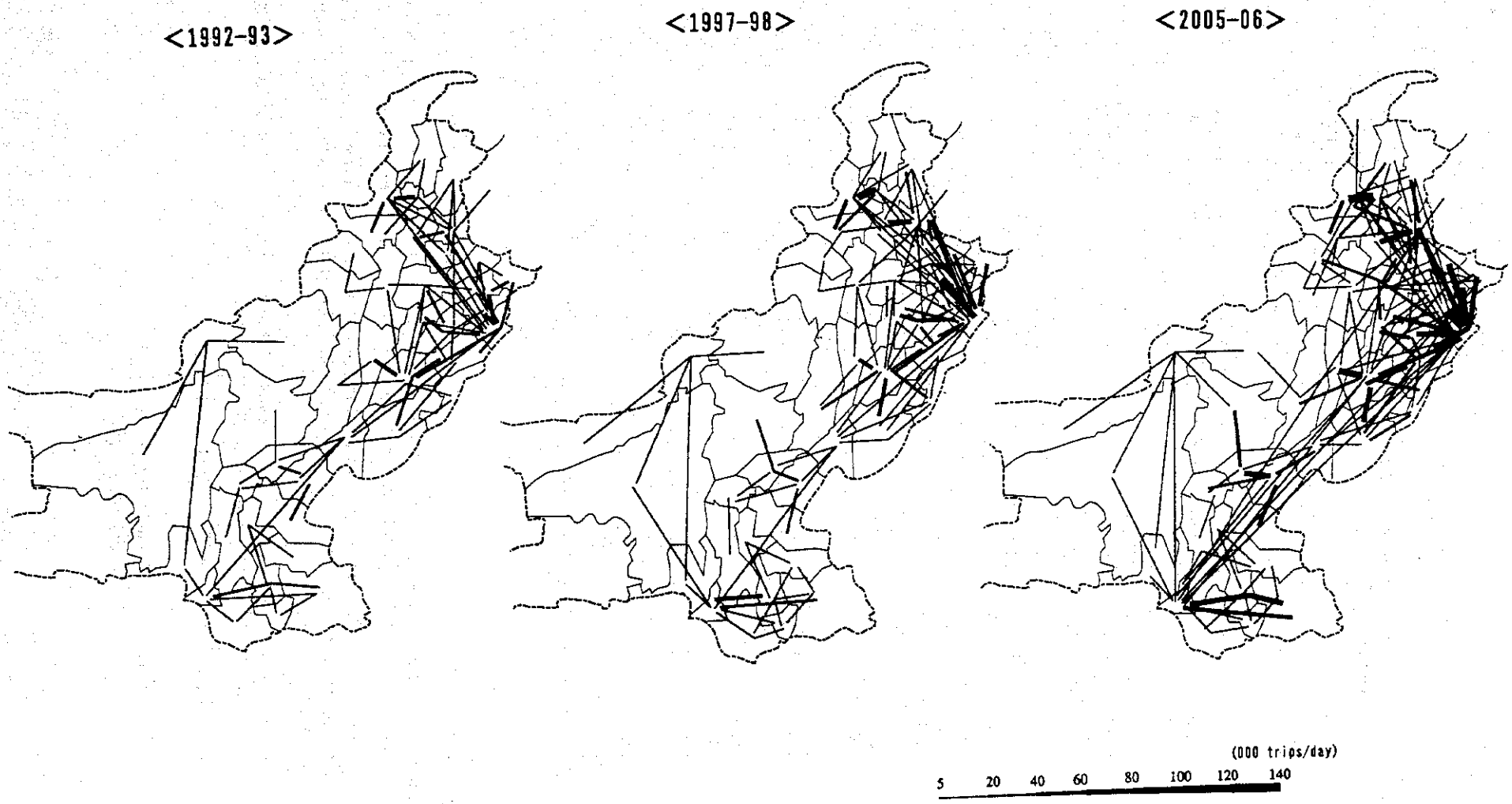


Table 3.5.3.1 Intermodal Relation between Road and Railway in terms of No.of Passengers by Distance, 1992-93

(passengers/day)

Distance (km)	Road		Rail		Total	
	No.	%	No.	%	No.	%
0 - 49	103,519	64.5	56,874	35.5	160,393	100.0
50 - 99	337,115	92.0	29,286	8.0	366,401	100.0
100 - 149	390,056	96.5	14,278	3.5	404,334	100.0
150 - 199	227,355	98.1	4,340	1.9	231,695	100.0
200 - 249	143,944	97.5	3,696	2.5	147,640	100.0
250 - 299	96,872	95.2	4,840	4.8	101,712	100.0
300 - 349	75,103	92.7	5,935	7.3	81,038	100.0
350 - 399	31,065	92.8	2,401	7.2	33,466	100.0
400 - 449	26,315	94.8	1,443	5.2	27,758	100.0
450 - 499	11,492	79.0	3,062	21.0	14,554	100.0
500 - 549	12,394	78.9	3,307	21.1	15,701	100.0
550 - 599	8,410	85.9	1,380	14.1	9,790	100.0
600 - 649	1,005	48.4	1,072	51.6	2,077	100.0
650 - 699	540	6.9	7,290	93.1	7,830	100.0
700 - 749	736	31.8	1,578	68.2	2,314	100.0
750 - 799	211	11.0	1,713	89.0	1,924	100.0
800 - 849	857	30.9	1,916	69.1	2,773	100.0
850 - 899	3,746	76.7	1,141	23.3	4,887	100.0
900 - 949	770	23.1	2,563	76.9	3,333	100.0
950 - 999	338	33.7	666	66.3	1,004	100.0
1000 - 1049	35	4.3	778	95.7	813	100.0
1050 - 1099	269	21.8	690	71.9	959	100.0
1100 - 1149	28	2.8	956	97.2	984	100.0
1150 - 1199	987	75.7	316	24.3	1,303	100.0
1200 - 1249	530	10.9	4,336	89.1	4,866	100.0
1250 - 1299	7	2.9	238	97.1	245	100.0
1300 - 1349	696	51.8	647	48.2	1,343	100.0
1350 - 1399	1,181	66.9	584	33.1	1,765	100.0
1400 - 1449	1,288	44.9	1,579	55.1	2,867	100.0
1450 - 1499	177	50.4	174	49.6	351	100.0
1500 - 1549	2,261	98.9	24	1.1	2,285	100.0
Total	1,479,300	90.3	159,103	9.7	1,638,410	100.0

2) Freight Traffic

Similarly to passenger traffic, modal shares of road and railway have been tabulated as shown in Table 3.5.3.2. From this table, the following can be pointed out:

a. Road carries about 93 percent of interzonal freight traffic in terms of tonnage (about 83 percent in terms of ton-kms). Unlike passenger traffic, road seems to be dominant in all distance ranges.

b. Despite the dominance of road, PR's share tends to be larger in longer distances. This is approximated by the following logit equation:

$$P = 1 / (1 + \exp(1.417 - 0.00075 * D))$$

where, P: share of railway
D: distance (kms)

Table 3.5.3.2 Intermodal Relation between Road and Railway in Terms of Commodity Tonnage by Distance, 1992-93

(tons/day)

Distance (km)	Road		Rail		Total	
	Ton	%	Ton	%	Ton	%
0 - 49	14,346	89.7	1,639	10.3	15,985	100.0
50 - 99	36,462	98.9	423	1.1	36,885	100.0
100 - 149	57,384	99.4	335	0.6	57,719	100.0
150 - 199	59,580	99.1	556	0.9	60,136	100.0
200 - 249	29,040	98.9	331	1.1	29,371	100.0
250 - 299	26,934	94.0	1,717	6.0	28,651	100.0
300 - 349	19,980	98.7	271	1.3	20,251	100.0
350 - 399	8,856	82.2	1,924	17.8	10,780	100.0
400 - 449	7,956	88.0	1,082	12.0	9,038	100.0
450 - 499	7,128	96.2	284	3.8	7,412	100.0
500 - 549	6,204	97.2	176	2.8	6,380	100.0
550 - 599	3,042	92.5	248	7.5	3,290	100.0
600 - 649	1,446	59.4	990	40.6	2,436	100.0
650 - 699	3,048	89.7	349	10.3	3,397	100.0
700 - 749	2,496	92.3	207	7.7	2,703	100.0
750 - 799	1,776	77.5	515	22.5	2,291	100.0
800 - 849	1,566	78.3	433	21.7	1,999	100.0
850 - 899	6,300	74.4	2,164	25.6	8,464	100.0
900 - 949	4,812	68.6	2,200	31.4	7,012	100.0
950 - 999	666	66.2	340	33.8	1,006	100.0
1000 - 1049	1,644	64.0	923	36.0	2,567	100.0
1050 - 1099	2,958	88.5	386	11.5	3,344	100.0
1100 - 1149	2,514	69.2	1,117	30.8	3,631	100.0
1150 - 1199	1,968	78.0	554	22.0	2,522	100.0
1200 - 1249	6,960	76.3	2,162	23.7	9,122	100.0
1250 - 1299	948	70.4	398	29.6	1,346	100.0
1300 - 1349	1,812	62.3	1,096	67.7	2,908	100.0
1350 - 1399	1,518	74.3	525	25.7	2,043	100.0
1400 - 1449	1,950	81.1	455	18.9	2,405	100.0
1450 - 1499	372	49.9	374	50.1	746	100.0
1500 - 1549	750	90.1	82	9.9	832	100.0
Total	322,416	93.0	24,256	7.0	346,672	100.0

c. Based on the above equation, the break-even distance, where road and railway are equally chosen, can be calculated at 1889 kms. This distance is reduced to 1450 kms if zones unserviced by railway are excluded from the analysis. Although this distance is still in fact beyond the actual distances between most major activity centers in Pakistan, this is the perceived break-even distance. In the following section, a comparison will be made with the economic break-even distance.

(2) Economic Consideration

From the detailed analysis on break-even distance presented in Section 4.2, the following can be concluded:

a. Economic break-even distances based on the estimated traffic-variable rail costs (not full rail costs), actual road costs and actual usage are:

- 275 kms for passenger
- 750 kms for freight

b. These break-even distances, however, change depending on the type of service and assumptions on capacity, utilization and loading practice. For instance, if road vehicles comply with legal loading limitations, the freight break-even distance of 750 kms would become under 300 kms.

c. Therefore, these break-even distances should not be understood as a clear- cut point. Rather, a flexible wide-range target should be pursued.

d. Nevertheless, the perceived actual break-even distances are much longer than the economically desirable break-even distances. How to fill the gaps between them would be one of the major policy directions.

(3) Dry Port Operation by Pakistan Railway

Recently, the volume of containers transported between Lahore Dry Port (LDP) and Karachi port has been remarkably increasing as shown in Table 3.5.3.3.

Table 3.5.3.3 Containers Transported between Lahore Dry Port Karachi Port

Year	TEU's through Karachi	Lahore Dry Port (TEU's/Year) by PR	by NLC	Total
A. 1986-87	240,000	2,216	2,105	4,321
B. 1990-91	390,000	16,237	942	17,179
C. B/A	1.63	7.33	0.45	3.98

Although LDP is the only busy dry port at present, transport of containers between Karachi and other dry ports also seems to be promising for PR, judging from the recent tendency and the distance (the nearest dry port is Quetta; 862 kms by railway). The little imbalance in container traffic between northbound and southbound, as shown later, would contribute to improve the performance of PR. Table 3.5.3.4 shows the present and projected port traffic, total and containers.

Table 3.5.3.4 Present and Projected Port traffic (Total and Containers)

	1992-93		1997-98		2005-06	
Total Port Traffic at Karachi (000tons/year)						
- Import		23,664		30,033		41,307
- Export		4,953		7,517		13,202
A. Total		28,617		37,550		54,509
Container Traffic at Karachi (000tons/year)	TEU		TEU		TEU	
- Import	2,638	(255)	3,638	(364)	6,377	(633)
- Export	2,504	(252)	4,167	(416)	7,973	(796)
B. Total	5,142	(507)	7,805	(779)	14,309	(1429)
Ratio B/A		0.180		0.208		0.263

The ratio of containers to total port traffic was 0.180 in 1992-93 and is projected to reach 0.208 and 0.263 in 1997-98 and 2005-06, respectively. Using this ratio, container volumes between Karachi port and dry ports were estimated as shown in Table 3.5.3.5. Here, the ratio above was halved because about half of international containers are stuffed/stripped in and around Karachi.

Table 3.5.3.5 Projection of Containers between Karachi Port and Dry Ports

(000 tons/Year)

Dry Port	Distance (kms)	1992-93 Total	1992-93 Container	1997-98 Total	1997-98 Container	2005-06 Total	2005-06 Container
Peshawar	1,685	543	7	816	85	1,306	171
Rawalpindi	1,512	372	10	589	61	1,008	132
Lahore	1,223	2,505	205	3,627	377	6,355	833
Sialkot	1,305	170	3	226	24	333	44
Multan	933	2,002	0	2,608	271	4,141	542
Quetta	862	951	0	1,316	137	2,059	270
Total	-	6,543	222	9,182	955	15,202	1,992
Ton kms (million/Yr)			280		1,099		2,302

As of 1992-93, dry ports related to container traffic, mostly of LDP, accounted only about 5 percent of the total PR freight traffic of 6,180 million ton-kms. Although it is still unknown whether all existing dry ports would be equally utilized, this market is considered to be hopeful for PR. Since they are "existing", they must be used as much as possible even if some additional investment is required.

(4) Railway Capacity

The analysis on PR's capacity has revealed the following:

a. PR's inherent line capacity, calculated under the assumption that the tracks are well maintained and minor existing bottlenecks such as local speed restrictions are removed, is sufficient to meet a far larger demand than actually transported. It is about 92 billion passenger-kms and 84 billion ton-kms a year (the number of trains was assumed the same for passenger and freight).

b. Due to the limited number of locomotives, the line capacity is lowered to about 32 billion passenger-kms and 22 billion ton-kms. Further, the scarcity of wagons/coaches brings it down to about 19 billion passenger-kms and 11 billion ton-kms.

c. By shortening the average turn-around time of freight wagons from the current 15.4 days to 7 days as proposed, which requires some additional locomotives, the line capacity for freight traffic could be lifted upto about 22 billion ton-kms.

Although the above figures need to be checked in detail in relation to the demand pattern, it is reasonable for this study to assume the following capacity for PR:

<1997-98>

- Passenger: 25 billion pass. kms (30% increase from 1992-93)
- Freight: 22 billion ton-kms (100% increase from 1992-93; shorten turn- around time and increase wagons and locomotives to some extent)

<2005-06>

- Passenger: 38 billion pass. kms (50% increase from 1997-98)
- Freight: 33 billion ton-kms (50% increase from 1997-98)

These targets could be attained mainly by increasing the number of locomotives, coaches and wagons and by managerial measures such as shortening wagon turn-around time. However, some major investment such as track dualization may be needed in critical sections. If the railway network was to be extended towards the land-locked Central Asian States, major construction work would become necessary and above railway capacities should be reviewed totally.

(5) Traffic Demand Assigned to PR

Based on above discussions, traffic demand of railway was extracted from the land traffic OD matrices (road and rail combined) for the following cases:

<Case 1 - Current Modal Split>

This case assumes the current modal split between road and railway to be maintained in the future. The present modal share of railway by zone pair was applied to future land traffic volume of the same zone pair (zones that have no access to railway could be automatically excluded).

<Case 2 - Economically Desirable Modal Split>

This case assumes an economically desirable break-even distance; 275 kms for passenger and 750 kms for freight. By zone pair, the share of railway was determined so that it becomes 0.5 at the break-even distance (L), 0 at 1/2*L and 1.0 at 2*L. For freight, a break-even distance of 300 kms was also tested. In addition, container volume between Karachi port and inland dry ports was preempted as PR's market before the above calculation.

The result is presented in Table 3.5.3.6.

Table 3.5.3.6 Traffic Demand Assigned to PR for Different Cases (Interzonal Traffic Only)

	1992-93	1997-98	2005-06
<Passenger> million Passenger-kms			
Case 1 - Current Modal Split	16,511	22,790	36,089
Case 2 - Economically Desirable Modal Split at 275 kms	-	39,951	64,416
Approxomate Line Capacity	19,000	25,000	38,000
<Freight> million ton-kms			
Case 1 - Current Modal Split	6,051	6,933	10,086
Case 2 - Economically Desirable Model Split at 750 kms	-	13,692	21,131
Case 2'- Economically Desirable Model Split at 300 kms	-	23,649	35,703
Approximate Line Capacity	11,000	22,000	33,000

As shown in Table 3.5.3.6, passenger traffic demand of Case 1 (Current Modal Split) will increase quite rapidly while Case 2 (Economically Desirable Modal Split) will bring the demand to an unrealistic level beyond the capacity limitations. This can be attributed to the fact that strong patronage for PR is seen in long distance travel even at present and that the demand for longer distance travel will increase fairly rapidly as economy grows. Therefore, Case 1 (Current Modal Split) was taken as future targets in this study. This is different from so-called "Do-Nothing Case", because upgrading the maintenance and performance as well as increasing the number of locomotives and coaches are implicitly assumed. Actually, to meet this demand, operations of faster trains will be needed even to maintain current shares of railway.

Freight traffic, on the contrary, does not show any drastic increase in Case 1 (Current Modal Share Case). This is primarily due to the already eroded marketing basis of PR's freight transport. This situation must be drastically changed. In this study, Case 2 (Economically Desirable Modal Split at 750 kms) was taken up as a reasonable target. Case 2 could be pursued as a long-term target. Figure 3.5.3.1 to 3.5.3.4 present the demand patterns.

(6) Modal Split between Road and Rail (Summary)

In the process of extracting railway demand from total land traffic demand, the demand for road transport was also determined. Table 3.5.3.7 shows the results. In this table, the railway ton-kms growth rate between 1992-93 and 1997-98 (17.7% p.a.) might be unrealistic. However, this is the level attainable mainly through managerial measures without major investment, and is not high as compared to the peak once attained in the last decade. Since it is imperative for PR to recover its lost market in several years, this target should be taken seriously.

Figure 3.5.3.1 Desired Lines of Road Passenger Traffic Demand

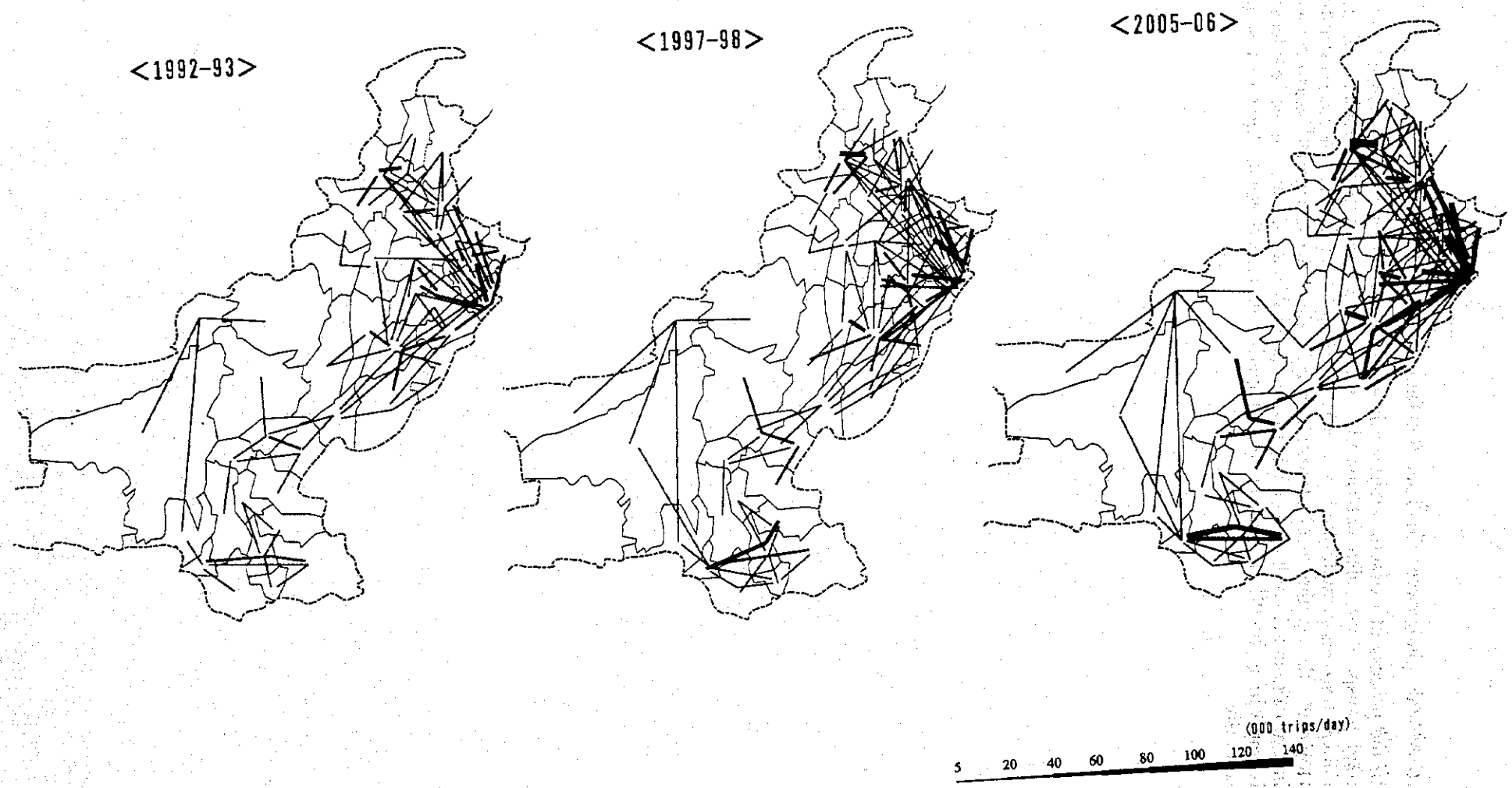


Figure 3.5.3.2 Desired Lines of Railway Passenger Traffic Demand

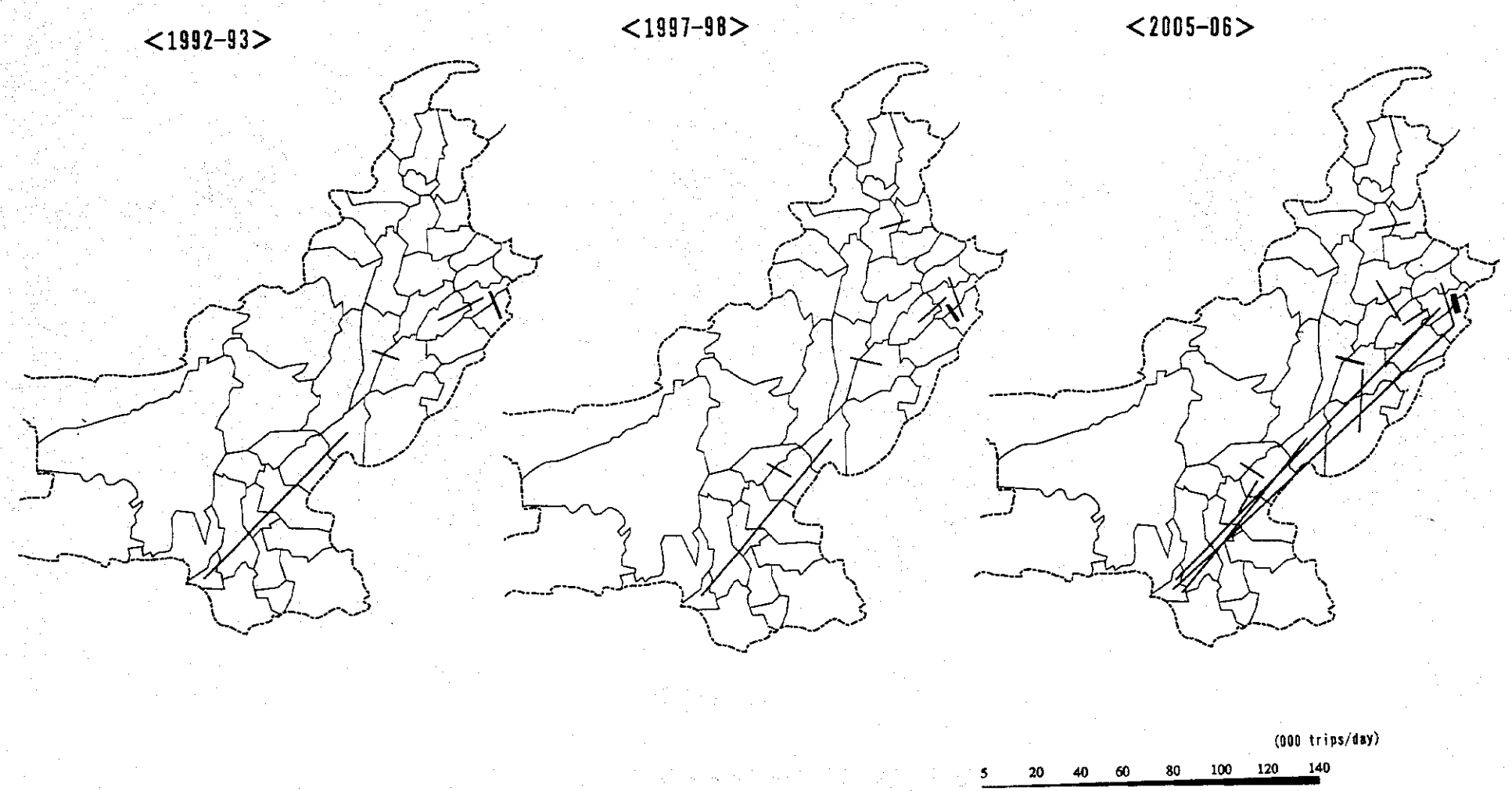


Figure 3.5.3.3 Desired Lines of Road Freight Traffic Demand

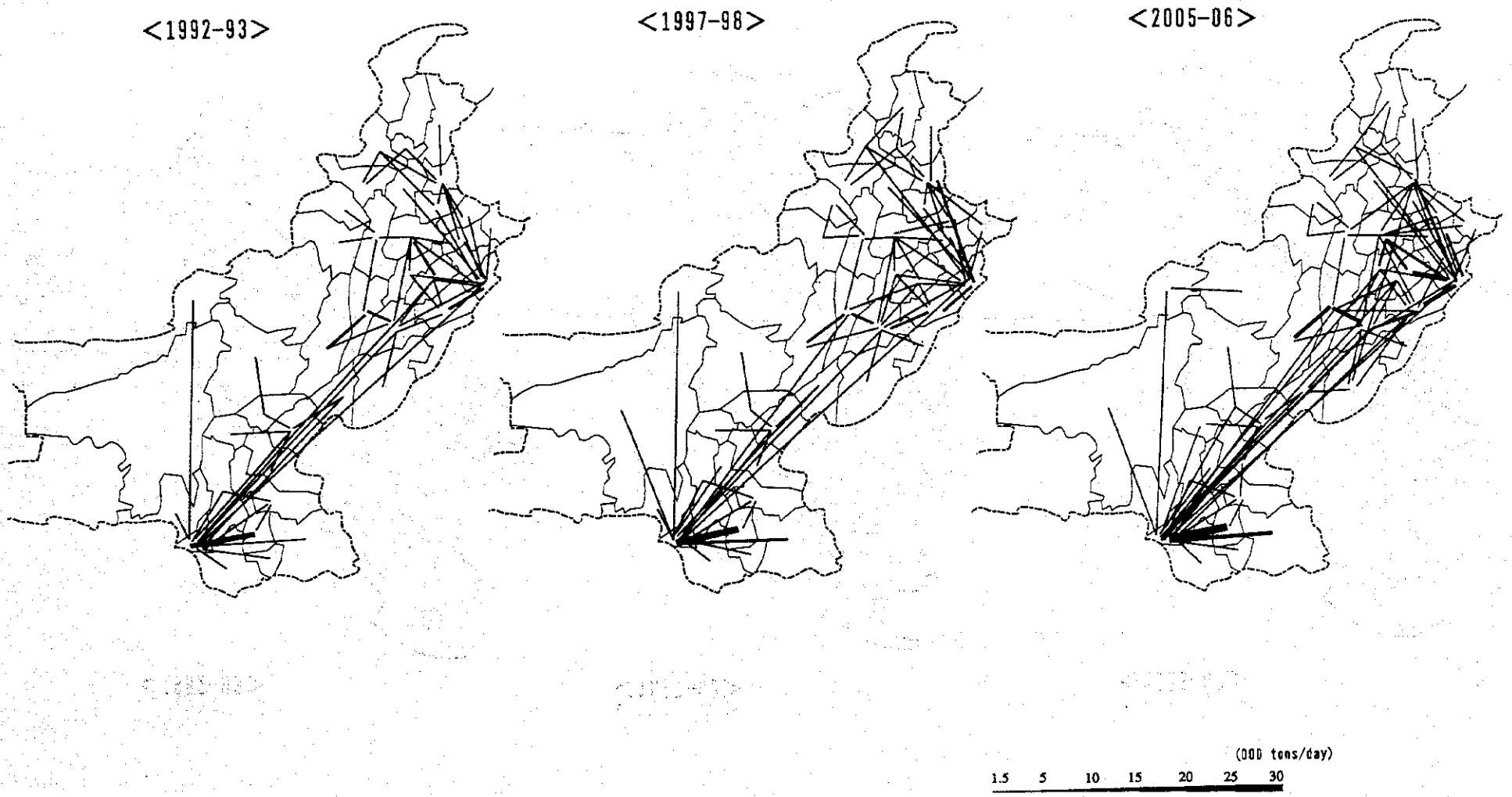
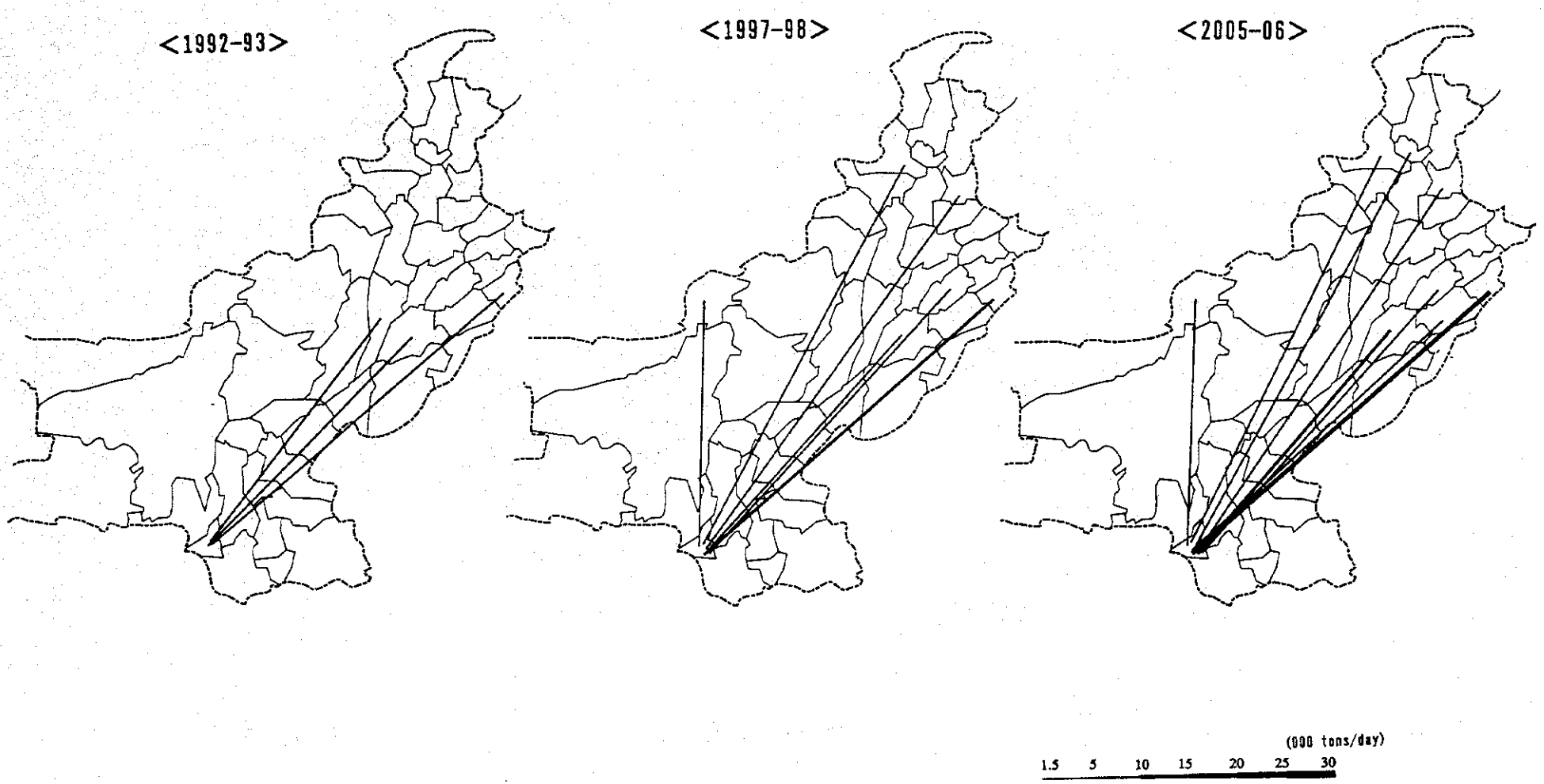


Figure 3.5.3.4 Desired Lines of Railway Freight Traffic Demand



REFERENCE

Current Modal Split Case

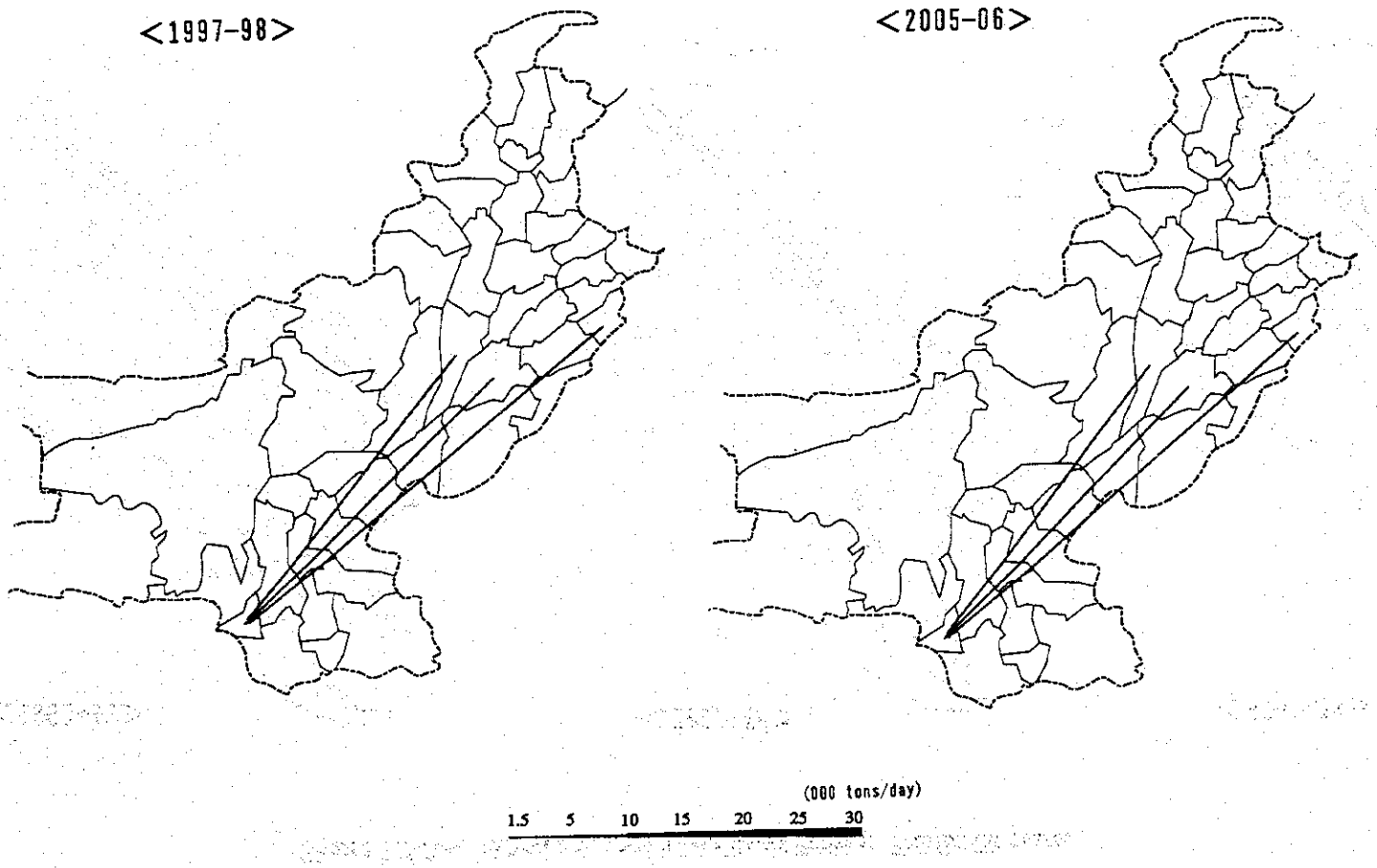


Table 3.5.3.7 Projection of Interzonal Road and Railway Traffic Demand (Summary)

		1992-93		1997-98		2005-06
<Passenger>						
Million pkm / Year	- Road	71,071	(6.3)	96,615	(5.5)	148,036
	- Rail	16,511	(6.7)	22,790	(5.9)	36,089
	Total	87,582	(6.4)	119,405	(5.6)	184,125
000 Trip / day	- Road	1,479	(6.1)	1,984	(5.2)	2,972
	- Rail	159	(6.2)	215	(5.6)	332
	Total	1,638	(6.1)	2,199	(5.2)	3,304
Average trip length	- Road	146		148		151
(kms)	- Rail	315		321		329
	Total	162		165		169
<Freight>						
million ton-kms /year	- Road	28,636	(1.1)	30,180	(4.1)	41,639
	- Rail	6,051	(17.7)	13,692	(5.6)	21,131
	Total	34,687	(4.8)	43,872	(4.6)	62,770
000 tons / day	- Road	322	(3.6)	384	(3.8)	517
	- Rail	24	(8.4)	36	(5.7)	56
	Total	347	(3.9)	421	(3.9)	573
Average trip length	- Road	269		238		244
(kms)	- Rail	764		1,153		1,143
	Total	303		316		332

Note: Total may not sum due to rounding.
Figures in parentheses show annual growth rates.

(7) Creation of Road Vehicle OD Matrices

The estimated future road OD matrices in terms of passengers and tonnage have been converted into road vehicle OD matrices using projected number of vehicles on road weighted by average load by vehicle type. Table 3.5.3.8 shows the results.

Table 3.5.3.8 Projected Road Vehicle OD Matrices

	No. of Trips per Day				
	1992-93		1997-98		2005-06
Motorcycle	6,350	4.9%	8,083	4.2%	11,241
Car	51,676	6.9%	72,275	5.7%	113
Wagon	24,701	7.0%	34,635	6.3%	56,655
Bus	22,389	5.5%	29,254	4.6%	42,002
Truck	53,736	3.6%	64,088	3.8%	86,343
Total	158,852	5.6%	208,335	5.0%	308,598

Note: Figures with "%" show annual growth rates.

3.6 Projection of Air Traffic

3.6.1 General

This section describes air traffic projections. In Section 3.3, domestic air transport demand was projected in terms of passenger-kms and ton-kms. This section, therefore, intends to further breakdown these macroscopic demand indicators into traffic volume and transport distance in the form of OD matrices. At the same time, international air traffic was also projected in terms of the number of passengers and tonnage. OD matrices were not created unlike the domestic air traffic.

3.6.2 Domestic Air Traffic

(1) Trip Generation/Attraction

In order to approximate air traffic generation attraction by zone, regression analyses were conducted. Among available zonal parameters (population and working population by industry), non-agricultural working population was chosen as explanatory variable to best fit the current tendency. The result is shown in Table 3.6.2.1.

The important question here is whether zones where airports do not exist at present should be included in the analyses. In this study, those were included because a zone should not be directly regarded as a catchment area of an airport and airports should have been constructed where demand surpasses a certain threshold. Due, however, to the possible large deviation from the actual situation, future theoretical values were not used immediately. They were calibrated using the ratio of actual value to the theoretical value calculated for the present by the regression equations. This procedure also eliminates the inconvenience of a demand found in zones where airports do not exist nor are planned. For zones where new airports are planned or proposed, however, theoretical values were taken as calculated. These are:

<Assumptions on New Airports>

- by 1997-98 (8th Five Year Plan)

  Sibi(45), Talhar(35), Bhagtanwala(13), Rajampur(21), Mangla(11), Walton(26), Parachinar(3), Mansehra(4), Sehwan Sharif(34), Kharan(43)

- by 2005-06 (Masterplan)

  Chilas(47), Loralai(41), Bhitshah(36), D.G.Khan(21), Naushero Teroz(31), Wana(5), Sialkot(20)

  * ( ) indicates JICA zone numbers.

In addition, an average growth was assumed for outside zones 47 to 51 where zonal parameters are unavailable.

(2) Trip Distribution

This stage of demand forecast aims to produce OD matrices. In this study, the following work was done:

a. For zones where airports are existing, the Fratar convergence calculation was applied holding the 1992-93 OD matrices as the present pattern.

b. For zones where airports do not exist but are planned, estimated generation and attraction were allocated to the three major airports (Karachi, Lahore and Islamabad) in proportion to the current shares.

c. By merging outputs of the works above, future air OD matrices have been formulated.

Table 3.6.2.1 Air Traffic Generation/Attraction and Non-Agricultural Working Population by Zone as of 1992-93

Zone No.	No. of Passenger	Cargo Tonnage	Non-agri Working Population	Zone No.	No. of Passenger	Cargo Tonnage	Non-agri Working Population
1	0	0	166	24	0	0	614
2	421,447	3,063	497	25	31,090	15	252
3	203	0	136	26	0	0	186
4	0	0	235	27	33,565	52	248
5	38,745	124	122	28	7,314	16	127
6	11,672	11	107	29	101,626	362	186
7	400,986	67	80	30	0	0	107
8	0	0	143	31	7,042	6	125
9	0	0	150	32	37,470	119	97
10	1,431,170	13,819	539	33	11,888	121	351
11	0	0	161	34	0	0	141
12	0	0	355	35	1,723	1	156
13	0	0	433	36	0	0	80
14	238	0	183	37	0	0	54
15	201,792	1,166	841	38	0	0	55
16	0	0	284	39	2,570,430	38,638	2,084
17	1,684,340	22,116	1,464	40	276,443	1,794	184
18	0	0	448	41	19,237	25	80
19	0	0	605	42	3,244	1	26
20	0	0	487	43	5,558	42	42
21	0	0	198	44	0	0	13
22	0	0	302	45	7,272	11	87
23	302,216	987	902	46	228,098	670	109

Note: Zones 47-51 are Northern Area, Azad Kashmir and other Countries.
Source: Traffic data compiled from PIA records.

Summary of Regression Analyses

No. of Air Passengers/Year -- Non-Agri. Wrk Pop.(000)		Tonnage of Air Cargo -- Non-Agri. Wrk Pop.(000)	
Constant	-170624.000	Constant	-2837.360
Std Err of Y Est	5003.726	Std Err of Y Est	3564.360
R Squared	0.708	R Squared	0.726
No of Observations	46.000	No of Observations	46.000
Degrees of Freedom	44.000	Degrees of Freedom	44.000
X Coefficient	1075.875	X Coefficient	15.008
Std Err of Coef.	104.148	Std Err of Coef.	1.391

(3) Calibration to Macro Demand Forecast

Domestic air traffic has been projected in accordance with the future economic framework in terms of passenger kms and ton kms (See Section 3.3). Hence, the OD matrices created above should be calibrated as against the macro transport demand indicators, i.e. passenger kms and ton kms.

This work includes:

a. to calculate passenger kms and ton kms based on the 1992-93 OD matrices (created from PIA records) and distances between zones. These values are slightly different from the PIA official statistics due to the existence of intrazonal flights (particularly in Northern Area and Baluchistan) and possible difference in distance measurement;

b. to calculate passenger kms and ton kms in the same manner for the future OD matrices created in the previous stage;

c. to multiply R to the future OD matrices to obtain calibrated future OD matrices.

$$R = \frac{Cp}{Cf} * \frac{Mf}{Mp}$$

where, Cp: 1992-93 calculated pkms or tkms
Cf: future calculated pkms or tkms
Mp: 1992-93 official pkms or tkms
Mf: future target pkms or tkms
(as per Macro Demand Forecast)

The OD matrices thus created have the features as presented in Table 3.6.2.2. As apparent, the number of passengers will grow slightly faster than passenger kms. This implies that shorter distance trips will increase rapidly in the future. Similar tendency can be pointed out also for cargo traffic.

Figure 3.6.2.1 illustrates the demand pattern of domestic air passengers.

Table 3.6.2.2 Summary of Domestic Air Traffic Projections

Year	Passenger		Cargo	
	NO. (000/year)	Pkms (million)	Tonnage (000tons/y)	Tkms (million)
1992-93	3,681	2,545	42	37
	8.0%	7.9%	7.0%	6.6%
1997-98	5,668	3,716	59	51
	6.9%	6.6%	6.8%	6.6%
2005-06	9,650	6,176	100	85

Note: Figures with "%" showbaverage annual growth rates.

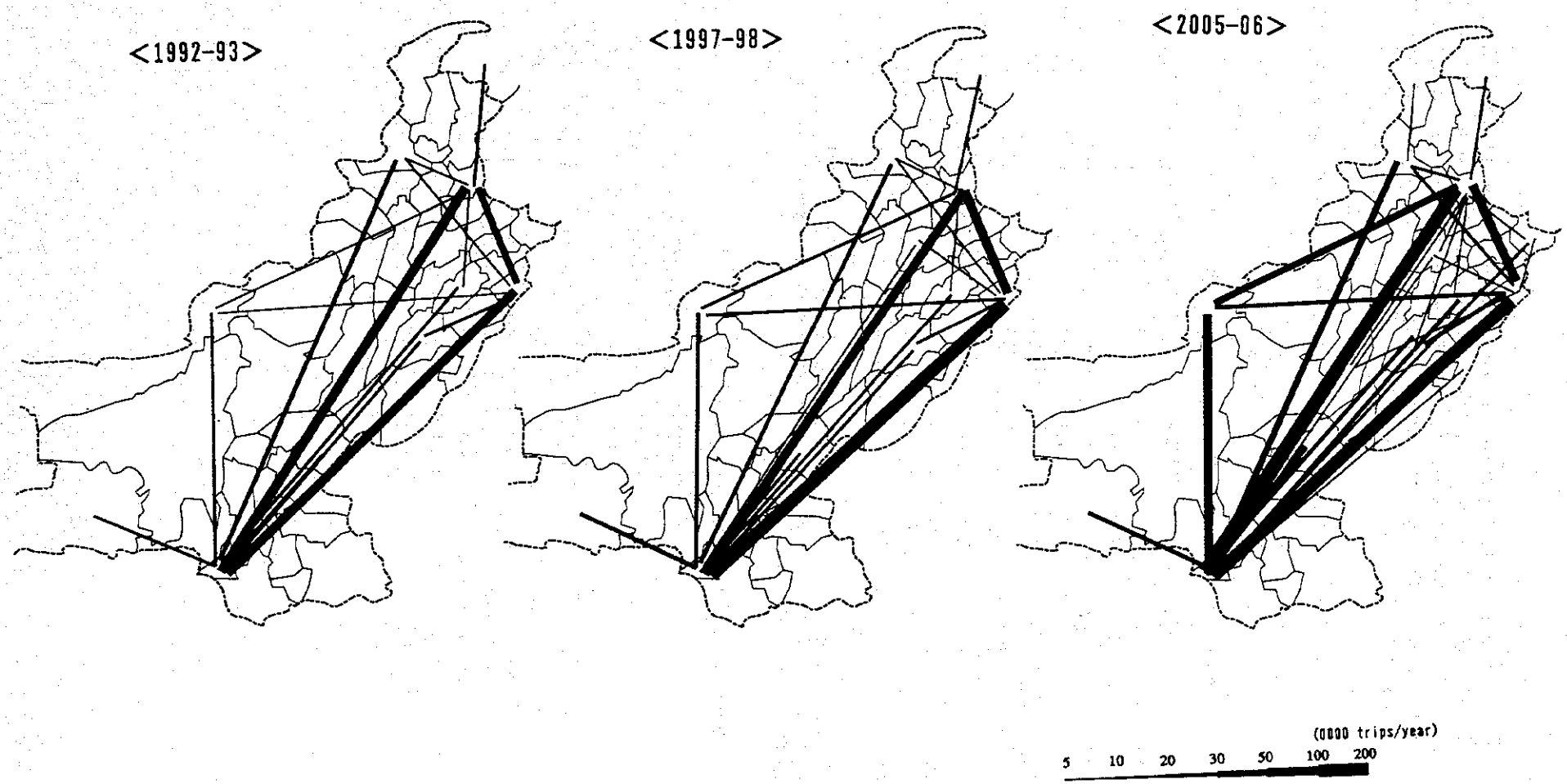
3.6.3 International Air Traffic

Table 3.6.3.1 shows the past trends and future projections as to international air traffic. The procedure of the projection is:

a. The number of PIA passengers by direction (Middle East, Europe, Far East and Regional) was calculated using regression equations. GNP was selected as an independent variable after comparing the result with population, GDP, net factor income from abroad and other possible variables.

b. Total number of PIA passengers was calculated, and using this as an independent variable, regression analysis was carried out to obtain total number of international passengers (not only of PIA).

Figure 3.6.2.1 Desired Lines of Domestic Air Passenger Traffic Demand



c. The volume of international air cargo has been largely fluctuating within a certain range in the past 10 years and no significant correlation was found with other parameters. Naturally, however, air cargo volume should increase as economy grows. Therefore, it was assumed that air cargo would increase at the same growth rate as the number of PIA passengers.

Table 3.6.3.1 Past Trends and Future Projections of International Air Traffic

Year	Total No.of Passengers (000)	No. of PIA Passengers (000)					Air Cargo (000 tons)	GNP (Rs.million in 1980-81 Prices)
		Total	M.East	Europe	F.East	Regional		
1983-84	3,325	1,567	993	257	154	163	103	327,607
1984-85	3,360	1,550	930	278	170	173	112	350,565
1985-86	3,629	1,576	944	285	169	178	129	373,506
1986-87	3,503	1,577	922	300	174	181	132	388,685
1987-88	3,752	1,726	996	345	196	189	121	402,516
1988-89	3,744	1,797	1,001	393	212	190	127	418,881
1989-90	3,963	1,893	1,085	390	194	223	135	439,647
1990-91	3,801	1,778	977	392	196	212	119	455,462
1991-92	4,167	1,960	1,113	402	224	221	123	485,362
1992-93	4,128	2,029	1,191	399	232	206	130	496,946
	4.1%	4.8%	2.6%	9.0%	6.0%	6.9%	4.8%	6.9%
1997-98	5,049	2,569	1,357	615	310	287	164	693,915
	4.6%	5.2%	4.2%	6.7%	6.0%	5.2%	5.2%	6.2%
2005-06	7,072	3,840	1,884	1,032	493	431	246	1,126,559

Note: Figures with "%" show average annual growth rates. * shows "provisional".
Source: PIA for past traffic data.

Summary of Regression Analyses

	PIA Passenger				
	M.East vs GNP	Europe vs GNP	F/East vs GNP	Regional vs GNP	Pass No. vs PIA Total
Constant	510.365	-55.635	17.361	55.443	959.884
Std Err of Y Est	57.902	22.869	10.013	9.711	91.699
R Squared	0.611	0.863	0.863	0.867	0.913
No. of Observations	10.000	10.000	10.000	10.000	10.000
Degrees of Freedom	8.000	8.000	8.000	8.000	8.000
X Coefficient	0.00122	0.00097	0.000422	0.000334	1.592
Std Err of Coef.	0.00034	0.00014	0.000060	0.000058	0.174

3.7 Comparison of Projected Results with the Previous NTPS(1988, JICA)

3.7.1 Port Traffic

Port traffic projection is directly influenced by socio-economic framework as well as government policies towards industrialization, natural resources development, self-sufficiency and so on. Table 3.7.1.1 gives a rough comparison of projected port traffic between the previous NTPS and this study.

Table 3.7.1.1 Comparison of Port Traffic Projection between the Previous NTPS and This Study

		(000 tons/year)		
		Previous NTPS (1988, JICA) (A)	This Study (B)	(B)/(A)
Import	1985-86	15,383	-	-
		3.7%	-	-
	1992-93	19,902	23,664	1.19
		4.4%	4.9%	
	1997-98	24,705	30,033	1.22
		4.2%	4.1%	
	2005-06	34,301	41,307	1.20
Export	1985-86	4,624	-	-
		2.8%	-	-
	1992-93	5,620	4,953	0.88
		4.6%	8.7%	
	1997-98	7,025	7,517	1.07
		6.0%	7.3%	
	2005-06	11,161	13,202	1.18
Total	1985-86	20,007	-	-
		3.5%	-	-
	1992-93	25,522	28,617	1.12
		4.5%	5.6%	
	1997-98	31,730	37,550	1.18
		4.6%	4.8%	
	2005-06	45,462	54,509	1.20

Note: Figures with "%" show average annual growth rates.

In this study, import was projected higher than the previous NTPS mainly due to the large benchmark figure of 1992-93. As to export, despite the low benchmark figure of 1992-93, this study assumed a high growth rate in line with the industrialization policy set forth in the Eighth FYP.

3.7.2 Land Traffic

(1) Road and Rail Combined

Table 3.7.2.1 compares the projections of the previous NTPS and this study.

Table 3.7.2.1 Comparison of Land Traffic Projection between the Previous NTPS and This Study

		(million pass-kms or tonkms/year)		
		Previous NTPS (1988,JICA) (A)	This Study (B)	(B)/(A)
Pass-kms (Total)	1985-86	114,031	-	-
		5.2%	-	
	1992-93	162,204	152,082	0.94
		4.3%	7.0%	
	1997-98	200,655	213,632	1.06
		3.8%	5.9%	
	2005-06	270,847	338,757	1.25
Pass-kms (Interzonal)	1985-86	61,772	-	-
		4.4%	-	
	1992-93	83,411	87,582	1.05
		4.8%	6.4%	
	1997-98	105,504	116,405	1.13
		3.5%	5.6%	
	2005-06	138,440	184,125	1.33
Ton-kms (Total)	1985-86	35,158	-	-
		4.5%	-	
	1992-93	47,998	43,180	0.90
		4.1%	6.2%	
	1997-98	58,760	58,275	0.99
		3.8%	5.5%	
	2005-06	78,905	89,341	1.13
Ton-kms (Interzonal)	1985-86	29,486	-	-
		3.2%	-	
	1992-93	36,858	34,687	0.94
		3.1%	4.8%	
	1997-98	43,032	43,872	1.02
		3.0%	4.6%	
	2005-06	54,608	62,770	1.15

Note:Figures with "%" show average annual growth rates.

As compared to the previous NTPS, this study has assumed higher growth rates reflecting the future socio-economic framework of which annual growth rate of GDP is 7.0% for 1992-93 through 1997-98 (6.0% in case of previous NTPS) and 6.3% for 1997-98 through 2005-06 (5.7% in case of previous NTPS).

(2) Road and Rail after Modal Split

Table 3.7.2.2 gives the comparison of traffic projection between the previous NTPS and this

study for the "economically desirable" case.

Table 3.7.2.2 Comparison of Road and Rail Traffic Projection between the Previous NTPS and This Study (Interzonal Only)

		(million pass-kms or tonkms/year) Previous NTPS (1988,JICA) (A)	This Study (B)	(B)/(A)
<Road>				
Pass-kms (Total)	1985-86	45,969	-	-
		4.6%	-	
	1992-93	63,138	71,071	1.13
		5.1%	6.3%	
	1997-98	80,995	96,615	1.19
		3.6%	5.5%	
	2005-06	107,777	148,036	1.37
Pass-kms (Interzonal)	1985-86	21,198	-	-
		2.1%	-	
	1992-93	24,564	28,636	1.17
		-	1.1%	
	1997-98	0	30,180	-
		-0.8%	4.1%	
	2005-06	22,140	41,639	1.88
<Rail>				
Ton-kms (Total)	1985-86	15,803	-	-
		3.6%	-	
	1992-93	20,273	16,511	0.81
		3.8%	6.7%	
	1997-98	24,509	22,790	0.93
		2.8%	5.9%	
	2005-06	30,663	36,089	1.18
Ton-kms (Interzonal)	1985-86	8,288	-	-
		5.8%	-	
	1992-93	12,294	6,051	0.49
		-	17.7%	
	1997-98	-	13,692	-
		7.8%	5.6%	
	2005-06	32,468	21,131	0.65

Note:Figures with "%" show average annual growth rates.

In the previous NTPS, an extremely drastic policy was proposed to make maximum use of PR(Pakistan Railway), particularly in relation to freight transport. Due to this reason, the road traffic demand for freight was projected to decrease further in the future. PR was expected to play the more important role in intercity freight transport than in road. This was planned in view of the economically desirable break-even distance. Although this study has the same standpoint, the projection of the previous NTPS has proved to be too optimistic at least for the year 1992-93 when PR carried only 49% of the projected freight traffic demand. This study might make the same mistake for the year 1997-98. However, the recent declining tendency of PR's traffic must surely be reversed in the near future. In order to look into more detail of the current performance of PR, items of study will be taken up in the following chapter.

3.7.3 Air Traffic

Table 3.7.3.1 gives a comparison of domestic air traffic projections between the previous NTPS and this study. No large difference could be observed. As for international air traffic, also no large difference is seen, although this study projected slightly higher than the previous NTPS because of the higher assumptions on economic growth.

Table 3.7.3.1 Comparison of Domestic Air Traffic Projection between the Previous NTPS and This Study

		(million pass-kms or tonkms/year)		
		Previous NTPS (1988,JICA) (A)	This Study (B)	(B)/(A)
Pass-kms	1985-86	1,794	-	-
		6.6%	-	
	1992-93	2,813	2,545	0.90
		6.4%	7.9%	
	1997-98	3,845	3,716	0.97
		6.1%	6.6%	
	2005-06	6,158	6,176	1.00
Ton-kms	1985-86	24	-	-
		6.0%	-	
	1992-93	36	37	1.03
		6.4%	6.6%	
	1997-98	49	51	1.04
		5.8%	6.6%	
	2005-06	77	85	1.10

Note : Figures with "%" show average annual growth rates.