THE STUDY ON NATIONAL TRANSPORT PLAN IN THE ISLAMIC REPUBLIC OF PAKISTAN

TECHNICAL PAPER Vol. 1

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I. REGIONAL ECONOMY

1. Methodology and Assumption

1) Agriculture

Province-wise production of wheat, rice, sugarcane and cotton have been firstly projected by multiplying farm land area by yield per hectare like national projection. Farm land area by province is estimated based on provincial share which is shown in Table 1. Also, yield per hectare by province is estimated based on comparative ratio of province and national which is shown in Table 2.

Secondly, the provincial production has been brokendown into district-wise production in a way similar to the projection of district population.

2) Manufacturing

The district-wise production of edible oil, sugar, cement, fertilizer and iron & steel, as well, as all the industries have been projected based on the following process.

a) Total Industry

The data of total industrial production by province and district are not available except in Census of Manufacturing Industry (CMI). Besides, CMI has not been conducted since 1975–76. Thus, the district-wise production of total industry in 1980–81 has been estimated first by using CMI data in 1970–71 and 1975–76. Secondly, the projection of total industrial production is done by using the following cross section model and projected figures are adjusted against the national total.

$$Y = -92 + (2.10768 + 3.30394\ DMY)\ POP \qquad r = 0.9853$$

where

Y : Total industrial production by zone[1)]

POP : Urban population by zone

DMY : Dummy variable (Karachi = 1, other zone = 0)

1) The whole country has been divided into 18 zones.

b) Edible oil

Province-wise production

The production of edible oil has been projected by province using the following model;

$$\log PP = 4.35691 + 0.53017 \log T \qquad r = 0.9745$$

$$\log PS = 4.05886 + 0.37381 \log T \qquad r = 0.9753$$

$$\log PN = 2.81552 + 0.37827 \log T \qquad r = 0.7903$$

$$\log PB = -0.39608 + 1.12639 \log T \qquad r = 0.9999$$

where

PP : Production of edible oil in Punjab

PS : Production of edible oil in Sind

PN : Production of edible oil in NWFP

PB : Production of edible oil in Baluchistan

T : Time trend (1971–72 = 1 . . . 1980–81 = 10)

Subject to National total = PP + PS + PN + PB

Table 1 Share of Provincial Farm Land Area Relating to Major Crops

(%)

	Punjab	Sind	N.W.F.P.	Baluchistan	Pakistan
Wheat	72.3	14.0	11.1	2.6	100.0
Rice	52.2	42.0	3.6	2.2	100.0
Sugarcane	71.2	15.5	13.3	-	100.0
Cotton	73.8	26.1	0.1	-	100.0

Source: Agricultural Statistics of Pakistan 1980
Statistical Pocket Book of Pakistan 1982

Note: Average during 1971–72 to 1980–81

Table 2 Comparative Ratio of Provincial and National Yield per Hectare Relating to Major Crops

	Punjab	Sind	NWFP	Baluchistan	Pakistan
Wheat	1.03	1.15	0.69	0.66	1.00
Rice	0.91	1.14	0.87	0.87	1.00
Sugarcane	1.00	0.96	1.02	-	1.00
Cotton	0.92	1.23	0.65	-	1.00

Source: Agricultural Statistics of Pakistan 1980
Statistical Pocket Book of Pakistan 1982

Note: Average during 1971–72 to 1980–81

District-wise production

The production projected at the provincial level has been brokendown into district-wise production based on the location and production capacity of on-going projects obtained from Vegetable Ghee Corporation and each provincial government.

c) Sugar

Province-wise production

The production of sugar has been projected by province using the following model;

PP = −103.9 + 0.019940 SP r = 0.7956

PS = 164.7 + 0.109609 SS r = 0.9395

PN = −194.6 + 0.083692 SN r = 0.6036

where

PP : Production of sugar in Punjab

PS : Production of sugar in Sind

PN : Production of sugar in NWFP

SP : Production of sugarcane in Punjab

SS : Production of sugarcane in Sind

SN : Production of sugarcane in NWFP

Subject to National total = PP + PS + PN

District-wise production

According to Ministry of Industry, the present average ratio between (A) capacity of sugarmill and (B) production of sugarcane of respective districts by province are;

(B)/(A)

Punjab : 39 t/unit

Sind : 12 t/unit

NWFP : 18 t/unit

Average production capacity of sugarmill by province are;

Punjab : 24,000 t

Sind : 27,000 t

NWFP : 27,000 t

It is assumed, therefore, that the sugarmills will be set up in the districts where projected. Production of sugarcane exceeds the following level;

Punjab : 39 t × 24,000 t = 936,000 t

Sind : 12 t × 27,000 t = 324,000 t

NWFP : 18 t × 27,000 t = 486,000 t

d) Cement

The production of cement in 1987–88 has been projected by district based

on the capacity of existing and on-going projects obtained from Ministry of Production. With regard to production in 1999–2000, it is assumed that share of production among districts in 1987–88 will remain constant.

e) Fertilizers

The production of fertilizers in 1987–88 has been projected by district in a way similar to the projection of cement, but based on the data obtained from Ministry of Industry. Provincial production in 1999–2000 has been projected based on the provincial fertilizers demand which has been projected in the port projection, and provincial production has been brokendown into district-wise production in a way similar to the projection of cement production.

f) Iron & steel

Province-wise production

Firstly, the production of iron & steel for Punjab and Sind excluding Karachi Steel Mill has been projected by using the following model;

$\log PP = 2.5784 + 1.16749 \log T$ $\quad r = 0.9040$

$\log PS = 2.5107 + 1.11843 \log T$ $\quad r = 0.8552$

where

PP : Production of iron & steel in Punjab

PS : Production of iron & steel in Sind

T : Time trend (1971–72 = 1 . . . 1980–81 = 10)

For NWFP, it is assumed that the level of production in 1980–81 will remain constant.

Secondly, projected figures by province are adjusted the national total excluding Karachi Steel Mill.

Thirdly, the production of Karachi Steel Mill is added to the results of projection above for Sind.

District-wise production

The district-wise data of iron & steel production are not available except in CMI. Thus, the production of iron & steel by district in 1980–81 has been first estimated in a way similar to the production of total industry. Secondly, it is assumed that district share in production of iron & steel in 1980–81 will remain constant.

3) Coal, Crude Oil and Petroleum

It is difficult to project production of mining and energy not only by district but also by province. It is, therefore, that district share in production of coal, crude oil and petroleum products in 1980–81 will remain constant. As for coal production, province-wise production has been done by using the following model;

$\log PP = 5.54456 + 0.211653 \log T$ $\quad r = 0.9108$

$\log PS = 3.88680 + 0.574098 \log T$ $\quad r = 0.8775$

$\log PN = 1.78591 + 0.675850 \log T$ $r = 0.6528$

$\log PB = 6.72597 - 0.093570 \log T$ $r = 0.5729$

where

PP : 3 year moving average in production of coal in Punjab

PS : -do- in Sind

PN : -do- in NWFP

PB : -do- in Baluchistan

T : Time trend (1971–72 = 1 . . . 1980–81 = 10)

Subject to National total = PP + PS + PN + PB

2. Existing and On-going Projects in Industrial Section

for Vegetable Ghee Industry ; See Table 3

for Sugar Mills ; See Table 4

for Cement Industry ; See Table 5

for Fertilizer Industry ; See Table 6

3. Statistical Data

1) Province-wise Production

a) General note

Agriculture

Source : Agricultural Statistics of Pakistan 1980
Statistical Pocket Book of Pakistan 1982

Manufacturing

Source : Pakistan Economic Survey 1980–81
Monthly Survey of Industrial Production & Employment in the Punjab February, 1982
Monthly Survey of Industrial Production & Employment in Sind December, 1981
Government of NWFP
Statistical Pocket Book of Pakistan 1982

Note : The sum of provincial figures is not always equal to Pakistan total due to the different source.

Energy

Source : Energy Year Book 1979, 1980

b) Data

See Table 7 to Table 18

2) Field-wise and/or Refinery-wise Production

See Table 19 to Table 21

Table 3 Existing and On-going Projects in Vegetable Ghee Industry

Name of Unit / Project	Location	Capacity (M.Tonnes)
Existing		
1 Suraj Ghee Industries Limited	Sheikhupura	24,000
2 United Industries	Faisalabad	28,000
3 Kakakhel Industries	Faisalabad	29,000
4 Sargroh Vegetable Ghee Mills	Faisalabad	21,000
5 Morafco Industries Limited	Faisalabad	19,000
6 Sheikh Fazal Rahman & Sons Ltd.	Multan	28,000
7 A & B Industries Gases Limited	Multan	14,500
8 Al Hilal Vegetable Ghee Milles	Multan	16,500
9 Kohinoor Oil Mills Limited	Kalashah Kaku	23,000
10 Universal Oil & Vegetable Ghee Mills Limited	Sheikhupura	17,000
11 Crescent Industries Limited	Chichawatni	20,000
12 Fazal Vegetable Ghee Milles	Islamabad	18,000
13 Punjab Vegetable Ghee & General Mills Limited	Lahore	10,000
14 Bengal Vegetable Ghee Industries Limited	Karachi	13,000
15 A & B Oil Industries Limited	karachi	14,000
16 E.M. Oil Milles Limited	Karachi	22,000
17 Burma Oil Milles Limited	Karachi	31,000
18 Moqbool Company Limited	Karachi	11,500
19 Hydri Industries Limited	Karachi	15,000
20 Wazir Ali Industries Limited	Hyderabad	30,000
21 Asaf Industries Limited	Shikarpur	12,500
22 Associated Industries Limited	Nowshera	30,000
23 Bara Vegetable Ghee Mills	Bara	10,000
24 Dargai Oil Processing Industries	Dargai	11,000
25 Haripur Oil Processing Industries Limited	Haripur	11,000
26 Chitan Vegetable Ghee Mslls	Quetta	9,000
27 Lever Brothers Pakistan Limited	Rahim Yar Khan	19,000
28 Lever Brothers Pakistan Limited	Karachi	15,000
29 Army Welfare Food Industries	Faisalabad	12,000
30 Khyber Vegetable Ghee Mills	Lahore	8,000
31 AKMIDC Vagetable Ghee Mills		9,000
Total		528,500
On-going		
1 Blue Star	Bahawalpur	9,000
2 Daman	D.I.Khan	9,000
3 Pakistan Ghee Industry	Gdjrat	9,000
4 Ra-ni Ghee Mill	Jhelum	9,000
5 Punjab Oil Mill	Islamabad	9,000
6 Ajman Corporation	Hab. Chowki.	4,500
7 Qureshi Mill	Mirpur	9,000
8 Fasal Sad	Tando Adam, Sind	9,000
9 Ahuad Vegetable Ghee	Sukkur	9,000
10 Arif Oil Mills	Khairpur, NWFP	9,000
11 Allied Ghee Industry	Mardan	9,000
12 Baluchistan Oil Mslls	Uchal	4,500

Source: Ministry of Industry
Vegetable Ghee Corporation

Table 4 Existing Sugar Mills

Name of Mill	Location	Capacity (M.Tonnes)
Punjab		
1 Fecto Sugar Mills	Darrya Khan	20,728
2 Bahawalnagar Sugar Mills	Chistian	23,167
3 Crescent Sugar ills	Faisalabad	30,483
4 Husein Sugar Mills	Jaranwala	23,167
5 Hyesons Sugar Mills	Jetha Bhutta	23,370
6 Kohinoor Sugar Mills	Jauharabad	20,322
7 Leiah Sugar Mills	Leiah	17,274
8 Modern Sugar Mills	Sangla Hill	23,167
9 Noon Sugar Mills	Bhalwal	23,167
10 Rahwali Sugar Mills	Rahwali	6,351
11 Shahtaj Sugar Mills	Mandi Bahuddin	23,167
12 Shakargunj Sugar Mills	Shakargunj	23,167
13 United Sugar Mills	Sadiqabad	38,889
14 Pasrur Sugar Mills	Sialkot	20,400
15 Pattoki Sugar Mills	Kasur	40,800
16 Kamalia Sugar Mills	Faisalabad	27,200
17 Samundri Gojra Sugar Mills	Faisalabad	27,200
18 Baba Farid Sugar Mills	Sahiwal	27,200
Sind		
19 Al-Noor Sugar Mills	Moro	23,167
20 Bawany Sugar Mills	Talhar	23,167
21 Fauji/TM Khan	TM Khan	31,839
22 Fauji/Khoski	Khoski	46,334
23 Habib Sugar Mills	Nawabshah	23,878
24 Mirpurkhas Sugar Mills	Mirpurkhas	23,167
25 Mehran Sugar Mills	Tando Allahyar	23,167
26 Larkana Sugar Mills	Naudero	20,728
27 Consolidated	Ranipur	27,000
28 Dadu Sugar Mills	Bayaro Goth	28,800
29 Thatta Sugar Mills	Deh Bijora	28,800
30 Shahmurad Sugar Mills	Thatta	28,400
NWFP		
31 Bannu Sugar Mills	Saria Naurang	18,290
32 Charsadda Sugar Mills	Charsadda	26,419
33 Faontier Sugar Mills	Takht Bhai	14,225
34 Premier Sugar Mills	Mardan	45,725
35 Khazana Sugar Mills	Khazana	31,000
Total		903,862

Source: Ministry of Industry

Table 5 Existing and On-going Projects in Cement Industry

Name of Plant / Project	Location		Capacity (M.tonnes)
Existing			
1 Zeal Pak Factory	Hyderabad		1,080,000
2 Associated Cement Factory	Wah, Attock		450,000
3 Associated Cement Factory	Rohri, Sukkur		270,000
4 Gharibwal Cement Factory	Gharibwal, Jhelum		540,000
5 Mustehkam Cement Factory	Hattar, Hazara	1st	360,000
		2nd	300,000
6 Javedan Cement Factory	Karachi	1st	300,000
		2nd	300,000
7 Maple Lkave Cement Factory	Daud khel		300,000
8 National Cement Factory	Karachi		160,000
9 National Cement Factory	Dankot, Jhelum		50,000
10 White Cement Factory	Daud Khel		15,000
Total			3,285,000
On-going			
Public			
1	Thatta		330,000
2	Dankot		300,000
3	Kohat		300,000
4	D.G.Khan		600,000
Private			
1 Galadari	Lasbela		600,000
2 Fakir	Karachi		300,000
3 Dadabhai	Dadu		300,000
4 Pakland	Thatta		300,000
5 Pharaon	Lasbela		600,000
6 Sarela	Quetta		6,000
7 Farooq	Peshawar		300,000
8 Qureshi	Peshawar		900,000
9 Fecto	Islamabad		300,000

Source: Ministry of Production

Table 6 Existing and On-going Projects in Fertilizer Industry

Name of Unit / Project	Location	Capacity (M.Tonnes)
Existing		
1 Exxon Chemical Pakistan Limited	Dharki	173,000
2 Dawood Hercules Chemical Limited	Sheikhupura	345,000
3 National Fertilizer Factory	Daudkhel	97,500
4 Pak-Arab (NFC)	Mulutan	826,900
5 National Fertilizer Factory	Faisalabad	90,000
6 Pak-Saudi (NFC)	Mirpur	543,000
Total Nitrogenous		1,833,250
Phosphatic		242,150
Nitrogenous and Phosphatic		2,075,400
On-going		
1 Fauji Fertilizer Company	Sadicaba	543,000
2 Hazara Fertilizer Limited (NFC)	Hazara	96,000

Source: Ministry of Industry

Table 7 Production of Wheat

(1000 Tonnes)

Year	Punjab	Sind	N.W.F.P.	Baluchistan	Pakistan
1971-72	5291.1	1081.1	439.6	78.6	6890.4
72-73	5693.5	1095.8	584.4	68.6	7442.3
73-74	5664.8	1246.0	606.9	112.2	7628.9
74-75	5785.6	1143.6	613.2	131.1	7673.5
75-76	6571.6	1320.9	660.4	137.8	8690.7
76-77	6807.7	1478.6	711.6	146.0	9143.9
77-78	6090.2	1427.0	688.6	161.4	8367.2
78-79	7323.6	1680.1	737.5	208.8	9950.0
79-80	7913.5	1849.4	810.8	231.1	10804.8
80-81	8299.9	1949.4	814.6	238.9	11302.8

Table 8 Production of Rice

(1000 Tonnes)

Year	Punjab	Sind	N.W.F.P	Baluchistan	Pakistan
1971-72	991.9	1168.1	59.3	42.6	2261.9
72-73	1000.9	1221.9	66.0	40.9	2329.7
73-74	1114.5	1235.0	72.2	33.4	2455.1
74-75	1152.4	1049.0	76.9	35.5	2313.8
75-76	1207.2	1286.1	84.6	39.6	2617.5
76-77	1332.0	1292.0	85.4	28.0	2737.4
77-78	1507.8	1315.3	87.6	38.9	2949.6
78-79	1765.9	1340.9	104.0	61.2	3272.0
79-80	1518.4	1499.1	104.7	93.6	3215.8
80-81	1361.7	1549.9	105.1	102.8	3119.5

Table 9 Production of Cotton

(1000 Tonnes)

Year	Punjab	Sind	N.W.F.P	Baluchistan	Pakistan
1971-72	529.1	177.8	0.4	0.1	707.4
72-73	502.4	198.7	0.5	-	701.6
73-74	448.9	208.9	0.6	0.1	658.5
74-75	440.1	193.3	0.6	0.1	634.1
75-76	344.4	168.8	0.5	-	513.7
76-77	276.8	157.4	0.6	0.1	434.9
77-78	359.5	214.8	0.5	-	574.8
78-79	330.3	142.5	0.4	-	473.2
79-80	481.6	246.1	0.4	-	728.1
80-81	474.3	239.2	0.5	0.3	714.4

Table 10 Production of Sugarcane

(1000 Tonnes)

Year	Punjab	Sind	N.W.F.P	Baluchistan	Pakistan
1971-72	13774.6	2784.8	3401.8	1.9	19963.1
72-73	13726.9	2915.1	3304.0	1.5	19947.5
73-74	16617.5	3795.0	3497.2	0.8	23910.5
74-75	14810.0	2767.2	3663.1	1.6	21241.9
75-76	18267.6	3586.4	3690.6	2.1	25546.7
76-77	21788.3	4037.0	3695.4	2.3	29523.0
77-78	22095.7	4260.4	3718.8	1.7	30076.6
78-79	19343.9	4373.8	3606.1	1.7	27325.5
79-80	19413.5	4664.4	3417.0	2.8	27497.7
80-81	23733.0	5007.3	3598.0	21.1	32359.4

Table 11 Production of Edible Oil

(1000 Tonnes)

Year	Punjab	Sind	N.W.F.P	Baluchistan	Pakistan
1971-72	90	62	N.A	N.A	162
72-73	105	72	24	N.A	182
73-74	129	90	24	N.A	225
74-75	160	94	30	N.A	272
75-76	160	96	30	N.A	277
76-77	193	108	30	N.A	326
77-78	212	113	30	N.A	360
78-79	252	131	32	7	422
79-80	268	140	36	8	452
80-81	291	148	57	9	505

Table 12 Production of Sugar

(1000 Tonnes)

Year	Punjab	Sind	N.W.F.P	Baluchistan	Pakistan
1971-72	149	111	97	-	375
72-73	180	160	97	-	429
73-74	263	245	94	-	608
74-75	225	140	130	-	502
75-76	319	212	130	-	630
76-77	348	333	93	-	736
77-78	351	352	116	-	861
78-79	200	301	107	-	607
79-80	177	348	61	-	586
80-81	409	337	106	-	851

Table 13 Production of Cement

(1000 Tonnes)

Year	Punjab	Sind	N.W.F.P	Baluchistan	Pakistan
1971-72	874	1140	N.A	-	2605
72-73	973	1599	135	-	2876
73-74	1074	1662	141	-	3145
74-75	1257	1653	192	-	3320
75-76	1197	1618	269	-	3196
76-77	1235	1427	300	-	3071
77-78	1292	1548	252	-	3224
78-79	1175	1481	367	-	3023
79-80	1284	1688	370	-	3343
80-81	1333	1872	333	-	3538

Table 14 Production of Fertilizers

(1000 M/Tonnes)

Year	Punjab	Sind	N.W.F.P	Baluchistan	Pakistan
1971-72	401	164	-	-	601
72-73	511	175	-	-	746
73-74	557	197	-	-	787
74-75	587	206	-	-	829
75-76	620	209	-	-	879
76-77	617	206	-	-	870
77-78	613	210	-	-	865
78-79	704	231	-	-	938
79-80	940	214	-	-	1177
80-81	1046	559	-	-	1605

Table 15 Production of Iron & Steel

(1000 Tonnes)

Year	Punjab	Sind	N.W.F.P	Baluchistan	Pakistan
1971-72	N.A	N.A	N.A	-	166
72-73	N.A	N.A	18	-	184
73-74	N.A	N.A	18	-	218
74-75	N.A	N.A	20	-	224
75-76	141	70	20	-	231
76-77	172	78	20	-	270
77-78	152	143	20	-	315
78-79	204	138	20	-	362
79-80	250	151	20	-	421
80-81	342	133	20	-	495

Note: The data for Punjab are estimated by using the following formula.
Punjab = Pakistan - Sind - NWFP

Table 16 Production of Coal

(1000 Tonnes)

Year	Punjab	Sind	N.W.F.P	Baluchistan	Pakistan
1971-72	366	108	16	724	1214
72-73	314	92	22	764	1192
73-74	339	93	14	766	1212
74-75	354	160	12	769	1295
75-76	331	89	14	621	1055
76-77	421	118	14	647	1200
77-78	382	166	30	673	1251
78-79	408	245	42	692	1387
79-80	483	189	42	856	1569

Table 17 Production of Crude Oil

(1000 Barrels)

Year	Punjab	Sind	N.W.F.P	Baluchistan	Pakistan
1971-72	3008	-	-	-	3008
72-73	3062	-	-	-	3062
73-74	2855	-	-	-	2855
74-75	2443	-	-	-	2443
75-76	2512	-	-	-	2512
76-77	3743	-	-	-	3743
77-78	3539	-	-	-	3539
78-79	3711	-	-	-	3711
79-80	3566	-	-	-	3566

Table 18 Production of Petroleum Products

(1000 Tonnes)

Year	Punjab	Sind	N.W.F.P	Baluchistan	Pakistan
1971-72	417	2829	-	-	3246
72-73	406	2857	-	-	3263
73-74	342	2885	-	-	3227
74-75	296	2782	-	-	3078
75-76	306	2657	-	-	2963
76-77	461	2603	-	-	3064
77-78	447	3404	-	-	3851
78-79	465	3317	-	-	3782
79-80	442	3824	-	-	4266

Table 19 Field Wise Production of Coal (1979–80)

Field	Production (M.Tonnes)
Punjab	
Makerwal/Salt Range	483,351
Sind	
Lakhra	153,909
Jhimpir	34,656
NWFP	
Chirat	41,434
Baluchistan	
Sor-Range	243,257
Degari	103,964
Sharigh	28,478
Sinjidi	127,203
Mach	54,247
Harani Field Nakus Khost	9,847
Dunki	132,992
Pir Ismail Ziarat	145,263
Abegum	10,388
Total	1,568,989

Source: Pakistan Energy Yearbook

Table 20 Field Wise Production of Crude Oil (1979–80)

Field	Production (US Barrels)
Khaur	6,792
Dhulian	123,380
Balkassar	279,841
Joya Mair	180,500
Meyal	2,403,731
Toot	514,645
Adhi	57,453
Total	3,566,342

Source: Pakistan Energy Yearbook

Table 21 Production of Petroleum Products (1979–80)

Refineries	Production (M.Tonnes)
Attock Refinery	456,055
Pakistan Refinery	1,962,468
National Refinery	2,023,747
Total	4,442,270

Source: Pakistan Energy Yearbook

4. **District-wise Projection**

for Population	; See Table 22
for Urban Population	; See Table 23
for Rural Population	; See Table 24
for Ratio of Urban Population	; See Table 25
for Wheat Production	; See Table 26
for Rice Production	; See Table 27
for Cotton Production	; See Table 28
for Sugarcane Production	; See Table 29
for Total Industrial Production	; See Table 30
for Edible Oil Production	; See Table 31
for Sugar Production	; See Table 32
for Cement Production	; See Table 33
for Fertilizers Production	; See Table 34
for Iron & Steel Production	: See Table 35
for Coal Production	; See Table 36
for Crude Oil Production	; See Table 37
for Petroleum Products Production	; See Table 38

Table 22 District-Wise Projection of Population

(000 PERSONS)

	1980 -1981	1982 -1983	1987 -1988	1999 -2000
PAKISTAN	83782	89327	102635	135756
PUNJAB	47451	50367	57361	74813
ATTOCK	1140	1178	1285	1632
RAWALPINDI	2458	2642	3054	4066
JHELUM	1162	1190	1275	1615
GUJRAT	2247	2343	2595	3336
SARGODHA	2557	2692	3024	3919
MIANWALI	1376	1457	1653	2133
FAISALABAD	4656	4794	5175	6624
JHANG	1962	2078	2361	3071
LAHORE	3512	3904	4727	6467
KASUR	1530	1628	1864	2427
SHEIKHUPURA	2101	2223	2521	3263
GUJRANWALA	2659	2859	3322	4399
SIALKOT	2706	2805	3068	3919
D.G.KHAN	1581	1697	1974	2569
MUZAFFARGARH	2151	2304	2675	3480
MULTAN	4068	4349	5018	6580
SAHIWAL	3613	3868	4478	5839
BAHAWALPUR	1447	1555	1808	2365
BAHAWALNAGAR	1371	1452	1652	2140
RAHIM YAR KHAN	1834	1953	2242	2916
VIHARI	1320	1397	1589	2055
SIND	18966	20554	24198	32747
JACOBABAD	1013	1094	1289	1743
SHIKARPUR	619	637	691	905
SUKKUR	1120	1204	1402	1888
LARKANA	1140	1200	1355	1803
NAWABSHAH	1637	1708	1903	2520
KHAIRPUR	981	1055	1235	1669
HYDERABAD	2080	2224	2552	3419
DADU	1074	1143	1316	1764
THARPARKAR	1501	1632	1941	2632
SANGHAR	922	985	1140	1531
THATTA	756	771	826	1075
BADIN	769	816	935	1250
KARACHI	5353	6085	7615	10551

	1980 -1981	1982 -1983	1987 -1988	1999 -2000
NWFP	13060	13619	15075	19079
MARDAN	1423	1468	1591	1997
PESHAWAR	2639	2799	3176	4086
KHYBER AGENCY	282	276	272	326
BAJUR & MAHMAND	448	438	431	518
KOHAT	808	851	958	1221
KHURRUM	289	285	286	346
ABBOTTABAD	1150	1184	1285	1615
MANSEHRA	1055	1082	1166	1456
KOHISTAN	465	529	669	883
D.I.KHAN	719	759	855	1089
S.WAZIRISTAN	308	301	297	357
BANNU	777	805	882	1110
N.WAZIRISTAN	235	230	226	272
DIR	769	820	944	1207
CHITRAL	208	217	242	305
SWAT	1227	1302	1485	1896
MALAKAND	258	273	310	394
BALUCHISTAN	4305	4786	6000	9116
QUETTA	380	421	520	791
PISHIN	374	404	485	726
LORALAI	391	442	568	869
ZHOB	360	408	525	804
CHAGHAI	120	136	175	268
KALAT	333	381	496	763
KHARAN	129	143	180	272
LASBELA	187	202	243	364
NASEERABAD	393	435	541	820
SIBI	129	135	155	229
KACHI	308	327	384	570
KOHLU	178	193	234	350
KHUZDAR	371	417	533	814
PANJGUR	161	188	252	391
TURBAT	378	435	571	880
GWADAR	113	119	138	204

Table 23 District-Wise Projection of Urban Population

(000 PERSONS)

	1980-1981	1982-1983	1987-1988	1999-2000
PAKISTAN	23860	27017	33537	46500
PUNJAB	13333	15110	18764	26021
ATTOCK	151	160	177	235
RAWALPINDI	1361	1550	1938	2695
JHELUM	212	233	276	376
GUJRAT	434	499	633	885
SARGODHA	651	733	901	1244
MIANWALI	236	245	261	341
FAISALABAD	1420	1588	1930	2656
JHANG	442	510	652	913
LAHORE	2958	3357	4177	5796
KASUR	329	373	464	644
SHEIKHUPURA	379	423	513	704
GUJRANWALA	1056	1225	1575	2211
SIALKOT	560	607	699	942
D.G.KHAN	185	206	250	343
MUZAFFARGARH	218	254	327	460
MULTAN	1098	1277	1649	2318
SAHIWAL	589	677	859	1201
BAHAWALPUR	328	366	444	611
BAHAWALNAGAR	245	275	336	463
RAHIM YAR KHAN	299	347	447	629
VIHARI	180	205	255	354
SIND	8205	9285	11523	15918
JACOBABAD	159	181	226	314
SHIKARPUR	114	128	156	214
SUKKUR	338	379	462	635
LARKANA	255	290	362	502
NAWABSHAH	266	303	379	524
KHAIRPUR	246	296	402	573
HYDERABAD	955	1038	1206	1624
DADU	150	169	209	288
THARPARKAR	256	284	341	465
SANGHAR	198	224	277	382
THATTA	83	86	92	120
BADIN	82	85	91	118
KARACHI	5103	5822	7320	10159

	1980-1981	1982-1983	1987-1988	1999-2000
NWFP	1652	1855	2264	3038
MARDAN	226	240	265	342
PESHAWAR	836	952	1190	1610
KHYBER AGENCY	0	0	0	0
BAJUR & MAHMAND	0	0	0	0
KOHAT	136	153	186	249
KHURRUM	0	0	0	0
ABBOTTABAD	151	177	230	316
MANSEHRA	37	43	56	76
KOHISTAN	0	0	0	0
D.I.KHAN	116	125	143	187
S.WAZIRISTAN	0	0	0	0
BANNU	62	67	77	100
N.WAZIRISTAN	0	0	0	0
DIR	0	0	0	0
CHITRAL	0	0	0	0
SWAT	88	98	118	158
MALAKAND	0	0	0	0
BALUCHISTAN	670	766	986	1523
QUETTA	285	325	416	642
PISHIN	44	50	64	99
LORALAI	19	22	29	45
ZHOB	33	36	44	66
CHAGHAI	11	11	12	17
KALAT	28	32	41	64
KHARAN	10	10	11	15
LASBELA	26	30	40	63
NASEERABAD	28	34	46	73
SIBI	28	34	46	73
KACHI	23	25	31	48
KOHLU	0	0	0	0
KHUZDAR	31	36	46	72
PANJGUR	10	12	16	26
TURBAT	52	60	78	122
GWADAR	42	49	64	99

Table 24 District-Wise Projection of Rural Population

(000 PERSONS)

	1980-1981	1982-1983	1987-1988	1999-2000
PAKISTAN	59922	62310	69098	89256
PUNJAB	34118	35257	38597	48792
ATTOCK	989	1018	1108	1397
RAWALPINDI	1097	1092	1116	1371
JHELUM	950	957	1000	1239
GUJRAT	1813	1844	1962	2452
SARGODHA	1906	1959	2124	2674
MIANWALI	1140	1212	1392	1792
FAISALABAD	3236	3206	3244	3968
JHANG	1520	1567	1709	2158
LAHORE	554	547	550	671
KASUR	1201	1255	1400	1783
SHEIKHUPURA	1722	1800	2009	2559
GUJRANWALA	1603	1634	1747	2187
SIALKOT	2146	2198	2369	2976
D.G.KHAN	1396	1491	1724	2225
MUZAFFARGARH	1933	2051	2348	3019
MULTAN	2970	3072	3369	4261
SAHIWAL	3024	3191	3619	4638
BAHAWALPUR	1119	1189	1363	1754
BAHAWALNAGAR	1126	1178	1316	1677
RAHIM YAR KHAN	1535	1606	1795	2288
VIHARI	1140	1193	1334	1701
SIND	10761	11269	12675	16829
JACOBABAD	854	913	1063	1429
SHIKARPUR	505	509	535	691
SUKKUR	782	825	939	1253
LARKANA	885	910	992	1301
NAWABSHAH	1371	1406	1525	1996
KHAIRPUR	735	759	833	1095
HYDERABAD	1125	1185	1346	1794
DADU	924	974	1107	1476
THARPARKAR	1245	1348	1600	2166
SANGHAR	724	762	863	1149
THATTA	673	685	733	955
BADIN	687	731	844	1131
KARACHI	250	262	295	392

	1980-1981	1982-1983	1987-1988	1999-2000
NWFP	11408	11764	12811	16041
MARDAN	1197	1228	1326	1655
PESHAWAR	1803	1846	1987	2476
KHYBER AGENCY	282	276	272	326
BAJUR & MAHMAND	448	438	431	518
KOHAT	672	699	772	972
KHURRUM	289	285	286	346
ABBOTTABAD	999	1007	1055	1300
MANSEHRA	1018	1039	1110	1380
KOHISTAN	465	529	669	883
D.I.KHAN	603	633	711	901
S.WAZIRISTAN	308	301	297	357
BANNU	715	738	806	1010
N.WAZIRISTAN	235	230	226	272
DIR	769	820	944	1207
CHITRAL	208	217	242	305
SWAT	1139	1204	1367	1739
MALAKAND	258	273	310	394
BALUCHISTAN	3635	4020	5014	7593
QUETTA	95	96	104	149
PISHIN	330	354	421	627
LORALAI	372	420	539	824
ZHOB	327	372	481	738
CHAGHAI	109	125	163	251
KALAT	305	349	435	699
KHARAN	119	133	169	257
LASBELA	161	172	203	301
NASEERABAD	365	401	495	748
SIBI	101	102	109	156
KACHI	285	302	353	522
KOHLU	178	193	234	350
KHUZDAR	340	382	486	742
PANJGUR	151	176	236	365
TURBAT	326	375	492	759
GWADAR	71	71	74	105

Table 25 District-Wise Projection of Ratio of Urban Population

(%)

	1980 -1981	1982 -1983	1987 -1988	1999 -2000		1980 -1981	1982 -1983	1987 -1988	1999 -2000
PAKISTAN	28.5	30.2	32.7	34.3					
PUNJAB	28.1	30.0	32.7	34.8	NWFP	12.6	13.6	15.0	15.9
ATTOCK	13.2	13.6	13.8	14.4	MARDAN	15.9	16.3	16.7	17.1
RAWALPINDI	55.4	58.7	63.5	66.3	PESHAWAR	31.7	34.0	37.5	39.4
JHELUM	18.2	19.6	21.6	23.3	KHYBER AGENCY	0.0	0.0	0.0	0.0
GUJRAT	19.3	21.3	24.4	26.5	BAJUR & MAHMAND	0.0	0.0	0.0	0.0
SARGODHA	25.5	27.2	29.8	31.7	KOHAT	16.8	18.0	19.4	20.4
MIANWALI	17.2	16.8	15.8	16.0	KHURRUM	0.0	0.0	0.0	0.0
FAISALABAD	30.5	33.1	37.3	40.1	ABBOTTABAD	13.1	14.9	17.9	19.6
JHANG	22.5	24.5	27.6	29.7	MANSEHRA	3.5	4.0	4.8	5.2
LAHORE	84.2	86.0	88.4	89.6	KOHISTAN	0.0	0.0	0.0	0.0
KASUR	21.5	22.9	24.9	26.5	D.I.KHAN	16.1	16.5	16.7	17.2
SHEIKHUPURA	18.0	19.0	20.3	21.6	S.WAZIRISTAN	0.0	0.0	0.0	0.0
GUJRANWALA	39.7	42.8	47.4	50.3	BANNU	8.0	8.3	8.7	9.0
SIALKOT	20.7	21.6	22.8	24.0	N.WAZIRISTAN	0.0	0.0	0.0	0.0
D.G.KHAN	11.7	12.1	12.7	13.4	DIR	0.0	0.0	0.0	0.0
MUZAFFARGARH	10.1	11.0	12.2	13.2	CHITRAL	0.0	0.0	0.0	0.0
MULTAN	27.0	29.4	32.9	35.2	SWAT	7.2	7.5	7.9	8.3
SAHIWAL	16.3	17.5	19.2	20.6	MALAKAND	0.0	0.0	0.0	0.0
BAHAWALPUR	22.7	23.5	24.6	25.8					
BAHAWALNAGAR	17.9	18.9	20.3	21.6					
RAHIM YAR KHAN	16.3	17.8	19.9	21.6					
VIHARI	13.6	14.7	16.0	17.2					
SIND	43.3	45.2	47.6	48.6	BALUCHISTAN	15.6	16.0	16.4	16.7
JACOBABAD	15.7	16.5	17.5	18.0	QUETTA	75.0	77.2	80.0	81.2
SHIKARPUR	18.4	20.1	22.6	23.6	PISHIN	11.8	12.4	13.2	13.6
SUKKUR	30.2	31.5	33.0	33.6	LORALAI	4.9	5.0	5.1	5.2
LARKANA	22.4	24.2	26.7	27.8	ZHOB	9.2	8.8	8.4	8.2
NAWABSHAH	16.2	17.7	19.9	20.8	CHAGHAI	9.2	8.1	6.9	6.3
KHAIRPUR	25.1	28.1	32.6	34.3	KALAT	8.4	8.4	8.3	8.4
HYDERABAD	45.9	46.7	47.3	47.5	KHARAN	7.8	7.0	6.1	5.5
DADU	14.0	14.8	15.9	16.3	LASBELA	13.9	14.9	16.5	17.3
THARPARKAR	17.1	17.4	17.6	17.7	NASEERABAD	7.1	7.8	8.5	8.9
SANGHAR	21.5	22.7	24.3	25.0	SIBI	21.7	25.2	29.7	31.9
THATTA	11.0	11.2	11.1	11.2	KACHI	7.5	7.6	8.1	8.4
BADIN	10.7	10.4	9.7	9.4	KOHLU	0.0	0.0	0.0	0.0
KARACHI	95.3	95.7	96.1	96.3	KHUZDAR	8.4	8.6	8.6	8.8
					PANJGUR	6.2	6.4	6.3	6.6
					TURBAT	13.8	13.8	13.7	13.9
					GWADAR	37.2	41.2	46.4	48.5

Table 26 District-Wise Projection of Wheat Production

(000 TON)

	1980 -1981	1982 -1983	1987 -1988	1999 -2000		1980 -1981	1982 -1983	1987 -1988	1999 -2000
PAKISTAN	11302	11744	14700	23807					
PUNJAB	8300	8749	10953	17739	NWFP	815	904	1127	1824
ATTOCK	241	254	373	690	MARDAN	99	110	116	160
RAWALPINDI	158	166	252	475	PESHAWAR	83	92	86	100
JHELUM	141	149	208	389	KHYBER AGENCY	19	21	33	60
GUJRAT	349	368	526	974	BAJUR & MAHMAND	33	37	56	107
SARGODHA	390	412	417	531	KOHAT	54	60	73	115
MIANWALI	307	324	428	726	KHURRUM	13	14	17	27
FAISALABAD	739	779	844	1151	ABBOTTABAD	74	82	100	158
JHANG	465	490	614	991	MANSEHRA	37	41	50	78
LAHORE	100	105	132	212	KOHISTAN	0	0	0	0
KASUR	324	342	450	744	D.I.KHAN	115	128	160	258
SHEIKHUPURA	415	438	559	921	S.WAZIRISTAN	5	5	7	11
GUJRANWALA	449	473	570	885	BANNU	111	124	168	291
SIALKOT	415	438	625	1133	N.WAZIRISTAN	7	7	9	16
D.G.KHAN	183	193	219	301	DIR	39	43	55	89
MUZAFFARGARH	457	482	515	708	CHITRAL	10	11	12	20
MULTAN	872	920	1129	1788	SWAT	59	65	91	162
SAHIWAL	997	1051	1272	1983	MALAKAND	58	64	94	169
BAHAWALPUR	274	289	395	690					
BAHAWALNAGAR	266	280	351	584					
RAHIM YAR KHAN	390	412	603	1098					
VIHARI	366	385	471	761					
SIND	1949	1891	2368	3825	BALUCHISTAN	239	200	252	409
JACOBABAD	76	74	95	161	QUETTA	5	4	4	5
SHIKARPUR	27	27	28	42	PISHIN	15	12	12	17
SUKKUR	113	110	121	172	LORALAI	22	18	21	31
LARKANA	80	78	78	103	ZHOB	7	6	7	10
NAWABSHAH	445	432	590	1021	CHAGHAI	2	2	2	3
KHAIRPUR	176	170	204	317	KALAT	23	20	28	48
HYDERABAD	232	225	284	459	KHARAN	2	2	1	1
DADU	135	131	171	283	LASBELA	1	1	1	1
THARPARKAR	246	239	275	409	NASEERABAD	119	100	129	212
SANGHAR	326	316	410	681	SIBI	18	15	20	33
THATTA	8	8	7	8	KACHI	9	8	10	16
BADIN	86	83	104	168	KOHLU	2	2	2	4
KARACHI	0	0	0	0	KHUZDAR	12	10	14	25
					PANJGUR	1	1	1	1
					TURBAT	1	1	1	2
					GWADAR	0	0	0	0

Table 27 District-Wise Projection of Rice Production

(000 TON)

	1980 -1981	1982 -1983	1987 -1988	1999 -2000
PAKISTAN	3120	3566	4404	6817
PUNJAB	1362	1687	2083	3224
ATTOCK	0	0	0	0
RAWALPINDI	0	0	0	0
JHELUM	1	2	2	3
GUJRAT	91	113	150	246
SARGODHA	72	89	123	210
MIANWALI	0	0	0	0
FAISALABAD	52	64	77	120
JHANG	31	39	52	87
LAHORE	37	46	54	81
KASUR	59	72	85	126
SHEIKHUPURA	227	281	323	465
GUJRANWALA	303	376	446	659
SIALKOT	152	189	188	223
D.G.KHAN	41	51	75	132
MUZAFFARGARH	22	27	35	61
MULTAN	30	37	56	100
SAHIWAL	133	165	215	349
BAHAWALPUR	20	25	40	74
BAHAWALNAGAR	34	42	58	103
RAHIM YAR KHAN	29	35	52	94
VIHARI	27	34	50	90
SIND	1550	1700	2100	3250
JACOBABAD	366	401	495	763
SHIKARPUR	198	218	271	419
SUKKUR	23	26	31	49
LARKANA	335	367	457	714
NAWABSHAH	17	19	27	49
KHAIRPUR	5	5	4	3
HYDERABAD	42	46	63	110
DADU	152	167	212	341
THARPARKAR	11	12	10	10
SANGHAR	6	7	4	0
THATTA	149	163	151	146
BADIN	246	270	373	646
KARACHI	0	0	0	0

	1980 -1981	1982 -1983	1987 -1988	1999 -2000
NWFP	105	111	137	213
MARDAN	1	1	1	1
PESHAWAR	2	2	2	2
KHYBER AGENCY	0	0	0	0
BAJUR & MAHMAND	0	0	0	0
KOHAT	1	1	2	4
KHURRUM	7	7	7	10
ABBOTTABAD	1	1	1	1
MANSEHRA	8	8	7	6
KOHISTAN	0	0	0	0
D.I.KHAN	13	13	18	31
S.WAZIRISTAN	0	0	0	0
BANNU	1	1	1	1
N.WAZIRISTAN	0	0	0	0
DIR	27	29	42	73
CHITRAL	4	4	6	12
SWAT	29	31	34	48
MALAKAND	13	13	16	24
BALUCHISTAN	103	68	84	130
QUETTA	0	0	0	0
PISHIN	0	0	0	0
LORALAI	0	0	0	0
ZHOB	0	0	0	0
CHAGHAI	0	0	0	0
KALAT	0	0	0	0
KHARAN	0	0	0	0
LASBELA	0	0	0	0
NASEERABAD	1	0	1	1
SIBI	99	66	81	124
KACHI	0	0	0	0
KOHLU	0	0	0	0
KHUZDAR	1	1	1	2
PANJGUR	0	0	0	0
TURBAT	2	1	2	3
GWADAR	0	0	0	0

Table 28 District-Wise Projection of Cotton Production

(000 TON)

	1980 -1981	1982 -1983	1987 -1988	1999 -2000
PAKISTAN	714	661	852	1152
PUNJAB	474	448	578	763
ATTOCK	0	0	0	0
RAWALPINDI	0	0	0	0
JHELUM	0	0	1	1
GUJRAT	1	1	1	2
SARGODHA	10	10	12	13
MIANWALI	9	8	15	29
FAISALABAD	18	17	20	23
JHANG	23	22	25	29
LAHORE	0	0	1	1
KASUR	7	6	8	8
SHEIKHUPURA	1	1	1	2
GUJRANWALA	1	1	1	1
SIALKOT	0	0	1	1
D.G.KHAN	16	15	21	31
MUZAFFARGARH	20	19	25	34
MULTAN	113	107	125	143
SAHIWAL	52	49	57	65
BAHAWALPUR	41	39	61	101
BAHAWALNAGAR	27	26	32	39
RAHIM YAR KHAN	82	77	113	175
VIHARI	53	50	58	66
SIND	239	212	273	361
JACOBABAD	0	0	0	0
SHIKARPUR	0	0	0	0
SUKKUR	35	31	44	65
LARKANA	0	0	0	0
NAWABSHAH	36	32	41	55
KHAIRPUR	22	20	26	34
HYDERABAD	34	30	33	37
DADU	1	1	1	2
THARPARKAR	52	46	57	73
SANGHAR	54	48	64	89
THATTA	0	0	0	1
BADIN	5	4	5	5
KARACHI	0	0	0	0

	1980 -1981	1982 -1983	1987 -1988	1999 -2000
NWFP	1	1	1	1
MARDAN	0	0	0	0
PESHAWAR	0	0	0	0
KHYBER AGENCY	0	0	0	0
BAJUR & MAHMAND	0	0	0	0
KOHAT	0	0	0	0
KHURRUM	0	0	0	0
ABBOTTABAD	0	0	0	0
MANSEHRA	0	0	0	0
KOHISTAN	0	0	0	0
D.I.KHAN	1	1	1	1
S.WAZIRISTAN	0	0	0	0
BANNU	0	0	0	0
N.WAZIRISTAN	0	0	0	0
DIR	0	0	0	0
CHITRAL	0	0	0	0
SWAT	0	0	0	0
MALAKAND	0	0	0	0
BALUCHISTAN	0	0	0	0
QUETTA	0	0	0	0
PISHIN	0	0	0	0
LORALAI	0	0	0	0
ZHOB	0	0	0	0
CHAGHAI	0	0	0	0
KALAT	0	0	0	0
KHARAN	0	0	0	0
LASBELA	0	0	0	0
NASEERABAD	0	0	0	0
SIBI	0	0	0	0
KACHI	0	0	0	0
KOHLU	0	0	0	0
KHUZDAR	0	0	0	0
PANJGUR	0	0	0	0
TURBAT	0	0	0	0
GWADAR	0	0	0	0

Table 29 District-Wise Projection of Sugarcane Production

(000 TON)

	1980 -1981	1982 -1983	1987 -1988	1999 -2000		1980 -1981	1982 -1983	1987 -1988	1999 -2000
PAKISTAN	32359	28380	32804	39045					
PUNJAB	23733	20291	23439	27899	NWFP	3598	3860	4466	5316
ATTOCK	0	0	0	0	MARDAN	1148	1231	1317	1387
RAWALPINDI	0	0	0	0	PESHAWAR	2008	2154	2514	3025
JHELUM	0	0	0	0	KHYBER AGENCY	4	4	4	11
GUJRAT	997	852	867	893	BAJUR & MAHMAND	61	66	116	202
SARGODHA	1566	1339	1219	1060	KOHAT	11	12	13	21
MIANWALI	570	487	445	391	KHURRUM	0	0	0	0
FAISALABAD	5530	4728	4735	4799	ABBOTTABAD	4	4	4	5
JHANG	1543	1319	1594	2009	MANSEHRA	0	0	0	0
LAHORE	47	41	47	56	KOHISTAN	0	0	0	0
KASUR	973	832	891	949	D.I.KHAN	76	81	89	90
SHEIKHUPURA	641	548	492	418	S.WAZIRISTAN	0	0	4	5
GUJRANWALA	403	345	305	279	BANNU	50	54	58	58
SIALKOT	380	325	305	251	N.WAZIRISTAN	18	19	27	43
D.G.KHAN	190	162	234	335	DIR	4	4	4	11
MUZAFFARGARH	1448	1238	1641	2232	CHITRAL	0	0	0	0
MULTAN	1519	1299	1758	2399	SWAT	43	46	85	154
SAHIWAL	2611	2232	2860	3738	MALAKAND	173	185	228	303
BAHAWALPUR	1021	873	1242	1730					
BAHAWALNAGAR	1471	1258	1688	2260					
RAHIM YAR KHAN	1827	1562	1969	2539					
VIHARI	997	852	1149	1562					
SIND	5007	4229	4899	5831	BALUCHISTAN	0	0	0	0
JACOBABAD	10	8	10	6	QUETTA	0	0	0	0
SHIKARPUR	15	13	15	17	PISHIN	0	0	0	0
SUKKUR	240	203	250	315	LORALAI	0	0	0	0
LARKANA	90	76	98	128	ZHOB	0	0	0	0
NAWABSHAH	1061	897	1024	1200	CHAGHAI	0	0	0	0
KHAIRPUR	426	359	446	559	KALAT	0	0	0	0
HYDERABAD	1041	880	1053	1293	KHARAN	0	0	0	0
DADU	160	135	181	245	LASBELA	0	0	0	0
THARPARKAR	330	279	240	198	NASEERABAD	0	0	0	0
SANGHAR	205	173	157	140	SIBI	0	0	0	0
THATTA	90	76	73	70	KACHI	0	0	0	0
BADIN	1337	1129	1352	1660	KOHLU	0	0	0	0
KARACHI	0	0	0	0	KHUZDAR	0	0	0	0
					PANJGUR	0	0	0	0
					TURBAT	0	0	0	0
					GWADAR	0	0	0	0

Table 30 District-Wise Projection of Production of All Industry

(MILLION RP)

	1980 -1981	1982 -1983	1987 -1988	1999 -2000
PAKISTAN	64708	72143	107256	220800
PUNJAB	27274	30847	46019	95308
ATTOCK	603	636	884	1675
RAWALPINDI	3145	3319	4612	8736
JHELUM	1671	1764	2451	4642
GUJRAT	877	1092	1905	4611
SARGODHA	1005	1085	1551	2989
MIANWALI	792	855	1222	2356
FAISALABAD	4041	4350	6249	12341
JHANG	624	672	965	1906
LAHORE	3571	4231	6193	12539
KASUR	22	26	38	77
SHEIKHUPURA	4287	5080	7435	15053
GUJRANWALA	852	1061	1851	4480
SIALKOT	398	496	864	2093
D.G.KHAN	65	70	101	203
MUZAFFARGARH	1017	1096	1587	3169
MULTAN	1310	1650	2946	7339
SAHIWAL	537	676	1208	3008
BAHAWALPUR	51	55	79	157
BAHAWALNAGAR	178	192	276	549
RAHIM YAR KHAN	2029	2188	3150	6259
VIHARI	201	253	452	1126
SIND	32270	35601	52976	109008
JACOBABAD	400	473	763	1690
SHIKARPUR	80	95	153	338
SUKKUR	237	280	452	1002
LARKANA	4	4	6	6
NAWABSHAH	577	739	1337	3357
KHAIRPUR	102	131	236	593
HYDERABAD	1250	1394	2047	3964
DADU	1637	1690	2272	4097
THARPARKAR	68	76	111	216
SANGHAR	17	22	39	99
THATTA	267	298	437	846
BADIN	107	119	175	339
KARACHI	27524	30280	44948	92461

	1980 -1981	1982 -1983	1987 -1988	1999 -2000
NWFP	5049	5393	7434	13877
MARDAN	1260	1318	1801	3323
PESHAWAR	1969	2060	2814	5194
KHYBER AGENCY	0	0	0	0
BAJUR & MAHMAND	0	0	0	0
KOHAT	755	790	1079	1991
KHURRUM	0	0	0	0
ABBOTTABAD	443	541	776	1549
MANSEHRA	109	133	191	381
KOHISTAN	0	0	0	0
D.I.KHAN	102	110	155	283
S.WAZIRISTAN	0	0	0	0
BANNU	190	204	288	527
N.WAZIRISTAN	0	0	0	0
DIR	0	0	0	0
CHITRAL	0	0	0	0
SWAT	221	237	330	629
MALAKAND	0	0	0	0
BALUCHISTAN	115	302	827	2607
QUETTA	49	128	350	1098
PISHIN	8	20	54	169
LORALAI	3	9	24	77
ZHOB	6	14	37	113
CHAGHAI	2	4	10	29
KALAT	5	13	34	109
KHARAN	2	4	9	26
LASBELA	4	12	34	108
NASEERABAD	5	13	39	125
SIBI	5	13	39	125
KACHI	4	10	26	82
KOHLU	0	0	0	0
KHUZDAR	5	14	39	123
PANJGUR	2	5	13	44
TURBAT	9	24	66	209
GWADAR	7	19	54	169

Table 31 District-Wise Projection of Edible Oil Production

(000 TON)

	1980 -1981	1982 -1983	1987 -1988	1999 -2000		1980 -1981	1982 -1983	1987 -1988	1999 -2000
PAKISTAN	505	551	979	2364					
PUNJAB	291	318	586	1449	NWFP	57	62	82	187
ATTOCK	0	0	0	0	MARDAN	0	0	6	13
RAWALPINDI	17	19	46	115	PESHAWAR	28	30	26	58
JHELUM	0	0	15	38	KHYBER AGENCY	9	10	7	15
GUJRAT	0	0	15	38	BAJUR & MAHMAND	0	0	0	0
SARGODHA	0	0	0	0	KOHAT	0	0	0	0
MIANWALI	0	0	0	0	KHURRUM	0	0	0	0
FAISALABAD	103	113	187	461	ABBOTTABAD	10	11	19	43
JHANG	0	0	0	0	MANSEHRA	0	0	0	0
LAHORE	17	19	31	75	KOHISTAN	0	0	0	0
KASUR	0	0	0	0	D.I.KHAN	0	0	6	13
SHEIKHUPURA	61	66	110	271	S.WAZIRISTAN	0	0	0	0
GUJRANWALA	0	0	0	0	BANNU	0	0	6	13
SIALKOT	0	0	0	0	N.WAZIRISTAN	0	0	0	0
D.G.KHAN	0	0	0	0	DIR	0	0	0	0
MUZAFFARGARH	0	0	0	0	CHITRAL	0	0	0	0
MULTAN	56	61	101	249	SWAT	0	0	0	0
SAHIWAL	19	21	34	84	MALAKAND	10	11	13	30
BAHAWALPUR	0	0	15	38					
BAHAWALNAGAR	0	0	0	0					
RAHIM YAR KHAN	18	20	32	80					
VIHARI	0	0	0	0					
SIND	148	161	284	635	BALUCHISTAN	9	10	27	93
JACOBABAD	0	0	0	0	QUETTA	9	10	17	60
SHIKARPUR	0	0	0	0	PISHIN	0	0	0	0
SUKKUR	12	13	20	45	LORALAI	0	0	0	0
LARKANA	0	0	14	31	ZHOB	0	0	0	0
NAWABSHAH	0	0	0	0	CHAGHAI	0	0	0	0
KHAIRPUR	0	0	0	0	KALAT	0	0	0	0
HYDERABAD	27	29	47	104	KHARAN	0	0	0	0
DADU	0	0	0	0	LASBELA	0	0	10	33
THARPARKAR	0	0	0	0	NASEERABAD	0	0	0	0
SANGHAR	0	0	14	31	SIBI	0	0	0	0
THATTA	0	0	0	0	KACHI	0	0	0	0
BADIN	0	0	0	0	KOHLU	0	0	0	0
KARACHI	109	119	189	424	KHUZDAR	0	0	0	0
					PANJGUR	0	0	0	0
					TURBAT	0	0	0	0
					GWADAR	0	0	0	0

Table 32 District-Wise Projection of Sugar Production

(000 TON)

	1980 -1981	1982 -1983	1987 -1988	1999 -2000		1980 -1981	1982 -1983	1987 -1988	1999 -2000
PAKISTAN	851	897	1481	3366					
PUNJAB	409	430	588	1294	NWFP	106	112	290	716
ATTOCK	0	0	0	0	MARDAN	47	50	92	210
RAWALPINDI	0	0	0	0	PESHAWAR	45	47	176	458
JHELUM	0	0	0	0	KHYBER AGENCY	0	0	0	0
GUJRAT	22	23	21	39	BAJUR & MAHMAND	0	0	0	0
SARGODHA	40	43	38	71	KOHAT	0	0	0	0
MIANWALI	20	21	19	35	KHURRUM	0	0	0	0
FAISALABAD	100	105	106	204	ABBOTTABAD	0	0	0	0
JHANG	22	23	36	87	MANSEHRA	0	0	0	0
LAHORE	0	0	0	0	KOHISTAN	0	0	0	0
KASUR	38	40	36	69	D.I.KHAN	0	0	0	0
SHEIKHUPURA	22	23	21	39	S.WAZIRISTAN	0	0	0	0
GUJRANWALA	6	6	7	12	BANNU	14	15	23	49
SIALKOT	19	20	18	34	N.WAZIRISTAN	0	0	0	0
D.G.KHAN	0	0	0	0	DIR	0	0	0	0
MUZAFFARGARH	16	17	37	96	CHITRAL	0	0	0	0
MULTAN	0	0	39	104	SWAT	0	0	0	0
SAHIWAL	25	27	64	159	MALAKAND	0	0	0	0
BAHAWALPUR	22	23	28	74					
BAHAWALNAGAR	0	0	38	97					
RAHIM YAR KHAN	58	61	55	109					
VIHARI	0	0	26	67					
SIND	337	355	603	1356	BALUCHISTAN	0	0	0	0
JACOBABAD	0	0	0	0	QUETTA	0	0	0	0
SHIKARPUR	0	0	0	0	PISHIN	0	0	0	0
SUKKUR	0	0	0	0	LORALAI	0	0	0	0
LARKANA	22	23	28	54	ZHOB	0	0	0	0
NAWABSHAH	48	51	113	259	CHAGHAI	0	0	0	0
KHAIRPUR	28	29	49	122	KALAT	0	0	0	0
HYDERABAD	57	60	117	279	KHARAN	0	0	0	0
DADU	30	31	39	75	LASBELA	0	0	0	0
THARPARKAR	24	25	31	60	NASEERABAD	0	0	0	0
SANGHAR	0	0	0	0	SIBI	0	0	0	0
THATTA	59	62	76	148	KACHI	0	0	0	0
BADIN	71	75	150	359	KOHLU	0	0	0	0
KARACHI	0	0	0	0	KHUZDAR	0	0	0	0
					PANJGUR	0	0	0	0
					TURBAT	0	0	0	0
					GWADAR	0	0	0	0

Table 33 District-Wise Projection of Cement Production

(000 TON)

	1980 -1981	1982 -1983	1987 -1988	1999 -2000		1980 -1981	1982 -1983	1987 -1988	1999 -2000
PAKISTAN	3538	4545	7810	13178					
PUNJAB	1333	1579	2325	3923	NWFP	333	579	1573	2655
ATTOCK	0	0	0	0	MARDAN	0	0	0	0
RAWALPINDI	443	443	691	1166	PESHAWAR	0	0	992	1674
JHELUM	580	825	827	1395	KHYBER AGENCY	0	0	0	0
GUJRAT	0	0	0	0	BAJUR & MAHMAND	0	0	0	0
SARGODHA	0	0	0	0	KOHAT	0	246	248	419
MIANWALI	311	311	311	525	KHURRUM	0	0	0	0
FAISALABAD	0	0	0	0	ABBOTTABAD	333	333	333	562
JHANG	0	0	0	0	MANSEHRA	0	0	0	0
LAHORE	0	0	0	0	KOHISTAN	0	0	0	0
KASUR	0	0	0	0	D.I.KHAN	0	0	0	0
SHEIKHUPURA	0	0	0	0	S.WAZIRISTAN	0	0	0	0
GUJRANWALA	0	0	0	0	BANNU	0	0	0	0
SIALKOT	0	0	0	0	N.WAZIRISTAN	0	0	0	0
D.G.KHAN	0	0	496	837	DIR	0	0	0	0
MUZAFFARGARH	0	0	0	0	CHITRAL	0	0	0	0
MULTAN	0	0	0	0	SWAT	0	0	0	0
SAHIWAL	0	0	0	0	MALAKAND	0	0	0	0
BAHAWALPUR	0	0	0	0					
BAHAWALNAGAR	0	0	0	0					
RAHIM YAR KHAN	0	0	0	0					
VIHARI	0	0	0	0					
SIND	1872	2388	2914	4917	BALUCHISTAN	0	0	997	1683
JACOBABAD	0	0	0	0	QUETTA	0	0	5	8
SHIKARPUR	0	0	0	0	PISHIN	0	0	0	0
SUKKUR	240	240	240	405	LORALAI	0	0	0	0
LARKANA	0	0	0	0	ZHOB	0	0	0	0
NAWABSHAH	0	0	0	0	CHAGHAI	0	0	0	0
KHAIRPUR	0	0	0	0	KALAT	0	0	0	0
HYDERABAD	958	958	958	1617	KHARAN	0	0	0	0
DADU	0	246	248	418	LASBELA	0	0	992	1675
THARPARKAR	0	0	0	0	NASEERABAD	0	0	0	0
SANGHAR	0	0	0	0	SIBI	0	0	0	0
THATTA	0	270	546	921	KACHI	0	0	0	0
BADIN	0	0	0	0	KOHLU	0	0	0	0
KARACHI	674	674	922	1556	KHUZDAR	0	0	0	0
					PANJGUR	0	0	0	0
					TURBAT	0	0	0	0
					GWADAR	0	0	0	0

Table 34 District-Wise Projection of Fertilizers Production

(000 TON)

	1980 -1981	1982 -1983	1987 -1988	1999 -2000		1980 -1981	1982 -1983	1987 -1988	1999 -2000
PAKISTAN	1605	1940	3016	6869					
PUNJAB	1046	1202	2114	4714	NWFP	0	96	107	371
ATTOCK	0	0	0	0	MARDAN	0	0	0	0
RAWALPINDI	0	0	0	0	PESHAWAR	0	0	0	0
JHELUM	0	0	0	0	KHYBER AGENCY	0	0	0	0
GUJRAT	0	0	0	0	BAJUR & MAHMAND	0	0	0	0
SARGODHA	0	0	0	0	KOHAT	0	0	0	0
MIANWALI	75	87	110	245	KHURRUM	0	0	0	0
FAISALABAD	69	79	99	222	ABBOTTABAD	0	96	107	371
JHANG	0	0	0	0	MANSEHRA	0	0	0	0
LAHORE	0	0	0	0	KOHISTAN	0	0	0	0
KASUR	0	0	0	0	D.I.KHAN	0	0	0	0
SHEIKHUPURA	266	305	383	853	S.WAZIRISTAN	0	0	0	0
GUJRANWALA	0	0	0	0	BANNU	0	0	0	0
SIALKOT	0	0	0	0	N.WAZIRISTAN	0	0	0	0
D.G.KHAN	0	0	0	0	DIR	0	0	0	0
MUZAFFARGARH	0	0	0	0	CHITRAL	0	0	0	0
MULTAN	636	731	920	2051	SWAT	0	0	0	0
SAHIWAL	0	0	0	0	MALAKAND	0	0	0	0
BAHAWALPUR	0	0	0	0					
BAHAWALNAGAR	0	0	0	0					
RAHIM YAR KHAN	0	0	602	1343					
VIHARI	0	0	0	0					
SIND	559	642	795	1703	BALUCHISTAN	0	0	0	81
JACOBABAD	0	0	0	0	QUETTA	0	0	0	81
SHIKARPUR	0	0	0	0	PISHIN	0	0	0	0
SUKKUR	559	642	795	1703	LORALAI	0	0	0	0
LARKANA	0	0	0	0	ZHOB	0	0	0	0
NAWABSHAH	0	0	0	0	CHAGHAI	0	0	0	0
KHAIRPUR	0	0	0	0	KALAT	0	0	0	0
HYDERABAD	0	0	0	0	KHARAN	0	0	0	0
DADU	0	0	0	0	LASBELA	0	0	0	0
THARPARKAR	0	0	0	0	NASEERABAD	0	0	0	0
SANGHAR	0	0	0	0	SIBI	0	0	0	0
THATTA	0	0	0	0	KACHI	0	0	0	0
BADIN	0	0	0	0	KOHLU	0	0	0	0
KARACHI	0	0	0	0	KHUZDAR	0	0	0	0
					PANJGUR	0	0	0	0
					TURBAT	0	0	0	0
					GWADAR	0	0	0	0

Table 35 District-Wise Projection of Iron & Steel Production

(000 TON)

	1980 -1981	1982 -1983	1987 -1988	1999 -2000
PAKISTAN	495	599	2392	6051
PUNJAB	342	414	652	3025
ATTOCK	0	0	1	3
RAWALPINDI	3	3	5	24
JHELUM	0	0	0	0
GUJRAT	0	0	0	0
SARGODHA	0	0	0	0
MIANWALI	0	0	0	0
FAISALABAD	1	1	2	9
JHANG	0	0	0	0
LAHORE	232	281	442	2051
KASUR	0	0	0	0
SHEIKHUPURA	97	118	185	859
GUJRANWALA	9	11	17	79
SIALKOT	0	0	0	0
D.G.KHAN	0	0	0	0
MUZAFFARGARH	0	0	0	0
MULTAN	0	0	0	0
SAHIWAL	0	0	0	0
BAHAWALPUR	0	0	0	0
BAHAWALNAGAR	0	0	0	0
RAHIM YAR KHAN	0	0	0	0
VIHARI	0	0	0	0
SIND	133	161	1716	2966
JACOBABAD	0	0	0	0
SHIKARPUR	0	0	0	0
SUKKUR	0	0	0	0
LARKANA	0	0	0	0
NAWABSHAH	0	0	0	0
KHAIRPUR	0	0	0	0
HYDERABAD	3	4	45	77
DADU	0	0	0	0
THARPARKAR	0	0	0	0
SANGHAR	0	0	0	0
THATTA	0	0	0	0
BADIN	0	0	0	0
KARACHI	130	157	1671	2889

	1980 -1981	1982 -1983	1987 -1988	1999 -2000
NWFP	20	24	24	60
MARDAN	0	0	0	0
PESHAWAR	20	24	24	60
KHYBER AGENCY	0	0	0	0
BAJUR & MAHMAND	0	0	0	0
KOHAT	0	0	0	0
KHURRUM	0	0	0	0
ABBOTTABAD	0	0	0	0
MANSEHRA	0	0	0	0
KOHISTAN	0	0	0	0
D.I.KHAN	0	0	0	0
S.WAZIRISTAN	0	0	0	0
BANNU	0	0	0	0
N.WAZIRISTAN	0	0	0	0
DIR	0	0	0	0
CHITRAL	0	0	0	0
SWAT	0	0	0	0
MALAKAND	0	0	0	0
BALUCHISTAN	0	0	0	0
QUETTA	0	0	0	0
PISHIN	0	0	0	0
LORALAI	0	0	0	0
ZHOB	0	0	0	0
CHAGHAI	0	0	0	0
KALAT	0	0	0	0
KHARAN	0	0	0	0
LASBELA	0	0	0	0
NASEERABAD	0	0	0	0
SIBI	0	0	0	0
KACHI	0	0	0	0
KOHLU	0	0	0	0
KHUZDAR	0	0	0	0
PANJGUR	0	0	0	0
TURBAT	0	0	0	0
GWADAR	0	0	0	0

Table 36 District-Wise Projection of Coal Production

(000 TON)

	1980 -1981	1982 -1983	1987 -1988	1999 -2000		1980 -1981	1982 -1983	1987 -1988	1999 -2000
PAKISTAN	1720	2506	6419	14457					
PUNJAB	470	685	2146	4761	NWFP	42	61	184	529
ATTOCK	0	0	0	0	MARDAN	0	0	0	0
RAWALPINDI	0	0	0	0	PESHAWAR	42	61	184	529
JHELUM	0	0	0	0	KHYBER AGENCY	0	0	0	0
GUJRAT	0	0	0	0	BAJUR & MAHMAND	0	0	0	0
SARGODHA	0	0	0	0	KOHAT	0	0	0	0
MIANWALI	470	685	2146	4761	KHURRUM	0	0	0	0
FAISALABAD	0	0	0	0	ABBOTTABAD	0	0	0	0
JHANG	0	0	0	0	MANSEHRA	0	0	0	0
LAHORE	0	0	0	0	KOHISTAN	0	0	0	0
KASUR	0	0	0	0	D.I.KHAN	0	0	0	0
SHEIKHUPURA	0	0	0	0	S.WAZIRISTAN	0	0	0	0
GUJRANWALA	0	0	0	0	BANNU	0	0	0	0
SIALKOT	0	0	0	0	N.WAZIRISTAN	0	0	0	0
D.G.KHAN	0	0	0	0	DIR	0	0	0	0
MUZAFFARGARH	0	0	0	0	CHITRAL	0	0	0	0
MULTAN	0	0	0	0	SWAT	0	0	0	0
SAHIWAL	0	0	0	0	MALAKAND	0	0	0	0
BAHAWALPUR	0	0	0	0					
BAHAWALNAGAR	0	0	0	0					
RAHIM YAR KHAN	0	0	0	0					
VIHARI	0	0	0	0					
SIND	206	300	1142	3074	BALUCHISTAN	1002	1460	2947	6093
JACOBABAD	0	0	0	0	QUETTA	0	0	0	0
SHIKARPUR	0	0	0	0	PISHIN	407	593	1196	2474
SUKKUR	0	0	0	0	LORALAI	156	228	460	951
LARKANA	0	0	0	0	ZHOB	0	0	0	0
NAWABSHAH	0	0	0	0	CHAGHAI	0	0	0	0
KHAIRPUR	0	0	0	0	KALAT	331	482	973	2011
HYDERABAD	0	0	0	0	KHARAN	0	0	0	0
DADU	168	245	931	2505	LASBELA	0	0	0	0
THARPARKAR	0	0	0	0	NASEERABAD	0	0	0	0
SANGHAR	0	0	0	0	SIBI	108	158	318	658
THATTA	38	56	211	569	KACHI	0	0	0	0
BADIN	0	0	0	0	KOHLU	0	0	0	0
KARACHI	0	0	0	0	KHUZDAR	0	0	0	0
					PANJGUR	0	0	0	0
					TURBAT	0	0	0	0
					GWADAR	0	0	0	0

Table 37 District-Wise Projection of Crude Oil Production

(000 TON)

	1980 -1981	1982 -1983	1987 -1988	1999 -2000
PAKISTAN	532	619	1057	2417
PUNJAB	532	619	1057	2417
ATTOCK	455	529	904	2067
RAWALPINDI	9	10	17	39
JHELUM	69	80	136	312
GUJRAT	0	0	0	0
SARGODHA	0	0	0	0
MIANWALI	0	0	0	0
FAISALABAD	0	0	0	0
JHANG	0	0	0	0
LAHORE	0	0	0	0
KASUR	0	0	0	0
SHEIKHUPURA	0	0	0	0
GUJRANWALA	0	0	0	0
SIALKOT	0	0	0	0
D.G.KHAN	0	0	0	0
MUZAFFARGARH	0	0	0	0
MULTAN	0	0	0	0
SAHIWAL	0	0	0	0
BAHAWALPUR	0	0	0	0
BAHAWALNAGAR	0	0	0	0
RAHIM YAR KHAN	0	0	0	0
VIHARI	0	0	0	0
SIND	0	0	0	0
JACOBABAD	0	0	0	0
SHIKARPUR	0	0	0	0
SUKKUR	0	0	0	0
LARKANA	0	0	0	0
NAWABSHAH	0	0	0	0
KHAIRPUR	0	0	0	0
HYDERABAD	0	0	0	0
DADU	0	0	0	0
THARPARKAR	0	0	0	0
SANGHAR	0	0	0	0
THATTA	0	0	0	0
BADIN	0	0	0	0
KARACHI	0	0	0	0

	1980 -1981	1982 -1983	1987 -1988	1999 -2000
NWFP	0	0	0	0
MARDAN	0	0	0	0
PESHAWAR	0	0	0	0
KHYBER AGENCY	0	0	0	0
BAJUR & MAHMAND	0	0	0	0
KOHAT	0	0	0	0
KHURRUM	0	0	0	0
ABBOTTABAD	0	0	0	0
MANSEHRA	0	0	0	0
KOHISTAN	0	0	0	0
D.I.KHAN	0	0	0	0
S.WAZIRISTAN	0	0	0	0
BANNU	0	0	0	0
N.WAZIRISTAN	0	0	0	0
DIR	0	0	0	0
CHITRAL	0	0	0	0
SWAT	0	0	0	0
MALAKAND	0	0	0	0
BALUCHISTAN	0	0	0	0
QUETTA	0	0	0	0
PISHIN	0	0	0	0
LORALAI	0	0	0	0
ZHOB	0	0	0	0
CHAGHAI	0	0	0	0
KALAT	0	0	0	0
KHARAN	0	0	0	0
LASBELA	0	0	0	0
NASEERABAD	0	0	0	0
SIBI	0	0	0	0
KACHI	0	0	0	0
KOHLU	0	0	0	0
KHUZDAR	0	0	0	0
PANJGUR	0	0	0	0
TURBAT	0	0	0	0
GWADAR	0	0	0	0

Table 38 District-Wise Projection of Petroleum Products Production

(000 TON)

	1980 -1981	1982 -1983	1987 -1988	1999 -2000		1980 -1981	1982 -1983	1987 -1988	1999 -2000
PAKISTAN	4259	4688	6234	12499					
PUNJAB	493	573	970	2211	NWFP	0	0	0	0
ATTOCK	493	573	970	2211	MARDAN	0	0	0	0
RAWALPINDI	0	0	0	0	PESHAWAR	0	0	0	0
JHELUM	0	0	0	0	KHYBER AGENCY	0	0	0	0
GUJRAT	0	0	0	0	BAJUR & MAHMAND	0	0	0	0
SARGODHA	0	0	0	0	KOHAT	0	0	0	0
MIANWALI	0	0	0	0	KHURRUM	0	0	0	0
FAISALABAD	0	0	0	0	ABBOTTABAD	0	0	0	0
JHANG	0	0	0	0	MANSEHRA	0	0	0	0
LAHORE	0	0	0	0	KOHISTAN	0	0	0	0
KASUR	0	0	0	0	D.I.KHAN	0	0	0	0
SHEIKHUPURA	0	0	0	0	S.WAZIRISTAN	0	0	0	0
GUJRANWALA	0	0	0	0	BANNU	0	0	0	0
SIALKOT	0	0	0	0	N.WAZIRISTAN	0	0	0	0
D.G.KHAN	0	0	0	0	DIR	0	0	0	0
MUZAFFARGARH	0	0	0	0	CHITRAL	0	0	0	0
MULTAN	0	0	0	0	SWAT	0	0	0	0
SAHIWAL	0	0	0	0	MALAKAND	0	0	0	0
BAHAWALPUR	0	0	0	0					
BAHAWALNAGAR	0	0	0	0					
RAHIM YAR KHAN	0	0	0	0					
VIHARI	0	0	0	0					
SIND	3766	4115	5264	10288	BALUCHISTAN	0	0	0	0
JACOBABAD	0	0	0	0	QUETTA	0	0	0	0
SHIKARPUR	0	0	0	0	PISHIN	0	0	0	0
SUKKUR	0	0	0	0	LORALAI	0	0	0	0
LARKANA	0	0	0	0	ZHOB	0	0	0	0
NAWABSHAH	0	0	0	0	CHAGHAI	0	0	0	0
KHAIRPUR	0	0	0	0	KALAT	0	0	0	0
HYDERABAD	0	0	0	0	KHARAN	0	0	0	0
DADU	0	0	0	0	LASBELA	0	0	0	0
THARPARKAR	0	0	0	0	NASEERABAD	0	0	0	0
SANGHAR	0	0	0	0	SIBI	0	0	0	0
THATTA	0	0	0	0	KACHI	0	0	0	0
BADIN	0	0	0	0	KOHLU	0	0	0	0
KARACHI	3766	4115	5264	10288	KHUZDAR	0	0	0	0
					PANJGUR	0	0	0	0
					TURBAT	0	0	0	0
					GWADAR	0	0	0	0

II. MACROSCOPIC TRAFFIC DEMAND

1. Plot of Regression Analysis
2. Port Traffic Projection

II. MACROSCOPIC TRAFFIC DEMAND

1. Plot of Regression Analysis

Fig. 1 and Fig. 2 show the plot of actual and fitted values of domestic traffic volume. These fitted values are obtained from regression models which are adopted in this study.

2. Port Traffic Projection

1) Assumption and/or Model for Projection

Wheat

ADMD = -3915 + 0.12479 POP + 1111 PGDP r = 0.9922

where

ADMD : 3 year moving average consumption of wheat

POP : Population

PGDP : Per capita GDP

Rice

Per capita consumption in the past is almost constant. Therefore, the level of per capita consumption of rice in future excluding 1982–83 is assumed to be as high as the average during the period 1971–72 to 1980–81. In 1982–83, it is assumed that the level in 1980–81 will be remain.

Cotton

log PDMD = 2.05008 - 0.15188 log T r = 0.6334

where

PDMD : Per capita consumption of cotton

T : Time trend (1971–72 = 1 . . . 1980–81 = 10)

Sugar

log DMD = -6.43952 + 1.06096 log GDP r = 0.6334

where

DMD : Per capita consumption of cotton

GDP : GDP at 1980–81 constant prices

Fertilizers

Consumption of fertilizer by crop

CW = -463 + 0.08772 PW r = 0.9611

CR = -171 + 0.08976 PR r = 0.9420

CS = -12.3 + 0.00337 PS r = 0.5581

CC = -45.4 + 0.11738 PC r = 0.3079

where

CW : Consumption of fertilizer for wheat

CR : Consumption of fertilizer for rice

CS : Consumption of fertilizer for sugarcane

Fig. 1 Plot of Actual and Fitted Values of Domestic Passenger Traffic

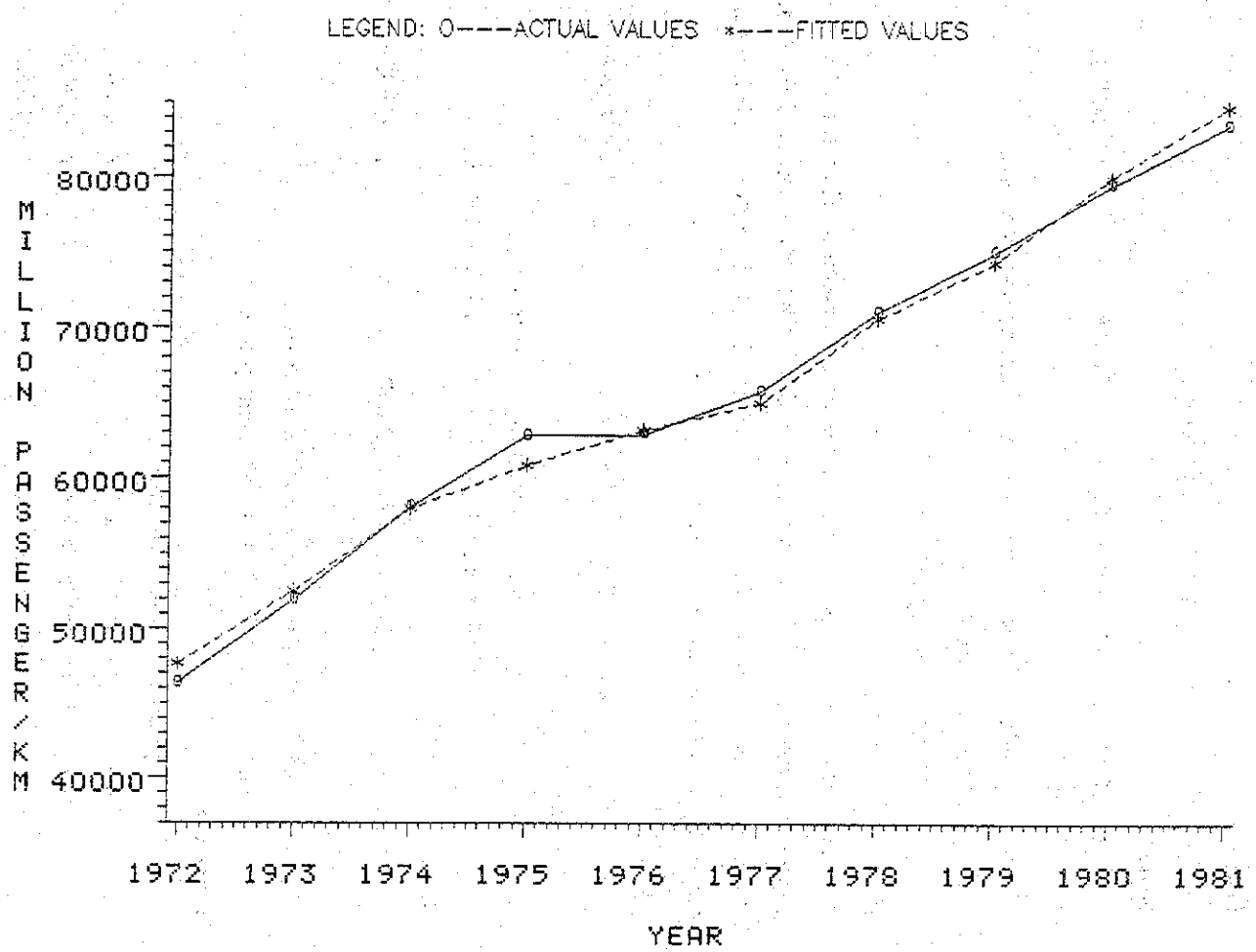
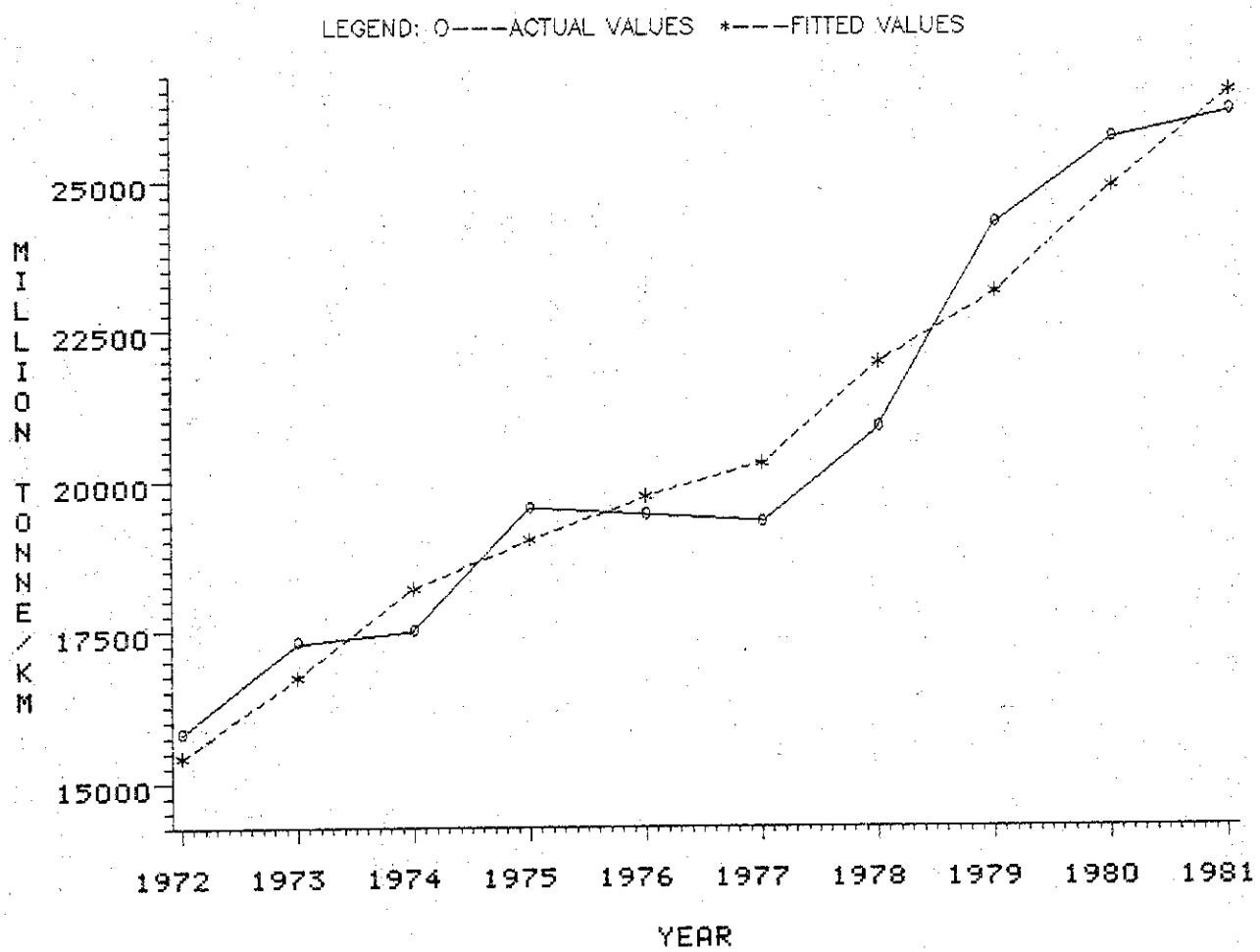


Fig. 2 Plot of Actual and Fitted Values of Domestic Cargo Traffic



CC : Consumption of fertilizer for cotton

PW : Production of wheat

PR : Production of rice

PS : Production of sugarcane

PC : Production of cotton

Value of correlation coefficient are low in case of sugarcane and cotton. As a result, the regression forms are changed as follows:

$\log CS/PS = -6.46531 + 0.33527 \log T$ $\quad r = 0.6591$

$\log CC/PC = -3.23795 + 0.86264 \log T$ $\quad r = 0.9039$

where

T : Time trend (1971–72 = 1 . . . 1980–81 = 10)

Consumption of fertilizer by nutrient

$MCRP = CW + CR + CS + CC$

$TOT = -16.7 + 1.17985\ MCRP$ $\quad r = 0.9996$

$\log N = 5.64977 + 0.35517 \log T$ $\quad r = 0.8217$

$\log P = 3.33822 + 0.84402 \log T$ $\quad r = 0.9419$

$\log K = -0.46807 + 1.05397 \log T$ $\quad r = 0.8976$

where

MCRP : Consumption of fertilizer for major crops

TOT : Total consumption of fertilizer

N : Consumption of nitrogen fertilizer

P : Consumption of phosphate fertilizer

K : Consumption of potassium fertilizer

T : Time trend (1971–72 = 1 . . . 1980–81 = 10)

Subject to TOT = N + P + K

Cement

$DMD = -4892 + 0.075933\ POP + 892.5\ PGDP$ $\quad r = 0.9886$

(4.37) (1.22)

where

DMD : Consumption of Cement

POP : Population

PGDP : Per capita GDP

Iron & Steel

$ADMD = -6.64551 + 6.1771\ PGDP$ $\quad r = 0.9085$

where

ADMD : 3 year moving average per capita consumption of iron & steel

PGDP : Per capita GDP

Phosphate Rock/Sulpher

DMD = -114 + 0.51947 PDT r = 0.8142

where

DMD : Consumption of phosphate rock/sulpher

PDT : Production of fertilizers in terms of nutrient tonnes

Coal

It is assumed that the import of coal will be used for Karachi Steel Mills. Figures for imported coal had been extracted from the Fifth-Five Year Plan.

Iron Ore

It has been done in a way similar to coal.

Import of Other Dry Cargoes

ADMD = -2140 + 0.046393 POP r = 0.9865

where

ADMD : 3 year moving average per capita consumption of other dry cargoes

POP : Population

Export of Other Dry Cargoes

log EXP/GDP = 1.89875 - 0.32559 log T r = -0.9335

where

EXP : Export of other dry cargoes

GDP : GDP at 1980–81 constant prices

T : Time trend (1971–72 = 1 . . . 1980–81 = 10)

Crude Oil

DMD = -283 + 0.02561 GDP r = 0.9331

where

DMD : Consumption of crude oil including import of petroleum products

GDP : GDP at 1980–81 constant prices

Petroleum Products

PDT = 758 + 0.570980 OIL r = 0.9405

DMD = 1189 + 0.008137 GDP r = 0.8845

where

PDT : Production of petroleum products

OIL : Supply of crude oil including import of petroleum products

DMD : Consumption of petroleum products excluding import

GDP : GDP at 1980–81 constant prices

Edible Oil

log PDMD = 1.14215 + 0.58016 log T r = 0.9664

where

PDMD : Per capita consumption of edible oil

T : Time trend (1971–72 = 1 . . . 1980–81 = 10)

Molasses

AEXP = -492 + 0.027385 APDT r = 0.8863

where

AEXP : 3 year moving average export of molasses

APDT : 3 year moving average sugarcane production

2) Projected Per Capita Consumption

Table 1 shows the projection of per capita consumption of selected commodities in terms of index numbers. The per capita consumption of iron & steel, sugar, fertilizers and crude oil (including import of petroleum products) expected to increase over two times during the period 1981–2000. As for other selected commodities excluding cotton, it is expected to increase less than two times.

Comparison with Other Reports

It is useful to make a comparison with other reports which is shown in Table 2. The absolute volume of per capita consumption prepared by other reports is comparable as their used data is different or not known. Therefore, comparison has made in terms of index numbers, set at 100 for 1980–81.

Swan Wooster Engineering Co., Ltd. (SWEC) issued "Forecast of Seaborne Trade for Pakistan" on April, 1978. SWEC projected much the same commodity as JICA Study Team. There is not so much difference projections between SWEC and JICA excluding cotton and petroleum products. In the projection of per capita consumption of cotton, JICA Study Team projected based on the trend which was declining as against SWEC which projected based on the incomes increase. Usually, the results of these two approach will be not so much different. It is considered that its difference results is mainly due to the difference of base year projection.

With regard to petroleum products excluding import, it is indicated to decrease in the SWEC projections which was done by based on the assuming low growth rate (1.3% per annum) for domestic production.

Canadian International Development Agency (CIDA) issued "Foodgrains Storage and Handling Master Plan" on April, 1980. Upto the year 1987–88, CIDA projected the consumption of wheat and rice based on the per capita consumption which was obtained from the Nutrient Cell, Planning Division, Ministry of Food and Agriculture. Both wheat and rice, projected per capita consumption by CIDA is a little greater than JICA projections.

ESCAP issued "Pakistan's Pattern of Development and Prospects" which was

Table 1 Index Numbers of per Capita Consumption by Commodity (1980–81 = 100)

Year	Wheat	Rice	Cotton	Sugar	Edible oil
1971-72	86	127	141	62	28
1972-73	97	100	154	87	29
1973-74	96	121	184	90	43
1974-75	99	129	132	65	51
1975-76	97	93	115	83	57
1976-77	92	99	116	91	68
1977-78	101	111	130	105	64
1978-79	103	107	111	71	84
1979-80	99	116	132	76	89
1980-81	100	100	100	100	100
1982-83	100	100	112	97	100
1987-88	107	110	106	122	122
1999-2000	123	110	98	207	166

Year	Cement	Iron & steel	Fertilizers	Crude oil 1)	Petroleum products 2)
1971-72	68	77	47	84	106
1972-73	75	90	52	84	100
1973-74	75	77	46	88	98
1974-75	85	102	48	85	102
1975-76	90	78	60	77	93
1976-77	85	89	66	78	88
1977-78	89	106	73	93	103
1978-79	96	94	87	95	95
1979-80	101	113	100	101	100
1980-81	100	100	100	100	100
1982-83	109	114	105	105	100
1987-88	128	154	139	128	110
1999-2000	168	284	205	207	152

Notes: 1) Including imports of petroleum products
2) Excluding imports

prepared by Dr. Moin Baqai for the project on New Pattern and Strategies of Development in the ESCAP region for DD3 (1980–89) on August, 1979. Projected per capita consumption of wheat by ESCAP is almost same level as JICA projections. However, in the case of rice, sugar, edible oil and petroleum, projected level of per capita consumption is greater than JICA projection. It is considered that the reason of this difference results between ESCAP and JICA is mainly due to the difference of base year for projection similar to the comparison with SWEC.

Comparison with Other Countries

It has been made to compare with other countries in the ESCAP region for the consumption of foodgrains and liquids energy in 1978.

Table 2 Comparison of per Capita Consumption Projections (1980–81 = 100)

Commodity	Year	JICA	SWEC 1)	CIDA 2)	ESCAP 3)
Wheat	1982-83	100	101	103	102
	1987-88	107	104	111	108
	1999-2000	123	112	-	124
Rice	1982-83	100	102	105	104
	1987-88	110	108	117	115
	1999-2000	110	126	-	141
Cotton	1982-83	112	105		
	1987-88	106	115		
	1999-2000	98	146		
Sugar	1982-83	97	107		108
	1987-88	122	129		142
	1999-2000	207	201		283
Edible oil	1982-83	100	105		114
	1987-88	122	119		143
	1999-2000	166	158		286
Cement	1982-83	109	105		
	1987-88	128	124		
	1999-2000	168	196		
Iron & steel	1982-83	114	110		
	1987-88	154	141		
	1999-2000	284	258		
Fertilizers	1982-83	105	110		
	1987-88	139	127		
	1999-2000	205	150		
		a)	a)		c)
Crude oil	1982-83	105	102		110
	1987-88	128	108		144
	1999-2000	207	148		272
		b)	b)		
Petroleum products	1982-83	100	104		
	1987-88	110	98		
	1999-2000	152	85		

Source: 1) Forecast of Seaborne Trade for Pakistan
(Swan Wooster Engineering Co., Ltd.; April, 1978)
2) Foodgrains Storage and Handling Master Plan
(Canadian International Development Agency; April, 1980)
3) Pakistan's Pattern of Development and Prospects
August, 1979

Note: a. Including imports of petroleum products
b. Excluding imports
c. Including petroleum products

Fig. 3 shows the comparison of per capita consumption of foodgrains (wheat and rice). It is indicated that the position of Pakistan is below the average with the difference of 10%. For the countries in the ESCAP region, existing average per capita consumption of foodgrains is around 179kg per annum which is close to be adopting projection (168kg) for Pakistan in the year 1999–2000 by this study.

Fig. 4 shows the correlation between per capita income and consumption of liquids energy. It is indicated that income elasticity of demand is about 1.08. An attempt has been made to project the per capita consumption of liquids energy using by above elasticity as follows:

	1980–81	1987–88	1999–2000
Per capita income (million Rs.)	2.972	3.856	6.223
Per capita consumption (Index numbers, 1980–81 = 100)	100	132	222

The result of projection using by above elasticity is close to be adopting projection by this study.

3) Surplus/Deficit Conditions

Wheat

Based on the projected consumption and production of wheat after making a 10% allowance for wastage and seed, the resulting trade is shown in Table 3. It should be noted that wheat was one of the major import commodity but it will be turn to be exported in 1999–2000. The export ratio to net availability in 1999–2000 will be 3.1%, in absolute terms about 640 thousand tons of wheat will be exported. On the other hand, in the period up to the year 1987–88, it will remain to be imported the range from about 300 thousand tons to 500 thousand tons.

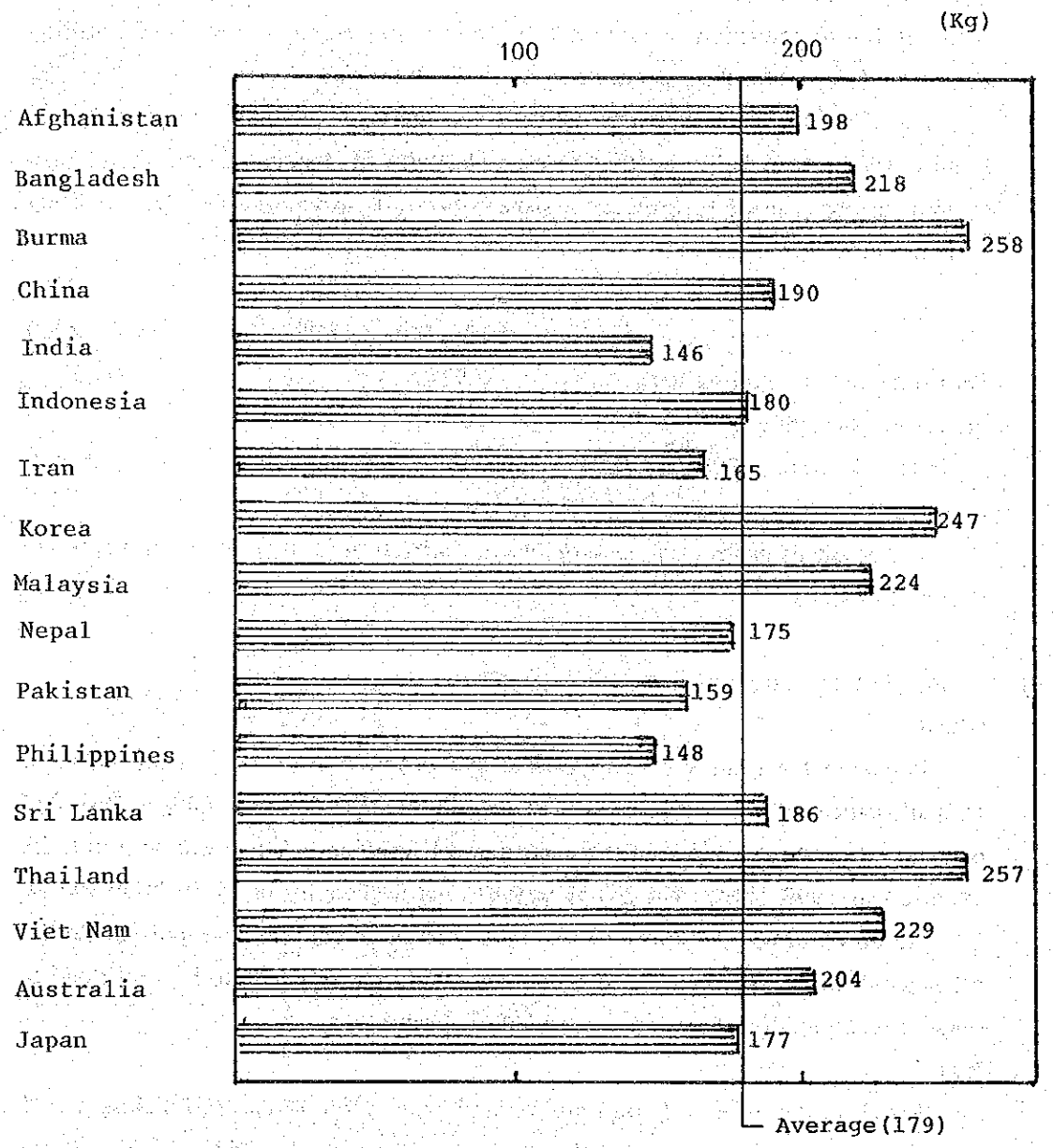
Rice

Based on the projected consumption and production of rice after making a 10% allowance for wastage and seed, the resulting trade is shown in Table 4. A continuing surplus in rice is projected up to the year 1999–2000. The surplus ratio to net production will be up from 43.4% in 1980–81 to 50.7% in 1999–2000. In absolute terms, the export volume of rice will increase from about 1.3 million tons in 1980–81 to 1.6 million tons in 1999–2000.

Cotton

Table 5 shows the production, consumption and export surplus of raw cotton. Over the past 10 years, the average volume of cotton exports was about 160 thousand tons as against 600 thousand tons in the average production. The export volume of

Fig. 3 Per Capita Consumption of Foodgrains (Wheat and Rice) in the ESCAP Region in 1978

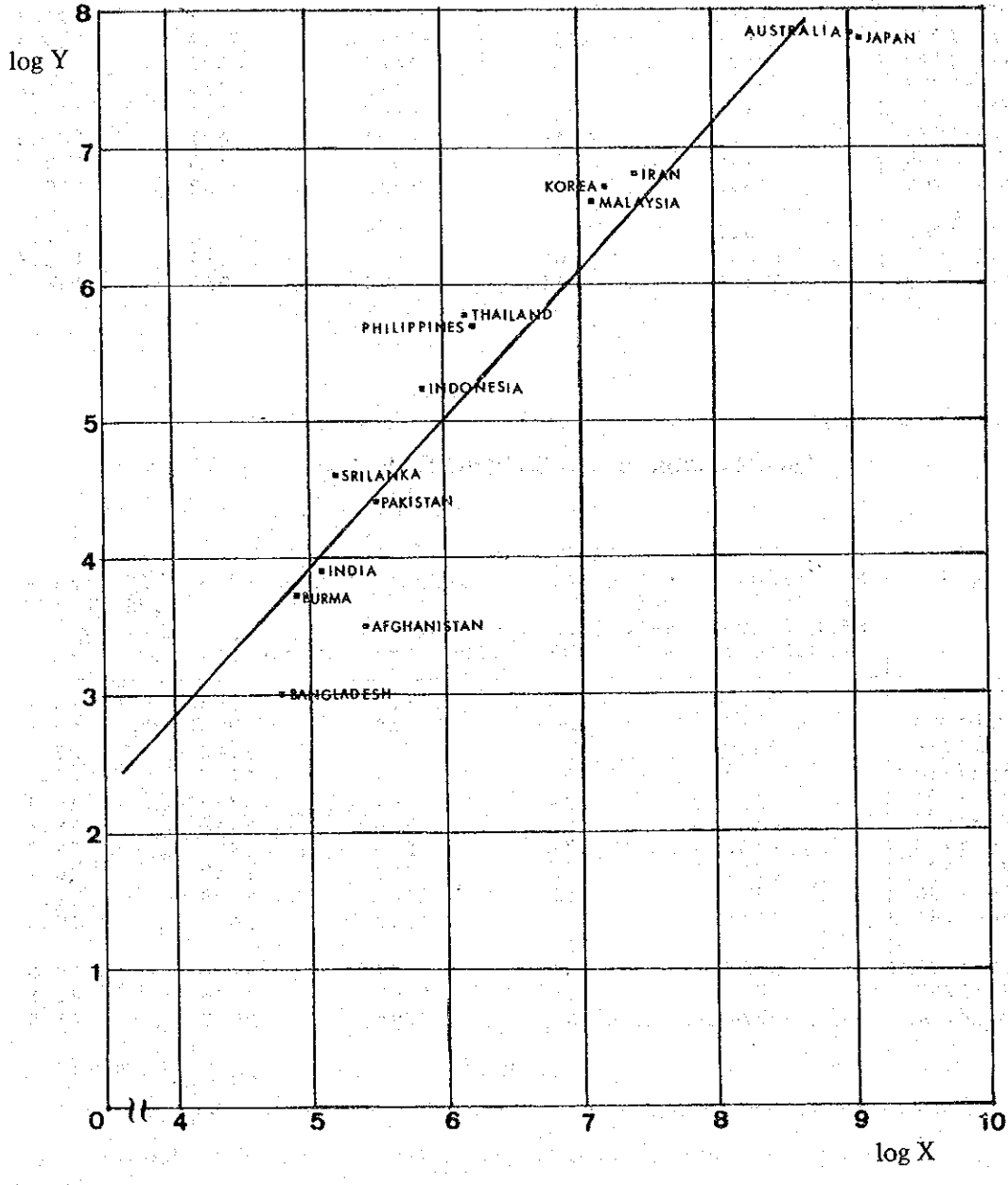


Source: Handbook on Agricultural Statistics for Asia and the Pacific 1980 (United Nations)

Fig. 4 Correlation between per Capita Income and Consumption of Liquids Energy in ESCAP Region (1978)

$\log Y = -1.46921 + 1.0805 \log X \quad r = 0.95$

Y: Per capita consumption of liquids energy
X: Per capita income



Source: Statistical Yearbook (United Nations)

Table 3 Projection of Seaborne Trade (Wheat)

YEAR	PREVIIOUS YEAR'S PRODUCTION (1000TON)	ALLOWANCE WASTE & SEED(10%) (1000TON)	IMPORT(-) EXPORT(+) (1000TON)	CONSUMPTION (1000TON)	PER CAPITA CONSUMPTION (KG)
1971-1972	6476	647	-715	6543	103.1
1972-1973	6890	689	-1358	7559	115.7
1973-1974	7442	744	-1024	7721	114.6
1974-1975	7629	762	-1414	8280	119.1
1975-1976	7673	767	-1422	8327	116.1
1976-1977	8691	869	-394	8215	110.0
1977-1978	9144	914	-967	9196	120.5
1978-1979	8367	836	-2161	9691	123.1
1979-1980	9950	995	-653	9608	118.3
1980-1981	10805	1080	-308	10032	119.7
1982-1983	11517	1151	-347	10712	119.9
1987-1988	14054	1405	-527	13175	128.4
1999-2000	22869	2286	643	19939	146.9

Table 4 Projection of Seaborne Trade (Rice)

YEAR	PREVIIOUS YEAR'S PRODUCTION (1000TON)	ALLOWANCE WASTE & SEED(10%) (1000TON)	EXPORT (1000TON)	CONSUMPTION (1000TON)	PER CAPITA CONSUMPTION (KG)
1971-1972	2200	220	414	1565	24.7
1972-1973	2262	226	760	1275	19.5
1973-1974	2330	233	508	1588	23.6
1974-1975	2455	245	454	1755	25.2
1975-1976	2314	231	783	1299	18.1
1976-1977	2618	261	910	1446	19.4
1977-1978	2737	273	806	1657	21.7
1978-1979	2950	295	1008	1647	20.9
1979-1980	3272	327	1106	1838	22.6
1980-1981	3216	321	1257	1637	19.5
1982-1983	3335	333	1259	1742	19.5
1987-1988	4222	422	1593	2206	21.5
1999-2000	6574	657	2998	2918	21.5

Table 5 Projection of Seaborne Trade (Cotton)

YEAR	PRODUCTION (1000TON)	EXPORT (1000TON)	CONSUMPTION (1000TON)	PER CAPITA CONSUMPTION (KG)
1971-1972	708	281	427	6.73
1972-1973	702	223	479	7.33
1973-1974	659	68	591	8.77
1974-1975	634	197	437	6.29
1975-1976	514	121	393	5.48
1976-1977	435	23	412	5.52
1977-1978	575	102	473	6.20
1978-1979	473	56	417	5.30
1979-1980	728	217	511	6.29
1980-1981	714	315	399	4.76
1982-1983	661	185	476	5.33
1987-1988	852	334	518	5.05
1999-2000	1125	492	633	4.66

cotton will increase from 315 thousand tons in 1980–81 to 334 thousand tons in 1987–88, 492 thousand tons in 1999–2000. As for the export ratio to production, it will be up to 39.2% in 1987–88 and 43.7% in 1999–2000 as against 26.7% in the average of past 10 years. The absolute volume of cotton exports is not so much, but cotton is one of the most important commodity because of its high unit value among the export commodities and earning of foreign exchange for Pakistan.

Sugar

Table 6 shows the production, consumption and surplus-deficit of refined sugar. During the past 10 years excluding 1972–73, the supply-demand of refined sugar was almost balanced of import which was less than 100 thousand tons. In future, but it will be turn to be exported after 1987–88. The export volume of refined sugar worked out 94 thousand tons in 1987–88 and 266 thousand tons in 1999–2000.

Cement

Table 7 shows the production, consumption and surplus-deficit of cement. During the past 10 years, it should be noted that cement was exported in the first half of 1970's but after 1977–78 it turned to be imported because of high increasing consumption. In future, the production of cement is expected to increase at a rate of 7.2% per annum as against 5.5% per annum for consumption. As a result, it will be turn to be exported again during the Sixth Five Year Plan.

Iron & Steel

Table 8 shows the production, consumption and surplus-deficit of iron & steel which is including M.S. products. In future production, it is projected based on the

Table 6 Projection of Seaborne Trade (Sugar)

YEAR	PRODUCTION (1000TON)	IMPORT(-) EXPORT(+) (1000TON)	CONSUMPTION (1000TON)	PER CAPITA CONSUMPTION (KG)
1971-1972	375	-62	437	6.88
1972-1973	429	-197	626	9.59
1973-1974	608	-61	669	9.93
1974-1975	502	0	502	7.22
1975-1976	630	-29	659	9.19
1976-1977	736	-11	747	10.00
1977-1978	861	-20	881	11.54
1978-1979	607	-10	617	7.84
1979-1980	586	-98	684	8.42
1980-1981	851	-74	925	11.04
1982-1983	897	-63	960	10.75
1987-1988	1481	94	1387	13.51
1999-2000	3366	266	3100	22.84

Table 7 Projection of Seaborne Trade (Cement)

YEAR	PRODUCTION (1000TON)	IMPORT(-) EXPORT(+) (1000TON)	CONSUMPTION (1000TON)	PER CAPITA CONSUMPTION (KG)
1971-1972	2605	540	2065	32.53
1972-1973	2876	520	2356	36.07
1973-1974	3145	699	2446	36.30
1974-1975	3320	483	2837	40.80
1975-1976	3196	98	3098	43.19
1976-1977	3071	13	3058	40.94
1977-1978	3224	-34	3258	42.68
1978-1979	3023	-630	3653	46.41
1979-1980	3343	-611	3954	48.68
1980-1981	3538	-444	3982	47.53
1982-1983	4545	-142	4687	52.47
1987-1988	7810	1467	6343	61.80
1999-2000	13178	2208	10970	80.81

Table 8 Projection of Seaborne Trade (Iron & Steel)

YEAR	PRODUCTION (1000TON)	IMPORT(-) EXPORT(+) (1000TON)	CONSUMPTION (1000TON)	PER CAPITA CONSUMPTION (KG)
1971-1972	166	-383	549	8.65
1972-1973	184	-472	656	10.04
1973-1974	218	-364	582	8.64
1974-1975	224	-570	794	11.42
1975-1976	231	-395	626	8.73
1976-1977	270	-476	746	9.99
1977-1978	315	-589	904	11.84
1978-1979	362	-463	825	10.48
1979-1980	421	-608	1029	12.67
1980-1981	495	-442	937	11.18
1982-1983	599	-536	1135	12.71
1987-1988	2392	630	1762	17.17
1999-2000	6051	1735	4316	31.79

Karachi steel mill which has been started trial production since August 1981 will be completed during the Sixth Five Year Plan. Therefore, the production of iron & steel is projected to increase at a rate of 14.1% per annum from 495 thousand tons in 1980–81 to 6051 thousand tons in 1999–2000 as against to increase at a rate of 8.4% per annum from 937 thousand tons in 1980–81 to 4316 thousand tons in 1999–2000 for consumption. As a result, iron & steel was import commodity but it will be turn to be exported during the Sixth Five Year Plan.

Fertilizers

The volume of fertilizer is usually measured in terms of "nutrient" tons. The principal forms of fertilizer nutrient are nitrogen (N), phosphate (P) and potassium (K). The production and consumption of fertilizer by nutrient are shown in Table 9 and Table 10. In 1980–81, the component ratio of total fertilizers is as follows;

	Production	Consumption
N	90.9%	76.0%
P	9.1%	23.2%
K	–	0.8%

During the past 10 years, almost fertilizers were imported because of moderate increasing production. Especially in the middle of 1970's the product level was almost constant. However, after the last of 1970's it was considerable changed in production

Table 9 Production of Fertilizers by Nutrient

(000N/TON)

YEAR	NITROGEN (N)	PHOSPHATE (P)	POTASSIUM (K)	TOTAL
1971-1972	215.1	4.9	0.0	220.0
1972-1973	274.5	8.2	0.0	282.7
1973-1974	300.1	4.2	0.0	304.3
1974-1975	320.6	6.3	0.0	326.9
1975-1976	314.9	11.8	0.0	326.7
1976-1977	312.3	13.4	0.0	325.7
1977-1978	312.8	15.0	0.0	327.8
1978-1979	336.6	28.9	0.0	365.5
1979-1980	389.9	51.5	0.0	441.4
1980-1981	586.3	58.5	0.0	644.8
1982-1983	732.3	63.3	0.0	795.6
1987-1988	1137.7	98.9	0.0	1236.6
1999-2000	2591.0	225.3	0.0	2816.3

Table 10 Consumption of Fertilizers by Nutrient

(000N/TON)

YEAR	NITROGEN (N)	PHOSPHATE (P)	POTASSIUM (K)	TOTAL
1971-1972	344.0	37.2	0.7	381.9
1972-1973	386.4	48.7	1.4	436.5
1973-1974	341.9	58.1	2.7	402.7
1974-1975	362.9	60.5	2.1	425.5
1975-1976	443.4	108.5	1.9	553.8
1976-1977	511.0	117.9	2.4	631.3
1977-1978	554.1	157.3	5.8	717.2
1978-1979	684.3	187.9	7.6	879.8
1979-1980	806.0	228.5	9.6	1044.1
1980-1981	819.6	250.4	9.0	1079.0
1982-1983	897.2	299.1	11.7	1208.0
1987-1988	1297.7	514.5	20.8	1833.0
1999-2000	2461.3	1200.8	54.2	3716.3

due to the starting operation in some new fertilizer plants, and it is expected that the increase of production from 1980–81 to 1987–88 and 1999–2000 will be about 1.9 times and 4.4 times respectively.

On the other hand, the increase of consumption from 1980–81 to 1987–88 and 1999–2000 has been also projected about 1.7 times and 3.3 times respectively.

Based on the projected production and consumption of fertilizer by nutrient, the resulting trade is shown in Table 11. Supply-demand of nitrogen fertilizer is expected to balance up to the year 1999–2000. The deficit for phosphate fertilizer will expand because of increasing consumption which is projected at a rate of 8.6% per annum up to the year 1999–2000. As for potassium fertilizer which is not produced in Pakistan, it is not so much volume at present but it will increase year by year.

With regard to raw materials like phosphate rock and sulpher which are required by phosphatic fertilizer plants, all of them are imported at present as shown in Table 12. However, it is anticipated that some of these raw materials will be provided by domestic production, and in future they will be imported a little over 50% of demand which is projected about 0.5 million tons in 1987–88 and 1.35 million tons in 1999–2000.

Other Dry Cargo

Import and export of other residual dry cargo are shown in Table 13 and Table 14 respectively. During the past 10 years, import of other dry cargo increased at a rate of 7.0% per annum as against levelling-out of export.

Based on relationship between population, GDP and other dry cargo, it is projected to increase at a rate of 4.0% per annum in import and 4.9% per annum in export from 1980–81 to 1999–2000. It is indicated that growth rate of import will declined and export will turn to increase because of rising domestic production with the development of industrialization.

Crude Oil & Petroleum Products

Supply-demand of crude oil and petroleum products are shown in Table 15 and Table 16 respectively. At present, crude oil & petroleum is imported about 90% of total consumption. Total consumption in the year 1999–2000 is projected to be 20.6 million tons growing at 6.6% per annum over the period. On the other hand, up to the year 1999–2000 total production is expected to be 2.4 million tons and it will be shortfall about 18.2 million tons.

With regard to petroleum products, Pakistan is surplus like naphtha and furnace oil, and these products are exported to Turkey, India and other countries. In 1980–81, export volume was about 1 million tons and export ratio to total products was 23.3%. Up to the year 1999–2000, total production is exported to be 12.5 million tons as against 8 million tons in consumption. As a result, petroleum products will be

Table 11 Projected Surplus/Deficit Conditions of Fertilizers by Nutrient

	Nutrient ton(1000N/Tons)				Metric ton(1000M/Tons)			
	1980 -81	1982 -83	1987 -88	1999 -2000	1980 -81	1982 -83	1987 -88	1999 -2000
Production	645	795	1237	2816	1605	1940	3016	6869
N	586	732	1138	2591	1445	1767	2746	6253
P	59	63	99	225	160	173	270	616
K	-	-	-	-	-	-	-	-
Consumption	1079	1208	1833	3716	2878	3168	4209	8646
N	820	897	1298	2461	2127	2263	3066	5971
P	250	299	515	1201	733	881	1101	2567
K	9	12	21	54	18	24	42	108
Surplus(+)/ Deficit(-)								
N	-234	-165	-160	130	-682	-496	-320	282
P	-191	-236	-416	-976	-573	-708	-831	-1951
K	-9	-12	-21	-54	-18	-24	-42	-108

Table 12 Projection of Seaborne Trade (Phosphate Rock/Sulpher)

YEAR	PRODUCTION (1000TON)	IMPORT (1000TON)	CONSUMPTION (1000TON)	PER CAPITA CONSUMPTION (KG)
1971-1972	0	19	19	0.30
1972-1973	0	45	45	0.69
1973-1974	0	0	0	0.0
1974-1975	0	11	11	0.16
1975-1976	0	34	34	0.47
1976-1977	0	26	26	0.35
1977-1978	0	58	58	0.76
1978-1979	0	136	136	1.73
1979-1980	0	176	176	2.17
1980-1981	0	191	191	2.28
1982-1983	0	299	299	3.35
1987-1988	250	278	528	5.14
1999-2000	570	779	1349	9.94

Table 13 Projection of Seaborne Trade (Import Other Dry Cargo)

YEAR	IMPORT (1000TON)	PER CAPITA IMPORT (KG)
1971-1972	1063	16.7
1972-1973	887	13.6
1973-1974	1074	15.9
1974-1975	1109	16.0
1975-1976	1331	18.6
1976-1977	1601	21.4
1977-1978	1491	19.5
1978-1979	1516	19.3
1979-1980	1730	21.3
1980-1981	1959	23.4
1982-1983	2004	22.4
1987-1988	2621	25.5
1999-2000	4158	30.6

Table 14 Projection of Seaborne Trade (Export Other Dry Cargo)

YEAR	EXPORT (1000TON)	GDP (1000TON)	EXPORT/GDP (TON/ MILLION RP)
1971-1972	963	154120	6.2
1972-1973	851	165238	5.2
1973-1974	1003	178023	5.6
1974-1975	716	185031	3.9
1975-1976	850	191166	4.4
1976-1977	755	195994	3.9
1977-1978	728	210452	3.5
1978-1979	677	220250	3.1
1979-1980	773	235590	3.3
1980-1981	766	249038	3.1
1982-1983	831	279830	3.0
1987-1988	1049	395794	2.7
1999-2000	1884	844847	2.2

Table 15 Projection of Seaborne Trade (Crude Oil & Petroleum)

YEAR	PRODUCTION (1000TON)	IMPORT (1000TON)	CONSUMPTION (1000TON)	PER CAPITA CONSUMPTION (KG)
1971-1972	409	3511	3920	61.75
1972-1973	416	3585	4001	61.26
1973-1974	388	3947	4335	64.33
1974-1975	332	4011	4343	62.46
1975-1976	342	3694	4036	56.27
1976-1977	509	3744	4253	56.93
1977-1978	481	4697	5178	67.83
1978-1979	505	4990	5495	69.81
1979-1980	485	5535	6020	74.11
1980-1981	532	5598	6130	73.17
1982-1983	619	6264	6883	77.05
1987-1988	1057	8533	9590	93.44
1999-2000	2417	18146	20563	151.47

Table 16 Projection of Seaborne Trade (Petroleum Products)

YEAR	PRODUCTION (1000TON)	EXPORT (1000TON)	CONSUMPTION (1000TON)	PER CAPITA CONSUMPTION (KG)
1971-1972	3246	628	2618	41.24
1972-1973	3263	708	2555	39.12
1973-1974	3227	644	2583	38.33
1974-1975	3078	306	2772	39.87
1975-1976	2963	376	2587	36.07
1976-1977	3064	505	2559	34.26
1977-1978	3851	783	3068	40.19
1978-1979	3782	881	2901	36.85
1979-1980	4266	1091	3175	39.09
1980-1981	4259	994	3265	38.97
1982-1983	4688	1222	3466	38.80
1987-1988	6234	1825	4409	42.96
1999-2000	12499	4436	8063	59.39

exported about 4.4 million tons and export ratio to total production will be up to 35.5% over the period.

Other Liquid Cargo

Table 17 shows the supply-demand of edible oil. During the past 10 years, both of production and consumption steadily increased at a rate of 13.5% per annum and 18.6% per annum respectively. At present, import ratio to total consumption is over 50%. In absolute terms, domestic production is 5 million tons and consumption is 11.1 million tons in 1980–81. However, up to the year 1999–2000 production is expected to increase at a rate of 8.5% per annum as against 5.3% per annum in consumption. As a result, import volume will be remain almost constant at a level of a little over 6 million tons.

With regard to molasses, total production is not known, it is therefore projected directly for export volume which is shown in Table 18 based on the relation to sugarcane production. The resulting trade of molasses will increase from 265 thousand tons in 1980–81 to 406 thousand tons in 1987–88, 577 thousand tons in 1999–2000.

Table 17 Projection of Seaborne Trade (Edible Oil & Tallow)

YEAR	PRODUCTION (1000TON)	IMPORT (1000TON)	CONSUMPTION (1000TON)	PER CAPITA CONSUMPTION (KG)
1971-1972	162	77	239	3.76
1972-1973	182	67	249	3.81
1973-1974	225	162	387	5.74
1974-1975	272	196	468	6.73
1975-1976	277	268	545	7.60
1976-1977	326	345	671	8.98
1977-1978	360	291	651	8.53
1978-1979	422	458	880	11.18
1979-1980	452	511	963	11.86
1980-1981	505	608	1113	13.28
1982-1983	551	632	1183	13.24
1987-1988	979	685	1664	16.21
1999-2000	2364	636	3000	22.10

Table 18 Projection of Seaborne Trade (Molasses)

YEAR	EXPORT (1000TON)	PER CAPITA EXPORT (KG)
1971-1972	185	2.9
1972-1973	96	1.5
1973-1974	124	1.8
1974-1975	111	1.6
1975-1976	127	1.8
1976-1977	169	2.3
1977-1978	421	5.5
1978-1979	416	5.3
1979-1980	212	2.6
1980-1981	265	3.2
1982-1983	302	3.4
1987-1988	406	4.0
1999-2000	577	4.3

III. MICROSCOPIC TRAFFIC DEMAND

Introduction

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III. MICROSCOPIC TRAFFIC DEMAND

Introduction

This report will complement the chapter of Microscopic Traffic Demand Forecasting in the main text.

It will include the subjects, mainly concerned with the present traffic estimates, because so many basic traffic data had been found to be lacking. Present traffic situation will be also analyzed. Future desire lines and the results of land traffic comparison with Thailand will be shown.

Comprehensive OD tables will be displayed in the Annex.

1. Present Road Traffic Estimates

1-1 Methodology

It is to be mentioned that there is no regular and reliable sources of information on road traffic which is indispensable together with that on railways for the comprehensive transport plan.

It is recommended that the regular survey on road traffic should be carried out and kept as the statistics for such purposes.

The relevant data available for estimation of road traffic volumes are (1) Traffic counts, (2) Number of vehicle on road, and (3) Fuel consumption.

In this study, estimation by traffic counts was adopted and processed, and the results were cross checked with reference to data (2) and (3).

The data applied in this study are the average daily traffic with six vehicle categories assembled by the four provinces on the traffic counts of the 350 survey stations out of total 500 complied by the Punjab Highway Department for the period of 1975–80.

Because of the reason that there are very few stations conducting successive observation for this period except Punjab, and therefore, interpolation and extrapolation have been applied to traffic counts estimate for those stations lacing of observation.

The average daily number of vehicles at each station was multiplied by the length of respective road sections and estimates of vehicle kilometers were prepared which were then multiplied by the load factor observed in Road OD Survey (NTRC, 1979–80).

1-2 Results

The results of estimation for vehicle kilometers, passenger kilometers and ton kilometers are shown in Table 1-1. It is pointed out that the increase in ton kilometers is larger (annual growth rate = 12%) and the increase in passenger kilometers is smaller (annual growth rate = 6%) compared with those derived by projection for 1975–80 shown on Fifth Five Year Plan.

1-3 Cross Check

POL consumption for transport sector is shown in Table 1-2. M.S. and H.O.B.C. are consumed mainly by motor cars and H.S.D. is by buses and trucks.

Assuming average fuel consumption of 10 miles/gallon (3.5km/l) for buses and trucks, the total H.S.D. that would be required for the estimated vehicle kilometers are 677 (1066) thousand tons in 1975 (1980). It is 75(71)% of total H.S.D. available for road vehicles in 1975 (1980). The balance may be accounted for urban transport, and other than buses and trucks. The annual growth rate of vehicle kilometers for motor cars is 13% for the period of 1975–1980, compatible with 11% of the growth rate of M.S. consumption. The vehicle kilometers estimated by traffic count data is at large corresponding to fuel consumption.

The average annual kilometers obtained from traffic count data by dividing the vehicle kilometers by the numbers of vehicles on road are 16, 63 and 96 thousand kilometers for motor cars/wagons, buses and trucks, which can be regarded as reasonable.

2. Present Land Traffic Estimates

2-1 Methodology

(1) Road OD

NTRC had carried out the Road OD Survey, which is noted as below:

	Period	Number of stations	Observation hours	Number of vehicles, interviewed
Round-I	July 1979–Mar. 1980	106	24	110,751
Round-II	Apr. 1980–Nov. 1980	98	24	101,436

The above data was processed to construct vehicle OD tables, commodity OD tables and passenger OD tables, as follows:

(1) Modification with sampling rate by station.

(2) Selections of stations relevant to each zones.

(3) Conversion to weight unit from cubic feet, number and gallons for some commodities.

(4) Re-categorization of commodity and passenger.

(5) Average for Round-I and Round-II.

Table 1-1 Road Transport Volume

			1975	1976	1977	1978	1979	1980
Motor Car Wagon	Vehicle	km/day ('000')	3,351	3,619	4,082	4,815	5,482	6,084
	Passenger	km/year (million)	6,996	7,556	8,522	10,053	11,445	12,702
Bus	Vehicle	km/day ('000')	3,018	3,155	3,293	3,366	3,539	3,803
	Passenger	km/year (million)	42,289	44,209	46,143	47,166	49,590	53,289
Motor Car & Bus	Passenger	km/year (million)	49,285	51,765	54,665	57,219	61,035	65,991
Truck	Vehicle	km/day ('000')	4,981	5,517	5,942	7,189	8,241	8,782
	Ton	km/year (million)	10,327	11,438	12,319	14,904	17,085	18,207

Note: Load Factor –
1) Motor Car/Wagon 5.72 Passengers/Vehicle
2) Bus 38.39 Passengers/Vehicle
3) Truck 5.68 Tons/Vehicle

Source: Study Team Estimates based upon Traffic Count Data.

Table 1-2 Pol Consumption (Transport Sector)

(Metric Tons)

Product/Year	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80
Aviation Fuels	188,547	155,527	190,161	217,328	240,367	259,851	290,293	334,676	345,694
M.S	261,208	256,506	249,343	268,826	278,466	289,757	343,506	390,761	426,271
H.O.B.C	53,185	58,251	59,888	66,158	74,452	84,186	101,455	114,712	115,983
H.S.D.	582,733	670,800	721,672	821,651	899,547	933,973	1,101,884	1,325,732	1,497,736
L.D.O	2,341	7,403	4,429	3,523	4,876	6,400	12,194	6,796	3,745
F.O	28,188	34,487	33,201	39,263	38,738	42,872	58,508	50,919	51,202
TOTAL:	1,116,175	1,182,974	1,258,694	1,416,749	1,536,446	1,617,039	1,907,840	2,223,596	2,440,631

Source: N.T.R.C.

Note:
M.S. Motor Spirit
H.O.B.C. High Octane Benzine Co.
H.S.D. High Speed Diesel (including tractor)
L.D.O. Low Diesel Oil
F.O. Furnace Oil

The results of Road OD Survey are summarized in Table 2-1 and Table 2-2, which show the load carried, number of vehicles and average load for commodity and passenger, respectively.

Table 2-1 Average Load Factor for Road OD Survey

(Tone/Day)

Type of commodity	Round-I			Round-II			Average		
	Load carried	No. of vehicles	Average load	Load carried	No. of vehicles	Average load	Load carried	No. of vehicles	Average load
1. Wheat	3,505	343	10.22	3,654	360	10.15	3,580	352	10.17
2. Rice	9,247	959	9.64	2,799	219	12.78	6,023	589	10.23
3. Cotton	5,110	714	7.16	4,137	540	7.66	4,624	627	7.37
4. Edible Oil	853	108	7.90	1,652	192	8.60	1,253	150	8.35
5. Sugar	1,099	122	9.01	715	72	9.93	907	97	9.35
6. Cement	4,898	440	11.13	5,244	474	11.06	5,071	457	11.10
7. Fertilizer	4,396	484	9.08	4,666	403	11.58	4,531	444	10.20
8. Iron & Steel	2,215	269	8.23	1,960	232	8.45	2,088	251	8.32
9. Mining	31,048	3,364	9.23	34,221	3,550	9.64	32,635	3,457	9.44
10. Coal & Coke	7,745	790	9.80	7,040	711	9.90	7,393	751	9.84
11. Petroleum	6,968	865	8.06	9,065	1,018	8.90	8,017	942	8.51
12. Firewood	1,890	221	8.55	2,072	252	8.22	1,981	237	8.36
13. Sugar Cane	2,944	404	7.29	1,982	245	8.09	2,463	325	7.58
14. Fruits & Vegetables	9,661	1,214	7.96	11,140	1,359	8.20	10,401	1,287	8.08
15. Live Stock	2,166	807	2.68	1,322	693	1.91	1,744	750	2.33
16. Others	37,172	4,829	7.70	30,690	4,064	7.55	33,931	4,447	7.63
17. Sum (Loaded)	130,903	15,933	8.22	122,380	14,385	8.51	126,642	15,159	8.35
18. Empty	–	11,128	–	–	11,161	–	–	11,145	–
19. Sum	180,903	27,061	4.84	122,380	25,546	4.79	126,642	26,304	4.81

Source: JICA Study Team Estimation from Road OD Surveys.

Table 2-2 Average Passenger Loads for Road OD Survey

(Passengers/Day)

Type of vehicle	Round-I			Round-II			Average		
	No. of pas-sengers	No. of vehicles	Average pas-sengers	No. of pas-sengers	No. of vehicles	Average pas-sengers	No. of pas-sengers	No. of vehicles	Average pas-sengers
Bus	558,271	14,503	38.49	605,112	15,803	38.29	581,692	15,153	38.39
Mini Bus/Wagon	41,425	3,491	11.87	53,044	4,443	11.94	47,235	3,967	11.91
Car/Jeep/Taxi	57,659	14,752	3.91	56,831	13,875	4.10	57,245	14,314	4.00
Sum	657,335	32,746		714,967	34,120		686,151	33,433	

Source: JICA Study Team Estimation from Road OD Surveys.

Note: Average passengers for car seem to be high.
This is partly because of misclassification of vehicle, and average passengers become 3.21, if misclassification were corrected.

Road OD tables were cross-checked from the viewpoint of national total of road traffic volume, as the following.

Vehicle OD, Commodity OD and Passenger OD tables were multiplied by distances between zones, which was calculated with minimum time path method and were compared with the national totals for road traffic shown in previous section.

Table 2-3 Road Traffic Volumes

		Based 1) on traffic counts	Based 2) on OD Tables	Ratio 2)/1) × 100 (%)
Motor Car Wagon	Vehicle Km/day ('000')	6084	3118*	51
	Passenger Km/year (Million)	12702	6082	48
Bus	Vehicle Km/day ('000')	3803	2262	59
	Passenger Km/year (Million)	53289	31635	59
Motor Car & Bus	Vehicle Km/day ('000')	9887	5380	54
	Passenger Km/year (Million)	65991	37717	57
Truck	Vehicle Km/day ('000')	8782	7114	81
	Ton Km/year (Million)	18207	16462	90

* Including pick-up/vans.

It is found that results of OD tables are less than the results of traffic counts. This is because the Road OD Surveys were carried out on the boundary of districts and do not include the intra-district traffics. This phenomenon is distinct, particularly for passengers, and it might be necessary to add the intra-district traffics in the stage of the traffic assignment for road planning.

(2) Railway OD

Railway commodity OD between stations are available by month (see Table 2-4). The seasonal fluctuation is large for the agricultural products, and July '80 and January '81 were selected as typical months.

The data on commodity OD were processed to construct commodity OD tables, as the following:

Table 2-4 Railway Commodity Carried by Month

(Unit in '000' QTLS = 100 ton)

Commodity	Total	July,80	Aug.80	Sep,80	Oct,80	Nov,80	Dec,80	Jan,81	Feb,81	Mar,81	Apr,81	May,81	Jun,81
1. Coal,Coke,Fuel	3,300	136	168	244	343	311	254	252	361	357	404	367	412
2. POL (B)	8,724	881	659	834	696	707	744	730	640	716	631	1,191	1,095
3. Furnace Oil	1,885	126	89	89	177	113	157	229	300	185	166	159	174
4. Firewood	3,252	278	304	283	420	404	257	191	242	350	320	203	195
5. Paddy, Rice	5,395	198	135	63	70	361	1,212	895	748	606	576	349	181
6. Other Rains	105	16	2	1	3	4	2	9	13	14	17	9	15
7. Oil Seeds	24	3	1	2	-	7	6	4	-	0	-	-	1
8. Wheat	8,091	1,575	1,207	548	967	349	84	266	406	616	473	689	911
9. Wool	11	1	1	1	1	1	2	1	1	0	0	1	0
10. Gypsum	325	73	69	9	16	27	28	31	6	16	25	25	21
11. Ballast	552	46	21	43	77	75	55	50	12	52	34	66	20
12. Salt - Hoch	2,599	181	173	189	198	230	239	272	217	296	228	195	180
13. Sugar	1,541	389	196	226	181	26	45	22	53	23	92	114	173
14. Timber	817	83	80	86	66	63	59	48	60	75	73	72	52
15. Metallic Ores	113	7	6	9	13	15	2	3	6	18	6	17	12
16. Hides, Skins	0	-	-	-	-	-	-	-	-	-	-	0	-
17. Cotton Raw	938	10	1	2	5	71	128	197	226	210	71	13	2
18. POL (C)	335	31	0	15	42	40	33	30	28	29	29	29	29
19. POL (A)	3,783	290	261	309	277	291	327	438	361	295	252	312	374
20. Cement	6,899	523	539	568	648	758	462	663	420	723	942	801	792
21. Cotton	10	1	1	1	1	0	0	1	*	0	3	0	1
22. Grass dry	700	50	46	71	83	66	80	74	57	63	39	25	44
23. Fruits, Vegetable	0	-	-	-	-	-	-	-	-	0	-	-	-
24. Malasses	15	-	-	-	15	-	-	-	-	-	-	-	-
25. Jagree	6	0	-	-	0	0	0	2	1	1	0	1	0
26. Fertilizers, Phosphate.	10,713	706	817	1,132	998	1,147	1,426	1,429	956	547	695	558	301
27. Jute	120	2	2	1	2	31	23	13	14	10	6	10	7
28. Iron Steel (A)	244	6	11	9	18	30	15	12	39	38	28	29	9
29. Iron Steel (B)	51	6	13	3	0	2	0	20	-	1	3	0	2
30. Iron Steel (C)	49	5	2	0	0	3	0	2	10	2	4	16	4
31. Machinery (General)	148	12	20	7	10	5	10	12	9	21	14	23	6
32. Machinery (Electrical)	21	3	0	3	2	0	2	3	2	2	1	1	0
33. Tobacco Manufacture	146	9	14	23	15	6	10	10	13	11	9	5	22
34. Edible Oils (D)	216	1	4	18	30	36	12	44	3	19	25	20	3
35. Sugarcane	168	-	-	-	-	23	40	34	31	21	19	0	-
36. Miscellaneous Commodities	5,372	340	405	357	918	507	391	425	433	361	481	424	332
37. Military Traffic	5,003	469	471	441	586	677	-	-	625	649	-	645	439
38. Livestock.	185	9	12	13	11	17	19	23	17	17	18	18	13
39. Coal, Coke for Railway.	57	1	1	-	0	0	2	11	19	8	4	3	7
40. Other revenue storage.	6,032	251	479	609	558	557	461	505	444	412	444	545	768
41. Railway materials	417	4	1	0	-	-	-	-	62	17	53	4	276
42. Coal, Coke for foreign railway	1	-	1	-	-	-	-	-	-	-	-	-	-
43. Capital Ballast	3,115	22	57	223	650	241	167	248	291	574	-	554	90
44. Revenue Ballast	8,867	847	1,087	822	551	698	481	580	386	527	539	1,547	810
45. Imprest stores	2,561	194	163	291	254	187	252	234	209	178	231	183	185
46. Motor Cars, Tractors.	60	6	2	9	3	9	4	8	4	5	4	5	1
47. Electric Fans, TV Sets etc.	33	1	0	0	3	5	2	2	2	0	1	13	2
48. Salt NDC	124	7	16	10	11	11	7	0	12	13	14	6	8
49. Rock Phosphate	1,479	209	2	-	145	105	158	194	122	0	177	118	249
50. Lubricating Oil	422	43	30	39	31	22	34	31	30	32	26	71	34
51. Military Oil	1,032	113	112	139	119	95	-	-	111	115	-	108	119
52. Military Wheat	71	2	0	1	2	6	-	-	8	21	*	7	24
53. Oil Cake	1,383	81	41	14	19	164	184	148	157	194	150	138	93
54. Vegetable Oil	1,402	121	114	142	112	127	157	105	82	119	94	111	117
55. Other Military Stores	14	-	11	-	-	-	-	-	-	-	-	-	3
56. Marble	13	5	1	0	2	-	-	2	2	0	0	-	-
57. Iron Scraps	670	-	-	-	-	-	-	-	77	394	58	47	93
58. --	-	-	-	-	-	-	-	-	-	-	-	-	-
59. H.S.D.Oil for Loco	2,428	107	206	256	219	215	197	191	202	184	206	176	268
60. Oil Fuel for Loco.	5,092	144	521	438	470	308	368	422	605	520	566	575	535
61. Total:-	112,326	8,624	8,576	8,593	10,043	9,147	9,319	9,851	9,160	9,860	8,974	10,677	9,502

Source: Pakistan Railways

(1) Conversion from stations to zones.

(2) Commodity re-categorization.

(3) Addition of July'80 and January '81 data and adjustment to annual volume for 1980/81 by commodity.

Railway passenger OD tables are not available now, and necessary to be estimated.

The station-wise data for number of passengers by classes (1975/76) were processed, together with the number of tickets sold by destination at the major stations (Karachi City, Lahore, Faisalabad, Rawalpindi, Peshawar, Quetta) in January, 1981 as the following:

(1) Conversion from stations to zones.

(2) Passenger re-categorization.

(3) Adjustment to the passengers-carried in Pakistan Railway Year Book for 1980/81.

(4) Distribution with the tickets data and with assumption.

(5) Convergence with Fratar method.

The estimation results were cross checked in terms of passenger km and distribution by distance, which are compiled by Pakistan Railways.

Table 2-5 Comparison between Actual and Estimation for Railway Passenger

	Lower class		Upper class	
	Actual	Estimation	Actual	Estimation
Passenger km (Million)	15,824	15,883	487	457
Passenger ('000')	122,600(100)	122,600(100)	602(100)	602(100)
0–100 kg (%)	92,370 (75)	91,438 (75)	9 (2)	18 (3)
100–500 km (%)	20,444 (17)	23,126 (19)	212 (35)	233 (39)
500 km– (%)	9,786 (8)	8,036 (6)	381 (63)	351 (58)

Source: Actual (Pakistan Railways)
Estimation (JICA Study Team, base on OD tables)

It was found that the estimation results are quite consistent with the actual one, as shown in Table 2-5.

2-2 Results

(1) Passenger

Present passenger traffic estimates are summarized in Table 2-6, where both traffics excluding and including the intra-zonal traffic are shown. This study is, mainly, focused on the inter-zonal traffics and the intra-zonal traffics are neglected in general.

Fig. 2-1 and Fig. 2-2 show the modal split by distance, and desire lines for road and rail, respectively. It is clearly seen that road carries the shorter distance trips and rail carries the longer distance trips.

(2) Commodity

Present commodity traffic estimates are summarized in Table 2-7, where both traffics excluding and including the intra-zonal traffic are shown. Different from the passenger traffic, the portion of the intra-zonal traffic is small.

Table 2-6 Present Passenger Traffic Estimates

			Sum	Lower class	Upper class
Passenger ('000')	I	Sum	281,251(100.0)	246,896(100.0)	34,356(100.0)
		Road	227,737(81.0)	193,977(78.6)	33,761(98.3)
		Rail	53,514(19.0)	52,918(21.4)	596(1.7)
Passenger-km (million)	I	Sum	51,539(100.0)	46,018(100.0)	5,522(100.0)
		Road	36,590(71.0)	31,525(68.5)	5,064(91.7)
		Rail	14,950(29.0)	14,492(31.5)	457(8.3)
	II	Sum	82,302(100.0)	69,113(100.0)	13,189(100.0)
		Road	65,991(80.2)	53,289(77.1)	12,702(96.3)
		Rail	16,311(19.8)	15,824(22.9)	487(3.7)

Note: I (Based on OD tables, excluding intra-zonal traffic)
II (Including intra-zonal traffic)

Source: JICA Study Team estimation

Fig. 2-1 Passenger Share between Road and Railway by Distance

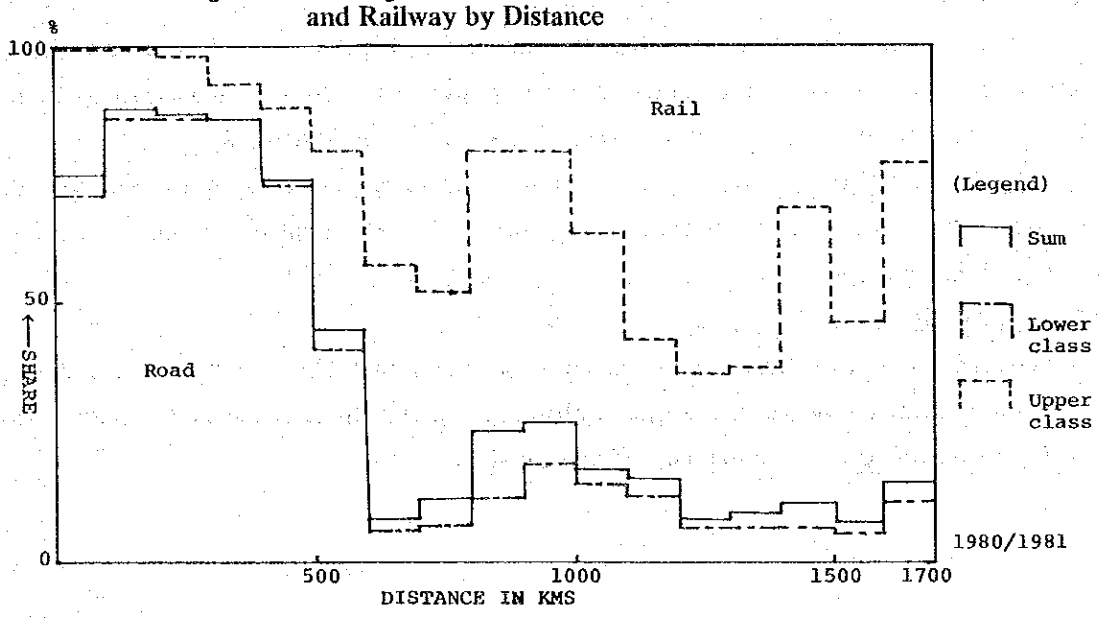
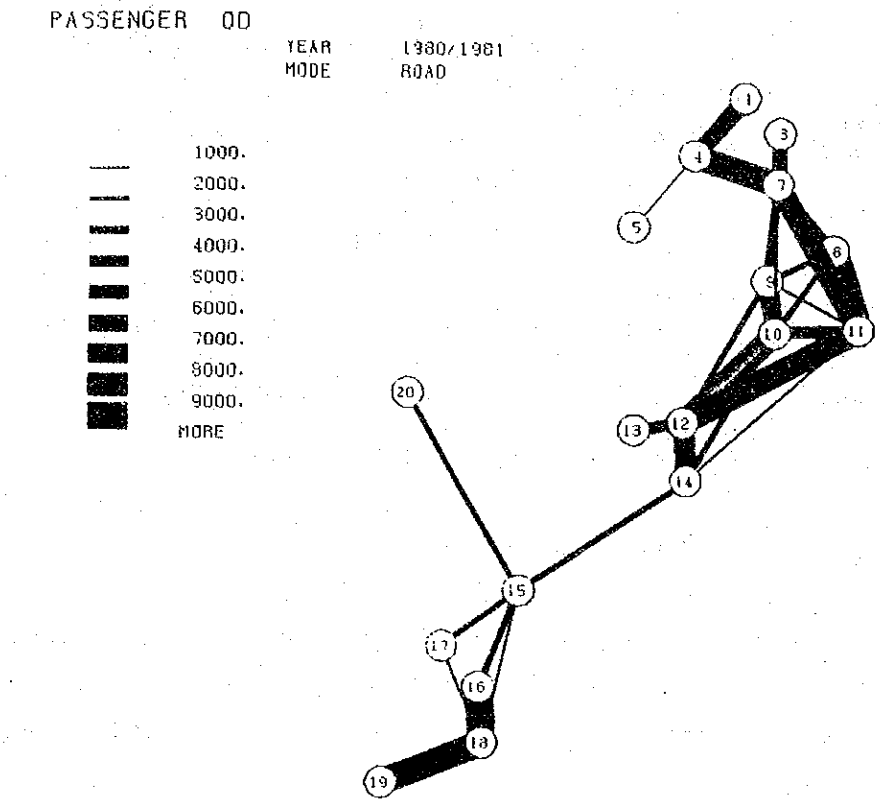


Fig. 2-2 Desire Lines for Passenger



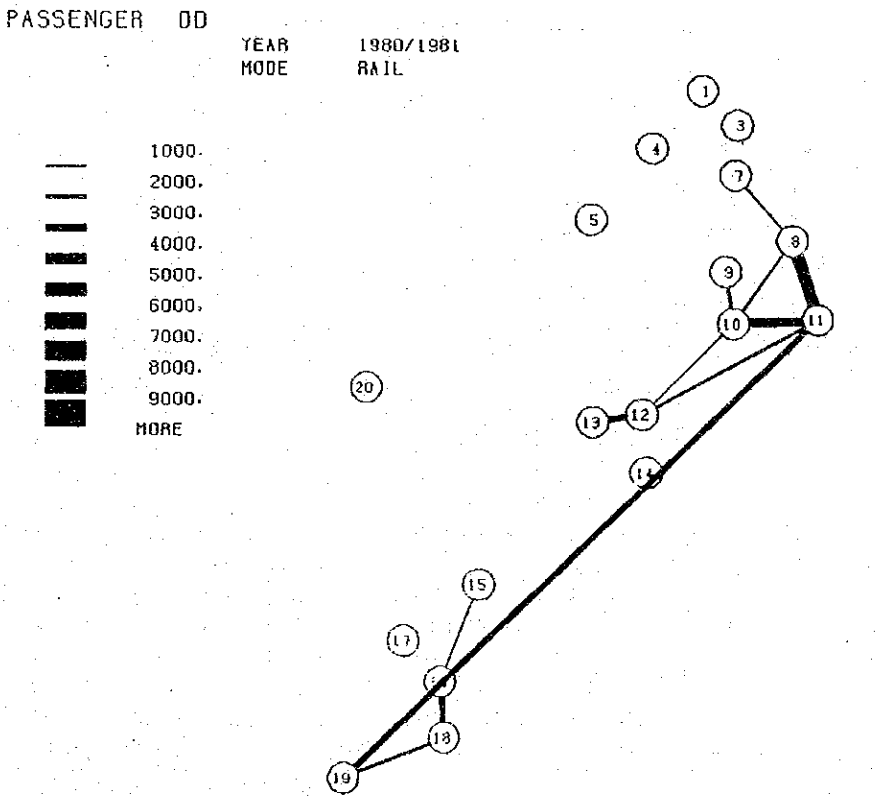


Table 2-7 Present Commodity Traffic Estimates

		I	II
Ton ('000')	Sum	53,986(100.0)	———
	Road	43,583 (80.7)	
	Rail	10,403 (19.3)	
Ton·km (million)	Sum	24,561(100.0)	26,125(100.0)
	Road	16,514 (67.2)	18,207 (69.7)
	Rail	8,047 (32.8)	7,918 (30.3)

Note: I (Based on OD tables, excluding intra-zonal traffic)
II (Including intra-zonal traffic)
As for railway, the difference between I and II comes from statistical reason.

Source: JICA Study Team estimation

Table 2-8 shows the modal split between road and railway by commodity. In terms of ton·km, railway carries more than road for wheat, sugar, cement, fertilizer, petroleum and rock phosphate. Major commodities for road are mining, fruits & vegetables and general cargos.

Table 2-8 Modal Split by Commodity

(1980 / 1981)

Commodity	Ton ('000')			Ton·km (million)		
	Sum	Road	Rail	Sum	Road	Rail
1 WHEAT	2,014	1,227 (60.9)	738 (59.1)	796	320 (40.2)	476 (59.8)
2 RICE	2,684	2,146 (80.0)	538 (20.0)	1,701	1,162 (68.3)	540 (31.7)
3 COTTON	1,749	1,655 (94.6)	94 (5.4)	697	618 (88.7)	79 (11.3)
4 EDIBLE OIL	617	455 (73.7)	162 (26.3)	411	224 (54.6)	187 (45.4)
5 SUGAR	450	309 (68.6)	142 (31.4)	216	54 (29.1)	162 (74.9)
6 CEMENT	2,585	1,819 (70.4)	766 (29.6)	1,056	514 (48.7)	542 (51.3)
7 FERTILIZER	2,702	1,622 (60.0)	1,079 (40.0)	1,751	830 (47.4)	922 (52.6)
8 IRON & STEEL	781	747 (95.7)	33 (4.3)	466	421 (90.4)	45 (9.6)
9 MINING	10,851	10,480 (96.6)	371 (3.4)	2,225	2,072 (93.1)	153 (6.9)
10 COAL & COKE	2,872	2,512 (87.5)	360 (12.5)	1,897	1,514 (79.8)	383 (20.2)
11 PETROLEUM	4,608	2,918 (63.3)	1,691 (36.7)	2,914	1,006 (34.5)	1,908 (65.5)
12 FIREWOOD	1,013	664 (65.5)	349 (34.5)	288	167 (57.8)	122 (42.2)
13 SUGAR CANE	805	805(100.0)	0 (0.0)	161	161(100.0)	0 (0.0)
14 FRUITS & VEGETABLE	3,635	3,635(100.0)	0 (0.0)	1,997	1,997(100.0)	0 (0.0)
15 LIVESTOCK	624	624(100.0)	0 (0.0)	177	177(100.0)	0 (0.0)
16 ROCK PHOSPHATE	148	0 (0.0)	148(100.0)	146	0 (0.0)	146 (100.0)
17 RAILWAY MATERIAL	1,415	0 (0.0)	1,415(100.0)	398	0 (0.0)	398 (100.0)
18 RAILWAY OIL	654	0 (0.0)	654(100.0)	470	0 (0.0)	470 (100.0)
19 OTHERS	13,779	11,965 (86.8)	1,814 (13.2)	6,795	5,278 (77.7)	1,516 (22.3)
20 SUM	53,986	43,583 (80.7)	10,403 (19.3)	24,561	16,514 (67.2)	8,047 (32.8)

Source: JICA Study Team estimation

Fig. 2-3 and Fig. 2-4 show the modal split by distance, and desire lines for road and railway, respectively. It is clearly seen that railway carries the longer distance commodities than road. However, it should be noted that road carries more than half at any distance, if summing up all commodities. It is, therefore, suggested that the long distance commodities should be converted to railway, from the viewpoint of transport cost. It is, also, seen that the flow from down-country to up-country dominates, and this might prevent the efficient transport.

(3) Vehicle OD

Desire lines for vehicle OD are shown in Fig. 2-5 in the passenger car unit (PCU), where one bus or truck corresponds to three cars. It is clearly seen that the longer distance trips are dominated by trucks.

3. Present Sea Traffic Estimates

It is necessary for planning of shipping to grasp the transport volume by commodity and by area, what is called trade matrix. However, present trade matrix is not available in Pakistan. It is, therefore, necessary to estimate the present trade matrix with the relevant data.

	Area j	Σ j
Commodity i	Trade Matrix	Trade by Commodity
Σ i	Trade by Area	

Sea-borne trade at Karachi Port (KPT statistics) gives "Trade by Commodity", and Pakistan's foreign trade by area/country (Port & Shipping Wing) gives "Trade by Area". Some information for trade matrix is obtained from Foreign Trade Statistics (Statistics Division).

Present Trade Matrix was estimated by processing these data as shown in Fig. 3-1.

Trade 3-1 shows the estimation result of present trade matrix.

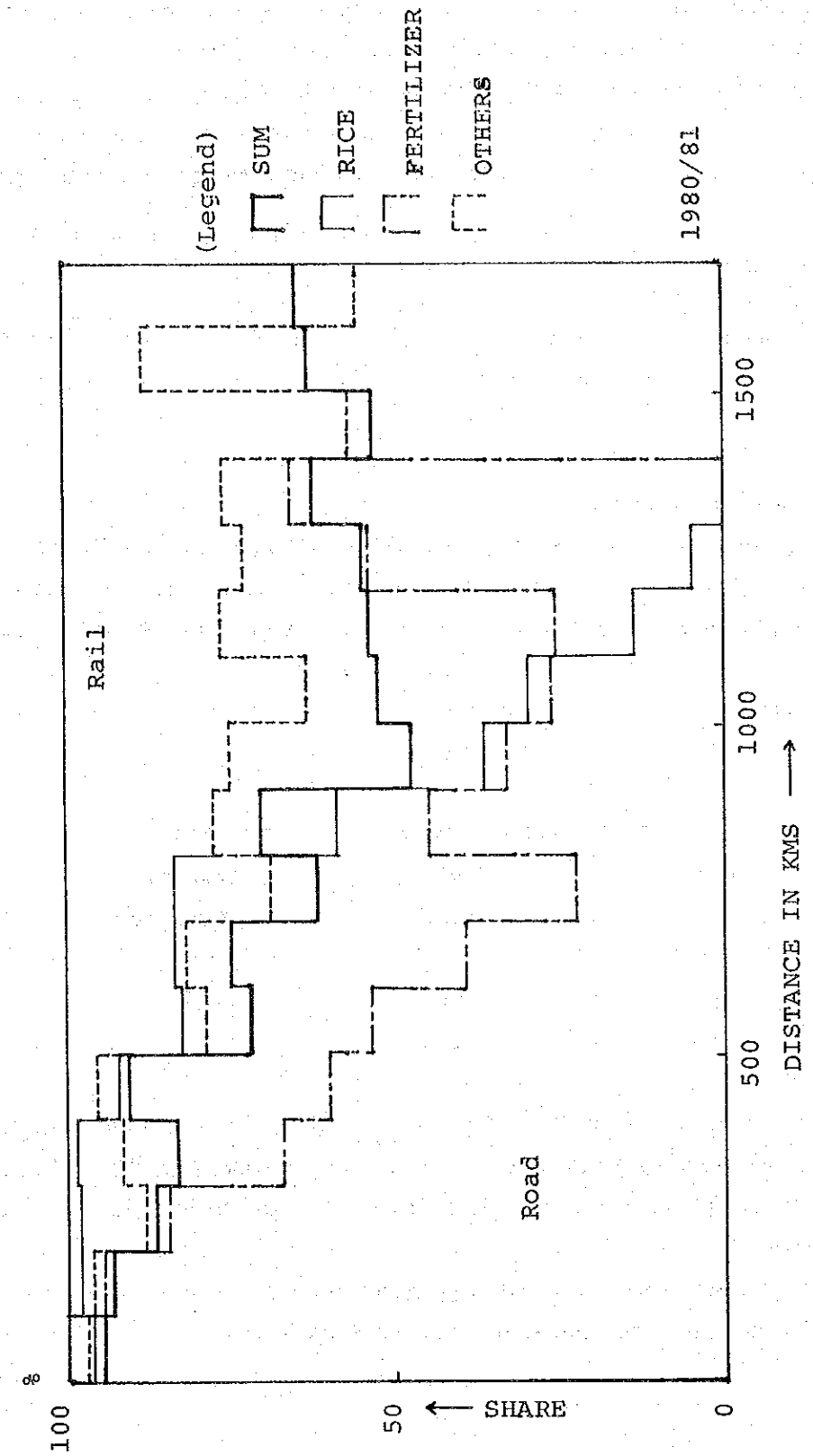
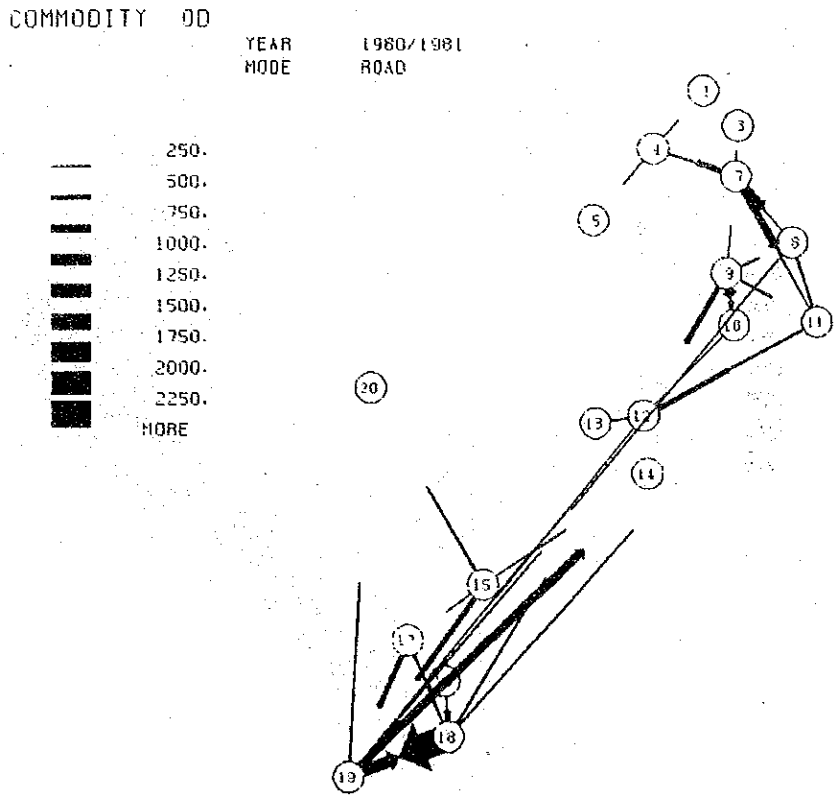


Fig. 2-3 Commodity Share between Road and Railway by Distance

Fig. 2-4 Desire Lines for Commodity



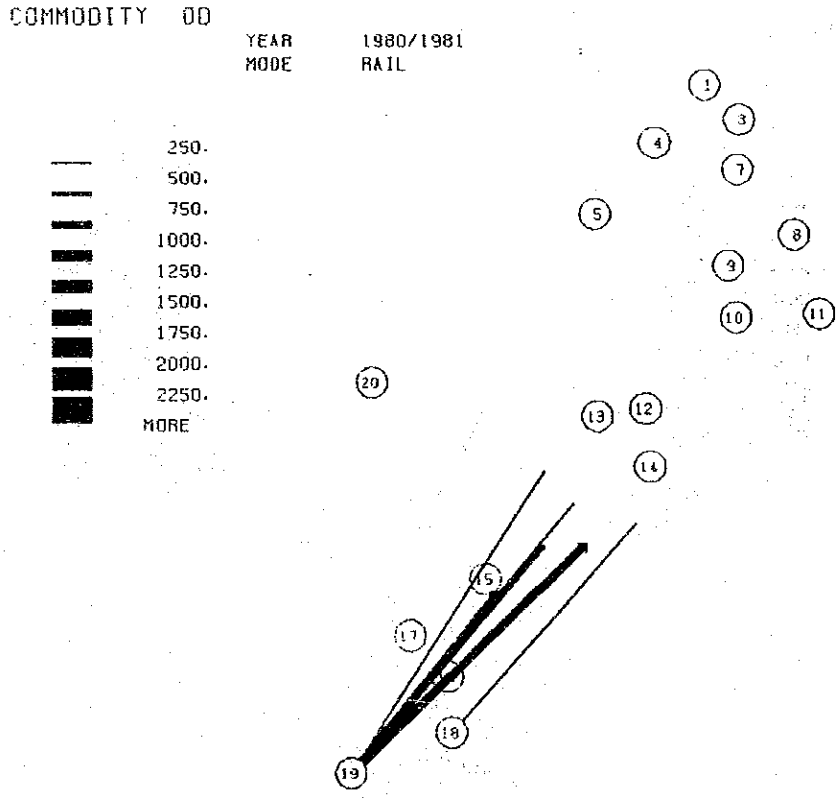
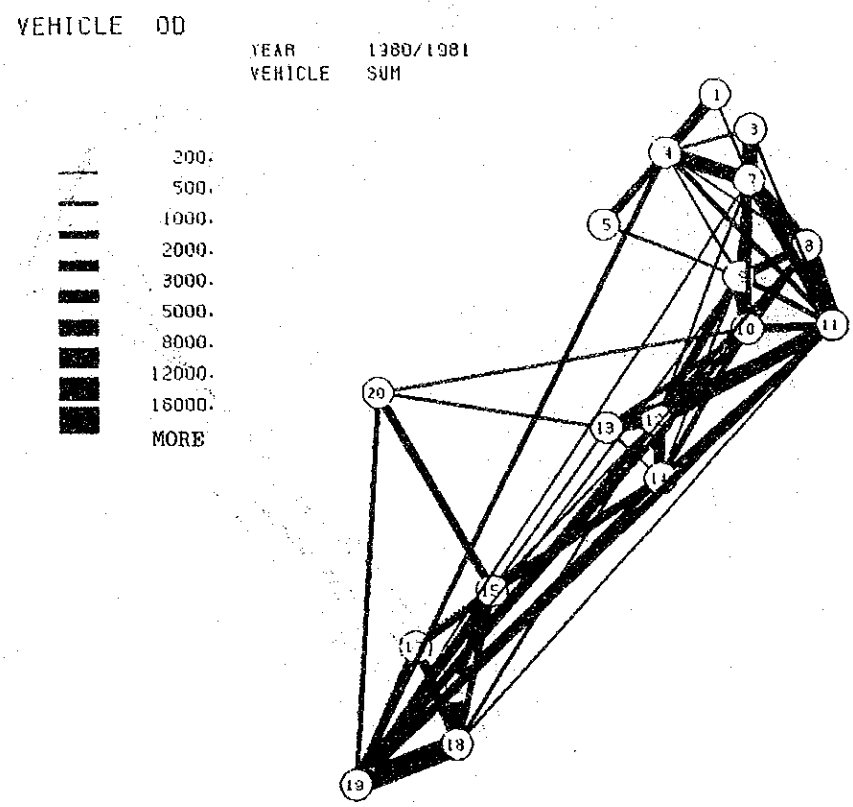


Fig. 2-5(1) Desire Lines for Vehicle



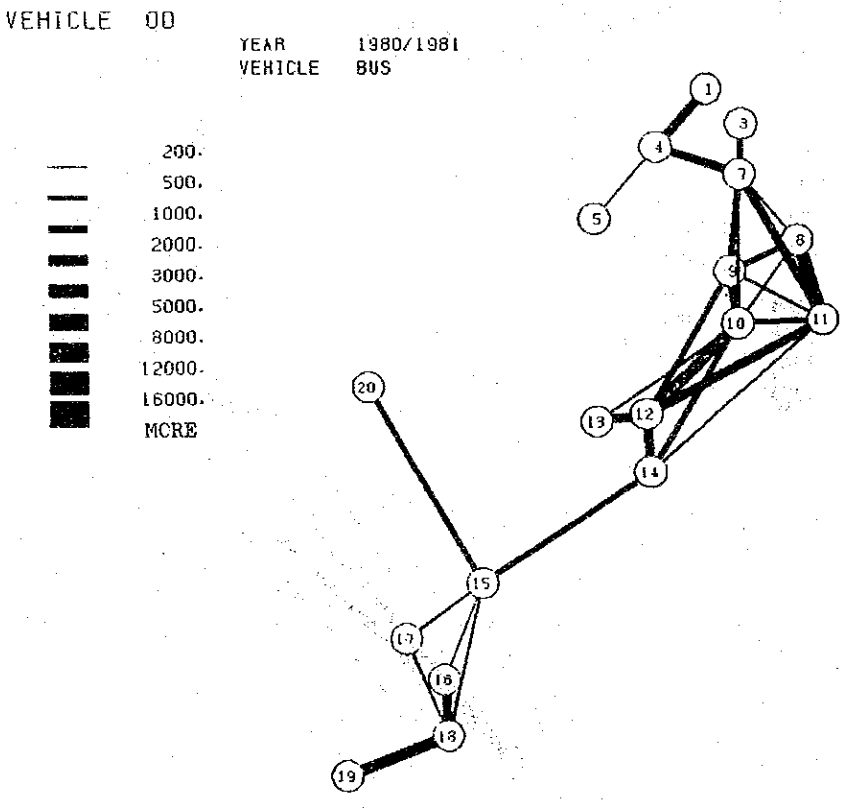
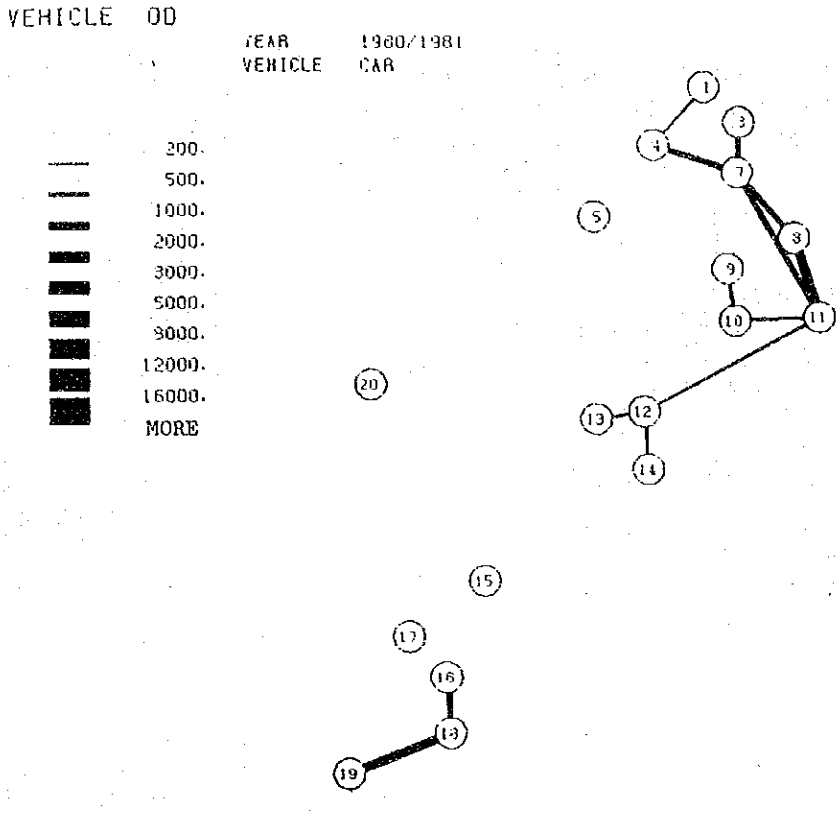


Fig. 2-5(2) Desire Lines for Vehicle



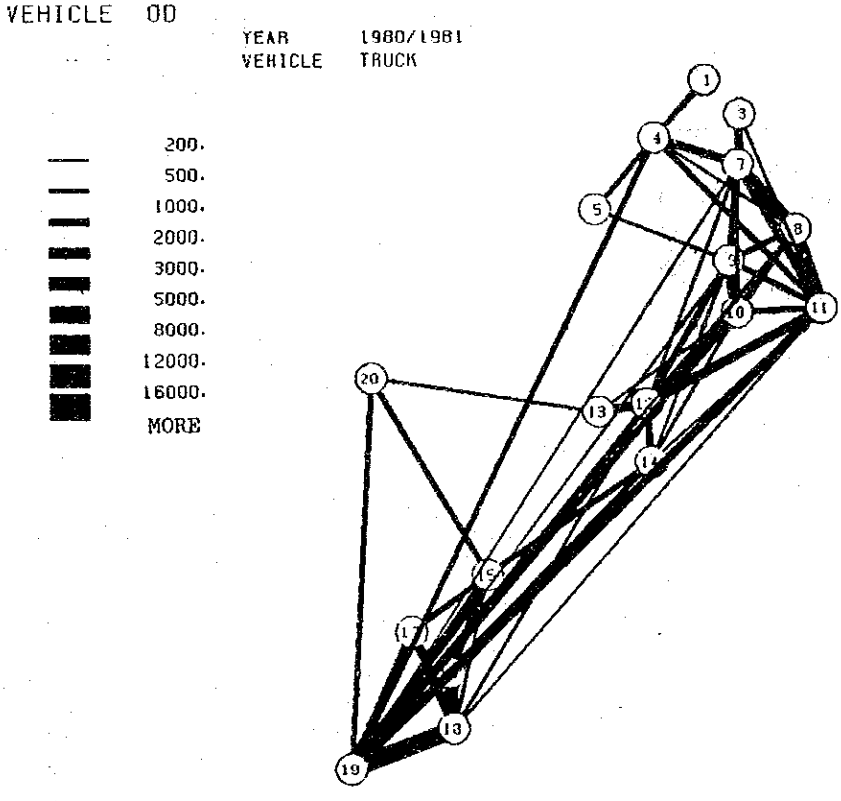


Fig. 3-1 Estimation Flow for Trade Matrix

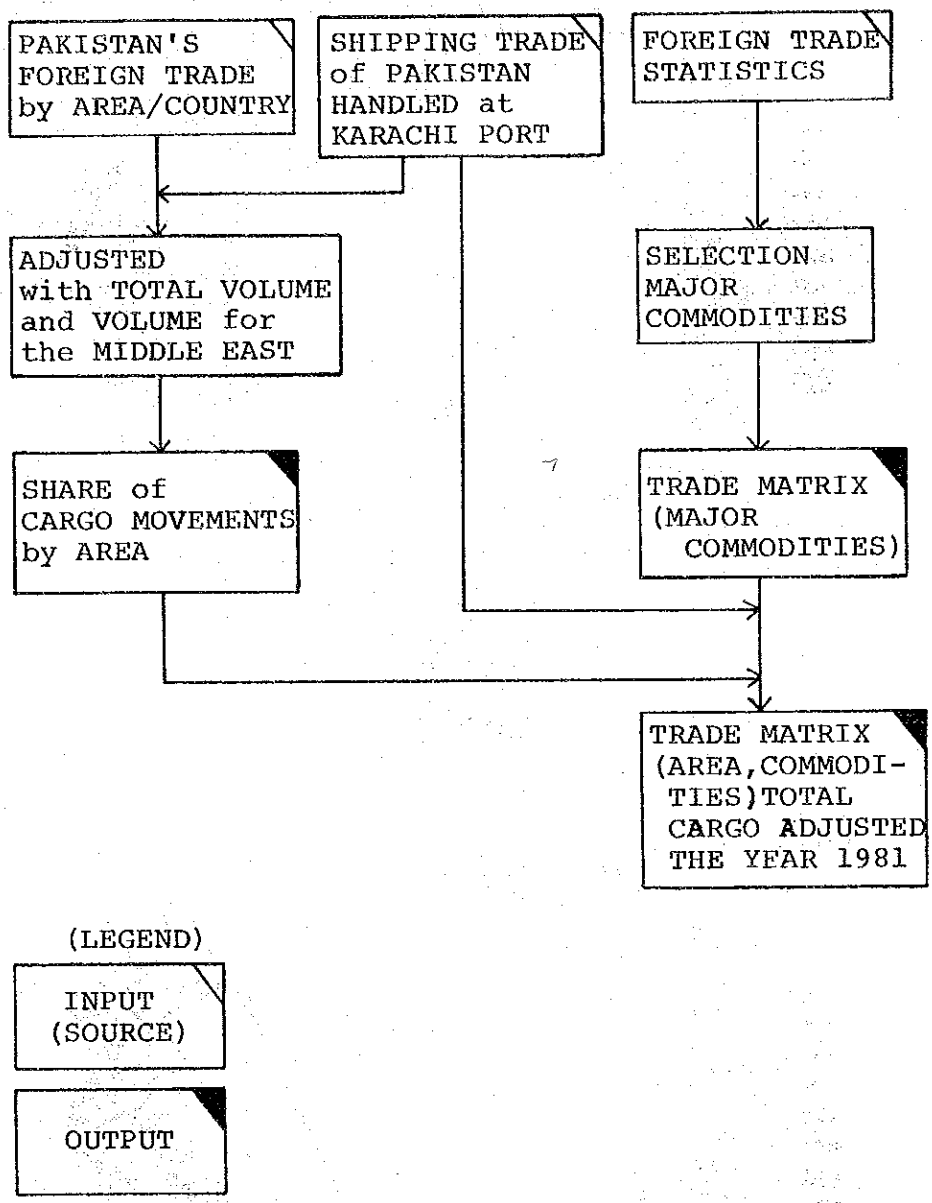


Table 3-1 Pakistan's Cargo Movement by Area and Type of Cargo

Import
1980 / 1981

	1 Europe	2 Asia	3 Middle East	4 Africa	5 South America	6 North	7 Oceania	(Total)
1. Wheat	82.	0.	0.	0.	0.	191.	34.	308.
2. Cement	350.	90.	4.	0.	0.	0.	0.	444.
3. Fertilizers	601.	8.	370.	0.	0.	506.	0.	1485.
4. Rice	0.	0.	0.	0.	0.	0.	0.	0.
5. Coal & Ores	87.	49.	77.	25.	24.	88.	56.	405.
6. Petrols	57.	44.	5494.	0.	0.	3.	0.	5598.
7. Molasses	0.	0.	0.	0.	0.	0.	0.	0.
8. Edible & Tallow	34.	255.	2.	0.	85.	232.	0.	608.
9. Cotton	0.	0.	0.	0.	0.	0.	0.	0.
10. Others	862.	1388.	14.	58.	45.	11.	97.	2475.
(Total)	2072.	1834.	5960.	83.	154.	1032.	188.	11323.

Export
1980 / 1981

	1 Europe	2 Asia	3 Middle East	4 Africa	5 South America	6 North	7 Oceania	(Total)
1. Wheat	0.	0.	0.	0.	0.	0.	0.	0.
2. Cement	0.	0.	0.	0.	0.	0.	0.	0.
3. Fertilizers	9.	5.	7.	0.	0.	0.	0.	21.
4. Rice	25.	103.	428.	545.	155.	1.	0.	1257.
5. Coal & Ores	0.	0.	0.	0.	0.	0.	0.	0.
6. Petrols	0.	477.	447.	0.	19.	0.	51.	994.
7. Molasses	261.	3.	1.	0.	0.	0.	0.	265.
8. Edible & Tallow	0.	0.	0.	0.	0.	0.	0.	0.
9. Cotton	10.	304.	1.	0.	1.	0.	0.	315.
10. Others	254.	52.	298.	0.	1.	162.	0.	767.
(Total)	558.	945.	1182.	545.	175.	163.	51.	3618.