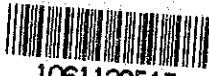


THE STUDY ON
NATIONAL TRANSPORT PLAN
IN THE ISLAMIC REPUBLIC OF PAKISTAN

FINAL REPORT

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

FINAL REPORT

MAY 1983

JAPAN INTERNATIONAL COOPERATION AGENCY

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国際協力事業団	
受入 月日 88.4.7 9225	117
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PREFACE

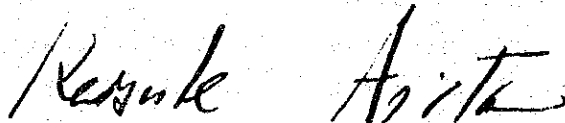
In response to the request of the Government of the Islamic Republic of Pakistan, the Government of Japan decided to conduct a study on the National Transport Plan in the Islamic Republic of Pakistan and entrusted it to the Japan International Cooperation Agency (JICA).

The JICA sent to Pakistan a study team, headed by Mr. Tomoo Yano, several times in the period from December 1981 to May 1983. The study team exchanged views with the officials concerned of the Government of Pakistan on the Project and conducted a field survey all over Pakistan. After the study team returned to Japan, further studies were carried out and the present report has been prepared.

I hope that this report will serve for the development of the transport sector in Pakistan and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the Government of Pakistan for their close cooperation extended to the team.

May 1983



Keisuke Arita
President
Japan International Cooperation Agency

LETTER OF TRANSMITTAL

Tokyo, May 1983

Mr. Keisuke Arita
President
Japan International Cooperation Agency

Dear Mr. President:

It is a great pleasure for me to submit herewith a report on the Study on National Transport Plan in the Islamic Republic of Pakistan.

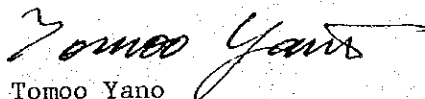
At the request of the Japan International Cooperation Agency, the Japanese study team, headed by the undersigned, conducted a study on this National Transport Plan for a duration of 18 months commencing in December, 1981 in Pakistan and in Japan, in accordance with the Scope of Work and the Inception Report mutually agreed upon between the two Governments of Japan and Pakistan on the 27th September, 1981 and the 10th February, 1982 respectively.

The report is presenting a comprehensive Masterplan for the National Transport Sector for Pakistan and a Plan of Action recommended for implementation by the Government of Pakistan, giving an order of priority for projects within each mode of transport.

On behalf of the Japanese study team, I would like to extend my deepest appreciation to the Government of the Islamic Republic of Pakistan and various agencies and organizations concerned, for their unlimited cooperation, assistance and heart-felt hospitality extended to the team during their stays in Pakistan.

My indebtedness is also great to the Japan International Cooperation Agency, the Ministries of Transport, Construction and Foreign Affairs, the Embassy of Japan in Islamabad, for giving us valuable suggestions and guidances in the field surveys and in preparation of this report.

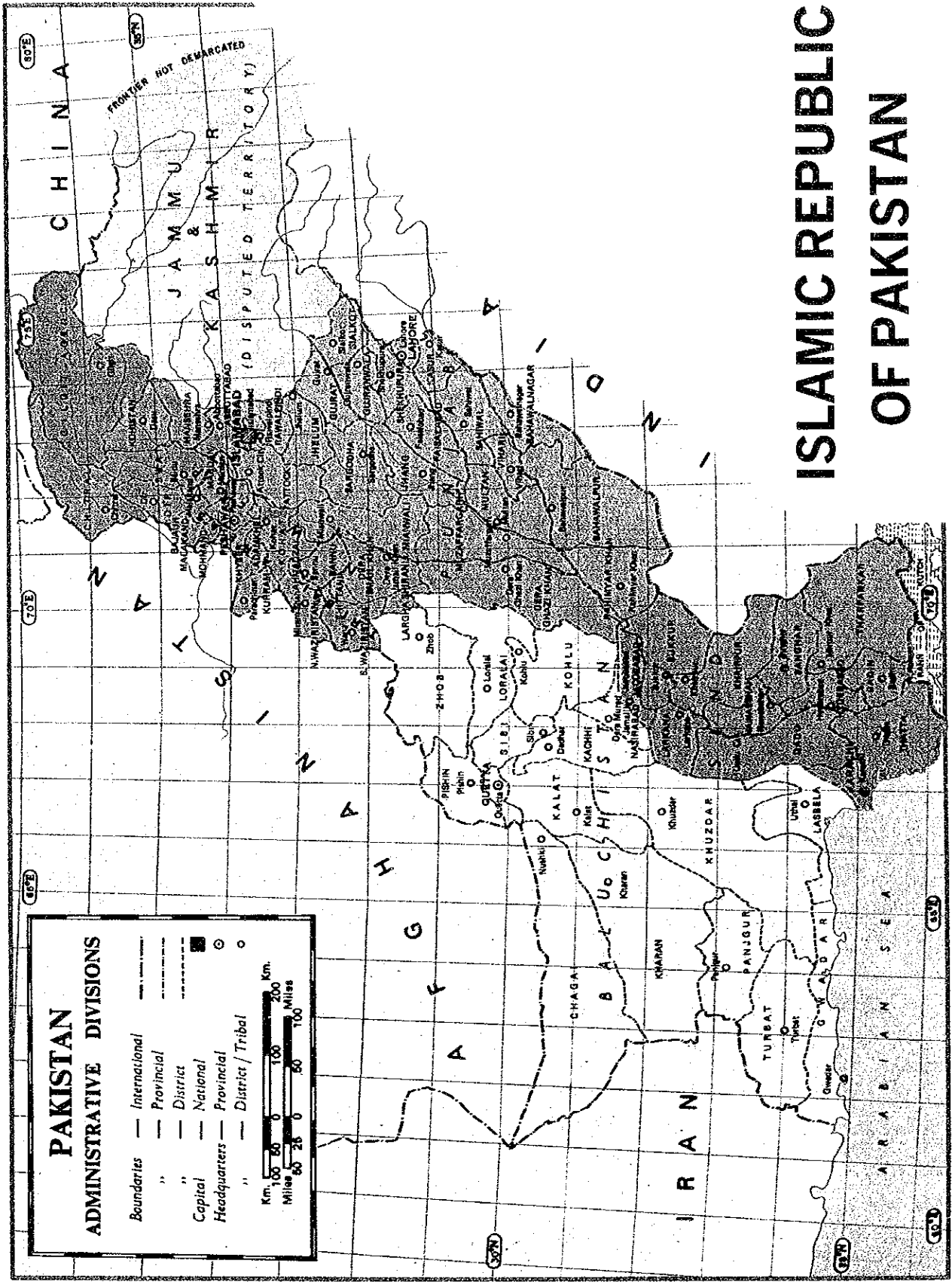
Very truly yours,



Tomoo Yano
Leader

Japanese Study Team on National
Transport Plan in the Islamic
Republic of Pakistan

ISLAMIC REPUBLIC OF PAKISTAN



PAKISTAN

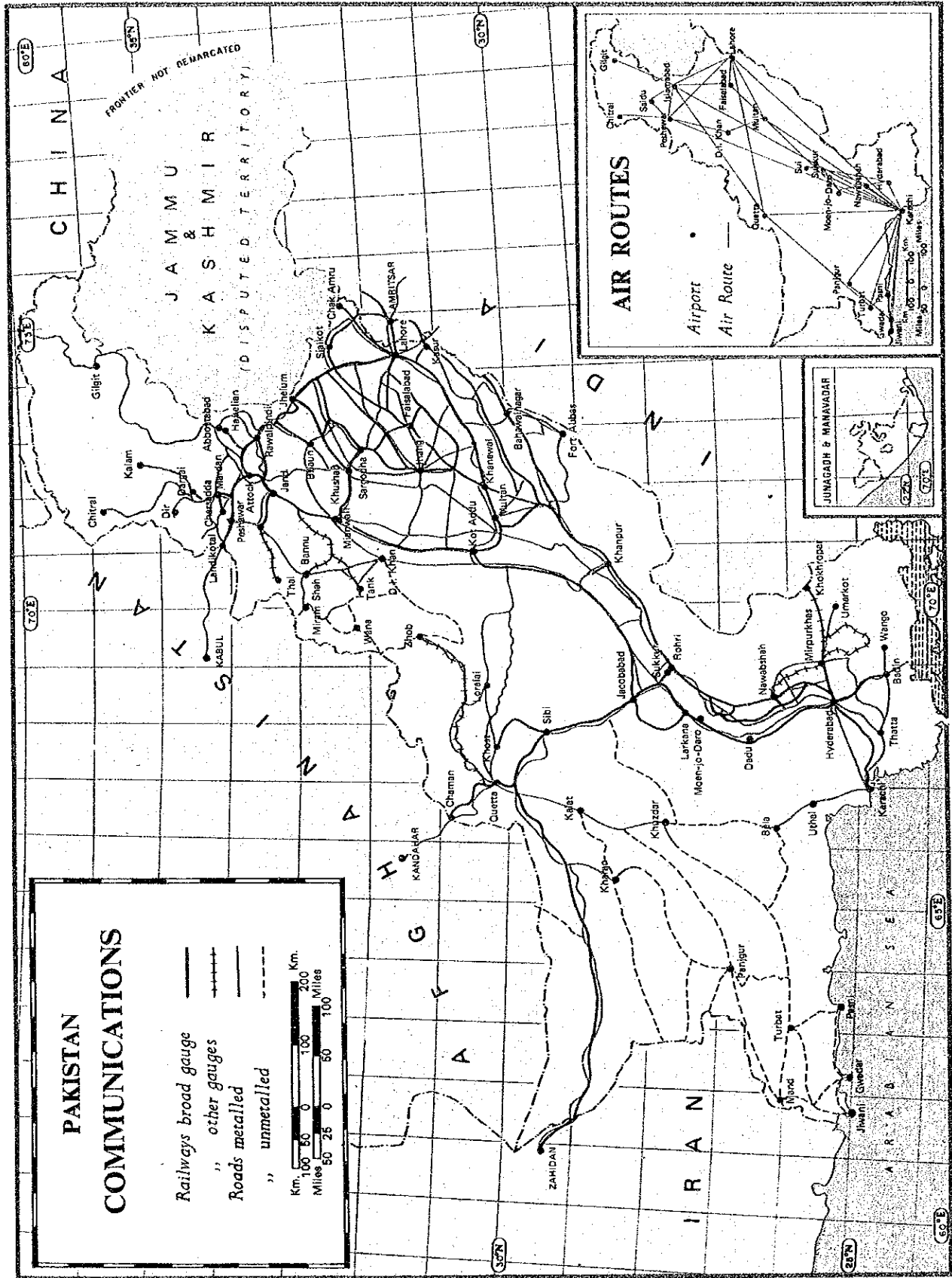
COMMUNICATIONS

Railways broad gauge

 " other gauges

Roads metalled

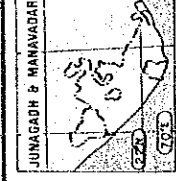
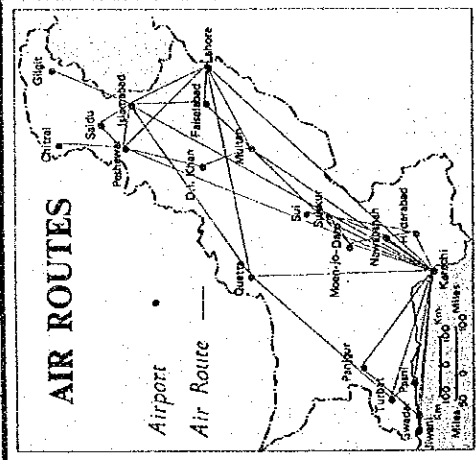
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AIR ROUTES

Airport

Air Route



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Abbreviations of Organizations Concerned in Pakistan

PDD	: Planning and Development Division
MOC	: Ministry of Communications
FD	: Finance Division
MOD	: Ministry of Defence
EAD	: Economic Affairs Division
MOR	: Ministry of Railway
PR	: Pakistan Railway
NLC	: National Logistic Cell
CAA	: Civil Aviation Authority
ADA	: Airport Development Authority
NHB	: National Highway Board
NTRC	: National Transport Research Center
PSW	: Ports and Shipping Wing
KPT	: Karachi Port Trust
PQA	: Port Qasim Authority
PNSC	: Pakistan National Shipping Corporation
NESPAK	: National Engineering Services of Pakistan
PIA	: Pakistan International Airlines
WAPDA	: Water and Power Development Authority

Exchange Rate

US\$1.00 = Rupees 10.0 = Yen 230

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SUMMARY

SUMMARY

I. APPROACHES AND METHODOLOGIES OF THE STUDY

The synopsis of the approaches and methodologies applied in the Study on the National Transport Plan are given hereunder.

1. Objectives of the Study

- 1) Formulate a comprehensive Masterplan for the national transport sector for Pakistan integrating the various modes of transport into an economically optimum transport system with the target year 2000.
- 2) Recommend based on the Masterplan, a Plan of Action for implementation by the Government of Pakistan which would be incorporated to the Sixth Five Year Plan, with the study period of 18 months starting in December, 1981 and completing in May, 1983.

2. Outline of the Study

- 1) Area : Whole area of Pakistan specified by 48 zones.
- 2) Modes of Transport : All modes of transport specified in Inception Report, namely; Road, Road Transport, Railways, Port, Shipping, Airport and Civil Aviation along with brief study on Inland Water Transportation and Pipeline.
- 3) Type of Transport : Cargo and passenger (domestic and international).
- 4) Route : Mainly the national and international trunk routes and inter-regional routes connected with the trunk routes.

3. Approaches and Methodologies Applied for the Study

In order to accomplish the objectives of the study stated in Article 1, with the study scope specified in Article 2 of this synopsis, the following approaches and methodologies are applied.

1) Data Base:

The Team used existing data and maps including the study reports on the transport sector prepared in the past, and conducted field survey insofar as to complement relevancy of existing data, for the past 10 years wherever available up to 1980/81.

2) Approaches and Methodologies:

Because of the reason that transport is an all-pervading industry, penetrating into all phases of production and distribution of goods, and the transport of persons depends on the same sector, the approaches and methodologies are applied as the following steps.

i) Identification of the characteristics and major issues of the existing transport system and its utilization is made by means of the diagnosis of the existing data. Identification is also made by the field survey on each mode and overall system of transport in the country by zone.

The outcome of this identification is to be the basis for determination of the gaps to be defined later between the optimum transport systems for Masterplan and Plan of Action and the existing system.

ii) Since transport is closely inter-related and inter-dependent with each sector of the industry which is the components of GDP and GNP together with population, identification of the potentials of developments in terms of macro and regional economics of the country is made by means of the projections of GDP, production and on population for the year 1999/2000 and 1987/88 based on the analysis of the past development trend by major commodity and by zone. Then, the surplus/deficit analysis of the major commodities for above two target years is made in terms of volumes of cargo and passenger based on the analysis of production/consumption, and export/import.

The outcomes of these projections and analyses are to be used for determination of co-relations between the traffic volumes to be projected.

iii) The macroscopic traffic demand forecast to determine the traffic volume for land, sea and air in passenger and cargo (domestic and international) transport is made by means of analysis of the existing traffic demands with time-series trend and of the outcomes of the macro and regional economic development potentials, for the years 1999/2000 and 1987/88. The data bases are of ADT (average daily traffic) and of O/D (origin/destination) surveys, for domestic traffic in terms of passenger-km and ton-km, and for

international sea and air in terms of number of passenger and volume of export/import cargoes.

Taking into consideration of the result of surplus/deficit analysis and macro and regional economics, the microscopic demand forecast is made by means of the analysis of the outcome of macroscopic traffic projection, with two (2) assumptions on the modal split of road and railway in land transport; one for extension of present pattern and the other for strategic modal split. Along with this modal split, traffic assignment for road is made based on QV curves.

The result of projected traffic volumes of passenger and cargo in the years 1999/2000 and 1987/88 in each zone is to be one of the components for overall and modal development plan for Masterplan and for Plan of Action for the Sixth Five Year Plan in the transport sector.

- iv) Based on the above two outcomes of the study and basic concept for transport planning, formulation of policy and strategy for transport system development is attempted along with two assumptions on modal split between road and railway, namely Alternative A for extension of the development trend between road and railway, and Alternative B for strategic modal split to preferentially allocate cargo from road to railway beyond break-even distance in terms of economic transport cost. Also, the guidelines on the financial framework for Masterplan and Plan of Action are worked out based on analysis of the past development expenditures in the transport sector.
- v) Structuring of the two Alternatives (A and B) of Masterplan are made by integrating the development plan of each mode of transport. Then, based on modal development plan, identification of the projects (mainly those with the development cost of more than Rs. 20 million) to fill in the gap between the transport facilities needed in the year 2000 and the existing facilities is made for each mode of transport. These candidate projects are screened and evaluated in terms of higher economic return. Those projects selected and incorporated in the two Masterplan Alternatives are cross-checked to be within the financial guidelines.

- vi) The evaluation and selection of the two Alternatives to be the optimum Masterplan is made by means of the quantitative analysis on the economics of general transport cost and the amount of energy consumption needed for the overall transport system and some of the qualitative analysis on pollution and traffic accident.
- vii) Based upon the selected Masterplan, a Plan of Action for implementation by the Government of Pakistan to be incorporated in the development of transport sector in the Sixth Five Year Plan is formulated by setting forth the development policy for overall system and for each mode of transport and practical modal development strategy along with the selection of projects with priority rating.

Then, the list of the projects is selected and summarized to indicate the implementation schedule by year and the related budget allocations for each mode of transport.

II. CONCLUSIONS

The conclusions of The Study on National Transport Plan in the Islamic Republic of Pakistan are presented herewith in this chapter.

The conclusions consist of two transport development plans, namely, a comprehensive Masterplan for the National Transport Sector for Pakistan integrating the various modes of transport into an economically optimum transport system with the target year 2000, and a Plan of Action for implementation by the Government of Pakistan to be incorporated in the Sixth Five Year Plan (1983/84 - 1987/88), giving the order of priority for projects within each mode of transport which is being derived from the Masterplan.

For the study, the JICA Study Team headed by Mr. Tomoo Yano visited Pakistan a number of times and conducted the fact-finding researches and analytical works in close cooperation with the Pakistani Counterpart Team headed by Mr. Sadaqat Hasan Mir, Senior Chief, T and C, Planning and Development Division, Government of Pakistan and specialist groups, and practised innumerable trials and verifying calculations for identification of the present situation and projections by application of every available analytical technology as possible, mainly by computer simulations. During these works, useful information and advices were offered by the Counterpart Team members and other experts concerned in the transport sectors in the two countries.

The further analytical works and plannings together with compilation of this report were mainly done in Japan, while the content is the crystal of the enormous joint elaboration of the Pakistan and Japanese specialists. It is also noted that this report was completed with the cooperations and advices of those indirectly concerned in the two nations.

The work flows and the methodologies applied in the study are described in the Inception Report submitted on the 10th February, 1982 and in each pertinent chapter and paragraph of this report. The details of the outputs of the study are shown in the main text, and all the data and analytical works practised for formulation of the two transport development plans are compiled in the Technical Papers of this study.

1. Masterplan

① Environments of Transport System

Pakistan, with an area of 804 thousand square kilometers, population of 83.8 million persons and GDP of Rs. 249.0 billion in 1980/81, has the

transport systems consisting of road, road transport, railway, port, shipping, airport, civil aviation, pipeline and inland water transportation.

The characteristics of the country is roughly described that topography is rather flat with exception of north and west, the country is land-located except to the south, the climate is in general dry and hot with average annual precipitation of 200 to 300 mm and the Indus River flows in the center of the country through Punjab and Sind to form vast alluvial land. The economy is predominantly agricultural with major crops including wheat, rice, sugarcane, cotton, and livestock products. Since Independence, industrialization has been gradually taking place from agro-based industries to some of the technology-oriented industries like steel, cement, fertilizers and other chemicals, although the national economy is suffering from various problems such as low domestic saving and investment, deficit in public financing and balance of payments, unemployment, energy constraint, inadequate physical infrastructure especially in the transport sector and low level of education.

The Government of Pakistan has consistently placed a great emphasis upon the integrated development of socio-economic activities of the nation and in order to strengthen such activities, has been spending about 1% of GDP or about 16% of total public sector investment on the development of transport sector annually.

The most important domestic trunk route among the existing transport system in the country runs along the Indus River and its tributaries from the Afghan border to the sole major port of Karachi connecting Peshawar, Rawalpindi, Lahore, Multan, Sukkur and Hyderabad, along which nearly 80% of the economic activity in terms of production value is concentrated. Therefore, the majority of the transport network has been developed along the trunk route (National Corridor) by means of major highways, road transport operations, railways, airports and airline operations, although their physical infrastructure facilities and equipments need substantial improvement because there has scarcely been major expansion or replacement of each mode of transport.

With regard to the international transport systems, as for sea port, Karachi and Qasim ports are functioning as the major international trading ports mainly for export and import of commodities, and in addition to many of the international shipping lines, national carrier is operating. As for the civil aviation, Karachi, Lahore and Islamabad airports are the major international airports of the country and together with other

international air lines, national flag carrier is functioning to provide the international passenger and cargo services connecting almost all the major cities of the world.

There are three federal ministries which are administering the main four modes of transport, namely Ministry of Communications responsible for road, port and shipping. Ministry of Railways responsible for railway operated by Pakistan Railways and Ministry of Defence for airport and commercial airline transportation. There are public and semi-public organizations, functioning as the execution and operation of the road transport facilities and equipments in addition to the private sector road transporters. They are National Highway Board (NHB) under MOC which is public and is responsible for construction and maintenance of the National Highways, five semi-public organizations responsible for urban and inter-provincial road passenger transport, namely, Karachi Transport Corporation (KTC), Punjab Urban Transport Corporation (PUTC), Punjab Road Transport Board (PRTB), Sind Road Transport Corporation (SRTC) and NWFP Road Transport Board (NWFP RTB), Civil Aviation Authority (CAA), a semi-public organization responsible for development and maintenance of civil airports, Pakistan International Airlines Corporation (PIA), a semi-public corporation for operation of air services, Port Qasim Authority (PQA), a public organization responsible for Port Qasim and semi-public Karachi Port Trust (KPT) for Karachi Port, Pakistan National Shipping Corporation (PNSC), a semi-public corporation responsible for national marine fleet operations. There is a organization as a department of Planning and Development Division of the Ministry of Finance and Planning, namely National Logistic Cell (NLC) which is functioning as the public goods road transportation.

② Macro Economic and Regional Plan

It is projected that in the year 2000, Pakistan will become fairly moderately industrialized country with population of 135.8 million, GDP of Rs. 844.8 billion at constant price of 1980/81 having a compound annual growth rate of 7.2% in the Sixth Five Year Plan period and 6.5% from then up to 2000 and with the per capita income at the same constant price of about US \$622. Some of the representative macro indicators are shown in the following Table 1.

Table 1 Macro Indicators

Item	Unit	1982/83	1987/88	1999/00	ACGR (%)		
					82/83-87/88	87/88-99/00	
1	2	3	4	5	6	7	
Population	Pakistan Total	1,000P	89,327	102,635	135,756	2.8	2.4
	Sind	"	20,550	24,177	32,697	3.3	2.5
	Punjab	"	50,396	57,383	74,809	2.6	2.2
	MWFP	"	13,621	15,078	19,092	2.1	2.0
	Baluchistan	"	4,787	5,997	9,158	4.6	3.6
G D P	Total	Mil. Rs. (1980/81 Price)	279,830	395,794	844,847	7.2	6.5
	Primary	"	77,174	96,280	183,046	4.5	5.6
	Secondary	"	51,500	86,329	189,153	10.9	6.8
	Tertiary	"	151,156	213,185	472,648	7.1	6.9
	Per Capita	Rs. (1980/81 Price)	3,133	3,856	6,223	4.2	4.1

Source: Projection by JICA Study Team, 1982

In parallel with the projection of GDP and population, as the input data for the traffic volume and assignment projection, the forecastings of production/consumption and surplus/dificit analysis were attempted on the selected major commodities. They are in agriculture, wheat, rice, sugar-cane and cotton which account for 84% of the total agricultural production in quantity in 1980/81, as for mining, coal, crude oil, phosphate/sulphur and iron ore which account for 15% of the total mining production and as for manufacturing, edible oil and fats, sugar, cigarettes, cotton yarn and cloth, fertilizers, cement, iron and steel and transport equipment which account for 70% of total manufacturing production. Similarly, major commodities were selected for export/import which account for 82% and 79% in quantity respectively.

In addition to these forecasting and analysis, cross-examination on the inter-regional cargo traffic of these selected commodities which account for about 70% were attempted. The details of these forecasting and analysis are shown in the main text by title of Macro and Regional Economic Framework.

③ Past Development Trend

The analysis of the past trend of the traffic volume as the whole in Pakistan indicates that the cargo traffic increased at the rate of 5.7%

per annum during the period between 1971/72 and 1980/81 and the passenger traffic increased at the rate of 6.8% per annum at the same period, while GDP growth rate was 5.5%, which shows that elasticity values of cargo and passenger traffic against GDP are 1.04 and 1.24 respectively.

Regarding the domestic transportation, it is to be mentioned that the share of road and railway in cargo traffic recorded a remarkable change to note that the share of road increased to 70% in 1980/81 from 50% in 1971/72: On the other hand, the shares of road and railway in passenger traffic maintained the same shares of 80% and 20% during the same period. The share of the air transportation among the domestic transport is 1.4% in passenger traffic and 0.1% in cargo in 1980/81.

④ Traffic Demand Forecast

The projection of the traffic demands for passenger and cargo in both international and domestic movements was made in macroscopic and microscopic levels based upon every available data and applicable projection models. The results of traffic demand projection are summarized in the following Table 2.

Table 2 Summary of Macro Indicators and Traffic Demand Forecasting

Item	Unit	1982/83	1987/88	1999/00	ACGR (%)		
					82/83-87/88	87/88-99/00	
1	2	3	4	5	6	7	
Population	1,000P	89,327	102,635	135,756	2.8	2.4	
G D P	Mil. Rs. (1980/81 Price)	279,830	395,794	844,847	7.2	6.5	
Per Capita	Rs. (1980/81 Price)	3,133	3,856	6,223	4.2	4.1	
Domestic	Passenger	MPK	95,218	130,388	234,771	6.5	5.0
	Road	"	74,945	101,897	181,338	6.3	4.9
	Rail	"	18,789	26,329	49,582	7.0	5.4
	Air	"	1,484	2,162	3,851	7.8	4.9
	Cargo	MTK	30,067	44,053	97,092	7.9	6.8
	Road	"	20,403	27,745	55,081	6.3	5.9
	Rail	"	8,019	13,716	36,357	11.3	8.5
	Pipeline	"	1,626	2,566	5,610	9.6	6.7
	Air	"	19	26	44	6.5	4.4
	International Air Port	Passenger	1,000P	35	29	42	-3.7
Cargo		1,000T	16,572	24,625	44,689	8.2	5.1
Passenger		1,000P	2,785	3,917	6,764	7.1	4.7
Cargo		1,000T	79	130	313	10.5	7.6

Source: Projection by JICA Study Team, 1982

Notes: (1) Traffic demand projections for domestic passenger and cargo are based on Masterplan Alternative B.

(2) ACGR: Annual Compound Growth Rate, P: Person, T: Ton

MPK: Million Passenger Kilometer, MTK: Million Ton Kilometer

The domestic traffic volume in passenger is projected to increase from 95,218 million passenger kilometers (MPK) in 1982/83 to 130,388 MPK in 1987/88 and 234,771 in 1999/2000, which indicate the annual growth rates of 6.5% during the Sixth Five Year Plan period and 5.0% thereafter. In case of domestic cargo traffic volumes, they will reach 44,053 million ton kilometers (MTK) in 1987/88 and 97,092 MTK in 1999/2000 from 30,067 MTK in 1982/83, which stand for the annual growth rates of 7.9% up to 1987/88 and 6.8% thereafter.

It is also calculated that the shares of the different modes of transport in the domestic transportation will change as per the following chart.

(%)

Mode	1982/83	1987/88	1999/2000
Passenger	100.0	100.0	100.0
Road	78.7	78.1	77.2
Rail	19.7	20.2	21.1
Air	1.6	1.7	1.6
Cargo	100.0	100.0	100.0
Road	67.9	63.0	56.7
Rail	26.7	31.1	37.4
Pipeline	5.4	5.8	5.8
Air	0.1	0.1	0.1

It is to be noted that above shares are based upon the result of the projection in accordance with the strategic modal split applied in the Masterplan Alternative B, in which the passenger and freight traffics in excess of break-even distances are strategically converted from road to railway.

With regard to the port traffics, the passenger traffic volume is projected to show 29 thousand persons in 1987/88 and 42 thousand persons in 1999/2000, which indicate the annual growth rates of -3.7% up to 1987/88 and 3.1% thereafter up to 1999/2000, while the cargo traffic volume will increase from 16.6 million tons to 24.6 million tons in 1987/88 and 44.7 million tons in 1999/2000, which show the annual growth rates of 8.2% and 5.1% respectively.

As for the international air traffics, the passenger traffic volume is projected to increase from 2,785 thousand persons in 1982/83 to 3,917 thousand persons in 1987/88 and 6,764 thousand in 1999/2000 which indicate

that the annual growth rates are 7.1% up to 1987/88 and 4.7% thereafter respectively, while the cargo traffic volume will increase from 79 thousand tons in 1982/83 to 130 thousand tons in 1987/88 and 313 thousand tons in 1999/2000, which show the annual growth rates of 10.5% and 7.6% respectively.

The results of the microscopic traffic demand forecast are shown in details in the main text, which is made in application of the so-called four-step estimation method, which comprises generation/attraction, distribution, modal split and traffic assignment of the passenger and freight by major commodities for each international and domestic zone.

⑤ Development Concept and Policy/Strategy

The basic concept for formulation of the Masterplan is that implementation of the plan should not only contribute to the speedy and safe movement of goods and passengers, but also directly stimulate the socio-economic development of the country. In consideration of the various constraints, the first approach to the Masterplan shall be the planning how available facilities can be used most efficiently, and the second is how investment in additional facilities shall be made with minimum use of resources while satisfying the planned objectives.

In line with this development concept, the formulation of policy for national transport Masterplan up to the year 2000 was attempted by means of analysis of each mode of transport, reviews of the policies adapted in the previous Five Year Plans, projection of the national and regional development potentials and the analysis of the traffic demand forecasts. The outstanding policies for development of national transport system are described below.

- (1) The national transport system of the country shall sufficiently cater for the domestic and international traffic demands in passenger and goods movements as a whole in the service level and quality of international standard. In other words, each mode of transport shall have enough capacity to meet with respective traffic demand and there would be no bottlenecks in the linkage between the different modes of transport.
- (2) The priority of investment in transport sector shall be given to those projects which have higher and quicker economic returns. On the other

hand, the investment to backward or isolated areas shall be made from the view point of basic human needs and national integration.

- (3) Meeting with the geographical characteristics of the country and transport economy, railway shall have major responsibility to the long haul freight transport.

The specific policies and strategies for the national transport Master-plan are worked out based on above, which are;

- 1) The modal distribution of future traffic shall be made on the basis of suitability of transport and relative cost.
- 2) Minimization of the total transport costs shall be aimed at by integrated development of different modes of transport.
- 3) Transport system shall be so developed as to encourage and increase production and commercial activities.
- 4) The transport capacity of existing facilities and equipments shall be fully utilized by elimination of their bottlenecks and by optimization of their performance efficiency.
- 5) Private sector investment shall be more introduced into transport sector to stimulate the transport activities.
- 6) The balanced national highway network shall be established by rationalizing the existing network.
- 7) Comprehensive measures to introduction of containerization shall be developed in effective coordination among shipping, ports, railway, road and road transport.
- 8) Serious bottlenecks on capacity and safety at major airports shall be removed on the highest priority to secure a smooth operation of international and domestic air traffic.

⑥ Modal Development Plan

⑥- 1 Road Plan

The road network which has been applied for the national transport plan is selected from the national highway and major provincial highway with the length of 15,906km from the total metalled road of 42,415km in 1979/80.

The development policy of road is that the balanced national highway network shall be established by rationalizing the existing network including the roads of national importance such as route N-5, Indus Highway, RCD Highway, route N-50, a route of Makran Coast and so on.

Regarding improvement criteria for primary and secondary highways, they are recommended as follows.

(1) Primary Highway

- 1) The highway shall have at least two lanes by the year 2000.
- 2) Volume/capacity ratio must be less than 0.70 (level of service C) in the year 1999/2000 and 0.85 (level of service D) in the year 1987/88.
- 3) Major railway crossings on primary highway are recommended to be eliminated by the year 2000.
- 4) In dual carriageways, all junction shall preferably be grade-separated.
- 5) The entire carriageway width of pavement plus paved shoulder shall be carried across all structures.

(2) Secondary Highway

- 1) Volume/capacity ratio must be less than 0.85 (level of service D).
- 2) In dual carriageways, railway crossings and junctions shall preferably be grade-separated as far as possible.
- 3) At least pavement width shall be carried across all structures.

The road projects within the applied road network for the Masterplan account for 239 projects including 26 on-going projects which are screened and selected from 416 candidate projects. The total development cost for the 239 projects amounts to Rs. 81,939 million in the constant price of 1980/81.

The details of the candidate and selected projects for this mode in the Masterplan and the Plan of Action are described in the main text specifying the order of priority and results of preliminary project evaluation.

It is to be mentioned that those projects to be needed for Alternative A of the Masterplan are also worked out and cross-examined in consideration of the corresponding traffic volumes and assignments in each links, but the Alternative A is dropped from the Masterplan after evaluation of the two alternatives.

⑥- 2 Road Transport Plan

(1) Passenger Transport

It is projected that in case of Masterplan Alternative B the road passenger traffics will reach 101,897 million passenger kilometers (MPK) in 1987/88 and 181,338 MPK in 1999/2000 from 74,945 in 1982/83, with the annual growth rates of 6.3% and 4.9% respectively. It is also calculated that the shares of the vehicle type-wise passenger kilometers are 13.9% for motor car and wagon and 86.1% for bus in 1999/2000, and those of the semi-public passenger road transport operator and the private Passenger road transporter are estimated to be around 15% and 85% in the same year although there would be quite variations among the 4 provinces.

The basic policy proposed in the Fifth Five Year Plan shall be continued to be maintained in this mode of transport and in consideration of the fact that the purpose of private sector is the pursuit of profit, it would be proper that semi-public sector should keep a certain share for the sake of social welfare in road passenger transport.

The required numbers of vehicles by type in the year 2000 for passenger transport are estimated to be 8,000 for bus and 62,000 for motor car and wagon.

(2) Freight Transport

It is projected that road freight traffics will reach 27,745 million ton-kilometers (MTK) in 1987/88 and 55,081 MTK in 1999/2000 from 20,403 MTK in 1982/83 with the annual growth rates of 6.3% and 5.9% respectively in case of Masterplan Alternative B.

For the best economics of road construction, analysis of axle load by truck and related cost evaluation are attempted because of the reason that the road freight transport is greatly dominated by the private sector. The strategy for this mode shall be the deliberate regulation of the axle load to limit 10 tons for single and 18 tons for tandem axle. The second strategy is the gradual introduction of the large size truck in view of vehicle operating cost and energy saving.

The required number of vehicles for road freight transport is estimated to be 14,000 in 1999/2000.

The projects selected for this mode in the Masterplan is listed in the main text, which amount in total Rs. 10,991 million.

⑥- 3 Railway Plan

It is projected that the railway passenger traffics will increase to 26,329 million passenger-kilometers (MPK) in 1987/88 and 49,582 MPK in 1999/2000 from 18,789 MPK in 1982/83, which indicate the annual growth rates of 7.0% and 5.4% respectively in the case of Masterplan Alternative B. As for the railway goods traffics, they will increase to 13,716 million ton-kilometers (MTK) in 1987/88 and 36,357 MTK in 1999/2000 from 8,019 MTK in 1982/83, with the annual growth rates of 11.3% and 8.5% respectively in the same case.

One of the most important policies for the transport system development in the Masterplan is the strategic allocation of goods over break-even distance to railway from road in view of the fact it can provide mass transport which leads to extremely lower transport cost than other modes of transport. Based on this policy, the following strategies and measures for railway transport are planned out.

- 1) Improvement of safety devices including block instruments between railway stations, interlocking instruments within the station yards and control instruments of the trains.
- 2) Improvement of tractive force for speedy mass transportation by better locomotives.
- 3) Increment of number of trains by shortening the block section and interval of stations on the single track with less than 40 trains. In excess of 40 trains, introduction of double track is needed.
- 4) Strengthening of long distance through train operations from origin to destination for shortening transport time and securing punctuality.
- 5) Introduction of concentrated goods handling base stations for realization of long distance through train, and for higher operational efficiency.

For this, it would be necessary for the railway to alter the transport system comprising train operation system, passenger transportation, goods transportation and development of transportation facilities.

The projects to be incorporated in the Masterplan are screened and selected from the various candidate projects, and the financial resources required for implementation of the selected projects amount to Rs. 66,694 million. The details of these projects are described in the main text.

⑥- 4 Port Plan

It is projected that the total passenger traffics at the Pakistan ports will be 29 thousand persons in 1987/88 and 42 thousand persons in 1999/2000 in comparison with 35 thousand persons in 1982/83, which means the annual growth rates of -3.7% and 3.1% for the respective periods. The seaborne cargo volumes will reach 24.625 million tons (MT) in 1987/88 and 44.689 MT in 1999/2000 from 16.572 MT in 1982/83, which indicate the annual growth rates of 8.2% and 5.1% respectively.

The major commodities of dry cargo shall be wheat, sugar, cement, fertilizers, iron and steel, coal, iron ore, phosphate rock/sulphur, rice, cotton and others. The major commodities of liquid cargo shall be crude oil and petroleum, edible oil and tallow, petroleum products and molasses.

The development policies of ports are described as the following.

- 1) The application of the functional divisions of the two ports of Karachi and Qasim, so as to make full and efficient use of the facilities of both ports.
- 2) At Karachi port, which will mainly handle general cargo, top priority is to be given to development of a new full container terminal. In addition, a new oil berth shall be constructed along with the procurement of on-shore and off-shore equipments.
- 3) At Qasim port, which will handle mostly bulk cargo, top priority is to be given to completion of on-going projects and construction of a new fertilizer and wheat terminals. In addition to these projects, acquisition of a dredger for deepening and widening of the channel and construction of a new oil berth and buoy berth will be implemented.
- 4) Construction of a mini-port at Gwadar in Baluchistan and the improvement of the Marine Academy are to be considered for promotion of regional development and for upgrading of the marine personnel respectively.

The details of the projects selected and incorporated in the Masterplan is given in the main text and the financial resources required for these projects amount to Rs. 8,940 million in total of ADP and non-ADP categories.

⑥- 5 Shipping Plan

The policy and strategy for expansion and development of the national flag merchant fleet and related development plan are drawn out as the following.

(1) Liner Trade

- 1) Keeping with the irreversible trend of containerization in the world shipping, acquisition of the full container vessels shall be introduced at the time of completion of the proposed full container terminal at Karachi port. In case of delay on container terminal construction, acquisition of the self-sustained container ships is to be identified as an alternative.
- 2) It will be necessary to strengthen the tonnage of multi-purpose ships in order to maintain 40% loading share of general cargo in main liner trade.
- 3) The fleets composition plan at each stage shall be carefully studied and implemented in full consideration of all the aspects such as financial impact, managerial view points and flexibility for technical innovation.

(2) Bulk Trade

- 1) The tramp shipping is operated essentially on the free market system because the freight rate in bulk shipping fluctuates according to demand and supply. The fleet arrangement of bulk carrier shall be decided by user of the service seeking most competitive rate, and by ship operator seeking operational flexibility. Therefore, the ship operator shall improve the operational efficiency to be competitive in the international market.
- 2) The fleet plan for bulk carriers for Pakistan Steel and crude oil tanker shall be identified based on capacity analysis of total required tonnage.
- 3) The acquisition of specialized ships and trampers in bulk trade shall be guided by the economic criteria instead of number of vessels calculated on the proposed loading share.

The details of the projects selected for the Masterplan are given in the main text and the financial resources required for these projects amount to Rs. 11,522 million in the non-ADP category.

⑥- 6 Airport and Aviation Plan

It is projected that the domestic air passenger traffic volumes will increase to 2,162 million passenger-kilometers (MPK) in 1987/88 and 3,851 MPK in 1999/2000 from 1,484 MPK in 1982/83, which show the annual growth rates of 7.8% and 4.9% respectively. The domestic air cargo traffic volumes will increase to 26 million ton-kilometers (MTK) in 1987/88 and 44 MTK in 1999/2000 from 19 MTK in 1982/83, which are still less than 0.1% among other modes of domestic transport, but show the annual growth rates of 6.5% and 4.4% respectively.

As for the international air traffics, the traffic volumes in passenger will be 3.9 million persons in 1987/88 and 6.8 million persons in 1999/2000 from 2.8 million persons in 1982/83, indicating the annual growth rates of 7.1% and 4.7% respectively. The cargo traffics will increase to 130 thousand tons in 1987/88 and 313 thousand tons in 1999/2000 from 79 thousand tons in 1982/83, indicating the annual growth rates of 10.5% and 7.6% respectively.

With regard to the shares of PIA for the international passenger traffic, it is estimated to carry about 4.2 million persons in 1999/2000, with the same growth rate as the international total.

(1) Airport Plan

Based on analyses on the route-wise and airport-wise traffic volumes, along with the proposed assignment of operating aircraft, design day coefficient, peak hour coefficient, load factor on design day, peak hour aircraft movements by route, the development policy and strategy and airport development plan are drawn out as the following.

- 1) Three major international airports of Karachi, Lahore and Islamabad, which handle 10.0 million, and both 2.6 million passengers respectively in 1999/2000 are to be given the top priority in development or improvement of the terminal facilities for passenger and cargo, and improvement of runway, taxiway, apron, navigational systems and telecommunication systems.
- 2) Nawabshah airport is desirable to be developed as an alternative

airport for international and domestic flights to Karachi.

- 3) Strengthening of the pavements of runway and taxiway of the other airports shall be made to accommodate the increasing traffic volume and heavier aircrafts to meet with the international standard.
- 4) Air navigation and telecommunication systems shall be newly planned and upgraded to meet with the aircraft operation requirements in conformity with the international standard.
- 5) Development of local airports which have low rate of traffic demand may be justified feasible from the view point of civil minimum.

The details of the development plans and the projects selected for the Masterplan are specified in the main text, and the financial resources required for those projects amount to Rs. 8,905 million.

(2) Fleet Plan

Based on the estimated aircraft movements on peak day by route, projected number of aircraft required by PIA are roughly estimated under the study of flight hours by route and annual operating hours by aircraft.

Assuming the aircraft service period in PIA to be about 15 years in average, fleet plan of PIA up to 2000 is planned to have 68 aircrafts in total.

The details of the fleet plan of PIA and the projects selected for the Masterplan are described in the main text, and the required financial resources for these projects amount to Rs. 32,700 million in the non-ADP category. As this estimation is made only based on demand forecast, it will be necessary to be checked from a aspect of budget financing.

⑥- 7 Other Modes

(1) Inland Water Transportation

There is no on-going and expected project on inland water transportation (IWT) for the Indus River and various canals, and it is suggested that the in-depth study on this transportation mode shall be commenced in the certain sections in close coordination with the authorities concerned.

(2) Pipeline for POL Transport

It is projected that the POL traffic demand will increase to 6.5 million tons in 1999/2000 with the annual growth rate of 5%.

It is estimated that a new pipeline for POL between Karachi and Multan with the length of about 870km and the diameter of 16 inches (40cm) is needed to be constructed running in parallel with the existing one. The construction cost of the pipeline will be about Rs. 1,440 million, but this project is excluded in the transport Masterplan because the administrative and financial responsibility are at present in the different authority other than transport sector.

⑦ Preliminary Project Evaluation

The approaches and methodologies applied in the preliminary project evaluation vary according to the mode of transport and also the nature of the project, but the following ways are basically applied.

1) Road Project:

The road projects are evaluated in terms of IRR, B/C, NPV and optimum implementation timing.

2) Railway Project:

The railway projects are evaluated in terms of differential cost-benefit analysis, marginal cost-benefit analysis, cost comparison and descriptive analysis.

3) Port Project:

The port projects are evaluated in terms of economic/financial analysis, cost comparison analysis and descriptive analysis.

4) Airport Project:

The airport projects are evaluated in terms of cost/benefit analysis and descriptive analysis.

The major outcomes of above project evaluations are described in detail in the main text and the Technical Papers.

the summary of the financial requirements of Masterplan Alternatives are calculated and cross-checked with the financial guidelines, which are shown in the following Table 3.

Table 3 Financial Requirement of Masterplan Alternatives

(Unit: Million Rs.)

Mode	Alternative A		Alternative B	
	Amount	Share(%)	Amount	Share(%)
Road	85,445	43.5	81,939	37.0
Road Transport	10,991	5.6	10,991	5.0
Railway	38,692	19.4	66,694	30.1
Port	8,940	4.5	8,940	4.0
Shipping	11,522	5.9	11,522	5.2
Airport	8,905	4.5	8,905	4.0
Civil Aviation	32,700	16.6	32,700	14.8
Total	196,595	100.0	221,691	100.0
ADP Category	148,016	75.3	173,112	78.1
Non-ADP Category	48,579	24.7	48,579	21.9
Difference A & B %			+25,096 11.3%	

Source: JICA Study Team, 1982

⑧ Selection of Masterplan

Selection of Masterplan for the national transport system with the target year 2000 is made mainly based on the result of quantitative comparison analysis of the general transport costs between Alternatives A and B. The outcomes of the evaluation indicate that the economic general transport cost of Alternative A account for Rs. 41,353 million while that of Alternative B stands at Rs. 37,339 million, which indicates that the general transport cost of Alternative B in economic terms is about 10% less than that of Alternative A. In other words, by adoption of Alternative B, Pakistan can save Rs. 4,014 million.

The result of evaluation on the combined cost of energy for road and railway between the two Alternatives also indicates that the said cost of Alternative B is approximately 13% less than that of Alternative A. In other words, adoption of Alternative B stands for saving of Rs. 1,921 million in comparison with Alternative A.

Also, the descriptive analysis leads to the result that adoption of Alternative B means less air and noise pollution and smaller degree of traffic accidents on road.

As the result of these quantitative and qualitative evaluations of the two Alternatives, Alternative B is selected as the Masterplan of national transport system.

2. Plan of Action for the Sixth Five Year Plan

The Plan of Action to be incorporated in the transport sector of the coming Sixth Five Year Plan is formulated based on the drawn-out Masterplan.

The applicable period of this Plan of Action is from 1983/84 to 1987/88 and the macro-economic indicators and the summary of the traffic demand projections are shown in the Tables 1 and 2, which indicate the state of transport environment and the traffic demands in each mode of transport in the target year of 1987/88, with respective growth rates.

In this Plan of Action, in order to keep up with the accelerated increase in the traffic demand in each mode of transport, intensive development plan is required. In line with such prerequisite, the financial guideline and the development policy and strategy are worked out.

The financial guideline in the positive frame stands for about Rs. 39 billion in the ADP category and about Rs. 17 billion in the non-ADP category and in total approximately Rs. 56 billion.

① Overall Development Policy

Overall transport development policy and strategy during the Sixth Five Year Plan period shall be;

- 1) Integrated development of different modes of transport shall be ensured, according to the economical modal distribution of traffic.
- 2) Transport system shall be developed to encourage the increase of production and commercial activities, and to contribute to economic development of the country.
- 3) Development of transport system shall also be aimed at opening-up of the backward areas.
- 4) The transport capacity of the existing facilities and equipments shall be fully utilized by elimination of bottlenecks and optimization of their performance efficiency.
- 5) Only those new projects which have a sufficient economic viability or higher importance from the view point of national integration shall be implemented.
- 6) Private sector investment shall be more encouraged to be introduced in transport sector to stimulate the transport activities and to reduce the resource constraints in the public sector.

- 7) A substantial share of the total traffics is expected between Karachi and up-country, and the transport capacity on the national corridor shall be substantially improved.
- 8) Transport facilities at the international terminals shall be substantially developed.
- 9) Dependable north-south links shall be initiated to develop as an alternative of national corridor and for regional development toward the west bank of the Indus.
- 10) Comprehensive measures for introduction of containerization shall be developed in close coordination among shipping, ports, railway, road and road transport.

② Modal Development Plan

②- 1. Road Development Plan

The development strategy for road are given below.

- 1) Emphasis shall be placed on completion of on-going projects.
- 2) Improvement of major national and provincial highways shall have the highest priority so that they can cater for the increased traffics.
- 3) The national highway N-5 shall be substantially improved keeping in view of the traffic requirements in various setions.
- 4) The balanced national highway network shall be established by rationalizing the existing network to include Indus Highway, RCD Highway (Quetta-Taftan Section), Quetta-D.G.Khan route and Multan-Jhang-Gujranwala route.
- 5) East-west trunk roads shall be substantially improved to cater for future international and inter-regional traffic.
- 6) Greater priority shall be given to rehabilitation and improvement of other arterial roads, which shall ensure quick economic returns and contribute to economic development of the country.
- 7) Construction of bridges across the major rivers/main canals and by-passes of trunk roads around large cities such as new Kotri Bridge on N-5 and long span bridge on Sargodha-Pindi Bhattian road shall be given priority for elimination of the bottlenecks.
- 8) New roads will be provided only in the case of opening up of isolated areas of the country.
- 9) The pace of development of farm-to-market road shall be accelerated to meet with the needs of the rural areas.

- 10) The examination shall be initiated for determination of utilization possibility of the canal roads for public transport.

Selection of the projects are made in line with the above development strategies and in consideration of the specific traffic demands in each link and on section, and of the financial guideline.

The projects selected are grouped in link, in route and by province, and the details of these projects with priority ratings are described in the main text and Technical Papers.

The financial resources required for implementation of the projects selected for the Plan of Action amount for Rs. 16,255 million and the annual phasing is worked out on the basis of project size and construction capabilities.

It is to be pointed out that functional classification of the road network shall not be regarded as a one-time process, and the determination of proper classification of a highway shall be based on evaluation of functional use and character.

②- 2 Road Transport Development Plan

It is projected that the road traffic volume for passenger will increase to 101,897 MPK in 1987/88 from 74,945 MPK in 1982/83 with the annual growth rate of 6.3% and for goods the traffic volume will increase to 27,745 MTK in 1987/88 from 20,403 MTK in 1982/83 with the annual growth rate of 6.3%.

The development strategies worked out for the Plan of Action are described as the following.

- 1) Road transport shall be utilized mainly for short haul or for high valued cargoes.
- 2) Road transport shall be considered as an important means to integrate backward regions and rural areas with more advanced regions.
- 3) Until such time that the railway capacity is substantially improved to carry its proper share of the projected traffics, road transport shall cover the surplus.
- 4) Large size truck may be introduced for freight transport when regulation of axle load is realized for 10 tons for single axle and 18 tons for tandem axle.
- 5) More attempts shall be made to improve operational and maintenance efficiency in the public road transport sectors.
- 6) Large private investment in road transport shall be encouraged by introduction of the comprehensive incentives.

- 7) Comprehensive counter measures to highway accidents shall be more advanced in review of the experiences of the developed countries in the fields of research, training, regulation, safety facilities, organizations, etc.

The selection of the projects to be incorporated in the corresponding period is made in line with the above development strategies and in consideration of the specific traffic demands and of the financial guideline.

The financial resources required for implementation of the projects selected account for Rs. 2,868 million and the annual phasing is worked out accordingly. The details of the projects and priority ratings are described in the main text.

②- 3 Railway Development Plan

It is projected that the railway traffic demands for passenger will increase to 26,329 MPK in 1987/88 from 18,709 MPK in 1982/83 with the annual growth rate of 7.0%, while that of goods will increase to 13,716 MTK in 1987/88 with the annual growth rate of 11.3%.

The development strategies for railway for the Plan of Action are described as the following.

- 1) Railway system shall be strengthened as the primary mode of transport for long haul traffic along the national corridor.
- 2) East-west rail trunk route i.e. Rohri-Quetta (-Taftan) shall be substantially improved to facilitate transport of national resources from Baluchistan and for integration of the country.
- 3) A high priority shall be given to increment of freight transport capacity by operational efficiency improvement.
- 4) Rehabilitation and replacement of worn-out facilities shall be given higher priority over new line construction.
- 5) Linkage facilities like terminal, access road, etc. between railway and other modes of transport shall be improved substantially to increase the overall capacity of the transport system of the country.
- 6) Containerization of railway shall be closely coordinated with the development paces of other modes of transport, such as ports, shipping, road and road transport, and the maximum use of the dry port at Lahore shall be attempted.
- 7) In view of the energy economics, electrification programmes of the railway shall be accelerated.

The selection of the projects to be incorporated in the plan period is made in line with the above development strategies and in consideration of the specific traffic demands and of the financial guideline. These projects are summarized in the following groups:

- 1) for improving the train operation devices on the main lines.
- 2) for introduction of container transportation.
- 3) for introduction of high speed goods trains.
- 4) for eliminating the bottlenecks at Bolan Pass.
- 5) for improving and developing the fundamentals of transportation.

The financial resources required for implementation of the projects account for Rs. 13,721 million and the annual phasing is worked out accordingly. The details of the projects and priority ratings are described in the main text.

②- 4 Port Development Plan

It is projected that the port passenger traffic will be estimated to be 29 thousand persons in 1987/88 from 35 thousand persons in 1982/83 which stands for the annual growth rate of -3.7%, while the seaborne cargo volume will increase to 24.6 million tons in 1987/88 from 16.6 million tons in 1982/83, which indicates the annual growth rate of 8.2%.

The development strategies for port during the period of Plan of Action are worked out and described as the following.

- 1) The roles of Karachi and Qasim Ports shall be coordinated to ensure the maximum handling of cargoes by clarifications of functional divisions.
- 2) All import of iron ore and coal for Pakistan Steel and export/import of wheat, rice, fertilizers and phosphate rock in full ship's load shall be handled at Qasim Port.
- 3) Export/import of general cargo and bulk cargoes as specified in Article 2) in parcel size shall be handled mainly at Karachi Port.
- 4) All liquid bulk cargoes up to a total of 10 million tons per annum shall be handled at Karachi Port, and any additional liquid cargo shall be assigned to Qasim Port.
- 5) A new full container terminal shall be established at Karachi Port.
- 6) The existing port capacity shall be further improved through modernization of handling equipments and improvement of labour productivity.

- 7) Effective coordination between inland transport and the two ports shall be ensured in view of the projected increase in traffic and the handling capacity of both ports.
- 8) Construction of mini-port on the Baluchistan coast shall be seriously considered.

The selection of the projects to be incorporated in the plan period is made in line with the above development strategies and in consideration of the projected traffic demands and of the financial guideline.

The financial resources required for implementation of the selected projects account for Rs. 4,552 million in total which consists of Rs. 2,999 million in ADP category and Rs. 1,553 million in non-ADP category. The details of the projects and the priority rating are described in the main text.

②- 5 Shipping Development Plan

The development strategies for shipping during the period of Plan of Action are worked out and described as the following.

- 1) In order to maintain the loading target for general cargo, full container vessels shall be introduced at the time of completion of the container terminals.
- 2) As for bulk carriers for Karachi Steel, fleet requirements shall be decided jointly by PNSC and Karachi Steel in order to secure most competitive freight rate and to achieve optimum utilization of the bulk fleet. Short and long term measures shall be considered according to production schedule and draft limitation.
- 3) As for tanker for liquid bulk, fleet requirements shall be decided by national tanker company on the basis of economical efficiency and national policy in consideration of the policy of the oil exporting countries.
- 4) As for tramper for dry bulk, conventional type vessels replaced by newly-built multi-purpose vessels, will be shifted to the tramp trade and shall be operated on the basis of economical efficiency.
- 5) Ships over 20 years age shall be replaced by new ships to lower the operational costs and to increase productivity.
- 6) Private investment in shipping shall be encouraged.

The selection of the projects to be incorporated in the plan period is

made in line with the above development strategies and in consideration of the market demands and of the financial guideline, which is summarized in five development categories as the following

- 1) acquisition of full container ships
- 2) fleet replacement programme
- 3) bulk carrier for Karachi Steel
- 4) tanker for crude oil
- 5) tanker for edible oil

The financial resources required for implementation of the selected projects account for Rs. 3,386 million in the non-ADP category. The details of the projects with priority rating are described in the main text.

②- 6 Airport and Aviation Development Plan

It is projected that the domestic air passenger traffic will increase to 2,162 MPK in 1987/88 from 1,484 MPK in 1982/83 with the annual growth rate of 7.8%, while the domestic air cargo traffic will increase to 26 MTK in 1987/88 from 19 MTK in 1982/83 with the annual growth rate of 6.5%.

It is also projected that the international air passenger will increase to 3.9 million persons in 1987/88 from 2.8 million persons in 1982/83 with the annual growth rate of 7.1%, while the international air cargo traffic will increase to 130 thousand tons in 1987/88 from 79 thousand tons in 1982/83 with the annual growth rate of 10.5%.

The development strategies for airport and civil aviation during the period of Plan of Action are worked out and described as the following.

- 1) Main international airports at Karachi, Islamabad and Lahore shall be further developed to increase their capacity and safety so that these airports can facilitate the projected traffic demands.
Furthermore, the passenger and cargo terminals of Karachi airport shall be immediately improved to eliminate the existing bottleneck.
- 2) Peshawar, Quetta, Multan, Faisalabad and Nawabshah shall be developed for safe and effective handling of large sized jet aircrafts.
- 3) The remaining 16 provincial airports, including 2 airports under construction at Ormara and Bannu shall be developed for short-haul turbo-prop jet aircrafts.
- 4) All new airports shall be under the following development criteria.
 - a. to meet the traffic demand.

- b. justification of development can be identified from the view point of national or regional development policy.
- 5) The ground hauling capacity of the major airports needs to be further expanded to comply with the projected traffic demands.
 - 6) Improvement of air navigational and telecommunication systems at existing airports shall be given greater priorities for safe operation and higher efficiency.
 - 7) Introduction of the twin jet aircrafts and expansion of the wide bodied jet fleet shall be implemented when higher revenue and better financial position can be ensured.
 - 8) Feasibility of feeder service shall be determined after full examination.

The selection of the projects to be incorporated in the plan period is made in line with the above development strategies and in consideration of the traffic demands and of the financial guideline. These projects are compiled by airport, and by particular facility, and details of which are described in the main text.

The financial resources required for implementation of the selected projects account for Rs. 4,962 million for airport and Rs. 10,220 million for civil aviation fleet expansion programme.

a) Cross-Examination of the Projects

The projects selected for implementation during the plan period for each mode of transport are cross-checked with other projects in terms of priority and urgency.

The total amount of the project cost in each mode of transport is calculated and it is also cross-examined if the amount is within the framework of the financial guideline previously set forth.

Another cross-checking is attempted whether a certain project will be a duplicated one with other project in the different mode of transport, and then, each modal development plan is finalized.

The summary of the financial requirement for the Plan of Action is given in the following Table 4.

Table 4 Transport Sector Financial Requirement for
the Sixth Five Year Plan (1983/84 - 1987/88)

Mode	ADP Category		non-ADP Category		Total	
	Amount	(%) Share	Amount	(%) Share	Amount	(%) Share
Road	16,255	39.8	-	-	16,255	29.0
Road Transport	2,868	7.0	-	-	2,868	5.1
Railway	13,721	33.6	-	-	13,721	24.5
Port	2,999	7.3	1,553	10.3	4,552	8.1
Shipping	-	-	3,386	22.3	3,386	6.1
Airport	4,962	12.2	-	-	4,962	8.9
Civil Aviation	-	-	10,220	67.4	10,220	18.3
Total	40,805	100.0	15,159	100.0	55,964	100.0
Share (%)	72.9		27.1		100.0	

Source: JICA Study Team, 1982

b) Investment Schedule

In consideration of the optimum time of implementation attempted at the preliminary project evaluation, project-wise implementation plan is drawn out keeping in view of the balanced yearly allocation of the financial resources into five years from 1983/84 to 1987/88.

The details of each project with yearly investment schedule, complete list of the projects in each mode of transport, summary of financial resources required during the Sixth Five Year Plan period with yearly allocation and analysis are given in the last part of the main text.

III. RECOMMENDATIONS

Upon completion of the study on the comprehensive National Transport Plan in the Islamic Republic of Pakistan, the JICA Study Team would like to make following recommendations for further improvement and development of the transport planning and systems in the country.

1. Improvement of Transport and Traffic Data Base

Any sort of transport planning or study needs the processing of vast data in the transport and other sectors of the economy. It is recommended that the regular surveys of the various mode of transport shall be carried out and kept as the statistics. Some of the data found missing are noted as follows.

- 1) National totals of road traffic after 1975.
- 2) Road O/D (origin/destination) survey data with seasonal fluctuations.
- 3) Railway passenger O/D data by class and also bus passenger O/D data.
- 4) Total Flow as well as Net Flow in terms of passenger and commodity flows in O/D survey data.
- 5) Seaborne trade data by commodity and area, of international ocean liners and trampers other than PNSC.
- 6) International air passenger and cargo O/D data, of the foreign carriers other than PIA.

It is also recommended that these transport and traffic data shall be compiled and stored in the computer system and maintained and up-dated periodically.

2. Improvement and Expansion of NTRC

The collection and processing of the various data pertaining to transport sector as aforementioned shall be one of the functions of NTRC which shall play the role of the integrated national research centre for the transport sector of the country. In order to make NTRC function fully, it is required to strengthen the manpower, in the fields of traffic and transport economics and engineering, research equipments including an adequate size of computer and drafters, etc. and proper budget allocations.

3. Needs for Feasibility Study for Applicable Project

Although those projects selected for implementation in the Masterplan and Plan of Action in this study are selected through preliminary evaluation, it is recommended for those projects which have not been through the feasibility study to be carried out the said study before implementation.

4. Urban Transport Planning

In addition to inter-zonal (inter-regional) national transport plan, it is recommended to carry out the study on the Masterplan and Plan of Action for the urban transport systems including a system for through traffic in the major cities, like Karachi, Lahore, Faisalabad, Rawalpindi, Peshawar, etc.

5. Needs for Study on Operational and Managerial Efficiencies

The optimum development of a transport system as a whole depends not only on the improvement and development of the physical facilities, but also improvement of the operational and managerial efficiencies of the organizations which are providing a certain transport services. Therefore, it is recommended to conduct the studies on these efficiency improvements of such organizations. Especially the study on railway is considered to be very important for achievement of effective investment to this sector.

6. Needs for Intergrated Coordination in Transport Development

Studies on IWT, Canal Road, Farm-to-Market Road, etc.

For realization of utilization and improvement of IWT, canal road and farm-to-market road to be the modes of transport in the country, intensive studies on such modes of transport are needed to be carried out in very close coordination and cooperation among the authorities concerned where the interest of a certain authority might conflict to the other. In carrying out such studies, a task force consisting of the experts of the authorities concerned might be a solution.

7. Needs for Intergrated Coordination in Implementation of Containerization Introduction

Implementation for introduction of containerization into the country requires an integrated coordination in the construction of physical facilities as well as procurement of equipment in port, shipping, road and railway. It is recommended that in containerization, each related modes of transport shall be closely cooperated in each phase of development.

8. Semi-Public Passenger Road Transport Organization in Baluchistan

It is recommended that a study on the feasibility study on establishment of a semi-public passenger road transport organization in Baluchistan shall be carried out, so that the people in this province can be provided with such road transport services as in other provinces.

9. Survey on Actual Conditions of Road Transport Sector

The system comprising road and road transport has the biggest share of all modes of transport in the country. But its actual conditions are not always fully grasped, particularly on road transport sector.

Therefore it is recommended that survey on the actual conditions regarding organizations, transport inventory, employment and traffic activities of road transport system shall be made periodically.

10. Study on Promotion of Private Investment in the Transport Sector

The studies how to promote the private investment in each mode of transport other than railway shall be carried out so that the results of such studies can indicate the various systematic incentives and environments to stimulate such investments, rather than screening the individual proposals to come by.

11. Proper Allocation of Budget for Maintenance

It is recommended that the proper amount of budget for maintenance and repair shall be allocated to the existing facilities in each mode of transport because many of such facilities need constant and continuous maintenance due to inferior standard and typical environmental conditions.

I. INTRODUCTION

I. INTRODUCTION

1. Background of the Study

Transport has been described as an all-pervading industry, penetrating into all phases of production and distribution of goods. While at the same time, the transport of persons depends on the same sector.

Investment in transport involves the expenditure of quite a large sum of fund. In the ESCAP region transport is absorbing about 20 to 40 percent of the total development expenditure, and therefore, the transport plan generally ranks first or second in magnitude among the items included in the development plans. In addition, large amounts of private capital are being involved along with the national development of transport sector.

The aforesaid facts suggest the need for a careful assessment and planning for transport development so that the use of limited resources in transport shall contribute to the national economy and to the betterment of social environment of the nation.

Based on this concept the Government of Pakistan has been conducting a series of careful studies on the transport sector represented by West Pakistan Transport Coordination Project; "TRACO" Study in 1971 and SOFRERAIL Study in 1971 as the comprehensive transport plan, and many other studies on certain modes of transport or on the movement of major commodities in the past. However, there has been no study on the comprehensive transport plan to meet with the socio-economic and structural changes of the country.

The Government of Pakistan is now planning improvement and development of the transport sector as one of the most important issues for the forthcoming Sixth Five Year Plan, which will start in July, 1983. To this end, a comprehensive national transport plan for the country is considered as an essential prerequisite.

2. The JICA Study

The Government of Japan, in response to the request made by the Government of Pakistan, has decided to conduct a study on National Transport Plan in Pakistan in accordance with the Scope of Work and Inception Report of this study mutually agreed upon and concluded between the Japan International Cooperation Agency (JICA) and the Government of Pakistan, on the 27th September, 1981 and 10th February, 1982 respectively in Islamabad, Pakistan.

The objectives of the study are 1) to formulate a comprehensive Masterplan for the National Transport Sector for Pakistan integrating the various modes of transport into an economically optimum transport system, and 2) to recommend based on the Masterplan, a plan of action for implementation by the Government of Pakistan, giving an order of priority for projects within each mode of transport, with the study period of 18 months, starting in December, 1981 and completing in May, 1983.

In accordance with the Scope of Work and the Inception Report of this study, JICA Study Team commenced the study in close cooperation and coordination with the Pakistani Counterpart Team, The Japanese Supervisory Committee and many other Pakistani Liaison Officers and officials of the various government authorities and enterprises who were assisting this study.

The outline of the study scope are described as follows:

- 1) Area: Whole area of Pakistan specified by zoning.
- 2) Mode of Transport: All modes of transport (Road, Road Transport, Railway, Port, Shipping, Airport, Aviation, Inland Water Transportation and Pipeline.)
- 3) Type of Traffic: Cargo and passenger (domestic and international)
- 4) Route: Mainly on the national and international trunk routes and inter-regional transport connected with the trunk routes.
- 5) Survey: Principally use existing data and maps, and field survey insofar as to complement relevancy of existing data.
- 6) Plan Period: Short Term Plan ... 1983 - 88
Long Term Plan Target Year 2000

II. EXISTING TRANSPORT SYSTEM AND UTILIZATION

