

JAPAN INTERNATIONAL COOPERATION AGENCY

DEPARTMENT OF ROADS
MINISTRY OF TRANSPORT AND COMMUNICATION
THE REPUBLIC OF KAZAKHSTAN

THE STUDY
ON
DEVELOPMENT OF ROAD NETWORK
IN WESTERN KAZAKHSTAN
IN
THE REPUBLIC OF KAZAKHSTAN

FINAL REPORT

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FEBRUARY, 1997

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Mr. Kimio Fujita
President
Japan International Cooperation Agency

February 1997

LETTER OF TRANSMITTAL

Dear Sir,

We are pleased to submit herewith the Final Report titled "The Study on Development of Road Network in Western Kazakhstan in the Republic of Kazakhstan". The report contains the advice and suggestions of the authorities concerned of the Government of Japan and your Agency as well as the comments made by the Ministry of Transport and Communication of the Government of Kazakhstan. The report consists of Main Report, Summary Report and Appendix Report in English, a Summary Report in Japanese and, a Summary Report in Russian.

The Main Report consists of 14 Chapters and presents the master plan and feasibility study on the road network and priority projects in Western Kazakhstan. It recommends the improvement of 358 km length of roads in Western Kazakhstan. The Summary Reports briefly illustrates the findings of the entire Study. The Appendix Report contains the supporting data including the technical details of the several field surveys carried out by the Study Team in Western Kazakhstan.

All members of the Study Team wish to express grateful acknowledgment to the personnel of your Agency, Ministry of Foreign Affairs, Advisory Committee, Ministry of Construction and Embassy of Japan in Kazakhstan, and also to officials of the Ministry of Transport and Communication, Government of Kazakhstan for their assistance extended to the Study Team. The Study Team sincerely hopes that the results of this study will contribute to the development of road network in Western Kazakhstan.

Yours faithfully,



Akira Ishido
Team Leader

PREFACE

In response to a request from the Government of Republic of Kazakhstan, the Government of Japan decided to conduct a master plan study and a feasibility study on road network development for western Kazakhstan and entrusted the study to the Japan International Cooperation Agency (JICA).

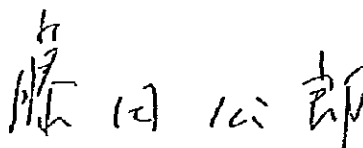
JICA sent to Kazakhstan a study team headed by Mr. Akira Ishido of Yachiyo Engineering Co., Ltd. (YEC), three times between September 1995 and November 1996.

The team held discussions with the officials concerned of the Government of Kazakhstan, and conducted field surveys at the study area. After the team returned to Japan, further studies were made and the present report was prepared.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of Kazakhstan for their close cooperation extended to the team.

February 1997



Kimio Fujita
President

Japan International Cooperation Agency

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ABBREVIATION

AASHTO	American Association of State Highway and Transportation Officials
AC	Asphalt Concrete Road
ADT	Average Daily Traffic
ADB	Asian Development Bank
B/C	Benefit-Cost Ratio
CBR	California Bearing Ratio
CIS	Commonwealth of Independent States
E	Earthen Road
EBRD	European Bank of Reconstruction and Development
ESCAP	Economic and Social Commission for Asia and the Pacific
EIA	Environmental Impact Assessment
FSU	Former Soviet Union
G	Gravel/Crushed Stone Road
GDP	Gross Domestic Product
GNP	Gross National Product
GRDP	Gross Regional Domestic Product
HDM	Highway Design and Maintenance Standards Model
IEE	Initial Environmental Examination
IH	International Highway
IMF	International Monetary Fund
IRI	International Road Roughness Index
IRR	Internal Rate of Return
JICA	Japan International Cooperation Agency
Kazdornii	State Highway Research Institute
Kazzhol	Kazakhstan Zholdary
LR	Local Road
MTC	Ministry of Transport Construction
MOTC	Ministry of Transport and Communications
NH	National Highway/Republican Road
NMP	Net Material Product
NPV	Net Present Value
NRDP	National Road Development Plan
O-D	Origin - Destination
pcu	Passenger Car Unit
RMMS	Road Maintenance Management System
USSR	Union of Soviet Socialist Republics
VAT	Value Added Tax
VOC	Vehicle Operating Costs
vpd	Vehicles Per Hour

FOREWORD

This Report is the Final Report on the "The Study on Development of Road Network in Western Kazakhstan in the Republic of Kazakhstan", which is undertaken by the Japan International Cooperation Agency (JICA) in accordance with the Scope of Work agreed and signed between the Ministry of Transport and Communication, Government of Kazakhstan and JICA.

The Study was carried out in both Kazakhstan and Japan since September 1995 and will be completed by January 1997.

The following Four Study Reports comprising the results of the study were prepared during the course of the Study.

- | | |
|-----------------------|----------------|
| 1) Inception Report | September 1995 |
| 2) Interim Report | May 1996 |
| 3) Draft Final Report | October 1996 |
| 4) Final Report | January 1997 |

This report comprises the results of the Study including analysis and recommendations for the road network and priority projects in Western Kazakhstan which comprises of the four states shadowed in the map below.

The close co-operation given to the Study Team by the Department of Roads and other concerned organisations in the Republic of Kazakhstan is very much appreciated. We hope this report will be useful for the development of road network in Western Kazakhstan.

Location of Western Kazakhstan



**Photos of Republican Roads and Bridges
in Western Kazakhstan**



Photo 1 : Republican Road (Aktyubinsk to Karabutak)

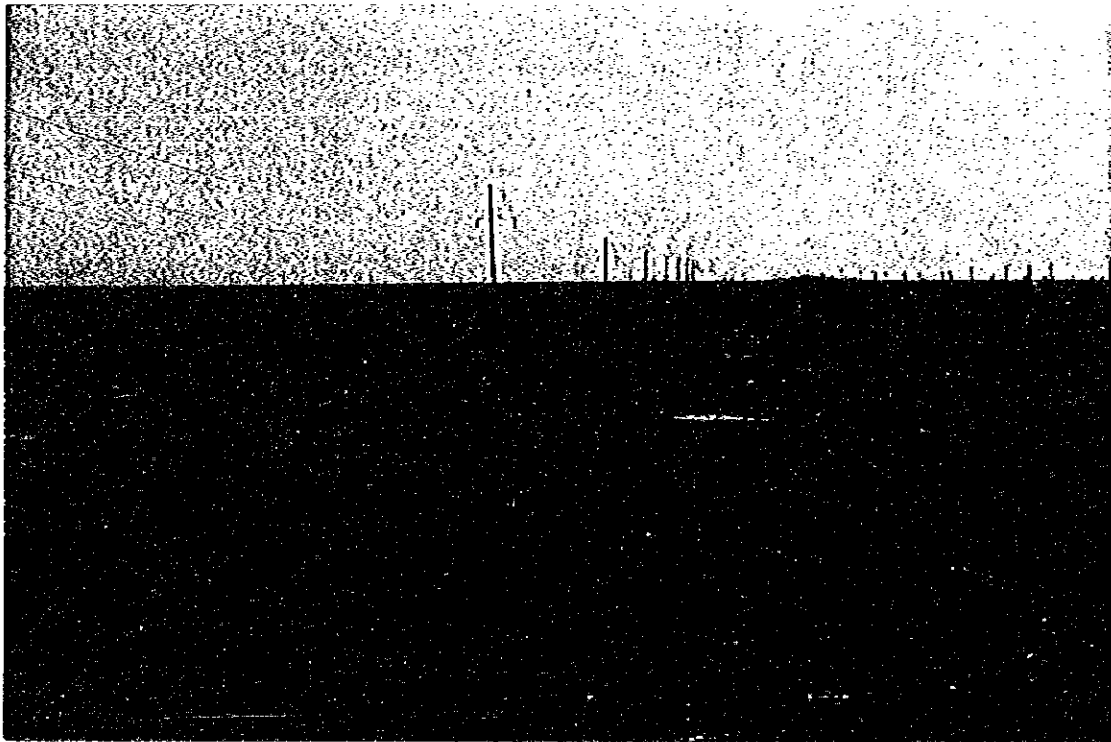


Photo 2 : Republican Road (Karabutak to Irgiz)



Photo 3 : Republican Road (Karabutak to Irgiz; hilly terrain)



Photo 4 : Republican Road; Construction Material Near Uralsk

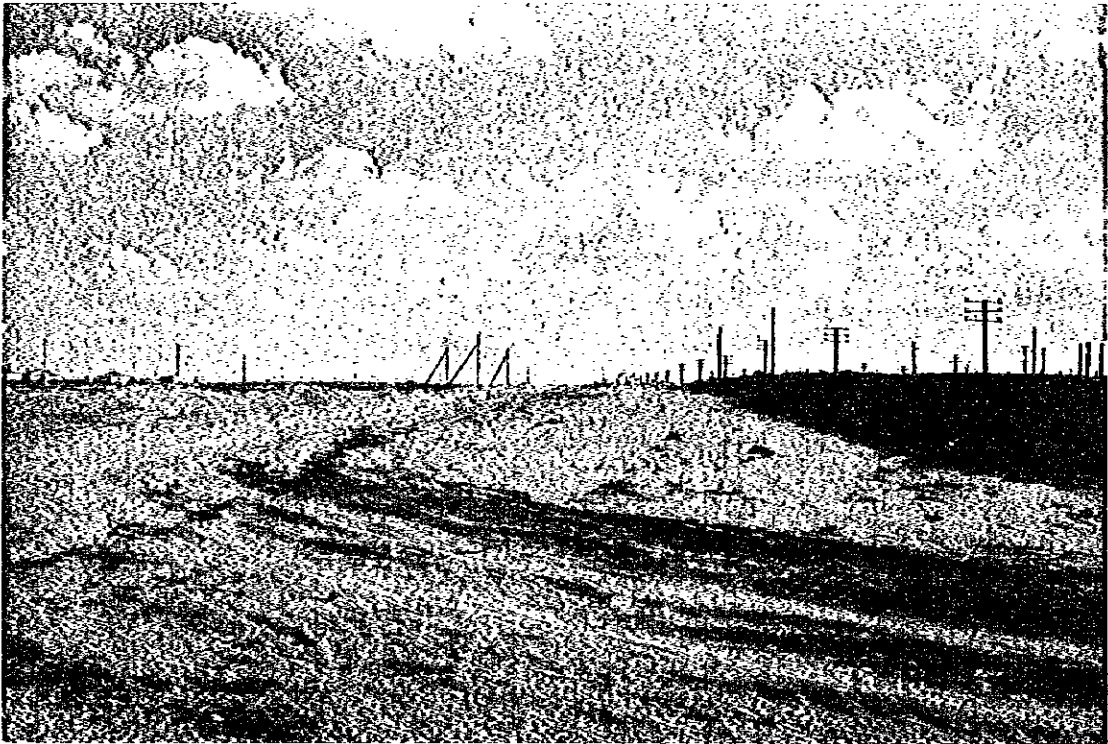


Photo 5 : Republican Road (Kulsary to Beyneu)

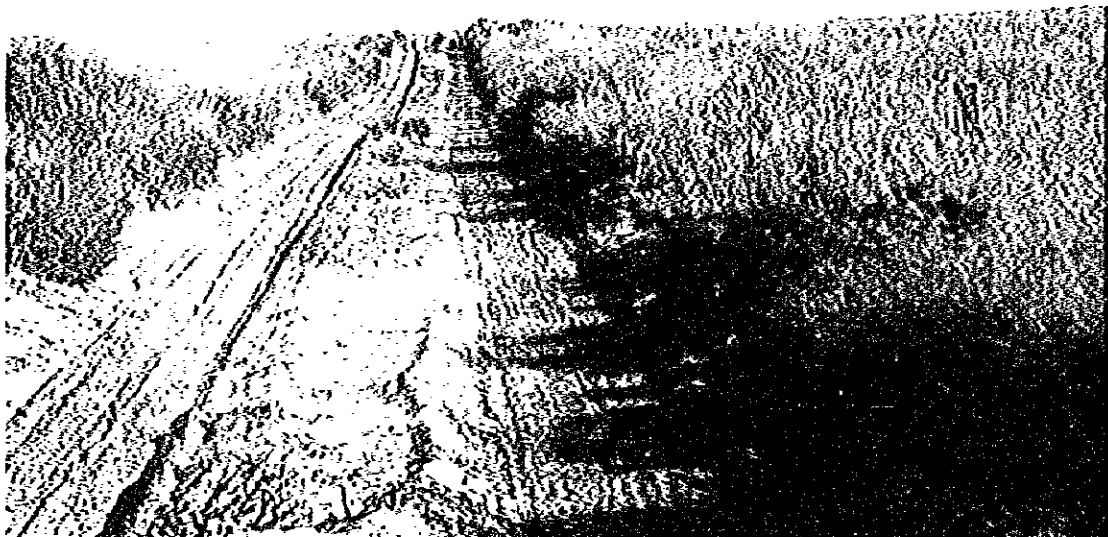


Photo 6 : Republican Road (Kulsary to Beyneu; no road)

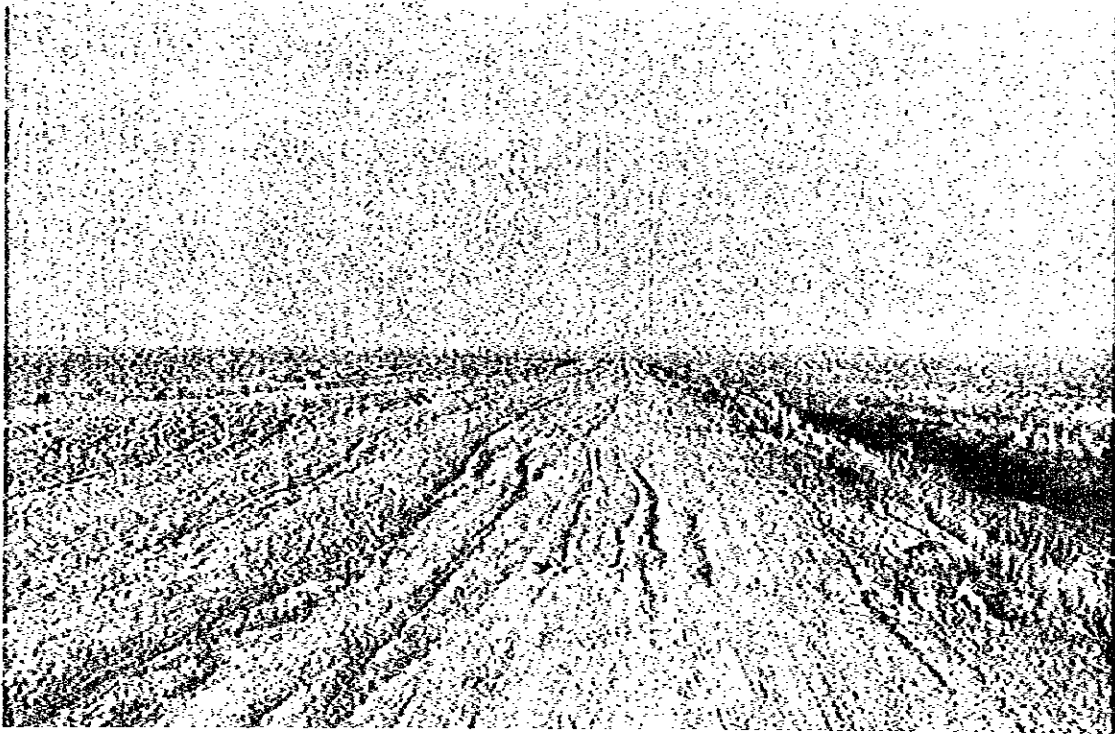


Photo 7 : Republican Road (Kzyl-Orda Border to Irgiz)

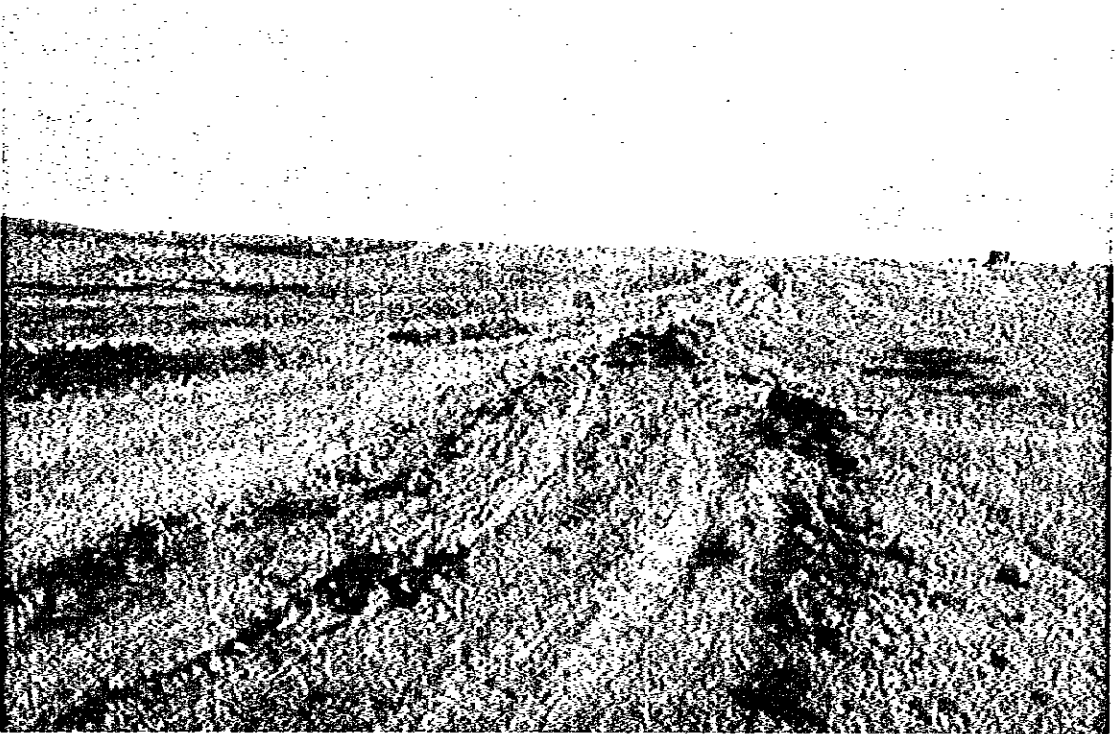


Photo 8 : Republican Road (Kzyl-Orda Border to Irgiz)

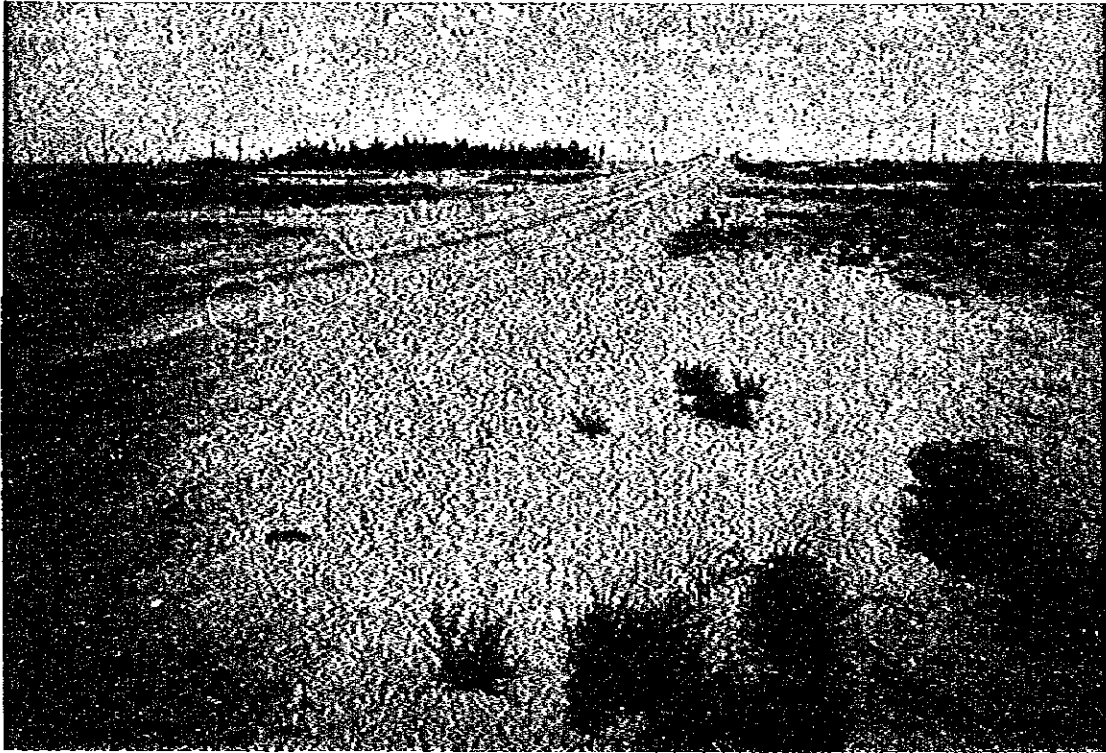


Photo 9 : Republican Road (Atyrau to Mahambet; Flooded Area)

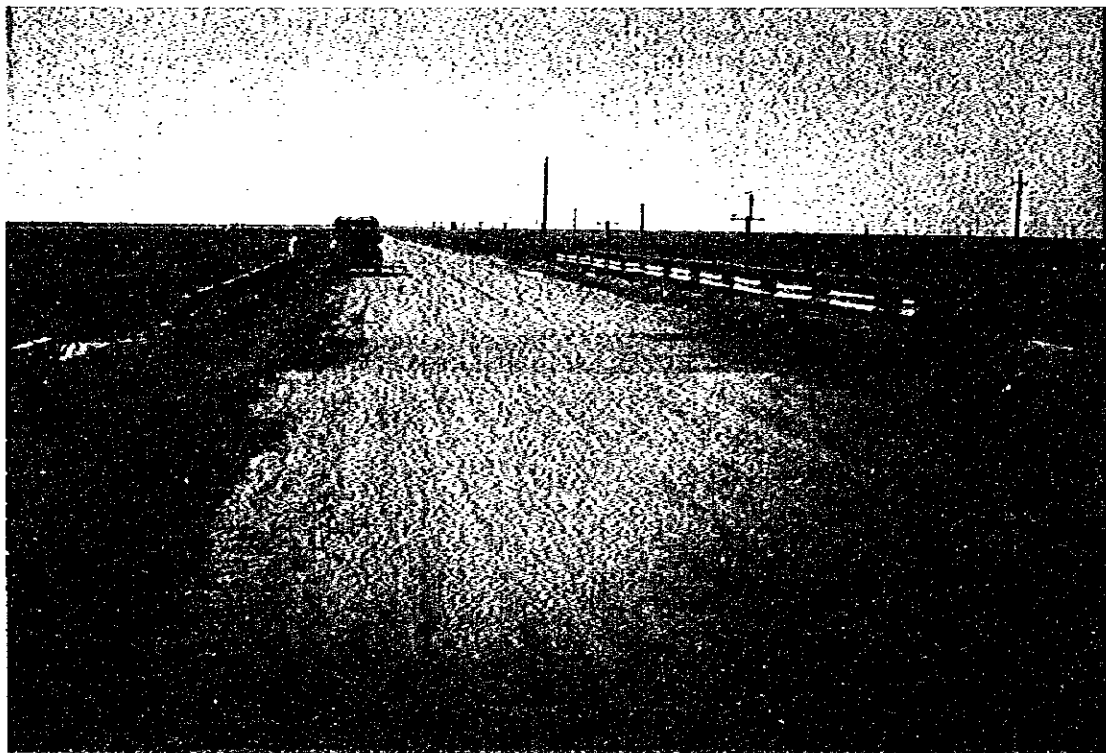


Photo 10 : Republican Road and Bridge No. 4 (Atyrau to Mahambet)

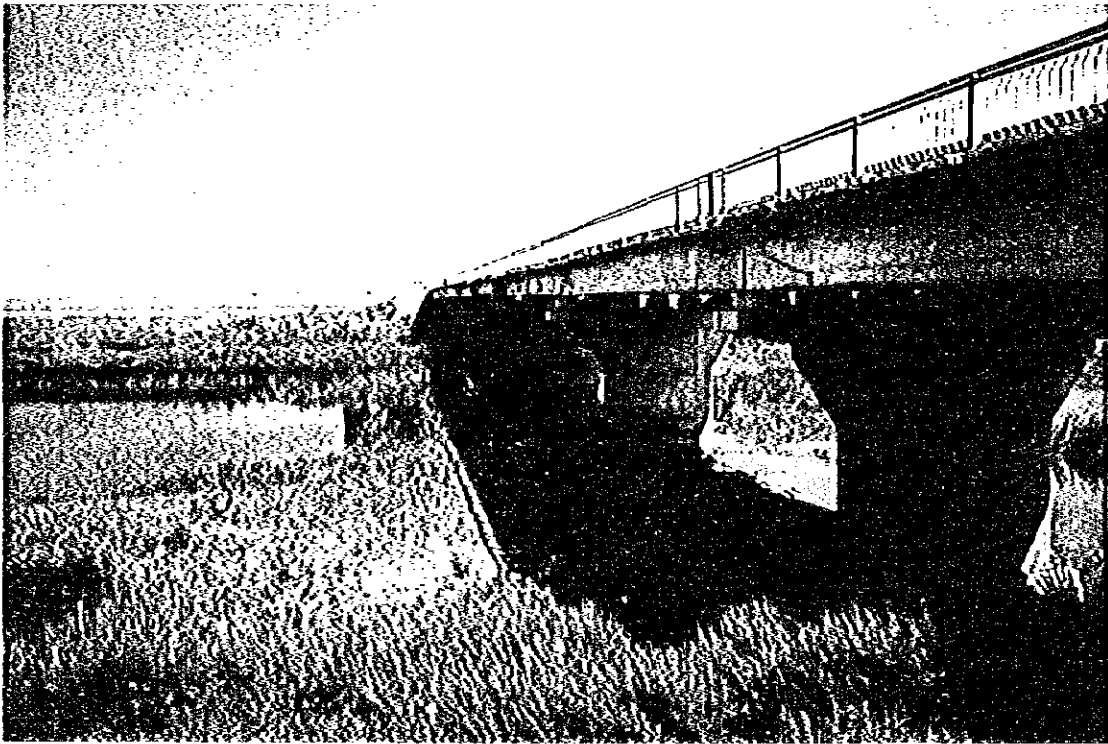


Photo 11 : Bridge No. 28 (Kzyl-Orda Border to Irgiz)



Photo 12 : Bridge No. 28 (Kzyl-Orda Border to Irgiz)



Photo 13 : Bridge No. 2 (Atyrau to Mahambet)

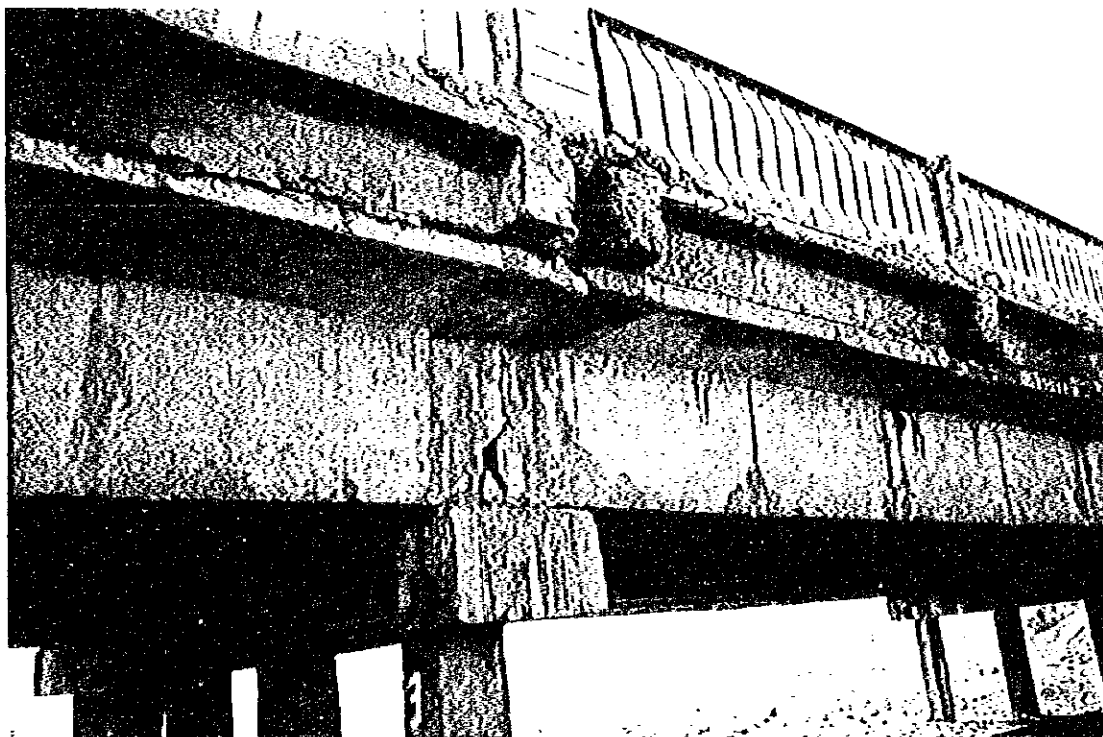
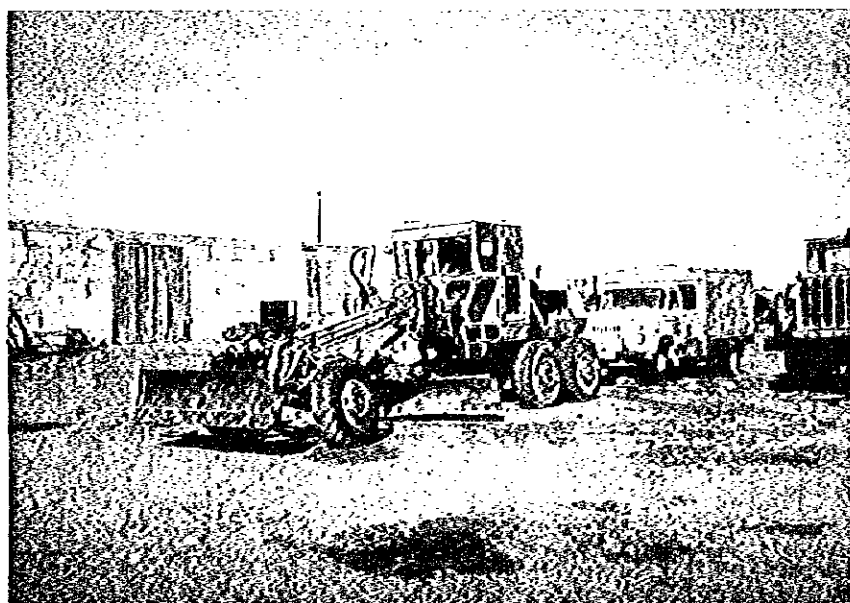


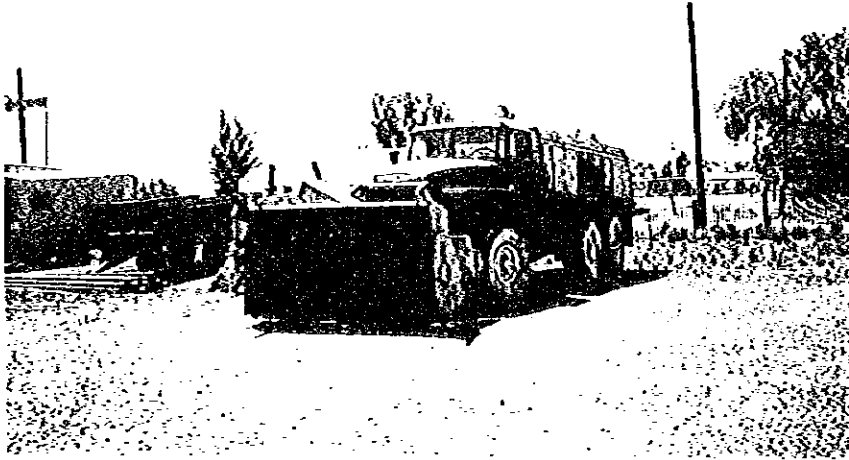
Photo 14 : Bridge No. 2 (Atyrau to Mahambet)



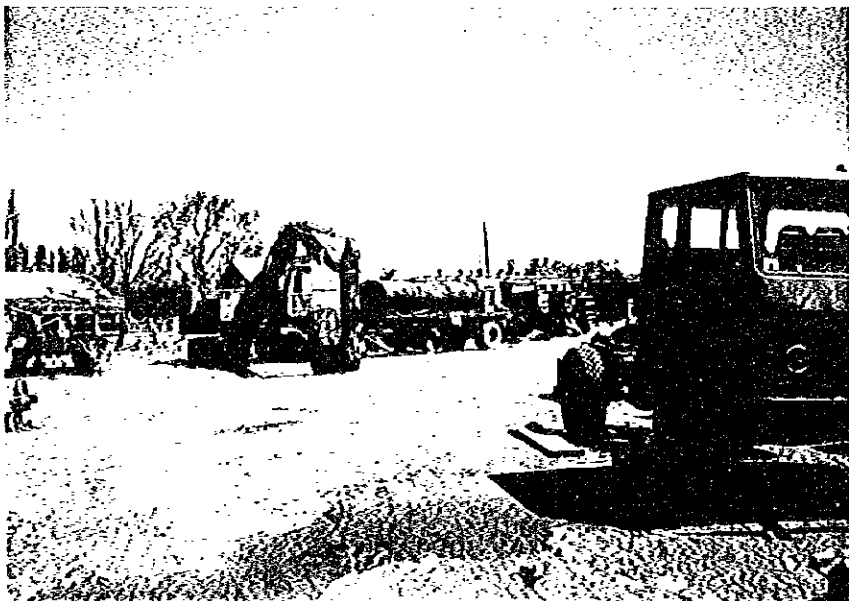
**Photo 15 : Existing Road Construction and Maintenance Equipment
(Actobe Zholdary)**



**Photo 16 : Existing Road Construction and Maintenance Equipment
(Actobe Zholdary)**



**Photo 17 : Existing Road Construction and Maintenance Equipment
(Atyrau Zholdary)**



**Photo 18 : Existing Road Construction and Maintenance Equipment
(Atyrau Zholdary)**

SUMMARY

1. Objectives of the Study

The road network of Kazakhstan comprises of about 160,000 km of several categories of roads as shown in the Table 1.

Table 1: Length of Roads in Kazakhstan

Republican Road	17,670 km
Local Road	69,667 km
Service Road	71,451 km
Total	158,788 km

The Objectives of the study are;

- 1) to formulate road network in Western Kazakhstan and
- 2) to conduct feasibility study on priority projects to be selected from long-list projects.

2. Formulation of the Road Network in Western Kazakhstan

Considering the population, number of vehicles, land extent and traffic, the existing road network which includes republican road, local roads and part of newly adopted Asian Highway forms sufficient road network in Western Kazakhstan. The total length of this road network is about 17,000 km as shown Figure 1 and Table 2.

Table 2: Road Length, Population and Area of Kazakhstan and Western Kazakhstan

Road Category	Kazakhstan	Western Kazakhstan
Republican Road	17,670 km	3,721 km
Local Road	69,667 km	13,336 km
Total	87,337 km	17,057 km
Population	16,679,000	2,207,000
Area	2,725,000 km ²	736,000 km ²

3. Feasibility Study on Priority Projects

The feasibility study was carried out on three priority projects which were selected from the 33 long-list projects having a total length of 4010 km. The feasibility study included estimation of road and bridge improvement costs, maintenance costs, vehicle operating costs and economic evaluation. (See Figure 2 and Table 3)

The results of the feasibility study are shown below in the Table 3.

Table 3: Economic Evaluation of Priority Projects

Road Section No.	Name of Road	Section	Length (km)	Project Cost (1,000US\$)	IRR %	B/C (12%)
1	Samara-Shimkent	Kzyl-Orda Border to Igriz	86	19,079	28.55	2.91
2	same as above	Igriz to Karabutak	189	43,605	23.28	1.93
18	Atyrau-Uralsk	Atyrau to Mahambet	83	26,729	23.01	2.15
Total			358	89,413	24.44	2.08

Based on the future traffic forecasts, the road category III was adopted for the priority projects. The three road sections mentioned above shall be improved to Category III road standard with pavement width of 7 m and shoulder width of 2.5m on both sides, thus the total width of roadway will be 12 m.

Typical cross section of road after improvement is shown below in Figure 3.

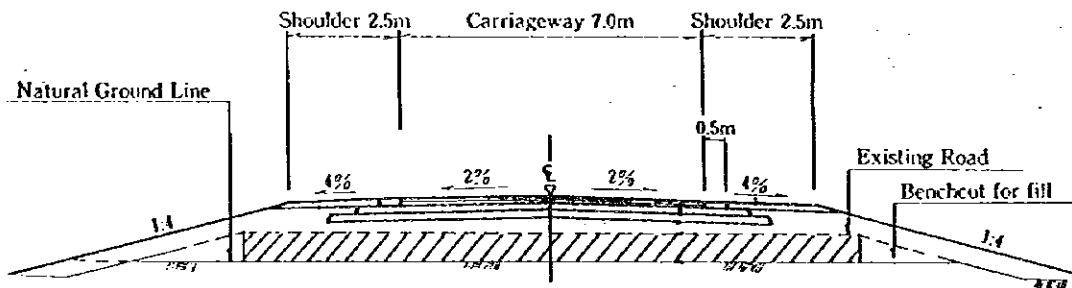
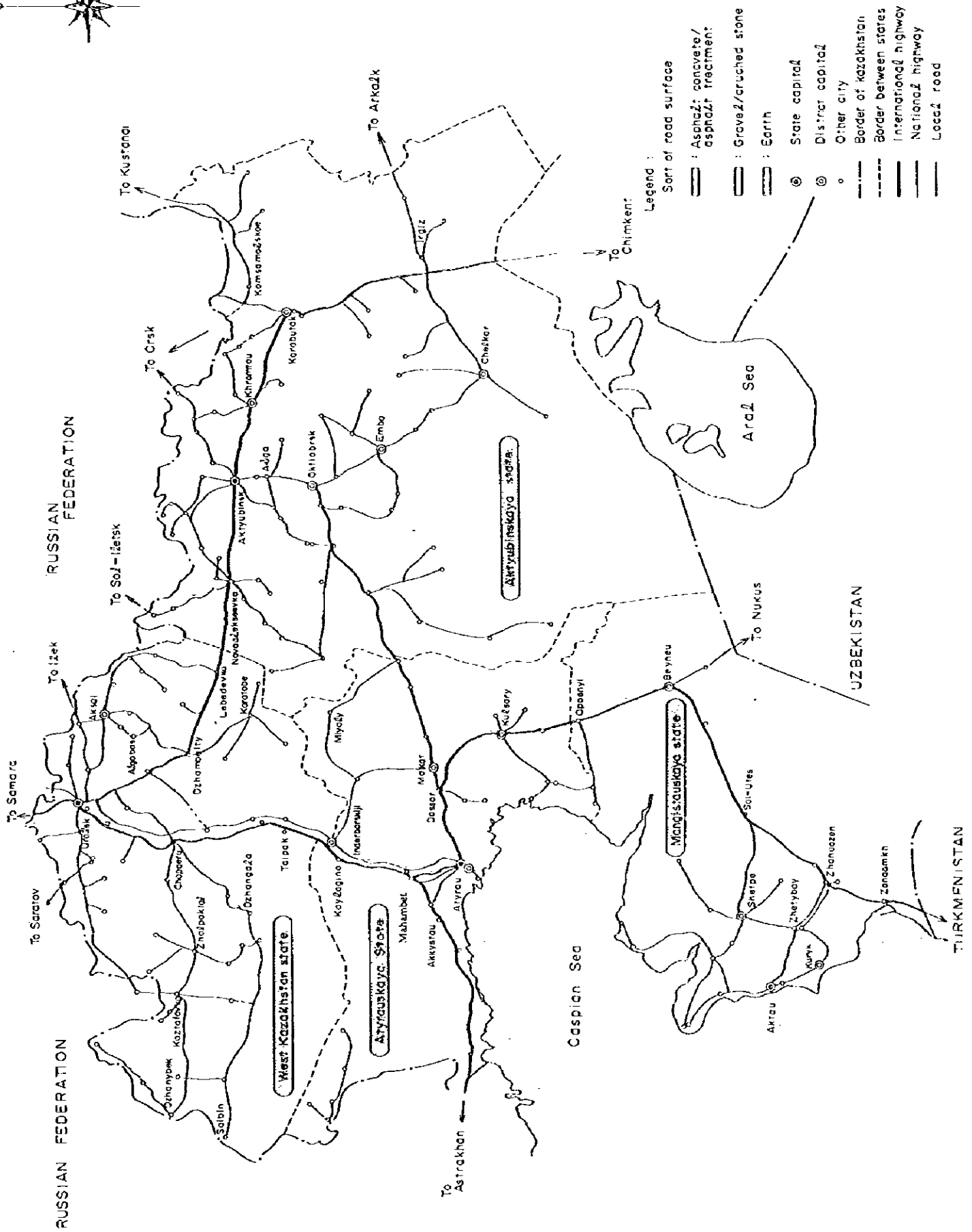
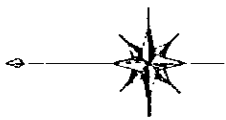


Fig. 3: Typical Cross Section of Road After Improvement

4 Recommendations

The Study Team recommends as follows.

- 1) Implementation of the three priority projects and, strengthening of the road maintenance system.
- 2) Introduction of the concept of cost accounting and quality control in construction works including structures.



- Legend :
- Sort of road surface
- : Asphalt: concrete / asphalt treatment
 - : Gravel/crushed stone
 - : Earth
- ⊙ : State capital
 ⊙ : District capital
 ○ : Other city
- - - : Border of Kazakhstan
 - - - : Border between states
 — : International highway
 — : National highway
 — : Local road

Fig. 1 : Roads in Western Kazakhstan

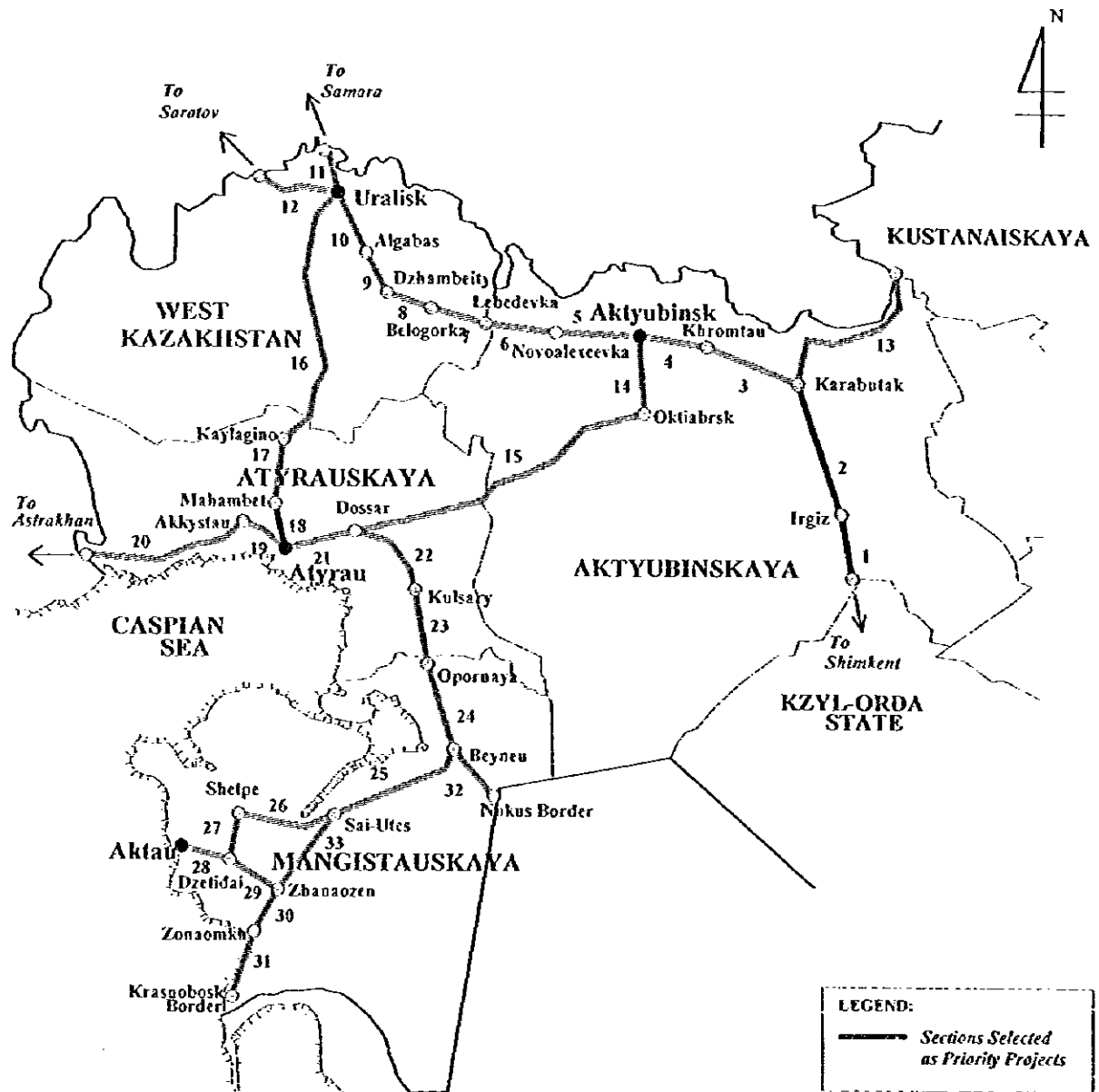


Fig. 2 : Long-List Projects and Selected Priority Projects

Chapter 1 Outline of the Study

- 1.1 Introduction**
 - 1.1.1 Background of Study**
 - 1.1.2 Objectives of Study**
- 1.2 Study Area**
- 1.3 Study Schedule and Organization**
 - 1.3.1 Study Schedule**
 - 1.3.2 Study Organization**
- 1.4 Technology Transfer**
- 1.5 Current Related Studies**

Chapter 1 Outline of the Study

1.1 Introduction

1.1.1 Background of Study

In response to the request of the Government of the Republic of Kazakhstan (hereinafter referred to as "the Government of Kazakhstan"), the Government of Japan decided to conduct the Study for Development of Road Network in Western Kazakhstan in the Republic of Kazakhstan (hereinafter referred to as "the Study") in accordance with the relevant laws and regulations in force in Japan.

Accordingly, Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programs of the Government of Japan undertook the Study in close relation with the authorities concerned of the Republic of Kazakhstan.

The preparatory Study Team was dispatched by JICA in February 1995, and after discussions with officials of the Government of Kazakhstan, the Scope of Works for the Study was agreed upon between both sides, and signed on March 10, 1995.

JICA has organized the Study Team to conduct the Study. The Study Team has carried out the study in close cooperation with the Kazakhstan authorities for one and half years since September 1995.

This Report comprises the results of the Study including analysis and recommendations for the road network and priority projects in Western Kazakhstan.

1.1.2 Objectives of the Study

JICA Study Team shall carry out the following studies and make a recommendation after both the field study including traffic survey and boring investigation for road improvement and also collect and analyze the data and issues on road and road transportation with close cooperation with the Department in the Republic of Kazakhstan.

- (1) To formulate a strategy plan for development of the road network in Western Kazakhstan.
- (2) To conduct a feasibility study on priority project(s) to be selected in the strategy plan.

The target year shall be 2010.

1.2 Study Area

The country is administratively divided into 19 states, and states are subdivided into districts. Districts include cities/towns, and state and collective settlements.

The study area covers the following four states of the Republic of Kazakhstan.

Aktyubinskaya state
West Kazakhstan state
Atyrauskaya state
Mangistauskaya state

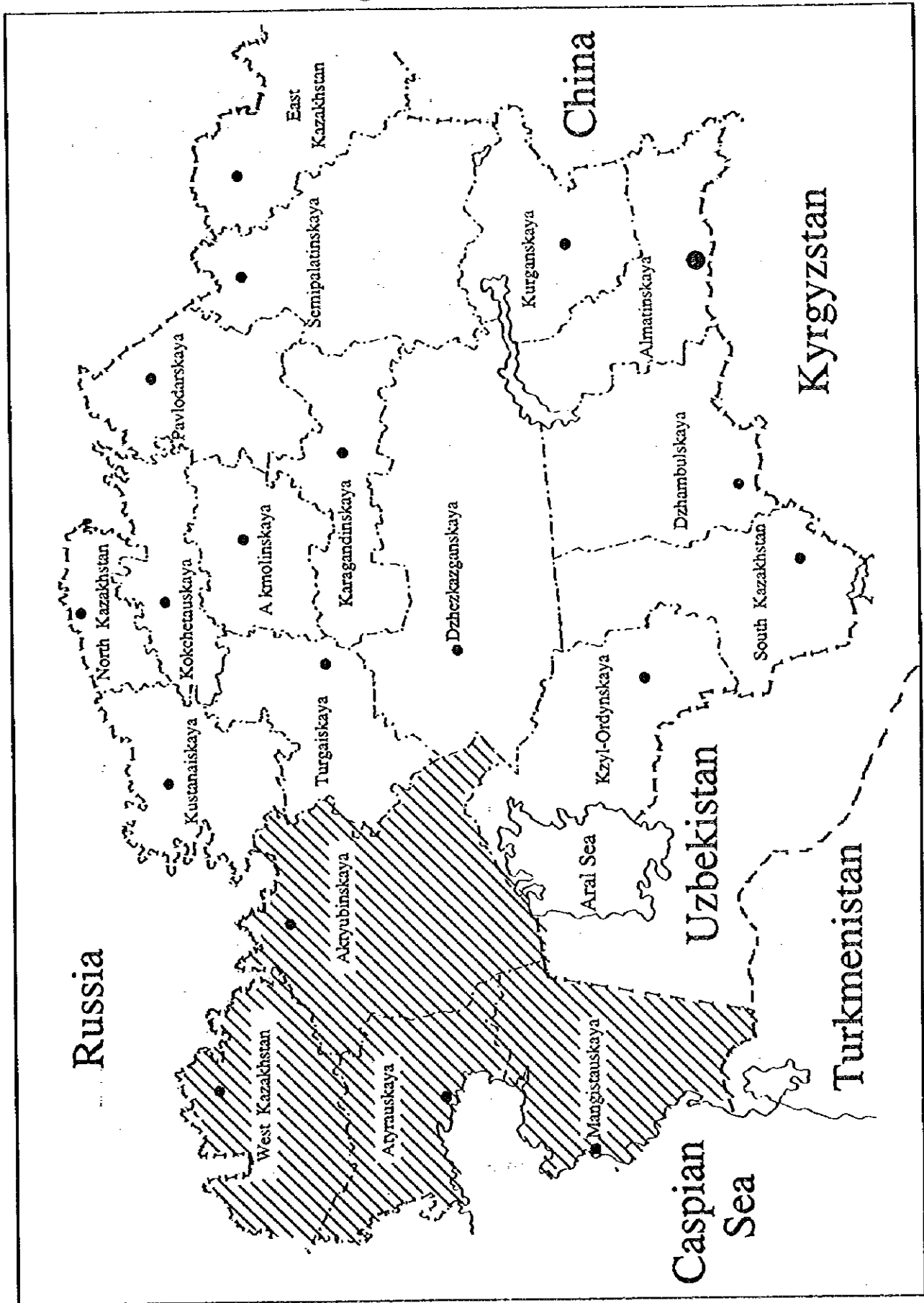
The above-mentioned four states have been collectively referred to as "Western Kazakhstan" in this Study and are shown in Fig. 1.2.1. Table 1.2.1 shows the area and numbers of cities/towns and settlements within each state. The total area is 736.1 Km², and 44 districts and 435 settlements are included.

Table 1.2.1 : Administrative Divisions of Western Kazakhstan

State	Area (1,000Km ²).	District Nos.	Town Nos	Town Type Settlement	Rural Type Settlement
Aktyubinskaya	300.6	16	7	3	150
Atyrauskaya	118.6	8	1	15	57
West Kazakhstan	151.3	16	2	4	164
Mangistauskaya	165.6	4	3	10	19
Western Kazakhstan	736.1	44	13	32	390
All Kazakhstan	2,724.9	220	83	204	2,496

Source: 1994 Statistics, etc.

Fig. 1.2.1 : Study Area



1.3 Study Schedule and Organization

1.3.1 Study Schedule

The duration of Study is 17 months commencing from September 1995 till January 1997. The study schedule is shown in Fig. 1.3.1. Following reports will be prepared in English including a Summary Report in Russian, during the course of the Study and submitted to the Government of Kazakhstan.

- | | |
|------------------------------------|------------|
| (1) Inception Report | Sept. 1995 |
| (2) Interim Report | May, 1996 |
| (3) Draft Final Report and Summary | Oct. 1996 |
| (4) Final Report and Summary | Jan, 1997 |

1.3.2 Study Organization

The parties directly concerned with implementation of the Study are the Department of Roads, Ministry of Transport and Communication as counterpart agency to the Study Team, JICA, Steering Committee organized by the Government of Kazakhstan, the Advisory Committee organized by JICA, and the Study Team. The schematic organization chart for the Study is shown in Fig. 1.3.2.

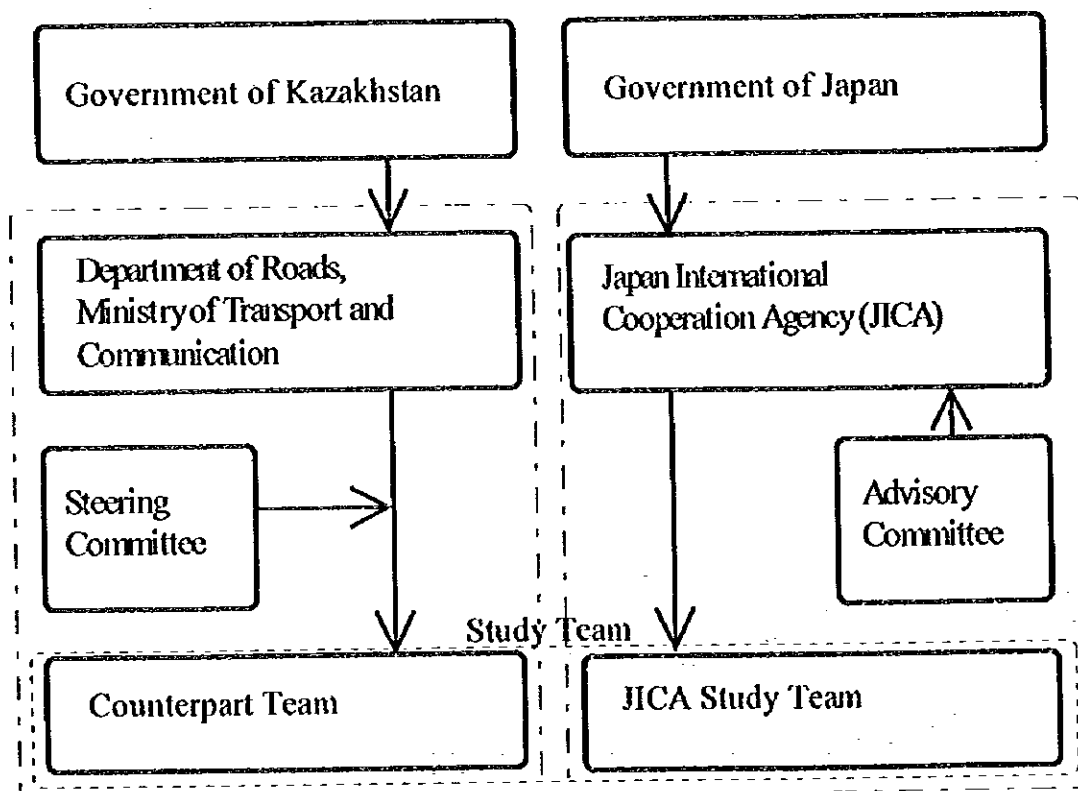


Fig. 1.3.2 : Organizational Chart for the Study

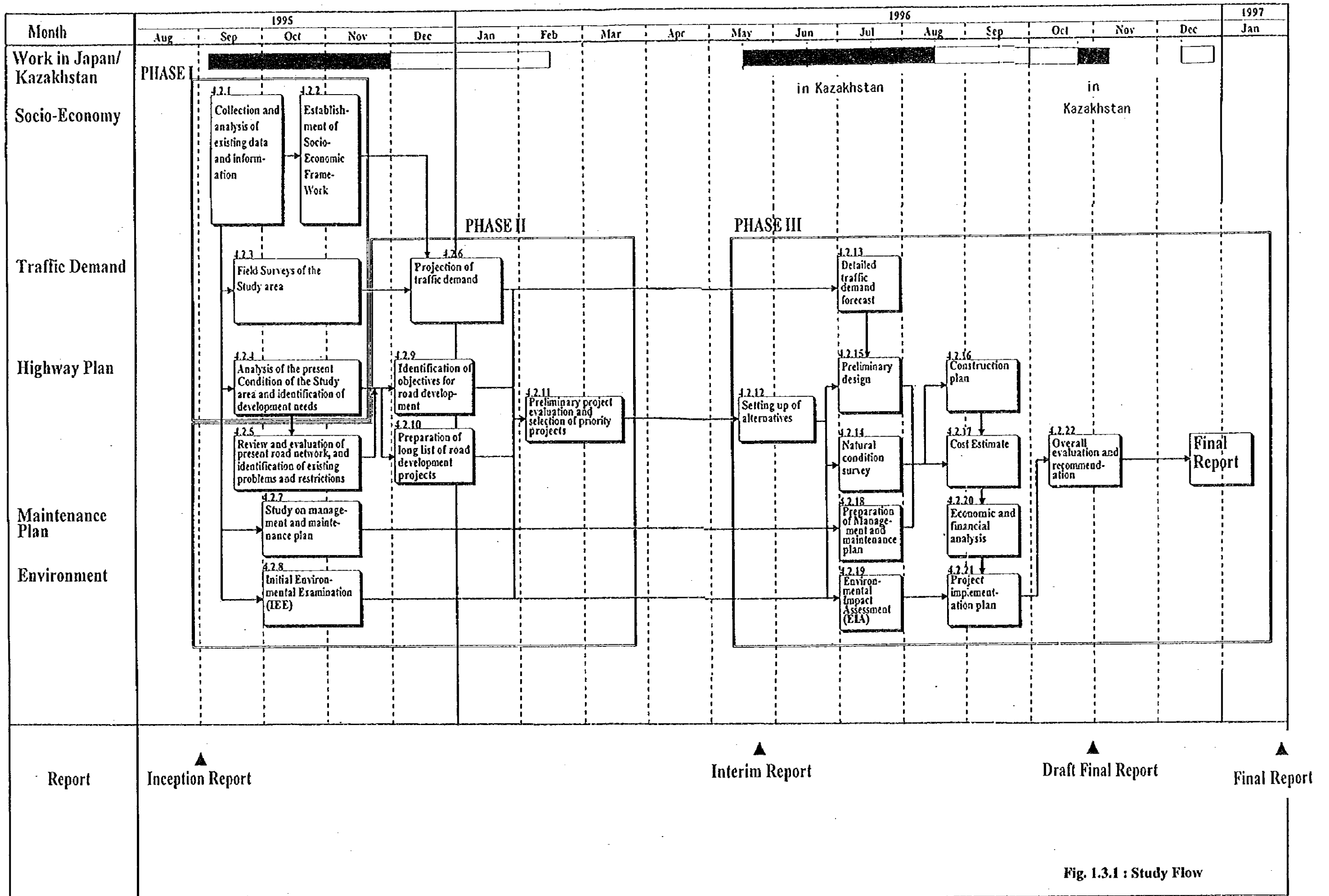


Fig. 1.3.1 : Study Flow



(1) JICA Study Team Members

Dr. Akira ISHIDO	Team Leader/Highway Planner
Mr. Tetsuo KAWAMURA	Regional Development Planner
Mr. Tetsuo HORIE	Traffic Surveyor
Mr. Yoshimasa ISHII	Traffic Demand Analyst
Mr. Akihiko KITAYAMA	Highway Engineer
Mr. Yukio KOSAKA	Maintenance Planner
Dr. Ravinder KATIYAR	Economist
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Mr. Katsumi FUJII	Coordinator

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(2) JICA Advisory Committee Members

Mr. Tamotsu KOBAYASHI	Ministry of Construction
Mr. Yasuo OGUCHI (Ex.)	Ministry of Construction
Mr. Takio MABASHI	Ministry of Construction

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(4) Steering Committee Members

Department of Roads, Ministry of Transport and Communication

Kazakhstan Zholdary, State Joint Stock Company

Kazdoroproject, State Joint Stock Company

Kazdornii, Joint Stock Company

Ministry of Environment

Statistic Research Committee

Representatives from Aktyubinskaya, West Kazakhstan, Atyrauskaya and

Mangistauskaya state

1.4 Technology Transfer

During the course of the study, the Study Team will carry out technology transfer to the Department of Roads counterpart staff, and to the staff of Zholdary, Kazdornii and Kazdorproject and other related organizations. Most of this technology transfer will be done on-the-job and during the meetings to discuss various aspects of the project.

Items of technology transfer are as follows.

- 1) Formulation of road network
- 2) Method of traffic forecast
- 3) Geometric standards of highways
- 4) Design of road pavement
- 5) Design and investigation of bridges
- 6) Construction cost estimation
- 7) Maintenance of road
- 8) Method of estimation of vehicle operating cost
- 9) Environmental considerations
- 10) Method of economic evaluation

1.5 Current Related Studies

Review on related studies are carried out on the following reports.

- 1) European Bank: Final Report, Roads and Road Transport Study, Russia, Ukraine, Kazakhstan, Belarus, December 1992
- 2) European Bank: Draft-Final Report, Road Development Study, July 1994
- 3) Asian Development Bank: Draft-Final Report of Road Rehabilitation Project, December 1995

There are no other studies than the above listed as well integrated and useful reference to the feasibility study.

- (1) EBRD : Roads and Road Transport Study : Russia, Ukraine, Kazakhstan, Belarus, December 1992**

(a) Agencies Concerned

- (i) Executive Agency : Commission of the European Communities
- (ii) Financing Agency : European Bank for Reconstruction and Development (EBRD)
- (iii) Consultancy : COWIconsult(Denmark) and TeenEcon(UK)

(b) Time Duration of the Study : from March 1992 to December 1992

(c) Objectives of the Study

- (i) Defining role of road transport
- (ii) Review investment priorities

(iii) Identify urgent projects

(d) Urgent Project in Kazakhstan

New road from Atyrau to Kulsary was selected as urgent project road in Kazakhstan.

The main results of the preliminary analysis of the project are follows.

NPV per km : 25.7 mill/rubles (rate 9%)

B/C : 2.03

IRR : 22.8%

Project Life : 15 years

(2) European Bank : Road Development Study : Kazakhstan, July 1994

(a) Agencies Concerned

(i) Executive Agency : EBRD

(ii) Financing Agency : EBRD

(iii) Consultancy : Carl Bro International(Denmark) and Danish Road Directorate

(b) Time Duration of the Study : from April to June 1994

(c) Objectives of the Study

(i) Improve road budget

(ii) Identify viable projects

(iii) Maintenance equipment

(iv) Training

(d) Result of the Study

(i) Revision of the National Road Plan

(ii) Recommendation of loan for maintenance, equipment, bridges and training

(3) ADB : Road Rehabilitation Project : Kazakhstan, December 1995

(a) Agency Concerned

(i) Executive Agency : Department of Roads, MOTC, Kazakhstan

(ii) Financing Agency : Asian Development Bank

(iii) Consultancy : Louis Berger International Inc.(USA) and Kazdorprockt (Kazakhstan)

(b) Time Duration of the Study : from July 1995 to January 1996

(c) Objectives of the Study

The principal objective of this study is to prepare feasibility analysis and preliminary design for the rehabilitation of selected sections of the National Road network included in the National Road Development Plan prepared by the Government of Kazakhstan.

(d) Selection of Road

- | | |
|------------------------|---|
| 1) National Road | 11,170km |
| 2) Preliminary List | 3,800km |
| 3) Shortlisted Road | 1,220km |
| 4) Final Selected Road | 407km(Eastern Kazakhstan)
(535km including additional roads) |

Criteria of selection of road are as follows

- 1) International corridor
- 2) Condition of road
- 3) Present traffic volume
- 4) Population density
- 5) Economic Activity
- 6) Engineering and environmental considerations

(e) Feasibility Analysis

Feasibility analysis were carried by following economic evaluation

- | | |
|------------------|--|
| cost | rehabilitation cost |
| benefit | vehicle operating cost and maintenance cost |
| project life | 20 years |
| evaluation items | NPV(rate 12%), IRR(22.6-26.0%) and B/C(1.2-2.2) |
| | (IRR and B/C written above are depend on road sections.) |

Execution of the final selected roads with total length 407km are recommended.

Chapter 2 Social Economic Conditions

2.1 Population

2.2 Economy

2.3 Transportation

2.3.1 Freight Transportation

2.3.2 Passenger Transportation

2.3.3 Vehicle Ownership

Chapter 2 Social Economic Conditions

2.1 Population

The population in Kazakhstan in 1994 was about 17 million. Migration has started since the establishment of CIS (Community of Independent Societies) in December, 1991, and the population in 1995 reduced by 263,300 (1.6% of the previous year).

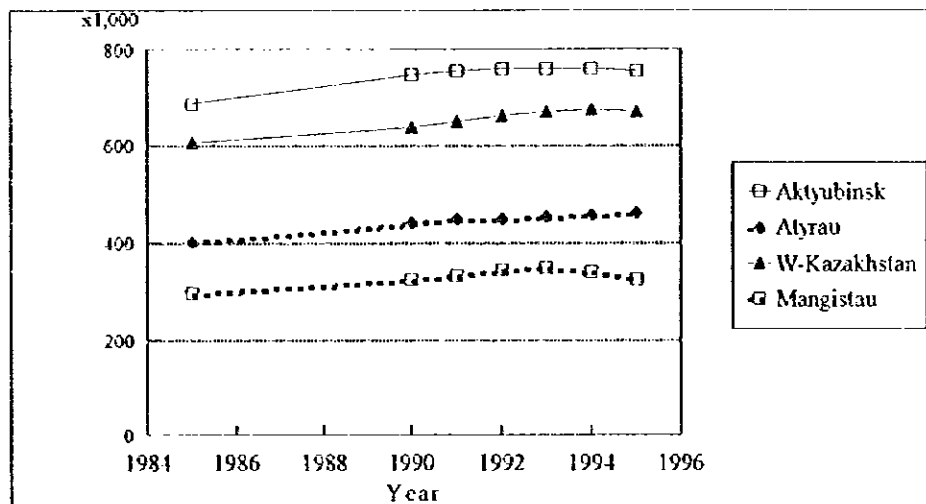
The total population in the four states of Western Kazakhstan is 13% (2.21 million in 1995) of that of the whole country. The area of the four states is 736.1 km² or about 27% of the whole country (2,724.9 km²), the population density of the Study Area is lower than the country average.

The population and area in the four states and whole Kazakhstan are shown in Table 2.1.1

Table 2.1.1 : Area and Population in 1995

State	Area (km ²)	Shared area (%)	Population (x1,000)	Shared population (%)
Aktyubinskaya	300.6	11	752.8	5
Atyrauskaya	118.6	4	459.6	3
West Kazakhstan	151.3	6	669.8	4
Mangistauskaya	165.6	6	324.4	2
Four states of Western Kazakhstan	736.1	27	2,206.6	13
Whole Kazakhstan	2,724.9	100	16,679.1	100

Aktyubinskaya state has the highest population of 750,000 among the four states in 1995, and 670,000 in West Kazakhstan, 460,000 in Atyrauskaya, and 320,000 in Mangistauskaya states are following. The average urban population share of the four states (54.7%) is similar to that of the country's average (56.0%), while the share of urban population in Mangistauskaya state is highly concentrated (79.6%) to the urban area and the rural population in West Kazakhstan state is higher than urban population (40.9%).



Source: 1995 Annual Statistics

Fig. 2.1.1 : Population Trend by State

The population trend in the three states other than Atyrauskaya state turned to decrease in 1995, while that in Atyrauskaya state keeps the increase since 1985 with the annual rate of 0.4% (see Fig. 2.1.1).

The population by district shows (see Fig. 2.1.2) the high concentration to the state capitals of about 1/3 to 1/2 of the state population. It is 260,000 in Aktyubinsk city, 150,000 in Atyrau city, 250,000 in Uralsk city and 170,000 in Aktau city. Other cities of which population is more than 50,000 are Khromtau and Chelkar in Aktyubinskaya state, Aksai (Burlinskiji rajon) in West Kazakhstan state, Ganjushkino (Kurmangazinskiji rajon), Veloksh, and Tengis (Zhylyoiskiji rajon) in Atyrauskaya state, and Zhanaozen in Mangistauskaya state.

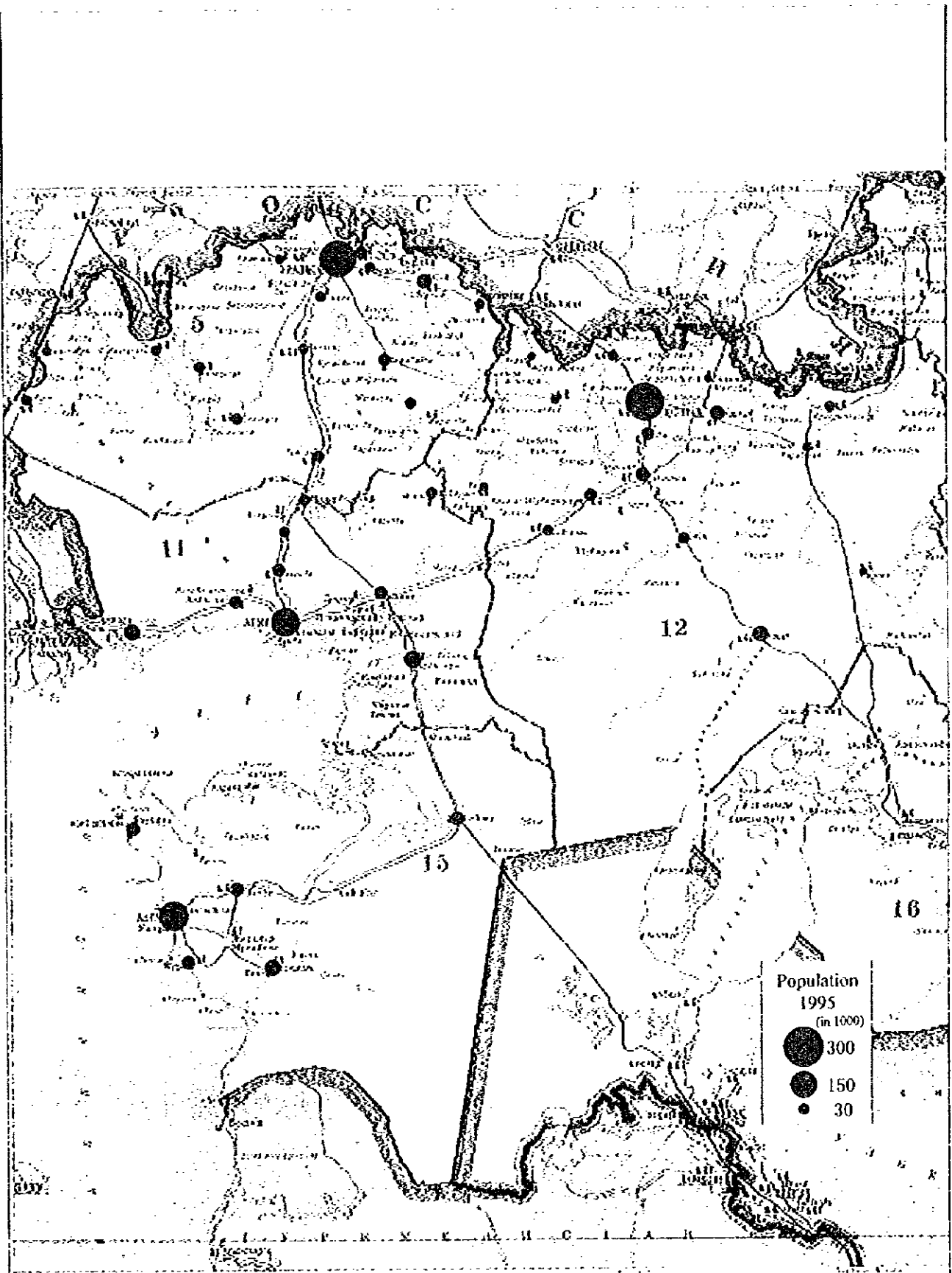
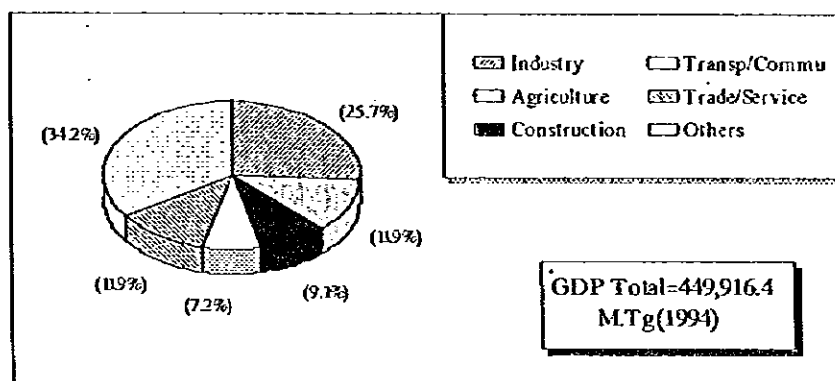


Fig. 2.1.2 : Population (in 1000) of Cities in Western Kazakhstan

2.2 Economy

In Kazakhstan, Net Material Product (NMP) has been used to show the size of economic activity following the system of Former Soviet Union (FSU), and recently Gross Domestic Product (GDP) was introduced following the System of National Account (SNA) of United Nations. NMP does not include services other than those related to goods and material production, so that the figure tends to be lower than GDP.

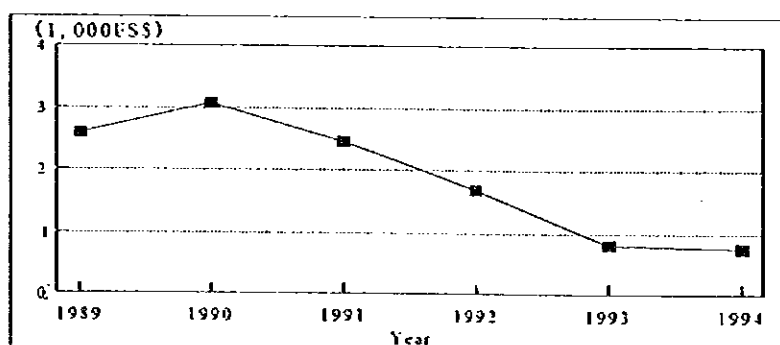
GDP in 1994 was 449,916 million Tenge as shown in Fig. 2.2.1. The sector of other services takes 34.2%, and mining and manufacturing sector takes 25.7%, and agriculture sector, occupying 23% of the total employment, 11.9%.



Source: 1994 Annual Statistics

Fig. 2.2.1 : GDP Share by Sector (1994)

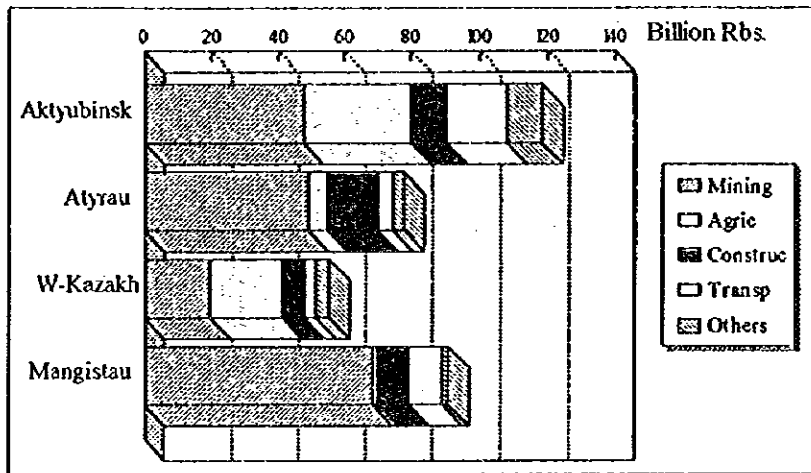
Fig 2.2.2 shows the trend of GDP per capita in terms of US\$, which recorded the highest of 3,000 US\$ in 1990 and the figure shows sharp decrease until 1993. However after 1993, the national economy started to stabilise and the figure indicates the possibility of increase afterwards. GDP per capita in 1994 counted at 740 US\$. It is noted that figures in 1993 and 1994 are preliminary figures.



Source: 1994 Annual Statistics

Fig. 2.2.2 : Trend of Per Capita GDP

The 1992 GRDP by state is shown in Figure 2.2.3.



Source: 1994 Annual Statistics

Note: Agric : Agriculture sector ; Const : Construction sector ;
 Transp : Transport sector ; Others : Other service sector

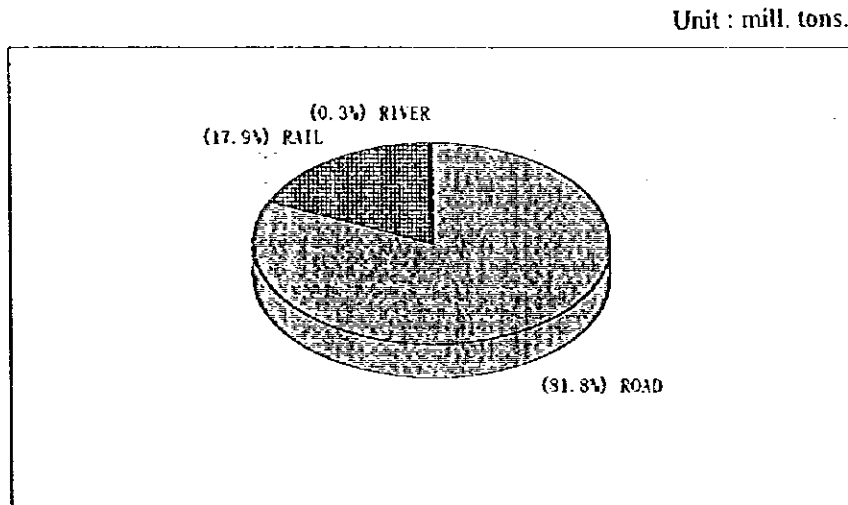
Fig. 2.2.3 : GRDP by Sector (1992)

2.3 Transportation

2.3.1 Freight Transportation

Means of freight transportation excluding pipeline consist of road (truck), rail and river transportation. In 1994, road transportation for the country totalled 800 million tons or 81.8% of loads hauled by all means of transportation. Rail transportation accounted for 175 million tons or 18%.

Within the 4 states surveyed, road transportation totalled 88.6 million tons or 11% of the entire country. The share of road transportation was high at 86.9% and especially so in West Kazakhstan state where it reached 95%.

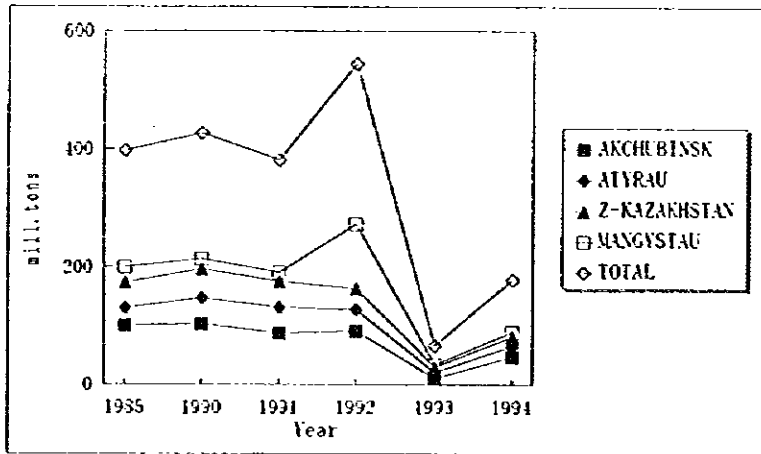


Source : Annual Statistics, 1995.

Fig. 2.3.1 : Share of Freight Transportation by Mode (1994)

Annual freight transportation volume from 1985 to 1994 are shown in Figure 2.3.2 to Figure 2.3.4 by mode.

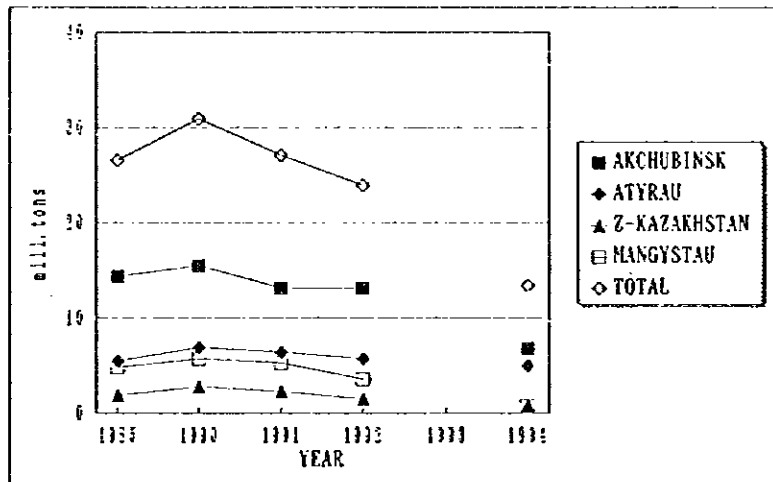
Unit : Working on rental terms/mill. tons.



Source : Annual Statistics, 1995.

Fig. 2.3.2 : Cargo Transportation by Road

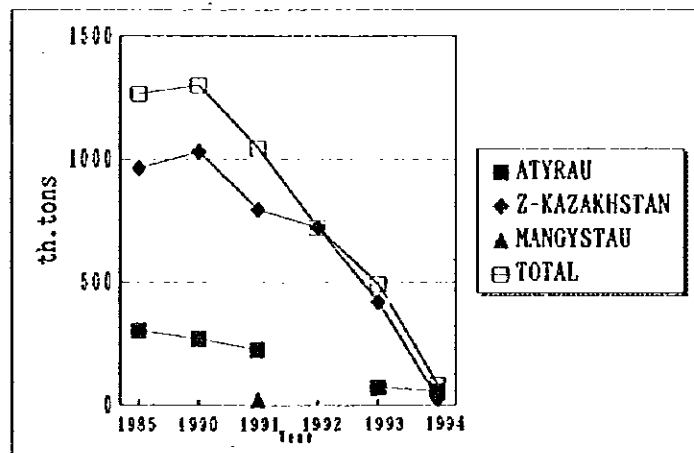
Unit : mill. tons.



Source : Annual Statistics, 1995.

Fig. 2.3.3 : Cargo Transportation by Rail

Unit : thousand tons.



Source : Annual Statistics, 1995.

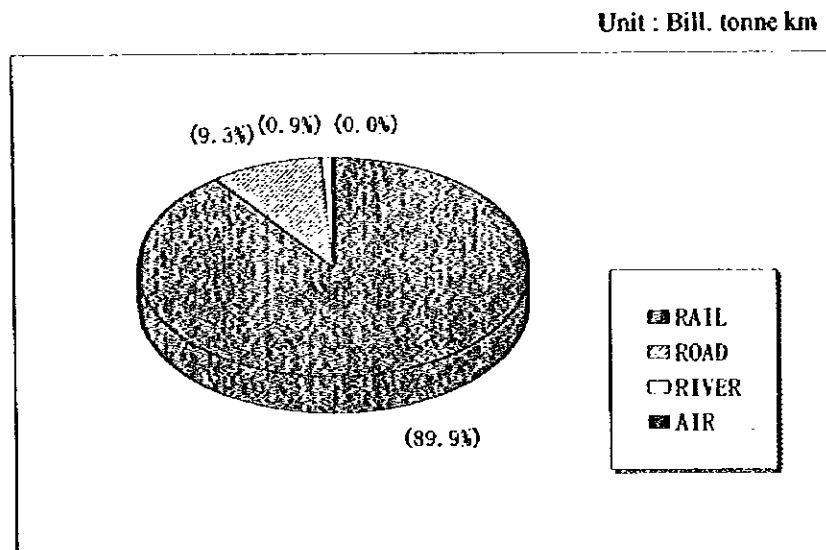
Fig. 2.3.4 : Cargo Transportation by River

As far as the national freight traffic volume (tonnage-kilometres) share is concerned, that of railways found to be 89.9%, road 9.3% and river 0.9%.

Concerning the share of freight traffic volume in West Kazakhstan state, data did not exist and therefore unknown, but according to information obtained through questioning persons concerned, the share of rail was determined to be highest or similar to the national tendency. This derives from the fact that the principal industry of Aktyubinskaya state is mining. The country's leading mines and producing fields for crude oil, copper, nickel, chrome, etc. are located in the state and rail transportation for such produce is most effective. Furthermore, the destination being faraway Russia also has much to do for the consequences.

Road transportation is highly reliant on the national highway linking Samara in Russia with Tashkent in Uzbekistan.

The country's largest oil producing regions are located in Atyrauskaya state and Mangistauskaya state and crude oil is sent to Russia through pipelines.



Source : Goskomstat, Ministries of Transport.

Fig. 2.3.5 : Volume of Freight Transportation by Mode (1991)

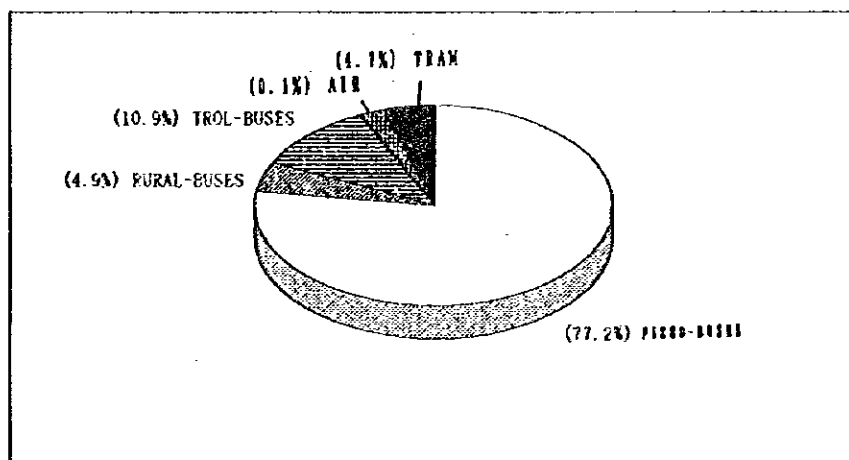
2.3.2 Passenger Transportation

Means of passenger transportation in Kazakhstan are bus, rail, air and inner city streetcar. Bus transportation can be broken down into those on regular routes, local routes and trolleys within cities.

In 1994, buses running regular routes carried 77.2% of all passengers across the country, the largest among all modes of transportation and hauled a total of 1485 million.

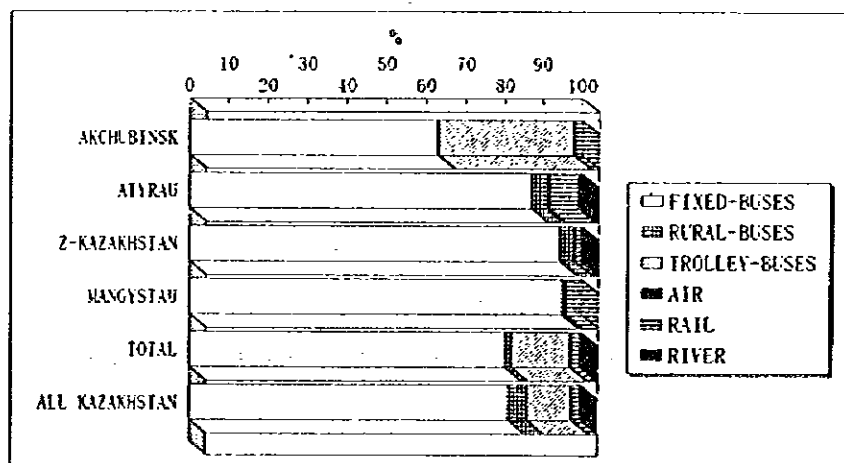
Trolleys in cities came next with 209 million passengers carried during the year. When the number of passengers carried by buses in the rural or local districts was included, the share of bus transportation came to 93%. Against such a predominant share, that of rail was 2% and air a meager 0.2%.

Within the 4 states surveyed and a total of 148 million passengers, buses running regular routes accounted for 80%. The reason why the share of buses running regular routes was lower than the national share was because the number of passengers riding trolleys in Aktyubinskaya was as high as 23 million. The other states showed a trend similar to the national tendency.



Source : Annual Statistics, 1995.

Fig. 2.3.6 : Share of Passengers Transportation by Mode (1994)

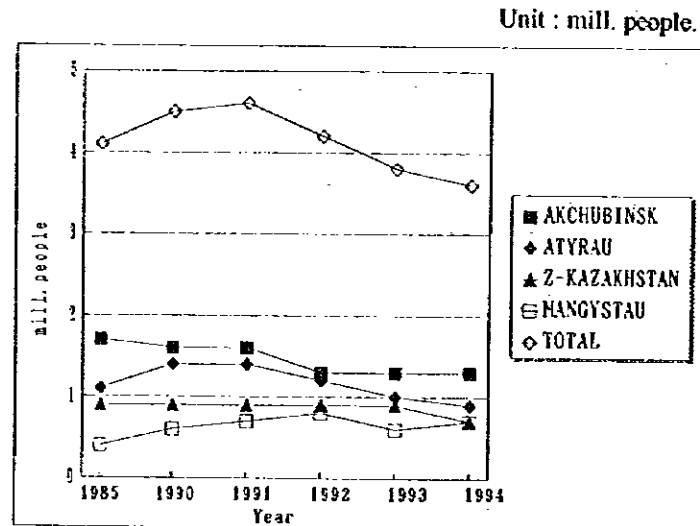


Source : Annual Statistics, 1995.

Fig. 2.3.7 : Share of Passengers Transportation by Mode (1994) (KAZAKHSTAN)

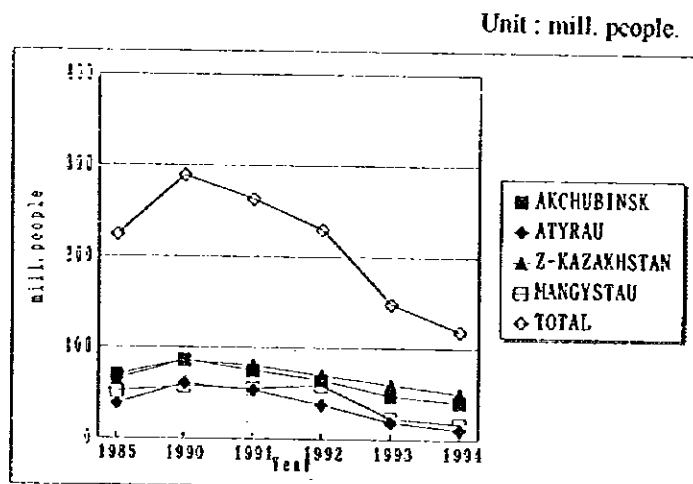
As far as the number of passengers using various modes of transportation is concerned, those using rail, buses running regular routes and rural or local buses decreased steadily since 1990 and, in 1994, it had dropped to some 50% of what it was in 1990. On the other hand, use of trolleys and streetcars, the means of transportation in cities or urban districts, has remained constant.

When considering that freight transportation is experiencing an upturn since 1993, passenger transportation has remained constant or declined somewhat.



Source : Annual Statistics, 1995.

Fig. 2.3.8 : Trend in Passenger Transportation by Rail

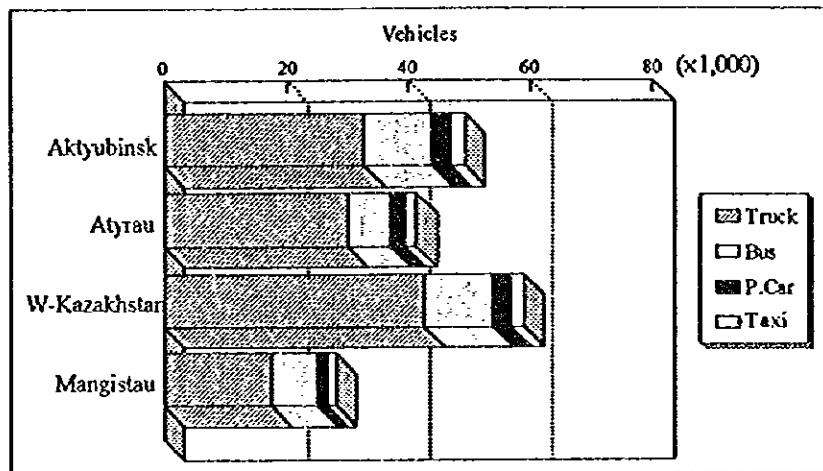


Source : Annual Statistics, 1995.

Fig. 2.3.9 : Trend in Passenger Transportation by Road

2.3.3 Vehicle Ownership

Fig. 2.3.10 shows registered number of vehicles by state in Western Kazakhstan in 1995. West Kazakhstan state has the highest fleet of 58,859 vehicles, and Aktyubinskaya state follows with 49,153 vehicles. The total number of vehicles in the four states of the Study Area is 177,285 and it is calculated that there are 80.3 vehicles per 1,000 persons. The number of vehicles in the annual statistics published from the Central Statistics Committee is different from the above figures, however according to the statistics, the share of the four states in Western Kazakhstan is 11.4% in 1994, which is slightly lower than the population share.



Source: State Administrations

Note: P.Car : Passenger Car

Fig. 2.3.10 : Number of vehicles in 1995

According to number of vehicles by vehicle classification of annual statistics in 1994, truck takes predominant share in all the four states, and the total share of truck of the four states in Western Kazkhsatan reaches to 69.0%, and bus 20.9%. The share of passenger car including taxi is only 11.1%. The share distribution in all Kazakhstan has the similar tendency.

