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No. 2

VOLUME 2 MAIN REPORT

THE COMPREHENSIVE STUDY ON THE DEVELOPMENT OF CALCUTTA AND HALDIA DOCK SYSTEMS OF CALCUTTA PORT TRUST IN INDIA

OCTOBER 1989

CALCUTTA PORT TRUST

FINAL REPORT

JAPAN INTERNATIONAL COOPERATION AGENCY

VOLUME 2 MAIN REPORT

THE COMPREHENSIVE STUDY ON THE DEVELOPMENT OF CALCUTTA AND HALDIA DOCK SYSTEMS OF CALCUTTA PORT TRUST IN INDIA

OCTOBER 1989

FINAL REPORT

PREFACE

In response to a request from the Government of India, the Japanese Government decided to conduct a Comprehensive Study on the Development of Calcutta and Haldia Dock Systems of Calcutta Port Trust and entrusted the study to Japan International Cooperation Agency (JICA).

JICA sent to India a survey team headed by Mr. Terumi Iijima, and composed of members from the Overseas Coastal Area Development Institute of Japan and Ocean Consultant, Japan Co., LTD, four times from June 1988 to August 1989.

The team held discussions with concerned officials of the Government of India, and conducted field surveys. 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 India for their close cooperation extended to the team.

October, 1989

Kensuke Yanagiya

Kensuke Yanagiya
President
Japan International Cooperation Agency

LETTER OF TRANSMITTAL

October, 1989

Mr. Kensuke Yanagiya
President
Japan International Cooperation Agency

Dear Mr. Yanagiya :

It is my great pleasure to submit herewith the Report for the Comprehensive Study on the Development of Calcutta and Haldia Dock Systems of Calcutta Port Trust in India.

The Study Team, which consists of the Overseas Coastal Area Development Institute of Japan and the Ocean Consultant, Japan Co., Ltd., headed by myself, conducted a survey in India from June 1988 to August 1989 at the request of the Japan International Cooperation Agency.

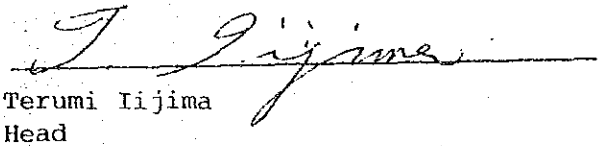
The findings of this survey were fully discussed with the Indian counter parts to formulate the Master Plan for the period up to the year 2005 and to formulate and examine the feasibility of the Short Term Development Plan for the period up to the year 1995 and were then compiled into this report. As a result of the Study, the implementation of the projects herein proposed is regarded as crucial not only to the further development of Calcutta and Haldia Dock Systems but also to the socio-economic development of the eastern region of India centered by the State of the West Bengal and also regarded as viable from economic and financial viewpoints.

I earnestly wish that the Plan herein proposed will be implemented at the possible earliest by the Government of India.

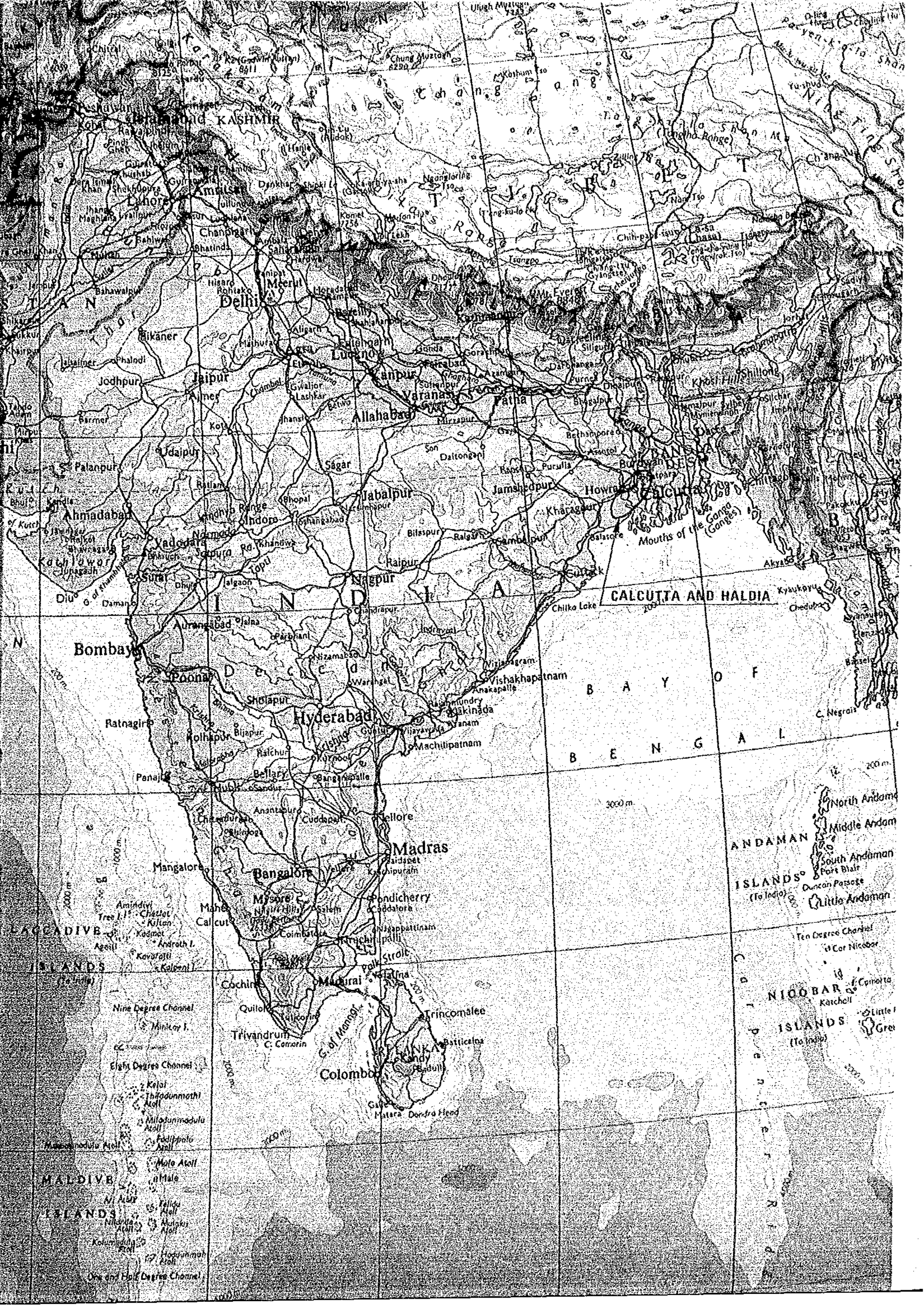
On behalf of the Study Team, I would like to express my deepest appreciation to the Government of India, the Calcutta Port Trust and the various organizations concerned with the Study for their brilliant cooperation and assistance, and for the heartfelt hospitality which they extended to the Team during their stay in India.

I am also greatly indebted to the Japan International Cooperation Agency, the Ministry of Transport, the Ministry of Foreign Affairs, the Japanese Embassy, the Japanese Consulate and the JICA Office in India for giving us valuable suggestions and assistance during the field surveys and the preparation of this report.

Respectfully,



Terumi Iijima
Head
Japanese Team for the Comprehensive Study on the Development of Calcutta and Haldia Dock Systems of Calcutta Port Trust in India
(Executive Director, the Overseas Coastal Area Development Institute of Japan)



KASHMIR
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Multan
Chandigarh
Delhi
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Raipur
Bilaspur
Sambalpur
Cuttack
Jamshedpur
Howrah
Calcutta
Kharagpur
Balasore
Asansol
Burdwan
Mouths of the Ganga (Ganges)
CALCUTTA AND HALDIA
Chilka Lake
BANGLADESH
INDIA
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Daman
Aurangabad
Bombay
Poona
Sholapur
Hyderabad
Deccan
Ratnagiri
Kolhapur
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Panaji
Hubli
Bellary
Kurnool
Vijayawada
Machilipatnam
Kakinada
Vishakhapatnam
Vizianagram
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Madras
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Mangalore
Calicut
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Pondicherry
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Madurai
Cochin
Quilon
Trivandrum
C. Comorin
Palk Strait
G. of Mannar
Jaffna
Trincomalee
Batticaloa
SRI LANKA
Kandy
Colombo
Matara
Dondra Head
BAY OF BENGAL
ANDAMAN ISLANDS (To India)
North Andaman
Middle Andaman
South Andaman
Port Blair
Duncan Passage
Little Andaman
Ten Degree Channel
Car Nicobar
NICOBAR ISLANDS (To India)
LACCADIVE ISLANDS (To India)
Amindivi
Kiltan
Kavaratti
Androth I.
Nine Degree Channel
Minicoy I.
Eight Degree Channel
MALDIVE ISLANDS
Male
One and Half Degree Channel
Tibet
Chang Tang
Bhutan
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3000 m
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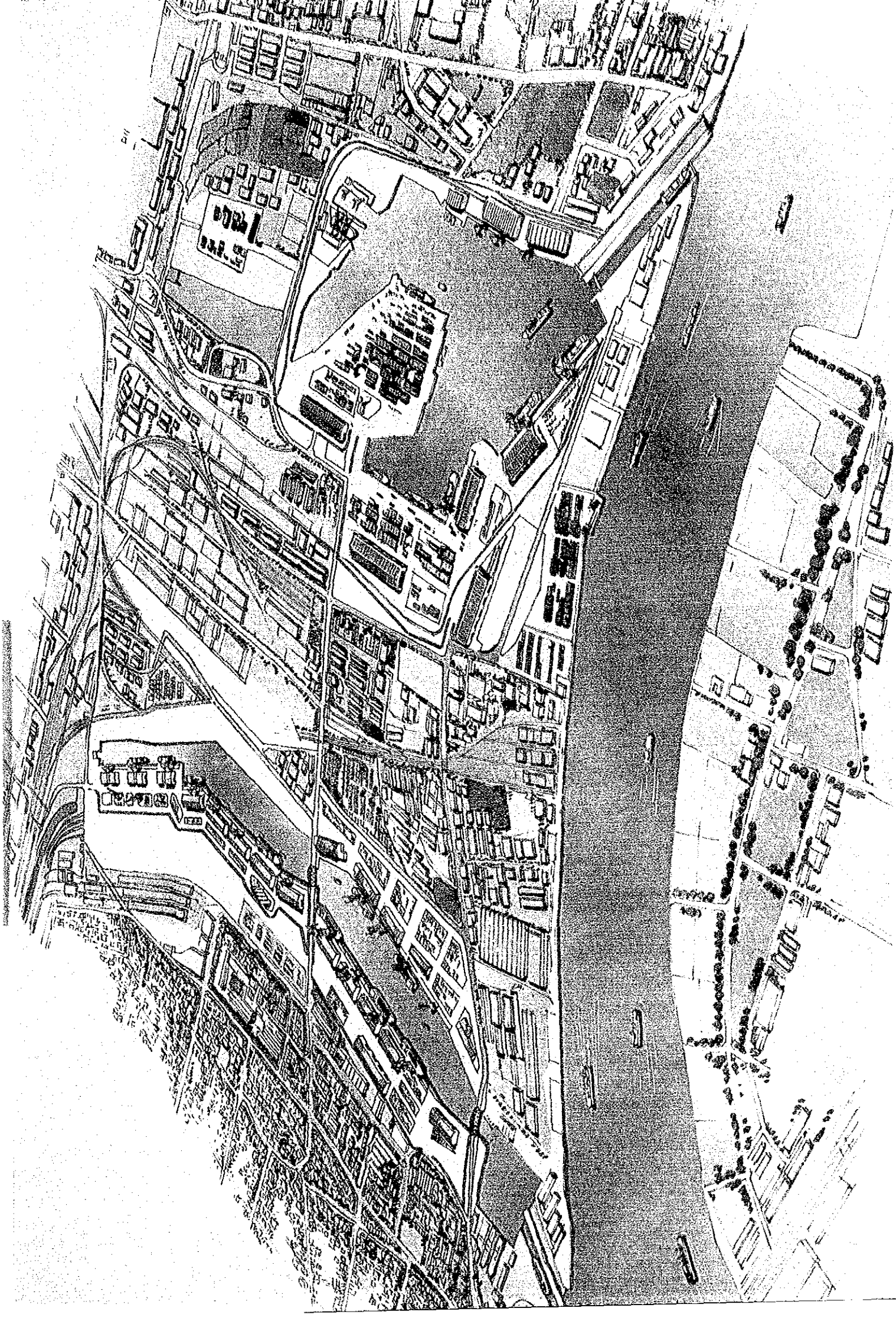

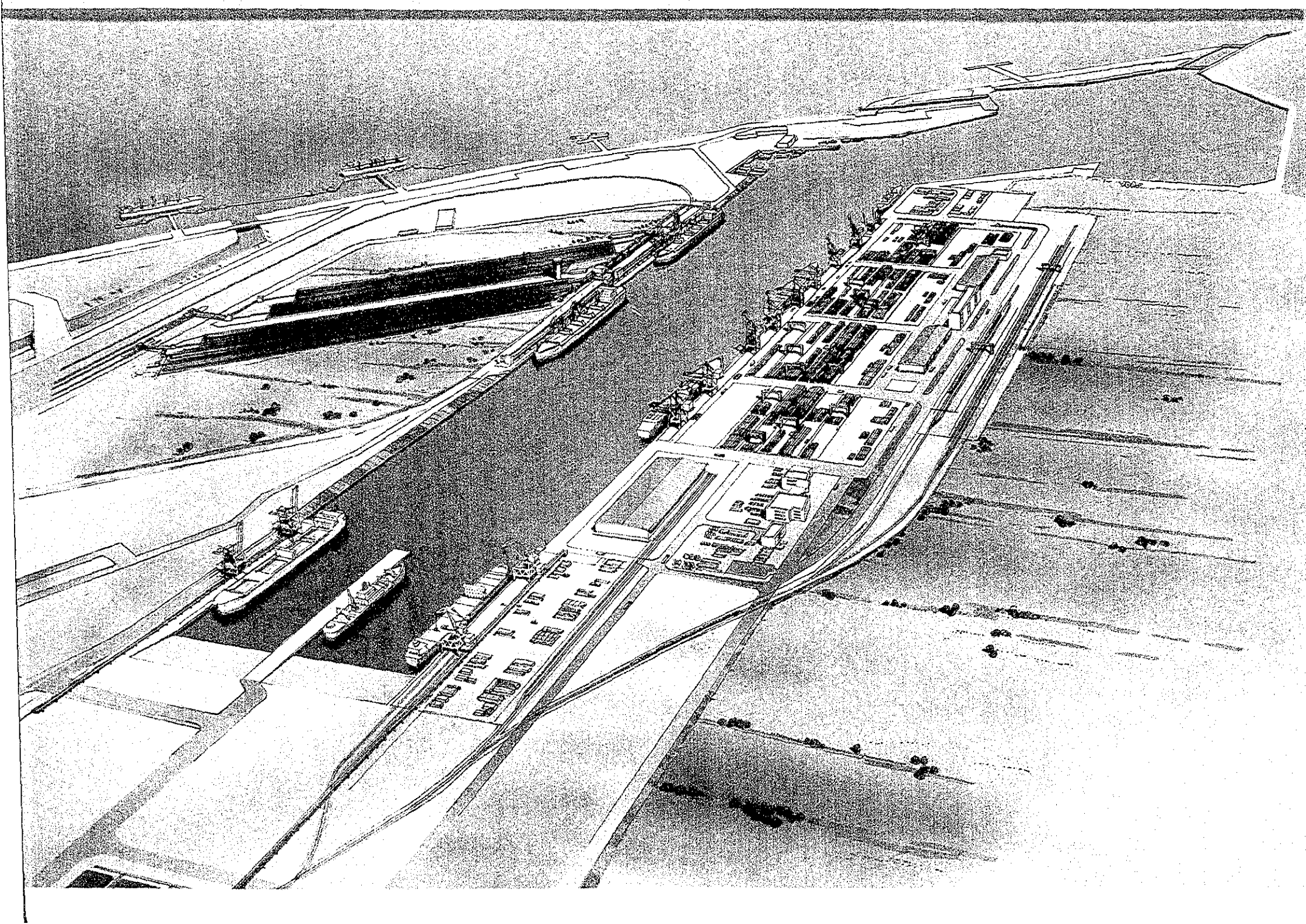

EXCHANGE RATE

$ 1 = Rs 13.50

$ 1 = ¥135

ABBREVIATIONS

ADB	Asian Development Bank
ARPA	Automatic Radar Plotting Aid
BB	Budge Budge
CDLB	Calcutta Dock Labour Board
CISF	Central Industrial Security Force
CIWTC	Central Inland Water Transport Corporation Limited
CPT	Calcutta Port Trust
DMD	Director Marine Department, CPT
DWT	Dead Weight Tonnage
EIL	Engineers India Limited
EJC	East Dock Junction
ETA	Estimate Time of Arrival
FAK	Freight All Kind
FCI	Food Corporation of India
GPS	Global Positioning System
GRT	Gross Registered Tonnage
HFC	Hindusthan Fertilizer Corporation
IALA	International Association of Light House Authorities
IBRD	International Bank for Reconstruction and Development
ICD	Inland Container Depot
IISCO	The Indian Iron and Steel corporation Limited
IOC	Indian Oil Corporation
IPA	Indian Ports Association
IWT	Inland Waterway Transport
JICA	Japan International Cooperation Agency
KODS	Kidderpore Old Dock Sill
KPD	Kidderpore Dock
LOA	Length Over All
MOST	Ministry of Surface Transport, Government of India
MP	Madhya Pradesh
MY	Million Yen
NRT	Net Registered Tonnage
NSD	Netaji Subash Dock
OCC	Oil Coordination Committee
OCDI	Overseas Coastal Area Development Institute of Japan

OECF	Overseas Economic Cooperation Fund
PHRI	Port and Harbour research Institute, Ministry of Transport, Japan
Rs	Rupee(s)
SAIL	Steel Authority of India Limited
SAR	Search and Rescue
SCI	Shipping Corporation of India Limited
SE	South Eastern Railway
TEU	Twenty-foot Equivalent Unit
UHF	Ultra High Frequency
UK	United Kingdom
UNCTAD	United Nations Conference on Trade and Development
UNLK	United Nations Layout Key
UP	Utter Pradesh
USA	United States of America
VHF	Very High Frequency
VTS	Vessel Traffic Management Service
W/T	Wireless Telephone

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Chapter 1 Introduction

1-1 Background

In response to the agreement reached between the Government of Japan and the Government of India, Japan International Cooperation Agency (hereinafter referred to as JICA), the official agency responsible for the implementation of the technical cooperation programms of the Government of Japan, conducted the Comprehensive Study on the Development of Calcutta and Haldia Dock Systems of Calcutta Port Trust (hereinafter referred to as "the Study").

Accordingly, JICA organized the Japanese Study Team (hereinafter referred to as "the Team"), which consists of 13 experts directed by Mr. T. Iijima, the leader of the Team and Managing Director of the Overseas Coastal Area Development Institute of Japan (hereinafter referred to as OCDI).

The first field survey was implemented from June 6th through August 13th 1988.

During the first field survey, the major activities were as follows.

(1) The submission and explanation of the Inception Report of the Study to the Coordination Committee on June 10th.
(2) The explanation of the Inception Report of the Study to the Calcutta Port Trust (hereinafter referred to as CPT) on June 14th.
(3) The agreement regarding the Inception Report of the Study on June 16th.
(4) The discussion between the Team and CPT officials headed by Chairman, CPT on August 1st.
(5) The submission and explanation of the Progress Report of the Study to the Coordination Committee on August 8th.
(6) The agreement regarding the Progress Report of the Study on August 9th.

Based upon the detailed analysis of the information collected during the first field survey and the discussions with the Indian counterpart personnel, the Interim Report (I) was prepared before starting the second field survey.

The second field survey was implemented from October 30th through December 20th, 1988. During the second field survey, the major activities were as follows.

(1) The submission and explanation of the Interim Report (I) of the Study to the Coordination Committee on November 4th.
(2) The explanation of the Interim Report (I) of the Study to CPT on November 7th.
(3) The discussion between the Team and CPT officials from November 7th.
(4) The discussion between the Team and the Nautical Advisor regarding Navigation Safety and Navigation Aids on November 14th.
(5) The information and data collection from the major ports in India from November 20th to December 1st.
(6) The information and data collection from the related Ministeries and Canalizing Agencies from December 1st.
(7) The discussion between the Team and the officials of the Ministry of Surface Transport headed by Mr. A Ananthakrishnan, the Development Advisor of Ports on December 8th.
(8) The discussion between the Team and the Coordination Committee and the formulation of the record note of discussion.

The third field survey was implemented from February 27th through March 13the, 1989. During the third field survey, the major activities were as follows.

(1) The submission of the Interim Report (II) of the Study to CPT and MOST on February 28th.
(2) The explanation of the Interim Report (II) of the Study to CPT on March 1st.
(3) The discussion between the Team and CPT officials from March 1st.
(4) The formation of salient points agreed upon between CPT and the Term through discussion on March 4th.
(5) The discussion between the Team and MOST on March 7th.
(6) The explanation of the Interim Report (II) of the Study to the Coordination Committee on March 8th.
(7) The formation of the Minutes of Meeting of the Coordination Committee on March 9th.

The fourth field survey was implemented from July 31st through August 13rd, 1989. During the fourth field survey, the major activities were as follows.

(1) The submission of the Draft Final Report of the Study to CPT on August 2nd.
(2) The explanation and discussion of the Draft Final Report of the Study between the Team and CPT officials from August 2nd to 5th.
(3) The submission of the Draft Final Report of the Study to MOST on August 7th.
(4) The explanation and discussion of the Draft Final Report of the Study between the Team and the Coordination Committee on August 8th and 9th.
(5) The formation of the Minutes of Meeting of the Coordination Committee on August 10th.

According to the Minutes of Meeting, the Indian side had sent the additional comments on the Draft Final Report. This Final Report is revised by the above comments which were submitted to JICA office in Delhi by August 28th.

1-2 Objectives of the Study

The objectives of the Study are as follows.

1. To prepare a Master Plan for Calcutta and Haldia Dock Systems for the period up to the year 2005.
2. To prepare a Short-term Development Plan for the development of Calcutta and Haldia Dock Systems up to the year 1995, within the framework of the Master Plan, and to determine the technical, economic and financial feasibility of the Short-term Development Plan.

1-3 Scope of the Study

The Study covers the following items:

(1) Review and Field Surveys
1) review of available information relevant to the Study

2) field surveys to the extent necessary for the Study

(2) Formulation of Master Plan

1) establishment of main goals and policy of the port development
2) forecast of the traffic for the period up to the year 2005
3) determination of rational allocation of functions between the two Dock System
4) layout of major port facilities and relevant infrastructure
5) preparation of preliminary cost estimates
6) preparation of implementation program

(3) Feasibility Study on Short-term Development Plan

1) detailed forecast of port traffic
2) preparation of detailed facilities development plan
3) preparation of preliminary design
4) preparation of cost estimates
5) preparation of implementation schedule
6) economic analysis
7) financial analysis
8) recommendation on management, operation and maintenance systems

1-4 Study Schedule

The Study was conducted as follows:

(1) The first field survey, presentation of Inception Report and Progress Report: Jun. 6th - Aug. 13th, 1988
(2) Preparation of Interim Report (I) : Aug. 14th - Oct. 29th, 1988
(3) The second field survey, presentation of Interim Report (I) : Oct. 30th - Dec. 20th, 1988
(4) Preparation of Interim Report (II) : Dec. 21th - Feb. 26th, 1989
(5) The thrid field survey, presentation of Interim Report (II) : Feb. 27th - Mar. 13th, 1989
(6) Preparation of Draft Final Report : May. 20th - Jul. 30th, 1989
(7) The fourth field survey, presentation of Draft Final Report : Jul. 31th - Aug. 14th, 1989

1-5 Organization of the Study Team

The members of the Study Team are as follows.

	Name	Responsibility
(1)	Terumi IIJIMA	Leader
(2)	Hiroshi SASAJIMA	Port Planning
(3)	Susumu MURATA	Port & Handling System Planning
(4)	Kenji HATTORI	Demand Forecast, Economic Analysis
(5)	Kunio MASUNAGA	Operation Planning, Financial Analysis
(6)	Yasuo KANESATO	Facilitiy Design
(7)	Nobuya FURUHASHI	Construction Method/Cost Estimation
(8)	Jun HAMANOUE	Port Traffic Facility Planning
(9)	Minoru FUJISHIRO	Navigation Aid System Planning
(10)	Ichiro OZAWA	Seaborne Traffic Analysis
(11)	Toshio SHIBAO	Handling Equipment Design
(12)	Katsunori KUWAZAKI	Navigation Safety Control Planning
(13)	Masahiro YOKOGAWA	Natural Conditions

1-6 List of Counterparts

List of Members of Co-ordination Committee

1. Mr. A. Ananthakrishnan - Chairman
   Dev. Advisor (Ports),
   Ministry of Surface Transport,
   New Delhi

2. Capt. V.K. Chawla
   Marine Advisor
   Oil Co-ordination Committee
   New Delhi.

3. Mr. S. Joshi - Under Secretary,
   Dept. of Eco. Affairs,
   Ministry of Finance,
   govt. of India,
   New Delhi.

4. Mr. S.K. Gupta
   Chief Freight Traffic Superintendent
   South Eastern Railway,
   Calcutta.

5. Shri K.K. Chakraborty,
Chief Freight Traffic Superintendent
South Eastern Railway,
Calcutta.

6. Shri A. Chakraborty,
Director (P & R)
Calcutta Port Trust.

7. Shri S. Chakraborty,
Joint Manager, Administration,
Haldia Dock Complex.

Main Co-ordinators

Calcutta

1. Shri A. Chakraborty,
Director (P & R)
Calcutta Port Trust

2. Shri B.N. Putatunda
Dy. Director (P & R) CPT.

Haldia

Shri S. Chakraborty
Joint Manager, Administration
Haldia Dock Complex

Chapter 2 Socio-Economic Background

2-1 General Introduction

The total land area of India is approximately 3.29 million square kilometers. India is the seventh largest country in the world and is well-marked off from the rest of Asia by mountains and the sea, which give the country a distinct geographical shape. Lying entirely in the northern hemisphere, the mainland extends between latitudes 8°4' and 37°6' north and longitudes 68°7' and 97°25' east and measures about 3,214 km from north to south and about 2,933 km from east to west.

The climate of India is broadly described as tropical monsoon. There are four seasons in India: (i) winter season (January - February), (ii) hot weather season, summer (March - May), (iii) rainy season, south-western monsoon period (June - September), and (iv) post-monsoon period and north-east monsoon period in the southern Peninsula (October - December).

India, a union of states, is a Sovereign Socialist Secular Democratic Republic with a parliamentary system of Government. The Republic is governed by the Constitution adopted in 1949. India comprises 22 states and nine union territories which are administered by the President. The Union executive consists of the President, the Vice-President and the Council of Ministers with the Prime Minister at the Head to aid and advise the President in the exercise of his functions. India has a parliamentary system of government with two houses - a lower house (House of the People) and an upper house (Council of States). There is a strict division between the activities handled by the states and by the national government. The police force, education, agriculture and industry are reserved for the state governments. Certain other areas are jointly administered by the two levels of government.

2-2 Population

2-2-1 Population at Present

According to the 1981 census, the total population of India was 685,184,692. India has nearly 16 per cent of the world's population. It is, after China (983 million in 1981), the second most populous country in the world.

The distribution of population in India varies widely. The most populous state is Uttar Pradesh followed by Bihar, Maharashtra, West Bengal and Andhra Pradesh. The average density of population per sq. km in 1981 was 216 and the most most densely populated state was Kerala with 655.

India's biggest problem is its ever increasing population. The population growth can be explained by the sharp decline in the death rate, while the birth rate has decreased only slightly (i.e. the natural growth rate). The death rate dramatically decreased (from 44.4 per 1,000 in 1901 to 15 in 1981) from the general improvement in food supply, new drugs, health programmes, control of communicable diseases, and reduced infant mortality. The birth rate in India has been declining from the beginning of the century (from 45.8 per 1,000 in 1901 to 37.2 in 1981). The result has been a widening gap between the birth rate and the death rate, resulting in a rapid natural growth rate. The improving living conditions have led to an increased life expectancy. An Indian could expect to live to be 41 in 1961 and 51 in 1981. The life expectancy is expected to be around 59 in 1990 and about 65 by the turn of the century. Death rates can be expected to continue to fall and to reach about 10 per 1,000 by the turn of the century. Therefore the trend portends greater difficulties for India in the future, as the absolute increases of population will be considerable.

Population growth in India also depends on net migration (i.e. the difference between the rates of in-migration and out-migration). International migration of Indians has been in two streams. Since the 1970s highly educated professionals have emigrated to settle in the USA, Britain, Canada and Western Europe. A generally less-educated labour force has migrated to the oil-rich West Asian countries and to South-east Asia.

In general, internal migration is considered as "population dispersal" or adjustment, inasmuch as it is a result of social, economic or political

processes. The states where the net migration in 1981 was negative are Uttar Pradesh, Bihar, Kerala, Andhra Pradesh, Rajasthan and Tamil Nadu. The states where the net migration was positive are West Bengal, Maharashtra, Madhya Pradesh, Haryana, Punjab, Orissa, Gujarat and Karnataka. In Maharashtra and West Bengal, the migration has been high from the rural to the urban areas. West Bengal has also received a large number of rural refugees from Bangladesh.

2-2-2 Future Population

According to the Indian population projections, the Indian population will increase to 836 million people in 1991, 915 million people in 1996, and 991 million people in 2001 (middle estimate), and the annual growth rate will decrease from 2.25 per cent in the decade 1971-1981 to 1.7 per cent in the decade 1991-2001 (middle estimate) assuming that a well-organized family planning programme will be effective.

Table 2-2-1 Population Growth

	1971[1]	1981[1]
	Total	Total
States		
Andhra Pradesh	43,502,708	53,549,673
Assam	14,957,542	19,896,843[2]
Bihar	56,353,369	69,914,734
Gujarat	26,697,475	34,085,799
Haryana	10,036,808	12,922,618
Himachal Pradesh	3,460,434	4,280,818
Jammu & Kashmir	4,616,632	5,987,389
Karnataka	29,299,014	37,135,714
Kerala	21,347,375	25,453,680
Madhya Pradesh	41,654,119	52,178,844
Maharashtra	50,412,235	62,784,171
Manipur	1,072,753	1,420,953
Meghalaya	1,011,699	1,335,819
Nagaland	516,449	774,930
Orissa	21,944,615	26,370,271
Punjab	13,551,060	16,788,915
Rajasthan	25,765,806	34,261,862
Sikkim	-	316,385
Tamil Nadu	41,199,168	48,408,077
Tripura	1,556,342	2,053,058
Uttar Pradesh	88,341,144	110,862,013
West Bengal	44,312,011	54,580,647
Union Trritories		
Andaman & Nicobar	115,133	188,741
Arunachal Pradesh	467,511	631,839
Chandigarh	257,251	451,610
Dadra & Nagar Haveli	74,170	103,676
Delhi	4,065,698	6,220,406
Goa, Daman & Diu	857,771	1,086,730
Lakshadweep	31,810	40,249
Mizoram	-	493,757
Pondicherry	471,707	604,471
INDIA	547,949,809	685,184,692[2]

Note: 1971 data for Assam includes Mizoram. Sikkim was a protectorate of India till 1975, when it became a state of the Indian Union.
[1]Census
[2]Estimated

Table 2-2-2 Population Projections : 1986-2001

Item	Projections		
	High	Medium	Low
Total population (million)			
1986	758.16	758.16	758.16
1991	843.50	836.45	832.53
1996	941.97	915.49	900.98
2001	1,052.51	991.48	959.22

Source: Register General, India.

2-2-3 Labour Force

A phenomenal increase in population is closely related to the economic situation. The growth of population directly results in increased demand for investible surplus for absorbing the increased labour supply. The work participation rates are observed to have declined : the decline is steep in the case of the female population. The proportion of workers engaged in the agricultural sector of the economy exceeds 70 per cent. In India the relatively higher growth of population in rural areas and a generally sluggish rate of growth of job-opportunities outside agriculture is one eminent cause of little or no change in the occupational structure of the working population.

The Population problem in India continues to be a pivotal issue.

Table 2-2-3 Occupational Distribution of Working Population:1901-1981

Sector/Industrial categories	1961	1971	1981[a]
1. Agricultural sector	**71.8**	**72.1**	**70.6**
Cultivators	52.8	43.4	42.1
Agricultural labourers	16.7	26.3	26.3
Livestock, forestry & others	2.3	2.4	2.2
2. Industrial sector	**12.2**	**11.2**	**12.9**
Mining & quarrying	0.5	0.5	0.5
Large & small industries	10.6	9.5	10.9
Construction	1.1	1.2	1.5
3. Services sector	**16.0**	**16.7**	**16.5**
Trade and commerce	4.0	5.6	5.9
Transport, storage and communication	1.6	2.4	2.5
Other services	10.4	8.7	8.1
Total	100.0	100.0	100.0

Source: Register General, India.
[a]Based on 5 per cent sample data.
The figures include marginal workers also.

Table 2-2-4 Work Participation Rates

Year	Total	Males	Females
1961	43.1	57.3	28.0
1971	34.2	52.7	14.2
1981*	33.4	51.6	14.0

Source: Registrar General, India.

Table 2-2-5 Working Population in States

India/States/U.T.	Total population ('000)	Workers ('000)	Percentage of workers to total population	
	1981	1981	1971	1981
INDIA	6,685,185	2,22,517	33.1	33.4
Andhra Pradesh	53,550	22,629	41.4	42.2
Assam	19,897*	n.a	28.4	n.a
Bihar	69,915	20,753	31.0	29.7
Gujarat	34,086	10,984	31.4	32.2
Haryana	12,923	3,664	26.4	28.4
Himachal Pradesh	4,281	1,471	36.9	34.4
Jammu & Kashmir	5,987	1,819	29.8	30.4
Karnataka	37,136	13,650	34.7	36.8
Kerala	25,454	6,791	29.1	26.7
Madhya Pradesh	52,179	20,041	36.7	38.4
Maharashtra	62,784	24,302	36.5	38.7
Manipur	1,421	573	34.6	40.4
Meghalaya	1,338	580	44.2	43.4
Nagaland	775	368	50.7	47.5
Orissa	26,370	8,635	31.2	32.7
Punjab	16,789	4,928	28.9	29.3
Rajasthan	34,262	10,442	31.2	30.5
Sikkim	316	147	53.2	46.6
Tamil Nadu	48,408	19,026	35.8	39.3
Tripura	2,053	609	27.8	29.6
Uttar Pradesh	1,10,862	32,397	30.9	29.2
West Bengal	54,581	15,424	27.9	28.3
A. & N. Inslands	189	63	39.5	33.2
Arunachal Pradesh	632	313	57.6	49.6
Chandigarh	452	157	33.3	34.7
Dadra & Nagar Haveli	104	42	47.2	40.8
Delhi	6,220	1,986	30.2	31.9
Goa, Daman & Diu	1,087	332	31.7	30.6
Lakshadweep	40	8	26.1	19.7
Mizoram	494	206	45.6	41.7
Pondicherry	604	173	29.9	28.7

Source: Indian Labour Year Book, 1985.
* Projected

2-3 National Economy

2-3-1 Overall Development

In India, after independence in 1947 the overall socio-economic situation was dismal because of the absence of industrial infrastructure, scarcity of skilled manpower, growing unemployment, low level of literacy and so on. Reconstruction and development of the economy were the obvious imperatives in the post-independence period. The principal strategy was industrialization with the development of heavy and basic industries. A five-year plan was prepared to promote rapid development. A formal strategy of development was enunciated when the Second Five Year Plan (1956-1960) was formulated. The main goal of the plan to shift away from the dependence on the agricultural sector which is strongly influenced by natural conditions towards more development in the sector. In the 1950's and 1960's the growth rate of the economy (GDP) was 3.7 per cent and 3.3 per cent per annum respectively and this growth rate increased to 4.8 per cent by 1986. The growth rate of the agriculture sector was 2.4 per cent in the 1960's, 1.7 per cent in the 1970's and 1.3 per cent during 1980 to 1986, while that of the industrial sector was 5.6 per cent in the 1960's 3.7 per cent in the 1970's and 9.2 per cent during 1980 to 1986.

In spite of the GDP growth, the growth rate of GDP per capita was lower than that of the GDP itself because of the high population growth. As noted above, the population of India is expected to continue to increase in the future. Therefore the GDP growth rate must be higher than the growth rate of population in order to increase the GDP per capita.

Table 2-3-1 GNP and Per capita at Factor Cost
(At 1970 - 71 prices)

	GDP (Rs. Crores)	GDP per capita (Rs.)	population (Million)
1960/61	25,534	577	442.4
65/66	29,023	588	493.4
70/71	36,736	666	551.3
75/76	42,890	695	617.2
80/81	50,623	734	690.1
84/85	61,693	822	750.9
86/87	67,231	860	781.4
Annual Growth Rate			
1971/61	3.7	1.4	2.2
81/71	3.3	1.0	2.3
87/81	4.8	2.7	2.1

Source: Economic Survey 1987-88 : GDP
Statistical Abstract : India 1985 : Population

2-3-2 Sectorial Economy

In India, agriculture still plays the pivotal role in socio-economic development, though the share of the agricultural sector is decreasing from 55.1 per cent in 1960/61 to 33.8 per cent in 1986/87.

The agricultural sector employs about 70 per cent of the labour force and produces about 30 per cent of the total export revenues. The main crops are rice and wheat.

The industrial economy of India has rapidly increased. From a state of near total dependence on imports for her requirements of manufactures, India has rapidly moved towards the desired objective of self-reliance.

Industrial expansion of India has been promoted by the Industrial Policy Resolution of 1956. Since 1956 there has been a large expansion of the public sector participation in the industrial activities over a wide range, including mining and manufacturing, transport and communication, generation and distribution of power, banking etc. The public sector enterprises have played the role of catalysers for industrialization and economic growth primarily by widening the infrastructural base of the

economy. But it is important to promote efficiency in the public sector for better resource-mobilization strategy in the near future.

Small scale and cottage industries have traditionally played a dominant role in the manufacturing sector of India. These industries provide employment which is next to agriculture. The small scale industries sector account for more than fifty per cent of the value added in the manufacturing sector and more than one-third of the total exports from India.

Table 2-3-2 GDP at Factor Cost by Sector
(1970 - 71 prices)

Year	Agriculture, forestry, fishing and mining		Manufacturing, construction, electricity gas and water supply		Transport, communication and trade		Banking and insurance, real estate fand ownership of dwellings and business services		Public administration and defence and other services		G D P	
		Share		Share		Share		Share		Share		Share
1960/61	14,078	55.1	4,413	17.3	3,523	13.8	1,292	5.1	2,228	8.7	25,534	100.0
65/66	13,559	46.7	6,297	21.7	4,735	16.3	1,659	5.7	2,773	9.6	29,023	100.0
70/71	17,802	48.5	7,594	20.7	5,912	16.1	2,114	5.7	3,314	9.0	36,736	100.0
75/76	19,934	46.5	8,782	20.5	7,461	17.4	2,574	6.0	4,139	9.6	42,890	100.0
80/81	21,015	41.5	10,937	21.6	9,554	18.9	3,358	6.6	5,759	11.4	50,623	100.0
84/85	23,012	37.3	15,917	25.8	10,611	17.2	5,614	9.1	6,539	10.6	61,693	100.0
86/87	22,724	33.8	18,556	27.6	11,967	17.8	6,387	9.5	7,597	11.3	67,231	100.0
Annual Growth Rate												
1971/61	2.4		5.6		5.3		5.0		4.1		3.7	
81/71	1.7		3.7		4.9		4.7		7.6		3.3	
86/81	1.3		9.2		3.8		11.3		4.7		4.8	

Source: Economic Survey 1987-88

Table 2-3-3 State Domestic Product at Factor Cost
(At Constant (1970-71) Prices)

(Rs. lakhs)

State/Union Territory	1970/71	1975/76	1980/81	1981/82	1982/83	1983/84	1984/85
Andhra Pradesh	25,228	29,830	34,322	39,072	39,351	42,006	40,443
Assam	7,714	9,386	10,951	10,819	11,922	12,533	13,067
Bihar	22,454	25,334	29,436	30,587	32,110	33,845	36,621
Gujarat	21,892	24,392	30,273	34,127	32,531	35,658	36,723
Haryana	8,689	10,591	13,533	14,161	15,151	15,000	15,623
Himachal Pradesh	2,324	2,810	2,831	3,128	2,968	3,181	3,023
Jammu & Kashmir	2,496	2,964	3,782	3,856	3,929	4,283	4,355
Karnataka	18,581	21,648	25,252	27,034	26,921	28,836	29,821
Kerala	12,546	14,232	15,696	16,182	16,560	16,538	17,512
Madhya Pradesh	19,913	23,147	26,785	28,037	29,319	33,157	31,672
Maharashtra	38,755	48,593	60,015	62,620	64,524	67,574	69,249
Manipur	411	626	722	759	805	859	895
Orissa	10,374	11,325	13,830	14,999	13,755	15,432	14,413
Punjab	14,362	17,717	22,934	24,715	26,019	26,130	27,877
Rajasthan*	16,537	17,252	18,083	20,034	21,328	23,451	21,840
Sikkim*	-	-	279	292	336	374	-
Tamil Nadu	23,711	26,790	28,120	32,912	31,013	32,418	37,269
Tripura	779	935	1,267	-	1,343	1,398	-
Uttar Pradesh	42,565	46,111	56,930	57,994	63,249	66,270	68,081
West Bengal	31,681	36,344	43,065	41,342	40,643	46,993	48,536
Arunachal Pradesh	213	263	404	471	518	534	-
Delhi	4,773	6,256	8,261	8,755	9,482	10,056	10,697
Goa, Daman & Diu	767	1,149	1,520	1,493	1,613	1,714	1,831
Pondicherry	389	513	790	857	864	851	853
INDIA(NNP)	3,235	40,274	47,414	49,934	51,154	55,300	57,243

Source: Same as Table III. 19.
Note: Refer Table III. 19.
* In Rs. crores

Table 2-3-4 State Domestic Product at Factor Cost
(At Constant (1970-71) Prices)

(Rs. lakhs)

Sl. No.	State/Union Territory	1970 /71	1975 /76	1980 /81	1981 /82	1982 /83	1983 /84	1984 /85	Rank based on 1984 /85
1.	Andhra Pradesh	585	625	647	721	712	746	705	11
2.	Assam	535	559	558	534	569	579	584	15
3.	Bihar	402	409	425	432	444	458	485	21
4.	Gujarat	829	819	901	989	922	985	993	7
5.	Haryana	877	938	1,058	1,081	1,129	1,092	1,111	5
6.	Himachal Pradesh	678	738	668	722	672	707	659	13
7.	Jammu & Kashmir	548	573	642	638	633	673	667	12
8.	Karnataka	641	666	687	717	697	727	730	9
9.	Kerala	594	610	620	629	633	620	645	14
10.	Madhya Pradesh	484	499	518	531	545	605	568	19
11.	Maharashtra	783	878	964	985	993	1,018	1,021	6
12.	Manipur	390	510	506	525	543	565	574	17
13.	Orissa	478	475	529	564	507	559	512	20
14.	Punjab	1,070	1,192	1,378	1,454	1,498	1,473	1,538	2
15.	Rajasthan*	651	589	535	577	597	638	577	16
16.	Sikkim*	-	-	888	900	1,008	1,093	n.a	n.a
17.	Tamil Nadu	581	597	584	674	625	642	726	10
18.	Tripura	502	518	623	-	617	619	n.a	n.a
19.	Uttar Pradesh	486	474	519	516	551	566	570	18
20.	West Bengal	722	747	797	750	722	817	827	8
21.	Arunachal Pradesh	456	479	640	726	780	784	n.a	n.a
22.	Delhi	1,199	1,274	1,363	1,373	1,426	1,450	1,479	3
23.	Goa, Daman & Diu	915	1,224	1,487	1,358	1,437	1,497	1,567	1
24.	Pondicherry	825	962	1,308	1,382	1,359	1,305	1,276	4
	INDIA(NNP)	3,235	40,274	47,414	49,934	51,154	55,300	57,243	

Source: (i) Estimates of State Domestic Product 19710-71 -- 1984-85 CSO, Nov. 1986
(ii) NAS, January 1987

2-3-3 Regional Economy (West Bengal)

The population of West Bengal in 1981 was 54.6 million persons which was 8 per cent share of the total population of India. The GDP of West Bengal in 1986/87 was 182,027 million Rupees at current prices and Rs. 5,237 crores at 1970/71 constant prices. The share of West Bengal in the national base was 7.8 per cent at 1970/71 constant prices. The GDP per capita of West Bengal was about 960 Rupees, compared with 981 Rupees nation wide in 1986/87.

The GDP by Sector shows that the share of agriculture, forestry, fishing and mining (43 per cent) is higher than the national base (33.8 per cent) and the share of manufacturing, construction and electricity, gas & water supply (19.6 per cent) is lower than the national base (27.6 per cent). Employment by industry also shows that the share of the agricultural sector in West Bengal is higher than that of the national base. But the share of the manufacturing sector is almost the same as in the national base. This means the earnings from the manufacturing sector per employment in West Bengal is lower than that of national base, that is, the economic efficiency of the manufacturing sector in West Bengal is lower than the national average.

Table 2-3-5 GDP at Factor Cost by Sector in 1986/87
(1970/71 prices)

(Unit: Rs. in crores, %)

Industry of Origin	West Bengal		India	
		Share		Share
1. Agriculture, Forestry, Fishing & mining	2,253	43.0	22,724	33.8
2. Manufacturing, Construction, Electricity Gas & Water supply	1,026	19.6	18,556	27.6
3. Transport, Communication and Trade	822	15.7	11,967	17.8
4. Banking and Insurance, Real Estate	493	9.4	6,387	9.5
5. Public Administration and Other Services	643	12.3	7,597	11.3
G D P	5,237	100.0	67,231	100.0

Table 2-3-6 GDP at Factor Cost by Sector in 1986/87
(1970/71 prices)

(Unit: Rs. in crores, %)

Industry of Origin	West Bengal		India	
		Share		Share
1. Agriculture, Forestry, Fishing & mining	438	16.7	2,407	9.8
2. Manufacturing, Construction, Electricity Gas & Water supply	960	36.6	8,197	33.3
3. Transport, Communication and Trade	369	14.1	3,368	13.7
4. Banking and Insurance, Real Estate	106	4.0	10,657	13.2
5. Public Administration and Other Services	752	28.6		
G D P	2,625	100.0	24,629	100.0

2-3-4 Foreign Trade

One of the most striking features of Indian's foreign trade in the post-independence period is the phenomenal increase in its value. The total value of foreign trade jumped from Rs. 12,510 million in 1950/51 to Rs 307,590 million in 1985/86, a rise of nearly 25 times. Indian trade has recorded remarkable changes in respect of both composition and direction of trade. The share of traditional exports has declined from nearly 70 per cent of the total exports in 1950/51 to nearly a third of the total in the eighties. Among the non-traditional goods such as commodities engineering goods, leather and leather manufactures, iron ore and clothing have recorded a significant increase in exports. The change recorded in the composition of imports is related to the strategy of industrialization. Imports of capital goods, industrial raw materials, petroleum and petroleum products have steadily replaced those of manufactured consumer goods and food-grains. The change in the direction of trade is clear as the heavy dependence on England has been reduced considerably and instead trade with the U.S.A., Japan, the USSR, F.R.G. and other developing countries has shown a remarkable increase.

Self-reliance is one of the objectives of planned growth in India. Self-reliance here means that India is able to pay for her imports through exports. In order to attain this objective, India has adopted policies of import controls and export promotion as well as promoting import substitution. In spite of the above policies, the trade deficit has increased to more than 8,000 crores in 1985/86. The sharp increases in oil-prices have accentuated the chronic deficits in the balance of payments

since the mid-seventies. There has been some letup in the increasing trade deficits due to the rapid increase in the production of domestic crude oil. Accordingly the share of imports of oil and petroleum products in total reduced from 66 per cent in 1979/80 to nearly 31 per cent in 1984/85. But for this, the financing of oil imports would have become virtually impossible because of the escalation of the foreign debt in recent years. Therefore the strategy to cope with this situation is to curtail the domestic demand for such bulk items as edible oils, sugar and fertilizers. It is also necessary to take measures for efficient management of the domestic demand for petroleum products and for a sustained acceleration in commodity exports as well as earnings from "invisible" trade. For these measures, the Indian economy depends upon the emergence of an efficient industrial production system and the acceleration of a healthy environment for investment in the industrial sector, especially import-substitution.

Table 2-3-7 Principal Imports

(Unit: Rs. crores)

	70/71	80/81	81/82	82/83	83/84	84/85	85/86	86/87
Imports	1,634.2	12,549.2	13,607.6	14,292.7	15,831.5	17,134.2	19,657.7	20,083.5
I. Food and Life animls chiefly for Food	242.4	380.2	690.1	638.2	1,018.1	694.8	853.7	N.A
II. Raw materials and Intermediate Manufactures	888.6	9,759.6	10,138.2	10,642.7	11,094.5	12,895.8	13,966.1	N.A
Petroleum oil and lubricants	136.6	5,266.5	5,189.5	5,621.9	4,832.0	5,409.1	4,989.4	2,679.6
Fertilizer and chemical products	216.5	1,490.1	1,512.9	1,147.7	1,626.2	2,770.6	3,255.8	N.A
Fertilizers and fetilizer material	99.9	817.8	698.7	368.4	424.2	1,346.1	1,435.8	773.5
Chemical elements and compounds	68.0	358.2	485.2	422.5	659.9	856.7	1,089.4	1,035.6
Others	48.6	314.1	329.0	356.8	542.1	567.8	730.6	N.A
Non-metallic mineral manufacturers	33.3	555.2	511.6	844.2	1,277.3	1,114.3	1,201.4	N.A
Iron and Steel	147.0	852.4	1,203.5	1,172.2	1,048.7	941.1	1,397.6	1,449.7
Others	355.2	1,595.4	1,720.7	1,856.7	2,310.3	2,660.7	3,121.9	N.A
III. Capital Goods	404.0	1,910.3	2,096.1	2,716.2	3,322.3	3,167.8	4,285.4	5,467.3
Non-electrical machinery, apparatus and appliance	257.8	1,089.1	1,349.2	1,438.7	2,051.3	1,927.7	2,592.7	3,713.9
Electrical machinery apparatus and appliances	70.4	259.7	326.4	494.2	675.4	730.4	922.5	877.5
Transport equipment	66.5	472.0	305.0	639.6	446.9	368.9	568.7	676.8
Others	9.3	89.5	115.5	143.7	148.7	140.8	201.5	199.1
IV. Others	99.2	499.1	683.2	295.6	396.6	375.8	552.5	N.A

Source: Economic Survey 1987-88

Table 2-3-8 Principal Exports

(Unit: Rs. crores)

	70/71	80/81	81/82	82/83	83/84	84/85	85/86	86/87
Exports	1,535.2	6,710.7	7,805.9	8,803.4	9,770.7	11,743.7	10,894.6	12,566.6
I. Agricultural and Allied Products	487.0	2,056.7	2,221.1	2,450.0	2,621.7	2,996.5	3,018.3	N.A
Coffee	25.1	214.2	146.3	187.1	181.7	210.2	264.9	306.2
Tea and Mate	148.3	425.5	395.2	369.8	515.2	766.6	626.3	549.7
Cashew Kernels	57.1	140.1	181.5	135.4	150.8	179.7	225.1	320.6
Spices	38.8	11.4	98.8	94.6	116.7	206.7	277.8	269.1
Fish & Fish preparations	30.5	217.0	284.9	364.2	364.0	381.4	409.0	478.5
Others	187.2	1,048.5	1,114.4	1,298.9	1,293.3	1,251.9	1,215.2	-
II. Ores and Minerals	164.0	413.6	458.8	490.8	506.2	637.6	784.7	674.7
Iron ore	117.3	303.3	351.8	380.5	401.6	459.4	578.8	543.2
Others	46.7	110.3	107.0	110.3	104.6	178.2	205.9	131.5
III. Manufactural Goods	772.0	3,746.8	4,369.6	4,551.1	4,969.4	6,210.1	6,374.2	N.A
Textile fablic & manufactures	145.4	932.6	1,047.1	1,556.1	1,481.3	1,717.5	1,795.1	1,899.7
Jute manufactures	190.4	330.0	258.0	206.3	170.9	341.3	261.8	265.0
Leather & leather manufactures	80.2	389.7	424.8	414.6	492.5	724.1	769.9	787.2
Handicrafts	72.8	951.9	1,250.8	1,440.4	1,599.3	1,750.8	1,881.4	2,501.7
Chemical and allied products	29.4	224.8	364.1	348.3	327.6	482.9	497.5	474.5
Machinery, Transport equipment and metal manufactures	130.4	815.0	938.9	807.1	758.7	880.3	897.9	875.0
Iron and steel	67.2	11.7	6.8	60.8	48.5	75.8	56.2	56.9
Others	56.2	91.1	79.1	-	90.0	237.4	214.4	-
IV. Mineral fuels and lubricants	12.6	27.9	224.9	1,240.4	1,591.0	1,822.9	654.9	416.2
V. Others	99.6	465.8	531.5	70.2	83.4	76.6	62.5	N.A

Source: Economic Survey 1987-88

Table 2-3-9 Foreign Trade by Country (Imports)

	70/71		80/81		81/82		82/83		83/84		84/85		85/86		86/87	
Imports	1,634.2		12,549.2		13,607.6		14,292.7		15,831.5		17,134.2		19,657.7		20,083.5	
JAPAN	83.4	5.1	748.8	6.0	886.5	6.5	1,087.9	7.6	1,446.9	9.1	1,240.0	7.2	1,774.0	9.0	2,558.0	12.7
U.S.A.	453.0	27.7	1,518.6	12.1	1,419.7	10.4	1,426.5	10.0	1,841.9	11.6	1,700.6	9.9	2,063.7	10.5	1,963.3	9.8
F.R.G.	107.5	6.6	693.8	5.5	947.8	7.0	831.4	5.8	1,122.9	7.1	1,289.1	7.5	1,543.7	7.9	1,936.6	9.7
U.K.	126.8	7.8	731.0	5.8	816.8	6.0	912.6	6.4	1,152.7	7.3	933.5	5.5	1,250.6	6.4	1,623.0	8.1
Belgium	11.5	0.7	295.9	2.4	501.3	3.7	631.5	4.4	648.6	4.1	793.9	4.6	950.6	4.8	1,089.7	5.4
U.S.S.R.	106.1	6.5	1,013.7	8.1	1,136.9	8.4	1,413.2	9.9	1,645.6	10.4	1,788.1	10.4	1,677.5	8.5	1,072.2	5.3
Saudi Arabia	24.2	1.5	540.1	4.3	829.8	6.1	1,495.9	10.5	1,069.0	6.8	1,262.9	7.4	794.2	4.1	687.2	3.4
France	21.3	1.3	280.3	2.2	253.6	1.9	425.6	3.0	289.3	1.8	357.0	2.1	582.6	3.0	669.4	3.3
Australia	36.6	2.2	170.1	1.4	260.6	1.9	326.0	2.3	154.0	1.0	200.6	1.2	442.1	2.2	431.0	2.2
Netherlands	19.1	1.1	214.5	1.7	278.6	2.0	248.7	1.7	278.7	1.8	364.7	2.1	296.1	1.5	385.7	1.9
Others	644.7	39.5	6,342.4	50.5	6,276.0	46.1	5,493.4	38.4	6,181.9	39.0	7,203.8	42.1	8,282.6	42.1	7,667.4	38.2

Source: Economic Survey 1987-88

Table 2-3-10 Foreign Trade by Country (Exports)

	70/71		80/81		81/82		82/83		83/84		84/85		85/86		86/87	
Exports	1,535.2		6,710.7		7,805.9		8,803.4		9,770.7		11,743.7		10,894.6		12,566.6	
U.S.A.	207.3	13.5	743.3	11.1	920.2	11.8	928.3	10.5	1,395.6	14.3	1,765.8	15.0	1,973.8	18.1	2,359.3	18.8
U.S.S.R.	209.9	13.7	1,226.3	18.3	1,661.1	21.3	1,669.8	19.0	1,305.9	13.4	1,879.6	16.0	2,005.7	18.4	1,872.9	14.9
JAPAN	203.5	13.3	597.8	8.9	690.4	8.8	833.6	9.5	825.7	8.5	1,029.4	8.8	1,164.4	10.7	1,343.6	10.7
F.R.G.	32.3	2.1	384.8	5.7	351.2	4.5	340.1	3.9	375.3	3.8	487.9	4.2	513.0	4.7	740.3	5.9
U.K.	170.4	11.1	394.9	5.9	420.1	5.4	421.8	4.8	556.1	5.7	612.6	5.2	524.4	4.8	737.1	5.9
Belgium	20.3	1.3	144.5	2.1	166.3	2.1	213.4	2.4	207.2	2.1	193.2	1.6	224.7	2.1	353.5	2.8
France	18.1	1.2	146.9	2.2	148.3	1.9	145.8	1.6	156.5	1.6	191.5	1.6	2.2	1.9	274.5	2.2
Netherlands	14.0	0.9	152.0	2.3	110.1	1.4	111.0	1.3	195.4	2.0	194.6	1.7	158.4	1.5	226.4	1.8
Saudi Arabia	14.5	0.9	165.3	2.5	180.1	2.3	227.1	2.6	244.9	2.5	271.8	2.3	221.3	2.0	219.0	1.7
Canada	28.0	1.8	62.3	0.9	67.4	0.9	57.5	0.6	91.8	0.9	131.1	1.1	132.1	1.2	149.5	1.2
Others	616.9	40.2	2,692.6	40.1	3,090.7	39.6	3,855.0	43.8	4,416.3	45.2	4,986.2	42.5	3,774.1	34.6	4,290.5	34.1

Source: Economic Survey 1987-88

2-4 Transportation

There are four main transport systems in India; railways, roads, ports and shipping and air transport.

2-4-1 Railways

The Indian railways are the nation's lifeline and the principal mode of transport in the country. The Indian railways are grouped into nine zonal administrations:

Southern Railway (Madras)	Western Railway (Bombay)
Central Railway (Bombay)	Northern Railway (Delhi)
Eastern Railway (Calcutta)	South Eastern Railway (Calcutta)
North Eastern Railway (Gorakhpur)	South Central Railway (Secunderabad)

North-east Frontier Railway (Maligaon, Guwahati)

( ) indicates headquarters

Indian railways carry nearly 50 per cent of the country's passenger traffic and two-thirds of its freight, thus constituting the most important means of transport in the country. More importantly, the railways have been instrumented in building growth corridors:

Bombay - Calcutta, Bombay - Ahmadabad - Delhi
Delhi - Kanpur - Calcutta, Madras - Hyderabad - Pune - Bombay
Bangalore - Hyderabad - Delhi,
Coimbatore - Madras - Vishakapatnum - Calcutta

Indian's railway route length is 61,850 kms (as of 31 March 1985) which is the largest in Asia and the fourth largest in the world, but the electrified route length is 6,325 kms. During 1984/85, they carried approximately 33.3 million passengers and 2,648 thousand tonnes of freight traffic. The operational fleet consisted of 10,128 locomotives, 38,583 coaching vehicles and 365,390 wagons in that year.

The responsibility for the administration and management of government railways vests in the Railway Board under the overall supervision of a Cabinet Minister assisted by a Minister of State.

Gauge-Change (Broad, Meter and Narrow Gauge) is a serious defect in the Indian railway system and appears to inhibit growth to towns in the subordinate network. The inter-gauge transfer of goods involves delays, expense and high rates of pilferage and spoilage.

In the year 1984/85, Indian railways entered the Metro Age. A section between Esplanade and Bhowanipur in Calcutta covering a distance of 3.5 km was opened for commercial operation during the year. The alignment takes off from Dun Dun in the North and covers a length of 16.43 km towards the south up to Tollyganj.

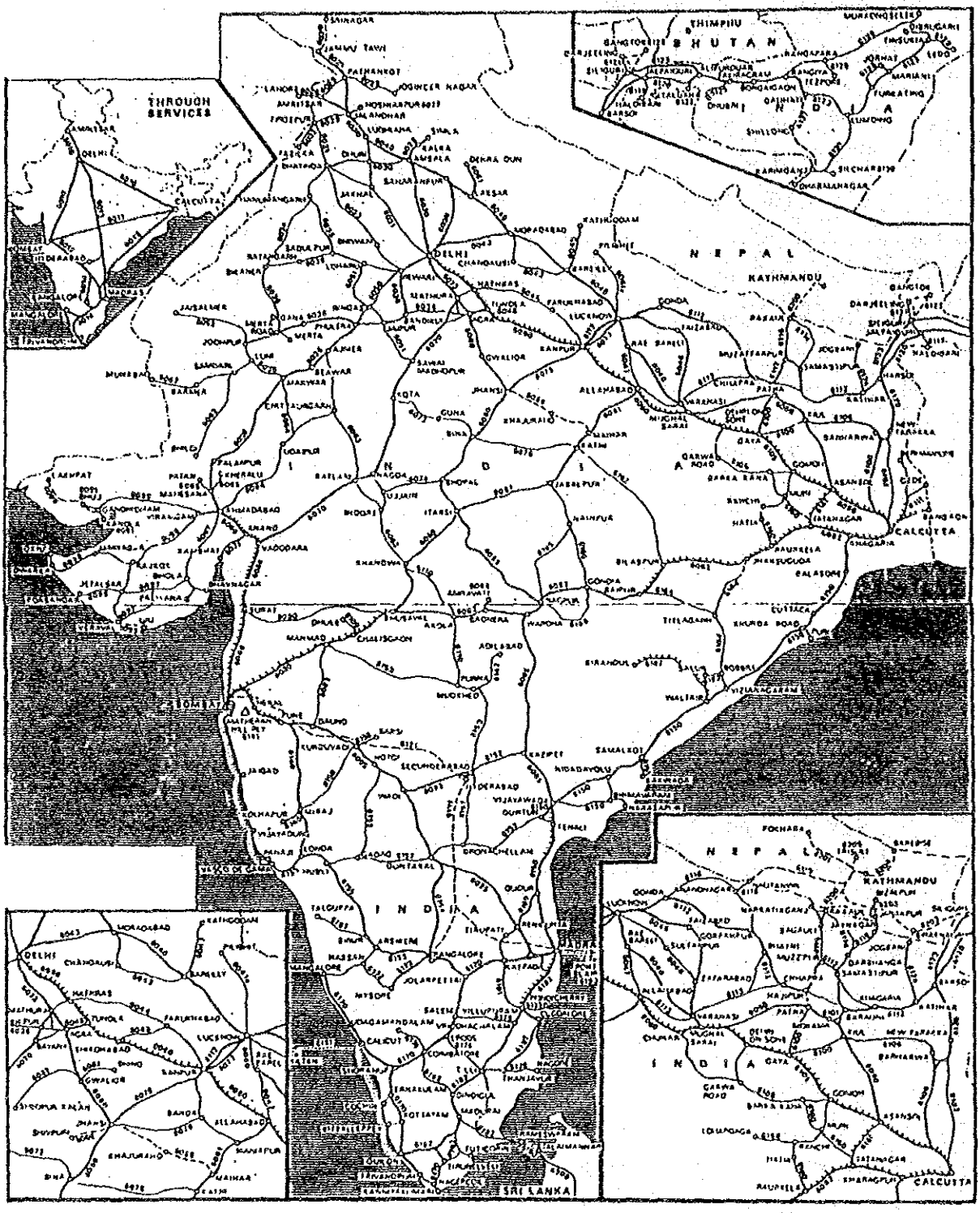

Fig. 2-4-1 Railways