PUBLIC WORKS DEPARTMENT,
GOVERNMENT OF WEST BENGAL
MINISTRY OF SHIPPING, ROAD TRANSPORT
AND HIGHWAYS, INDIA

NO.

THE FEASIBILITY STUDY
ON
THE CONSTRUCTION OF
RAICHAK - KUKURAHATI BRIDGE
IN INDIA

PROGRESS REPORT I

DECEMBER 2006

JAPAN INTERNATIONAL COOPERATION AGENCY

NIPPON KOEI CO., LTD.

In Association with

CHODAI CO., LTD.

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PREFACE

In response to the request from the Government of India and the Government of West Bengal, the Government of Japan decided to conduct the Feasibility Study on the Construction of Raichak - Kukurahati Bridge in India, and entrusted the Study to the Japan International Cooperation Agency (JICA).

JICA sent the Study Team, headed by Mr. Katsufumi Matsuzawa of Nippon Koei Co., Ltd. and organized by Nippon Koei Co., Ltd. and Chodai Co., Ltd., to India from 4 June, 2006 to 31 August, 2006.

The Study Team had a series of discussions with the officials concerned of the Government of India and the Government of West Bengal and conducted related field surveys. Although the early termination of the Study was confirmed by Note of Verbal between the Government of Japan and the Government of India, the Study Team conducted further studies and compiled this "Progress Report I" as the final result.

I hope that this report will contribute to the promotion of the plan and to the enhancement of amity between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of India, the Government of West Bengal for their close cooperation throughout the Study.

December, 2006

Kazuhisa MATSUOKA
Vice President
Japan International Cooperation Agency

December, 2006

Mr. Kazuhisa MATSUOKA
Vice President,
Japan International Cooperation Agency
Tokyo, Japan

LETTER OF TRANSMITTAL

We are pleased to submit to you the report on the Feasibility Study on the Construction of Raichak – Kukurahati Bridge in India. The report compiled all findings obtained through the Study from June 2006 to December 2006 in India conducted by Nippon Koei Co., Ltd. and Chodai Co., Ltd. in accordance with the contract with Japan International Cooperation Agency.

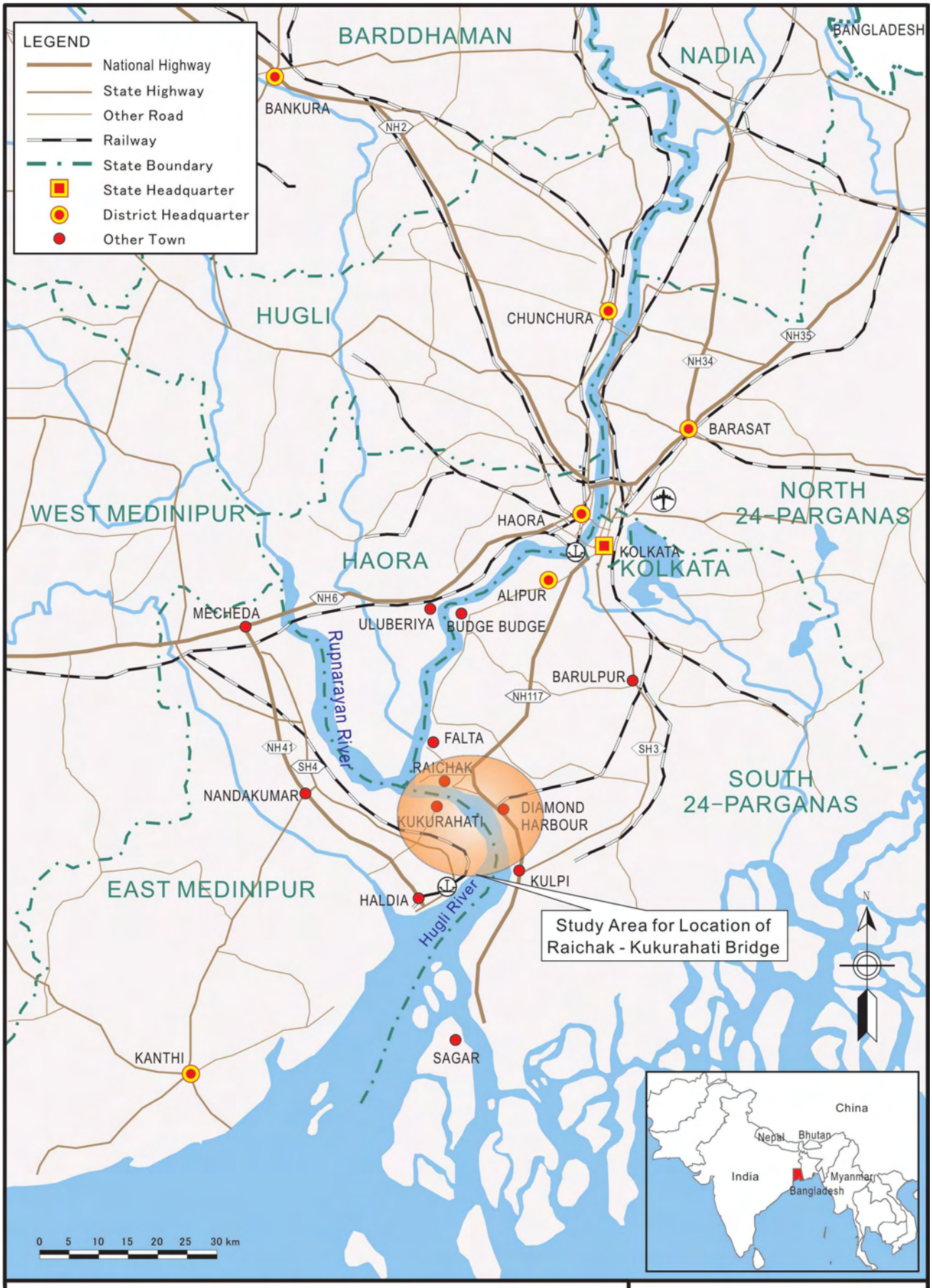
We express regret for the early termination of the Study, which was officially confirmed by Note of Verbal between the Government of Japan and the Government of India. However, Useful outcomes for further study were obtained such as crossing location and alignment of approach road, the necessity of bypass of NH117, study of navigational requirement etc.

We wish to take this opportunity to express our sincere gratitude to your agency and the Ministry of Foreign Affairs, and also wish to express our deep appreciation to the Government agencies concerned in India, especially the counterpart agency of the Government of West Bengal, Public Works Department, and Kolkata Port Trust of MoSRTH, for the close cooperation and assistance extended to us during the Study.

We hope this report will contribute to the development of India.

Very truly yours,

Katsufumi MATSUZAWA
Team Leader
The Feasibility Study on the Construction of Raichak – Kukurahati Bridge in India



The Feasibility Study on the Construction of Raichak – Kukurahati Bridge in India

Location Map

The Feasibility Study on the Construction of Raichak – Kukurahati Bridge in India

Progress Report I

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Abbreviations

AAI	**:**	**Airports Authority of India**
ADB	**:**	**Asian Development Bank**
B/C	**:**	**Benefit / Cost Ratio**
BOT	**:**	**Build, Operate and Transfer**
CDL	**:**	**Chart Datum Line**
CES	**:**	**Consulting Engineering Services (India) Pvt.Ltd.**
CID	**:**	**Commerce and Industry Department**
DEA	**:**	**Department of Economic Affairs**
EIA	**:**	**Environmental Impact Assessment**
EIRR	**:**	**Economic Internal Rate of Return**
F/S	**:**	**Feasiblity Study**
GDP	**:**	**Gross Domestic Product**
GIS	**:**	**Geographic Information System**
GOI	**:**	**Government of India**
GOJ	**:**	**Government of Japan**
GQ	**:**	**Golden Quadrilateral**
GSDP	**:**	**Gross State Domestic Product**
H.H.W	**:**	**Highest High Water**
HDA	**:**	**Hadia Development Authority**
HDC	**:**	**Haldia Dock Complex**
ICD	**:**	**Inland Container Depot**
IEE	**:**	**Initial Environmental Examination**
IMD	**:**	**Indian Meteorological Department**
JBIC	**:**	**Japana Bank of International Cooperation**
JETRO	**:**	**Japan External Trade Organization**

JICA	**:**	**Japan International Cooperation Agency**
KDS	**:**	**Kolkata Dock System**
KMA	**:**	**Kolkata Metropolitan Area**
KoPT	**:**	**Kolkata Port Trust**
KPD	**:**	**Kidderpore Dock**
L.L.W	**:**	**Lowest Low Water**
LOA	**:**	**Length Overall**
MoSRTH	**:**	**Ministry of Shipping, Road Transport and Highways**
MSL	**:**	**Mean Sea Level**
NGO	**:**	**Non-Governmental Organization**
NH	**:**	**National Highway**
NH 34	**:**	**National Highway 34**
NHAI	**:**	**National Highways Authority of India**
NHAI	**:**	**National Highways Authority of India**
NHDP	**:**	**National Highways Development Project**
NSD	**:**	**Netaji Subhas Dock**
NSDP	**:**	**Net State Domestic Product**
ODA	**:**	**Official Development Aid**
P.W.D	**:**	**Public Works Department**
PAFs	**:**	**Project Affected Families**
PCU	**:**	**Passenger Car Unit**
PFI	**:**	**Private Financing Intiative**
PPP	**:**	**Public Private Partnership**
ROW	**:**	**Right-of-way**
SAARC	**:**	**South Asian Association for Regional Cooperation**
SAFTA	**:**	**South Asian Free Trade Area**
SAGQ	**:**	**South Asian Growth Quadrangle**

SASEC	**:**	**South Asia Sub-regional Economic Cooperation**
SEZ	**:**	**Special Economic Zone**
SH	**:**	**State Highway**
SWOT	**:**	**Strength, Weakness, Opportunity and Threat**
TOR	**:**	**Terms of Reference**
WBCR	**:**	**West Bengal Corridor Region**
WBG	**:**	**West Bengal State Government**
WBIDC	**:**	**West Bengal Industrial Development Corporation**
WBPWD	**:**	**West Bengal State Public Works Department**
WBPWRD	**:**	**West Bengal State Public Works (Road) Department**
WBSC	**:**	**West Bengal Southern Corridor**
WBSR	**:**	**West Bengal Southern Region**

CHAPTER 1

INTRODUCTION

CHAPTER 1 Introduction

1.1 Background of the Study

The background and major events relating to the construction project for the Raichak -Kukrahati Bridge are discussed below in chronological order.

1) Kolkata, the state capital of West Bengal and an old port city, has a population of 4.5 million including the whole Kolkata metropolis. Kolkata has been expanding towards the north, south and east as the Hugli River, which is a tributary of the River Ganges, limits transportation towards the west. Recently, there has been significant growth in economic activity towards the south (e.g. in Haldia and Falta).

   Haldia Port and Kolkata Port are the main gateways for marine transport to and from West Bengal State. These ports play an important role in the economic and distribution systems, not only for India, but also for neighbouring countries. Haldia Port, along with its vast industrial area, has enjoyed its status as the major contributor to economic development. The economy and the industries driving it are expected to create additional employment and achieve further economic development based on business and investment activities in Kolkata City and the Haldia Industrial Complex.

   The road transport infrastructure in the southern part of West Bengal State is under considerable pressure. The Hugli River hampers transportation between Kolkata City and the Haldia Industrial Complex due to the lack of a direct route. The existing route via National Highway No.41 and No.6 requires travel over a longer distance and time due to detouring. By linking the major road network on both banks of the Hugli River, it is expected that opportunities for regional development will be created in the southern part of West Bengal State. This will also bring significant benefits to the North-Eastern State and neighbouring countries including Nepal, Bhutan and Bangladesh.

2) Various studies, such as the "North-South Corridor Development Project in West Bengal" by the Asian Development Bank in 2000 and "the Feasibility Study on the Hugli River Crossing Project in India" by the Japan External Trade Organization (JETRO), were conducted between August 2002 and January 2003 in order to improve the crossing over the Hugli River at Raichak – Kukrahati. However, there has not yet been a firm determination that the optimum crossing method would be to construct a new bridge.

3) In April 2004, the Government of India (GOI) made a request based on the JETRO feasibility study to the Government of Japan (GOJ) for a Japanese Yen loan to be provided by the Japan Bank for International Cooperation (JBIC). JBIC decided that the program proposed by the JETRO study was insufficient to allow for the provision of a Japanese Yen

loan for building such a long span bridge and required another comprehensive feasibility study to be undertaken by an internationally authorized agency.

4) In November 2004, the GOI including the Ministry of Shipping, Road Transport and Highways (MoSRTH), Department of Economic Affairs (DEA) and the Government of West Bengal requested the GOJ to provide technical assistance in carrying out the Feasibility Study on the Construction of the Raichak – Kukurahati Bridge (the Study).

5) In response to the GOI's request, the GOJ decided to conduct the Study and concluded the Note Verbal between the GOJ and the GOI in August 2005. The GOJ entrusted the execution of the Study to the Japan International Cooperation Agency (JICA), the official agency of the GOJ responsible for the implementation of technical cooperation programs. The scope of work for the comprehensive feasibility study was decided between JICA and the Public Works Department of the State Government of West Bengal (PWD) and MoSRTH on February 28, 2006.

6) JICA organized the JICA Study Team for conducting the Study and the JICA Advisory Committee and Environmental Committee in May 2006. The Study commenced on June 4, 2006 when the JICA Study Team was deployed to India. Meanwhile, in June 2006 the State Government of West Bengal (GOWB) organized the Counterpart Team comprising the PWD, the Transportation Department (TD) and Kolkata Port Trust of MoSRTH, Technical Committee and Steering Committee for the Study. Since commencement the Study has been conducted smoothly.

7) The unexpected situation occurred on July 31, 2006 when the Principal Secretary of the Commerce and Industry Department of GOWB (CID) signed a memorandum of understanding, which includes various projects along with the Raichak-Kukrahati Bridge, with a consortium consisting of Indonesia based Salim Group as the leading firm, West Bengal Industrial Development Corporation (WBIDC), and others in the presence of the Chief Minister, Commerce and Industry Minister, and Chief Secretary of GOWB.

8) However, the JICA Study Team and the Counterpart Team as well as the Technical Committee continued their responsibilities based on the Scope of Work determined by JICA, the PWD and the MoSRTH on February 28, 2006.

9) The Chief Secretary of GOWB had clearly mentioned that the Study is not necessary at meeting with Resident Representative of JICA India Office at Writers' Building on August 11, 2006 because of the double deals indicated above.

10) The Chief Minister of West Bengal held a meeting with Japanese Ambassador at the Banga Bhavan in Delhi on September 24, 2006 on status of the Study. However, no conclusion had been reached at the meeting.

11) The Minister of Commerce and Industry of GOWB held a meeting with the Deputy Ministry of Foreign Affairs, the Government of Japan on October 18, 2006 in Tokyo. The Minister of Commerce and Industry of GOWB conveyed the declination of the Study as a result of discussion with GOI. GOJ started its procedure for early termination of the Study.

12) JICA agreed with GOWB that the Study should be terminated earlier than the schedule based on the circumstances stated above.

1.1.1 Objectives of the Study

The objectives of the Study are as follows;

(1) To conduct a feasibility study on the construction of the Raichak – Kukurahati bridge over the Hugli River including its approach roads and taking into consideration regional development and the social and natural environments, and

(2) To pursue technical transfer to the counterpart personnel during the course of the Study.

1.1.2 Feasibility Study

(1) A pre-feasibility study for the construction of a bridge across the Hugli River, to connect Raichak on the north bank and Kukrahati on the south bank, was conducted by Pacific Consultants and other firms using JETRO funds between August 2002 and January 2003 (the so-called JETRO Study). In the JETRO Study, a 3,500 m long bridge, consisting of a 400 m center span cable stayed girder bridge and a 60 m span of pre-stressed concrete box girders, was proposed at the navigational crossing point from the left bank to the right bank. Following this, the Kolkata Port Trust examined the bridge proposed in the JETRO Study through a physical model test, which revealed the likelihood of severe siltation in the downstream of the river.

(2) Following this, the GOI requested the GOJ to conduct a feasibility study on the construction of a bridge over the Hugli River. In response to the request, the Government of Japan decided to conduct the Study under the relevant laws and regulations in force in Japan. Meanwhile the JICA India Office entrusted to CES Delhi an evaluation study of two project proposals; Sagar Port from Kolkata Port Trust in May 2004, and Raichak-Kukrahati Bridge from PWD in November 2004 based on the JETRO Study. CES Delhi prepared an evaluation report in March 2005 containing various unclear issues.

(3) JICA dispatched the Preparatory Study Team, headed by Mr. Nobuhiro Koyama, for the feasibility study of the Raichak-Kukurahati Bridge to India from February 20 to 28, 2006. The Preparatory Study Team had a series of meetings to discuss the scope of work for the Study with the related agencies (the Department of Economic Affairs (DEA), MoSRTH, PWD, Kolkata Port Trust, TD, Haldia Development Authority, WBIDC, NGOs). Accordingly,

the scope of work for the feasibility study of the Raichak-Kukrahati Bridge in West Bengal was established as set out in the minutes of the meeting dated 28 February 2006 between the JICA Preparatory Study Team and the PWD of GOWB and MoSRTH.

(4) On the basis of the scope of work for the Study JICA was undertaking the Study in close cooperation with the GOI and GOWB. In May 2003, JICA organized an Advisory Committee. In the meantime, JICA appointed a Study Team, headed by Mr. Katsufumi Matsuzawa, consisting of Nippon Koei Co., Ltd. in association with Chodai Co., Ltd. (the Study Team) to conduct the Study, and dispatched the Study Team from June 4, 2006.

In June 2006, GOWB organized a Technical Committee, headed by Mr. P.K. Deb, Engineer-in-chief & Ex-officio Secretary to PWD, and a Steering Committee, headed by Mr. A.K. Deb, Chief Secretary of GOWB. In the meantime, the PWD appointed a counterpart team, headed by Mr. S.K. Saha, Chief Engineer P&QA of the PWD, consisting of the PWD, TD and Kolkata Port Trust.

(5) The Study Team produced and submitted the Inception Report in June, 2006. The first Technical Committee meeting was held on June 9 to discuss the contents of the Inception Report. The minutes of meeting dated June 9, 2006 were recorded And the Inception Report prepared by the Study Team was refined on the basis of these meeting minutes. The Steering Committee meeting was held on June 28, 2006 and the contents of the Inception Report were agreed. Since that time, the Study has been conducted in accordance with the work flow diagram shown in **Figure 1.1.1.**

(6) In August 2006, the Study Team submitted a technical paper on navigational requirements. This is one of the most dominant factors in deciding the type and size of the bridge, bridge location alternatives and alignment alternatives for the approach road. The second Technical Committee meeting was held on August 9, 2006 to discuss the navigational requirements, bridge location and alignment of the approach road. The results of the discussions were compiled into the minutes of the meeting dated August 9, 2006.

The Study Team conducted the following items under Task-1 [Analysis of Existing Conditions in the Study Area] and Task-2 [Study of the Regional Development Framework for the Southern Part of West Bengal State], as scheduled in the Inception Report until late August 2006.

<u>Task-1</u>

- Collection and review of existing data, information and reports related to the Study.
- Investigation of social and economic conditions viz. transportation infrastructure survey, traffic surveys, land-use survey, investigation of industry and economic zones, investigation of social and economic activities around ferry terminals, investigation of

residential people in the study area.

- Study of the natural conditions, subsoil and geology, geographic features and hydrology.

Task-2

- Study on the development potential and the direction of regional development in the southern part of West Bengal State.
- Study on the direction of social economic infrastructure.
- Setting up the socio-economic framework.
- Study on the crossing location.

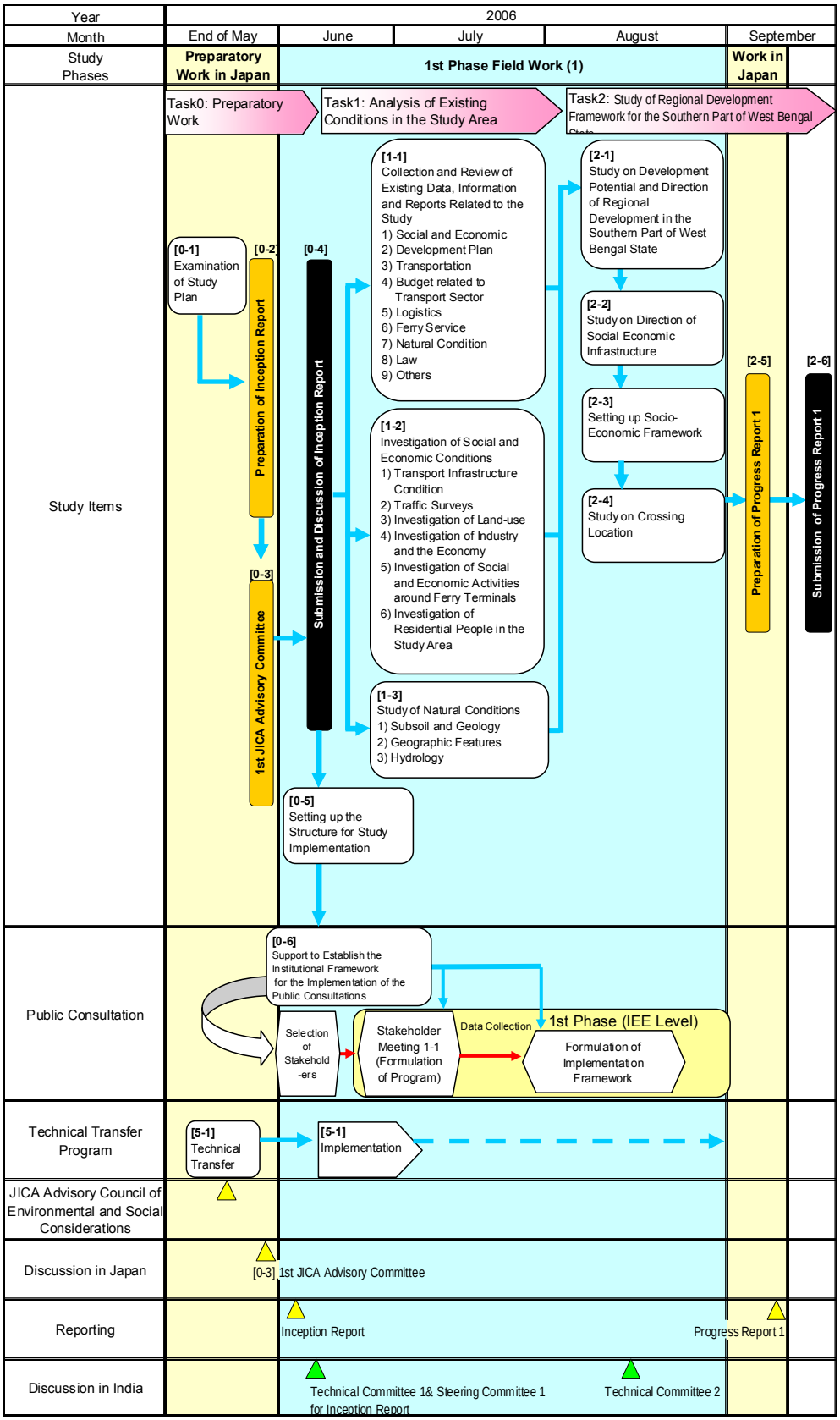


Figure 1.1.1 Work Flow Diagram up to Progress Report 1

1.2 Components of Progress Report 1

The Progress Report 1 consists of

Chapter 1: Introduction

Chapter 2: Socio-Economic Conditions and Regional Development Prospects

Chapter 3: Road Transport Conditions and Future Development Prospects in the Study Area

Chapter 4: Natural Conditions in the Study Area

Chapter 5: Initial Environmental Examination

Chapter 6: Initial Study on Bridge Location and Route Alignment

Chapter 7: Preconditions for Bridge Planning

Chapter 8: Recommendations and Suggestions on Further Study

Chapter 1 deals with the necessity of the Raichak-Kukrahati Bridge Project, the background of the Study, the members involved and the main events during the Study. Chapter 2 covers the present socio-economic conditions and future industrial development prospects in the study area. Chapter 3 deals with the outcomes of the traffic survey undertaken by the Study Team, developing an understanding of the present and future road transport and railway networks, river surface and air transport conditions. Chapter 4 deals with the hydrological and hydraulic data, oceanographic data, meteorological data and seismic data available from relevant organizations. Chapter 5 and Chapter 6 deal with the initial environmental examination and the bridge location and alignment study in which four alternative bridge locations are studied and an initial screening is made. Chapter 7 deals with navigation requirement that is one of the dominant factors to consider in planning bridge. Chapter 8 describes issues to be solved in the future and recommendations/suggestions from the Study Team.

1.3 Members Involved

1.3.1 Members from the Japanese Side

(1) JICA Advisory Committee

No	Name	Position
1	Mr. Akira Kaneko	Chairman, Professor of Toyo University
2	Mr. Akira Moriyama	Member, Honsyu-Shikoku Bridge Expressway Co.,Ltd.
3	Mr. Kenichi Tanaka	Member, Japan International Cooperation Agency

(2) JICA Study Team (Members deployed to India,up to August 2006)

No	Name	Position
1	Mr. Katsufumi Matsuzawa	Team Leader
2	Mr. Tetsu Nakagawa	Deputy Team Leader/Bridge Planning
3	Mr. Kiyoshi Yasukawa	Transportation and Road Planning/Traffic Demand Forecast 1
4	Mr. Koichi Arakawa	Traffic Survey/Traffic Demand Forecast 2
5	Mr. Koji Yamada	Regional Infrastructure Planning/Regional Development Planning
6	Mr. Minoru Nagai	Industrial Development Planning
7	Mr. Shusuke Minato	Environmental Assessment (Social Environmental Consideration)/Public Consultation 2
8	Mr. Takanori Hayashida	Environmental Assessment (Natural Environmental Consideration)
9	Mr. Yasuhiro Azuma	River Planning
10	Ms. Hikaru Sugimoto	Natural Condition Survey (Hydrology & Hydraulics)
11	Mr. Shinsuke Mori	Natural Condition Survey (Topography & Geology)
12	Mr. Naresh Sthapit	Alignment Planning
13	Mr.Shinsuke Kubo	Inland Water Transport/Ferry Operation Planning
14	Mr. Shimpei Imada	Assistant Transport and Road Planning/Coordinator

1.3.2 Members from the Indian Side

(1) Steering Committee

No	Name	Position
1.	Mr. A. K. Deb	Chief Secretary to the Govt. of West Bengal
2.	Dr. P. K. Agarwal	Principal Secretary, P.W. & P.W. (Roads) Department
3.	Mr. Samar Ghosh	Principal Secretary, Finance Department
4.	Mr. S. Choudhury	Principal Secretary, Transport Department
5.	Mr. P. K. Deb	Engineer-in-Chief & Ex-officio Secretary

6.	Mr. Sabyasachi Sengupta	Secretary, Commerce & Industry Department
7.	Mr. A. K. Barman(EN)	Secretary, Environment Department
	Mr. A. K. Pattanayek (Forest)	Secretary, Forest Department
8.	Ms. Sreyasi Chaudhuri	Representative of the Dept. of Economic Affairs, Govt. of India
9.	Mr. A. P. Bahadur	Representative of the Ministry of Shipping, Road Transport and Highways, Govt. of India
10.	Mr. Fujii Tomoyuki	Representative of JICA
11.	Mr. K. Matsuzawa	Leader of Japanese Consultant
12.	Dr. A. K. Chanda	Chairman, Kolkata Port Trust
13.	Mr. P. R. Baviskar, IAS	CEO, Kolkata Metropolitan Development Authority
14.	Sri S. Gupta	CEO, Haldia Development Authority

(2) Technical Committee (other than counterpart team)

No	Name	Position
1.	Dr. P. K. Agarwal	Principal Secretary, Public Works & Public Works (Roads) Department
2.	Mr. P. K. Deb	Engineer-in-Chief & Ex-officio Secretary, Public Works & Public Works (Roads) Department
3.	Mr. S. K. Saha	Chief Engineer (Planning & QA), Public Works (Roads) Department
4.	Mr. B. Chaudhuri	Chief Hydraulic Engineer, Kolkata Port Trust
5.	Mr. B. K. Sadhu	Chief Traffic & Transportation Engineer, Transport Department

(3) Counterpart Team

No	Name	Position
1	Mr. Swapan Kr. Saha	Chief Engineer, Planning & Quality Assurance
2	Mr. Joydeb Basu	Superintending Engineer, Bridge Planning Circle
3	Mr. Pradip Chatterjee	Executive Engineer, NH Survey Division I
4	Mr. Partha Sarathi Sengupta	Executive Engineer, Bridge Planning Circle
5	Mr. Kashi Nath Das	Executive Engineer, Highway Survey Division III
6	Mr. Rudranath Bhattacharya	Assistant Engineer, Bridge Planning Circle
7	Mr. Pulak Ghosh	Assistant Engineer, Bridge Planning Circle
8	Mr. Dipankar Haldar	Assistant Engineer, Bridge Planning Circle

1.4 Main Events to Date

June 4, 2006	Deployment of the Study Team to India
June 6, 2006	Inception Report was submitted by the Study Team to the PWD.
June 9, 2006	Technical Committee Meeting for the Inception Report at Writers' Building.
June 12, 2006	Taking-over office space along with office furniture/equipment provided by PWD from PWD to the Study Team.
June 21, 2006	Revised Inception Report, in which the results of matters discussed in the Technical Committee Meeting dated June 9, was submitted by the Study Team to the PWD.
June 28, 2006	Steering Committee Meeting for the Inception Report at Writers' Building
July 10 & 11	Public Consultation Meeting for the stakeholders in the Districts of South 24 Paraganas and East Medinipur
July 31, 2006	The Commerce & Industry Department of the State Government signed a memorandum of understanding, which includes Raichak-Kukrahati Bridge, with a consortium led by Indonesia based Salim Group.
August 9, 2006	Second Technical Committee Meeting covering the vertical and horizontal clearance and probable locations of river crossings
August 31, 2006	The Study Team left India to Japan
November 9, 2006	Handing-over office space in Salt Lake along with office furniture/equipment provided by PWD from the Study Team to PWD

CHAPTER 2

SOCIO-ECONOMIC CONDITIONS AND REGIONAL DEVELOPMENT PROSPECTS

CHAPTER 2 SOCIO-ECONOMIC CONDITIONS AND REGIONAL DEVELOPMENT PROSPECTS

2.1 National and Sub-Regional Development Context

The study area is located in the southern part of West Bengal State. In this sub-section, the larger development prospects are described at a sub-regional and national level. At the end of this sub-section, the socio-economic framework will be discussed on both a sub-regional and national level.

2.1.1 Sub-Regional Development Context for South Asia

The sub-regional context broadly relevant to the development of West Bengal State is what is called the South Asia sub-region. South Asia herein refers to eight nations; Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka, and is inhabited by a total of 1.4 billion people. In recent years, economic development in these countries has steadily progressed, and many of these countries are now faced with unparalleled opportunities to reduce poverty as they have never experienced before. The regional economy grew by a robust 7.8% in 2005, powered chiefly by strong growth in India and Pakistan. Still, it is said that 30% of the people in the sub-region live on less than $1 per day.

(1) SAARC

As part of promoting regional development in this area and in pursuit of a regional trade arrangement, the South Asian Association for Regional Cooperation (SAARC) was formed in 1985 including Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. This is a framework for an ongoing initiative for a free trade agreement, which will be discussed later in sub-section 2.1.2.

(2) SASEC and SAGQ

South Asia is one of the poorest sub-regions in the world and poverty is wide spread in the eastern region of South Asia; an area comprising Bangladesh, Bhutan, the eastern states of India, and Nepal. This is the framework for the South Asia Sub-regional Economic Cooperation (SASEC).

In line with the sub-regional cooperation of SASEC, a sub-regional economic cooperation program named the South Asian Growth Quadrangle (SAGQ) was launched. This was initiated by the Foreign Ministers of the aforementioned four nations in April 1997 and formally recognized and endorsed at the SAARC Summit in May 1997. SAARC identified the following sectors as priorities; environment, energy and power, trade and investment,

transport and tourism.

In November 2000, SASEC held a private sector forum in Kolkata, focusing on economic cooperation in the eastern South Asia sub-region. The eastern South Asia sub-region denotes an area encompassing Bangladesh, Bhutan, Nepal, and the Indian states of Arunachal Pradesh, Assam, Bihar, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura, and West Bengal. Broadly, an investment program for the sub-region would include an economic corridor around the Bay of Bengal, linking ports from Chittagong to Dhaka, Mongla, Kolkata, and Haldia, which will be carried through a project called the West Bengal Economic Corridor. It would also include a transport grid of east-west highways and railroads linking the eastern Indian hill states with West Bengal by way of Bangladesh, as well as north-south transport corridors linking Nepal, Bhutan, and the hill states of eastern India to the ports of Kolkata and Haldia. This was called the West Bengal Corridor Development Project, and was supported henceforward by the ADB.

2.1.2 Trade Agreements

(1) Overview

In recent years, India has positively strengthened economic cooperation with Southeast Asian countries as well as South Asian countries. India has been making efforts to establish the South Asia Free Trade Area (SAFTA) as one of the members of the South Asia Association Regional Cooperation (SAARC) that consists of India, Pakistan, Sri Lanka, Bangladesh, Nepal, Bhutan, and Maldives. In addition, India and the Association of South East Asian Nations (ASEAN) have been making efforts to establish the India-ASEAN Regional Trade and Investment Area (RTIA).

Figure 2.1.1 shows an overview of both the multilateral and bilateral trade agreements between India and the SAARC countries, and those between India and ASEAN members.

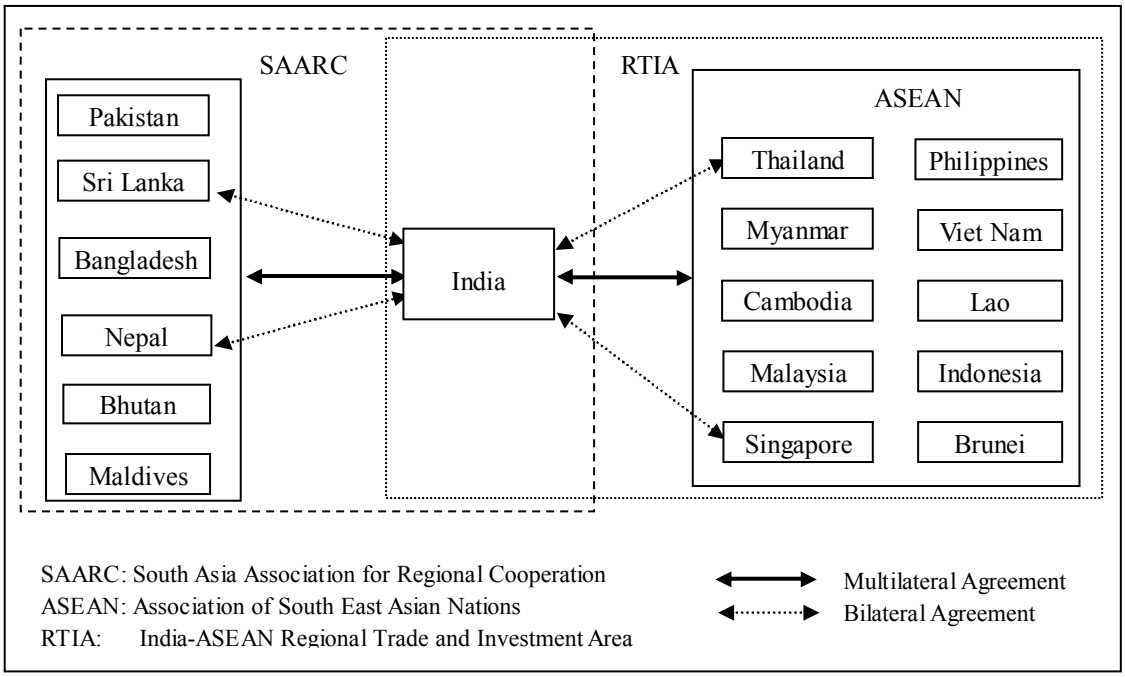


Figure 2.1.1 Overview of India's Trade Agreements

(2) SAARC

On 6 January 2004, the framework for establishing SAFTA was agreed between the seven SAARC countries: India, Pakistan, Sri Lanka, Bangladesh, Nepal, Bhutan, and Maldives.

The framework came into force on 1 January 2006, and the trade deregulation program was initiated on 1 July 2006. During the first phase (until the end of 2007), India, Pakistan, and Sri Lanka are required to reduce their customs duty to less than or equal to 20% on all goods with some exceptions. The four other members of the so-called LDC[1], i.e. Bangladesh, Nepal, Bhutan, and Maldives, are required to reduce their customs duty to less than or equal to 30%.

In the second phase, India and Pakistan shall reduce their customs duty to between 0% and 5% before the end of 2012, Sri Lanka before the end of 2013, and the other LDCs before the end of 2015.

India has provided the exception lists for the customs duty reduction program to other members of SAARC. The list for Pakistan and Sri Lanka includes 884 goods items, and that for the other LDCs includes 763 goods items.

(3) India-ASEAN

On 8 October 2003, the framework agreement for comprehensive economic cooperation between India and ASEAN was made towards an India-ASEAN Regional Trade and

[1] LDC: Least Developed Countries

Investment Area (RTIA). According to the framework agreement, customs duty reductions were scheduled to start from January 2006, but had not yet started in April 2006 as they had not yet reached agreement on the rule of origins. The framework agreement stipulates that customs duties shall be abolished not later than the end of 2011 by Brunei, Indonesia, Malaysia, Singapore, and Thailand; and not later than the end of 2016 by the other six counties.

(4) Framework Agreement for Establishing a Free Trade Area between India and Thailand

On 9 October 2003, the framework agreement for establishing a Free Trade Area between India and Thailand was concluded. It was scheduled under the framework agreement that negotiation of customs duty on trade goods should be completed by March 2005 and on trade services and investment should be completed by January 2006. However, in April 2006 negotiations had not yet been completed for both segments. Hence, the abolishment of customs duty will be postponed from the agreed due date of 31 December 2016.

The Early Harvest Scheme, through which customs duty shall be reduced for 82 goods items as the front-runners, commenced from 1 September 2004.

(5) Comprehensive Economic Cooperation Agreement Between India and Singapore

The Comprehensive Economic Cooperation Agreement (CECA) was concluded between India and Singapore in June 2005, and came into force from 1 August 2005. India identified the customs duty deduction program which is classified into: 1) 506 goods items for which customs duty shall be abolished immediately after the effective date; 2) 2,202 goods items for which customs duty shall be phased out by 2009; 3) 2,407 goods items for which customs duty shall be reduced step-by-step by 2009; 4) 6,551 goods items which are exceptional items for customs duty reduction and abolition.

Preferential custom duty is expressed as a discount rate being the current effective tax rate against the most favoured nation (MFN rate) in the agreement. For the above phased out goods items, the customs duty rate was reduced by 10% of the MFN rate on 1 August 2005. Since then the discount rate is to be increased step-by-step such that the customs duty shall be completely abolished by 1 April 2009. For the items where the customs duty is reducing step-by-step, the customs duty shall be reduced by 5% discount rate on 1 August 2005, followed by the discount rates being increased to 50% on step-by-step basis until 1 April 2009.

(6) Free Trade Agreement Between India and Sri Lanka

The Free Trade Agreement was established between India and Sri Lanka in December 1998, and came into force in March 2000. The agreement provides the customs duty reduction program classified into: 1) Basic duty is exempt immediately after the effective date; 2)

Basic duty is phased out; 3) Quota system is applied; 4) Exceptional items for customs duty reduction and abolition (negative list). India identified 1,351 and 2,799 goods items for the first and second categories, respectively. Tea and garments were identified for the quota system, and a negative list of 196 goods items including alcoholic liquor, petrochemical products, rubber goods, and textile.

(7) Trade Agreement Between India and Nepal

The Trade Agreement was concluded between India and Nepal in 1991 such that India can provide Nepal with assistance towards industrial promotion. Under the agreement, India has provided an exemption from customs duty for goods imported from Nepal, while Nepal has imposed customs duty for goods imported from India.

2.1.3 National Development Context for India

(1) Golden Quadrilateral (GQ)

The golden quadrilateral (GQ) is the largest expressway project in India (see **Figure 2.1.2**). The GQ constitutes the first phase of the National Highways Development Project (NHDP), and consists of building 5,846 kilometres of four/six lane expressways connecting the four major cities of India, namely Delhi, Mumbai, Kolkata and Chennai (thus forming a quadrilateral of sorts). The total cost is estimated to be US$12.317 billion (at 1999 prices) (or Rs580 billion). As of end of May 2006, 92% of the entire work was completed, with the final completion date set as December 2006.

Source: Wikipedia Foundation

Figure 2.1.2 Golden Quadrilateral, North-South and East-West Corridors

(2) NS - EW Corridors

In parallel with the GQ, the north-south and east-west corridors (NS-EW) are two major ongoing expressway projects in India. The NS-EW consists of building 7,300 km of four/six lane expressways connecting Srinagar, Kanyakumari, Porbandar and Silchar, at a cost of US$12.317 billion (at 1999 prices). As of December 2005, 11% of the entire work has been completed, with the final completion date set as December 2009. West Bengal State hosts a part of East-West Corridor that connects the eastern states of India with the central and

western parts of India. The East-West Corridor passes through the northern part of West Bengal State, and provides essential access to the eastern states.

(3) Special Economic Zones

a) Special Economic Zones Scheme

In India, a Special Economic Zones (SEZ) scheme was introduced within the export and import policy from 1st April 2000, with a view to providing an internationally competitive and hassle-free environment for exports.

The Indian SEZ scheme has the following salient features and facilities:

- A designated duty free enclave;
- To be treated as a foreign territory for trade operations, duties and tariffs;
- Exemption from the customs duty on the import of capital goods, raw materials, consumables, spares, etc;
- Exemption from the central excise duty on the procurement of capital goods, raw materials, consumables, spares, etc. from the domestic market;
- Reimbursement of the central sales tax paid on domestic purchases;
- Exemption and reduction of income tax under the relevant sections of the Income Tax Act.

All the import and export operations of the SEZ unit shall be on a self-certification basis. The units in the SEZ have to be a net foreign exchange earner but they shall not be subjected to any pre-determined value addition or minimum export performance requirements. Sales in Domestic Tariff Area by SEZ units shall be subject to payment of the full customs duty and import policy in force.

b) Board of Approval

SEZs were established by the central government based on the recommendation of the Board of Approval. The Board of Approval has the duties, power and functions to approve or reject proposals for the establishment of SEZs submitted by the state governments.

c) Unit Approval Committee

A Unit Approval Committee is formed for each SEZ, headed by Development Commissioner and consisting of the following members: officers of the central government, officers of the state government, and a nominee of the developer. The committee has the power and function to consider applications for setting up Units in SEZs; to grant or refuse the approval and clearances for the establishment and operation of Units in SEZs; to monitor the

performance of Units and take action against Units wherever necessary as prescribed under the rules; to take required appropriate action in case of violation of the conditions of approval; and perform any other required functions.

d) Approved SEZs

The policy provides for setting up of SEZs in the public, private, joint sector or by state governments. The central government converted the Export Processing Zones (EPZ) located at eight sites into SEZs. Falta EPZ in West Bengal was converted into Falta SEZ as one of the eight sites.

In addition, six new SEZs were set up in India. Of these, two SEZs were set up in West Bengal: Manikanchan Salt Lake SEZ for gems and jewellery; and Salt Lake Electronic City SEZ, Kolkata.

Apart from those 14 SEZs, at present there are 61 sites where the central government has approved SEZ proposals and SEZs are being establishing accordingly. Kulpi in West Bengal is one of the 61 sites.

(4) West Bengal Corridor

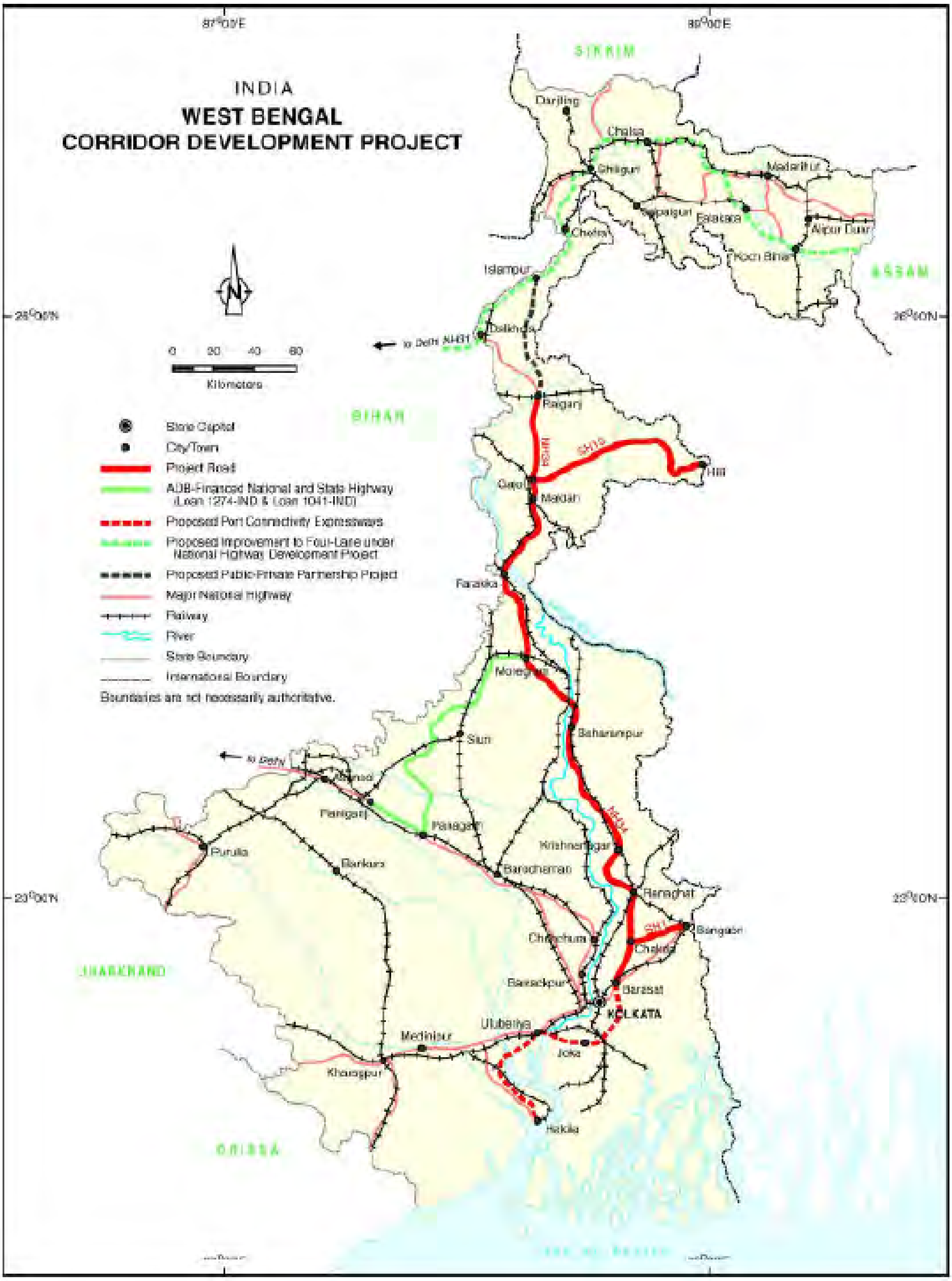
The West Bengal Corridor is important in consolidating the major trunk routes and the regional economic corridors. The ADB has been active in the development of the West Bengal Corridor by improving the trunk and connecting roads through West Bengal State.

a) West Bengal Corridor Development Project[2]

The West Bengal Corridor Development Project (ADB IND 322003) is one of the flagship projects under SASEC for the sub-regional transport corridor development (see **Figure 2.1.3**). The West Bengal Corridor extends from Haldia Port off the Bay of Bengal via Kolkata to the northern parts of West Bengal, and provides the major trade access to India's north-eastern states and to neighbouring Bhutan and Nepal.

The Project will comprise the improvement of (i) the national highway (NH34) from Barasat, on the northern outskirts of Kolkata, to Raiganj, about 370 km north; and (ii) two state highways providing connections with the Bangladesh border at Bangaon (SH1) and Hilli (SH10) and (iii) provide rural communities with access to markets, schools, hospitals, other social services, and employment opportunities by rehabilitating approximately 100 km of rural access roads. The total cost is estimated to be US$323 million, of which ADB finances US$212 million.

[2] ADB, Report and Recommendation of the President to the Board of Directors on a Proposed Loan to India for the West Bengal Corridor Development Project, November 2001, Manila.



Source; ADB

Figure 2.1.3 Project Map for the West Bengal Corridor Development Project

b) Sub-Regional Transport Connectivity Project[3]

This technical assistance project focuses on (i) a bypass between Barasat and the Belgharia Expressway, in order to complete the high quality through route from NH34 to Haldia Port; (ii) upgrading NH34 between Raiganj and Dalkhola, in order to complete the link between NH34 and the East-West corridor; and (iii) bridges on NH34 at Baharampur and Maldah, to bypass congested areas.

This project, together with the West Bengal Corridor Development Project mentioned earlier, will improve the north-south trunk connection along the spine of West Bengal State, and will serve as the trunk route for the West Bengal Corridor. This route also connects the East-West Corridor with the golden quadrilateral via the city of Kolkata.

2.1.4 Sub-Regional Structure

As discussed earlier, the Study area comprises a part of the eastern South Asia sub-region, of which West Bengal plays a role as a gateway. The conceptual structure of the sub-region is considered below.

[3] ADB, Technical Assistance for Preparing the Sub-Regional Transport Connectivity Project (INDIA), December 2003, Manila.

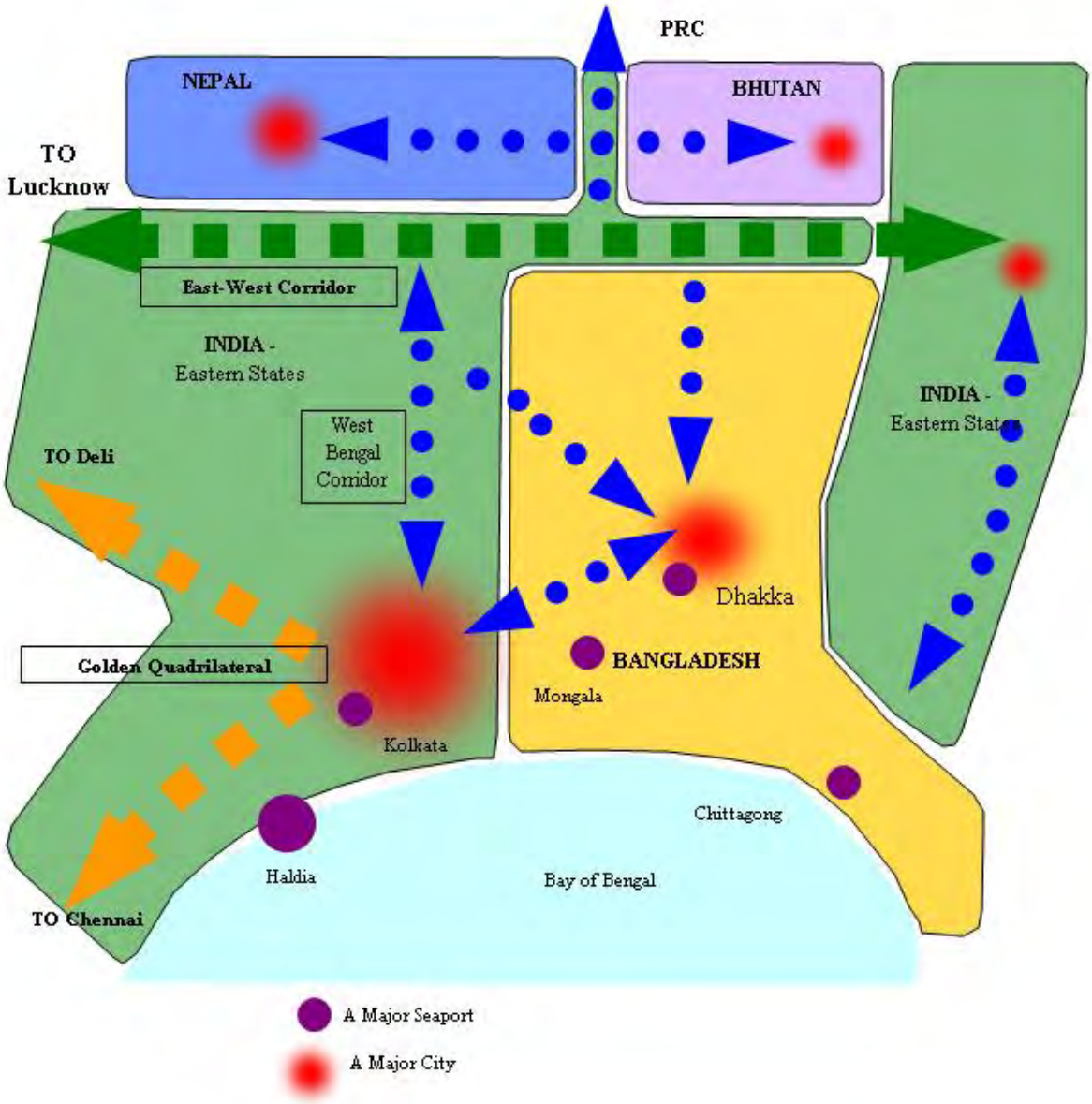


Figure 2.1.4 Sub-Regional Structure of Eastern South Asia

Kolkata, together with Haldia Port, are located at the gateway of the eastern South Asia sub-region and provide the 625 million people living in the SASEC region with access to the markets. Kolkata is also a major node in the golden quadrilateral and connects to Chennai to the southwest and Delhi to the northwest as shown in **Figure 2.1.4**. West Bengal State is serviced in the northern area by the East-West Corridor that connects the eastern states with the central areas of India. The golden quadrilateral at Kolkata and the East-West Corridor shall be connected by the West Bengal Corridor that will connect the northern part of West Bengal and Kolkota in a north-south direction.

2.1.5 Spatial Boundary for the Socio-Economic Framework

The Project should be considered in terms of its South Asian sub-regional context and the best fitting sub-regional context is the "eastern South Asia sub-region" under SASEC. Spatially, this area comprises Bangladesh, Bhutan, the eastern states of India, and Nepal. The eastern states of India herein refers to 13 states namely; Arunachal Pradesh, Assam, Bihar, Jharkhand, Manipur, Meghalaya, Mizoram, Nagaland, Orissa, Sikkim, Tripura, and Uttar Pradesh, and West Bengal.

(1) Population

The SASEC region was inhabited by 626 million people in the year 2005, of which 460 million, or 74%, were located in the 13 eastern states of India. The largest populations were recorded in Uttar Pradesh (180 million), followed by Bihar (89 million) and West Bengal (84 million).

Table 2.1.1 Population Projection for the SASEC Sub-Region

Item		Population (million)					
		2001	2005	2010	2015	2020	2025
All India (reference)		1,028.61	1,112.19	1,192.51	1,268.96	1,339.74	1,399.84
India-Eastern States	*West Bengal*	*80.18*	84.28	88.67	92.73	96.63	99.99
	Bihar	83.00	89.26	96.39	102.73	108.37	113.08
	Uttar Pradesh	166.20	179.82	197.27	214.67	231.43	246.23
	Orissa	36.81	38.49	40.39	42.14	43.76	45.11
	Jharkhand	26.95	28.85	31.04	33.20	35.28	37.05
	Assam	26.66	28.27	30.19	32.07	33.86	35.35
	Meghalaya	2.32	2.44	2.59	2.74	2.89	3.01
	Manipur	2.17	2.28	2.42	2.56	2.70	2.82
	Tripura	3.20	3.37	3.57	3.78	3.98	4.16
	Mizoram	0.89	0.94	0.99	1.05	1.11	1.16
	Nagaland	1.99	2.09	2.22	2.35	2.48	2.59
	Arunachal Pradesh	1.10	1.16	1.23	1.30	1.37	1.43
	Sikkim	0.54	0.57	0.61	0.64	0.67	0.70
	Total - Eastern states	430.36	460.09	495.75	530.03	562.48	590.55
Bangladesh		131.50	139.10	148.10	156.70	-	-
Nepal		23.15	25.74	28.70	31.62	-	-
Bhutan		0.70	0.76	0.86	0.97	-	-
Total - SASEC Subregion		585.71	625.69	673.41	719.33	-	-
Total - SASEC Countries		1,183.96	1,277.79	1,370.17	1,458.25	-	-

Source: 1) India: Report of the Technical Group on Population Projections Constituted by the National Commission on Population, May 2006, Office of the Registrar General & Census Commissioner, India
2) Bangladesh: Projection based on 1991 census (projection based on 2001 Census not available)
3) Nepal: Ministry of Population and Environment, Nepal Population Report 2002, Kathmandu, Nepal.

Bangladesh has a population of 139 million, which is about 22% of the total population of WBCR. In 2005, Nepal had a population of 26 million, followed by Bhutan with 0.7 million.

(2) Economic Parameters

In 2005, the WBCR had a total regional output equivalent to US$223 billion, of which

US$159 billion or 71% of the total, originated from the eastern states of India including West Bengal. The second largest contribution was from Bangladesh with the GDP equivalent of US$57 billion, or 26% of the total of SASEC Region.

Table 2.1.2 GDP/GSDP and Other Economic Parameters for the SASEC Sub-Region

Item		GDP/GSDP (million US$)			Population (million)		Per Capita
		2004	2005	Share (%)	2005	Share (%)	2005
All India (reference)		630,393	681,455	-	1112.19	-	612.7
India - Eastern States	West Bengal	42,256	45,678	20.4%	84.28	13.4%	542.0
	Bihar	13,985	15,118	6.8%	89.26	14.2%	169.4
	Uttar Pradesh	52,490	56,741	25.4%	179.82	28.7%	315.5
	Orissa	12,837	13,877	6.2%	38.49	6.1%	360.5
	Jharkhand	9,730	10,518	4.7%	28.85	4.6%	364.6
	Assam	9,695	10,480	4.7%	28.27	4.5%	370.7
	Meghalaya	1,172	1,267	0.6%	2.44	0.4%	519.3
	Manipur	905	978	0.4%	2.28	0.4%	428.9
	Tripura	1,470	1,589	0.7%	3.37	0.5%	472.1
	Mizoram	488	528	0.2%	0.94	0.1%	564.7
	Nagaland	1,058	1,143	0.5%	2.09	0.3%	546.0
	Arunachal Pradesh	504	545	0.2%	1.16	0.2%	471.5
	Sikkim	341	369	0.2%	0.57	0.1%	647.8
	Total - Eastern states	146,930	158,831	71.0%	461.81	73.7%	343.9
Bangladesh		56,530	57,270	25.6%	139.10	22.2%	411.7
Nepal		6,420	6,710	3.0%	25.30	4.0%	265.2
Bhutan		690	760	0.3%	0.80	0.1%	950.0
Total - SASEC Subregion		210,570	223,571	100.0%	627.01	100.0%	356.6
Total - SASEC Countries		694,033	746,195	-	1,277.39	-	584.2

Source: 1) India: GSDP for each estate estimated by Ministry of Statistics and Programme Implementation
2) GDP for India, Bangladesh, Nepal and Bhutan by ADB, Asian Development Outlook 2006, Manila

The per capita GDP for the entire sub-region is estimated to be US$357.

According to the medium term projection by ADB, the prospects for economic development are strong and high for the SASEC Region. The economic growth in India was about 8.1% in 2005, and is expected to be in the range of 8.0% to 8.5% up until the year 2010. The economic growth in Bangladesh was also as high as 5.6% in 2005, and is expected to be in the range of 6.0% to 7.0% up until 2010.

Table 2.1.3 Real Economic Growth Rates for the SASEC Sub-Region

(Unit; %)

Year	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	Up to2010
India	5.6	7.3	4.4	5.8	4.0	8.5	6.9	8.1	7.6	7.8	8.0 - 8.5
Bangladesh	5.9	4.9	5.9	5.3	4.4	5.3	6.3	5.6	6.5	6.0	7.0 (2009)
Nepal	4.5	3.3	6.1	5.6	-0.6	3.2	3.5	2.3	2.0	3.4	5.0 - 6.0
Bhutan	6.6	7.3	9.5	8.6	7.1	6.8	8.7	8.8	10.0	12.0	-

Source: ADB, Asian Development Outlook 2006, Manila

2.2 Regional Development Context for West Bengal and Kolkata

2.2.1 Outline of Regional Structure

(1) Brief History

The modern history of Kolkata traces back to 1699 when the British East India Company decided to develop Calcutta as a Presidency City. In 1715, the British completed the Old Fort (Fort William), and the growth of the city of Calcutta was powered by the growing operations of the East India Company. In 1772 Calcutta became the capital of British India when the first Governor-General, Warren Hastings, transferred all important offices to the city from Murshidabad, which triggered active urban development in the city in the period between 1780 and 1820. In 1854, the first railway was built between Calcutta and Hugli. Calcutta continued to house the capital until 1911, after which the British moved the capital of India from Calcutta to Delhi.

Nonetheless, the growth of Calcutta continued in the 20th century. With the instability associated with the independence of Pakistan, it was said that there was a large influx of people into India, and West Bengal State accommodated a large part of this influx. A rapid growth of population continued after WWII, which shifted Calcutta into a mega-city with more than 10 million people in its greater urban region.

In the last decade, during which the economy of India has been attempting to expand, Kolkata, renamed from Calcutta in 2001, has been one of the major engines for development. Kolkata is now a centre for ICT, a favourable place for foreign direct investment and has a fast growing economy with good infrastructure.

(2) Natural Geography

Kolkata is located on the lower plains of the Hugli River. The Hugli River continues into the Ganges delta towards the south, which is a significant geographical landmark. The Ganges River is the main river, which divides with one branch entering Bangladesh as the Padma River and the other branch flowing down through West Bengal as the Bhagirathi River.

The Sundarbans National Park captures the precious natural heritage of the Ganges Delta. The area is intersected by an intricate network of interconnecting waterways, constantly changing due to the action of the tides and waves. The area provides a habitat in the lower Bengal Basin for a variety of species including the famous Bengal Tiger. Sundarbans is the largest area of mangrove forest in the world, and the only mangrove forest that is inhabited by the Bengal Tiger. This is the main reason why this area was inscribed on the UNESCO

list of World Heritage[4] sites in 1987, together with the adjoining Bangladesh portion which was inscribed in 1997.

(3) Cities and Towns

Kolkata is the major city in the southern part of West Bengal State. The population of Kolkata Municipality alone was approximately 4.5 million in 2004. However, the total population of Kolkata metropolis is estimated to reach around 13 million, which includes the surrounding continuous urban areas in and around Kolkata.

There are few large cities outside of Kolkata metropolis. However, some of the largest other cities are Barasat in North 24 Parganas, Uluberia in Haora district, and Haldia, the seaport. The major towns outside of the metropolis are listed below.

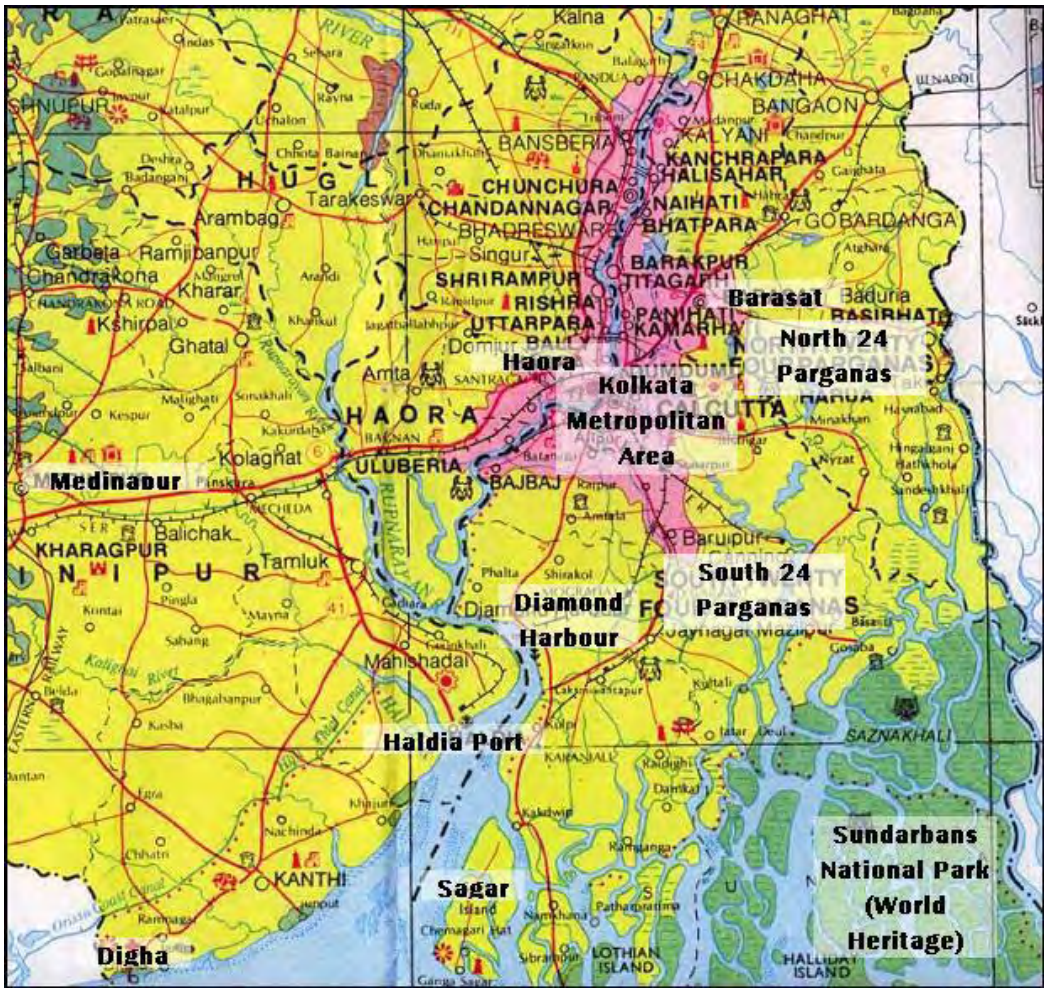


Figure 2.2.1 Major Cities and Towns in the Study Area

[4] Advisory Board Evaluation Report, Sundarbans National Park (452) India, UNESCO, 1987

Table 2.2.1 City and Towns in the Study Area

Name of City / Town	District	Population in 2001
Kolkata Metropolis	Kolkata and surrounding districts	13 million
Barasat	North 24 Parganas	231,521
Uluberia	Haora	202,135
Haldia	East Medinipur	170,673
Medinipur	West Medinipur	149,769
Basirhat	North 24 Parganas	113,159
Contai	East Medinipur	77,513
Diamond Harbour	North 24 Parganas	37,234

Source: Statistical Abstract 2002-2003, Bureau of Applied Economics and Statistics, Government of West Bengal

(4) Resorts and Tourist Attractions

Kolkata is the regional mother city for tourism with various sites in and around the city containing cultural and historical attractions. Aside from these sites, there are a few resorts in the southern part of Kolkata as described below.

a) Digha Beach Resort

The most popular getaway in West Bengal is the beach resort of Digha. This beach resort is located at the tip of the sandy beach facing the Bay of Bengal, some 163 km south west of Kolkata. Digha has long been known by western residents as "Brighton of the East", named after a beach resort outside of London. After independence, the West Bengal Government promoted Digha as a local beach resort. A small town, Digha is crowded with hotels along the main road. Its accessibility to Kolkata, sandy beaches, and an active fishing scene, attracts tourists throughout the year.

b) Diamond Harbour Resort

Another resort town in the area is Diamond Harbour. Diamond harbour is a small city situated 48 km from Kolkata along the Hugli River. The harbour is a popular destination for Kolkata residents on day trips. The name Diamond Harbour was given by the British, as the harbour used to be one of the major ports during British rule. The entire Diamond Harbour region forms an ideal tourist spot for Kolkata residents. A popular activity in the area is river cruises. Other tourist attractions include the pilgrim centre of Sarisha Ramakrishna Mission Ashram and the remains of a Portuguese Fort.

c) Eco-Tourism in Sundarbans National Park

The mangrove wetland in the Sundarbans National Park, which is designated as a UNESCO

World Heritage area, has ample possibilities, primarily for eco-tourism. At present, the state government of West Bengal conducts occasional tours which focus on watching different species of animals, and boat trips through the creeks of the dense mangrove forest.

2.2.2 Present Socio-Economic Conditions

(1) Population

The study area encompasses the districts of Haora, Hugli, North 24 Parganas, South 24 Parganas, East Medinipur, West Medinipur and Kolkata Municipality with a total area of 33,000 km^2. The total population in the study area is 39 million, which constitutes approximately half of the total population in the West Bengal State. The population in the Kolkata Municipality is 4.4 million, but considering that the urban area continues from Kolkata to the suburban areas in the adjoining districts, the total population of the greater urban area centred on Kolkata is about 10 million or so.

With respect to population growth, it appears that the population of Kolkata has not been growing fast, with an average growth rate of 0.4% over the decade from 1991 to 2001. The growth rates were higher in the adjoining districts of Kolkata, with average rates in the range of 1.4% to 2.1%. The population growth in North 24 Parganas was the highest in the region with an average growth rate of 2.1% over the same period.

Table 2.2.2 District Population in West Bengal Southern Region

Item		Area km2	Population ('000)			Urban Population ('000)		
			1991	2001	Average growth 01/91, %	1991	2001	Average growth 01/91, %
WB Southen Corridor	*Kolkata*	*185*	*4,400*	*4,573*	0.4%	*4,400*	*4,573*	0.4%
	Haora	1,467	3,730	4,273	1.4%	1,849	2,152	1.5%
	Hughli	3,149	4,355	5,042	1.5%	1,358	1,588	1.6%
	North 24Parganas	4,094	7,282	8,934	2.1%	3,730	4,851	2.7%
	South 24 Parganas	9,960	5,715	6,907	1.9%	760	1,086	3.6%
	East Medinipur	4,295	8,332	4,417	1.9%	821	366	1.5%
	West Medinipur	9,786		5,193			618	
	Total	32,936	33,814	39,340	1.5%	12,919	15,234	1.7%
Other Districts		55,816	34,264	40,836	1.8%	5,789	7,194	2.2%
Total - West Bengal		88,752	68,078	80,176	1.6%	18,708	22,427	1.8%

Source: Statistical Handbook West Bangal 2004

(2) Land Use

The present land uses have been determined from an agricultural viewpoint in the statistical data for West Bengal state. The category "Area not available for cultivation" includes the built-up areas and urban areas. The proportion of land in this category is high for Haora and North 24 Parganas (at more than 30%) where urban development is active in the areas

around Kolkata.

Table 2.2.3 Land Use in West Bengal State Southern Region

Item		Area km2	Land Use share in %				
			Area not available for cultivation	Other cultivated land excl. current	Area under forest	Current fallows	Net area sown
WB Southen Corridor	*Kolkata*	*185*	-	-	-	-	-
	Haora	1,467	32.1%	1.5%	0.0%	3.5%	62.8%
	Hughli	3,149	26.1%	1.3%	0.2%	0.3%	72.1%
	North 24Parganas	4,094	30.5%	2.3%	0.0%	0.6%	66.6%
	South 24 Pargana	9,960	13.3%	0.4%	44.7%	1.4%	40.2%
	East Medinipur	4,295	23.6%	1.1%	0.2%	0.2%	75.0%
	West Medinipur	9,786	16.0%	1.6%	18.3%	3.2%	60.9%
	Total	32,936	19.7%	1.2%	19.2%	1.7%	58.3%
Other Districts		55,816	18.4%	1.5%	10.3%	5.0%	64.8%
Total - West Bengal		88,752	18.8%	1.4%	13.5%	3.8%	62.5%

Source: Statistical Handbook West Bangal 2004

(3) Employment and Labour

Out of the total population of 39 million in the West Bengal southern region, the number of main workers is 11 million and the number of marginal workers is 4 million, giving a total number of 15 million workers, which is approximately 36% of the total population. It is noteworthy that there are approximately 1.7 million marginal workers in Medinipur and South 24 Parganas, which is the direct hinterland of the Raichak-Kukrahati Bridge. This population is the potential labour force for industrial development in the region, although the workers would need vocational training to make them ready for modern industries.

Table 2.2.4 Employment and Labour in West Bengal State Southern Region in 2001

Item		Population	Main Worker	Margicanl Worker	Total Worker	Culti- vators	Agricul- tural labourers	Household industry workers	Other workers
WB Southen Corridor	*Kolkata*	4,573	1,624	94	1,718	6	4	52.5	1,654
	Haora	4,273	1,225	214	1,439	75	147	166	1,052
	Hughli	5,042	1,528	331	1,859	278	452	96	1,033
	North 24Parganas	8,934	2,623	365	2,988	301	407	133	2,148
	South 24 Pargana	6,907	1,678	565	2,243	362	584	136	1,161
	East Medinipur	4,417	2,530	1,221	3,751	1,055	1,192	278	1,226
	West Medinipur	5,193							
	Total	39,340	11,208	2,790	13,998	2,077	2,786	861	8,274
Other Districts		40,836	11,816	3,668	15,484	3,577	4,577	1,311	6,019
Total - West Bengal		80,176	23,024	6,458	29,482	5,654	7,363	2,172	14,293

Source: Statistical Abstract 2002-2003, Government of West Bengal

2.2.3 Major Industries

(1) Major Industries in the States

a) Leather

West Bengal is one of the top states for the export of finished leather goods from India. Seventy percent of India's leather goods are exported from West Bengal. Bata India Limited is India's largest manufacturer and marketer of footwear products. Bata India Limited manufactures footwear products from leather supplied from two tanneries in Batanagar (near Kolkata), and Mokamehghat (Bihar), at its own five plants located near Kolkata.

A total of 538 manufacturers are engaged in leather products in the state. West Bengal Leather Industrial Corporation provides market facilities for the leather products manufactured by small scale industries in the states.

b) Jute

Jute textile manufacturing is the most prominent industry in West Bengal due to the availability of raw jute, transportation and cheap labour available in the state. At present there are 59 jute mills in West Bengal out of a total of 73 in India. Most of the jute mills in the state are located on the two banks of the Hugli River near Kolkata.

India is the world's largest producer of raw jute. India alone produces 50% of the world's raw jute and 40% of the finished jute goods. The jute industry provides employment for 40 million farmers and 0.2 million factory workers.

c) Engineering

The major engineering industries in West Bengal are railway engineering and wagon manufacturing, shipbuilding, machine tools, textile machinery, transport equipment, engineering goods and automobile manufacturing. The development of these industries is made possible through the availability of power, skilled labour, the presence of Kolkata and Haldia Ports, the presence of a market for engineering goods and the iron and steel plants at Durgapur and Burnpur (both places are in the Burwan District).

Tata Motors will set up its first car plant in West Bengal, according to its announcement on 18 May 2006. The assembly plant for small cars will be located in the Singur block of the Chandannagar sub-division in Hugli District. The plant will be spread over an area of 280 hectares and include the additional facilities of a vendor park. The total investment is likely to be over Rs.1,000 crores, including direct investment by Tata Motors and investment by its vendors. The plant will initially employ 2,000 direct workers, and is expected to create employment in excess of 10,000 jobs amongst the vendors and service providers in the vicinity of the plant. The construction work will commence shortly, and the plant will be

commissioned in 2008.

On 27 July 2006, Telco Construction Equipment Company (Telcon) announced that it was setting up a new manufacturing plant in Kharagpur in the West Medinipur District. Telcon, the largest manufacturer of construction equipment in India, is a 60:40 joint venture between Tata Motors and Japan's Hitachi Construction Machinery Co. Ltd. (HCMC). The plant will be spread over an area of 60 hectares and include the additional facilities of a vendor park. The investment is likely to be Rs. 250 crores. The new plant will generate employment for about 500 persons, including both direct and indirect jobs. The construction work will commence by December 2006 and operations will commence by March 2008. The plant will manufacture backhoe loaders, midi excavators, off-highway dump trucks, wheel loaders and large mining shovels, for both the domestic and international markets.

d) Paper

After Maharashtra, West Bengal is the second largest state in India in terms of paper production. The total installation capacity of paper mills is approximately 222,600 tonnes per year in West Bengal. The development of the paper industry is made possible through the availability of raw materials, waste paper, the supply of water from the Hugli River, cheap transportation facilities, fuel and the large consumption market.

e) Tea

West Bengal is the second largest state in India in terms of tea production. It contributes towards 21% of the total production of tea in India. Most of the tea gardens are located in the two northern districts, Darjeeling and Jalpaniguri. There are 343 tea gardens covering 103,950 hectares of planted area in West Bengal. Kolkata Port is the largest tea handling port in India and Kolkata has the largest tea auction market in India.

(2) Development Areas Identified by the State Government

The state government has identified the following industry segments as development areas for special attention, and is keenly pursuing these areas in partnership with other stakeholders. Another significant feature of the state's industrial policy is to work for an enduring partnership for development with a focus on Southeast Asian countries.

- Petrochemicals and Downstream Industries;
- Electronics & Information Technology;
- Iron and Steel, Metallurgical & Engineering;
- Textiles;
- Leather and Leather Products;

- Food Processing, Edible Oil, and Vegetable Processing;
- Gems and Jewellery;
- Development of Medical Plants, Rubber, Palm Oil and Tea;
- Basic Drugs, Chemicals and Pharmaceuticals;
- Development of Mines and Minerals;
- Tourism; and
- Industrial and Social Infrastructure Development.

(3) Medium and Large Industrial Projects Implemented in the Study Areas

The investment trends were analysed for each district in order to get an idea of the industry agglomeration in each district. **Table 2.2.5** shows the investment in West Bengal during the period from 1991-2004. Medium and large scale projects were implemented in West Bengal, with a total investment of Rs. 26,690 Crores or approximately US$5.9 billion, over 14 years from 1991 to 2004. The number of projects implemented was approximately 1,000, including the following extra large projects:

- Duragapur Steel Plant project was implemented in 1994, with an investment of Rs. 4,492 Crores (location: Burdwan District).
- Haldia Petrochemicals' project was implemented in 2000, with an investment of Rs. 5,170 Crores plus Rs. 807 Crores for additional revised costs (location: Haldia, East Medinipur District).
- MCC PTA India implemented the first project in 2000, with an investment of Rs. 1,600 Crores (location: Haldia, East Medinipur District).

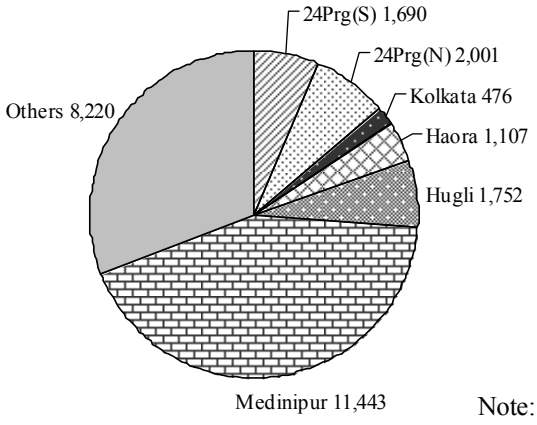
Table 2.2.5 Investment in Projects Implemented between 1991- 2004

Unit: Rs. Crores

		Southern Parts of West Bengal						Other Districts	WB Total
		24Prg(S)	24Prg(N)	Kolkata	Haora	Hugli	Medinipur		
A	Cement, Glass, Ceramics, Fly Ash Bricks	72		60	124	185	74	403	918
B	Chemicals, Petrochemicals, Industrial Gases, Paints, Pigments, Fertilisers & Coal Tar Products	54	118	7	18	96	9,455	155	9,902
C	Drugs, Pharmaceuticals and Toilet Goods	54	61	18		12	37	65	246
D	Electrical and Electronics	109	152	106	23	34	450	5	878
E	Engineering	77	88	11	54	80	34	57	402
F	Food Products	186	100	32	208	82	143	440	1,191
G	Hotel, Hospitals, Service Sector, Printing and Multi Media	377	187	32	7		28	15	647
H	Leather and Rubber	16	3	19		31		31	100
I	Metallurgical Products other than Steel	6	132		2	112	31	66	349
J	Paper, Wood, Plywood and Board	68	3	3		5	13	32	122
K	Plastic Goods	198	39	6	78	14	516	106	956
L	Software & Telecommunications		313	129		10		35	486
M	Steel Ingots, Alloys, Sponge Iron, Pig Iron, Mini Steel Plant, Steel Bars, Billets, Forgings & Other Steel Products	340	332		360	559	247	6,552	8,391
N	Textile (Wool, Silk, Knitted Goods, Jute, Readymade Garments & Yarn)	81	305	2	170	514	259	105	1,436
O	Miscellaneous Projects not otherwise Classified	51	169	52	64	19	158	154	665
Total		1,690	2,001	476	1,107	1,752	11,443	8,220	26,690

Source: A Review of the Industrial Scenario in West Bengal (Annual Report 2004-2005), Commerce and Industries Department, Government of West Bengal

Figure 2.2.2 illustrates the district-wise investment in medium and large scale industries over all of the industrial areas. The investment in Medinipur was Rs. 11,443 Crores out of a total investment in West Bengal of Rs. 26,690 Crores. Medium and large industries in the Haldia industrial complex have contributed towards the investment sunk into Medinipur.



Source: A Review of the Industrial Scenario in West Bengal (Annual Report 2004-2005), Commerce and Industries Department, Government of West Bengal

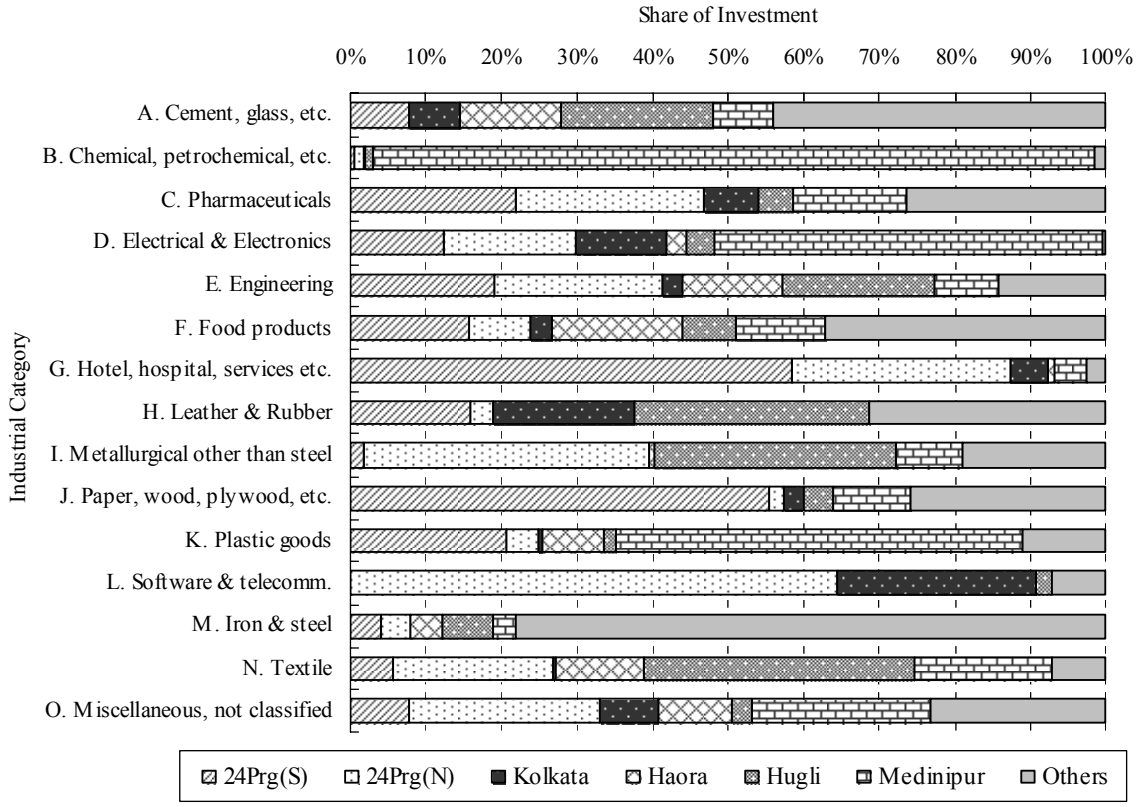
Figure 2.2.2 District-Wise Investment in West Bengal (between 1991-2004)

Figure 2.2.3 illustrates the district-wise investment share between 15 categories of industry. More than 50% of investment sunk into West Bengal has been concentrated in the southern part of West Bengal in all categories except the iron and steel industries. Most of the iron and steel factories are located in the Asansol-Durgapur Region of the Burdwan District due to its proximity to the coal and iron ore belts. Furthermore, the share of investment in the southern part of the state was over 80% in the following seven categories:

1. Chemicals, petrochemicals, industrial gases, paints, pigments, fertilisers and coal tar products;
2. Electrical and electronics;
3. Engineering;
4. Hotel, hospitals, service sector, printing and multi media;
5. Plastic goods;

6. Software and telecommunications;

7. Textile including knitted goods, jute, readymade garments and yarn.



Source: A Review of the Industrial Scenario in West Bengal (Annual Report 2004-2005), Commerce and Industries Department, Government of West Bengal

Figure 2.2.3 Share of Investment in each District by Industrial Category (1991-2004)

(4) Petrochemical Downstream Industries in the Study Area

Petrochemical downstream industries are one of the development areas identified by the state government. Many plastic processing plants have been developed in the state. As many as 627 new plastic processing factories were developed in the state between January 1998 and December 2004 with a total processing capacity of 182,842 tons per annum. These factories have been producing household plastic items such as buckets, mugs and containers and moulded furniture from plastic resin manufactured by Haldia Petrochemicals Ltd (HPL). Out of the 627 factories, a total of 576 have been developed in the southern part of West Bengal. Particularly in Kolkata and Haora District, 236 and 154 plastic processing factories have been developed, respectively, due to the close vicinity to plastic users as well as HPL.

Table 2.2.6 HPL Downstream Industries: Progress between January 1998 and December 2004

State/District	No. of Unit				Capacity ton/annum	Employment
	Total	Small Scale	Medium Scale	Large Scale		
West Bengal						
South 24 Parganas	60	59	1		6,452	908
North 24 Parganas	76	69	4	3	17,294	2,292
Kolkata	236	220	16		53,015	6,588
Haora	154	129	25		51,404	8,077
Hugli	32	29	3		10,933	1,211
East Medinipur	11	9	2		7,149	1,130
West Medinipur	7	6	1		2,554	239
Southern Districts Sub-total	576	521	52	3	148,801	20,445
Other Districts	51	44	5	2	34,041	4,749
West Bengal Total	627	565	57	5	182,842	25,194
Other States	57	30	27		44,864	6,576
Grand Total	**684**	**595**	**84**	**5**	**227,706**	**31,770**

Source: A Review of the Industrial Scenario in West Bengal (Annual Report 2004-2005), Commerce and Industries Department, Government of West Bengal

(5) Haldia Refinery and Crude Oil Transport

a) Haldia Refinery

Haldia Refinery of the Indian Oil Corporation is the sole refinery in West Bengal. It was commissioned in January 1975 with an original capacity of 2.5 million tons per annum (MMTPA). Petroleum products from this refinery are supplied mainly to Eastern India through two product pipelines as well as through rail wagons and tank trucks. The installed capacity of this refinery was increased to the current level of 6.0 MMTPA through several expansion projects. The refinery receives crude oil through direct pipeline connections from Haldia Oil Jetty Nos.1 and 2.

b) Haldia-Barauni Crude Oil Pipeline

The 943 km long Haldia-Barauni Crude Oil Pipeline (HBCPL) with a capacity of 7.5 MMTPA was commissioned in 1999. Crude oil received at Haldia No.3 Jetty is transported to Indian Oil's Barauni Refinery in Bihar with a capacity of 6.0 MMTPA via HBCPL. The crude oil requirement of Indian Oil's subsidiary Bongaigaon Refinery and Petrochemicals Ltd.'s refinery at Bongaigaon is also partly transported through the HBCPL.

c) Paradip-Haldia Crude Oil Pipeline (under construction)

The 330 km long crude oil pipeline from Paradip Port in Orissa to Haldia is under construction, and is expected to be commissioned in 2006. The project consists of; installation of crude oil handling facilities at Paradip Port including laying a 48 inch diameter, 20 km transfer pipeline; development of a tank farm with a total storage capacity of 900,000 kl at Paradip; and laying a 30 inch diameter, 330 km long crude oil pipeline to the Haldia-Barauni Crude Oil Pipeline at Haldia.

The pipeline will facilitate the transportation of crude oil to the Haldia and Barauni refineries with a total capacity of 12 MMTPA in an efficient and cost effective manner compared to the present system of receiving crude oil through the Haldia dock complex. If Indian Oil completely replaces the present system of receiving crude oil through the Pradip-Haldia Crude Oil Pipeline, the Haldia dock complex will lose 12 MMTPA of crude oil or nearly one third of the entire commodity cargo. At present, Indian Oil cannot bring crude oil by VLCC[5] at Haldia Port due to the low draft availability in the Hugli River.

It is necessary for India to increase crude oil imports on an annual basis in order to meet the growing demand for petroleum products. At present, India imports two thirds of its crude oil demand. Crude oil is usually imported by large size crude tankers, especially VLCCs, as they can transport crude oil over long distances in a cost effective manner. In this context, as far as crude oil receiving is concerned, it is natural that the gateway of Eastern India should move from Haldia Port to Raradip Port as fully laden VLCCs cannot be received at Haldia Port.

5 VLCC is Very Large Crude Carrier with a size of 250,000 – 300,000 DWT. Its full load draft is about 20-22 metres.

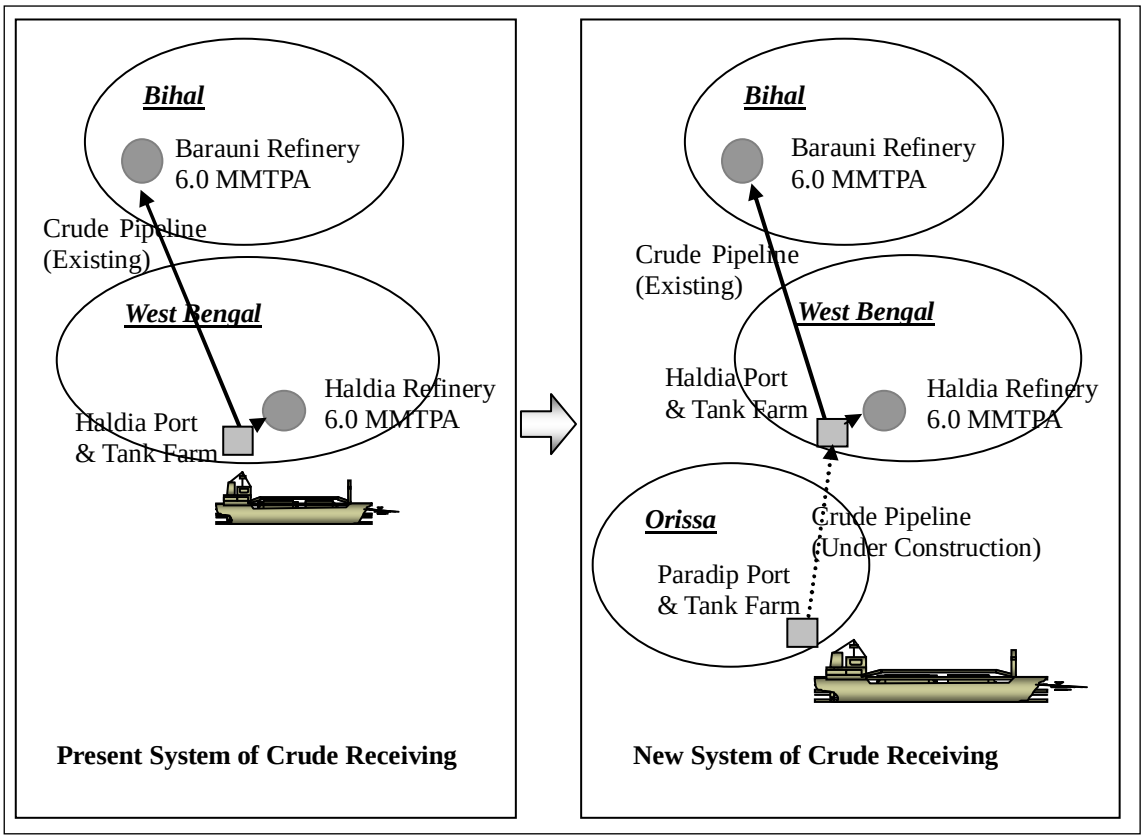


Figure 2.2.4 Crude Receiving System in Eastern India

d) Petroleum Product Pipelines

There are currently two petroleum product pipelines running through West Bengal. Both pipelines originate in Haldia.

The 525 km long Haldia-Barauni pipeline was commissioned in 1967, and at present it is engaged in transportation of indigenous as well as imported petroleum products from Haldia with a capacity of 1.25 MMTPA.

The 277 km long Haldia-Mourigram-Raibandh pipeline was built in early 1972 for the transportation of petroleum products from Haldia Refinery to eastern India. It has delivery stations at Mourigram and Raibandh. In 1999, the 8 km long pipeline was branched at Raghudevpur in the Haura District and extended to Budge Budge in South 24 Paraganas crossing the Hugli River.

2.3 Major Regional Infrastructure

2.3.1 Present Conditions of Major Regional Infrastructure

(1) Seaport

The state of West Bengal has two major seaports, Kolkata and Haldia, which are both under

the management of the Kolkata Port Trust, or KoPT. Together they handle over 46 million tonne of cargo every year, which ranks the second highest in India. The volume of cargo is steadily increasing.

The Haldia Dock Complex (HDC) comprises the impounded dock system with 12 berths, three (3) oil jetties in the river, three (3) barge jetties in the river for handling oil carried by barges, and Haldia anchorage for LASH vessels. Haldia is located near the estuary of the Hugli River.

The Kolkata Dock System (KDS) comprises the impounded dock systems at Kidderpore Dock (KPD), and Netaji Subhas Dock (NSD), in Kolkata, petroleum wharves at Budge Budge and anchorages at Sagar, Diamond Harbour and Sandheads are grouped under the Kolkata Dock System (KDS).

Table 2.3.1 Growth in Port Traffic

Port	Cargo handling in million tonnes					Ave. annual growth rate
	2000/01	2001/02	2002/03	2003/04	2004/05	
Kolkata	7.2	5.4	7.2	8.7	9.9	8.3%
Haldia	22.8	25.0	28.6	32.4	36.3	12.3%
Total	30.0	30.4	35.8	41.1	46.2	11.4%

Source: KoPT

Over the last four years, the tonnage handled by the ports has grown rapidly, at an annual rate of 11%. In particular, the tonnage at Haldia has grown more rapidly, at an annual rate of 12%.

The available sailing drafts at Kolkata and Haldia are said to be in the range of 7 meters and 8.5 meters, respectively. These limited sailing drafts hamper larger vessels from visiting the ports, forcing transhipment elsewhere using smaller vessels.

(2) Airport

Kolkata is connected by air with the rest of India and the major international hub airports such as Bangkok, Singapore and Dubai. The airport is located in the eastern part of Kolkata, and is named Netaji Subhas Chandra Bose International Airport. Currently the airport is being modernized by extension of the runway by 400 m, construction of a new integrated cargo terminal, construction of a new international departure area and construction of a part of the domestic terminal.

The number of passengers has grown at an annual average rate of 10% over the last 5 years. The latest growth rate (that is 2004/05 to 2005/06) was as high as 26%, due in some part to the overall demand growth boosted partly by emerging low-cost airlines for domestic routes.

Table 2.3.2 Growth in Airport Traffic

Airport	Annual Passenger in 1000						Ave. annual growth rate
	2000/01	2001/02	2002/03	2003/04*	2004/05	2005/06	
Passenger	2,686.0	2,561.0	2,827.0	3,222.0	3,494.0	4,407.0	10.4%

Source : Airport Authority of India
Note; * annuitized

(3) Road Network

The major roads in the West Bengal southern region are NH6 connecting Kolkata to the central, western and southern parts of India and NH2 connecting to Delhi. Some of the important regional arterial roads are NH41 that connects the port of Haldia to NH6, and NH34 that connects Kolkata with the northern part of West Bengal.

A detailed description of the condition of the regional road network is discussed in Chapter 3, and shall not be duplicated here.

(4) Railroad

The total length of the railway network in West Bengal is 3,681 km, of which 1,700 km is electrified. The major stations in Kolkata are Haora for the South Eastern Railway that serves Haldia Port and the vicinity, and Seladah Station for the Eastern Railway that serves Kulpi, Diamond Harbour and Canning.

2.3.2 Improvement Plans for Major Regional Infrastructure

The following table summarizes the major projects and plans for the improvement of the major regional infrastructure. The list contains projects and plans with different maturity dates; some entries are already committed for implementation and others are under consideration.

(1) Seaport

As discussed earlier, the existing port facilities under the Kolkata Port Trust have limited sailing drafts and this limits the size of the vessels that can visit the ports. In addition, it is said that substantial dredging is necessary every year to maintain the navigation channels. In 2003/04, 27.8 million cubic meters of dredging was carried out at a cost of Rs.3,475 million.

KoPT plans to develop a new deeper seaport at Sagar Island with a depth of 12.5 meters. Sagar Island is located 145 km downstream of Kolkata and 72 km from Sandheads and is a possible site.

(2) Airport

Due to the rapidly increasing volume of air passenger and cargo traffic, the Airport Authority

of India (AAI) plans to upgrade the Kolkata International Airport. The basic idea is to upgrade the airport such that it can sustain the increasing air traffic volumes through the construction of a third runway and by renewing the international and domestic terminals. There are presently two runways in the airport, however the separation of these two runways would still not allow for parallel operation. Consequently, the third runway is planned to enable parallel operation. The total cost of this improvement work is estimated to be Rs20,000 million.

(3) Road Network

The road network is crucial for supporting regional development in India. In the ninth and tenth 5-year planning periods (1997-2002 and 2002 - 2007), the Government of India adopted ambitious schemes, namely the golden quadrilateral and the north-south and east-west corridors for the improvement of the primary transportation network of national highways. In the eleventh 5-year plan, more attention is being placed on connectivity with the primary national highway network through improving secondary networks comprising of other national highways and state highways.

West Bengal is the gateway between a number of adjoining states and neighbouring countries. West Bengal requires a road network system that will not only cover the needs of the State, but also serve as the primary mode of both goods and passenger transport to the adjoining states and neighbouring countries[6].

Consequently, there are a number of improvement projects required for the road network in the study area. The following are some of the major improvement projects that are committed, planned or discussed.

a) Improvement of NH41

National Route 41 is the road that connects Haldia Port to the roads in the Quadrilateral, viz. NH6 and NH2. NH41 currently consists of two lanes, however overflowing freight vehicles use one lane for parking severely limiting the capacity of NH4. Expansion of NH41 to four lanes is now in progress.

b) Raichak-Kukrahati Bridge

Although a feasibility study for the Raichak-Kukrahati Bridge was terminated in early schedule, useful outcomes for further study were obtained such as crossing location and alignment of approach road, the necessity of bypass of NH117, study of navigational requirement etc. and compiled in this report.

[6] Approach Paper of P.W.& P. W. (Road) Department to the 11th Five Year Plan, WBG.

c) Barasat – Raichak Road

No bridge functions effectively unless it is connected to the regional road network. In the case of the Raichak-Kukrahati Bridge, connection to NH34 at Barasat to the northeast of Kolkata will be crucial. NH34 is the trunk road in the West Bengal Corridor connecting Kolkata to the northern part of West Bengal, as well as to the eastern states of India. This road will also serve as a ring road on the eastern side of Kolkata.

d) Uluberia – South Kolkata Road

Uluberia is a town on NH6 on the western side of the Hugli River. The Uluberia – South Kolkata road will form the southern part of the Kolkata ring road that will connect to the road mentioned in 3) above. This will involve a bridge near Uluberia over the Hugli River. This road has been proposed for implementation as part of a Rs.7,000 million Haldia expressway (Haldia – Uluberia – south Kolkata).

e) Diamond Harbour – Sagar Road

This is the road that will need to be provided in conjunction with the new port proposed in Sagar Island (refer to item (1) above). The road will connect the new port proposed in Sagar with Haldia via the Raichak-Kukrahati Bridge. The road will also pass through the local township of Diamond Harbour, which has the potential for being a local service town, and Kulpi where there are plans for an industrial area and a port with eight meters draft is being considered.

(4) Railroad

There are no detailed railroad improvement plans pertaining to the regional development of the West Bengal southern region, however JICA is now conducting a national level study to further utilize the railway network for freight transport. As Kolkata is the eastern gateway to the dedicated freight corridor of Mumbai – Delhi – Kolkata through which multimodal, high axle load, computer controlled freight transport is being contemplated; plans for effective inter-modal transport shall be advocated particularly at the proposed new port in Sagar. The railway will provide an effective transport means for containerized freight as well as petrochemical products. It is also a good means of transport for some bulk cargo, such as coal. In order for the railroads to play a greater role in the transportation of goods, an effective port head trans-shipping facility at the proposed new port in Sagar or at the existing Haldia Port, as well as a land-side facility such as an ICD (Inland Container Depot) at the fringe of Kolkata will be essential.

Table 2.3.3 Major Urban Development and Regional Infrastructure Improvement Projects

Project / Initiator	Information Source / Study Level	Outline	Effects on West Bengal Southern Region	Total Capital Cost Estimate / basis
Sagar Port Development Project / KoPT	Evaluation Study of Project Proposals from Kolkata Port Trust and Public Works Department, March 2005; Pre F/S	• Development of deep seaport at Sagar Island with a sailing draft of -12.5 m with a container berths and coal berths • Development of connecting roads, railway and a bridge to Sagar	• Improved and more inexpensive sea lane connectivity as much larger container vessels could visit the port • Strength in promoting/locating export oriented firms particularly with heavy products	Rs. 21,970 million Order of magnitude basis
Improvement of NSC International Airport of Kolkata	AAI Regional Office; Preliminary Study	• Immediate: Extension of second runway by 400 m; upgrading of international building; and separate cargo complex by 2007 • Short-term; Construction of the third runway (now two); new buildings for international and domestic terminals; and six aero-bridges for international and 10 for domestic by 2010	• Improved air connectivity to major international locations • Better handling capacity of air cargo • Strength in promoting/locating export oriented manufacturers with high value added and advance technology	Immediate (by 2007); Rs.2,250 million Short Term (by 2010) Rs.20,000 million
Raichak-Kukrahati Bridge WBPWRD	Present Study by JICA F/S underway	• Construction of a bridge over the Hugli River at Raichak and Kukrahati • Construction of access roads from NR41 to Kukrahati and NR117 at Sarisha to Raichak	• Positive effects on Haldia Port with improved accessibility to/from Kolkata • New possibility of Industrial development in the Haldia Industrial Complex and FALTA • Regional development effects for Medinapur and South 24 Parganas • Positive effects on resort development in Digha and Diamond Habour	tbd
Barasat – Raichak Road	Proposed; No detail study yet	• This road in necessary to connect the above bridge to the existing network of national highways from Barasat on NH34 to Sarisha on NH117	• This road connects the Haldia port to the West Bengal Economic Corridor • This road also constitutes part of the Kolkata ring road that will divert some of the traffic to lessen the traffic load in the inner city areas	tbd
Uluberia – South Kolkata Road	Proposed; No detail study yet	• Road from Uluberia on NR6 on the western side of the Hugli river to South Kolkata • This road connection will require a bridge near Uluberia over the Hugli River.	• This road has been proposed for implementation as part of a Rs.7,000 million Haldia expressway (Haldia – Uluberia – south Kolkata).	tbd
Diamond Harbour – Sagar Road	Conceived in conjunction with proposed new port at Sagar	• This road is conjunctive to the new port proposed at Sagar Island.	• The road will connect the new port at Sagar with Haldia via the Raichak-Kukrahati Bridge. • The road also goes through Diamond Harbour and Kulpi.	tbd
Inter-modal freight transport with Railway	Conceived in JICA Study for Railway Modernization	• Improved port head transhipment facility • ICD near the fringe of Kolkota	• More effective utilization of railways for freight transport particularly with containerized cargo • Relieve the regional roads of freight traffic.	tbd

2.3.3 Existing Industrial Area

(1) Haldia Industrial Area

The planning area covered by the Haldia Development Authority (HDA) is declared by Notification No. 1875-T&CP/1R-C/80 dated 17.03.1980, No. 355 &356-T&CP/C-2/2L-7/2001(l) dated 16.02.2004 of the Urban Development, Government of West Bengal, with a total of 761.26 km^2 and having 476 mouzas.

Source: "Where industrial entrepreneurships find berth"
by the Haldia Development Authority

Figure 2.3.1 HDA Planning Area

As shown in **Table 2.3.4**, the HDA has acquired approximately 3,453 acres of land up until 31st March 2003. Of this total, 1,382 acres of land is utilised for industry. It should be noted that the 3,453 acres of land does not include the land acquired by entities other than HDA before HDA begins land acquisition. For instance, some large segments of land for the Haldia Refinery of Indian Oil Corporation, the Haldia Dock Complex, and the Haldia Petrochemicals Ltd are not included.

At present the HDA has 1,365 acres of land ready for industrial allotment. An area of over 1,500 acres is being developed that is ideally suitable for steel industries, petrochemicals and downstream industries, refineries and power plants.

Table 2.3.4 Status of Land Acquisition by the HDA

(As at 2002-2003)

Land Categories	Land Area (Acre)	
Land utilized		2,514
Industrial purposes	(1,382)	
Industrial infrastructure including roads and water supply	(516)	
Social infrastructure	(246)	
Residential purposes	(215)	
Rehabilitation purposes	(155)	
Land at hand		939
Total land acquired		3,453

Source: Annual Report 2002-2003, Haldia Development Authority

The Land Pricing Sub-committee of the HDA determines land rates by the type of land use. For example, on 1 January 2005, the land rate premiums were; Rs.10.0 lakhs per acre for manufacturing/production units, Rs.20.0 lakhs per acre for storage units, and Rs.7.0 lakhs per acre for HPL downstream.

Currently 29 large or medium scale industries are working in the Haldia Industrial Area. In addition, 17 new industries are currently being set up. It is expected that the existing industries' product marketing and the investment environment at Haldia will be improved, subject to the completion of the bridge construction project and the connecting road.

(2) Falta Special Economic Zone

Falta Special Economic Zone (FSEZ) is one of the eight Special Economic Zones[7] set up by Ministry of Commerce and Industry of Government of India under the SEZ scheme. FSEZ was set up in 1984 under the administrative control of the Ministry of Commerce as a multi-product SEZ.

The scheme and FSEZ are managed and administered by the office of the Falta Special Economic Zone Development Commissioner located in Kolkata. This office, in addition to the management of FSEZ and units therein, also manages similar 100% Export Oriented Units, under the EOU scheme approved on a standalone basis outside of FSEZ in the eastern and north-eastern states of India. **Table 2.3.5** summarizes the development of FSEZ.

[7] There are eight SEZ at Santacruz, Surat, Kandla, Kochi, Vishakapatnam, Falta, Noida and Madras.

Table 2.3.5 Development of FSEZ

Infrastructure Development	Description
Location	FSEZ is located in South 24 Paraganas District, at a distance of about 55 kilometres from the heart of Kolkata City and about 45 kilometres from the southern suburbs.
Development area	Gross area: 280 acres Area developed: 253 acres with full infrastructure facilities Area under development: 27 acres
Plots	Developed plots of various sizes are available to meet the requirements of industries, at a very nominal lease rent of Rs.25 per square metre per annum. This is further subject to concessions during the first five years: • First year: 30 percent • Second year: 25 percent • Third year: 20 percent Service charge: Rs.2 per square metre per annum
Standard Design Factory (SDF)	Total Area 15,570 square metres Fully occupied Lease rent: Rs.400 per square metre per annum. The tariff is subject to the following concessions: • First year: 30 percent • Second year: 25 percent • Third year: 20 percent Service charge: Rs.25 per square metre per annum
Industrial Sheds	Total Area 6,500 square metre Fully occupied Lease rent: Rs.250 per square metre per annum. The tariff is subject to the following concessions: • First year: 30percent • Second year: 25 percent • Third year: 20 percent Service charge: Rs.15 per square metre per annum

Source: Falta Special Economic Zone

The list of operating units in the Falta Special Economic Zone contains 93 industries (as at 1 July 2006) as provided by the Falta Special Economic Zone Development Commissioner. It is expected that the Raichak-Kukrahati Bridge will impact on the existing industries' raw material transportation as well as product marketing, and enhance the investment environment at FSEZ by improving traffic. This is subject to the completion of the bridge construction project and preparation of the connecting road.

(3) Growth Centres

To date, the West Bengal Industrial Infrastructure Development Corporation (WBIIDC) has set up 12 growth centres[8] in the state. Four of the 12 growth centres, namely, Falta,

[8] A growth centre is likely to be a specific designation of industrial estate for large and medium industries in West Bengal or India.

Uluberia, Kharagpur, and Haldia growth centres are located in the southern part of West Bengal. **Table 2.3.6** shows the land allotment position of the existing growth centres in southern West Bengal as at 31 March 2005. As is shown in the table, the WBIIDC has so far developed 529 acres of plots, and 479 acres have already been allotted. A total of 126 industry units have come to the growth centres in the southern part of West Bengal.

Table 2.3.6 Land Allotment Position of Existing Growth Centres in Southern WB

As on 31st March 2005

Name of Growth Centre	Location	Area developed for allotment	Area already allotted	Area available for further allotment	No. of Industrial Units
Falta (Phase-1)	South 24 Parganas District, 55 km from Kolkata, beside Falta SEZ	89 acres 20 units of shed	80 acres 12 units of shed	9 acres 8 units of shed	30
Uluberia (Phase-1)	Haora District, 55 km from Kolkata, on NH 6	112 acres 36 units of shed 104 units of SDF	112 acres 35 units of shed 39 units of SDF	No plots 1 unit of shed 65 units of SDF	67
Haldia (Phase-1)	East Medinipur District, Haldia, 2km from NH 41	100 acres	100 acres	No plots	6
Kharagpur	West Medinipur, 140 km from Kolkata	228 acres	187 acres	41 acres	23
Existing Growth Centres Total		529 acres 56 units of shed 104 units of SDF	479 acres 47 units of shed 39 units of SDF	50 acres 9 units of shed 65 units of SDF	126

Source: A Review of the Industrial Scenario in West Bengal (Annual Report 2004-2005), Commerce and Industries Department, Government of West Bengal

To meet the growing demand for industrial land, land has been acquired for the expansion of the growth centres in Falta, Uluberia, and Haldia. **Table 2.3.7** shows the status (as at 31March 2005) of the expansion projects for the three growth centres.

Table 2.3.7 Expansion of Growth Centres in Southern WB

As on 31st March 2005

Name of Growth Centre	Location	Area under development (acres)	Remarks
Falta (Phase-2)	South 24 Parganas District, 55 km from Kolkata, beside Falta SEZ	260	Under land acquisition
Uluberia (Phase-2)	Haora District, 55 km from Kolkata, on NH 6	200	Apparel Park will be developed on the land being acquired at Uluberia in collaboration with WBIDC.
Haldia (Phase-2)	East Medinipur District, Haldia, 2km from NH 41	250	
Total		710	

Source: A Review of the Industrial Scenario in West Bengal (Annual Report 2004-2005), Commerce and Industries Department, Government of West Bengal, and others

(4) Industrial Parks/Complexes Being Developed in the Study Area

Recently, the West Bengal Industrial Development Corporation (WBIDC), under the Commerce and Industries Department, has been developing industrial parks and complexes for the specific industries shown in **Table 2.3.8**. These industrial parks include a food park, steel park, gem and jewellery park, toy and light engineering park, apparel export park, foundry park, garment park, rubber park, chemical park, leather complex, and electronics complex. The development projects for these industrial parks and complexes require land with a total area of over 5,500 acres in the southern part of West Bengal.

Table 2.3.8 Industrial Parks and Complexes Being Developed in Southern WB

Name of Industrial Park	Location	Area (Acre)	Type of Industries	Investor	Status and remarks
Food Park (Phase-1)	Sankrail, Haora	55	Food processing	WBIDC	Already established
Kharagpur Steel Park	Kharagpur, West Medinipur	300	Iron and Steel	WBIDC	Under implementation
Guptamani Steel Park	Guptamani, West Medinipur	2,500	Iron and Steel	WBIDC	Under implementation
Gems & Jewellery Park (Manikanchan)	Salt Lake, Kolkata	5	Gems and jewellery	WBIDC	Established Principle approval for SEZ has been granted.
Toy Park-Light Engineering Park (Shilpangan)	Salt Lake, Kolkata	2	Toys, sports goods, etc.	WBIDC	Already established
Apparel Export Park	Uluberia, Haora	150		WBIDC	Under implementation Direct employment opportunities: 22,000
Foundry Park	Hawli Bagam, Haora	924		WBIDC with Indian Foundry Association	Under implementation Direct employment opportunities: 30,000
Garment Park	Kolkata	9		WBIDC	Under implementation
Chemical Park	Haora	150	Chemical	Indian Chemical Merchants & Manufact. Ass. (ICMMA)	Under implementation
Rubber Park	Haora	170	Rubber	All Indian Rubber Industries Association, WBIDC	Under implementation Direct employment opportunities: 10,000 persons
Kolkata Leather Complex	Kolkata	1,100	Leather integrated complex	WBIDC	Under implementation
Salt Lake Electronics Complex	Salt Lake	150	Software	WBIDC	Under implementation
Total		5,515			

Source: A Review of the Industrial Scenario in West Bengal (Annual Report 2004-2005), Commerce and Industries Department, Government of West Bengal, and others

(5) Industrial Estates for Small Industries

The West Bengal Small Industries Development Corporation (WBSIDC), under the Department of Cottage and Small Scale Industries, has developed a large number of

industrial estates for small industries across the state. **Table 2.3.9** shows those located in the southern part of the state.

Table 2.3.9 Industrial Estates for Small Industries in the Southern Part of West Bengal

Name of Industrial Estate for Small Industries	Location
Baruipur Industrial Estate	South 24 Parganas
Behala Industrial Estate	Kolkata
Ultadanga Industrial Estate	Kolkata
Kidderpore Industrial Estate	Kolkata
Kasba Industrial Estate (Phase1,2,3)	Kolkata
Manicktala Industrial Estate	Kolkata
Ashokenagar Industrial Estate	North 24 Parganas

Source: WBSIDC

2.4 Legal and Organizational Framework

2.4.1 Relevant Laws

(1) Town and Country Planning Act (1979)

The basic law for regional development in West Bengal is the 1979 Town and Country Planning and Development Act. This act entitles the government to earmark an area for the construction of a township. After an area has been notified under this act, it can be classified as a "planning area", and a land use plan can be formulated stipulating zones such as roads, residential and commercial areas.

Based on this act, each development authority was established to implement specific "planning areas". Seven authorities were established under this act, including the Kolkata Metropolitan Development Authority (KMDA) for the Kolkata Metropolitan Area (KMA), and the Haldia Development Authority (HDA) for Haldia.

This act also enables the public body to stipulate building operation rules, which are a set of construction codes and building regulations that sanction building plans and designs. There are such rules set for Kolkata, Salt Lake and lately for New Town in the suburb of Kolkata.

(2) Special Economic Zones Act (2005)

In January 2000, the Government of India introduced a policy for setting up Special Economic Zones in the country aimed at providing an internationally competitive environment for export oriented firms. The Special Economic Zones Act, 2005, was enacted in June 2006.

The policy made provisions for establishing SEZs in various forms, including the public, private, joint sector or by state governments. It was also envisaged that some of the existing

Export Processing Zones (EPZ) would be converted into SEZs. Falta in West Bengal was thus converted into a SEZ. In addition, three new SEZs were approved for establishment, including Salt Lake (Kolkata).

Currently, 36 SEZs have been approved, and all of the eight Export Processing Zones (EPZs) have been converted into SEZs, which are fully functional. In addition three new SEZs that were approved for establishment have recently commenced operations and approval has been given to 42 SEZs in various parts of the country.

2.4.2 Organizations Related to Industrial Development

(1) Commerce and Industry Department, Government of West Bengal

The Commerce and Industries Department is basically assigned with functions relating to the promotion and regulation of large and medium scale industries and trade and commerce in West Bengal. The department coordinates the promotion and development of large and medium scale industries other than cottage and small scale industries as well as closed and ailing industries.

The department has under its administrative control five directorates/offices and nine corporations.

Directorates / Offices

1. Directorate of Industries
2. Directorate of Cinchona & Other Medical Plants
3. Directorate of Mines & Minerals
4. West Bengal Government Press and Stationary Office
5. The Office of the Registrar of Firms, Societies and Non-Trading Corporation

Corporations

1. West Bengal Industrial Development Corporation Limited (WBIDC)
2. West Bengal Industrial Infrastructure Development Corporation (WBIIDC)
3. West Bengal Electronics Industry Development Corporation Limited (WEBEL)
4. West Bengal Pharmaceutical & Phytochemical Development Corporation Limited
5. West Bengal Sugar Industries Development Corporation Limited
6. West Bengal Tea Development Corporation Limited
7. West Bengal Mineral Development & Trading Corporation Limited
8. The Greater Calcutta Gas Supply Corporation Limited
9. The Infusion (India) Limited

Of the directorates, offices and corporations listed above, the Directorate of Industries, WBIDC and WBIIDC is strongly linked to the industrial developments that will take advantage of the Raichak-Kukrahati Bridge Project.

(2) Cottage and Small Scale Industries Department, Government of West Bengal

This department promotes cottage and small scale industries, handlooms, power looms, artisan's readymade garments, hosiery, sericulture by way of training, infrastructure development, extension of services, skill development, and design development. This department organises marketing arrangements for the products of weavers, artisans and small scale industries. It is actively associated with the downstream industry set-up related to Haldia Petrochemical Ltd.

The department has under its administrative control the following corporations, undertakings, co-operatives, and societies:

1. West Bengal Small Industries Development Corporation Limited
2. West Bengal Handicrafts Development Corporation Limited
3. West Bengal Leather Industries Development Corporation Limited
4. West Bengal Ceramic Development Corporation Limited
5. West Bengal Handloom & Power Loom Development Corporation Limited
6. West Bengal State Handloom Co-op Society Limited
7. West Bengal State Handcrafts Co-op Society Limited
8. West Bengal Project Development
9. Silpa Barta Printing Press Ltd.
10. Pulver Ash
11. SIDA
12. Spining Mills (6 mills)
13. Electronics Test & Development Centre (ETDC)
14. State Export Promotion Society (SEPS)

(3) Haldia Development Authority

The Haldia Development Authority (HDA) was constituted under the West Bengal Town and Country Act in 1979 to ensure the planned and integrated development of the Haldia Industrial Region. The HDA has been granted a considerable degree of functional autonomy to achieve a single point objective of promoting and developing Haldia as one of the most efficiently managed and easily accessible industrial hubs of West Bengal.

Primarily, it provides for the infrastructure needs of industrial plants. This includes acquiring and making available land for both factories and employees' homes, building a network of roads, providing drinking water as well as water for industrial use, ensuring adequate drainage facilities as also ensuring access to electricity.

Most importantly, the HDA has been instrumental in creating an environment that is, at the same time, peaceful, promising and profitable. As industries have moved in with their people, they have found houses, schools, hospitals, markets, shopping and recreational

centres, modern communication facilities and transportation, as good as in any modern township.

At present, the HDA is headed by Mr. Lakshman Seth, Member of Parliament, as its chairman. The board consists of members who are representatives of East Medinipur, Haldia Municipality, Urban Development Department, Financial Department, Commerce and Industries Department, Tourism Department, Haldia Dock Complex, Haldia Refinery of Indian Oil Corporation, Haldia Petrochemicals Ltd., etc. The Board of the HDA has formed three sub-committees, namely, the Land Pricing sub-committee, Tender sub-committee, and the Land and Estate sub-committee.

2.5 Regional Development Prospect for West Bengal and Kolkata

2.5.1 Potential and Constraints Relating to Industrial Development

(1) Potential for Industrial Development

a) Haldia

Haldia has a high potential for industrial development.

The Government of India is considering Jlingham, Haldia as one of the five possible sites for the national-wide Mega Chemical Industrial Estate (MCIE) in an area of 7,500 acres.

In addition, efforts are being made to declare the port city as a Special Economic Zone (SEZ) for export oriented industries. The Haldia Industrial Area has location advantages for the export oriented industries due to the Haldia Dock Complex. By setting up a SEZ in the Haldia Industrial Area, the advantages for the export oriented industries will be strengthened.

Furthermore, the Haldia Development Authority has also been encouraging the plastic processing industries.

b) Falta

There are two different types of industrial estates in Falta in the South 24 Paraganas District, namely the Falta SEZ under the control of the Government of India, and the Falta Growth Centre under the control of the Government of West Bengal.

Most factories located in the Falta SEZ import raw materials via Haldia Port, and export their finished products via Haldia Port. These factories entrust certain transport agents with inland transportation between Haldia and Falta for both raw materials and finished products. Such transportation takes a few days for a one-way journey and attracts a considerable transportation cost. A significant reduction in time and transport charges is expected for the existing factories, subject to the successful completion of the bridge construction. As for section IV of the Falta SEZ under expansion project, the investment environment will be

significantly improved by the bridge project.

The WIIDC under the West Bengal Government has an expansion plan for the Falta Growth Centre. The plan involves multi-product industrial estates aimed at both the export and indigenous markets. Supposing the Raichak-Kukrahati Bridge is built with an adequate road network, the linkages to the port and industries in Haldia will be strengthened. Hence, it is expected that factories will be developed to manufacture PET bottles from PTA produced by MCC PTA at Haldia, and plastics processed from plastic resin by HPL.

c) Kulpi

Kulpi port project, which is the State's first private port project at Kulpi on the eastern bank of the Hugli River, became realistic on 11th August 2004, ten years after the project concept is formulated.

The Peninsular and Oriental Stream Navigation Company (P&O)[9] had secured the rights to become an investor in Bengal Port Ltd (BPL) which had signed development and concession agreements for a port and special economic zone (SEZ) property development. P&O currently holds a 44.5% stake in BPL; another 44.5% stake is shared between Mukund Steel and its affiliate, Keventer Agro; and WBIDC holds 11%.

According to an announcement by P&O, it will have the rights to acquire 69% of the Kulpi Port Company to which BPL will assign a 50 year concession to develop, operate and maintain the port.

The new port will initially have two berths with any additional capacity to be developed in line with demand, subject to feasibility studies and a detailed master plan. The berths will each have a potential capacity of approximately 0.5 million teu and comprise 350 meters of quay line. Preliminary estimates of capital expenditure are US$235 million for the first two berths. Depending on the outcome of the feasibility studies and the timing of the notification and supporting infrastructure works (to be progressed by the Government of West Bengal), the first berth could be operated by 2007 and the second berth post 2009.

The SPZ and port will be spread over 3,000 acres in total of which 300 acres will be used for the port and allied backup facilities and 2,700 acres for the SEZ.

After the signing of the agreement in August 2004, a detailed techno-economic feasibility study for the project has been undertaken by a consultant, Jacobs Babtie of Jacobs Engineering based in the US. Meanwhile, the Shipping Ministry of India has formed a technical committee to provide assistance to the project. As of August 2006, there have been no announcements regarding the outcomes of the feasibility studies.

[9] P&O is one of the world's foremost developers and operators of container ports, based in the UK.

The sectors identified for the SEZ are food processing, leather products, wood products, engineering, consumer electronics, chemicals and auto products, all with a pronounced export focus. The JICA Study Team expects that the sector involved in freezing prawns and shrimps will also be included due to the close proximity to the estuarine area of the Hugli River which is suitable for the extensive culture of prawns and shrimps.

d) Sagar Island

The Kolkata Port Trust (KoPT) has two ports, namely the Kolkata Dock System (KDS) and the Haldia Dock Complex (HDC). Both ports cannot handle deep drafted vessels due to their low draft availabilities of about 7 meters and 8.5 meters, respectively.

In February 2004, KoPT commissioned the development of a virtual jetty at a location approximately 1,000 metres away from the West Bank of Sagar Island for handling deep drafted vessels. The virtual jetty is functional for loading and unloading vessels in all seasons and takes care of Panamax size vessels with a draft of 10.5 metres. The virtual jetty consists of four mooring buoys placed on four sides to tie-up the ship so that barges or small vessels can tie-up alongside for stable loading and unloading operations. Examples of commodities that can be handled on the virtual jetty are iron ore, thermal coal, coking coal, petroleum coke, vegetable oil, wheat, maize, logs and pulses.

Apart from the virtual jetty, KoPT has a plan to construct a new port on the West Bank of Sagar Island to handle vessels with a draft of 12.5 meters without the need for the transhipment currently being carried out at the virtual jetty. In addition, there is an idea of building an industrial estate on the hinterland of the port. However, Sagar Island is within the Coastal Regulation Zone (CRZ) where construction activities are restricted, according to the previous report. Careful investigation of the CRZ must be carried out before the Sagar Project is further developed.

(2) Constraints of Industrial Development

a) Low Draft Availability in the Ports

Loading and unloading operations cannot be carried for vessels with a draft deeper than 12 meters at any port of the KoPT including Sagar Port under the planning stage, except by transhipment at Sandheads.

The low draft availability constrains the industries that need the deep drafted vessels such as VLCC for crude transport and LNG tankers. Hence, it is difficult to attract new large-scale refineries to handle imported crude oil and LNG receiving and re-gasification terminals.

b) Constraints in Plastic Processing

The Government of West Bengal is promoting the plastic processing industry as one of the development areas. However, due to its non-biodegradable nature, littering of plastics causes irreversible damage to the environment. Municipal authorities have two options for plastic disposal: incineration and landfill. While plastics remain fairly inert in the landfills, the large volume to mass ratio of plastics aggravates the shortage of landfill space. Incineration of plastics, especially chlorinated ones like PVC[10] releases harmful dioxin, which is a potent human carcinogen.

In order to combat the excessive amount of plastic junk generated every day, the Ministry of Environment and Forests (MoEF) and the West Bengal Pollution Control Board (WBPCB) have, over the years, imposed several restrictions on the use of plastic carry bags.

For instance, on 15 September 2001, the WBPCB banned the manufacture, sale and use of plastic carry bags in the ecologically fragile areas of the State such as the entire Sundarban area; Coastal Regulation Zone areas like Digha, Sankarpur, Frazerganj, Sagar, Bakkhali etc.; hilly areas of Darjeeling District; and the entire forested areas of West Bengal.

Apart from plastics, MoEF may also impose several restrictions on industrial activities in the ecologically fragile areas as a matter of course. In relation to site selection for industrial development projects, it is essential to conduct an environmental study including legal interpretation.

c) Coastal Regulation Zone

The Coastal Regulation Zone (CRZ) was promulgated on 19 February 1991, as a derivative of the Environment Protection Act, 1986 with the objective of protecting the sensitive ecosystems along the coastal regions by preventing construction activities. However, some activities are likely to be allowed under exceptional circumstances. It is essential to be judicious about checking against the all CRZ Notifications of MoEF relating to CRZ, prior to the commencement of a detailed study.

2.5.2 Direction of Industrial Development

Regional development is closely related to the construction of large scale transport infrastructure. Construction of the Raichak-Kukrahati Bridge with an adequate supporting road network will significantly impact regional development, especially industrial development on both banks of the Hugli River.

Based on the potential and constraints described above, the Study Team has identified certain industrial segments that are promising industries to developed on both banks of the Hugli

[10] Polyvinyl Chloride

River.

(3) Petrochemical Industries

If the ethylene production capacity is used as the practical measure to compare petrochemical industries, then the 455 KTA[11] produced by Haldia Petrochemicals is not as large as the production capacity of other industrial areas in South Asian countries.

For example, three petrochemical complexes in Mapta Put, an industrial area in the eastern seaboard of Thailand, have a total ethylene production capacity of 2,031 KTA and three petrochemical complexes in Singapore have a total ethylene production capacity of 1,890 KTA. Taking into account the growing market in Eastern India as well as exports, there is the possibility of one or two more petrochemical complexes being developed in Haldia.

Another direction of the petrochemical industry is the diversification of products. At present, the finished petrochemicals from Haldia Petrochemicals Ltd (HPL) are limited to polyolefin[12] like LLDPE, HDPE, and PP[13]. Other products are sold to Western India and Southeast Asia as intermediate products.

For example, aromatics are manufactured from naphtha or pyrolysis gasoline that is produced by HPL as one of the intermediate products. Aromatics can be used as a raw material for manufacturing Para-Xylene (PX) and Polystyrene (PS) through various chemical processes. PX is major raw material of Pure Terephthalic Acid (PTA); hence, there is an opportunity for creating a linkage with MCC PTA India at Haldia. PS is one of the multi-purpose plastic resins which are widely used throughout the world.

Another example is the manufacturing of synthetic rubber and Acrylonitrile-Butadiene-Styrene (ABS) from butadiene as one of the intermediate products. Synthetic rubber is an indispensable material for tire manufacturing; hence, there are opportunities for the development of tire industries in the southern part of West Bengal through the linkage with the automobile and motorbike industries in West Bengal. ABS is used for parts of automobile and home electric appliances due to its durability.

These examples of diversification are promising, although the production capacity needs to be sufficient when compared to the economic size of the plant.

(4) Plastic Processing

According to the WBIDC, the per capita plastic consumption in West Bengal is approximately 1.5 kg and is as low as 0.08 kg in the north-eastern region, compared to an average of 2.0 kg over the entire India. Even this average for India compares poorly with

11 KTA(Kilo-tons per annum) = 1,000 tons per annum

12 Polyolefins is a generic term for a polymer of olefin such as ethylene and propylene.

13 LLDPE=Linear Low Density Polyethylene, HDPE=High Density Polyethylene, PP=Polypropylene

the world average of 15 kg. Thus, there exists a huge untapped market potential in the region, if it is to even reach the national level.

A significant portion of the processed plastics are supplied for industrial uses, mainly packaging. The demand for these items is derived by the user segment, and its growth largely depends on the growth of the user segment. Hence, it is quite important to emphasize that the prosperity of these segments boosts the plastics processing industry. Significant growth is expected in the fields of food processing, construction, metal, cement and chemicals in West Bengal and this will directly boost the plastics industry. The fast moving consumer goods (FMCG), consumer durables, and automobile sectors in Eastern India, which are also significant users of processed plastic products, can further boost the plastics industry in the region.

By building the Raichak-Kukrahati Bridge with an adequate road network, this segment can be developed on both sides of the Hugli River except in the ecologically fragile areas where the WBPCB has banned the manufacture, sale and use of plastic carry bags.

(5) Electrical Home Appliances

The Japan Electrical Machinery Manufacturers' Association has carried out market research of certain electric appliances in India. According the results of the market research, 4.1 million refrigerators, 1.5 million clothes washers, and 1.3 million air conditioners were manufactured in India in 2004. These volumes are forecast to increase to 5.7 million, 2.8 million, and 2.6 million in 2009, respectively. It is reported that the majority of purchasers were new users; as such electrical appliances are becoming popular in India.

It is expected that there will be a significant market for electrical home appliances in Eastern India, although this should be proven through further market research. Based upon the expected growth in the market, this segment is promising throughout the state, particularly in the Kolkata and North 24 Parganas Districts.

Plastics are used to manufacture certain parts of electrical home appliances. The manufacture of these parts is generally undertaken near to the assembly plants for the electrical home appliances. This will reduce the time and costs involved in transporting the plastic resin from Haldia to the manufacturing plants, subject to the construction of the Raichak-Kukrahati Bridge and the associated road networks.

(6) Engineering

Recently, motorbike and automotive industries have become more prevalent in the southern part of West Bengal. Arjun, a joint venture between Indonesia's Salim group and Jakarta based businessman Prasoon Muherjee's Universal Success, is scheduled to begin commercial operation by late 2007. In the first year, Arjun expects to sell around 60,000 motorbikes.

In addition, two automotive manufacturing plants are being set up in the southern parts of the state. The first one, a joint venture between M/S URAL India Ltd and URALAZ of Russia, will manufacture a wide range of trucks for defence purposes as well as civil applications at it's Haldia plant. The second manufacturing plant, Tata Motors, will manufacture small cars at Singur in the Hugli District.

These upcoming projects will extend the indigenous market of motorbike and automotive industries in West Bengal. Consequently, further automotive industries will be developed within the state.

With this growth in the plastics processing industry, more metal working industries will be required for manufacturing moulds and dies for plastic processing in the southern part of the state, particularly in Kolkata and the surrounding areas.

(7) Rubber Industry

With the development of the anticipated motorbike and automotive industries, tire manufacturing industries are also likely to be developed within the southern part of West Bengal. The tire manufacturing industry is likely to use synthetic rubber that is available in Haldia, subject to the realization of synthetic rubber manufacturing as described previously in the discussion on the petrochemical industry.

(8) Food Processing

West Bengal is the largest producer of fish in the country. The establishment of cold chain infrastructure will be encouraged in both districts of East Medinipur and South 24 Paraganas for the preservation of fish.

(9) Aquaculture

The state is the highest producer of shrimps in the country, most of which are frozen and sold without further processing. The estuarine area of the Hugli River in the Sunderbans is suited for the extensive culture of prawns and shrimps. The state has identified Meena Dweep, an island near Haldia, as an area for establishing a large-scale prawn production centre with a farming capacity of up to 5,000 tons per annum. Export markets for shrimps and prawns have been growing exponentially, particularly the Japanese, US and European markets. In addition, there is also a large domestic market.

Shrimp and prawn aquaculture will be encouraged on both banks of the Hugli River. However, adequate care must be taken to avoid the potential problems associated with environment hazards and contamination.

(10) Synthetic Fibre

The synthetic fibre industry, particularly the polyester fibre industry is promising in India. Based on the large indigenous market, this segment will be encouraged.

2.5.3 Definition of Regional Development Objectives

The southern region of West Bengal is adjacent to the Kolkata metropolis, and is accessible from the sea through the Kolkata and Haldia ports (the second largest port in India), and by air through the Kolkata International Airport, the third largest international airport in India. The area is connected to the golden quadrilateral and this connection is now being improved with the expansion of NH41 and the construction of the Raichak – Kukrahati Bridge and adjoining roads. The West Bengal Southern Region will have outstanding land, sea and air accessibility which will be essential for the export oriented and high growth industries.

Kolkata metropolis has an estimated population of 13 million, and is the second largest in India after Mumbai (16 million) and is comparable to Delhi (13 million). Kolkata is also the regional economic centre in the eastern states of India, and is a gateway to neighbouring nations such as Bangladesh, Nepal and Bhutan. The total population of the sub-region is approximately 400 million, with an annual gross output equivalent to US$220 billion. The West Bengal Southern Region is thus the gateway for this huge economic sub-region in the hinterland of Kolkata.

On this basis, the West Bengal Southern Region is suitable for economic activities pertaining to the production of export-oriented products as well as high-growth, high-technology consumer goods catering to the large hinterland population as well as to the whole of India.

West Bengal Southern Corridor
Growth & Export Zone

2.5.4 Strengths, Weaknesses, Opportunities and Threats

A SWOT analysis generally looks into the strengths, weaknesses, opportunities and threats, and derives a strategy for development based on a presumed objective. Taking the above directive, namely the West Bengal Southern Corridor – Export and Growth Zone, as the objective of regional development, a SWOT analysis was conducted, as detailed below.

The following is the SWOT matrix.

Table 2.5.1 SWOT Matrix for the Study Area (Draft)

Item	Strength [S]	Weakness [W]	Opportunity [O]	Threat [T]
A. Human resources	• Large urban population of Kolkata, with good education [AS1] • Large rural population in the surround areas of Kolkata [AS2]	• Rural population are not accustomed to manufacturing type of works [AW1]	• Recent economic growth awaken urban population for high value added jobs [AO1]	• Rapid increase in demand for human resources may cause imbalance of supply [AT1]
B. Urban Planning	• Large unused lands in the Study Area [BS1]	• Most unused lands are flood-prone lands that needs land preparation for use. [BW1] • Other lands are used for agricultural production [BW2] • Increasing land prices [BW3]	• Kolkata Metropolitan Area is growing very fast. [BO1]	• Urban area in Kolkata is highly built-up [BT1]
C. Investment for Development	• Existing industrial estates in Haldia Port area and FALTA [CS1]	•	• Special Economic Zones Act was enacted in 2005 [CO1]	• IT industries are focusing on Salt Lake in the suburb of Kolkata for investment [CT1]
D. Seaport	• Plan for deep seaport at Sagar Island [DS1]	• Limited depth of the existing seaport (8.5 m at Haldia, 7 – 8 m at Kolkata) [DW1]	•	• Increasing reliance on larger container ships requiring deeper ports [DT1]
E. Airport	• Increasing passengers and air cargo at International Airport [ES1] • Extending 2nd runway by 400 m, upgrading international building, & develop a separate cargo complex in progress [ES1]	• Limited direct flights to major international airports [EW1]	• Rapid increase in international air passengers and cargo [EO1]	•
F. Road Network	• Connection to Golden Quadrilateral, the main spine of India [FS1] • Improvement of NH34 in progress [FS2] • Raichak-Kukrahati Bridge under consideration [FS3] • Plan of Barasat Bypass to connect NH34 towards the southern part of Kolkata [FS4]	• Continuous congestion in NH 41 due to the lack of capacity (2 lanes). [FW1] • Restriction of heavy tracks crossing the Hugli River during the day time [FW2] • No ring road for Kolkata – aggravating congesting in the city [FW3]	•	• High quality road network required for export oriented firms – lack of it may cause distracting of firms [FT1]
G. Railway	• Huge amount of existing stock in India[GS1]	• Limited inter-modal transhipping functions [GW1]	• New focus on multimodal freight corridor [GO1]	•

2.5.5 Regional Development Strategies

The SWOT analysis produces strategies by considering what measures are necessary for enhancing the identified strengths, improving the weaknesses, capitalizing on opportunities and evading threats.

The following is the SWOT strategy matrix.

Table 2.5.2 Development Strategies

Sector	Development Strategies	Relevant SWOT entries
A. Human resources	• Locate export-oriented industries in the study area and create employment for the population in and around the area, and provide vocational training as necessary.	[AS1], [AS2], [AW1], [AO1], [AT1]
B. Urban Planning	• Make available land plots that are suitable for industrial location by land procurement, flood protection and land preparation.	[BS1], [BW1], [BW2], [BW3]
	• Kolkata needs an urban transport network such as a light rail or metro to serve the growing population and solve the bottlenecks (the Hugli River, in particular).	[BO1]
	• Make a new town centre in the suburb of Kolkata and relocate the administrative functions such as government offices, and accommodate universities and medical institutes.	[BT1]
C. Investment for Development	• Prepare for the development of SEZ in Haldia for diverse products including multi-products and petrochemicals (but excluding IT industries), by securing the developers and manufacturers to be located in the area.	[CS1], [CO1], [CT1]
D. Seaport	• Make the maximum use of the existing port facilities at Haldia and Kolkata and improve the connectivity of the ports. • Prepare for the future development of a deep seaport at Sagar Island and conduct an engineering study.	[DS1], [DW1], [DT1]
E. Airport	• Ensure maximum use of the existing facilities and prepare for urgent needs and upgrading the facilities for the increased needs.	[ES1], [EW1], [EO1]
F. Road Network	• Upgrade the connectivity of Haldia Port (on-going). • Prepare for the construction of the Raichak- Kukrahati Bridge and the access roads by conducting a Feasibility Study (this Study). • Improve connectivity of the southern part of Kolkata to Kolkata city, NH34 and NH2.	[FS1], [FS2], [FS3], [FS4], [FW1], [FW2], [FW3], [FT1]
G. Railroad	• Plan for seamless inter-modal transport at the proposed Sagar Port or at Haldia for better utilization of the railway for freight transport, particularly of containerized cargo, petrochemical products and some bulk cargo. • Plan for an Inland Container Depot (ICD) at the fringe of Kolkata for reducing freight transport loads on roads.	[GS1], [GO1], [GO1]

2.5.6 Regional Development Phases

Regional Development Phases are summarized in the following table:

Table 2.5.3 Summary of Regional Development Phases

	Short-Term	Medium-Term	Long-Term
Target Year	Five Years (2010)	Target: Ten Years (2015)	Twenty Years (2025)
Development Goal	Enhancement of the present capacity of the region for export processing and other high growth industries	i) Continued regional development along the Haldia - Kukrahati - Raichak belt ii) New development towards Kulpi and Sagar Island	i) To consolidate the different parts of this wide area and to establish the area as a gateway of Eastern India as well as the South Asia sub-region ii) To maintain the active metropolitan area of Kolkata
Major Infrastructure Development	i) Early construction of the Eastern and Southern Expressway, which will focus on the construction of a bridge (or possibly a tunnel) over the Hugli River ii) Connecting road between NH41 on the south-western end and NH34 on the north-eastern end	i) New seaport either at Sagar, with an operating draft of 12.5 m, or an equally deep seaport at Kulpi ii) International airport in Kolkata urgently needs to be improved	i) Ring road around Kolkata shall be a necessity to maintain and enhance the urban functions of Kolkata ii) Freight transport needs to be redefined and upgraded a) Deep seaport that could accommodate large container vessels b) Multi-modal high speed transport system encompassing the sea transport and surface transport c) Inland container depot at the fringe of the metropolis
Major Industrial Development	Extension and expansion of the Haldia Industrial Complex and Falta, primarily capitalizing on the improved road transport	Kulpi and/or Sagar will have the advantages of a superior location and the development of export-oriented industries will be promoted therein.	Enhancing the existing Salt Lake/New Town area will be an effective option to make Kolkata ready for the provision of high-tech and advance technologies.
Major Urban Development	Haldia City needs to be enhanced to provide urban services to the population living and working in the area.	Diamond Harbour City will be crucial as the new regional centre in the southern part of South 24 Parganas. This area needs to be enhanced to provide urban services.	Areas along the eastern and southern expressway will be a suitable location for a new town serving such purpose as i) public offices, ii) higher education institutions and iii) residential units.

(1) Short-Term Development

a) Target Year

Target: Five Years (2010)

b) Development Goal

The short-tem development goal for the West Bengal Southern Corridor will focus on the enhancement of the present capacity of the region for export processing and other high growth industries along the Barasat – South Kolkata – Raichak - Haldia belt.

c) Major Infrastructure Development

The most urgent of all of the development requirements is the early construction of the Eastern and Southern Expressway, which will focus on the construction of a bridge (or possibly a tunnel) over the Hugli River at Raichak – Kukrahati and the connecting road between NH41 on the south-western end near Haldia and to Barasat on NH34 on the north-eastern end.

This new connection, together with the completion of the improvement of NH41, will provide the West Bengal Southern Region with a much needed high speed connection to the Kolkata metropolis. This also means that the Kolkata Port (the second largest port in India) will be consolidated with Kolkata Metropolitan Area, the oldest and second largest city, and therefore the whole of India will be easily accessible via the golden quadrilateral (NH6 & NH2). The West Bengal Southern Region will possess the best location factors in the eastern part of India for the development of export-oriented industries.

d) Major Industrial Development

With regard to industrial development, the focus will continue to be given to the extension and expansion of the Haldia Industrial Complex and Falta, primarily capitalizing on the improved road transport. For Falta, in particular, the effects of the bridge will not be insignificant. Under the present condition without the bridge, trucks have to travel from Haldia via NH41 and NH6 and then cross the bridge at Second Hugli, and on to NH117 before reaching Falta. With the new bridge, this journey will take less than an hour.

e) Major Urban Development

As development will be focused around the Haldia-Kukrahati-Raichak belt, the role of Haldia City needs to be enhanced to provide urban services to the population living and working in the area. Haldia is a city with a population of 170,000, and is virtually functioning as a regional centre for administrative and urban services in east Medinipur. With the construction of the new bridge, Haldia will be central in wider region including the southern part of South 24 Parganas.

(2) Medium-Term Development

a) Target Year

Target: Ten Years (2015)

b) Development Goals

The medium-term development phase will focus on two directives. One is continued regional development along the Haldia - Kukrahati - Raichak belt to allow for the materialization of a zone geared for manufacturing industries focussing on export-oriented or

export-quality goods.

Another medium-term development phase will be the new development towards Kulpi and Sagar Island. This will be conditional on the feasibility of the new deep seaport development either at Sagar Island or at Kulpi. The new seaport will enable much larger vessels to visit Kolkata, and will thus substitute for some of the transhipment functions currently being conducted outside of India[14]. The road and rail connections will be extended to Sagar via Kulpi.

Thus the development goals of this phase will be to see the industrial development on both sides of the Hugli River; viz. the Haldia side and the Kulpi side, combined and consolidated by the bridge at Kukrahati-Raichak.

c) Major Infrastructure Development

Important infrastructure for this phase is a new seaport either at Sagar, with an operating draft of 12.5 m, or an equally deep seaport at Kulpi. For this to materialize, a feasibility study needs to be conducted as soon as possible, particularly for the Sagar project, as this deep seaport will be extremely beneficial to the Indian economy as it could accommodate large container vessels, and reduce the transhipment of Indian cargo at foreign ports.

The international airport in Kolkata urgently needs to be improved to keep pace with the very rapidly growing air traffic demand for passengers and cargo and to allow the area to re-establish itself not only as an East Indian region, but also as a sub-regional hub for South Asia.

Together with the seaport and airport, a road connecting the port to the road network leading to Haldia and Kolkata needs to be developed, which would mean improvement of the Diamond Harbour road and construction of new roads to the port heads.

d) Major Industrial Development

Kulpi and/or Sagar will have the advantages of a superior location and the development of export-oriented industries will be promoted therein.

With the growth in new industries, there may be a higher need for new towns for housing, offices and non-polluting high-tech industries, which could best be accommodated in the southern part of Kolkata. With the growth of south Kolkata, a missing link in the Kolkata ring road, viz. a link to Uluberia crossing the Hugli River may be necessary.

[14] According to the 10th Five Year Plan of India, about 70% of containers to and from India are now transshipped at foreign ports such as Colombo, Dubai, Singapore etc. This not only benefits these ports, but hinders the competitiveness of Indian goods for export.

e) Major Urban Development

During this phase, the role and function of Diamond Harbour City will be crucial as the new regional centre in the southern part of South 24 Parganas. Diamond also has potential as a resort and a transportation point. This area needs to be enhanced to provide urban services to the population living and working in the area. Diamond Harbour is presently a much smaller town than Haldia, with a population of 37,000 in 2001; however it needs to be seen as a sub-centre and should be enhanced with regard to the required capacity for administrative and urban services.

(3) Long-Term Development Goals

a) Target Year

Target: Twenty Years (2025)

b) Development Goals

The major goal to be achieved in this development phase is to consolidate the different parts of this wide area and to establish the area as a gateway of Eastern India as well as the South Asia sub-region. Another goal is to maintain the active metropolitan area of Kolkata such that it is capable of hosting the economic activities that shall take place in and around Kolkata, including the West Bengal Southern Corridor region. Further strengthening this area will be the major theme for the long-term development.

c) Major Infrastructure Development

The focus on infrastructure development shall also focus on the remedial measures required to maintain and enhance the urban functions of Kolkata. For that purpose, the ring road around Kolkata shall be a necessity. In order to complete the ring road, a missing link will need to be completed that will comprise the southern part of Kolkata, connecting NH6 near Uluberia and the Southern and Eastern Expressway at a point south of Kolkata.

In order for Kolkata's function as the regional hub to be strengthened for Eastern India, the role of West Bengal with regards to freight transport needs to be redefined and upgraded. With a deep seaport that could accommodate large container vessels, considerations will have to be made as to the introduction of multi-modal high speed transport system encompassing the sea transport and surface transport by rail and track, and effectively and seamlessly combining these services. An inland container depot at the fringe of the metropolis will also need to be considered, in order to reduce the burden of freight transport through the inner city.

d) Major Industrial Development

Kolkata will have to make itself ready for the provision of high-tech and advance

technologies. Enhancing the existing Salt Lake/New Town area will be an effective option for this purpose. If the planned area is insufficient, a new location may be sought, probably in the eastern or southern part of Kolkata.

e) Major Urban Development

With the growth in the population level and economic activities, the urban structure of Kolkata will need to be renewed in a different light. Relocation of the public offices now plentiful in the inner city area, such as B.B.D Bagh, to suburban locations will need to be considered. Similarly, higher education institutions such as colleges and universities may also need to be relocated. Residential units in suburban locations will be more attractive to city dwellers in the future. Areas along the eastern and southern expressways will be a suitable location for a new town serving such a purpose.

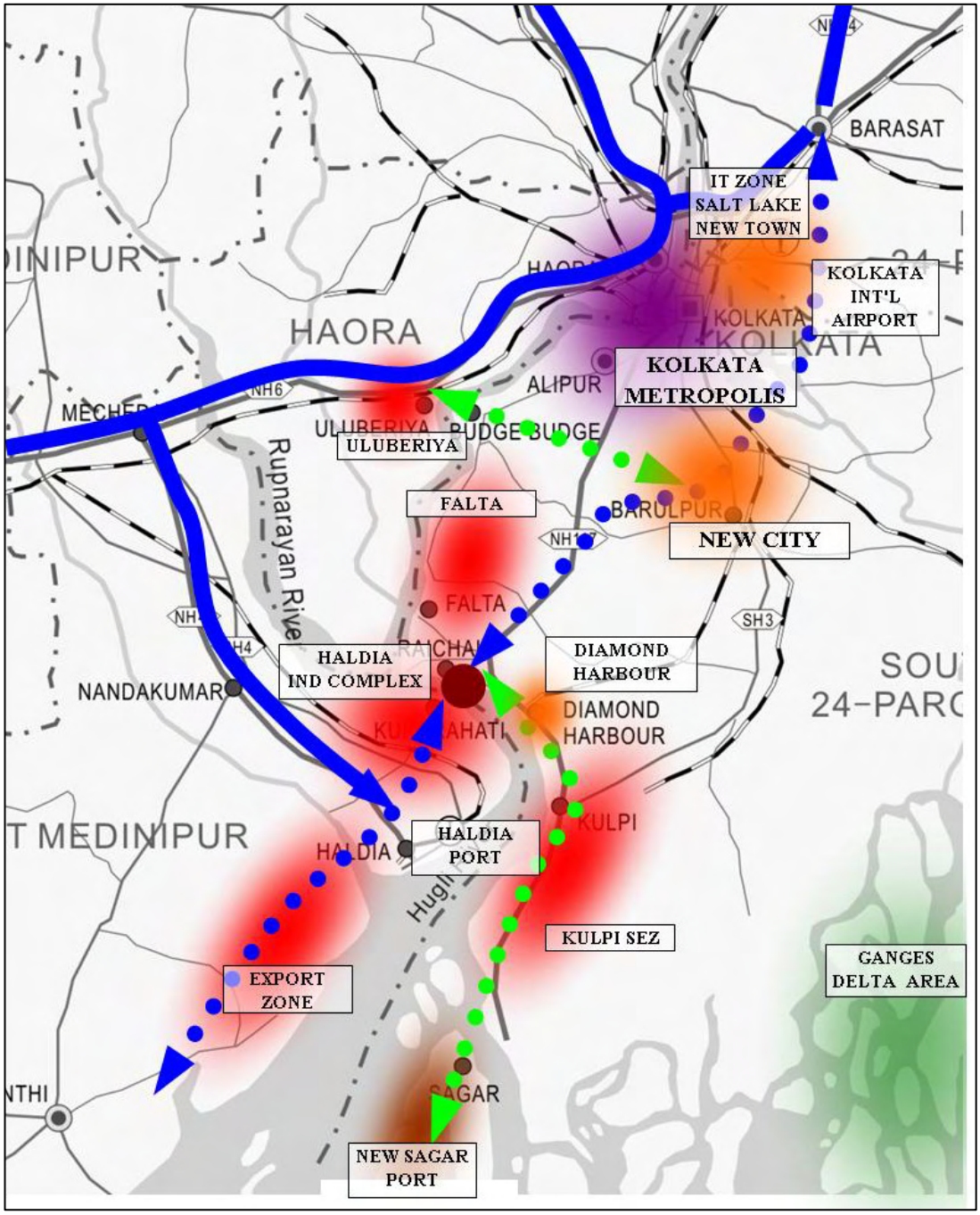


Figure 2.5.1 Regional Infrastructure and Industrial Development Strategy for West Bengal Southern Corridor - Export & Growth Zone

2.5.7 Socio-Economic Framework for West Bengal State

(1) Conditions for the Economic Framework

This subsection deals with the economic framework for the West Bengal State.

The following aspects summarize the basic conditions for setting up the economic framework.

a) Population

The latest population census was conducted in 2001, and this provides the basic population database. The future population by state is also published by the Office of the Registrar General and the Census Commissioner[15]. This includes a projection of the state population from 2001 through to 2026. The population projection for West Bengal State was adopted from this publication.

b) Gross and Net Domestic Product for the State

Estimates of the Gross State Domestic Product (GSDP) determined by the Ministry of Statistics and Programme Implementation are available in terms of the current prices and 1993-94 constant prices and are expressed in a time series for all of the states.

For the future projection, there are a few relevant projections available.

- The growth targets[16] in the 10th Five Year Plan 2002 – 2007 presume the real term growth rate for India during the planning period to be 8.0% and for West Bengal State 8.75%, which is 0.75% higher than the national target.
- The growth targets[17] in the 11th Five Year Plan 2007 – 2012 for India are reportedly set at 8.5%, which means the GSDP target for West Bengal State was estimated to be 9.25%.
- While there are no official projections after 2012, the real term growth targets are presumed to decline slightly.

There are Net State Domestic Product (NSDP) estimates for each state in terms of current prices and 1993-94 constant prices. The difference between the GSDP and NSDP is the consumption of the fixed asset portion. Future estimates of NSDP are carried out with a fixed factor for the GSDP.

[15] Population Projections for India and States 2001-2026, Report of the Technical Group on Population Projections Constituted by the National Commission on Population, May 2006, Office of Registrar General and Census Commissioner
[16] 10th Five Year Plan 2002 – 2007, Volume iii, State Plans, Trends Concerns and Strategies, Planning Commission, Government of India.
[17] As reported in the India Economic News, June 15, 2006

(2) Economic Framework for West Bengal

Based on the foregoing factors, the economic parameters for the West Bengal State for the planning period were established as given below.

Table 2.5.4 Projection of Gross and Net State Domestic Product for West Bengal State

Category	Price level	Unit	2001-02	2002-03	2003-04	2004-05	2005-06	2010-11	2015-16	2020-21	2025-26
GSDP	2003-04 Constant Price	Billion Rs.	1,647	1,765	1,897	2,063	2,244	3,452	5,191	7,628	10,950
	Growth rate	(%)		7.2%	7.5%	8.8%	8.8%	9.0%	8.5%	8.0%	7.5%
NSDP	2003-04 Constant Price	Billion Rs.	1,545	1,657	1,780	1,936	2,106	3,240	4,871	7,158	10,276
	Growth rate	(%)		7.2%	7.5%	8.8%	8.8%	9.0%	8.5%	8.0%	7.5%
Population			80,176	81,278	82,320	83,316	84,277	88,669	92,725	96,633	99,988
	Growth rate	(%)		1.4%	1.3%	1.2%	1.2%	1.0%	0.9%	0.8%	0.7%
Per Capita GSDP	2003-04 Constant Price	Rs.	20,539	21,720	23,048	24,765	26,624	38,936	55,985	78,934	109,518
	Growth rate	(%)		5.7%	6.1%	7.4%	7.5%	7.9%	7.5%	7.1%	6.8%
Per Capita NSDP	2003-04 Constant Price	Rs.	19,274	20,382	21,628	23,239	24,984	36,537	52,537	74,072	102,771
	Growth rate	(%)		5.7%	6.1%	7.4%	7.5%	7.9%	7.5%	7.1%	6.8%

Source:Data for Population by Census, GSDP by Ministry of Planning, NSDP by West Bengal Government
Future projections by JICA Study Team
Note: 1 Billion Rs. = 1,000 Million Rs.

The population growth in West Bengal is forecast at around 1% per annum or less in the future. The economic output was expressed in terms of GSDP and NSDP in 2003-04 constant prices, so as to exclude inflation.

According to the projection, the per capita GSDP of West Bengal is estimated to reach Rs.56,000 in 2015-16, or exceed US$1,000 based on the current exchange rate, and is projected to double to reach Rs.110,000 in 2025-26.

2.5.8 Socio-Economic Framework for the Industrial Sector

(1) NDDP for the Industrial Sector

Initially, the future Net District Domestic Products (NDDP) was forecast from statistical data for the historical NDDP and using the same growth rate as used for the Net State Domestic Products (NSDP). Subsequently, the contribution ratio of the manufacturing industry, which was derived from statistical data, was multiplied by the NDDP. The results are shown in **Table 2.5.5**.

The NDDP for the manufacturing industrial sector in the southern part of West Bengal accounts for more than 60% of the NDDP for the manufacturing industrial sector in the whole of West Bengal. The value for Kolkata is smaller than the other southern districts, as there are fewer medium and large industries in Kolkata compared to other districts. The contribution ratio of the manufacturing industry in Kolkata is 6%, while that in Haora is 24%. In the state capital, Kolkata, the following sectors are dominant: banking and insurance; real estate, ownership of dwelling and business service; and public administration.

Table 2.5.5 Forecast of NDDP for the Manufacturing Industrial Sector

At 2003-04 Constant Price
Unit: Billion Rs

Year	West Bengal	Southern Part of West Bengal						Other Districts
		24Prg(S)	24Prg(N)	Kolkata	Haora	Hugli	Medinipur	
2005-06	243.8	23.7	36.5	15.2	26.7	22.3	24.8	94.6
2010-11	375.0	36.5	56.2	23.4	41.1	34.2	38.2	145.5
2015-16	563.8	54.8	84.5	35.1	61.8	51.5	57.4	218.7
2020-21	828.5	80.5	124.2	51.6	90.8	75.7	84.3	321.4
2025-26	1,189.4	115.6	178.2	74.1	130.4	108.6	121.0	461.4

(2) Employment by Industrial Sector since 2005

The number of workers in the manufacturing industry was forecast based on the growth rate from the NDDP and statistic data and assuming the improvement of labour productivity. Subsequently, the increase from 2005 in the number of workers required was calculated as shown in **Table 2.5.6**.

Based on the benchmark year of 2005, approximately 1.16 million workers will be required in the manufacturing industry in West Bengal up until 2020 in order to achieve the forecast NSDP.

Table 2.5.6 Increase in the Number of Workers Required in the Manufacturing Industry

Unit: 1,000 workers

Year	West Bengal Total	Southern Part of West Bengal					Others
		24Prg(N&S)	Kolkata	Haora	Hugli	Medinipur	
2010	321	148	6	62	38	10	57
2015	708	326	14	136	83	22	126
2020	1,160	534	23	223	136	37	207
2025	1,670	769	33	321	196	53	298

(3) Increase in Utilised Land Area from 2005 by Industrial Sector

The area of land used by the manufacturing industry was forecast based on the labour volumes and the ratio of the land area to the number of workers that was estimated by segment. Subsequently, the increase from 2005 in the utilised land area was calculated as shown in **Table 2.5.7**. It must be noted that the values obtained are land areas for

manufacturing activities but do not include residential areas for factory workers or infrastructure for industrial development.

Based on the benchmark year of 2005, approximately 118,000 acres of land will be required for the manufacturing industry in West Bengal up to 2020 in order to achieve the forecasted NSDP.

Table 2.5.7 Increase in Land Area for the Manufacturing Industry

Unit: Acres

	West Bengal Total	Southern Part of West Bengal						Others
		24Prg (N&S)	Kolkata	Haora	Hugli	Medinipur	Sub-total	
2010	32,632	12,507	296	6,808	3,968	2,017	25,595	7,036
2015	71,932	27,570	652	15,007	8,747	4,445	56,421	15,511
2020	117,880	45,180	1,069	24,593	14,335	7,285	92,462	25,419
2025	169,757	65,064	1,539	35,416	20,643	10,491	133,152	36,605

2.6 Financial Aspects for Infrastructure Development

2.6.1 Type of Financing for Infrastructure Development

(1) Implementation within the Government Budget

The Government of India has an annual budget for the development of infrastructure, focusing mostly on infrastructure with national and/or inter-regional functions. The state governments have their annual budgets for infrastructure development for the specific state needs and interests. These development budgets cater to the basic infrastructure needs of the nation and the states, and are financed primarily by taxes.

In most of the non-revenue generating projects, such as national and state highways, these funds are often the only funding source. The five-year plans broadly show the allocation of funds by sector and sub-sector.

(2) Implementation using the International Soft Loan

There are financing sources available for selected economically and financially viable infrastructure development projects through multilateral and bilateral financing institutions. The multinational funding sources include the World Bank (IBRD) and the Asian Development Bank (ADB), and the representative bilateral funding source includes the Japan Bank of International Cooperation.

The financing conditions differ by institution and type of loan, but generally these

international financing institutions provide "soft loans" in which the loan conditions are better than those for commercial loans. These international financing institutions also provide technical assistance for project formulation and/or project implementation.

The following chart shows a typical scheme for a project financed by an international financing institution for a revenue generating project.

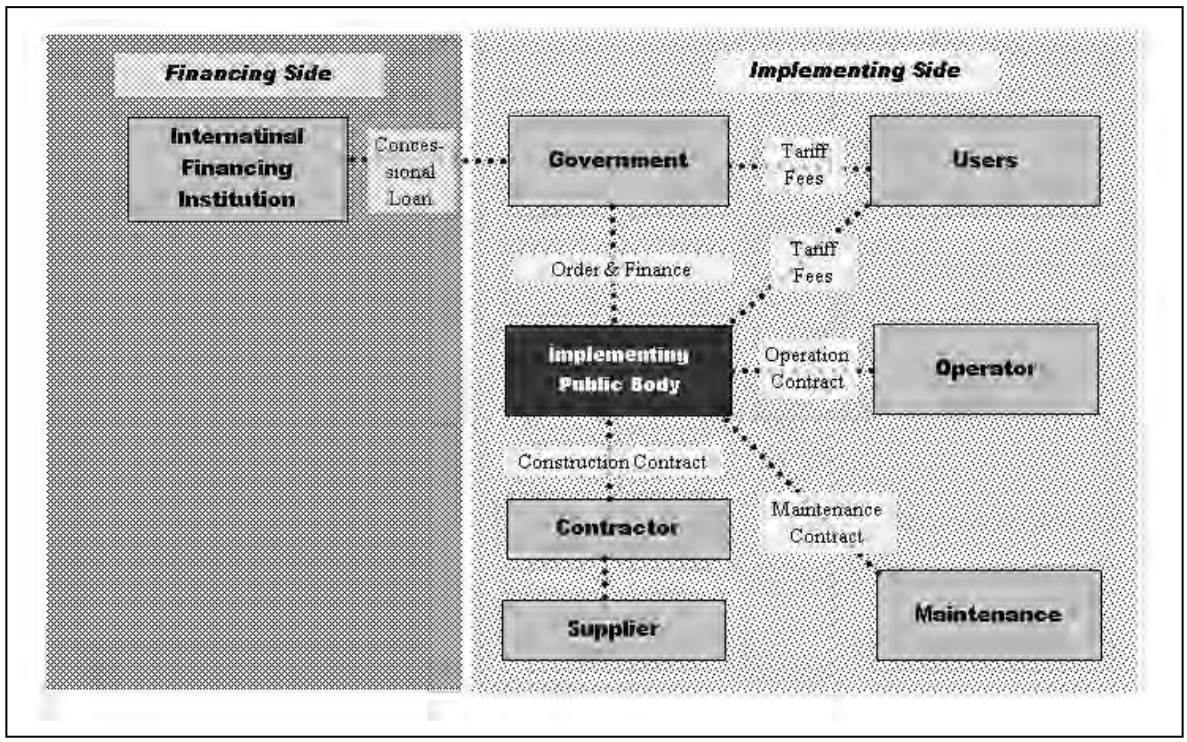


Figure 2.6.1 Typical Financing Scheme based on an International Soft Loan

(3) Implementation under a BOT Scheme

Occasionally, a revenue generating project, such as a toll bridge, an airport or a seaport could be implemented under a Build-Operate-and-Transfer (BOT[18]) scheme. This type of scheme is possible only if a reliable private firm (or firms) builds the required facility with the appropriate financing, operates the facility and provides the service to the users for a fixed period of time. In this case, some fees will be collected from users based on the agreed upon terms and conditions.

Utilizing the private sector finance and managerial capacity for infrastructure development and service provision is widely practiced. The United Kingdom has had a number of successful DBFO (Design-Build-Finance-and-Operate) road projects. From these examples it is widely accepted that efficiency and innovation in the private sector are the results of competition. For this reason the concessionaire for the DBFO scheme must be determined

[18] The same notion is sometimes referred to as Build-Own-Operate-and-Transfer (BOOT) scheme, but the essence is the same.

by an open, competitive tender. If private sector financing is to be efficient, it must be subject to real, fair (and thus transparent) competition. Cronyism and corruption in awarding the concession must be avoided, as they deter major companies from competing and thus increase costs for users.

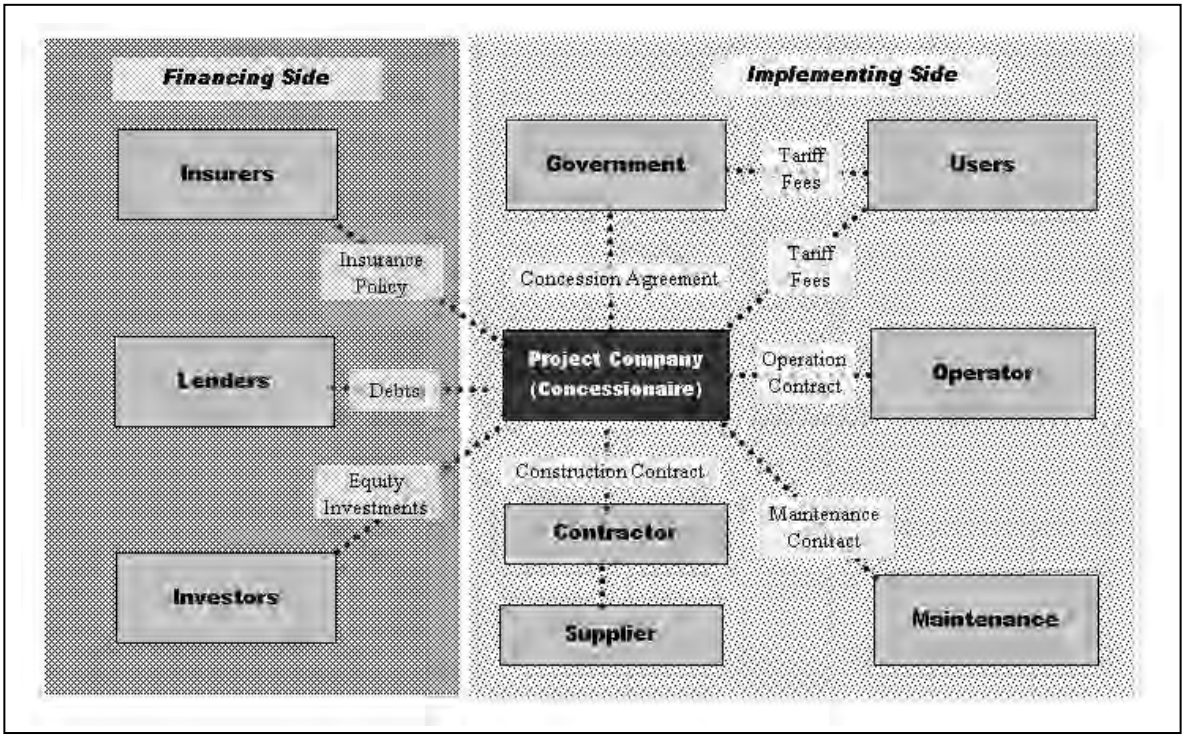


Figure 2.6.2 Typical Financing Scheme for a BOT Project

(4) Implementation of a Commercial Scheme

Infrastructure can also be developed as a part of a commercial development project. In such cases, the development costs are borne by the developer, who initiates and implements the project. While most of the local infrastructure necessary for the purpose of the commercial development shall be borne by the developer, part of the costs for regional infrastructure such as a segment of national or state roads could be requested to be shared by the public sector. Most of the land development projects, such as industrial estates or new town projects are of this type. Some commercial schemes can also be entrusted to public corporations.

(5) Viability Gap Financing

This is an emerging new scheme of funding BOT schemes that have a "viability gap". Some of the infrastructure projects have a long gestation period and do not entirely render sufficient revenue to repay the debt. The viability gap denotes this gap in the project financing scheme that needs to be filled with grant funding until it becomes commercially viable. The GOI has introduced viability gap financing in infrastructure projects such as

road, seaport, airport, power and water supply projects. This VGF scheme increases the applicability of PPP schemes in infrastructure development. For VGF, either the government budget or an international soft loan can be utilized.

2.6.2 Suitability of Financing

A development project can be classified by the need for the project. The project is either driven by public needs, or commercial needs. Public money should be spent on projects that meet public needs. Other projects that are driven by commercial needs, meaning that they are profit seeking, are suitable for commercial financing, such as a private bank loan.

Another line can be drawn to divide the projects into those that are revenue generating or non-revenue generating. Some of the public projects can be revenue generating – such as toll roads, airport or seaport projects where fees can be collected, or water and power projects where user fees can be collected.

These public projects that are revenue generating are often considered for PPP – Public Private Partnership schemes. Where the revenue accruing from the projects is not entirely sustaining the project financially, public money can be channelled towards the project to fill the gap. This is called viability gap financing. The general suitability range of different financing schemes is shown in the following chart relative to the nature of the projects and the type of needs.

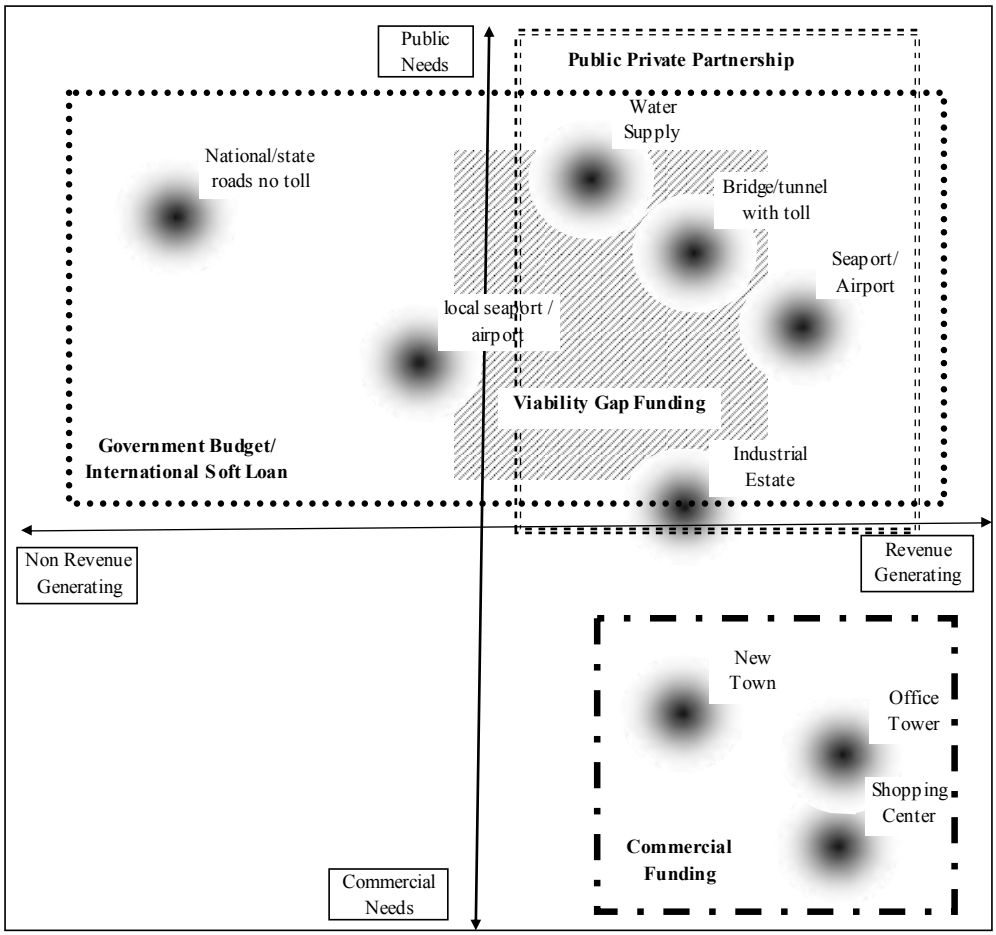


Figure 2.6.3 Type of Financing and Suitability for Infrastructure Projects

2.6.3 Principles for Public Projects

In order for public projects to be sustainable, some essential considerations are imperative in carrying out the projects with respect to public needs, as described below.

(1) Openness and Fairness of the Selection Procedure

The financing of public projects consumes the precious development resources that could otherwise be channelled into other development needs, and thus the process of carrying out public projects has to be open and fair. It is important that the essential information relating to the public projects is open to the public. Therefore, the tender information such as opportunities for potential contractors as well as selection results, need to be publicized for public projects. The same principle applies to PPP schemes, and in this case the information to be open to the public would include the contents of the PPP agreement documents including the concession agreement. Such agreements are often kept confidential between the parties concerned if the project is of a private/commercial nature. However, keeping the project documents confidential is not suitable for agreements

involving public bodies, such as central and/or local government, as the agreement shall impose an effect on the livelihood of the local people, and may use the development resources that belong to the public.

(2) Principle of Least Cost Burden

As is the case in public spending, the basic principle of public procurement is to choose the least cost offer for the specified quality of the goods or services to be procured. On the same token, for a PPP-type of contract, the net cost to the state has to be minimized. The net cost includes not only the public spending on the project, but also the lost revenue of land resources given to the concessionaire free of charge or at a sub-market price and foregone revenue in the form of fees (such as toll fees) that will be collected by the concessionaire.

(3) Principle of Competitiveness

Open competition for a project with public needs often provides the thrust for lowering the cost of the project. This is the reason why a competitive tender is often required by law in procuring the goods and services for public projects.

This same principle applies to PPP schemes such as BOT projects. In order to retain competitiveness in public project with PPP schemes, it is necessary that the public sector plays the role of the initiator of the project by setting the development target and outlining the scope of the services to be procured by the PPP scheme. Such a procurement plan could be publicized for potential tenderers so that they can develop their proposals with a financing scheme. The public body can then select the best proposal. It is improper, if not illegal, for the public body to choose a concessionaire based on a single bid without making an effort to have competitive bidders.