

FINAL REPORT

THE STUDY ON THE DEVELOPMENT PROJECT OF DHAKA AND NARAYANGANJ PORTS IN THE PEOPLE'S REPUBLIC OF BANGLADESH

VOLUME 1 MAIN REPORT

SEPTEMBER 1987

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OF
DHAKA AND NARAYANGANJ PORTS**

**IN
THE PEOPLE'S REPUBLIC OF BANGLADESH**

VOLUME 1 MAIN REPORT

SEPTEMBER 1987

国際協力事業団		
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PREFACE

In response to the request of the Government of the People's Republic of Bangladesh, the Japanese Government has decided to conduct a Study on the Development Project of Dhaka and Narayanganj Ports and entrusted the study to the Japan International Cooperation Agency (JICA).

The JICA sent to Bangladesh a survey team headed by Mr. Terumi IIJIMA, executive director of Overseas Coastal Area Development Institute of Japan (OCDI), four times in the period from January 1986 to February 1987.

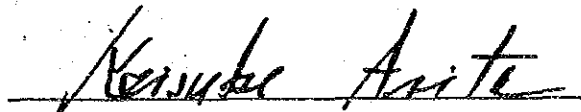
The team had discussions on the project with the officials concerned of the Bangladesh Government and conducted a field survey in the project area.

After the team returned to Japan, further studies were made and the present report has been prepared.

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

I wish to express my deep appreciation to the officials concerned of the Government of the People's Republic of Bangladesh for the close cooperation extended to the team.

September 1987

A handwritten signature in black ink, reading "Keisuke Arita", is written over a horizontal line.

Keisuke Arita

President

Japan International Cooperation
Agency

LETTER OF TRANSMITTAL

September 1987

Mr. Keisuke Arita
President
Japan International Cooperation Agency

Dear Sir:

It is my great pleasure to submit herewith the Report for the Study on the Development Project of Dhaka and Narayanganj Ports in the People's Republic of Bangladesh.

This report is the result of studies carried out by the Overseas Coastal Area Development Institute of Japan and Mitsui Consultant Ltd. at the request of the Japan International Cooperation Agency. The study team conducted the first field survey from January to March 1986 to collect a variety of data including data on natural conditions. The survey was followed by three other field surveys.

Based on the findings of these surveys as well as on the data and information collected and analyzed in Japan, we have evaluated the current situation of the Dhaka Metropolitan Area and formulated a development plan which has been carefully examined from the engineering, economic and financial viewpoints.

We believe that the Development Project of Dhaka and Narayanganj Ports as proposed in this report will provide an effective means of comprehensive development of inland transport in Bangladesh, a means which is feasible both economically and financially. We, therefore, earnestly hope that measures will be taken to implement this project as soon as possible.

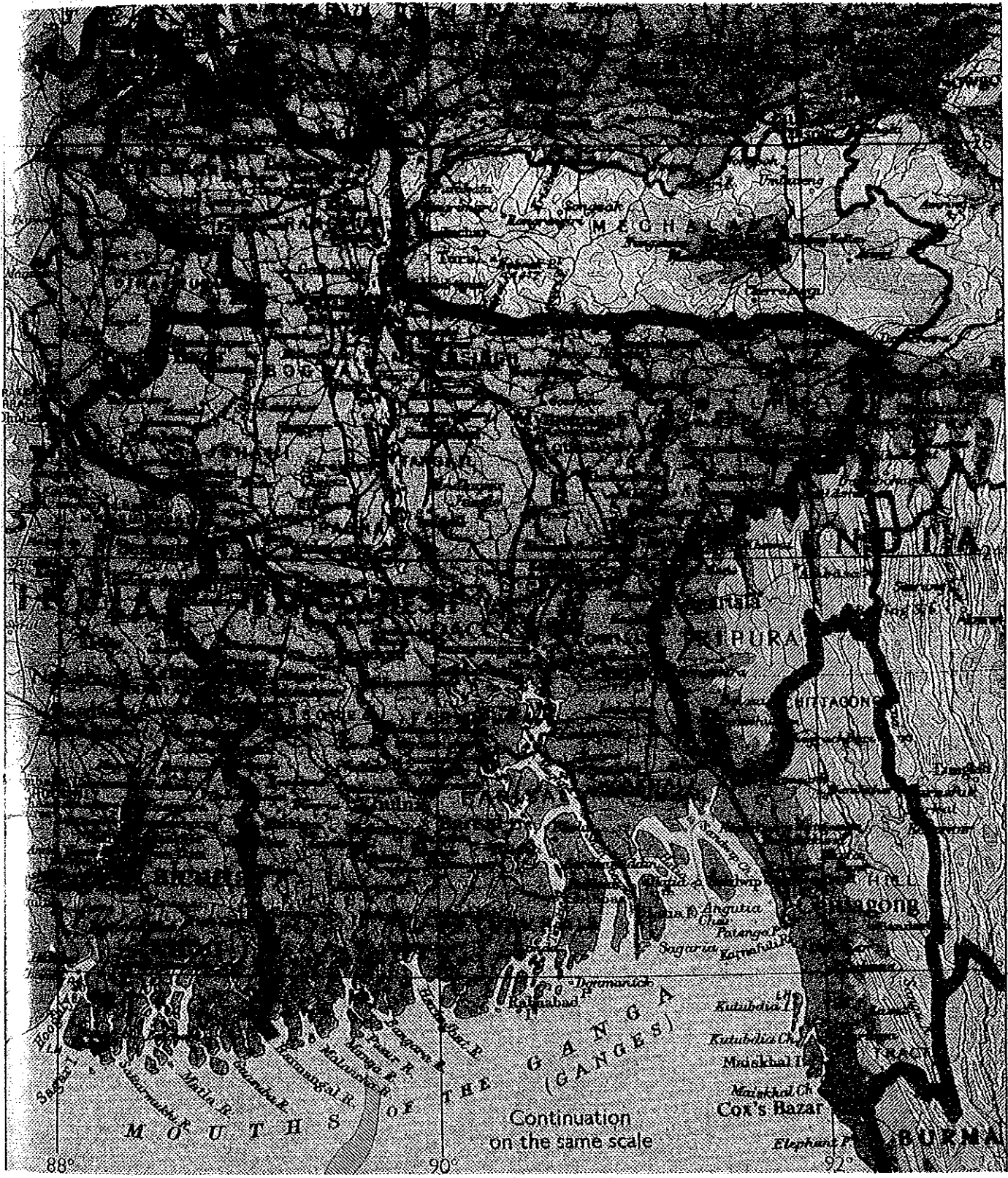
On behalf of the study team, let me express my heartfelt thanks to the Inland Water transport Authority and to the other related agencies of the Bangladesh Government for the generous cooperation, assistance and warm hospitality which were extended to the study team during their stay in Bangladesh.

Our thanks are also due to the Japan International Cooperation Agency, the Ministry of Foreign Affairs, the Ministry of Transport and Japanese Embassy in Dhaka for their valuable advice and support during the field surveys and the preparation of this report.

Your Faithfully,



Terumi Iijima
Head
Japanese Study Team for
the Development Project of
Dhaka and Narayanganj Ports
(Executive Director, the Overseas
Coastal Area Development Institute
of Japan)



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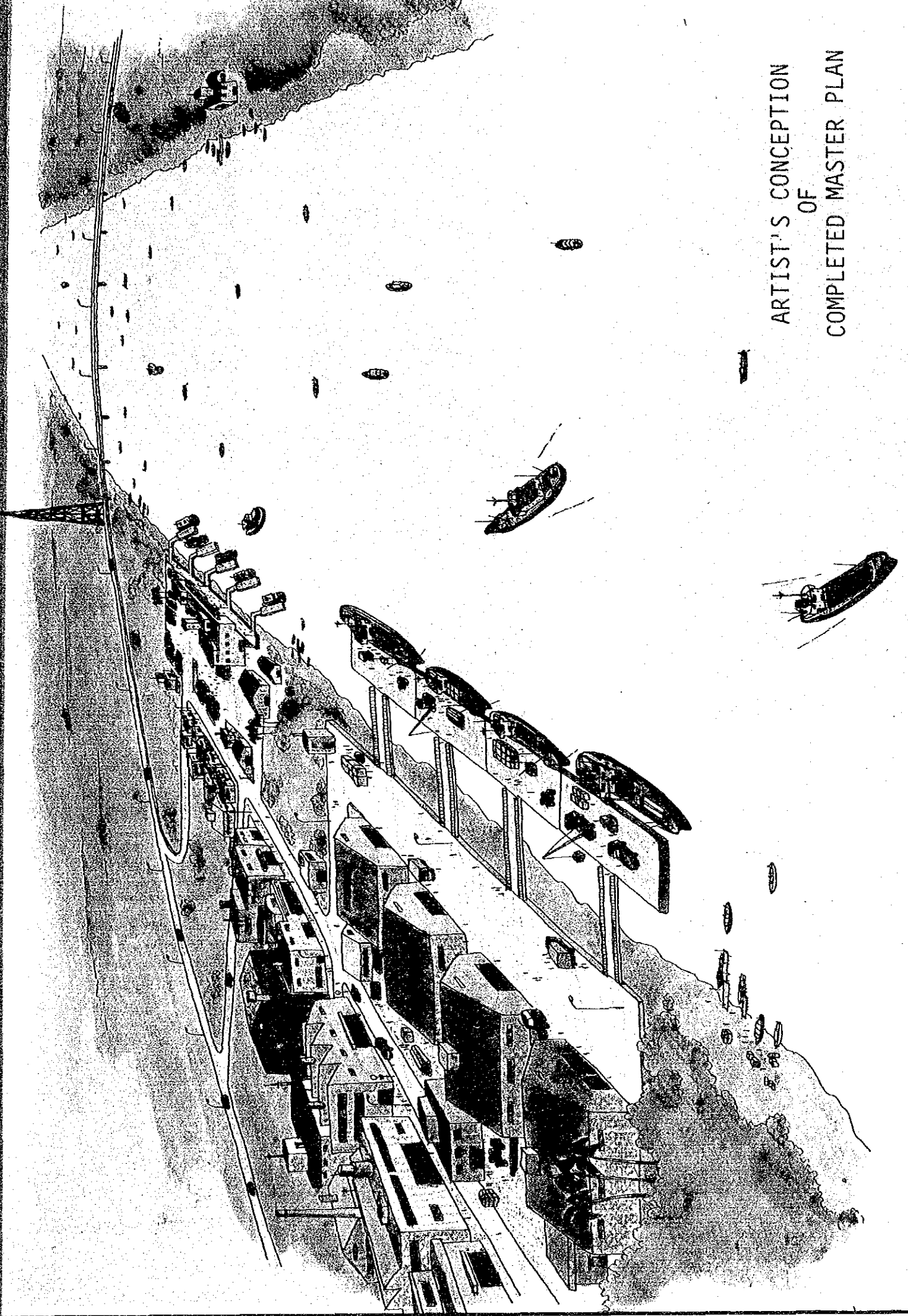
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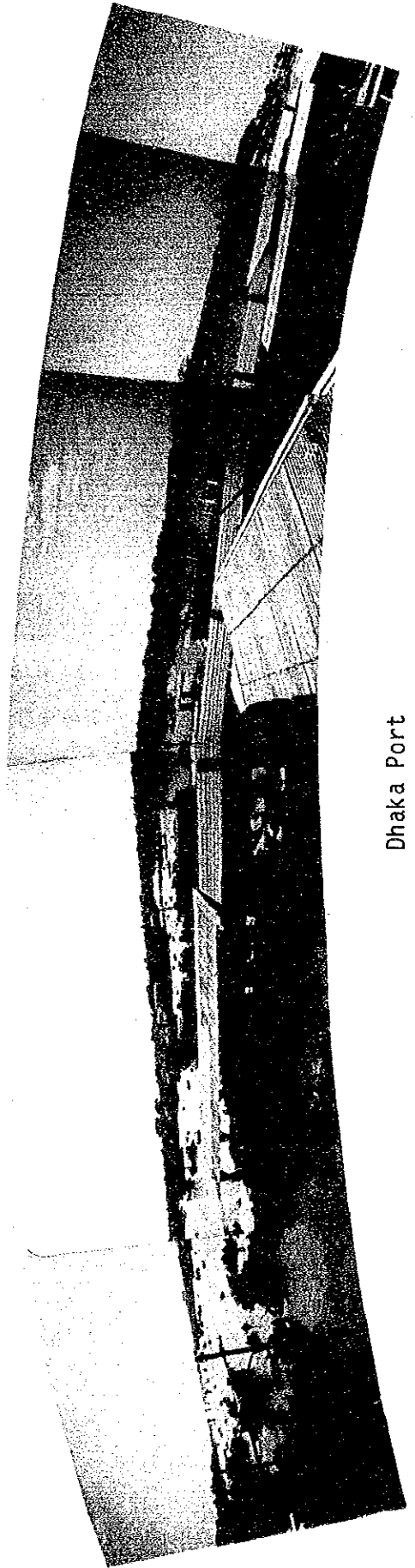
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ARTIST'S CONCEPTION
OF
COMPLETED MASTER PLAN





Dhaka Port

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CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS AND RECOMMENDATIONS

1. Necessity for the Development of Dhaka and Narayanganj Ports

Dhaka and Narayanganj Ports play a very important role in supporting the national economic activities, and especially the economy of the Dhaka Metropolitan Area which is the largest urban center in Bangladesh.

But the ports are suffering from various problems such as the shortage of facilities to adequately handle the large cargo volume and traffic congestion of access transportation. Further, the Buriganga River Bridge is expected to be constructed in 1990 and the coasters which presently use the port facilities at Bandamtali, which is the main area at Dhaka Port, may be unable to use these facilities thereafter because of the restriction of the bridge clearance.

Under these circumstances, it is important to accelerate the development of both ports to ensure continued smooth port functions, to strengthen the distribution functions and to harmonize with the entire urban area.

2. Master Plan

The Master Plan is formulated with the target year of 2005. The cargo volume expected for both ports is estimated as about 2,750 thousand tons (excluding the cargoes for the private jetties) considering national and related development plans and the trend of the socio-economic activities in the ports' hinterland.

To meet the projected increase in cargo movement, the Master Plan proposes 17 new berths. Twelve of these berths are for general cargo and five are for container cargo to meet the progress of containerization of cargo through Chittagong and

Chalna Ports. Further, a passenger terminal exclusively for middle and long distance services is proposed to lessen the congestion of the terminal area and river traffic.

Naturally, the development of the ports must take place in conjunction with urban development plans. In this connection, the future change of the urban structure of the Dhaka and Narayanganj Metropolitan Area is examined and land use concepts for the areas around the ports are proposed in the Master Plan.

3. Short-term Development Plan

(1) Port Plan

The short-term development plan with 1995 as the target year is an effort to accommodate the cargo demand and to propose countermeasures against the navigational restriction of the Buriganga River Bridge. The volume of cargoes in the target year is about 1,704 thousand tons (excluding the cargoes for private jetties).

Facilities to be constructed under the short-term plan are four general cargo berths, four transit sheds and an access road.

(2) Construction Cost and Schedule

The construction cost is estimated at about 302 million taka (prices as of the middle of 1986). About 175 million taka of the cost, approximately 58%, are the foreign portion. The construction period is about three years excluding the survey and the detailed design.

(3) Economic Analysis

The Short-term Development Plan is evaluated using the Internal Rate of Return (IRR) which is calculated based on a cost-benefit analysis from the viewpoint of the national economy.

Benefits considered are the reductions in vessel waiting cost, cargo transportation cost, cargo handling cost, and damage and pilferage, while costs are the construction, handling equipment, maintenance, administrative and land costs. The internal rate of return, using a calculation period of 25 years, is 17.8%. This shows that the implementation of the Short-term Development Plan is feasible from the viewpoint of the national economy.

(4) Financial Analysis

The revenue items are the berthing charges, the landing and shipping charges, the storage charges and the road charges. The expenditure items are the wages and salaries, the administration cost and the repair/maintenance cost. These revenues can more than compensate for these expenditure. However, the surplus is only enough to cover about 20% of the total capital investment. Therefore, considering the economic feasibility of the project, it is important to make some financial measures to provide the necessary capital investment for the Short-term Development Plan.

4. Recommendations

Judging from the above, it is concluded that the Short-term Development Plan with the target year of 1995 is feasible and should be implemented. Planning, fund raising, detailed design and construction of this project will be conducted in accordance with the plans presented in this report. The recommendations below concern various matters the Study Team noticed while conducting this study and drafting the plans.

(1) The Master Plan (target year 2005) was formulated based on the socio-economic frame of "The Third Five Year Plan 1985-90" and other related plans. However, the economy is subject to constant flux, and the demand at the ports is greatly influenced by changes in the domestic and world economy. Before the Master Plan aiming at the year 2005 is put into practice, it should be carefully reviewed in the light of regional and national economic

development including the effects of the port development on the hinterland after the implementation of the Short-term Plan.

(2) The cargo volume at Dhaka and Narayanganj Ports is expected to increase along with the development of national and regional economic activities. On the other hand, as the existing port facilities are not satisfactory and the clearance of the Buriganga River Bridge will restrict vessel navigation, the existing port facilities at Badamtali should be relocated to the area downstream of the Bridge. Thus, it is important to implement the Short-term Development Plan at the earliest possible time.

(3) The Short-term Development Plan comprises construction within the river port where work will be restricted in many ways. Further, the construction work of the Buriganga River Bridge will be executed at the same time as the port construction. Thus, difficulties are expected to arise in the port operation and construction. Particularly during the construction period the local port authority, port users and construction planners must always coordinate their plans to ensure that the construction works do not hinder regular port operations.

(4) The area of the topographical survey conducted by the Study Team does not cover the entire construction area for the proposed facilities, and this survey is not sufficient for the detailed engineering design. Accordingly, when executing the detailed design, it will be necessary to make an additional topographic survey of the entire proposed project area.

(5) The following proposals mentioned in this report must be fully implemented in order to ensure smooth port operations.

- * To introduce a cargo handling system using forklifts at the new general cargo berths.

- * To apply a new tariff system for the proposed transit

sheds to prevent misuse as warehouses by consignors and cargo handling contractor.

- * To operate the proposed new general cargo berths as priority berths for coasters.

(6) In order to promote the project effectively and to develop a comprehensive inland water transport system, the realization of the following matters are recommended:

- * To develop the new additional passenger pontoons proposed by BIWTA at Dhaka passenger terminal in accordance with BIWTA's schedule.
- * To establish and conduct a systematic and standardized traffic survey for the inland river ports including Dhaka and Narayanganj ports.
- * To implement a comprehensive study for the containerization transport taking the on-going studies being carried out by ADB and World Bank consultants and this study into consideration.

SUMMARY

SUMMARY

1. Introduction

1.1 Background

Dhaka Port is located at the edge of the City of Dhaka, the capital of Bangladesh, and faces the Buriganga River. It is the liveliest port in Bangladesh. The Dhaka District is a major political and economic center, and serves as a terminal for land transportation networks to the northwest and northeast regions where inland waterway transportation has not been greatly developed. The cargo handling volume at Dhaka port has been gradually increasing year after year. However, because of the scarcity of mooring facilities and backup areas, ships must wait for berths. Moreover the port is not efficiently connected with any railways or road networks, and existing access roads are jammed with trucks, cars and rickshaws. Also, a new bridge over the Buriganga River is expected to be constructed in 1990 at the center of the port, and its clearance will restrict ship navigation.

At Narayanganj Port, which has almost the same hinterland as Dhaka Port, a greater cargo volume is handled and more passengers get on and off vessels than at Dhaka. Although the importance of Dhaka Port has increased in recent years, Narayanganj Port is a key port which must support the metropolitan area activities together with Dhaka port. Appropriate measures should be taken to make the port function more smoothly and to facilitate further growth.

In this connection, the Government of Bangladesh has requested the Japanese Government to provide technical cooperation to assist with the development planning of the two ports.

1.2 Objectives of the Study

The objectives of the Study are to prepare Master Plans for Dhaka and Narayanganj ports for the period up to the year 2005, and further to determine the technical, economic and financial feasibility of the Short-term Plan to be formulated for the ports within the framework of the Master Plans. The target year for the Short-term Development Plan is up to the year 1995.

2. Outline of Bangladesh

2.1 Geography

Bangladesh is predominantly a deltaic region with an area of 144,000 sq.km divided by three major rivers. The area of the rivers accounts for 5.4% of the gross land area and about 12% of the actual land area is forested.

The climate of Bangladesh is a tropical climate with two distinct seasons: the dry season and the monsoon season. The average rainfall varies from 1100 mm to 3500 mm and about 80% of the total rainfall falls in the monsoon season.

Although the high rainfall and the enormous flow of the large rivers are sometimes considered a hinderance to development, this abundant water enables Bangladesh to produce many crops. One-third of the land available for cultivation has good soils and nearly four-fifths of the country is potentially suitable for intensive agriculture.

2.2 Demography

The total population of Bangladesh was estimated as 89.9 million persons with a population density 660 persons per sq.km in 1981. The annual growth rate of the population during the past decade was more than 2% with a high crude birth rate of 3.5% and a lowering crude death rate of 1.2%. As a result, a younger population structure has gradually become dominant which is reflected in the decreased labor force participant rate.

The population of the Dhaka district was 11.5% of the total population and the population density was twice the national average in 1981. Other urbanized districts also showed a high population density, and the country experienced continued internal migration toward urban areas.

2.3 Economic Profile

The Gross Domestic Product (GDP) of Bangladesh in 1983/84 is 349,922 million Taka, and the GDP per capita is estimated as 3,606 Taka. The economy of Bangladesh is dominated by the agricultural sector, although the share of the agricultural sector in GDP has steadily declined.

Since the inauguration of the New Industry Policy in 1982, a large number of nationalized enterprises have been turned over to the private sector, and private investment has been emphasized. The leading industrial products are jute goods. However, jute goods have been facing increasing competition from synthetics and other substitutes on the world market.

The balance of trade of Bangladesh has shown a rapidly growing deficit for more than a decade. The principal export earners, raw jute and jute goods, are suffering a serious setback on the international market due to competition from their synthetic substitutes. Furthermore, the high prices of machinery and capital goods and the increased food deficit make the balance of payments still worse.

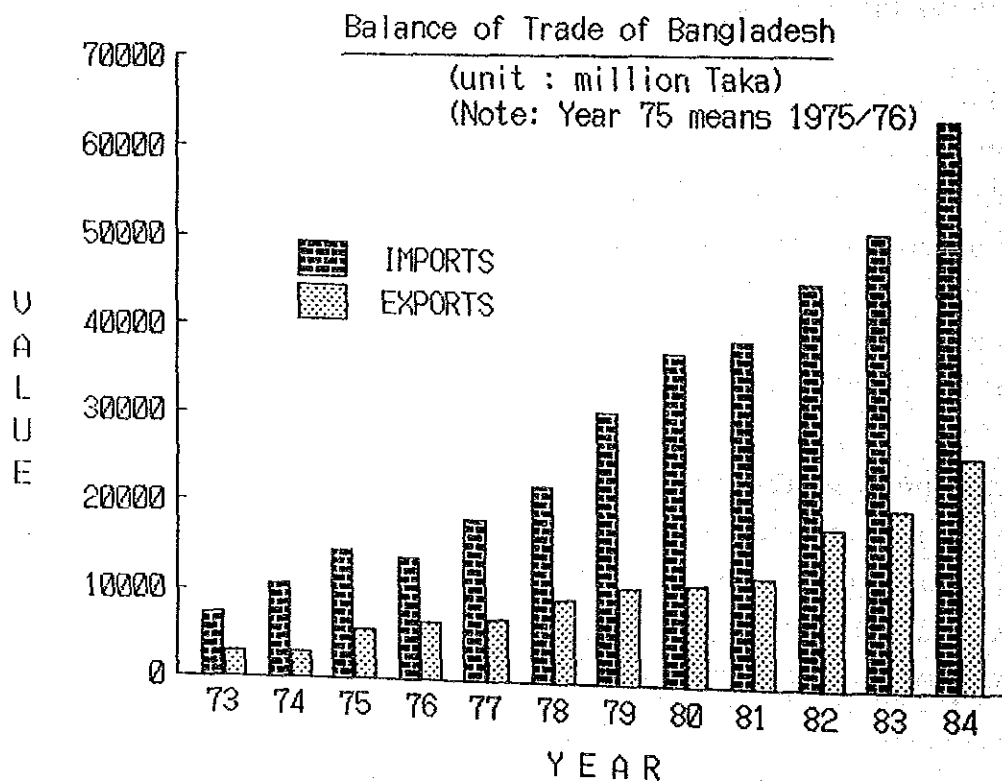


Fig. 2.3.1 Balance of Trade of Bangladesh

2.4 Transportation

The transport system of Bangladesh comprises railways, roads and inland water transport. According to the Statistical Yearbook, the total handled volume is 88.9 million tonnes in 1984/85. 77% of the total cargo is handled by road transport and about 20% is handled by inland water transport. The rest is handled by railways.

The inland waterways play an important role in the transportation of goods and passengers along the 13,623 km national river network. The organized water transport sector carried 48.7 million passengers and 3.8 million tonnes of cargo in 1982/83 on the main arteries to and from Dhaka, Chittagong, Barisal and Chalna. The unorganized water transport fleet is comprised of country boats providing a livelihood for a great number of small-scale operators.

The total length of roads under the administration of the R.H.D. is 8,515 km spread over the whole country. Although the road network is well distributed, due to a lack of bridges the roads are often discontinuous in river areas. Main arteries comprise Dhaka-Chittagong with some branches and roads servicing the large inland cities.

Bangladesh Railways has lines throughout the nation with a total rail length of 2,892 km as of the end of 1983/84. Most of the lines are metergauge. However, the majority of the track in the western part of the country is broad gauge, and the two types of gauge in the national railway system necessitate frequent transshipment of goods. Similar transshipment are involved at riverine points. The total number of passengers and total freight carried by the railways was 98.9 million persons and 2.9 million tonnes in 1983/84.

3. Outline of the Dhaka-Narayanganj Metropolitan Area

3.1 General Features

The Dhaka-Narayanganj Metropolitan Area (hereinafter referred to as "DNMA") is located at the center of the Dhaka Region, and its area is about 900 sq.km. From the standpoint of the administrative structure, DNMA includes the Dhaka Municipal Corporation, the Dhaka Cantonment Board, the Municipalities of Narayanganj and Tongi and surrounding thanas and upazilas.

Since 1971 when Bangladesh became independent, Dhaka has experienced a tremendous growth of population, business and industry, and the entire area from Narayanganj in the southeast to Tongi and Savar in the north and north-west has become urbanized.

3.2 Population

The population of DNMA increased from 2.9 million in 1974 to 4.2 million in 1981 at an annual growth rate of 5.61%. This high growth rate is due to the migration of many persons into Dhaka and Narayanganj.

Table 3.2.1 Population and Population Growth Rate of Bangladesh, Dhaka Region and DNMA, 1974 and 1981

	1974	1981	Annual Growth Rate (%)
Bangladesh	76,398	89,912	2.35
Dhaka Region	8,135	10,340	3.49
DNMA	2,870	4,206	5.61
Rest of D.R.	5,265	6,134	2.21
DNMA as a % of BD	3.8	4.7	
DNMA as a % of D.R.	35.3	40.7	

Source: BBS

The characteristics of the age-sex composition of DNMA are a high sex ratio (the number of males to 100 females) and a low dependency ratio (the ratio of children and elderly to working age population). This is because many single working-age males migrate into DNMA to seek better educational and employment opportunities.

The literacy rate of Bangladesh is very low, but in DNMA nearly 50% of the population are literate.

3.3 Economic Activity

The refined activity rate (percentage of the labour force population to the population 10 years and over) of males in DNMA is 73.5%, a little lower than the national level. This may be due to the higher rate of school attendance and the difficulty of absorbing marginal employees in the non-agricultural sectors. The female labour force participation in DNMA is relatively higher than the national average, but still very low.

In DNMA, 16% of the total labour force is engaged in manufacturing work and 77% is engaged in business and other tertiary sector work. Agricultural workers comprise only 7% of the total.

Table 3.3.1 Sectoral Employment by Sex, 1981

(percent)

Sector	Bangladesh			DNMA		
	Both Sexes	Male	Female	Both Sexes	Male	Female
Agriculture	61.3	63.1	28.0	7.3	7.6	3.2
Manufacturing	4.3	4.2	5.1	15.7	16.3	5.7
Others	34.4	32.7	66.9	77.0	76.1	91.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: 1981 Population Census

The gross regional product (GRP) of DNMA is estimated at about 25,000 million taka. The industrial production accounts for about one-third of the total GRP, and the other non-agricultural production accounts for about two-thirds. The GRP per capita is estimated at 5,100 taka.

Table 3.3.2 Estimated GRP of DNMA, 1983/84

(million Taka)

	Amount	Percent
Agriculture	1,000	4
Manufacturing	8,000	32
Others	16,000	64
Total	25,000	100

Source: Study Team Estimates

3.4 Urban Structure

The general land use layout and the main transportation network are shown in Fig. 3.4.1. Urban areas extend northwards from Dhaka. Many factories and godowns are located along the river ports of Dhaka and Narayanganj. Adjoining Dhaka Port, there is a commercial-residential quarter called old Dhaka. The detailed land use around Dhaka and Narayanganj ports is shown in Fig. 3.4.2 and Fig. 3.4.3. For analysis, forecasting and planning, DNMA is divided as shown in Fig. 3.4.4.

The population of DNMA in 1985 is estimated as 5.2 million persons. 3.9 million persons, 75% of the total population, are living in the Central and North Zone, while 1.3 million persons are living in the Port Related Zone.

As for the employment distribution, the Port Related Zone occupies 29% of the total employment, 4% more than its population share. 22% of the employment in the Port Related Zone is in the manufacturing sector. Thus, the Port Related Zone is highly industrialized.

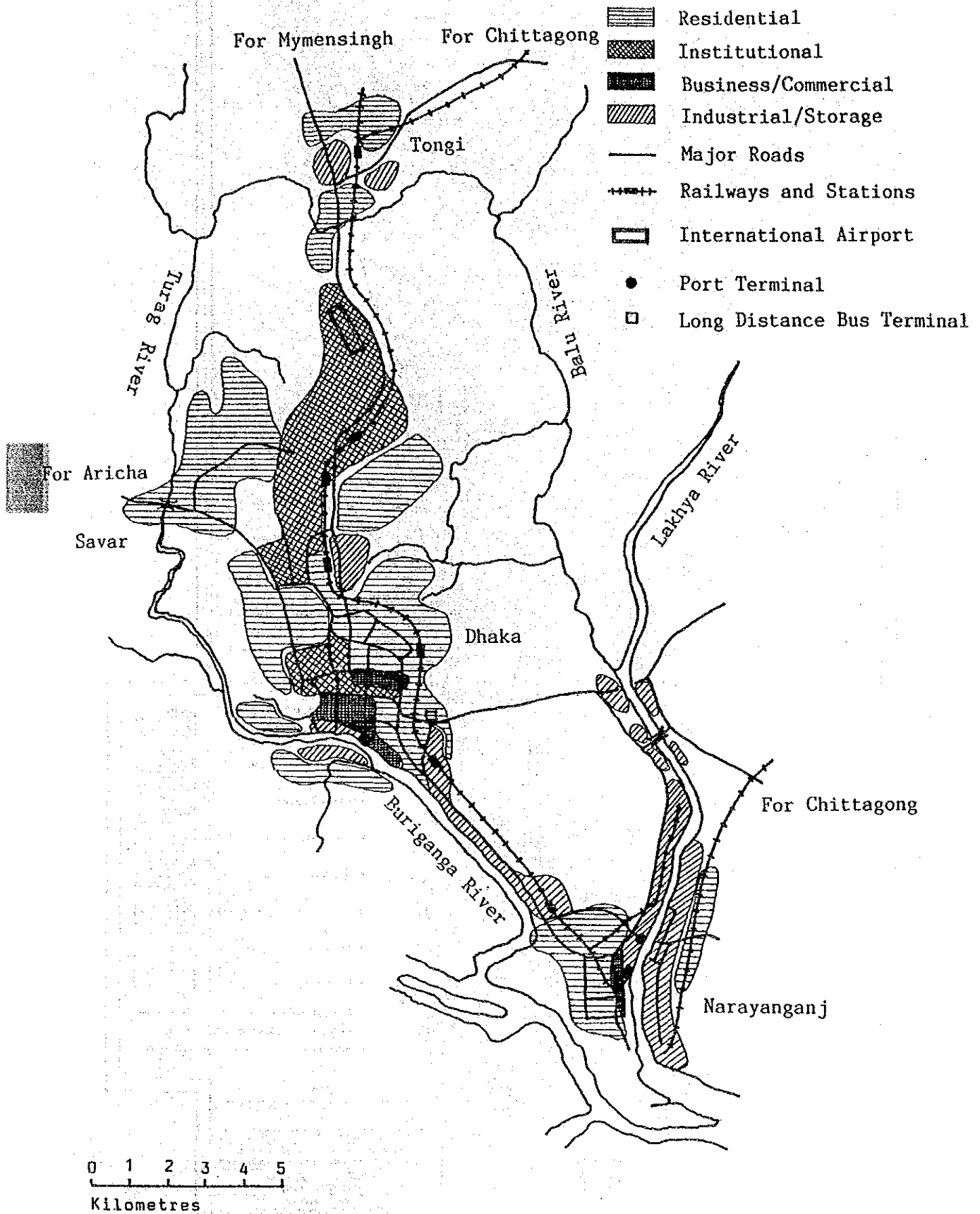


Fig. 3.4.1 Urban Land Use and Transportation Network of DNMA

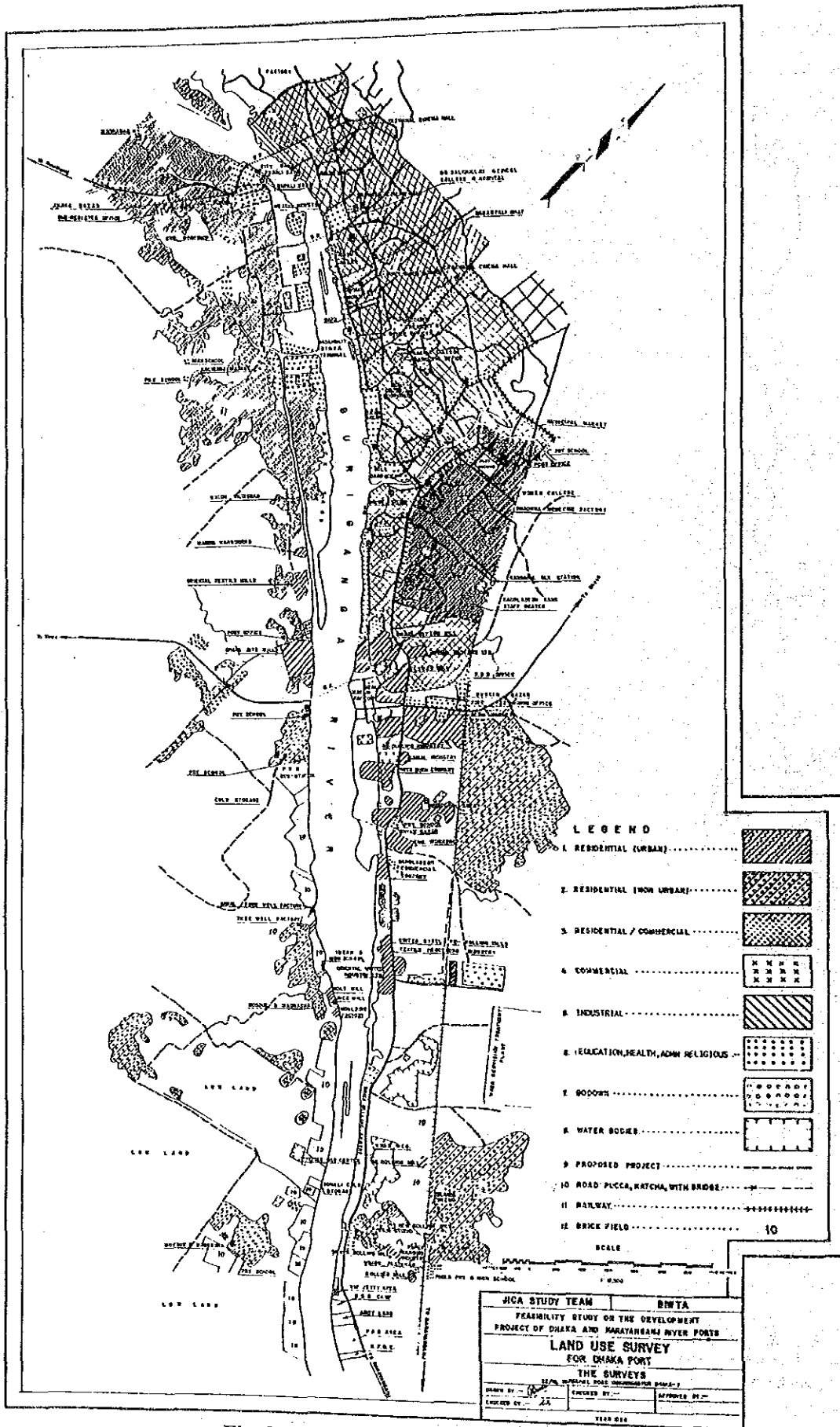


Fig. 3.4.2 Land Use around Dhaka Port

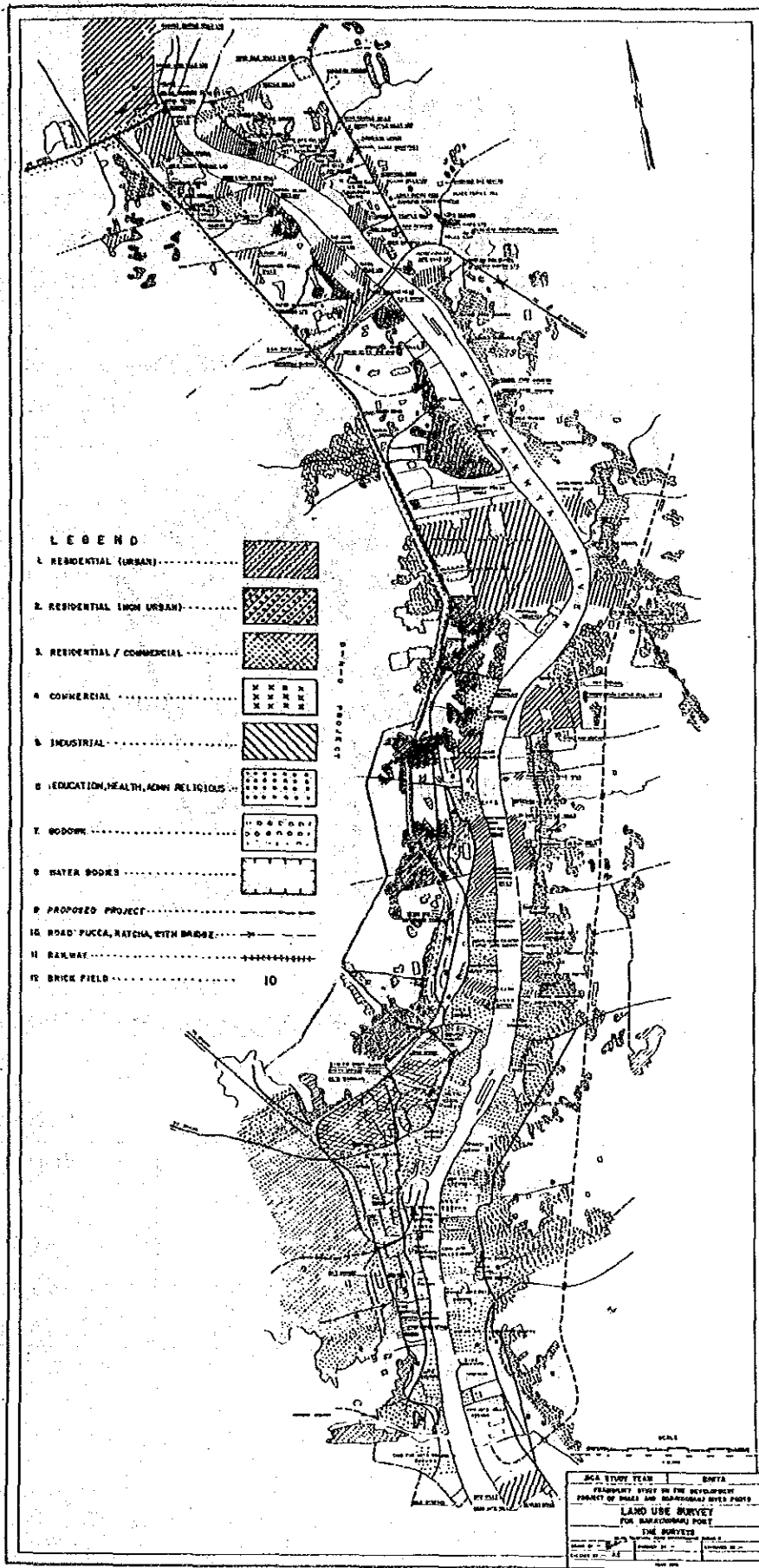


Fig. 3.4.3 Land Use around Narayanganj Port

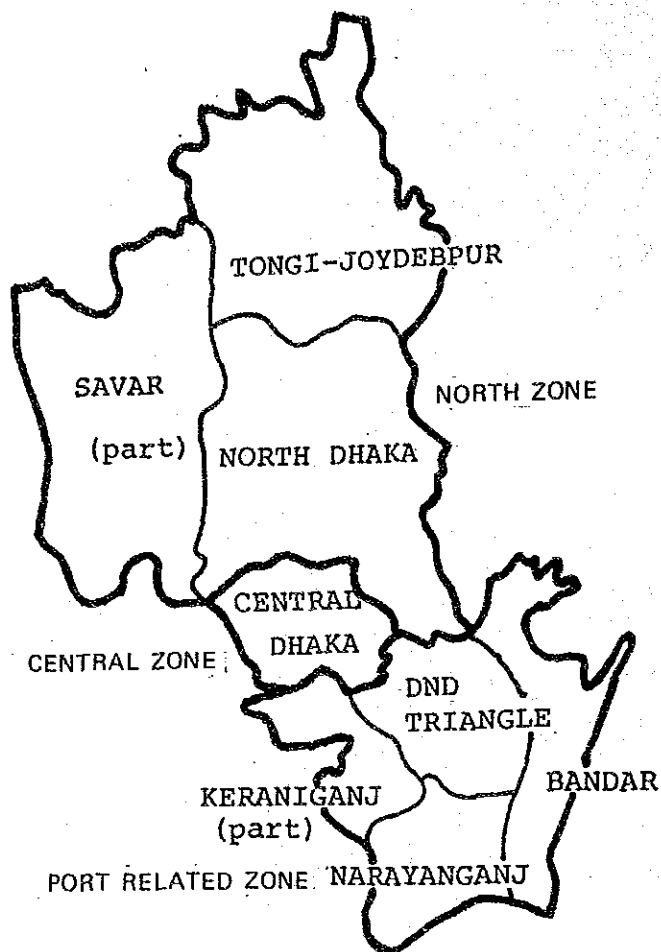


Fig. 3.4.4 Zone Division of DNMA

Table 3.4.1 Population and Employment Distribution by Zone, 1985

Zone	(thousand)	
	Population	Employment
Port Related Zone	1,260 (24.3)	505 (28.7)
Central Zone	2,470 (47.7)	840 (47.7)
North Zone	1,450 (28.0)	415 (23.6)
Total	5,180(100.0)	1,760(100.0)

Source: Study Team Estimates

4. Natural Conditions of Dhaka and Narayanganj Ports

4.1 Topographical Features

Dhaka city is located at the southern end of the central plateau at a ground elevation of 5 m to 7 m PWD, which is generally high enough to be free from annual flooding.

The Buriganga and Lakhya rivers flow southwards down along the edge of the plateau, forming a series of natural levees along the river banks.

Narayanganj City sits on sandy hills 6 m high formed by the Lakhya river. Most of the city does not usually become submerged by the annual flooding.

A typical soil profile of a natural levee (location B) indicates that the upper layer including the bank itself is a loose sand deposit (refer to Fig. 4.1.1). The lower stratum lying lower than 20 m deep is a compacted sand layer. The soil profile of location A indicates the same lower stratum sandy layer as at location B.

The soil in location G, located close to the confluence of the Dhaleswari and the Lakhya, consists of sandy soil only.

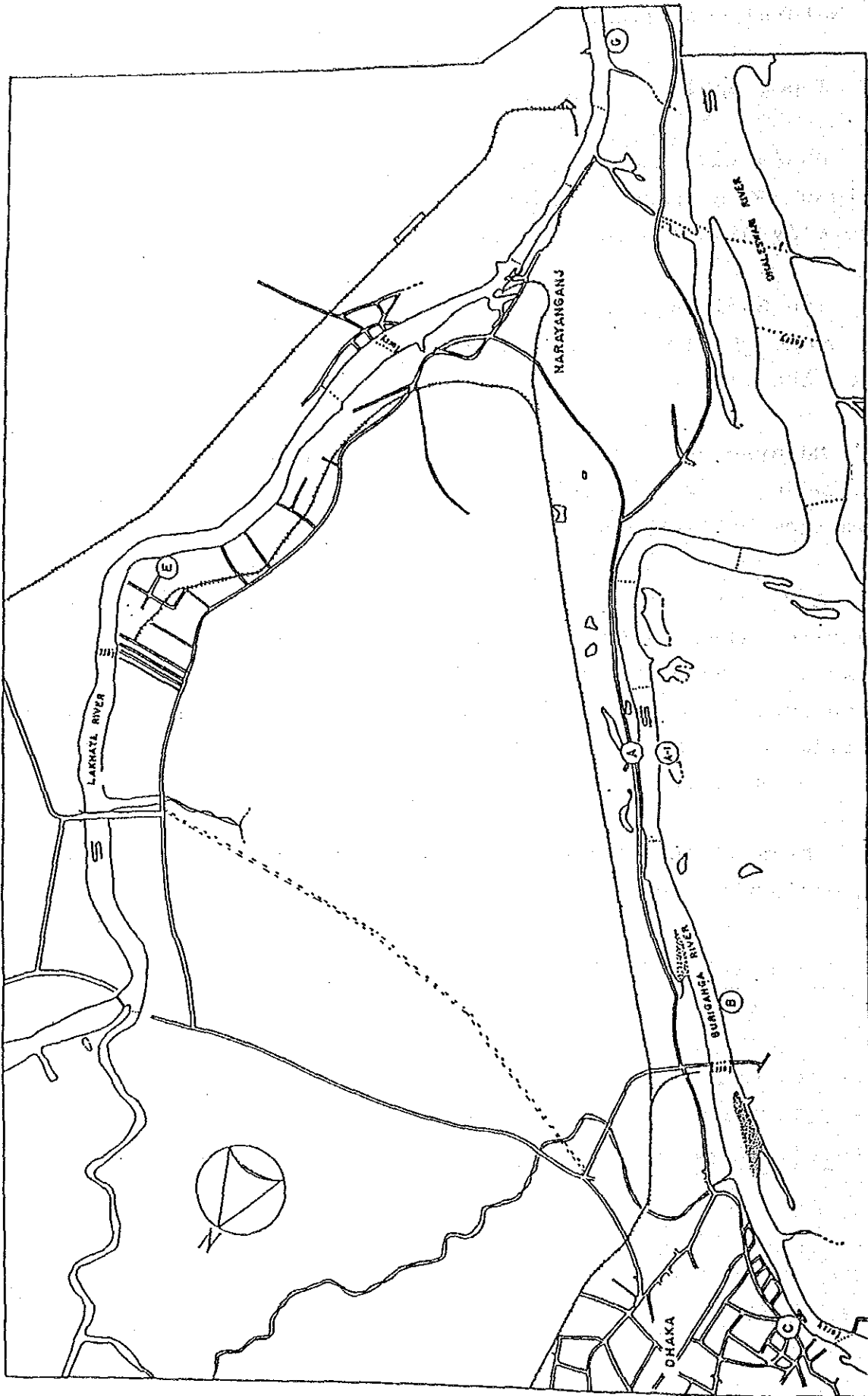


Fig. 4.1.1 River Bank Locations

4.2 Meteorological Features

The central region of Bangladesh has a typical subtropical monsoon climate. The period from November to February is a warm dry season with many clear days. The period from March to May is a hot season during which the temperature rises considerably. The period from June to October is the so-called monsoon season when the temperature drops slightly and the monsoon brings a great amount of rain from the Bay of Bengal.

4.3 River Features

The level of the river water in the port becomes gradually lower after the rainy season and reaches a low water level in the middle of November, with a tendency to drop still further until the beginning of March. It tends to increase slightly from mid-March onwards. The rate of increase becomes highest at the end of June and the water surface reaches its peak in August or September.

As for the annual maximum water level observed in Dhaka Port since 1951, the highest water level on record is 7.087 m PWD on August 22, 1955 and the lowest annual high is 5.25 m PWD recorded on August 22, 1978. The middle value is 5.93 m. There is some variation in the flood season, but fluctuation at this time is generally regular.

Dhaka port extends along the left bank of the Buriganga river over 10 km, and the main port facilities are concentrated in the northern part, that is, in the areas adjoining Old Dhaka.

The Buriganga river turns its flowing course sharply in the northern part of the port area, meanders very slightly, and then turns course again very sharply at the south end of the port area.

The straight sections are flat and shallow. River cross

sections in bending parts are generally narrow in width and are deep.

Narayanganj port extends along both banks of the Lakhya river over 10 km or more. The main port facilities are concentrated on the west bank in the downstream part, but a grain silo and a power station are constructed upstream on the west bank. Refer to Table 4.3.1.

Table 4.3.1 River Cross Sections in Dhaka & Narayanganj Ports

Location		Distance (km)	Width of River (m)	Width of Channel (m)	Maximum Depth from S.L.W (m)
Dhaka Port	Fish Ghat	0	215	160	-10.5
	Badamtali	1.0	210	170	-13.0
	Wise Ghat	1.5	290	200	- 9.5
	Terminal	-	310	230	- 8.0
		2.0	345	220	- 5.5
	Mill Barrack	3.0	470	195	- 5.8
		4.0	425	135	- 4.3
	Postagola	4.5	440	160	- 5.8
	Power House	5.0	600	110	- 7.0
	Site B	5.5	560	250	- 7.0
		7.0	320	205	- 7.6
	Site A	7.5	280	190	- 8.8
	8.0	330	185	- 7.6	
	9.0	350	230	- 5.8	
Narayanganj Port	Site D	0	(400)	180	- 9.2
	Power Station	1	250	170	-10.7
		2	245	275	-11.0
	Site E	3	390	180	- 9.5
		4	(300)	120	-10.7
		5	220	150	-11.3
		6	345	205	- 7.9
	Dreger Base	7	330	165	- 7.3
		8	170	145	-17.4
	Terminal	9	(350)	150	-12.2
		10	255	170	- 9.8
Site G	11	320	185	- 8.2	

Parts of the port areas in both Dhaka and Narayanganj have been sounded at 5 year intervals since 1964.

Simply overlapping river cross sections sounded during 1965 to 1982 clearly shows the results of the IWTA dredging operations, especially in front of the Terminal and the adjoining area downstream as well as in the wide river bottom area from Postagola to Syampur.

If the dredging of shoals in the port area continues in the future, a bellowing effect on the river bottom will occur near the dredging site, but little siltation will occur in the port area.

Continuation of maintenance dredging by IWTA as at present will protect the port area from siltation.

The maximum value of current velocity in the dry season is 0.57 m/sec at the beginning of the flood tide. The river current changes direction and velocity according to periodic variations in the river water position.

The maximum value of current velocity observed in the flood season of 1984 is 1.26 m/sec. This takes place not at the peak of the water level, but slightly after the beginning of the rapid descent in water level.

4.4 Earthquakes

In Bangladesh during the last one hundred years, widespread earthquake damage was only caused by the great earthquake of 1897 which had its epicentral tract in the Shillong Plateau.

"The Committee of Experts on Earthquakes Hazard Minimization" published its final report in November 1979 with inclusion of the seismic zoning map of Bangladesh and

recommended methods of calculating the shear force at the base of buildings.

5. Port Activities at Dhaka and Narayanganj Ports

5.1 Management and Operations

- (1) Under Ordinance No. LXXV of 1958 the Bangladesh Inland Water Transport Authority was set up in November 1958 for the development, maintenance and control of inland water transport and of certain inland waterways in Bangladesh.
- (2) The BIWTA is semi-governmental body directly under the control of the Ministry of Ports, Shipping and IWT. There are 12 departments and one marine workshop in BIWTA as shown in the following diagram.

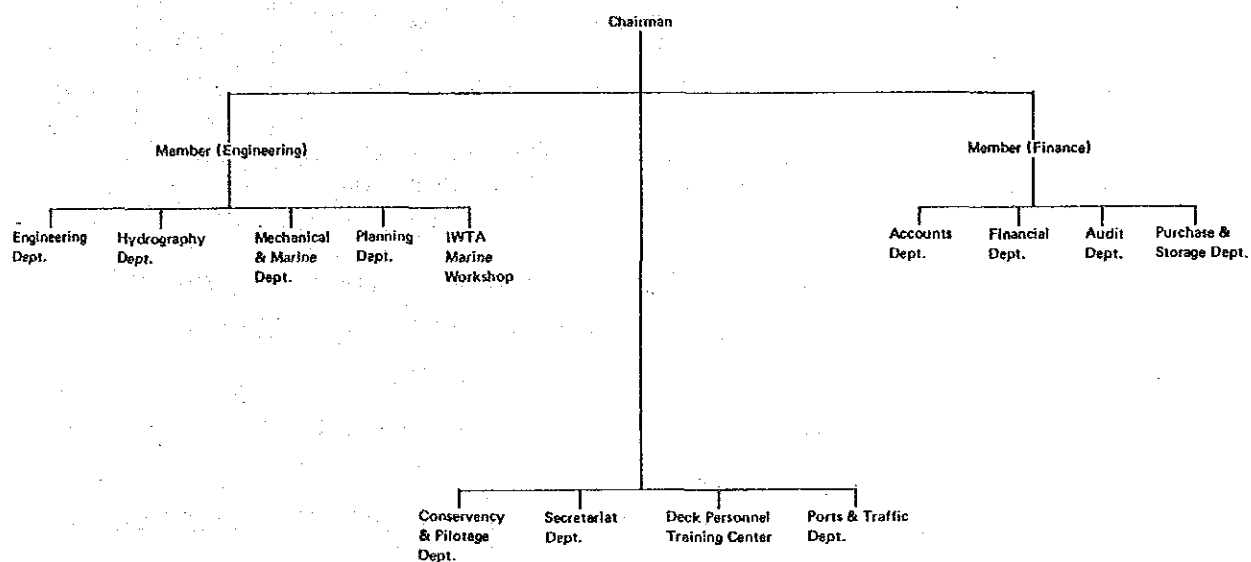


Fig. 5.1.1 Organization of BIWTA.

5.2 Vessels Engaged in Inland Water Transport

- (1) There are two categories of vessels engaged in inland water transport in Bangladesh. One is the "bay-crossing" type and the other is the "inland" type.

Table 5.2.1 Registered Vessels by Type
(cargo carrying vessels)

	Public Sector		Private Sector		Total	
	1978	1983	1978	1983	1978	1983
Bay Crossing						
Coaster	23	25	18	75	41	100
Tug	6	8	-	-	6	6
Flat	8	8	-	-	8	6
Barge	54	52	-	-	54	52
Tanker	16	14	7	16	23	30
Inland						
Cargo Vessel	9	6	350	556	359	562
Tug	50	58	83	123	133	181
Flat	51	38	52	52	103	90
Barge	249	186	392	510	641	696
Tanker	-	-	-	8	-	8

Source: BIWTA Annual Ports and Traffic Report

- (2) A general description of each vessel type is presented in "Transport of Containers in Bangladesh" as follows:

Coaster - the majority of these vessels range in size from 500 to 1,000 DWT.

Cargo vessel - size ranges from 250 to 400 DWT with those of 300 tons being the most numerous

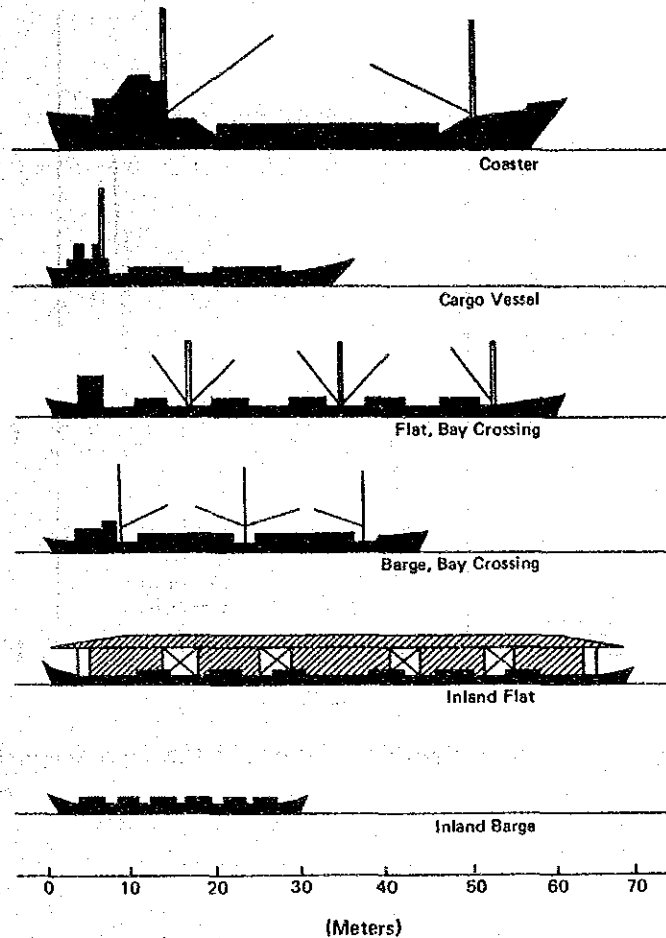
Flat, Bay crossing - cargo capacity of 550 tons

Barge, Bay crossing - average capacity of 300 tons in the older units, but now up to the 750 tons in the newer ones.

Flat, Inland - flats have up to 900 tons of cargo capacity

Barge, Inland - almost always in the 250 to 350 ton cargo capacity range.

Towing vessels - sea-going tugs of up to 1,000 BHP, pusher tugs of similar horsepower and smaller inland tugs of 500 BHP.



Source: Transport of Containers in Bangladesh

Fig. 5.2.1 Types of Cargo Carrying Vessels

5.3 Seaport Statistics

- (1) There are two seaports in Bangladesh: Chittagong and Chalna.

About 80% of the total cargo handling volume at the two ports is import cargo and the remaining 20% is export cargo.

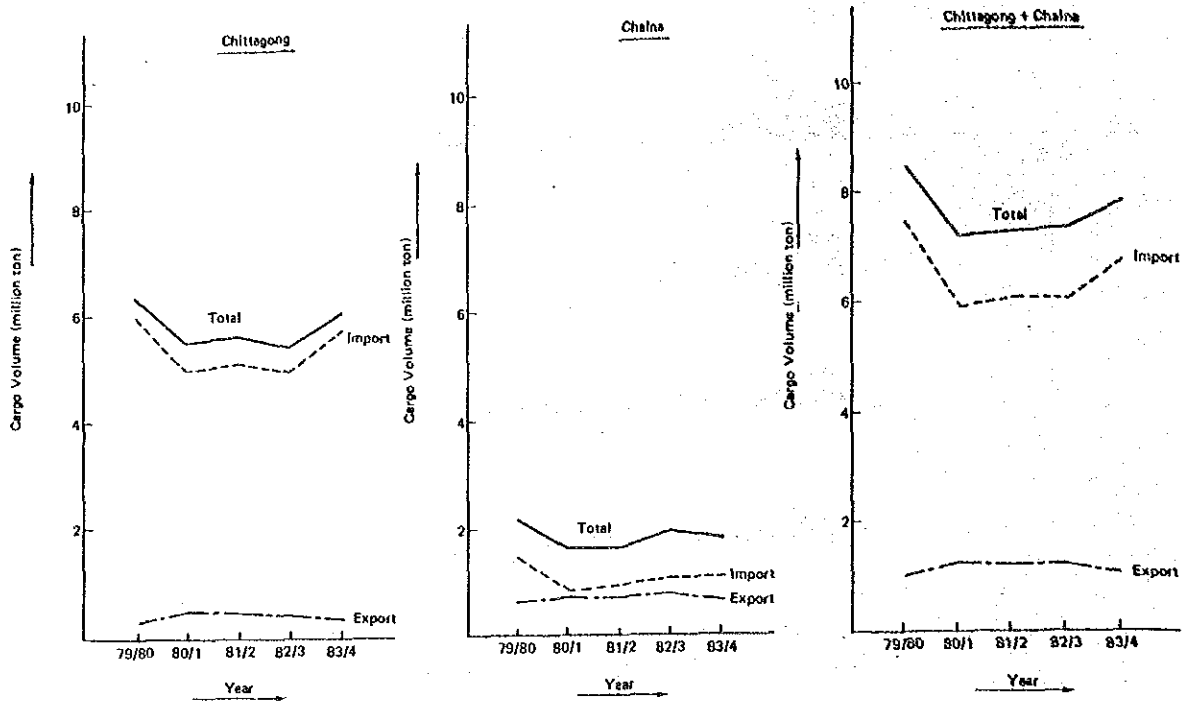


Fig. 5.3.1 Cargo Handling Volume at the Two Seaports

Source: Year Book Chittagong & Chalna Port

- (2) The major commodities of import cargo are food grains, cement, fertilizer, petroleum products and iron and steel, and the major commodities of export cargo are jute and jute goods.

5.4 Ports Cargo Statistics

- (1) There are three sets of cargo data at Dhaka and Narayanganj ports as shown in the following table.

Table 5.4.1 Cargo Handling Volume at Dhaka and Narayanganj Ports

(Unit: '000 tons)

Kind of Data	Dhaka	Narayanganj	Total	Remarks
TAPP (1982/83)	1,933.0	1,085.0	3,018.0	°Cargo volume at IWTA jetties, improvised facilities and private jetties
Annual Ports & Traffic Report (1982/83)	913.8	874.4	1,788.2	°Only Registered vessels °Excluding Country Boats
Study Team OD Survey (1986)	73.1 (877.2)	174.8 (2,097.6)	247.9 (2,974.8)	°One Month Survey (18 Feb.-19 Mar.1986) °Including Country Boats

Note: Figures in parentheses are on an annual basis.

Objectives and results of OD survey are presented in Appendix.

(2) The principal cargo movement during the one month traffic survey at Dhaka and Narayanganj ports is shown as follows:

Table 5.4.2 Principal Cargo Movement Based on the Field Traffic Survey

(Unit: tons)

(Dhaka)

Commodity	Incoming	Outgoing	Total
Cement	48,858	200	49,058
Fertilizer	6,971	-	6,971
Sugar	6,287	61	6,348
Wheat/Rice	3,186	563	3,749
Newsprint	2,914	12	2,926
Iron & Steel	927	169	1,096
Others	2,225	774	2,999
Total	71,368	1,779	73,147

(Narayanganj)

Commodity	Incoming	Outgoing	Total
Raw Jute	37,833	17,001	54,834
Wheat/Rice	35,925	13,077	49,002
Fertilizer	42,500	784	43,284
Jute goods	209	20,492	20,701
Salt	999	943	1,942
Sugar	591	499	1,090
Others	1,797	2,165	3,962
Total	119,854	54,961	174,815

Source: Field traffic survey of dry cargo movement by the study team. (18.2.1986 - 19.3.1986)

5.5 Passenger Statistics

- (1) Passenger service is separated into public sector and private sector service.

The number of vessels by sector is presented as follows:

Table 5.5.1 Number of Vessels by Sector

Type of Vessel	Private Sector		Public Sector	
	No. of Vessels	Capacity	No. of vessels	Capacity
Pass. (inland)	-	-	22	10,048
Pass. Vessel	95	27,036	-	-
Pass. Launch	1,230	100,996	-	-
Ferries	-	-	17	2,060
Sea Truck	-	-	2	260
Total	1,325	128,032	41	12,368

Source: Annual Ports & Traffic Report 1982/83

- (2) There are two sets of passenger data at Dhaka and Narayanganj ports.

Table 5.5.2 Passenger Traffic at Dhaka and Narayanganj Ports

(Unit: '000 persons)

Kind of Data	Dhaka	Narayanganj	Total	No. of Pass/day	Remarks
TAPP (1983/84)	15,467	5,516	20,983	57.5	°Source: BIWTA (1978/79-1983/84)
Study Team Survey(1986)	493 (11,247)	232 (5,293)	725 (16,540)	45.3	°during 16 day survey (27.Feb.-19.Mar. 1986)

Note: Figures in parentheses are on an annual basis.
Results of Study team survey is presented in Appendix.