

EAST PAKISTAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY

TRANSPORTATION PLANNING WITH REFERENCE TO REGIONAL DEVELOPMENT OF EAST PAKISTAN

A THESIS

SUBMITTED TO THE POST GRADUATE DEPARTMENT OF PHYSICAL PLANNING

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE

DEGREE OF

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BY

MOHAMMAD ANWAR HOSSAIN

EAST PAKISTAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY, Dacca.

1971

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## ABSTRACT

The purpose of this study is to find out the nature, extent, and effectiveness of the present transportation facilities, the need for improved modes of transportation, and the scope and features of a long-range programme of interrelated improvements by which the transportation system in East Pakistan would make maximum contribution to regional economic development of the province, appropriate to each stage of development and need. Since mobility is essential to almost everything that underdeveloped country like East Pakistan, is striving to accomplish, it follows that transportation is a factor in the success or failure of the entire development effort. Analysis of transportation potential made it mandatory that the planned growth of the economy of East Pakistan is pronounced. Economically remote resources can be rendered proximate by providing transportation.

To this end the improvement of the provincial balanced regional development and the requirement of transportation has been attempted to determine by the three forces which are (i) the growth and distribution of population, (ii) the growth of income pattern, and (iii) the shape of the urban growth. An overall scheme of regional transport system has been worked out towards this goal.

Accordingly, attempting to construct a regional integrating transportation system or to formulate a national coordinating transportation policy determine the improved transport investment decisions in the light of pertinent regional objectives and the growth rates in a developing economy like East Pakistan.

## TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	iii
LIST OF TABLES	vi
LIST OF FIGURES	viii
 CHAPTER	
I. INTRODUCTION	1
II. TRANSPORT REQUIREMENTS FOR EAST PAKISTAN	14
2.1 Population	15
2.1.1 Density and Distribution of Population in East Pakistan	15
2.1.2 Urban Growth in East Pakistan	19
2.1.3 Labour force and Employment	23
2.2 Gross Domestic Product	26
2.3 Transport Requirements	28
2.3.1 Waterways	37
2.3.2 Railways	38
2.3.3 Highways	40
2.4 Inter-modal Analysis of Transportation in East Pakistan	44
2.4.1 Transportation Plan for Food Grains in East Pakistan, 1971	45
III. TRANSPORT LOCATIONS IN EAST PAKISTAN	50
3.1 Waterways	50
3.1.1 East Pakistan Inland Water Transport Authority	52
3.1.2 Inadequate Facilities	52
3.1.3 Location of Inland Ports	53
3.1.4 Rural Water Transport	54
3.2 Railways	55

## TABLE OF CONTENTS

	Page
3.3 Highways	61
3.3.1 East Pakistan Road Transport Corporation	66
3.4 Airways	67
IV. TRANSPORT INVESTMENT IN EAST PAKISTAN	70
4.1 Cost Benefits	73
4.1.1 Economic Benefits	73
4.1.2 Access Benefits	75
4.1.3 Substitution Benefits	76
4.1.4 User Benefits	76
4.2 Costs	77
4.2.1 Measuring Economic Costs	77
4.2.2 Direct Operating Costs	79
4.3 Cost-Benefit Comparison	80
4.4 Transport Investment in East Pakistan	82
V. TRANSPORTATION AND REGIONAL DEVELOPMENT OF EAST PAKISTAN	94
5.1 Transportation Policy	97
VI. CONCLUDING REMARKS	101
BIBLIOGRAPHY	111

## LIST OF TABLES

Table	Page
II.1 Population of East Pakistan, 1981-1961	16
II.2 Projected Population of East Pakistan, 1961-1986	17
II.3 Population Density by District, 1961	18
II.4 Growth of Urban Population, 1901-1961	20
II.5 East Pakistan Projected Urban Growth, 1960-85	21
II.6 Projected Urban Population of Major Cities of East Pakistan, 1961-1986	22
II.7 Projected Size of Labour force, 1961-1986	23
II.8 Civilian Labour Force by Industry Group, 1961	24
II.9 Breakdown of Potential Labour force in 1961	24
II.10 Distribution of Labour Force by Economic Sector, 1961-1985	25
II.11 Gross Domestic Product by Economic Sector of Origin, 1961	26
II.12 Projected Gross Domestic Product at Factor Cost, 1961-1985	27
II.13 Projected Absorption of Labour Force and Gross Product per employed person, East Pakistan, 1961-1985	28
II.14 Percentage of Annual Growth of Output and Employment of Pakistan Perspective Plan, 1965-1985.	29
II.15 East Pakistan Non-agricultural Labour Productivity Projections, 1960-1985	30
II.16 Projected Annual Rates of Increase in East Pakistan	30
II.17 Food Consumption, 1961-1981	32
II.18 Requirements for non-food Products	33
II.19 Urban Generated Traffic Breakdown	35
II.20 Projected Traffic, 1961-1981	36
II.21 Projected I.M.T. Traffic Movement of Commodity from 1960-1980	37
II.22 Projected Passenger Traffic from 1960-1985	38



## LIST OF TABLES

	Page
II.23 Projected Passenger Traffic from 1960-1985	39
II.24 The Estimated Vehicles from 1960-1985	41
II.25 The Growth Projections of Population, gross product, percapita income, passenger & freight of East Pakistan from 1960-1980	43
II.26 The Zone wise monthly food grain of L.S.D. and the soils	46
II.27 Quantity to be transported from Chittagong & Chaina Ports	47
II.28 Zone wise food to be moved to L.S.D.s and their requirement of Transport by type	48
III.1 The Rail land ratio by district	57
III.2 Rail-Population ratio of East Pakistan	58
III.3 The highways of East Pakistan	62
III.4 The bus routes by district upto 1961	65
IV.1 Comparative Benefits Derivation Case I	80
IV.2 Comparative Benefits Derivation Case II	81
IV.3 Comparative Benefits Derivation of Case II and II	82
IV.4 Actual Expenditure made on Transport in East Pakistan	84
IV.5 Passengers Movements and Cargo Carried	85
IV.6 Breakdown of Actual Annual Expenditure on Transport in East Pakistan	86
IV.7 Road Mileage in Pakistan	89
IV.8 Types of Countries of theirrespective road mileage	90
IV.9 Expenditure Pattern	91

## LIST OF FIGURES

### Figure

1. Location Map of East Pakistan
2. Administrative Map of East Pakistan
- 2a. Topography of East Pakistan
- 2b. Mean Annual Rainfall of East Pakistan
3. Population of major Urban Centres and their transport link with the province
4. Major Power Projects of East Pakistan
5. Major Industrial Centres of East Pakistan
- 5a. Location of E.P.I.O.C. Projects
6. Population growth - East Pakistan 1961-1986
7. Population density per sq. mile 1961
8. Growth of cities and total population
9. Urban population projections of East Pakistan
10. Projected population growth of major cities in East Pakistan
11. Projections of gross product and capital formation 1960-61 to 1984-85
12. Per capita Income and percentage of labour force in agriculture East Pakistan and selected countries
13. Export & Import tonnage projections of Chittagong and Chalna ports
14. East Pakistan projected passenger traffic and freight traffic
15. Transportation plan for foodgrains from ports of Chittagong and Chalna to major zones
16. Distributions of food within zones
17. Availability of Trucks and Wagons of transport for food
- 17a. Availability of Bergers and Coasters

## LIST OF FIGURES

### Figure

18. Waterways of East Pakistan
19. Railways of East Pakistan 1968
20. Roads and Highways of East Pakistan 1968
21. East Pakistan E.P.R.T.C. Routes 1968
22. Airways of East Pakistan
23. Passenger car operating costs at various speed
- 23a. Measuring Benefits
24. Internal rate of return
25. A model of transportation network for regional development of East Pakistan
26. Integrating and Coordinating Functions of Transportation System

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CHAPTER I

INTRODUCTION

DEFINITION

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INTRODUCTION

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Transportation Planning and Regional development is a subject of considerable current interest and importance. Providing for the movement of people and goods within the region is one of the most complex and difficult problems. Regional transportation is, therefore, a region wide problem requiring region wide planning for its proper solution.

Transportation Problems in developing regions, like East Pakistan, of the world are receiving increasingly more attention from economists, engineers and regional planners. In planning for the development of most regions, the question usually arises as to what role transportation is to play. Generally, planners tend to attach considerable weight to the availability of adequate transportation facilities - to the extent that transportation is often credited with initiating development by itself.

There is little doubt, of course, that transportation or the lack of it can be an important factor in regional development. The role of transportation, however, is primarily a permissive one, the existence of adequate transport capacity being a necessary but not sufficient condition for stimulating economic activity. Generally, where the development effects of improvements in transport have been dramatic, the seeds of development already existed and the lack of adequate transportation was the one factor restraining development.

The extent to which transportation problems of undeveloped regions differ from those of more economically advanced regions depends largely on the relative importance attached to the various consequences of a decision to invest in a transportation facility. Highly developed economies are usually characterized by

dense transport networks. Thus, relatively speaking, the effect of one new addition to the transport system on the entire economy is likely to be less than in underdeveloped economies where one transport link may mean the difference between under capacity and over capitalisation in the transport sector. In addition, where the transport network is less dense, the effects of transport improvements on expanding the area of influence of the few welfare facilities that do exist is generally more pronounced.

Planning a complete system of regional transportation involves specification both of the types of transport facilities required and of the time at which such facilities should become available. In particular, a regional plan for transportation should specify :

- (a) The location of transport routes in space.
- (b) The physical description of these routes in terms of their type and standards.
- (c) The scheduling of investments in the transportation system over future time periods.
- (d) Methods of financing construction of the transportation system.
- (e) Methods of operating and maintaining the completed system.
- (f) The pricing policy to be employed in charging for transport services provided by the system.

Three steps are usually involved in this procedure. First, an accurate determination of the demand for transportation must be made. This involves determining the magnitude and character of both commodity flows and passenger movements. Traffic variation overtime, average shipment size, and the nature of the cargo involved are of primary concern in describing the characteristics of the commodity movements. The nature and magnitude of these anticipated commodities flows will be the major determinants of the transport plan, although some basic network of transportation facilities will

be dictated by the need to perform the minimum administrative, social, and military functions required of any responsible government. Second, the supply side of transportation must be investigated. Cost characteristics and differences in the quality of service for alternative modes of transportation and for alternative methods of production are of major concern here. There is, of course, considerable interaction between transport demand that eventually materializes. The final step involves evaluating alternative transport solutions, taking into account the availability of factor inputs needed for the supply of transportation associated with each alternative as well as interactions between supply and demand.

The material development of East Pakistan may be summed up in one word - the transport. An improved transport is certainly a prerequisite for any type of development. "The development of a country's transport system is both an index and a pre-requisite of its economic growth. There is a close relationship between the volume of transport and the level of economic activity because each depends upon the other; an adequate and efficient system of transport is essential to the success of any plan of economic development".<sup>1</sup>

There is a recognized interdependency between transportation and regional and national economic development. Production of crops in excess of what would be immediately and locally consumed, or manufacture of products in excess of local demands adds nothing to the economy unless these crops and products can be moved in an economical and timely manner to domestic or international markets. Similarly, fertilizers - seeds, raw materials and component parts, equipment and supplies must be transported to their areas of end use. Expansion of knowledge and unity of spirit in a country also

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1. The second 5 year plan (60 - 65), Pakistan, Chapter II, P.277

depend greatly on ready transportation and communications among the different sections of the country. Economical and timely movement of goods and persons requires roads, motor transport, rail roads, inland water ways and air transport facilities.

The five-Year Plans of Pakistan provided the correlation of transportation with other development programmes. The criteria of efficient use of scarce resources, to the extent that they can be applied quantitatively, should guide the selection of elements of the several programmes for priority. 1

Though it is frequently assumed that all transport improvements stimulate economic development, the sad truth is that some do, some do not, and that even some of those that do may not be economically justified in the sense that there may be better investment opportunities. Each project must therefore be investigated individually, and no helpful generalisations appear possible until more research shows that certain definite correlations do exist.

Before any transport improvement can be said to have stimulated economic development at all, a number of conditions must be met. The most important is showing that the economic development would not have taken place in any case without the transport improvement. A second is that the resources used in the new development would otherwise have remained unused or used less productively. Finally, it is essential that the economic activity stimulated does not replace equally productive activity which otherwise would have taken place.

Where transport is intended to open up new land for development, three types of situation may arise. In the first, the transport facility is an integral part of an agricultural, industrial or mining project. The second situation is one where

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1. Deptt. of the Army Corps of Engineers, Transportation Survey of East Pakistan, 1961  
Vol.1, P.2.



transport is clearly the only significant bottleneck to development and where all other requirements are already met. An example would be a road to connect an existing town and nearby fruit growing area, whose products are now being transported by animal or cart. Finally, there is the frequent case where transport is built into a new area, which, though promising, will not develop unless other investments and improvements are also made. Transport investments in this last group are rarely justified unless accompanied by the other improvements.

The relationship between transport and development is an area where only very little research has so far been made. But it is clear that if the main purpose of a transport facility is to stimulate economic development, greater efforts must be made to measure this benefit. And if the economic development can be achieved only if the transport improvement is supplemented by other investments, then these other measures become an essential condition of the project.

In planning for the over-all improvement of transportation as a vital segment of the economy of East Pakistan, it is assumed that transportation may provide goals and purpose. To a very great extent the economy of East Pakistan is agrarian in nature. Due to failure of agriculture to cope with the increasing growth of population, however, new resources upon which to build a broader economic base are being searched out and developed. After independence the Government of East Pakistan took steps to improve the well-being of the nation through over-all planning for the economic development of the country. This programme was initiated by First Five-Year Plan for the period ending 1 July, 1960. The Second and Third-Five Plans of Pakistan (1960-65 to 1965-70), have shown increasing rates of accomplishment including those in the transportation segment.

East Pakistan, a land of delicate beauty, is one of the two provinces of Pakistan. It lies roughly between  $20^{\circ} 15'$  and  $26^{\circ} 45'$  North Latitude and  $88^{\circ}$  and  $92^{\circ} 6'$  East Longitude. It has an area of 55,126 sq. miles. 1 The country is land locked in three sides while

1. Nafis Ahmad, An Economic Geography of East Pakistan (London: Oxford University Press, 1958) p.2.

the south is open to the world through the Bay of Bengal. Average east-west length is 220 miles and north-south 258 miles (Figs. 1 & 2).

It is almost an alluvial plain. The plain contains many well marked topographical features, formed by older alluvial deposits, which rise several feet above the dead flatness, and provide protection from the annual summer floods. These floods follow the melting of the snow on the Himalayan ranges, which accompanies the very heavy rainfall on these ranges. The province itself gets an average rainfall of 75 inches a year (Figs. 2a & 2b).

All this water is brought down to the Bay of Bengal by three main rivers, the Ganges, the Brahmaputra, and the Meghna. These three main rivers and their many branched interconnect East Pakistan in such a fashion as to form an effective navigational system.

The estimated population is 70 million in 1970. The man-land ratio in East Pakistan is non-economic relative to agriculture. According to the census of 1961, the per capita land is 0.69 acre, per family land consisting of six persons is 4.10 acre and available cultivable land is 2.5 acre. The estimated population in 1980 is 93 million and per capita land is calculated 0.38 acre and per family land is 2.30 acre.<sup>2</sup> The cultivated area of land available is 29000 square miles and the average farm size is 3.5 acre in East Pakistan as per the census of 1961. <sup>3</sup>

1. Government of Pakistan, Census of Pakistan, 1961 (Karachi : Manager of Government Publications)
2. An approach towards the formulation of a Physical Planning Strategy for East Pakistan (Dacca: E.P.G.P.)
3. Ibid p.14

LOCATION MAP, EAST PAKISTAN 1970

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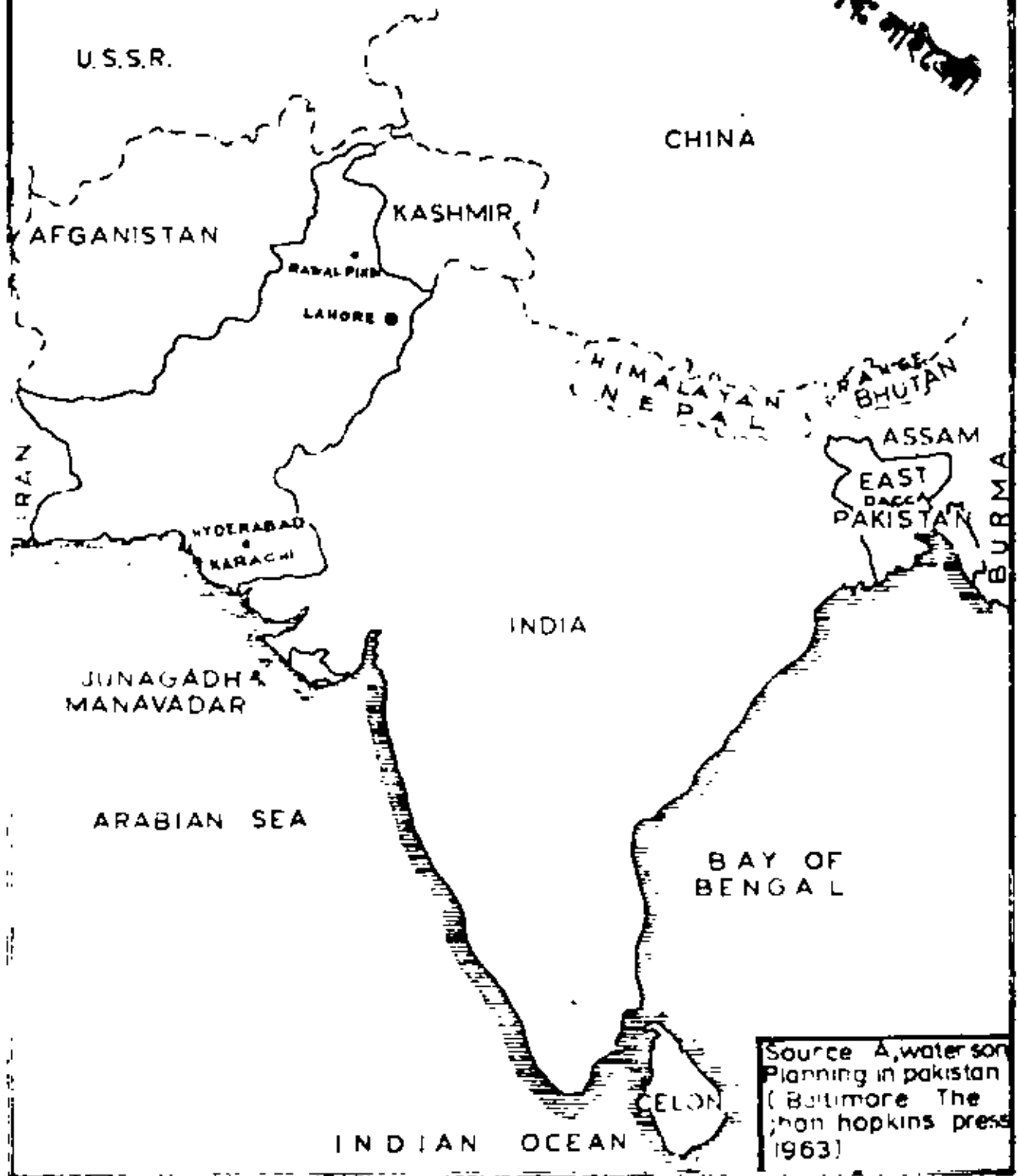


FIG. NO 1

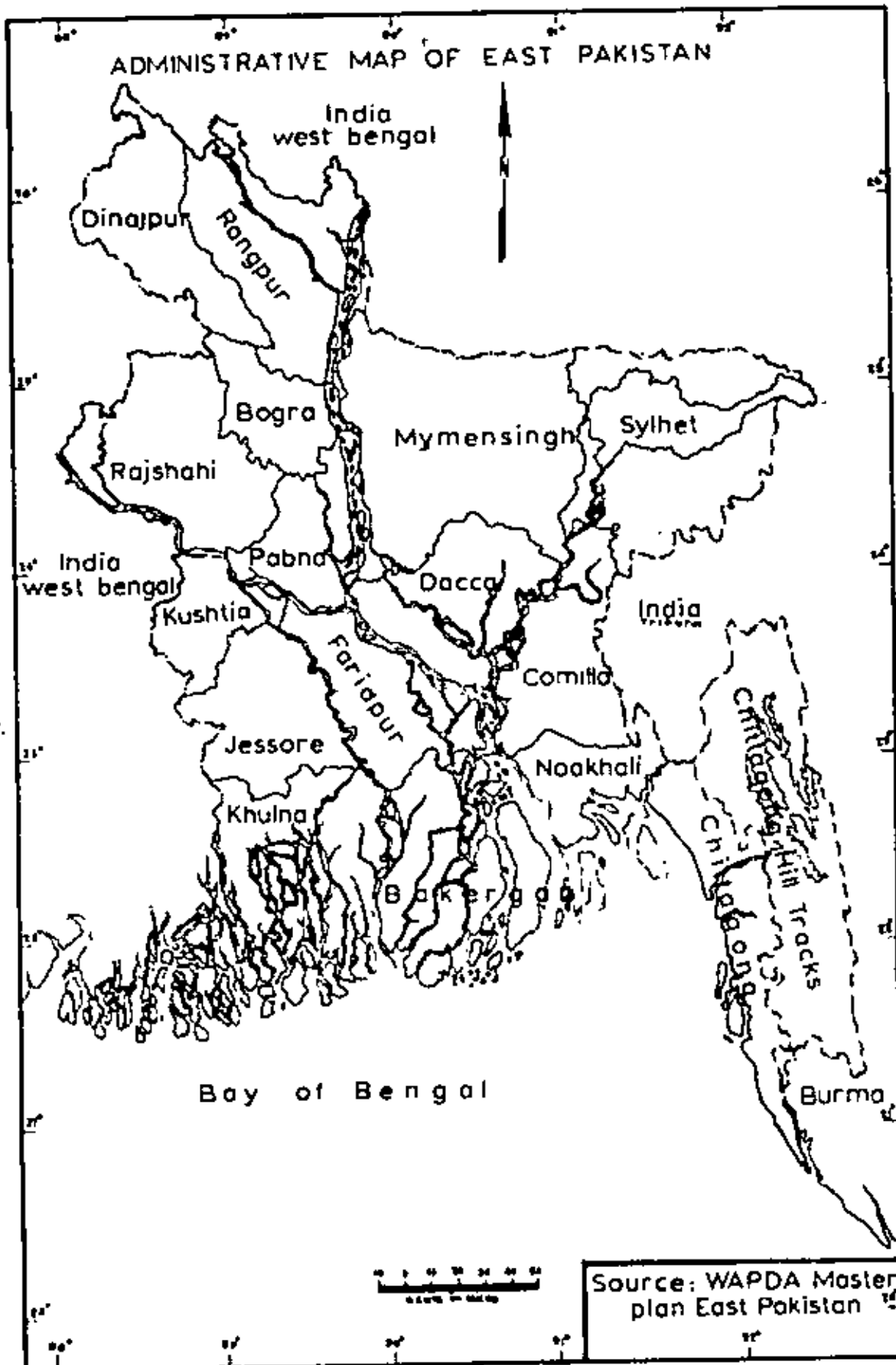


FIG. NO 2

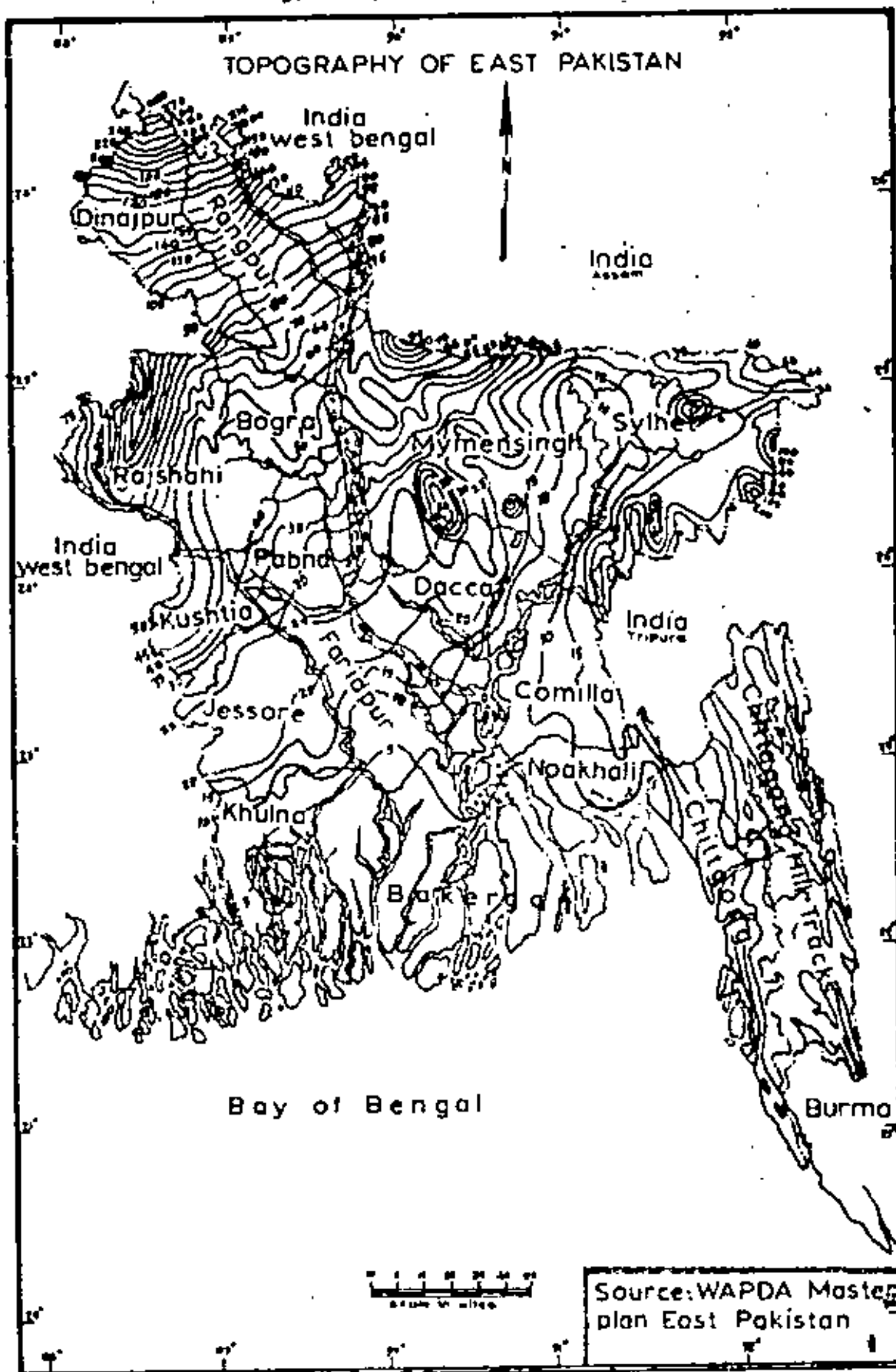


FIG. NO 2(a)

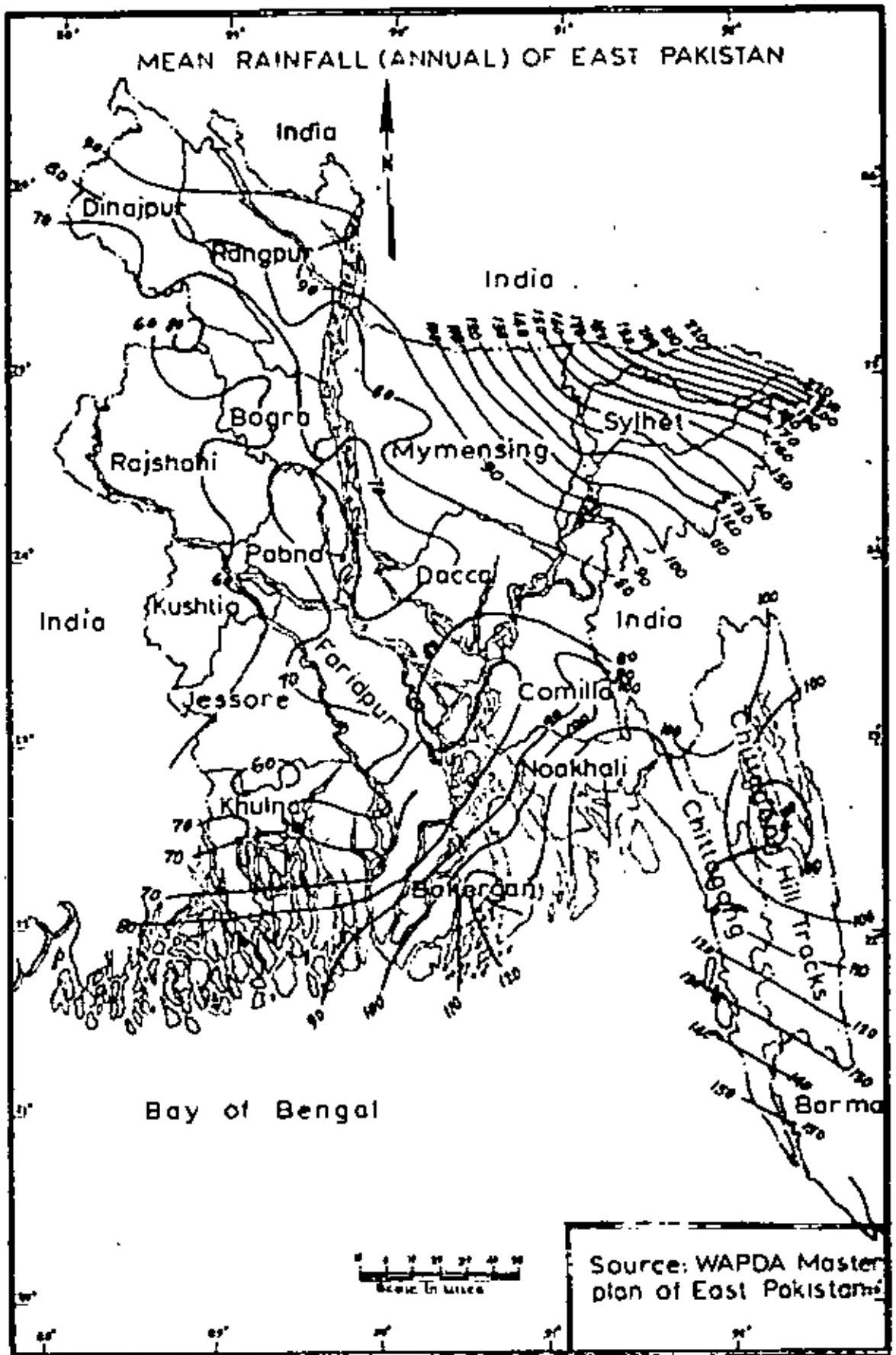


FIG. NO 2(b)

The region enjoys an abundance of natural and human resources. Principally water the tremendous hydro-electric potential. Population relative to land is the big supply of labour force. Agriculturally, jute, tea and forest resources are such more prospective and have comparative advantages.

The export of jute and tea have been the principal economic activity of the region for a long time. The major jute producing area is in the valley of Brahmaputra and the largest acreage lies in the districts of Mymensingh, Dacca, Rangpur, Bogra and Pabna. The highest yield per acre is recorded in the northern parts. 1 East Pakistan is one of the leading tea producing region, along the lower slopes of the Himalayas, in the district of Sylhet, and in the hills of Chittagong and Tipperah. There are nearly 147 tea gardens to-day. 2 The production of jute and tea in 1966-67 was 1, 143 (thousand tons) and 29 (thousand tons) respectively. 3

Principal population centres of East Pakistan include "Dacca, Chittagong, Narayanganj, Khulna, Barisal, Saidpur, Rajshahi, Comilla, Mymensingh, Serajganj, Brahmanbaria, Pabna, Rangpur, Jamalpur, Dinajpur, Sylhet, Chandpur, Bogra, Faridpur and Farhatipur". 4 Average all-weather railways, roads, waterways and airways interconnect all of these towns and cities. These modes of transportation are the major link with all parts of East Pakistan, shown in figure 3.

1. Twenty years of Pakistan (1947-1967), Pakistan Publications, page 155.

2. Ibid - p.157

3. Source: Department of Marketing Intelligence & Agricultural Statistics.

4. 20 years of Pakistan in Statistics (1947-1967) (Karachi: Manager of Government Publication ) page 24.

# POPULATION OF MAJOR URBAN CENTRES AND THEIR LINKS WITH THE PROVINCE

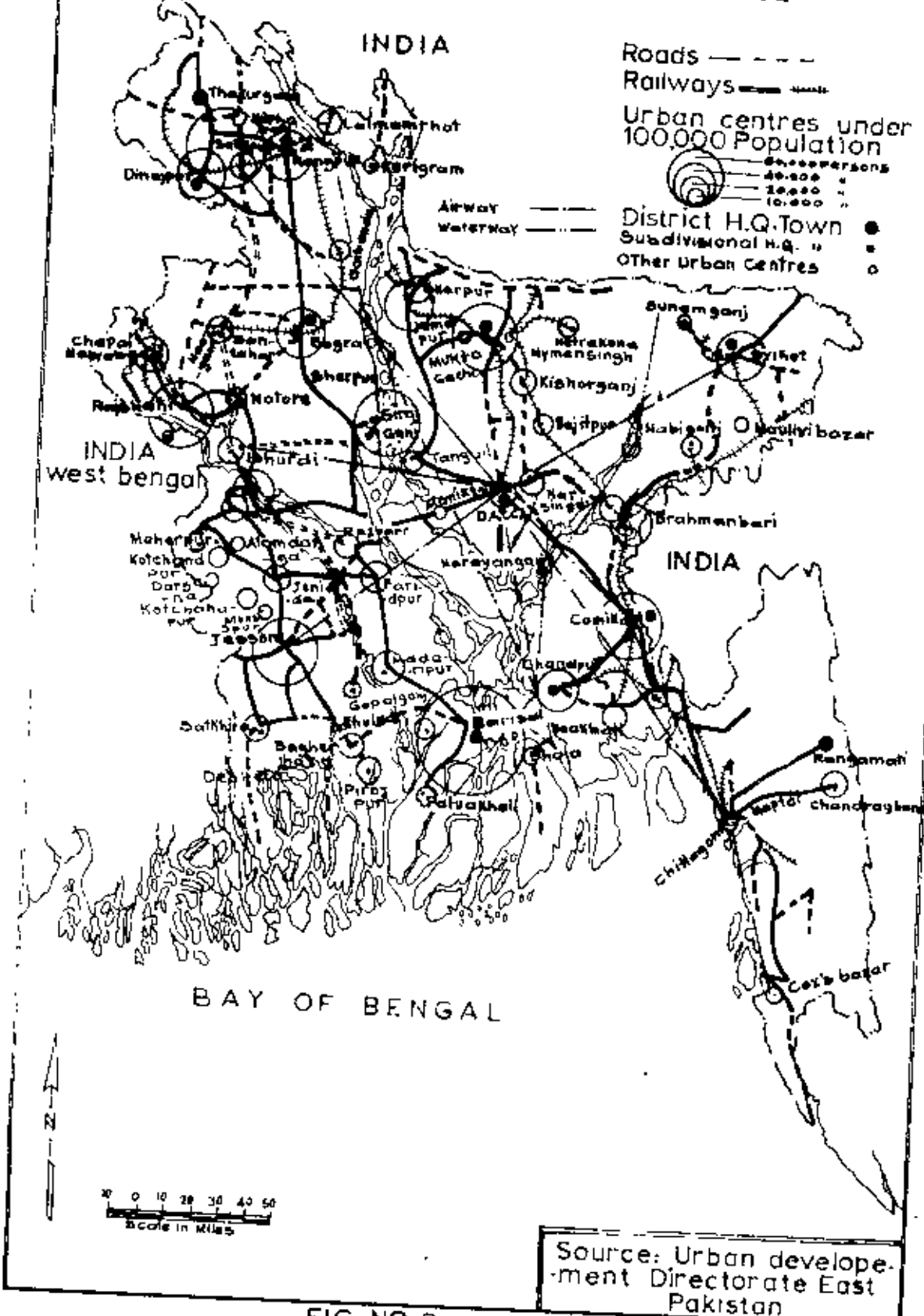


FIG. NO 3



The East Pakistan Water Power Development Authority was created by East Pakistan Ordinance No.1, of 1959, to provide centralized control of water resources and power development in the province. The Ordinance specifically required "a comprehensive plan for the development and utilization of the water and power resources of East Pakistan on a unified and multi-purpose basis". The unified direction and autonomous control of development prospects which are uniquely interrelated in East Pakistan, has already achieved many economies in the use of resources. The objectives are to develop resources of the country as rapidly as possible so as to promote the welfare of the people, provide adequate living standards, social services, equality of opportunities and aim at the widest and most equitable distribution of income and property.

The Master Plan of the Authority is a logical out growth of the accelerating need for extensive improvements in the entire economy of East Pakistan. The existing water and power projects operating and integrating industrial complex on a region-wide basis. Industrial expansion, in variety and volume of products, and in all productive units from cottages to largest plants is the indispensable part of the betterment of the water and power projects and progress of East Pakistan. Increases of yield from the land and of power will support the rapid expansion of the industry in the region. Figure 4 shows the water and power projects of East Pakistan.

By the Government of Pakistan Ordinance of June, 1962, The East Pakistan Industrial Development Corporation, was entrusted with the responsibility of promoting and facilitating the industrialization of the province.

Policies and measures adopted by the I.P.I.D.C. to influence the Geographical distribution of industrial activity can be grouped under six major headings :

- (a) Policies for removing regional economic disparities;
- (b) Policies implicit in the institutional and procedural frame work for regulating industrial investment,
- (c) Fiscal Policies.



- (d) Programmes to set up industrial estates for large and small scale industries.
- (e) Policies adopted for the location of public sector enterprises.
- (f) Other policies and measures influencing industrial activity, such as investment in infra-structure facilities (road transport and power), educational programmes and policies of local bodies, railways and power authorities.

In analysing these policies and measures, an attempt will be made to distinguish between three different broad ranges of objectives:

- (i) Disposal of industry into less developed regions;
- (ii) Mobilising the resources of less developed regions for industrial development;
- (iii) Preventing the establishment of new industries in already over-crowded urban areas.

One of the major characteristics of the regional development is the concentration of industrial activities at the confluence of the areas of raw materials. Because of inter-industry relationships and because of transportation for both domestic and international markets, many of the new industries are being planned in close proximity to one another. The province of East Pakistan has two main belts of industrial concentration: one around Dacca and the other around Chittagong, with many scattered industrial units springing up in the rest of the province (Figs. 5 & 5a). Figures 5 and 5a show the existing industrial location of East Pakistan.

Most of the new developments have taken place beyond the municipal boundary in a haphazard manner in a ribbon form. This has led not only to unplanned growth of towns and irrational use of land but also to the provision of uneconomic utility services. Due to the growth of industrial complexes new urban areas are emerging which call for their immediate planning to guide the growth and to control the development for rational and economic utilization of land.

Industries are growing haphazardly along the river bank utilising unnecessarily large water front and rendering the back and the adjacent areas uneuitable for further

# MAJOR INDUSTRIAL CENTRES OF EAST PAKISTAN

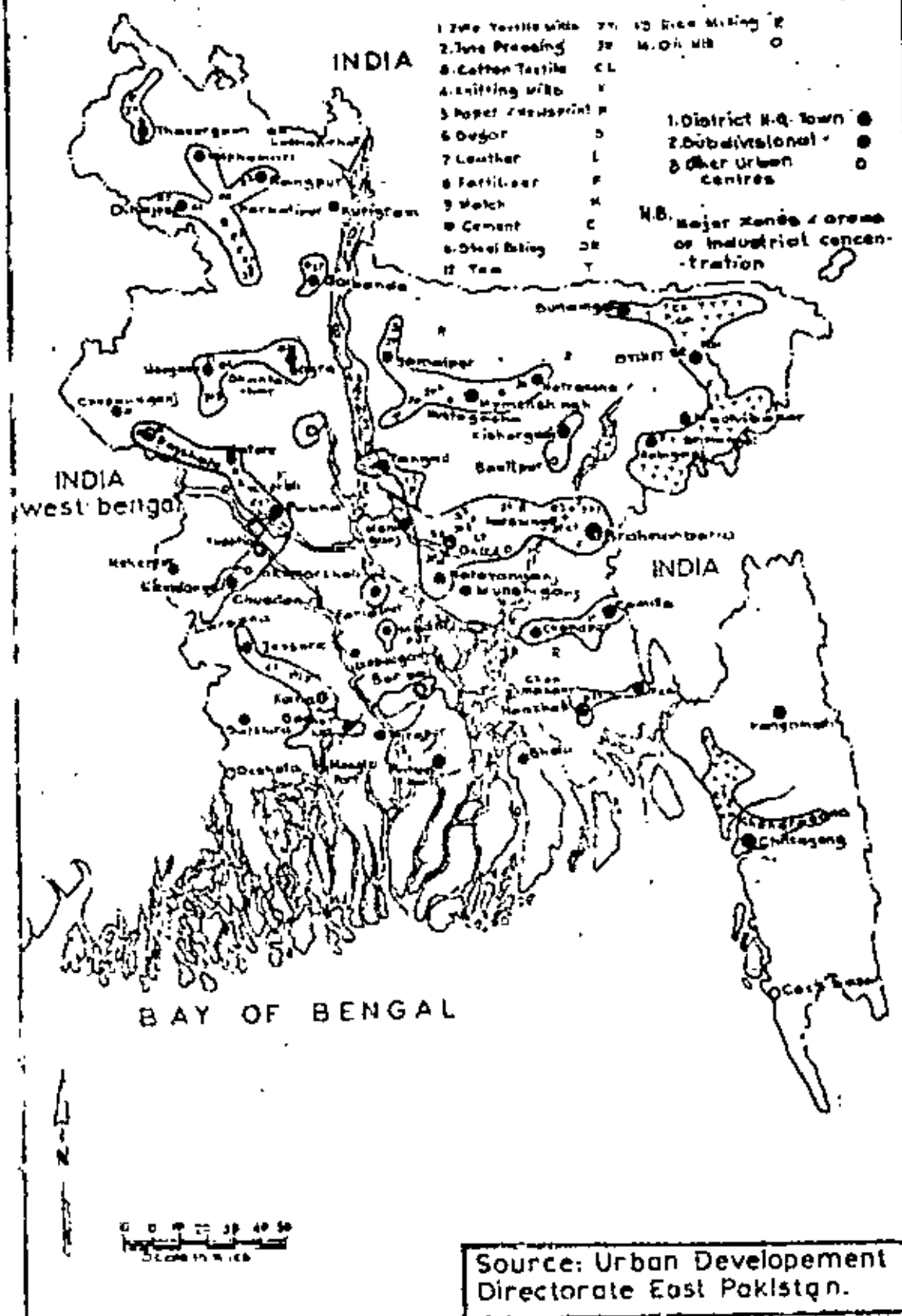


FIG. NO 5

Source: Urban Development Directorate East Pakistan.

# LOCATION OF E.P.I.D.C. PROJECTS

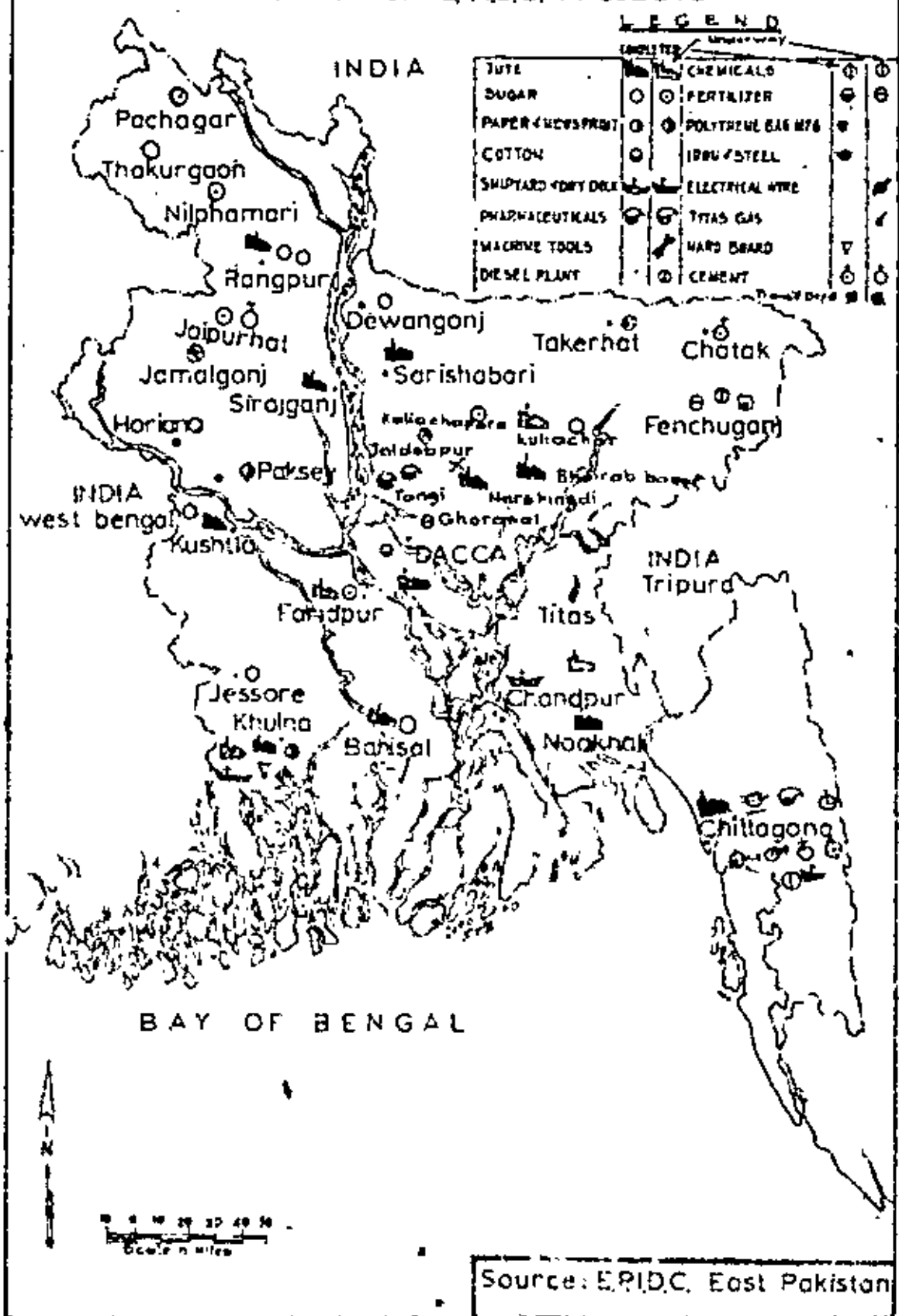


FIG. NO 5 (a)

industrial development and depriving the local public of the facility of access to the river. This unplanned and unco-ordinated development led to uneconomic use of buildable land sometimes involving duplication of expenditure to provide necessary infra-structure, residential and civic facilities.

With a view to arrest further unplanned and haphazard extension of industries and to guide and control the development of the area planning is necessary. The Urban Development Directorate of the Department of Planning of the Government of East Pakistan has been assigned to prepare the development plans of those areas in East Pakistan where population is increasing rapidly due to the discovery of mineral resources or industrial investments. All these allure prospective employments. These projects are Narasingdi, Chandpur, Jamalpur (Boura), Kanchan, Saver, Tongi (suburb of Dacca), Rajshahi, Jessore etc.

Planning an urban area to accommodate the anticipated urban population presents problems of equal if not greater proportions than problems of implementing the industrial programme itself. On the one hand, the magnitude of the investment in social overhead needed to keep pace with the rapid growth of population must be kept low enough so as to detract from the over-all profitability of investing in the region. The investment in the social overhead is estimated to be sizeable. In the field of housing, for example, estimated needs are "13,000 plots" <sup>1</sup>, for the period of Fourth Five-Year Plan (1970-75). This social overhead investment should be sponsored by the government. If this <sup>is</sup> not provided around the employment centres, the cost of transportation will drain away the wages of the employees. The alternative to paying the costs of transportation associated with these long work trips is to provide housing near the centres of employment.

Aside from social overhead investment in the new city itself, investments will be required to reduce the costs of transportation between the region and the rest of the country. At the present time, East Pakistan is a food-deficit area and with the anticipated

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1. The Fourth Five-Year Plan of Pakistan (1970-75) Planning Commission, Govt. of Pakistan, July, 1970, p.505.

growth in population the cost of transporting foods and other consumer goods to the region will become an increasingly important factor. The extensive distances separating the region from areas where consumer goods are produced tend to raise costs of living; high living costs are eventually reflected in higher costs of production. Thus transport costs, through their effect on costs of production and distribution, seriously influence the province infra-regionally.

However, the resources of the region have been proved, and the major transport investments needed to initiate development have already been made. Roads, Railways, Waterways and Airways facilities are needed for accelerating the development schemes. Dacca, the capital of East Pakistan is linked with the rest of the province by roads, railways waterways and airways provide access to practically any point where transport demand exists.

\* Less than 10 percent of the villages are accessible by a highway of any kind and a majority can be reached only by water. Owing to the constant silting of the channels many villages are accessible only during the 3 to 4 months annual flood season".<sup>1</sup>

"Geography has combined in its many elements to make East Pakistan one of the most difficult areas in the world to provide a transportation system that can furnish assured communications throughout the year".<sup>2</sup>

The major transportation planning problems of East Pakistan therefore relate less to questions of where to provide new transport facilities than to determining what increases in the capacity of existing routes will be consistent with over-all development goals.

1. Transportation Survey of East Pakistan, 1961, volume 1, Department of the Army Corps of Engineers, p.3.

2. Ibid - p.3.

Transportation imply the movement of goods and people which use to exploit natural resources, raise agricultural productivity, increase industrial output, enhance per capita consumption, and so forth which are economic objectives. Since transportation is a service designed to connect production and population centres with each other or with consumption centres, transportation cannot be said to have a separate objective independent of a country's development goals. For example, if East Pakistan gear up her resources to develop for export, the necessary railway and port investments are essentially a joint cost together with the initial investments, and the justification for the transport investment hinges essentially on the justification for the project as a whole. The same would be true of feeder roads to promote new agricultural production. If we want to discourage excessively crowded cities, transport policies and investments in urban areas must be properly related to such a goal. If we emphasise on the development of heavy industry, the railways play an important role; if it is on light industry and production of consumer goods, the use of trucking becomes more crucial. A country's general strategy for economic development thus dictates the appropriate transport strategy. This is one of the important reasons why the best time for initiating a transport survey is when programmes are also being prepared for other sectors.

A basic objective of transportation planning is to determine the improvements needed by which all modes of transportation will make maximum contribution in a balanced manner to the economic development of the area. This was the basis from which the 20 year perspective plan (1960-1980) and its order of priorities evolved. It was assumed that the development plans of the Government of Pakistan materialising and that its programmes, especially the agricultural and industrial development phases, will play their respective roles. The projected development assumes transport of increasing volumes of goods and numbers of people, by the various modes of transport over the two decades from 1960 to 1980. The physical requirements of the transportation system, and improvement in organisation, administration, laws and



regulations are the basis for action in economic manner by means reasonably available to the country. †

Within this broader context, the objective of transportation planning is to ensure that the traffic will be carried at the lowest cost to the economy of East Pakistan. This least cost will increase the total value of goods and services in the economy achieving potential economic growth of East Pakistan.

The purpose of this study is to find out the nature, extent, and effectiveness of the present transportation facilities, the need for improved modes of transportation, and the scope and features of a long-range programme of interrelated improvements by which the transportation system in East Pakistan would make maximum contribution to economic development of the country, appropriate to each stage of development and need.

To this end the study will deal with the followings :

- (i) Transport Requirements for East Pakistan.
- (ii) Transport Locations in East Pakistan;
- (iii) Transport Investment in East Pakistan;
- (iv) Transportation<sup>and</sup> Regional Development of East Pakistan.

In pursuing this study an extensive survey of secondary materials relevant to the subject matter has been taken. A spot survey was not feasible, but the secondary materials provided the needed information for the researching and writing of this thesis. Several useful sources have been utilised—books, periodicals, and public documents. These research materials were procured from the libraries in East Pakistan and from Institutions and Governmental agencies of both central and provincial.

1. Transportation Survey of East Pakistan, 1961, volume 1, Department of the Army Corps of Engineers, p.2.

**CHAPTER II**

**TRANSPORT REQUIREMENTS FOR EAST PAKISTAN**

## CHAPTER II

## TRANSPORT REQUIREMENTS FOR EAST PAKISTAN

Although transport is essential to that standard of individual consumption which we regard as the hall mark of civilisation, and the command of rapid and comfortable travel is itself regarded as an indispensable part of culture, yet the demand for transport is not fundamental in human nature, but essential art to evaluate overall economic potentiality of any region like East Pakistan.

The factors to be counted to determine the requirements of transportation for a region are many and include Geography and climate, nature-volume-location of future and present agricultural, industrial and mining output and its consumption, future population growth and present densities all over the region, translating output and population data into traffic, both by volume and by origin and destination.

Since future transportation depends on developments in the industrial agricultural and other sectors of the economy and on population developments, transport demand can be no better than forecasts of regional economic developments in these areas. It is therefore necessary to estimate not merely future production and consumption as a whole, but also its specific location as well.

The requirement for transportation in East Pakistan will be determined by three main forces, all of them interrelated in some degree :

- (i) the growth and distribution of population;
- (ii) the growth in income, its character and distribution pattern ; and
- (iii) the shape of the urban growth of the province.

The general economy of East Pakistan embraces its geography, its population, the agricultural, mineral and industrial resources and their respective areas of production and its transportation systems. Analysis of transportation potential make it mandatory that the planned growth of the economy of East Pakistan is pronounced. The tempo of industrialisation aimed to generate higher per capita income is the example of reflections in examining

the planned growth of the economy and the part which transportation must play in it.

The available conservative quantities of data on different sectors of the economy of East Pakistan are the basis for the analysis of transportation demand in East Pakistan.

## 2.1 Population

Economic development and population growth in an emerging economy are closely related. Expansion to successively higher levels of economic development is directly affected by rates of growth in population. So, it is important to understand the components of current population growth and to prepare reliable estimates of future population of East Pakistan. Nevertheless, it is essential that future population be estimated if sound economic development programmes are to be formulated whether these programmes relate to ports, highways, railways, industrial ventures or other activities.

### 2.1.1 Density and Distribution of Population in East Pakistan

The problems of economic development posed by East Pakistan's rapidly growing population are of a kind and dimension hardly encountered in any other part of the world at this time.<sup>1</sup>

East Pakistan has 54.3% of the population of Pakistan, although it covers only 15% of the land area. Historically, the population of East Pakistan has expanded from 24.5 million in 1951 (the first census) to 55.25 million at (the last census) 1961. The population of the province were then doubled in the eighty years between 1881 and 1961 (Table II-1). Population gains of this magnitude, coupled with limited land resources and low income levels, underlie the urgency of initiating development programmes in the major sectors of the economy

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1. United Nations, Department of Economic and Social Affairs, "The Population of Asia and the Far East, 1950-1980", Population Studies No.31, New York, 1959

**TABLE II-1 POPULATION OF EAST PAKISTAN, 1881-1961**

Year	Population	Index of population increase	Inter censal population increment	Percent	
				Urban	Rural
1881	24,501,567	100			
1891	26,613,092	109	2,111,516		
1	28,927,786	118	2,314,694	2.42	97.58
1911	31,65,056	129	2,627,270	2.55	97.45
1921	33,234,096	136	1,699,040	2.63	97.37
1931	35,960,000	147	2,705,904	3.01	96.99
1941	40,727,000	166	4,777,000	3.56	96.44
1951	45,427,000	185	4,690,000	4.58	95.62
1961	53,230,000	223	9,803,000	5.19	94.81

Source : 1881 to 1891 : Govt. of East Bengal, "Statistics Relating to Population and Population of East Bengal", Statistical Bulletin No.1, 1930. Adjusted to include estimated population of Sylhet District.

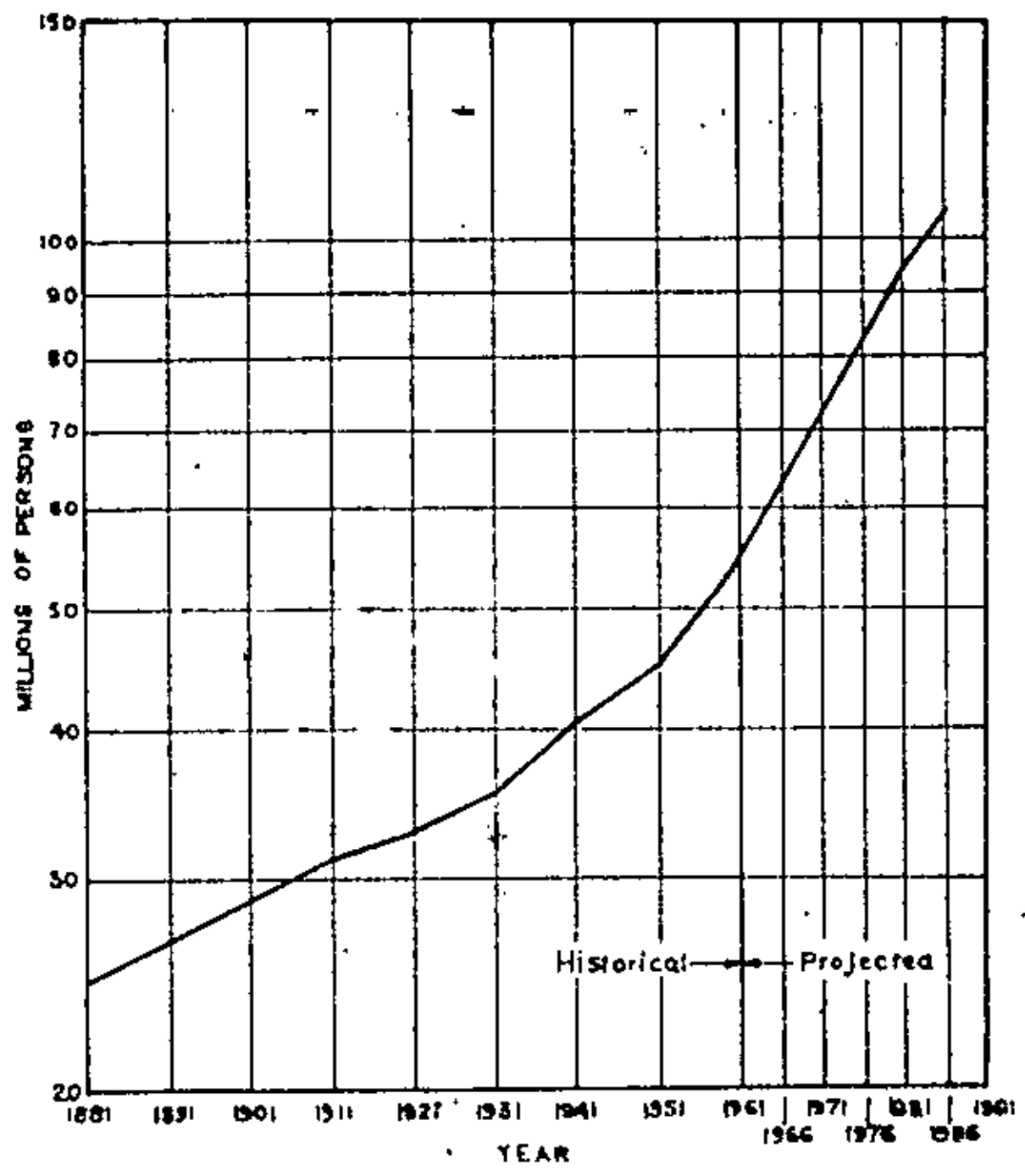
1901 to 1921 : "Population Census of Pakistan", 1951, Vol. 2,

1931 to 1961 : Revised Census of Population Data.

The population of East Pakistan grew by less than 0.8% from 1881-1931. It grew by 1.7% from 1931-1941. From 1951-1961, the population is reported to have grown by about 2% per year. It is believed that actual population in 1961 was 7% greater than that reported.<sup>1</sup> It is expected the population will increase from 53.23 million in 1961 to 103.9 million in 1986. Figure - 6 shows the historical growth of population from 1881-1961 and the projected growth to 1986. It doubled in the 80 years prior to 1961, but will merely double again in the succeeding 25 years (table II-2)

1. Economic & Engineering Feasibility Report, Dacca-Azicche Road, Vol.1, Messers & Whitney International Ltd. P. A-1-4.

# POPULATION GROWTH - EAST PAKISTAN 1881 - 1986.



SOURCE: WAPDA MASTER PLAN EAST PAKISTAN

FIG. NO. 6

TABLE 11-2. PROJECTED POPULATION OF EAST PAKISTAN, 1961 to 1986.

Year	Projected population (Million)	Index of population increase
1961	53.25	100
1965	63.08	114
1970	72.11	131
1975	83.30	151
1980	95.00	172
1986	105.90	192

Source : Pakistan Planning Commission.

The population of East Pakistan is distributed among seventeen districts which comprise the province of East Pakistan (Fig.2)

Rainfall pattern and transportation routes are key factors which determine the distribution of population within the province. In the western districts, less rainfall occurs than in the remainder of the province thereby limiting agricultural production. Transportation facilities play a key role in determining the location of urban and rural economic activities in the province and hence of population densities. Districts with highest population densities are located adjacent to major river waterways in the central part of the province. The relative lack of low cost water transport facilities contributes to the lower population densities of districts adjoining the western and eastern international boundaries of East Pakistan. Figure 7 shows population density per square mile, in 1961.

The average density of population varied from less than 100 to over 2,000 persons





per square mile among the 17 districts for an over-all average of 1,064 in 1961, or about 2.6 persons per acre of cultivated land ( Table II-3).

TABLE II-3. POPULATION DENSITY BY DISTRICT, 1961

District	Land Area 1 (Sq. Miles)	Population	Population per square mile
Dinajpur	2,593	4,858,058	717
Rangpur	3,385	4,125,517	1,229
Bogra	1,464	1,710,540	1,168
Rajshahi	2,565	3,054,772	856
Pabna	1,693	2,128,782	1,257
Kushtia	1,323	1,267,435	958
Jessore	2,497	2,360,170	953
Khulna	4,080	2,661,392	652
Barisal	3,590	4,631,607	1,290
Hymansingh	6,151	7,627,818	1,240
Coxa	2,670	5,437,708	2,074
Fariapur	2,424	3,454,783	1,425
Sylhet	4,736	3,792,340	801
Comilla	2,446	4,769,180	1,950
Mackhali	1,623	2,330,120	1,596
Chittagong	2,619	3,241,518	1,238
Chittagong Hill Tracts	8,085	418,243	82
East Pakistan	51,921.1	55,230,000	1,064

1. Land area exclusive of major river areas.

Source : "Population census of Pakistan, 1961", Census Bulletin No.2.

Intensified population pressure on 21.6 million acres of cultivated land resources in the province, increasing from 2.6 persons per acre in 1961 to 4.9 persons per acre in 1986, will require a major shift of the future population away from the present agrarian economy with its heavy emphasis on land as a factor of production.<sup>1</sup> Under these situations, industrialization and the urbanization of population will play major roles in the future economic development.

Future densities in the districts will be largely dependent on shifts in population from one place to another in response to economic opportunities created by development programmes and urbanization.

### 2.1.2 Urban Growth in East Pakistan

Urbanization of population occurs largely in response to the various economic functions served by a town or a city. In the past, urbanization in East Pakistan responded primarily to the development of administrative, trading and transportation centres. With the establishment of manufacturing industries, urban growth has now become closely related to industrialization. It is evident that there is a substantial impact of industrialization on many aspects of urbanization. Industrialization is likely to affect not only the rate of growth of particular urban areas but also the type of growth in urbanization, as well as the relative level of economic development involved in urbanization.

Growth rate of urban centres is expected to be five times that of the total population so that by 1986, 26.5 million or 25% of the people will be non-rural. The number of urban communities increased from 49 in 1901 to 78 in 1961, of which rounded 100,000 population. Additional urban centres will develop, and this transition to urban life will cause great changes in labour forces, in training, and social attitudes. The table II-4 shows the growth of urban population from 1901 to 1961.

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1. E.P.W.A.F.O.A. Master Plan, Supplement, C. p.9.

TABLE II-4 GROWTH OF URBAN POPULATION, 1901 to 1961.

Year	Total urban population	Percent urban	Index of urban population growth	Index of total population growth
1901	702,035	2.43	100	100
1911	807,024	2.55	115	109
1921	878,480	2.64	125	115
1931	1,076,489	3.02	153	124
1941	1,537,243	3.66	219	141
1951	1,844,343	4.28	343	157
1961	2,640,726	5.19	376	168

Sources : "Population Census of Pakistan", 1951, Vol. I.

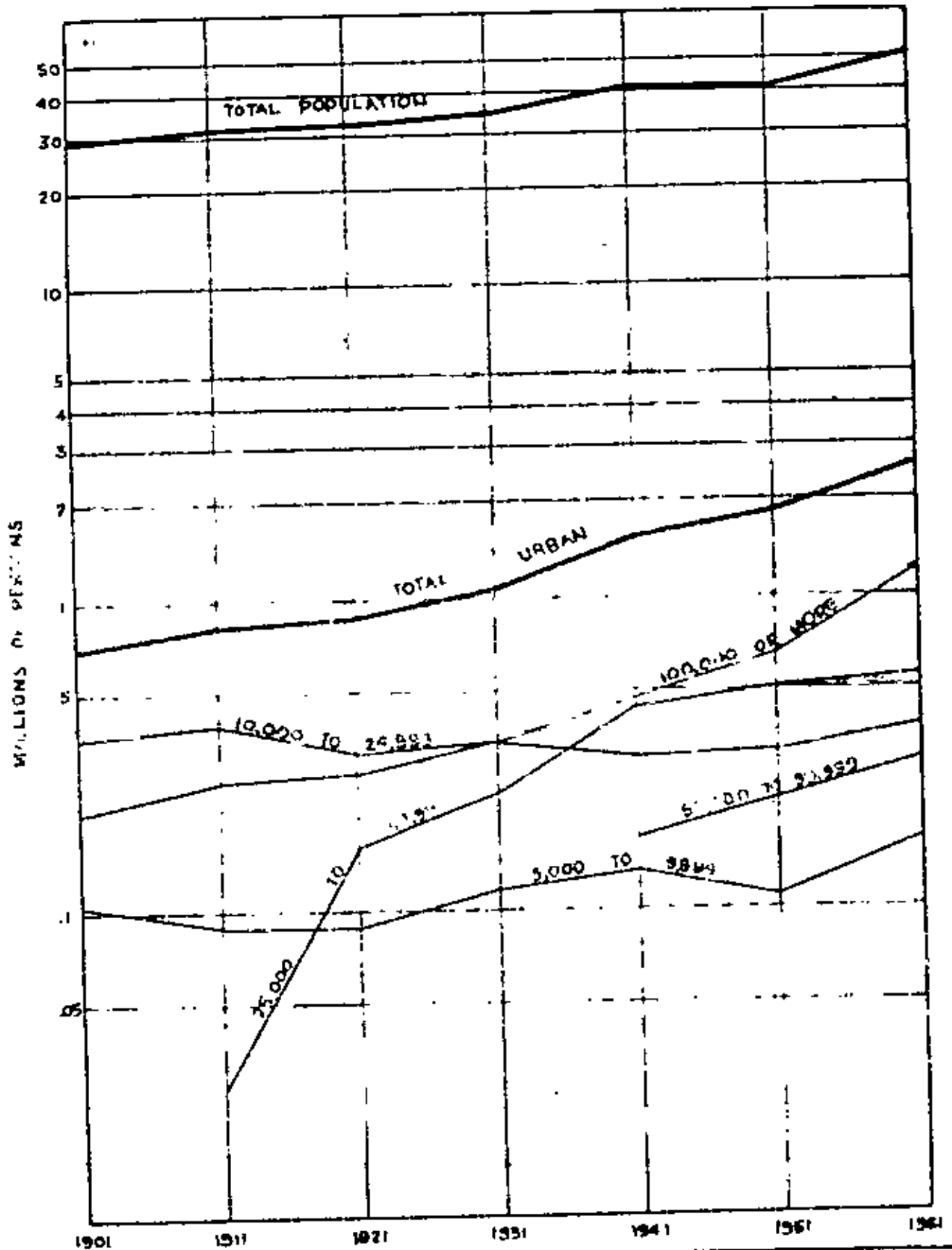
"Population Census of Pakistan", 1961, Bulletin 2.

The figure 2 shows the relative rates of growth of cities of different population size groups and total population from 1901 to 1961 in East Pakistan. Although the number of dwelling in urban centres increased at twice the rate of the general population from 1901 to 1961, only 5.2% or 2,640,700 were classed as urban in 1961.

Cities of over 100,000 inhabitants are situated to serve as major transfer points between the rail and water transport systems of the province. Most cities in the 50,000 to 100,000 size-group also have access to major rail or water transport routes. Smaller size towns generally have access to secondary transport routes only. On the other hand, the evolution of rural villages into larger urban centres is severely handicapped by the almost complete absence of transportation facilities. Only 31% of the villages had metalled roads within five miles, public transportation facilities were also remote from most villages, only 39% of the villages had bus stops within five miles, 27% had railway stations, and had steamer terminals within that distance.

1. Sources: Government of Pakistan, Central Statistical Office, "National Sample Survey, Second Round, 1960".

# GROWTH OF CITIES AND TOTAL POPULATION



SOURCE: WAPDA MASTER PLAN  
EAST PAKISTAN 1901 - 1961

Projected gross capital formation representing all new investments in the economic base of East Pakistan may be used as an index for estimating future urban population growth of the province. Cheap and efficient transport have the positive stimulus to the growth of urban centres. The table II-5 shows the projected urban population growth of East Pakistan 1960-1985. The projection prepared by A.W.I.L. is assumed the revised development programmes of East Pakistan in 1965. In 1965 A.W.I.L. assumed 3.9 million where as others assumed other things remaining the same throughout the projection period. In 1985, U.D.O. assumed 28.5 where as A.W.I.L. assumed 18.2. This shows the gap of 10.3 million. The disturbance of 1971 will result more decline in the future trend. But yet it will be taken as accepted. The prospective plan of Pakistan will definitely fail to achieve the targets. So A.W.I.L. projection has partially accurate value.

TABLE II-5 EAST PAKISTAN PROJECTED URBAN GROWTH, 1960-85  
(Population in Millions)

Year	UDDI	ICCD2	CDI 3	A.W.I.L. 4
1960	2.0	2.6	2.9	2.0
1965	6.0	5.2	4.2	2.9
1970	10.0	10.8	7.5	5.5
1975	15.0	16.0	13.0	7.9
1980	23.0	23.0	20.0	12.7
1985	28.5	26.5	27.5	18.2
1960-85%	918	919	848	730
% p.a.	9.6	9.6	9.3	6.5

Sources: 1. UDD Physical Planning Program  
 2. EPWAPDA Master Plan, Supplement C.  
 3. CDI Annual Report No.1  
 4. AWIL Economic & Engineering Feasibility Study of Decca by pass & paratraz Road.

The figure 9 shows the projected urban population of East Pakistan from 1960-1980. In the figure the solid line shows the projection prepared by A.M.I.L. and brok lines shows the projection prepared by U.D.D. I.E.C.O. C.D.M. As U.D.D. & IECO calculated the equal rate of growth so only U.D.D. projection value is shown in the figure 9. The requirement of area for cities and industry is expected to increase from about 450,000 acres in 1961 to about 2,000,000 acres in 1980 largely by conversion of farm lands.

(Potential external economics are found in major cities include the availability of a large experienced labour pool, developed transportation, communication, utility systems, fire and police protection, closeness to allied industries, consumer markets. All these positive stimulus to urbanisation is an indirect result of cheap transportation and large scale production.)

The major cities in East Pakistan which exceeded 100,000 population are Dacca, Chittagong, Narayanganj and Khulna in 1961. The projected population of these cities are shown in the table II-6 and figure 10.

**TABLE II-6 PROJECTED URBAN POPULATION OF MAJOR CITIES 1 OF EAST PAKISTAN, 1961-1986.**

(Population in thousands)

Year	Dacca	Narayanganj	Chittagong	Khulna	Total	Four Major Cities as % of Total Urban Population
1961	557	162	364	128	1,211	46%
1963	710	200	430	225	1,565	40%
1970	900	225	520	325	1,970	39%
1975	1,100	240	640	410	2,390	26%
1980	1,300	248	795	485	2,828	20%
1986	1,500	250	1,000	550	3,300	13%

1. Major cities has been defined in terms of population more than 100,000.

Source : IECO, Master Plan, EPWAPDA, Supplement, C.

URBAN POPULATION PROJECTIONS OF EAST PAKISTAN

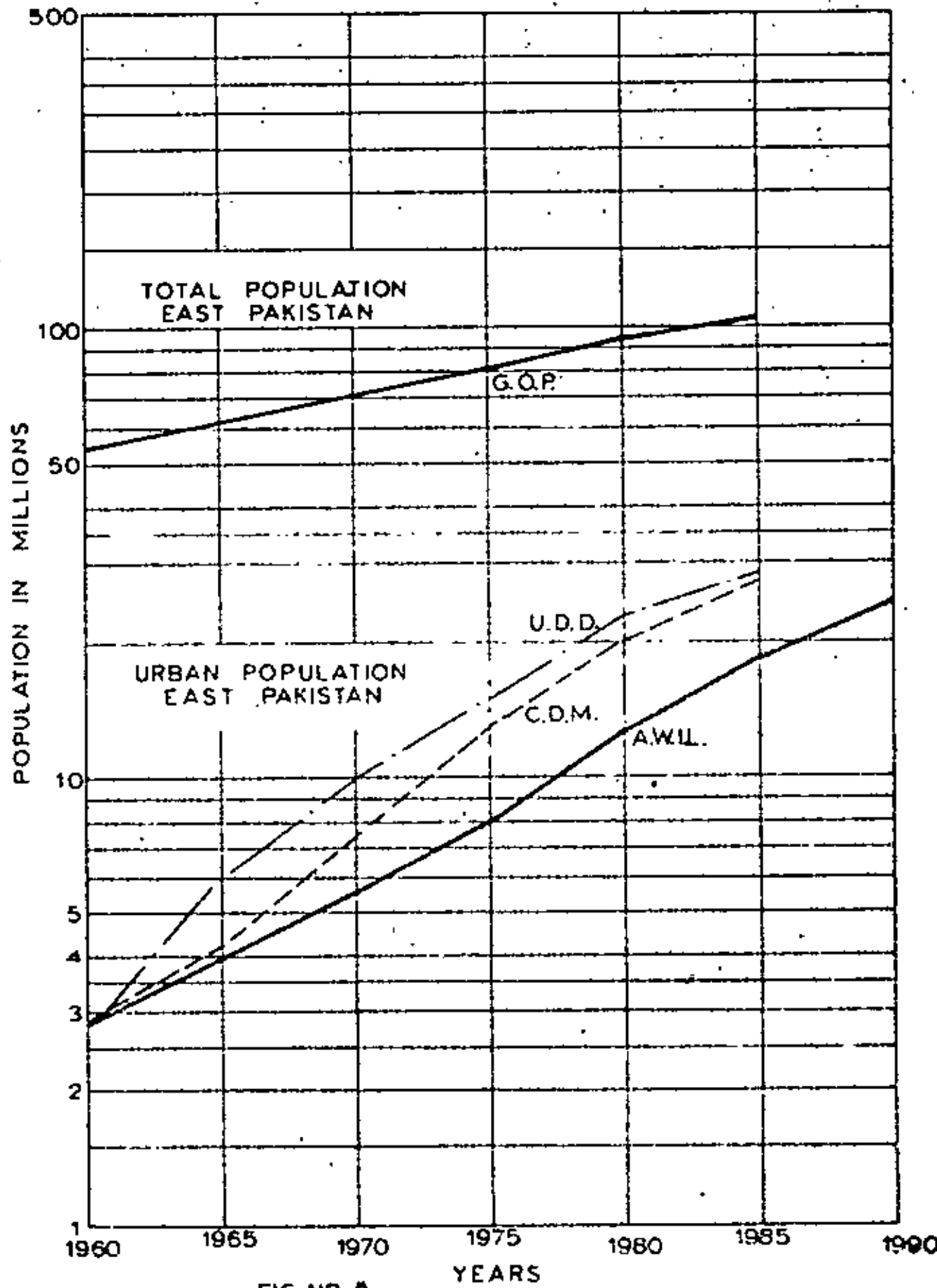


FIG. NO. 9

Source: Ammann & Whitney  
Dacca Bypass and Penetrator Road  
1966.

Major cities of East Pakistan in terms of population and functions are Dacca, Chittagong, Khulna shown in figure 18. a continuous growth in contrast with Narayanganj which has little additional unoccupied land to support further occupation and expansion. Chittagong and Khulna have to provide large population increases resulting from their further development as sea ports and industrial centres.

### 2.1.3 Labour Force & Employment

In the face of a rapidly increasing labour force, the attainment of a state of full employment by 1985 in both the rural and urban sectors of the economy, has been given high priority in national and regional economic planning. The realization of this employment goal will in turn, contribute to fulfillment of the following related national objectives :

- (i) Higher production levels;
- (ii) Increased percapita income;
- (iii) Expanded foreign trade; and
- (iv) The commencement of a self-sustained process of economic growth.

In 1961, 18.87 million workers constituted the civilian labour force of East Pakistan equal to 34% of the total population of the province. The table II-7 shows the projected size of Labour force from 1961 to 1986 in East Pakistan.

TABLE II-7. PROJECTED SIZE OF LABOUR FORCE, 1961 to 1986

Year	Population (millions)	Number of Workers in Labour force (millions)
1961	55.25	18.87
1966	63.08	21.04
1971	72.11	23.58
1976	83.30	26.43
1981	95.08	30.26
1986	105.90	34.05

Source : Pakistan Planning Commission. Unofficial estimate.



Perspective long term changes in employment, by type of industry, will place increasingly larger shares of the labour force in non-agricultural industries as the economy of the province develops. The tables II-8 and II-9 show the civilian labour force by industry group and break-down of potential labour force in 1961.

TABLE II-8. CIVILIAN LABOUR FORCE BY INDUSTRY GROUP, 1961.

Economic Sector	Number of workers (in thousands)	Total percentage
Agricultural Labour Force	14,937	79%
Non-agricultural Labour Force	3,933	21%
Total	18,870	100%

Source: Pakistan Planning Commission. Un-official estimate.

TABLE II-9. BREAKDOWN OF POTENTIAL LABOUR FORCE IN 1961.

Economic Sector	Number of Workers (in thousands)
Agriculture	10,037
Agricultural unemployed	4,900
Mining	3
Manufacturing & Processing	980
Building & Construction	700
Trade	700
Transport	530
Other Services	650
Non-agricultural unemployed	200
Total	18,870

Source: Pakistan Planning Commission.

The changes in the breakdown of the population between urban and rural areas will be related to similar changes in the distribution of active population among agricultural and non-agricultural activities in the coming years for higher percentage of non-agricultural investment. Table II-10 shows the projected distribution of Labour Force by economic sector 1961-1985.

TABLE II-10 DISTRIBUTION OF LABOUR FORCE OF ECONOMIC SECTOR, 1961 & 1985

Sector	No. of Workers (in thousands)	Total percentage	No. of workers (in thousand)	percent/ of total
Agriculture	14,937	79%	16,000	47%
Non-agriculture	3,933	21%	18,000	53%
Total	18,870	100%	34,000	100%

Source: Pakistan Planning Commission, Unofficial data.

A productive agricultural economy is called upon to supply not only food and raw materials, but also the additional manpower for industrial development. As the planned industrial development programmes are initiated, the urban labour force will be necessary to increase in absolute size and relative distribution over the total population. This in turn exerts additional pressure on a shrinking rural labour force to increase agricultural output to meet the food and raw material needs of both itself and an increasing urban population. In Table II-10 shows that agricultural labour force is decreasing from 79% from 1961 to 1985 when nonagricultural is increasing from 21% to 53% from 1961 to 1985.

## 2.2 Gross Domestic Product

To set the back ground for the need of more and better transportation requirements, it is realistic to review and evaluate the gross domestic product of East Pakistan. The table II-11 shows the gross domestic product by sector in 1961 at factor cost.

**TABLE II-11**  
**GROSS DOMESTIC PRODUCT BY ECONOMIC SECTOR OF ORIGIN**  
**1961**

Economic Sector		Percent of gross product	Gross product (million rupees)
Extractive Industries	Crops	51.4	
	Livestock	9.5	10,360
	Fisheries	8.7	
	Forestry	0.2	
Manufacturing		10.2	1,610
Service Industries	Trade & Commerce	6.0	
	Banking & Insurance	0.3	
	Transport	2.2	3,760
	Other Services	6.4	
	Rental Income	3.5	
	Govt.	3.6	
<b>Total :</b>		<b>100%</b>	<b>15,730</b>

Source : U.S. Army Corps of Engineers "Transportation Survey of East Pakistan"

Vol. II, 1962.

prospective gross domestic product of East Pakistan, if other things remaining the same, is subject to investment fund and criteria. Table II-12 shows the projected gross domestic product at factor cost from 1961 to 1985.

TABLE II - 12

PROJECTED GROSS DOMESTIC PRODUCT AT FACTOR COST

1961 to 1985

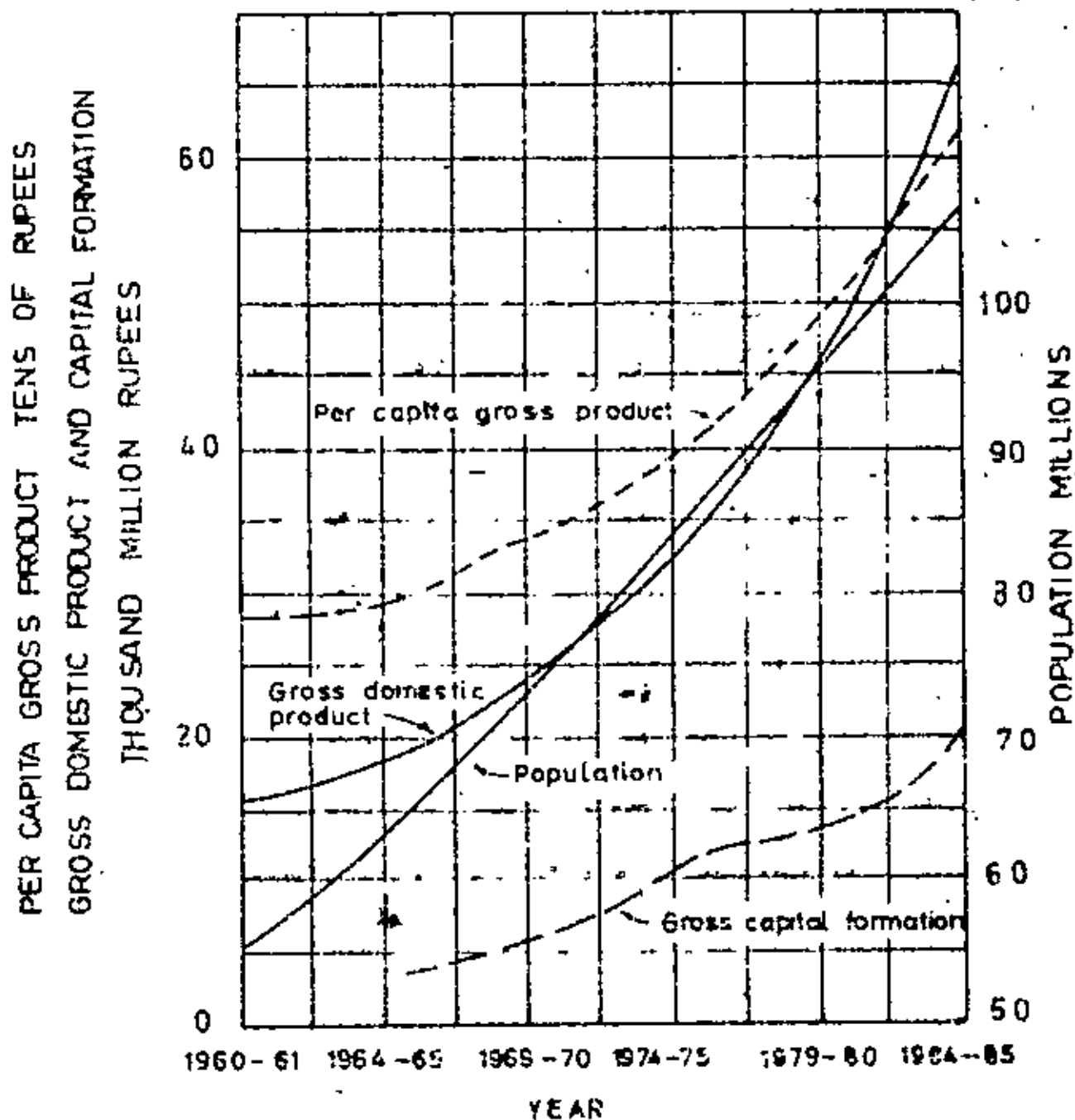
Year	Gross domestic product (million rupees)	Population (in million)	Per capita gross product (in rupees)
1961	15,750	55.25	285
1965	18,214	63.08	288
1970	24,152	72.11	335
1975	32,589	83.20	391
1980	44,429	95.00	469
1985	65,714	108.90	621

Source : East Pakistan Planning Commission. Unofficial estimate.

The planned increase in capital formation is from 3,400 million rupees annually in 1965 to 20,900 million in 1985. These projections are shown on figure 11. The capital required to sustain the planned economic growth and to eliminate the need for external resources by 1985 will come from savings at a relatively high ratio, steady increase in value and percentage of exports.

According to the preliminary estimates of planning commission, the gross domestic product of East Pakistan is expected to increase four-fold by 1985. With almost a two-fold increase in population expected by 1985, the projected increase in gross domestic product will double per capita annual income from 285 rupees

PROJECTIONS OF GROSS PRODUCT AND CAPITAL FORMATION  
1960-61 TO 1984-85



SOURCE: WAPDA MASTER PLAN  
 EAST PAKISTAN

FIG NO.1]

over 600 rupees and gross domestic product per employed person will also be more than double by 1985. The table II-13 shows the projected absorption of labour force and gross product per employed person in East Pakistan 1961-1985.

TABLE II - 13

PROJECTED ABSORPTION OF LABOUR FORCE AND GROSS PRODUCT PER EMPLOYED PERSON, EAST PAKISTAN - 1961 to 1985

Year	population (million)	Gross domestic product (million rupees)	Number of worker in labour force (millions)	Per capita Gross product (rupees)	Gross domestic product per employed person (rupees)
1961	55.25	15,730	18.07	285	833
1965	63.08	18,240	21.04	290	867
1970	72.11	24,152	23.58	335	1024
1975	83.30	32,589	26.43	391	1235
1980	95.00	46,429	30.26	489	1535
1985	105.90	65,714	34.05	621	1933

Source : Deducted from the Table II-11 and Table II-12.

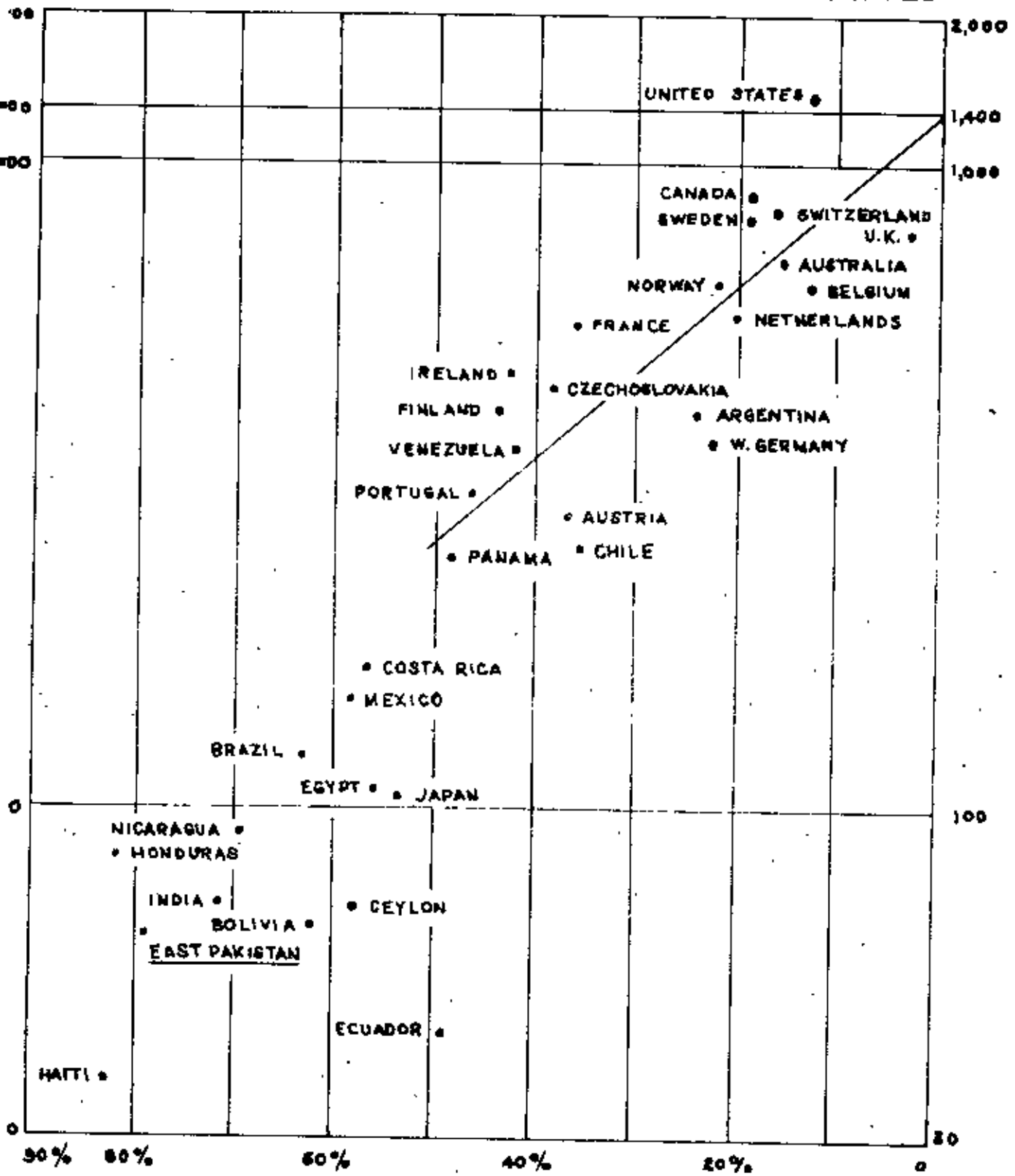
Figure 12 compares the relationships of per capita income and percentage of labour force in agriculture with East Pakistan and selected countries.

### 2.3 Transport Requirements

As a first step, the evaluation and projections for income and output, labour force and unemployment, urban and rural population have been made and may be incorporated in the perspective plan (1963-1985).

Officially real output was projected to quadruple in the perspective plan, with agricultural output tripling, non-agricultural output five times, and manufacturing

PER CAPITA INCOME AND PERCENTAGE OF LABOR FORCE IN AGRICULTURE - EAST PAKISTAN AND SELECTED COUNTRIES



SOURCE: THE INSTITUTE OF DEVELOPMENT ECONOMICS, 1962

FIG NO. -12

Seventimes its 1963 size, for equalising per capita income inter-regionally and infra-regionally by industrialising the regions. 1 The table II-14 shows percentage of annual growth of output and employment from 1965 to 1985.

TABLE II - 14

PERCENTAGE OF ANNUAL GROWTH OF OUTPUT AND EMPLOYMENT FOR PAKISTAN PERSPECTIVE PLAN  
1965-1985

Sectors	Output	Employment
Agriculture	5.6	2.1
Manufacturing	10.2	2.0
Other sectors	7.7	2.6
Labour force	-	2.6
Total	7.2	3.6

Source : Amann & Whitney International Ltd.

From the view point of urbanisation the significant figures are of table II-14, are the manufacturing and other sectors which are 10.2 and 7.7 respectively.

The table II-15 shows the projected non-agricultural labour productivity of East Pakistan from 1960 to 1985.

1. Economic and Engineering Feasibility study, Dacca by pass and penetrator Road  
A.W.I.L. p.9.



TABLE II - 13EAST PAKISTAN NON-AGRICULTURAL LABOUR PRODUCTIVITY PROJECTIONS - 1960 to 1985

(Annual rate of increase %)

East Pakistan	1960	1965	1970	1975	1980	1985
	1965	1970	1975	1980	1985	1985
	1.3	1.5	1.7	1.8	1.9	

Source : Amern &amp; Whitney International Ltd.

By combining the estimates of labour productivity with urban population of East Pakistan we may derive an estimate of economic output for the urban areas of East Pakistan. The table II-16 shows the projected annual rates of increase in East Pakistan from 1960 to 1985.

TABLE II - 16PROJECTED ANNUAL RATES OF INCREASE IN EAST PAKISTAN

Year	Urban population*	Productivity	Urban output	Transport requirements
1960-65	7.6	1.3	10.1	
1965-70	12.2	1.5	16.3	
1970-75	11.6	1.7	19.8	
1975-80	9.0	1.8	12.9	
1980-85	6.5	1.9	12.3	

\*Urban population in the table has been taken from the Table II-5 column 4 of COM projections and its annual projection rates.

Source : Deducted from Table II-5 and II-13.

Transport requirements may be determined by the rate of growth of traffic and the overall output growth. The estimate of population and output growth, can be related to requirements of transportation services. Any overall ratio between production and transportation growth can serve only as a guide line in analysing traffic in major urban areas.

The 1961 urban-rural breakdown can be based on East Pakistan GNP data from the Central Statistical Office for 1960-1962, with non-agricultural output considered as urban and all other as rural. The rural-urban output ratio derived from these figures is 2:1 (Table II-10).

The table II-14 shows a rapid rate of urbanisation, an economy moving towards a situation in which large amounts of transportation will be required. Projected growth rates and transportation requirements will depend among other things on the extent and rate of urbanisation. Economic growth tends to occur in the matrix of urban regions. It is through this matrix that the evolving space economy is organised. 1

Ideally, the overall demand for transportation could be projected by estimating the demand for each commodity, the respective supply and the unit costs associated with transporting the commodity to its market. The total demand for transportation can be distinguished into the following categories :

- (i) Food; and
- (ii) Non-food includes industrial commodities.

The table II-17 shows the consumption of food assuming 1% growth in rural, and 1.5% growth in urban per capita food consumption per year from 1961 to 1981

1. John Friedson, "The Process of Regional Development," MIT-Harvard Joint Center Urban Studies, MIT U.S.A., 1964.

TABLE 11 - 17 FOOD CONSUMPTION, 1961 - 1981

(in constant rupees)

Year	Food Consumption			Percentage Distribution			Annual rate of growth		
	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban
1961	180.0	94.3	8.7	100	94.3	8.7			
1971	146.9	126.7	20.2	100	86.2	13.8	3.9	3.0	13.5
1981	223.4	163.4	60.0	100	73.1	26.9	4.3	2.6	11.5

\*Assuming a 1% growth in rural, and 1.5% growth in urban per capita food consumption per year.

Source : Economic & Engineering Feasibility Report Quetta-Arisha Road, Vol.1.

Food consumption will grow slightly faster than the population. If it is assumed that the rural food consumption will grow about 1% per capita per year, and the urban about 1.5% and that the 94.3% rural population consumed about 94.3% of the food, and the 5.7% urban population consumed about 5.7% of the food in 1961, the total food consumption in 1971 would be approximately 45% of above that for 1961, in constant rupees. If urban consumption of food accounted for 5.7% of the total in 1961, under these assumptions it would account for 14.2% of the total in 1971, and 27% of the total in 1981.

The physical volume of urban consumption of food would be 3.6 times as great in 1971, and 10 times as great in 1981, as it was in 1961. The demand for food in urban areas would require a greater increase in ton-miles of transportation to the cities. This requirement of transportation particularly needs to be reliable and to have wide accessibility to sources of production.

Requirements for non-food products for the East Pakistan economy, assuming it

grows by 6% per year from 1961 to 1971, and 7% per year from 1971 to 1981, and that the urban-rural breakdown, may have as shown in the table II - 18.

TABLE II - 18 REQUIREMENTS FOR NON-FOOD PRODUCTS

Year	Total	Rural	Urban
1961	100	100	100
1971	185	134	400
1981	400	168	1200

Source : Economic & Engineering Feasibility Report, Dacca-Aricha Road, Vol.1.

Transportation of food consumed in urban areas goes up as quantities increase and as the distances the food must be moved rise too. More than tons must be moved more miles. As have seen, if per capita food consumption grows 1% in the rural area, and 1.3% per year in the urban areas. The population growth assumed would result in a growth of food of 13.5% per year from 1961-1971 in urban areas, which would bring 3.6 times that it was in 1961. In 1981, the urban food consumption would be 1000% of the volume of 1961. This increased demand for food in urban areas will be accompanied by a slight shift from rice towards more perishable foods which will require a major growth in food transport to cities.

Let assumption of urban food consumption be 3.6 times great in 1971 as it was in 1961, that agricultural per acre rises a third by 1971 in the areas serving cities. The farm area required to provide urban food would be 2.7 times as great in 1971 as in 1961.

In 1971, it suggested that food would travel at least 1.8 times in 1961 and the ton-mile moved will be 6.5 times as great in 1971 as in 1961.

If urban consumption is 10 times in 1981, and if food production per acre doubles, the land produce food will be needed 5 times. In 1981, the food will travel 2.5 times

higher and the tax-rates about 23 times than 1961. "This increase even may be higher because land around urban areas is shifting from agricultural to non-agricultural use". 1

Urban consumer expenditures for other than food may grow somewhat faster than expenditures for food. Rising living standards may be expressed first in food, but they are soon expressed even more dramatically in expenditures for clothing, housing, consumable durable things which require efficient transportation.

Traffic grows faster than the GNP in the early stages of development. "Such (transport) requirements increase much more rapidly than output, especially in the early stage of economic development. Multipliers of three and four or more to one are not uncommon".2 East Pakistan's economy is rural sustaining where people purchase small amounts of salt, cloth, kerosene and items which are transported to the farm, and conversely the farms export relatively low. To each city family, if there are 19 farm families, an export of 6% rural output is sufficient to feed the city families. When 10% is urban population, doubled food must be shipped from the farms or elsewhere. About double comes back either in the form of consumer goods or items which increase output of the farm, such as better seed, tools, and more fertilizer etc. Change from 5% to 10% urban-results an increase in the total income of about 3%, but the traffic to and from the farms would be doubled. That would be a 33% ratio of growth in traffic to growth in income.

On a more individual basis, if a farmer produces 9 pounds of rice for each of the five members of his family, and total consumption averages 8 pounds of rice per person in the family, the farmer may have 1 pound to sell and to transport. And he will receive money in return to buy 1/2 cloth, kerosene, salt and other goods. If his production increases 10 pounds per person, and consumption 8.4 as well he still has 1 pound to sell; that is, he has 60% more to transport and he can buy 60% more goods as output increased

1. Memorandum, entitled "Industrial Growth and Urban Land Requirements in East Pakistan", May 14, 1962. Dr. John Edison of the Harvard University Pakistan Advisory Group.

2. United Nations Economic Development and Planning in Asia and the Far East, VI - Transport Development.

by 11%. The movement of goods has gone up 5 such as his output. As urbanization of the country continued and the sophistication of its economy increases, the ratio of growth in traffic to growth in the GNP tends to decline to a 1:1 relationship.

"The GNP growth was about 4% per year during the period 1947-1961".<sup>1</sup> Let assumption be the 3 times higher of highway traffic than the GNP. But to be conservative, the non-food urban generated highway traffic was assumed to grow 3 times higher than urban GNP till 1971, and double from 1971 to 1981.

After examining the detailed unpublished GNP data, an arbitrary break of 30% food and 70% for non-food for urban generated traffic was used for 1961. At first glance a low figure for food, but the volume of construction and other types of investment is very high.

Using this 30-70 break, and the growth assumptions for transportation of foods and 2:1 ratio of transportation to GNP growth for non-foods, yields the following growth pattern for urban generated traffic through 1971 and 1981 as shown in the table II-19.

TABLE II-19. URBAN GENERATED TRAFFIC BREAKDOWN

A

Year	Food		Non-Food		Total
	Simple index	Weighted index	Simple index	weighted index	Weighted index
1961	100	30	100	70	100
1971	650	195	1,200	840	1,035
1981	2,300	750	4,250	2,975	3,225

B % Distribution

Year	Food	Non-food	Total
1961	30	70	100
1971	19	81	100
1981	14	86	100

Source : Economic and Engineering Feasibility Report on Faridpur-Jhenidah-Jessore and Khulna Roads, Vol.1.

1. "Economic & Engineering Feasibility Report on Faridpur-Jhenidah-Jessore-Khulna Roads" Vol.1, p.1-21, Louis Berger.

Under these premises transportation of food would account for about 20% of consumer urban generated traffic by 1971 but only 14% by 1981.

The growth in the rural economy will be slower than the urban economy. The comparable ratio of growth in rural traffic generated to growth in the rural economy is greater than comparable urban ratio. The miles traveled per unit of goods produced for and consumed by the rural population will not increase as much as the miles traveled per unit of urban goods.

Total consumer generated traffic, rural and urban, may be 3.7 times higher in 1971, with an average growth of 14% per year, and about 13 times higher in 1981, as in 1961 which is shown in the table II-20.

TABLE II-20 PROJECTED TRAFFIC, 1961-1981

Year	Urban Generated Traffic			Rural Generated			Total	
	Simple Index	Weighted Index	Amount growth%	Simple Index	Weighted Index	Amount growth%	Weighted Index	Annual growth%
1961	100	20	-	100	30	-	100	-
1971	1,025	207	26.2	300	160	4.9	367	13.9
1981	5,225	1,045	17.6	380	280	9.7	1,325	13.8

Source: Economic and Engineering Feasibility Report on Fazilpur-Jherishah-Jessore and Khulna Roads, Vol.1.

The 1961 traffic distribution between urban and rural is estimated on the basis of 1951 urban population. It is assumed that urban generated traffic grow by 3.0 times than the estimated GNP rate of urban growth, or 24% per year, and that the rural traffic grow by 2 times than the estimated rate of rural GNP growth, or 8% per year from 1951 - 1961.

The increase in consumption in East Pakistan as a whole during 1960 is only 5% per year. Under these assumptions while the economy as a whole, including private

private investment, is expected to grow by 6% or more per year during these years. And in the 1970, the economy may grow by 7% to 8% per year. A growth in the total GNP of 6% per year may bring a growth in rural generated traffic of over the figure of 4.4% to 5% per year. A growth in urban generated traffic exceeding the 23% or more per year, and a growth in total traffic of more than 14% shown for 1961-1971.

### 2.3.1 ~~TRAFFIC~~

Most of the assumptions in the foregoing observations have a potential influence on water traffic between local points, which will be reduced or increased as agriculture expands in the different areas, as plants are built, as existing plants and mechanical locomotion change the internal economic progress.

The table II-21 shows the projected IMT traffic with regard to commodity movement from origin to destination between consumption, production and distribution centres from 1960 to 1980.

TABLE - II-21 THE PROJECTED I.M.T. TRAFFIC MOVEMENT FROM  
1960 TO 1980

Commodity	1960-60	60-65	1969-70	1974-75	1979-80
Arts & its products	81	103	111	116	120
Grains & pulses	46	40	32	31	33
Coal & Loke	60	71	107	107	107
Cement	23	175	304	304	304
Gravels	41	54	67	80	93
Firewood	9	15	17	19	20
Gum wood	19	22	24	27	29
Bamboo	10	12	13	15	16
Fertilizers	1	10	20	20	20
Paper	9	11	23	14	18
Piece goods	3	5	6	8	9
Iron & steel	1	4	8	4	15
Other	14	21	29	35	42

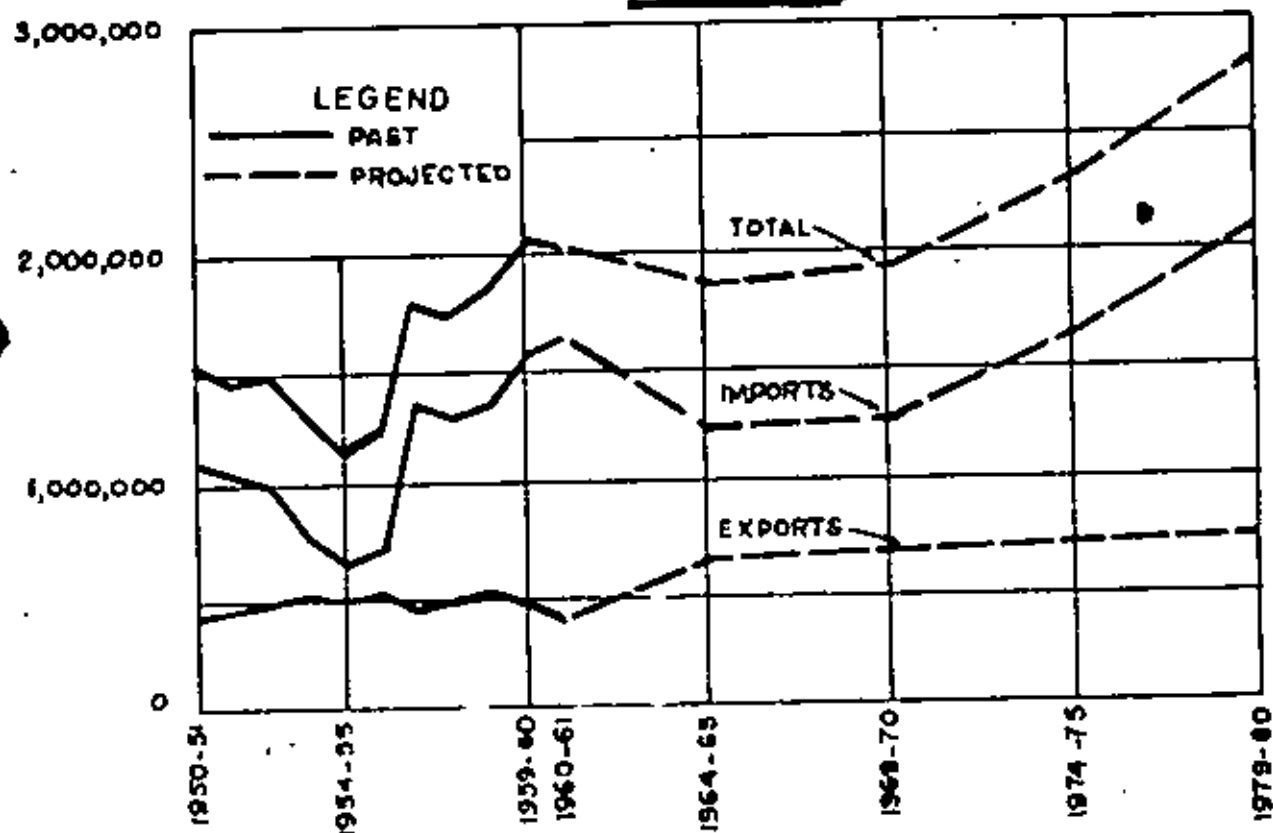
Source : Transportation Survey of East Pakistan Army Corps of Engineers, Vol II, p.62.



EXPORT, IMPORT TONNAGE PROJECTIONS OF CHITTAGONG AND

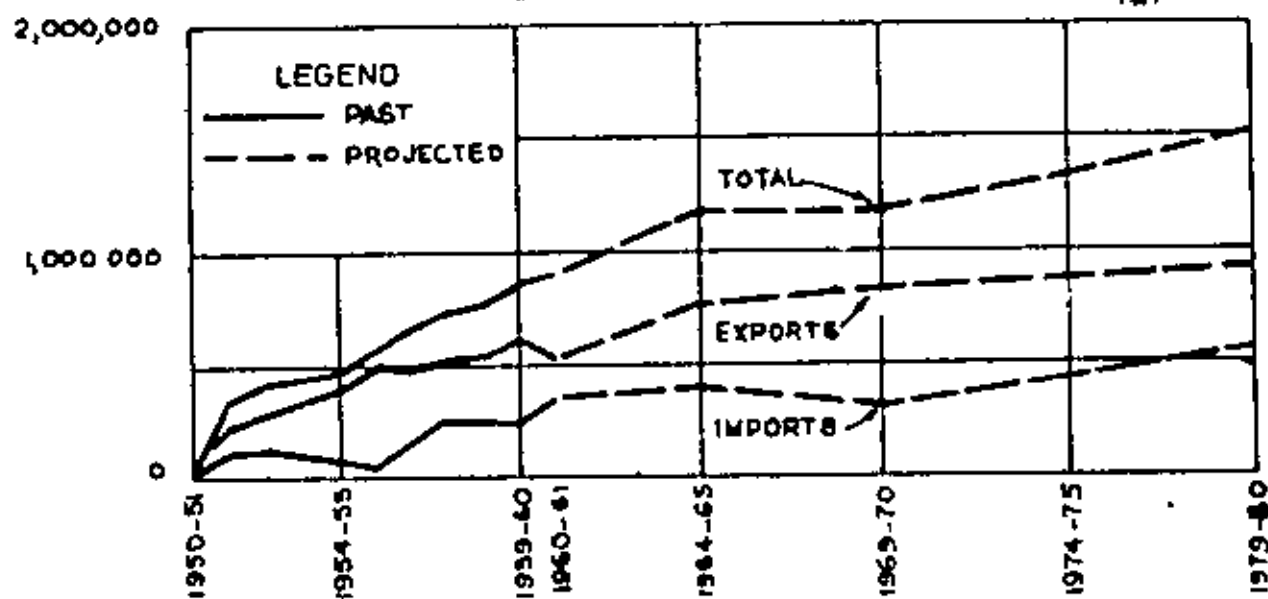
CHALNA PORTS

CHITTAGONG



CHALNA

ক. বি. মাহবুব



SOURCE: TRANSPORTATION SURVEY OF EAST PAKISTAN  
 DEPT. OF THE ARMY CORPS OF ENGINEERS

FIG NO-13

Jute and jute products, coal and coke, cement, oil, food grains and salt; these are big tonnage commodities at the present time. All the production, consumption and distribution centres are of great importance in the development of future water traffic. All of these except Shalna are consumption & production centres. There are a good number of minor ports important mainly as collection and distribution centres.

The water traffic is of tremendous importance in the riverine region like East Bengal. In comparison with unflooded country; the water traffic of East Bengal the land of rain and river supplement the railway & highway traffic of the region.

In developing projections of imports and exports through the two main ports Chittagong and Chalna of East Pakistan assumed the following current economic plans :

(i) Cement: The cement plant at Chittak which now 120,000 tons capacity. The new plant at Takerhat in Sunamganj has the capacity 300,000 tons. Remaining requirements will be imported.

(ii) Fertilizer : The plant at Fenchuganj has capacity of meeting 180,000 tons for home consumption and surplus of 20,000 tons are exportable capacity.

(iii) Iron & Steel : The steel plant and Karnaphuli Paper Mills at Chittagong.

(iv) Jute and Jute products; and

(v) Tea export from Sylhet.

(Items i to v may be conceived from the figures 5 and 5a)

Projected tonnages for the two ports are shown on figure 13. A graph showing tonnage projections of ports, import, export and total tonnage for the years 1951 to 1980.

### 2.3.2 Railways

Taking 1960 as the base year and assuming that railway passenger traffic will record the same percentage of the increase of the population, the number of passenger would approximate the following in table II-22 figure as derived from the table II-2.

TABLE II-22 PROJECTED PASSENGER TRAFFIC FROM 1960 to 1985

Year	Passenger (in millions)
1961	55.25
1965	63.08
1970	72.11
1975	83.30
1980	95.00
1985	105.90

In addition to the growth rate of population another important factor in projecting passenger traffic is the increased purchasing power of the people resulting from an increase in national wealth.

Estimates of future passenger traffic should be related to:

- (i) Growth in population;
- (ii) Individual percapita income

The growth of passenger traffic on the basis of population is not sufficient, but necessary. But since higher percapita income is a direct result of the economic growth of the country is likely to generate passenger traffic in direct proportion to its own increase.

The passenger traffic is likely to approximate the following in table II-23 as derived from the table II-12.

TABLE II-23. PROJECTED PASSENGER TRAFFIC FROM 1960 TO 1985

Year	Passenger (Million)
1960	55 . 25
1965	71 . 02
1970	86 . 15
1975	104 . 27
1980	117 . 39
1985	131 . 51

There are other factors which would have a bearing on the growth of passenger traffic. Among these are the increased urbanization of the population and the capacity of the Pakistan Eastern Railway to carry extra traffic. If urbanization does not keep pace with the growth of industries, the gap would be filled by commuter services. With the buses and launches taking a greater share of commuter traffic, it is expected that more long distance traffic will be carried by railroads.

The transport by rail of grains and pulses involves two types of movement namely :

(a) Internal movement: Locally produced paddy is carried to the rice mills and the milled rice is moved from surplus districts such as Dinajpur, Rangpur, Bogra, Khulna, Rajshahi and Sylhet to the deficit districts such as Faridpur, Feni, Barisal, Moulvibazar and Comilla.

(b) Movement of imported food grains : Out of the imported food grains about three

... is routed through Chittagong and one quarter through Chalna Port. About 94% of the food grains imports through Chittagong is distributed by rail to all districts, subdivisional towns and storage depots in eastern region. 80% of the food grain imported via Chalna is transported by rail from Khulna to the deficit districts in the western region. Over half of the imports are moved directly to consumer districts and the rest despatched subsequently from reserve depots to deficit areas. Such movements do involve cross hauling of loaded wagons.

Raw Jute is the most important cash crop and foreign exchange earner. East Pakistan meets 5% of the world demand for jute. The quantity hauled via the railroad depends on the crop yield, that hauled by waterway and the world market. The railway handles from one half to three quarters of the annual production of raw jute. Rail movements are principally as follows :

- (i) Kutcha bales to puzze presses (rail and country boats)
- (ii) Kutcha and puzze bales to jute mills in Dacca, Narayanganj, Khulna, Daulatpur and Chittagong and other areas (rail & water).
- (iii) Puzze bales to Chittagong and Chalna for export (rail & river steamers)
- (iv) Jute cuttings to Chittagong (rail, water transport & river steamers etc.)

About 90% of the jute export exported through Chittagong port is carried by railway from baling centres situated in both east & west regions - Narayanganj and Dacca, Ashuganj, Chandpur, Chittagong, Sarisbari, Gouripur, Santahar, Joypurhat, Saidpur, Dinajpur, Gaibandha, Rangpur etc. About 26% of the jute through Chalna is carried by rail from western region of the province to Chalna and Daulatpur.

Other agricultural products tea, tobacco, cotton, hides, oils, fruits etc. also regularly carried by Pakistan Eastern Railway.

### 2.3.3 Highways

There is a natural potential demand for personalized transportation in East Pakistan. Due to the rural population and their limited income, the demand will be for bicycles, scooters, motor cycles and low cost vehicles. The living patterns of rural population

where land holdings small indicate only a small percentage can be expected to have direct access to usable roads.

For the purpose of forecasting vehicles a ratio of 1500:1 may be assumed. This ratio indicates about 70,000 vehicles in 1985 based on an estimated population of 105.90 million.

Vehicles estimates are based on the following assumptions :

(i) That ownership of the vehicles will be 1 car to 1500 people in 1985 as shown in the following table II-24.

(ii) Delay in highway construction and development may influence this trend;

(iii) That the economy, foreign exchange, cost of vehicles and that factors would prevent such an expansion to take place.

The table II-24 shows the estimated vehicles from 1960 to 1985.

TABLE II-24

Year	Population (million)	Vehicles	Mileage
1961	53.25	17,000	
1965	63.00	23,000	64,800
1970	72.11	30,800	102,200
1975	83.30	34,600	188,800
1980	95.00	43,600	263,560
1985	105.90	70,000	400,000

Source: Deducted from the table II-2 assuming 1500:1 car.

Good roads can contribute not only to the movement of the private vehicles, even if its use is relatively small, but also to the use of bicycles, scooters, and motor cycles. In East Pakistan good roads are important because of economic utilization by mass carriers such as buses and trucks which will definitely contribute to the economy of the province.

Estimates of future passengers are based on substantial improvement in roads,

equipments running times and service to the public. The development of the truck and secondary roads and the completion of such roads through areas not presently served within a band of six miles on each side of these routes.

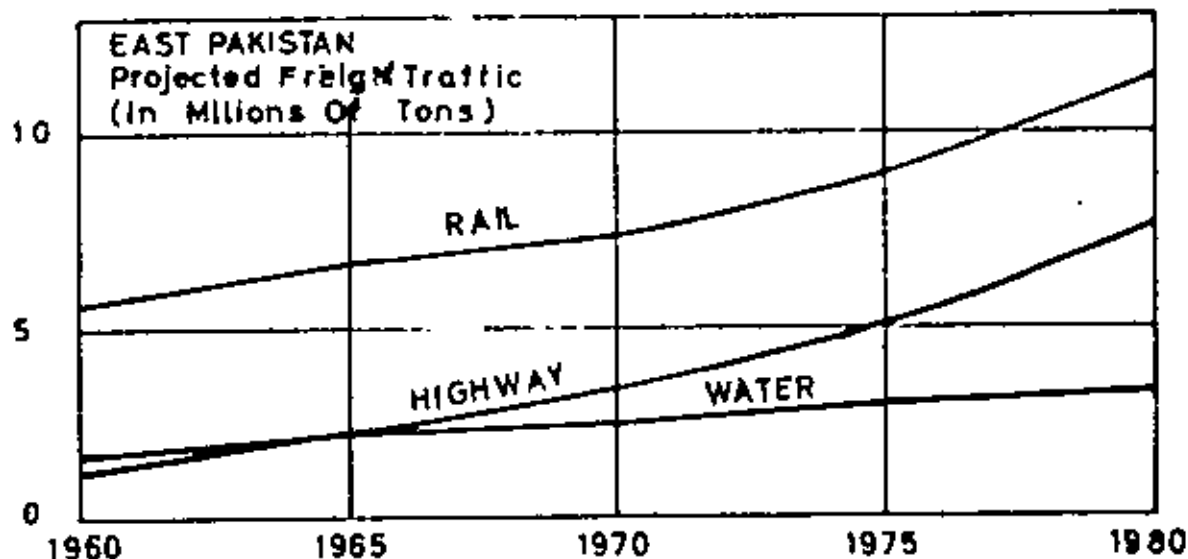
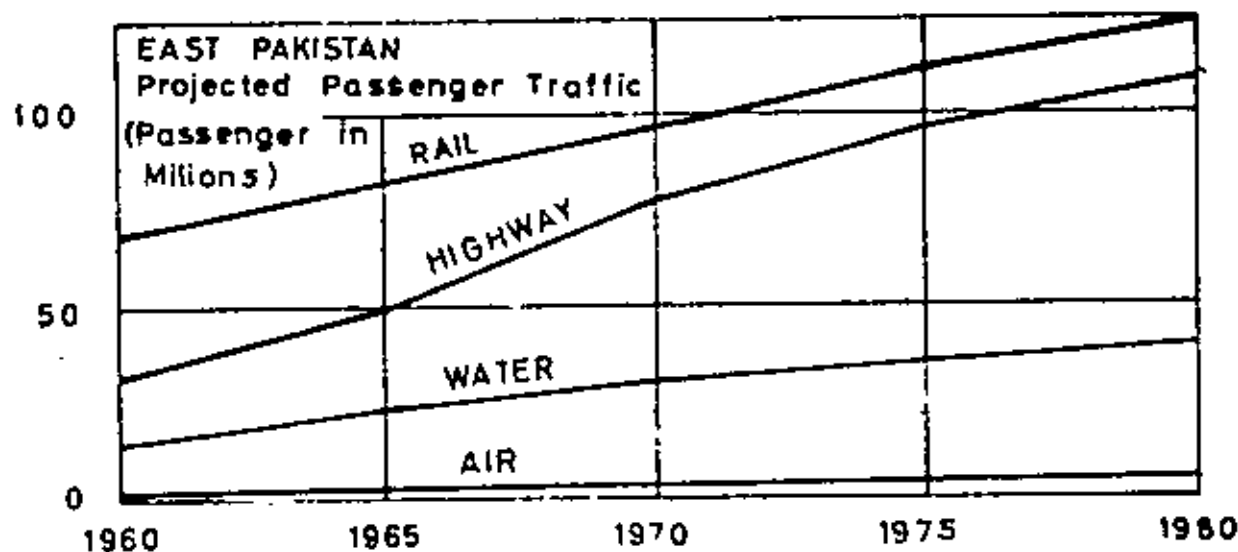
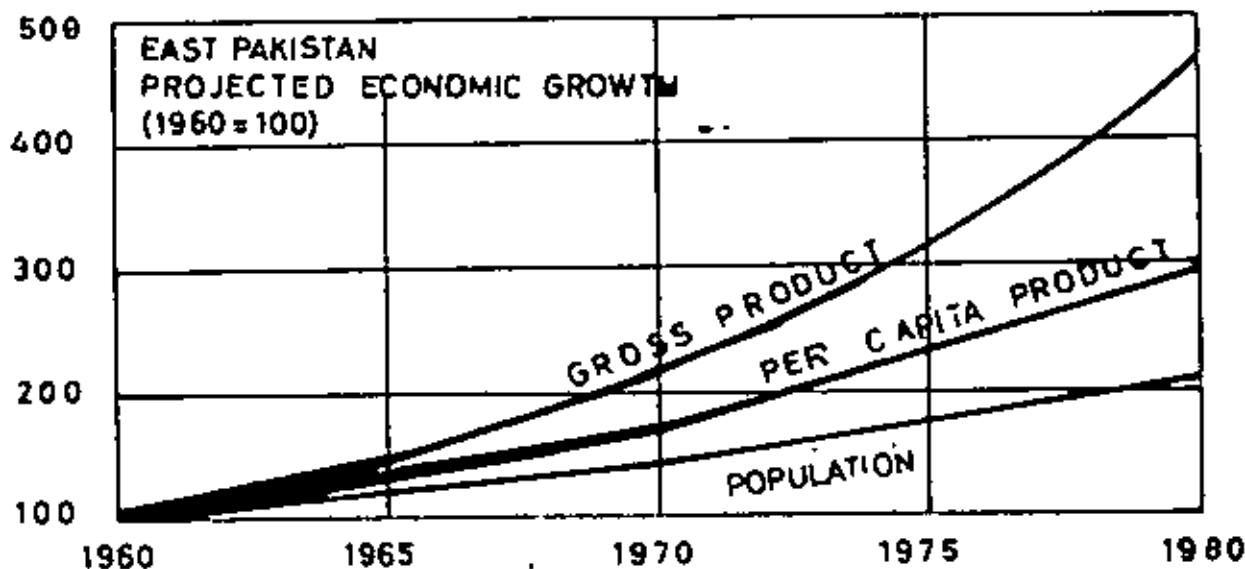
The development of highway transport system for East Pakistan be coordinated with and be complementary to, but also in a few areas to competitive with rail and water link facilities. Any programme for the development of an efficient coordinated, economic, safe and sound transport system for the common carriage of freight and passenger must, among other things, rest upon a fair, reasonable, logical and coordinated system of classification and ratings.

The highway transportation network is used by motorised vehicles, rickshaws, bicycles, carts and pedestrians. Ox-carts, hauling between 250,000 and 300,000 with capacities of one half-ton each, compose the largest class of road vehicles in East Pakistan.

The figure 14 show the projected traffic upto 1980. The projections of traffic assumed that the probable growth of the gross product, percapita income, domestic savings, gross investment and external assistance. Physical, technical and economic trends and growth in the fields of agriculture and industry and location of projected manufacturing plants were studied to develop estimates of future tonnages of the commodities that would require the various modes of transport.

The table II-25 shows the growth projections of population, gross product, percapita income, passenger and freight of East Pakistan from 1960 to 1980.

# EAST PAKISTAN PROJECTED ECONOMIC GROWTH, PASSENGER AND FREIGHT TRAFFIC 1960-1980



SOURCE: TRANSPORTATION SURVEY OF EAST PAKISTAN ARMY CORPS OF ENGINEERS.

FIG NO.14

TABLE II - 25

Item	1961	1965	1970	1975	1980	1985
Population 1 (million)	59.25	63.08	72.11	83.30	95.00	103.90
Gross provincial Product 2 (million)	15,750	16,214	24,152	32,509	46,429	65,714
Per capita gross 3 in rupees	265	260	335	391	489	621
Passenger (million).						
Water 4	14.2	24.0	30.5	34.5	38.4	44.8
Railway 5	55.25	71.02	86.19	104.27	117.39	131.51
High way 6 (inter city)	17,000	25,800	30,800	34,600	43,600	70,000
Air 7	0.14	0.30	0.45	0.60	0.800	0.98
Freight (thousands of tons)						
Water 8	317	543	760	782	826	903
Railway 9	5,529	6,742	7,446	9,147	11,495	12,111
High way 10 (inter city)	1,300	2,250	3,350	5000	7,450	9,380

Source : Note : 1. table II-2

2. table II-12

3. table II-12

4. Transport survey of East Pakistan vol- 1 p. 16

5. Table II-28.

6. Table II-24

7. Transport survey of East Pakistan vol- 1. p. 16

8. Prepared from the table II-21 only the internal movement of cargo  
is considered.

9. Transport survey of East Pakistan vol-1.p.16

10. Transport survey of East Pakistan vol.1.p.16



Future transportation needs of East Pakistan will be satisfied by present capabilities, and improvements in past capabilities and by new and expanded capabilities. The existing situation, including transportation facilities available and traffic presently using them; the interrelation of the various transportation improvements to each other and to the centre of production, distribution & consumption. Projections of the future traffic that can be expected on the different systems based on consideration of the economic development that could be reasonably expected if the transportation systems are improved.

#### 2.4 INTERMODAL ANALYSIS OF TRANSPORTATION IN EAST PAKISTAN

Transportation of goods may be examined from the aspect of the type of (1) goods; (2) service, (3) user, and (4) the mode employed.

(1) For transport purposes, goods may be classified as (a) bulk commodities both light and heavy which move in volume and a considerable distances; (b) perishable both food and non-food; and miscellaneous.

(2) Transport service may be classified as (a) like haul movements between two usually relatively two distant points; (b) collection and distribution, within local areas; and (c) Shipments between major centres and near and distant hinter lands.

(3) The type of user involved affects the transportation of goods. The service needed by a producer, importer or exporter may be quite different from that required by large wholesalers and a large retailer is different from that required by small wholesalers and retailers. Requirements vary sharply by type and by size of user. The most important distinguishing features in East Pakistan may be (a) accessibility of the user, (b) the size, and (c) the frequency of his receipts and shipments.

(4) To meet the above needs, there are three major modes of transportation service of goods in East Pakistan, rail, road and water. An effective transportation programme will permit each type of goods to receive the type of service that best fits its characteristics and the needs of the user, within the limits of the capital and human resources available.

The four aspects of goods transportation the type of goods moved, type of service wanted, type of user making for the service, and the type of transportation - rail, road, water, and air - providing the service have in numberable combinations and permutations. But a few general principles tend to govern the combinations that best fit particular needs.

The first principle is that no one combination can begin to fit all needs. The movement of perishables must be handled speedily. Usually that can not be done by water. The movement of heavy bulk commodities over long distances cannot be done cheaply by road, and collection and discharge of small lots at closely spaced points cannot be done cheaply by rail. A flexible, adjustable relationship between the four aspects is needed to produce the best system for a growing economy.

Dr. বি. মাহবুবুল

One important operation involving a particular combination of a specific type of goods, of service, of user and of mode, is bulk movement of heavy goods a long distance for a large consumer, for one who can order in volume, and can guarantee a continued market, and maximum use of a given amount and mode of transport facility. Such operation may be illustrated by transportation plan for food grains in East Pakistan, 1971.

#### 2.4.1 Transportation Plan for Food Grains in East Pakistan, 1971

Transportation plan for food grains is largely oriented towards water transport. In doing this the entire province has been divided into 4 major zones and some other subzones for the purpose of food grain transportation and distribution.

The zones and subzones are as follows :

##### (a) Chittagong zone :

Subzones : (i) Chittagong sub-zone: for serving Chittagong, Chittagong Hill Tracts, Moulvibazar and parts of Comilla

(ii) Barisal subzone: for serving Barisal and Patuakhali Districts.

(b) Chandpur-Daugkandi Zone : for serving Sylhet and the rest of Comilla.

(c) Dacca-Maryanganj: for serving Dacca Munsifganj and Tangail.

(d) Khulna Zones

## Subzones:

- (i) Khulna Sub-zone: for serving Khulna, Jessore, and Faridpur districts.
- (ii) Moulvibali (Pabna) subzone: for serving Pabna & Rajshahi districts.
- (iii) Santahar subzone: To serve Bogra, Rangpur and Dinajpur districts.

For the purpose of distributing and transporting food grains in all the major 4 zones 314LSOs, 12680s and 8 silos are considered. 2.

The zone wise monthly food grain of C.S.D. L.S.D. and the Silos are given in table 11-24.

TABLE 11-24

Zone	Central supply Dept. (CSO)	Local Supply Dept. (LSO)	Silo
Chittagong	19,291	38,362	15,000 Chittagong
Chandpur-Daurkandi	7,358	11,930	
Decca-Marayanganj	68,118	26,013	15,000 Marayanganj
Khulna	46,493	68,889	
Total	141,460	145,214	30,000

Source: Food Department, Govt. of East Pakistan

The total of all the movement requirements for the CSOs, LSOs and the Silos is thus 316, 674 tons and for which the existing transport facilities are to be allocated at various phases. The following three such transportation phases namely may be envisaged, viz. -

- (i) Arterial movement which would be mainly from the ports to the CSO/LSO without
- (ii) Sub-arterial movement which would be from certain CSOs and ports to LSOs when it would involve one transshipment; and
- (iii) Capillary movements from port/CSOs to the LSOs where more than one transshipments would be involved.

1. Food Dept. Govt. of East Pakistan, 1971 LSO = Local supply dept., CSO = Central Supply Dept., Silos are big depots.

The underlined assumptions for working out the monthly requirement of transport that on the meter broad gauge system of the railway 14 and 20 tons respectively per wagon. Truck and Boat capacity is assumed to be 5 tons and 30 tons respectively.

It is found that a sum total of 1,41,460 tons of the table II-22 and 56,515 tons of the table II-27 (1,41,460 + 56,515 = 197975) is the minimum quantity required to be moved out of the ports of Chittagong and Chalna.

The following table II-27 would indicate the quantity to be transported from Chittagong and Chalna ports to various destinations :

TABLE II-27 QUANTITY TO BE TRANSPORTED FROM CHITTAGONG & CHALNA PORTS

(In tons)

Destination	Movement to CSD	Movement to LSDs from ports	Total	Mode of transport
Chandpur-Bauckandi zone	7,538	5,496	13,034	Rail
Barisal zone	4,291	17,382	21,673	Coaster
Chittagong Silo	15,000	--	15,000	--
Narayanganj-Dacca zone (including Narayanganj Silo)	68,118	7,576	75,694	Coaster/Barges.
Khulna zone	46,493	26,159	72,652	Barges.
Total	141,460	56,515	197975	

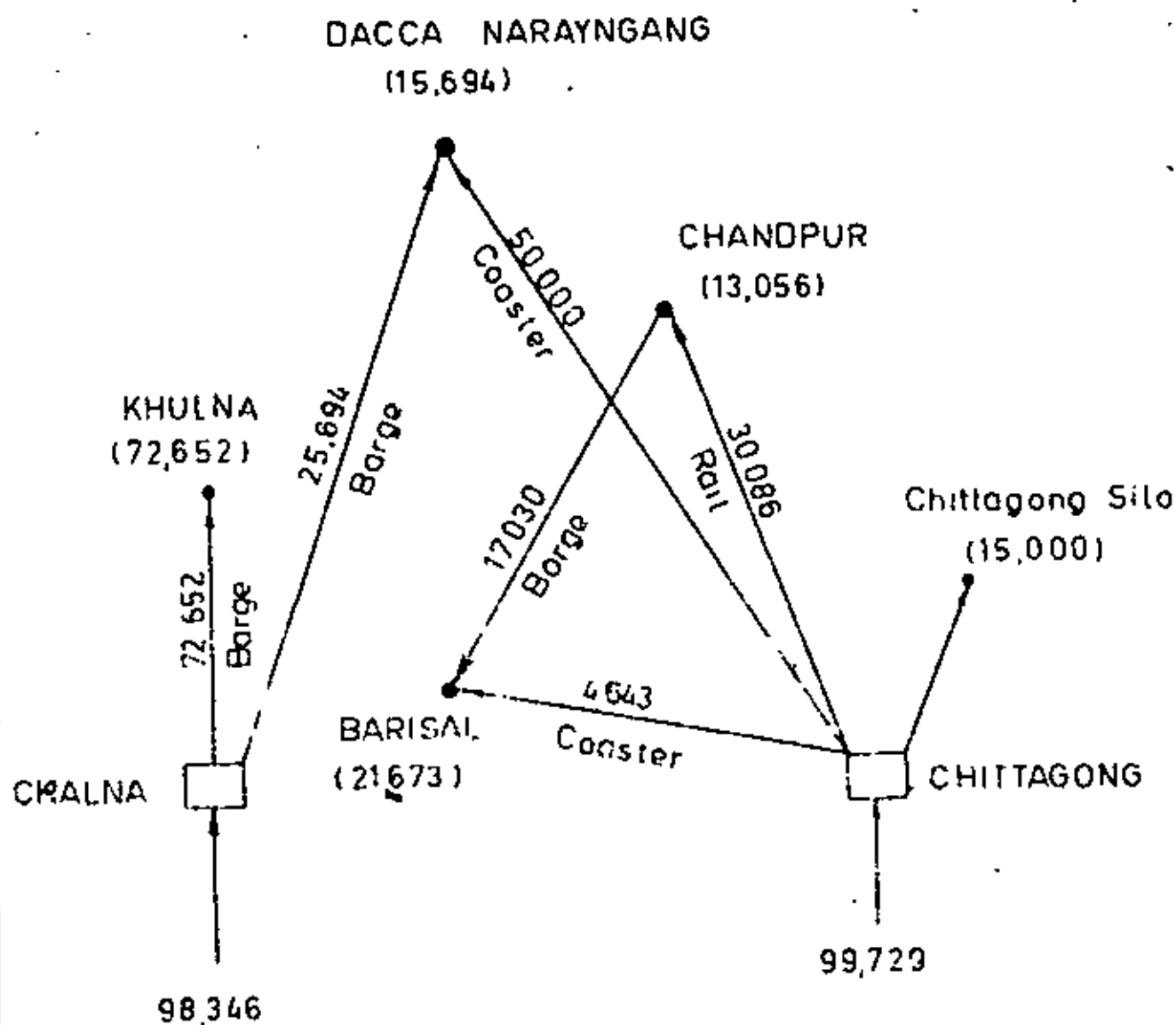
Source: Department of Food, Govt. of East Pakistan.

It appears from the table that about 130,56 tons would move to Chandpur by rail. 15,000 tons would move to Chittagong Silo. The coaster requirement for Barisal and Patuakhali is 21,673 tons and Dacca/Narayanganj is about 50,000. The total tons of transport requirement at Chittagong port is 99,729 tons. Fig. 15 shows the transportation plan for food from Chittagong and Chalna ports to major zones.

The requirement of Dacca-Narayanganj zone is 75,694 tons, the amount to be moved by coaster is shown 50,000 tons. The balance requirement of 75694-50000 = 25694 is to be

# TRANSPORTATION PLAN FOR FOODGRAINS FROM PORTS OF CHITTAGONG AND CHALNA TO MAJOR ZONES

ALL FIGURES IN TONS



SOURCE: FOOD DEPARTMENT  
BOOKLET 1970

FIG NO - 15

brought from Chalna. Out of 73,694 tone, 8,459 tone of food grains required to be moved from Narayanganj to Mymensingh CSD by rail and 7,576 tone to LSO directly and 59,659 tone Baccs Narayanganj vicinity CSD. As out of 98,346 tone 23,694 tone to be moved to Baccs Narayanganj zone the rest amount 72,652 tone would move to Khulna for the requirements of the CSD & various LSO. Therefore, the total transportation requirement is 98,346 tone for Chalna parts. Out of 72,652 tone from Khulna, 26,159 tone direct to L.S.O.s, 12,375 tone to Moulvili C.S.O, 7,535 tone to Barsther C.S.O. and 26,533 to Khulna vicinity C.S.O. (Fig.16)

The transportation plan in Fig.16 is mainly for the transportation of food from the sea ports and a few major inland ports to the CSDs and LSOs. The requirement of transport for feeding all the LSOs may be worked out in terms of wagons, trucks and boats may be shown in the table II-28.

TABLE II-28. ZONE WISE FOOD TO BE MOVED TO LSOs AND THEIR REQUIREMENTS OF TRANSPORT BY TYPE.

Zone	Monthly requirement of movement of food (in tone)	Transport			Effective requirements		
		Wagon	Truck	Boat	Wagon	Truck	Boat
Khulna	68,889	2,892	2,336	572	898	866	143
Bacca Narayanganj	26,013	990	1,481	200	198	494	40
Chandpur-Daukandi.	11950	--	1,423	406	-	41	162
Chittagong	20362	607	538	959	121	264	319
Total	1,45,214	4,489	4,498	2,137	1,217	1,665	664

\* Basis of Effective Requirements:

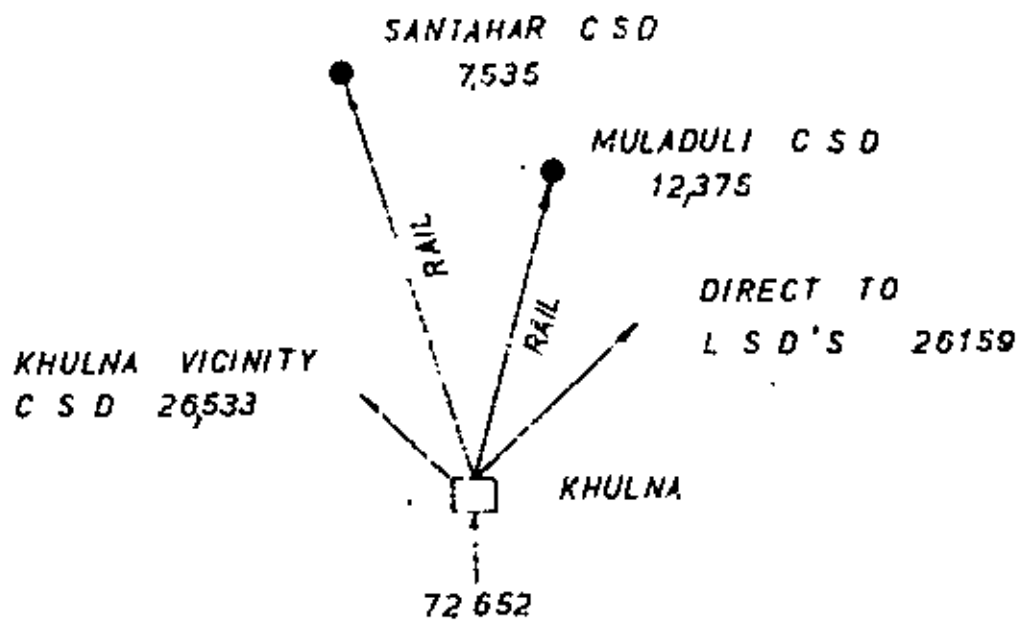
Truck ( 5 tone each) - 3 round trip per day in all zones except Khulna subzone and Chittagong Jessore, Satkhira and Chittagong Hill Tracts.

Boats ( 3 tone each ) - 3 turn round per month in all zones except Chandpur where it is assumed to be 2.5.

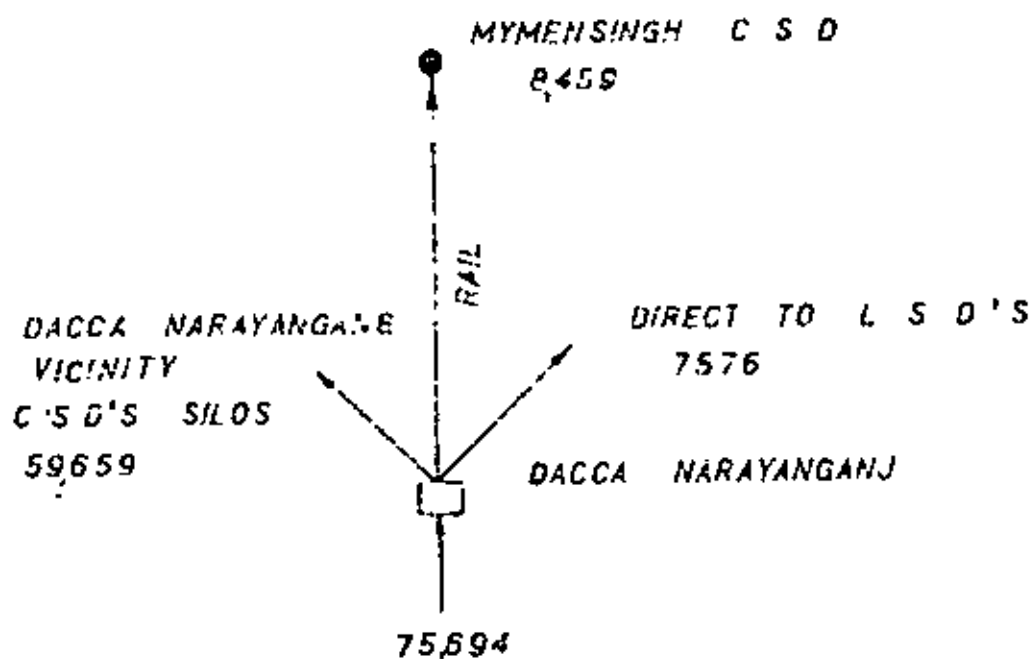
Wagon ( 14 MG 200G) - 3 average turn round per month.

Source: Department of Food, Govt. of East Pakistan.

# DISTRIBUTIONS OF FOODGRAINS WITHIN ZONES



## KHULNA ZONE



## DACCA NARAYANGANJ ZONE

SOURCE FOOD DEPARTMENT  
BOOKLET 1970

Fig. 17 shows the availability of trucks and wagons transport for food.

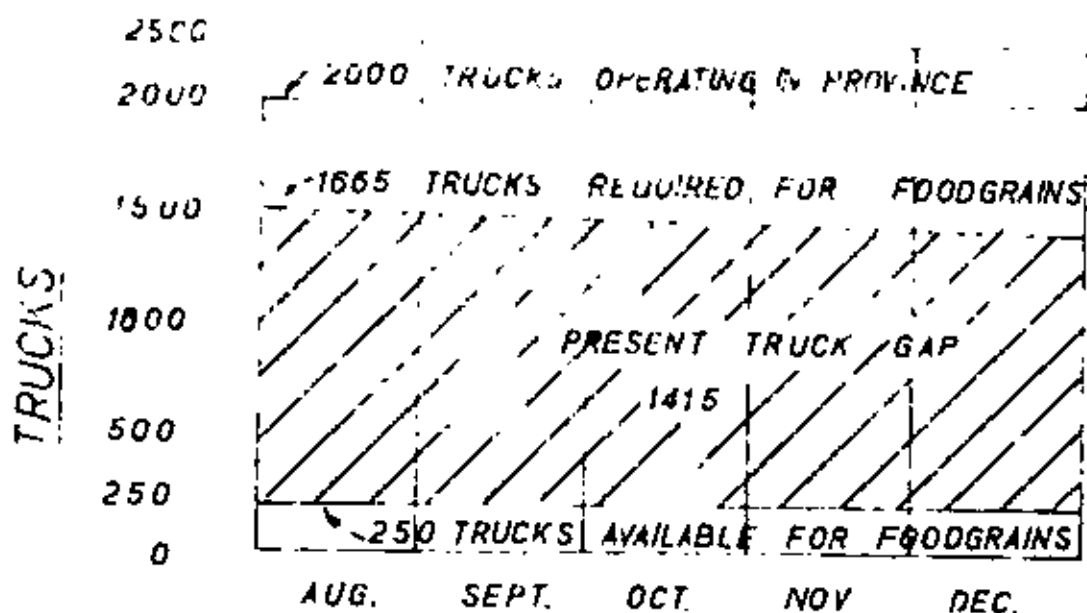
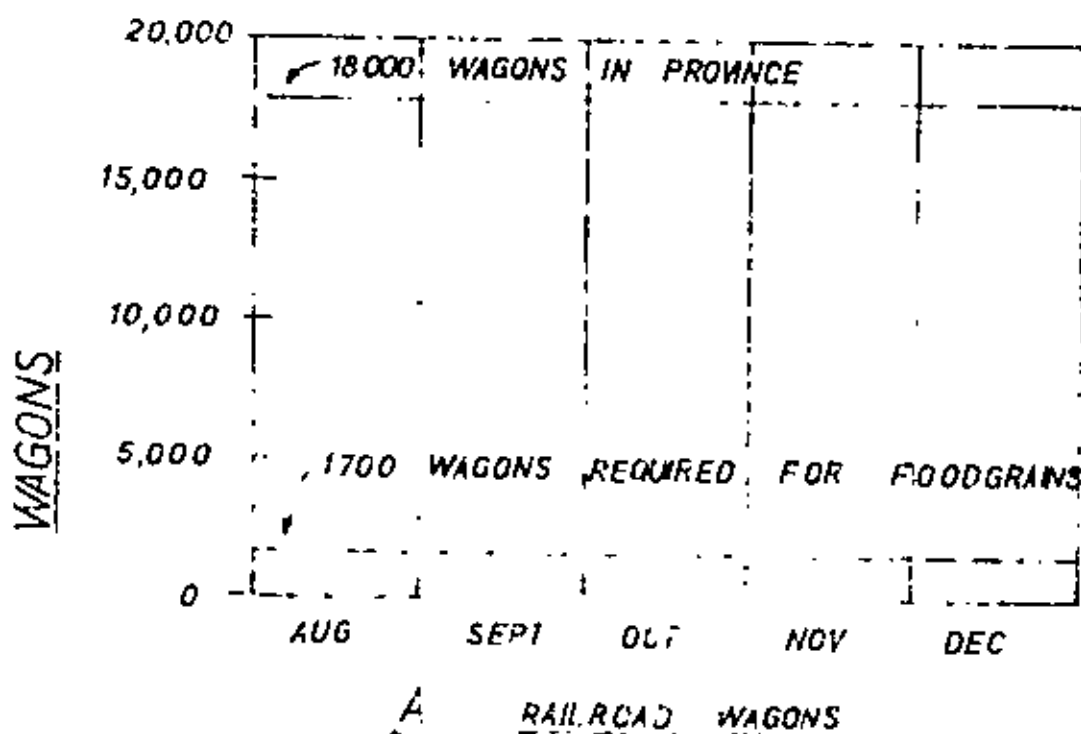
Fig. 17A shows the availability of Barges & Coasters transport for food.

Transportation requirements and programmes should be planned so that they will not be a known bottleneck to economic growth. In the developing economy like East Pakistan, the transportation requirements are not met in conjunction with growth rate of the economy, production will be slowed, distribution of food is checked, consumption hindered, prices gyrate, and the economy suffers.

Goods of different types must move with different requirements as to cost, speed, frequency, convenience and certainty. Pakistan Eastern Railway partly met the requirements of bulky goods to cover long distance. But other bulky commodities like jute, rice and logs are handled by water. But water way is not for all the year. But all the productive areas need access to transportation all the year around. Roads are cheaper per unit of goods that can be moved in a given time. So roads rather than canals provide the best mode of transportation for most in the urban traffic. As the country becomes more urban and more industrial, the importance of speed, convenience, frequency and certainty will increase. Highway transportation will provide an increasing share of the total movement of both goods and people.

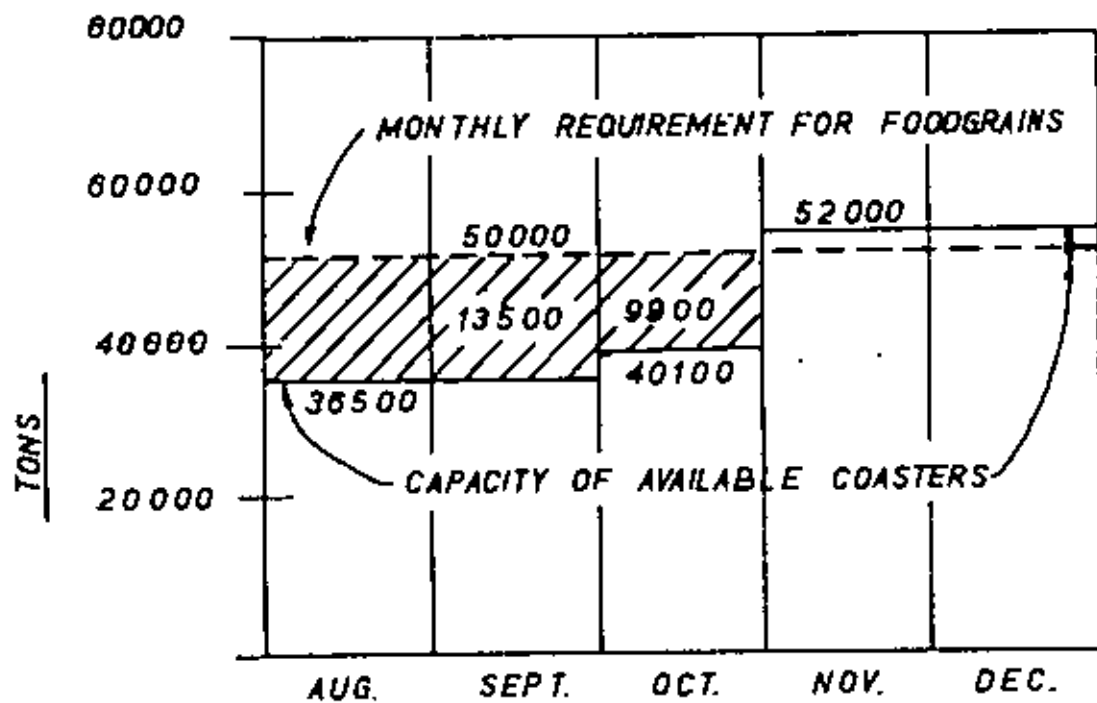


# AVAILABILITY OF TRANSPORT FOR FOODGRAINS

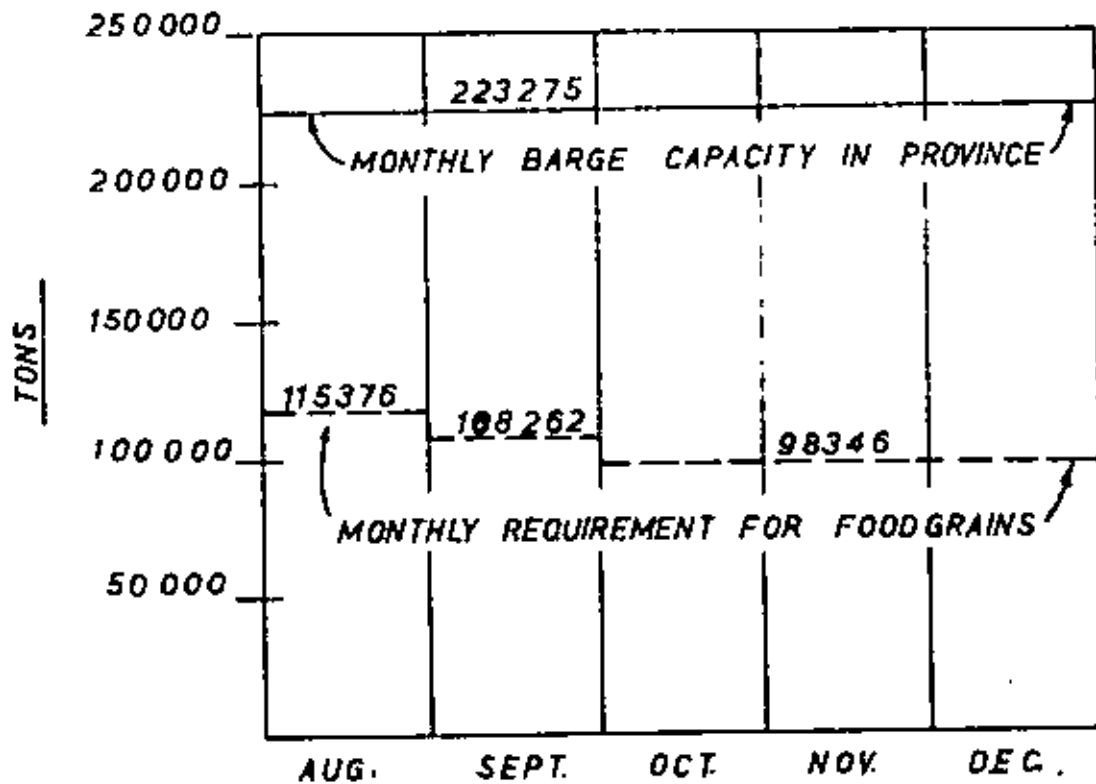


SOURCE: FOOD DEPARTMENT  
BOOKLET - 1970

# AVAILABILITY OF TRANSPORT FOR FOODGRAINS



## COASTERS FOR CHITTAGONG NARAYANGANJ SERVICE



## BARGE CAPACITY

SOURCE: FOOD DEPARTMENT BOOKLET - 1970

**CHAPTER III**  
**TRANSPORT LOCATIONS IN EAST PAKISTAN**

## CHAPTER III

## TRANSPORT LOCATIONS IN EAST PAKISTAN

Progressing from the path to the road, the river to the ocean, the rail to the sky, the space for movement of man and his vehicles now occupies about a good portion of the land in the human habitation. With the variety in modes of travel came increased speed, extended lines of communication, and most important unprecedented mobility of countless millions of people. The impact on the structure of our civilization is great. The industrial economy is rooted in large part on the production and transportation. Volume of commercial development and the public utility services depends to a large extent upon the existing facilities and structure of transportation system of any underdeveloped country like East Pakistan.

Existing transportation facilities in East Pakistan range from hand baskets, ox-carts and hand propelled boats to airplanes. The majority of passenger travel and commodity movement is inadequately served by out dated, wornout and uncoordinated facilities. There are four chief means of transportation and communication in East Pakistan. These are waterways, railways, highways and airways in the east. Each and every mode of transportation in East Pakistan was self-oriented. After partition of Indo-Pakistan sub-continent in 1947, the transportation system of East Pakistan is integrating and coordinating to attain the unified goal of economic and national development. Development at the initial stage of East Pakistan is greatly handicapped by the inefficient and non-coordinated system of transportation.

### 3.1 Waterways

Almost all of East Pakistan is a low tropical plain formed by great rivers and land with their tributaries and distributaries. Because of this intricate network of rivers, inland water transport is by far the most important means of transportation in the area. Commerce and transportation of commodities and people in the area have depended primarily on inland water transport since the earliest times and to the present day

For centuries the rivers and streams of East Pakistan have provided for the area an excellent system of natural waterways. These waterways may be divided into three classes:

(i) Larger, deep rivers which are navigable throughout the year for all types of water borne traffic, ranging from the largest size river steamers down to a small country boat;

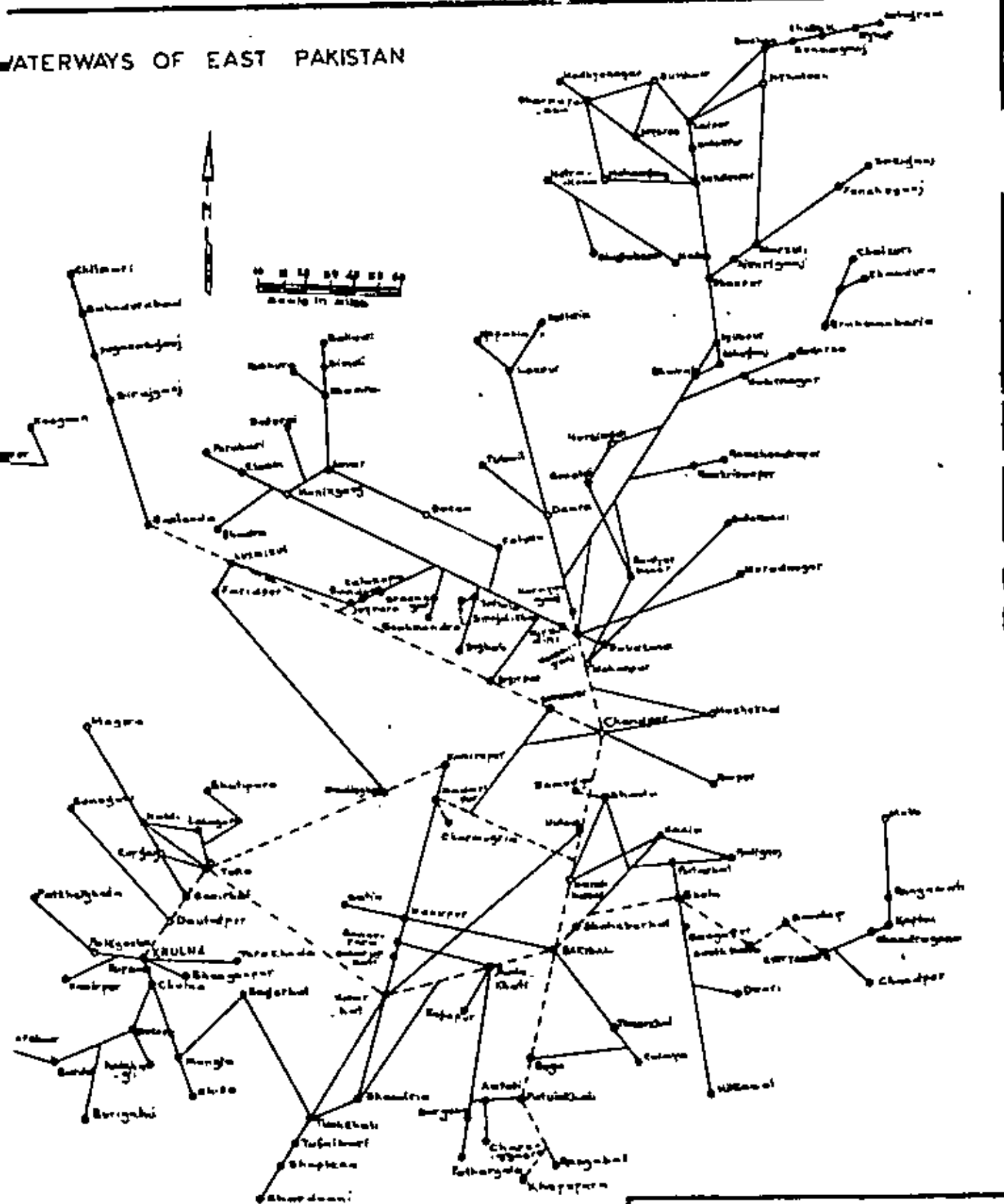
(ii) Smaller and shallower rivers which are navigable throughout the year for country boats of fair size, but can be negotiated by steamers only when in flood (rainy season).

(iii) Smaller streams, channels and khals which are navigable in some cases for the whole year round, and in others only during the rains for country craft of various sizes. In the first category may be placed the rivers : Padma, Brahmaputra, Meghna, Karnafuli, together with many of the river estuaries in the southern districts of Khulna and Barisal. These rivers, along with their off-shoots and inter connections, provide the routes for long distance water-borne traffic. In the second group may be included the majority of the larger streams in the central and eastern portion of the deltaic area. The rest of the streams fall into the third category. The figure 16 shows the existing waterways of East Pakistan.

In East Pakistan among all forms of communication and transport, waterways dominate the scene. Owing to lack of relief and to the many distributory channels, it is easy to construct inter-linking canal connections. Inland waterways generally follow the main river directions. All major rivers, though liable to shifting of their courses, are full of water and capable of carrying craft of various sizes throughout the year. During monsoon months this capacity is greatly increased. The remotest areas in the plain then become approachable by water routes.

The transport of bulky commodities is the main economic function of water transport. The navigable rivers have been of immense importance in the siting of commercial and collecting centres in the past, and in comparatively recent times have influenced the location of industry. Cheap transport facilities combined with the resources of the hinterland have been a waterier factor in the origin and development of several urban centres.

# WATERWAYS OF EAST PAKISTAN



Source: LWTA, East Pakistan

FIG. NO. 8

The attraction of suitable sites on waterways has also been a factor in the development of recent commercial activity. With growing industrialisation, many such localities will be in a favourable position to distribute the finished products of the factories.

It was estimated that water transportation composes 70% of the total transportation system. Water provides 3,000 miles of transportation throughout the year and amounts upto 4,500 miles during the monsoon. In most areas waterways become the only means of transport between thousands of villages situated close to the banks of the rivers. Many of the interior villages are still without any proper link to the communication network.

### 3.1.1 - E.P.I.W.T.A.

The E.P.I.W.T.A. was established in 1958. It was inevitable that inland transportation should be called upon to play a major part in order to distribute and collect, the large tonnages of imports, exports and internal movement of goods, all over the province. With little road routes available, a single railway line connecting Chittagong with the remainder of the province and Chalna being an anchorage port, the vast network of waterways assumed a sudden and new importance in the economic life of East Pakistan. The creation of the Inland Water Transport Authority is one step forward in the progress of planning and implementation of inland water routes in East Pakistan.

### 3.2.1 Inadequate Facilities

During the period 1947-58, no public jetties existed on the inland waterways of the province, and cargoes and passengers carried by self-propelled craft without jetties facilities. These loading and unloading of cargoes and passengers took place through privately operated ghats.

The ghats included those established areas to serve the needs of the railway at railway terminals on the banks of the rivers where the bulk of passengers and cargoes were transhipped with the arrivals and departures of train. The other broad category of ghats comprised those of the privately owned processing plants built on the same banks of rivers in populated districts and centres of collection and distribution.

At the beginning of the period broad requirement of import and export cargo movements in the province mostly were taken care of by railway movement to from Chittagong. The internal provincial requirements were absorbed by railways and IW including a very large but unrecorded tonnage by country craft. Existing riverine transshipment points were mainly of traditional design, with shore connections quite unsuited to fast cargo working.

Commercial vessels and any other forms of transportation containers are designed to be on the move. When not moving between points of cargo origin and destination, they may be considered as being wrongfully employed.

### 3.1.3 Location of Inland Ports

There are five ports chiefly in East Pakistan - Dacca, Narayanganj, Chandpur, Barisal, Khulna and minor river ports. The location of inland ports depends on the following factors :

- (i) Good railway water way and road connection;
- (ii) Proximity to industrial centres;
- (iii) Sufficient depth in the port area and approach channel connecting the port with the main arteries of navigation;
- (iv) Stable bank and navigation channel;
- (v) Safety of the vessels against excessive current and cyclones;
- (vi) Not excessive variation between the average highest and lowest water levels indifferent seasons due to upland flood or tidal effect,
- (vii) Type and volume of cargo as well as nature of passenger traffic,
- (viii) Sufficient space for construction of storage areas, movement of cranes and labourers for handling of cargoes and for their extension, if and when required.
- (ix) Arrangement available for handling and storing the cargo.
- (x) Type and number of vessels which are likely to use the port and frequency of such uses.



### 3.1.4 Rural Water Transport

The bulk of the country boat traffic, for relatively short hauls and out of shallow rivers and creeks, is not only economical under most conditions of its use but is absolutely essential to the provincial economy. As long as this situation exists, country boats will continue to be used, just as country wagons are used.

In rural areas of East Pakistan, for exchange of commodities a large number of collecting and distributing centres, called hats, have developed. At the smallest hats, which are open airmarkets, upto 1000 persons may assemble and 5 to 10 tons of goods are sold on market days. The service area about 5 miles. They are generally located near a stream or road. The next larger hats may attract 5000 persons, and distribute 25 to 50 tons. These serve an area of 25 to 30 miles. They are on launch or steamer routes, the railroad, air or important roads. Then there are the large and regional hats, usually located on junctions of transportation, taking advantage of more than one transportation facility. Examples are : a railroad terminates near a waterway, such as at Narayanganj, Chandpur, Chittagong and the Khulna complex, which includes Khulna and Daulatpur; a meeting of waterways, such as Barisal, and a junction of the railroad and a road net, with water connections, such as Dacca. Of course there are many smaller but important regional hats and all to a greater or lesser degree are production and consumption centres. A journey to market by water even at ten mile distance becomes a long day. Production may have to be sold at nearer markets, though buyers may be fewer, prices lower consequently, and the goods displayed for purchase less varied and more expensive simply because the means of reaching the better markets are just not there. The incentive to increase output is correspondingly diminished and the stimulus of the non energetic and enterprising among the inhabitants increased.

During the plan periods government rapidly made and implemented large scale plans for the economic development of the province. The most important infra-structure in the planned development was undoubtedly transportation. Without its expansion no development could possibly take place and it was realized that transportation could not expand in

any significant without the provision of facilities for transshipping cargoes and passengers at points as near as possible to important areas of industry, production and consumption.

The topography of the province, together with the advantages and disadvantages naturally imposed by its mighty riverine and deltaic complexes had already been responsible for establishing the only locations suitable as permanent areas for the existence and growth of large local populations and their day to day activities.

Excluding the sea port city of Chittagong, these areas have been defined Dacca, Narayanganj, Chandpur, Barisal and Khulna. There had always been a demand for them to be linked together by the most economical and efficient forms of transport which because of lack of a substantial highways system, were met by INI and railways.

The rapid expansion of industrial activities led to the establishment of many new industries in these five principal areas. The vast new industrial estates at Tejgaon and Tongi and the large jute and textile mills and other industries in Narayanganj, Khulna, were symptomatic of the expansion which initiated plans for transportation and transshipment of goods and working people. The population expansions in these areas created huge demands for dwellings and family consumable items which, in many instances would be fulfilled in the main from provincial sources. This produced a vastly expanded activity in country best collections and deliveries in these areas which presented big problems in port congestion in areas often unsuitable as places to load or discharge cargoes and passengers and effect their clearance through narrow congested approach roads.

Many communities, large and small, on the banks of the rivers of East Pakistan have developed where landings are made. In all there are 1,170 riverine stations where passengers and cargo are handled. 1

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1. "Transportation Survey of East Pakistan" US Army Corps of Engineers, 1961 Vol.II, p.93.

Waterway communications play a vital role in the economy of East Pakistan. ~~The~~ ~~role in the economy of East Pakistan.~~ The country is the meeting place of two mighty rivers, the Ganges and the Brahmaputra, and on sides there are a number of major and minor rivers which remain navigable throughout the year. The activity and behaviour of these rivers, have always played a pivotal role in determining the transportation network and in fashioning the economic conditions of the people.

The rivers of East Pakistan can be said to be its liabilities as well as an asset to the area. Water transport services influence economic specialisation by impeding or facilitating development. The entire economy of East Pakistan is heavily dependent on water transport. Yet the largest portion of the inland water transport of East Pakistan is still being served by the country boats, the traditional "bullock carts of the rivers"

### 3.2 Railways

The railway network in East Pakistan is comprised of two separate systems separated ~~James~~ ~~river~~ and its contribution as the Ganges river and the Meghna river. The railway system east of this divisive water course serves the important stations at Chittagong, Dacca, Shairab Bazar, Mymensingh and Sylhet. The railway system on the west side of this water barrier serves all of the important points of the Rajshahi Division, and by means of the Hardinge Bridge across the Ganges River it serves Kushtia, Khulna and the railway terminals at Goulundo, Faridpur, Kawkhal and Bhatispara. The railway system on the west side is comprised of two different Gauges, one called the broad Gauge and the other called meter gauge. The broad gauge railroad extends from Khulna to Chilkhati with branches to Goulundo Ghat, Sirajganj Ghat and Amara. The meter gauge railroad extends from Tistamukh Ghat to Santahar to Kaulia, Kanchan and Putea with branches to Burisari, Kurigram, Mughalhat, Birol and Baharpur. The figure 19 shows the railway system of East Pakistan. As shown in the figure 19, railways serve only a small part of the province and are subject to enormous technical difficulties.

# RAILWAYS OF EAST PAKISTAN 1968

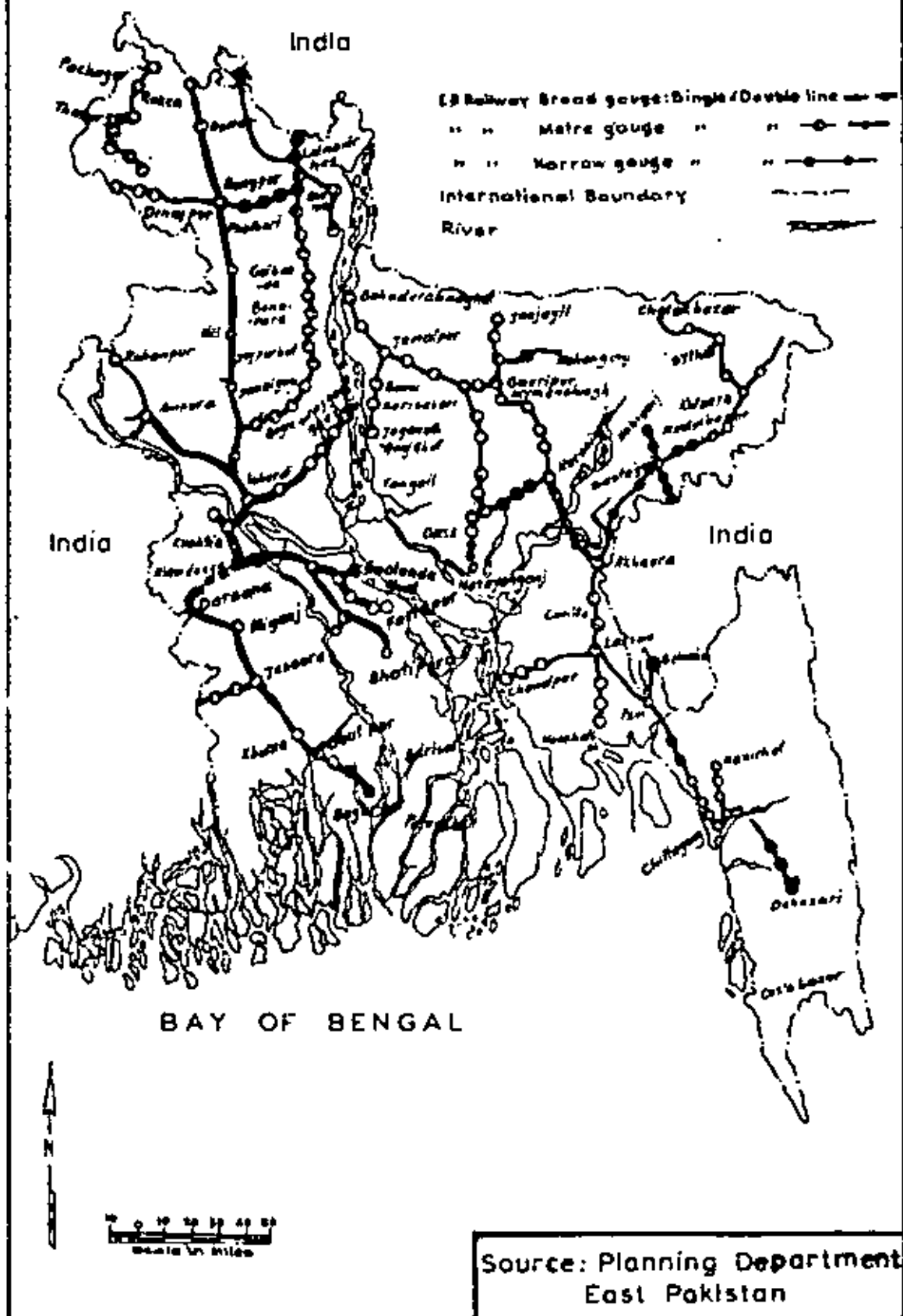


FIG. NO. 19

The table III-1 shows the rail-land ratio by district. In the districts of Bogra and Jessore respectively over 70% of the total area is served by rail. Kustia and Rangpur districts rank second and over 60% of their total area is served by rail. Noakhali, Comilla and Dinajpur districts rank third and the area served by rail ranges between 45 and 55% of the total area. The remaining districts are poorly served by rail ranging from 24% to 39% of the total area.

TABLE III - 1  
The Rail-Land ratio by district \*

	Total area sq.miles	Area served by rail sq. miles	% of total area served by rail	Rail-Land ratio(sq.Miles served per mil of line)
East Pakistan	55,126	16,000	30	31
Chittagong including Chittagong Hill Tracts	2,570	747	25	28
Noakhali	1,598	830	52	31
Comilla	2,531	1,297	52	17
Barisal (including Patuakhali)	4,040	0	0	0
Bacca	2,741	890	32	30
Faridpur	2,504	622	24	28
Mymensingh	6,230	2,269	35	26
Bogra	1,475	912	70	18
Dinajpur	2,535	1,100	46	25
Khulna	4,810	299	6	142
Kustia	1,371	837	60	16
Pabna	1,826	709	39	34
Rajshahi	3,639	1,376	40	30
Rangpur	3,699	2,197	60	17

\* Statistical information for Sylhet and Jessore was not available.

Sources: The Oriental Geographer, Volume XII, 1, January, 1968, p.28.

The rail-land ratio <sup>1</sup> in the province averages 1:21. This ratio varies from area to area and is an index of the availability of higher land free from inundation and soil erosion for laying track. In the districts of Comilla, Kushtia, Bogra and Rangpur the rail land ratio ranges between 16 and 18 whereas Chittagong, Noakhali, Dinajpur, Faridpur, Mymensingh and Dinajpur maintain 31 to 25 square miles of rail track. 2. Despite the programmes for rapid rehabilitation and development in the post independence period, rail transport facilities are still very limited. The table III-2 shows the rail population ratio of East Pakistan.

Table III-2 RAIL POPULATION RATIO OF EAST PAKISTAN

	Percentage of the total population served by rail	1 mile of rail track serving population <sup>1</sup>
East Pakistan	40.5	30
Jessore	63	10
Kushtia	63	11
Dinajpur	35	14
Rangpur	50	14
Bogra	68	16
Rajshahi	37	18
Chittagong	41	25
Sylhet	42	24
Comilla	43	26
Mymensingh	37	25
Faridpur	19	29
Pabna	37	31
Dacca	32	45
Noakhali	42	45
Khulna	17	61

Source : Ibid p.29.

1. The area served by one mile of rail track.

2. The Oriental Geographer, Vol.XII, No.1, January, 1968, p.28.

In 1961, there was one mile of railroad track available for every 30,000 people in the country. However, rail transport facilities in terms of population rail road ratio vary from area to area and it is conditioned by the size of districts in terms of area and population, and the geographical and topographical nature of different parts of the country. In the districts of Dinajpur, Jessore and Rangpur, nearly 55 to 60% of the total population is served by rail and one mile of rail track serves 10-14 thousand persons, whereas in the areas of Dacca and Moulvibali 42-32% of the total population is served by rail and a mile of rail track serves 45,000 persons respectively. In the districts of Chittagong, Sylhet, Comilla and Mymensingh, 37-43% of the total population is served by rail, and one mile of rail track serves 24-26 thousand persons.

Low speed, poor rail facilities, lack of wagon and coach capacities, availability of poor coaches and wagons, quality of sleepers, and lack of double track affect service adversely on almost each route in the area. Insufficient carrying and stoppage capacity of the transportation modes handicaps distribution. Producers are known to limit production because of fear of spoilage or delays in reaching markets. Physical gaps in the system and lack of transfer or connecting facilities, contribute to the general inadequacies of the system. The rail service is falling, chiefly in terminal movements due in part to out dated facilities and practices in the area as a whole. One of the trouble spots is at Chittagong where transportation facilities cannot move imports expeditiously to other distribution points which shattered the regular process of development.

In an agricultural country like East Pakistan the harvest periods are important from a transport standpoint because they give an idea of the peak season volume. During the rice harvest, the import required is mostly for short distances and a large volume of rice is generally moved by water transport. However, the role of rail transport in serving various other crops, in the province in addition to the rice cannot be minimized. About 37% of the total area under paddy and jute respectively in the province is served by railroad. 33% of the total area under vegetables is served by rail road in the province.

Out of the total imports of East Pakistan, it is estimated that about 55% of the total imports of the province are moved by rail and 45% is moved by inland waterways. The important factor in the movement of various imported commodities by rail lies in the fact that the imported goods consuming centres in the province are mostly located on rail-heads.

The meter gauge produced 68% of the total ton-miles, whereas the share of the broad gauge was only 32%. Commodity wise breakdown of the freight carried by railroad in East Pakistan shows that coal, paddy, and jute rank first and constituted over 50% of the total freight carried. Fruits, vegetables, petroleum products, cement and salt are the other important commodities of rail freight and constituted about 17.5% of the total freight. The small railway stations generate average small volume of goods, largely due to the under developed nature of the region.

The movement and growth of passenger traffic of the people is basically to (a) attend local or regional markets; (b) many people visit nearby towns to sell their perishable commodities, and they generally leave in the morning and return to their homes in the evening; (c) and people go to appear before the courts for legal matters.

It is also worth mentioning that the increase in population is far exceeded by the annual rate of increase in passenger traffic. The main contributory factors are the rising level of economic activity, relatively more mobilization of rural population to some urban areas and a degree of general economic inequity in rural areas.

The rail transport has helped the expansion of both domestic and international trade of the area, and through such market enlargement, railways did and will bring a number of small isolated economic units into some form of exchange economy and stimulated industrial growth. However, further extension of railway system and facilities would depend primarily on the further expansion of industries and general widening of the national market. Movement of many agricultural raw materials from the rural areas to the city and fertilizers and many consumer goods from urban centres to country side will increase the demand on the existing railway facilities.



East Pakistan has characteristically two "Traffic Partings", namely break of gauge and unbridgable Jamuna-Padma-Meghna. Conversion into one gauge would be most economical. Furthermore, the stimulation of construction of country roads would be profitable for both producers and railways. Since a large part of the country is badly situated from a transport point of view, the development of roads linking the main rail roads would bring a geographical regrouping of all such productive areas. Such roads & high ways are mostly needed for rail transport for their traffic.

### 3.3. High ways

East Pakistan was completely neglected in pre-independence days in matters of roads and highways development. The typical river-ridden surface of the province puts roads and highways at a disadvantage, particularly when covering long distances. Ferries are common feature of road transport. In East Pakistan, therefore, roads remain auxiliary to both river transport and railways.

The total length of metalled highways existing in East Pakistan in 1968-69 was 2,387 miles. 1 At the time of partition there were only 608 miles of highway of which the amount of metalled highway was about 287 miles. The length of unmetalled roads is about 58,000 miles of which about 25,000 miles comprise major roads and about 33,000 miles represent minor roads. 2

The unmetalled roads are generally unserviceable for commerce because the surface of the road cannot be maintained during the wet seasons. The completion of the North Bengal highway along with some unmetalled roads, although a small portion of the total highway system, has made a significant improvement in the over land communication between the hinterland and the centres of commerce. The principal roads and highways are shown on the figure 20.

Road facilities will open out many rural areas to contact with neighbouring communities and trade centres because the lorry, handling a much smaller unit than the goods train or large boat, can serve remote areas more frequently. Thus consumer goods

1. Economic Survey of East Pakistan 1969-70, Planning Department of Govt. of East Pakistan.  
2. East Pakistan, A Systematic Regional Geography and its Development Planning, Nazim-ul-Rasheed  
Second edition - 1967.



will be better distributed and the transport of rural marketable commodities will be better organized if roads are developed. The new industrial development will receive potential stimulus. A great increase in demand for highway transportation can be expected by areas not served by rail or water. Transportation by trucks and lorries carrying both freight and passengers will provide faster delivery.

The major highway network, with Dacca as the hub cover about 2500 miles. The length of the existing secondary highways and feeder roads range between 27,000 and 42,000 miles. Many of these roads are primitive and are not paved. Many of the roads in East Pakistan are on embankments to raise them above the level of flood waters which inundate the country during the wet season.

The present highway system consists in general of short segments radiating from principal centres of population and economic activity. Connections between these centres do exist during the dry season only.

The following Table III-3 shows the highways of East Pakistan.

TABLE III-3

Trunk route No.1

<u>Name of the routes</u>	<u>Miles</u>
(a) Cox's Bazar to Chittagong	96
(b) Chittagong Feni	72
(c) Feni to Comilla	38
(d) Comilla to Sandkhendi	33
(e) Sandkhendi to Dacca	20
(f) Dacca to Daire	10
(g) Dacca to Aricha	56
	325

## Trunk route No.2

(a) Comillato Companyganj	13
(b) Companyganj to Brahmanbaria	35
(c) Brahmanbaria to Sylhet(District boundary)	15.5
(d) Sylhet (district boundary) to Moulvibazar	67
(e) Moulvibazar to Fenchuganj	62
(f) Fenchuganj to Sylhet	15
(g) Sylhet to Jaintapur	35
(h) Brahmanbaria via Masainagar & Habiganj to Moulvibazar	53
	<hr/>
	258.5

## Trunk route No.3

(a) Nagerbari to Ishardi	35
(b) Bera to Bogra	37
(c) Bogra to Rangpur	68
(d) Rangpur to Dinajpur	47
(e) Dinajpur to Panchagath	60
(f) Panchagath to Tetulia	22
	<hr/>
	269

## Trunk route No.4

(a) Ishardi to Rajshahi	56
(b) Rajshahi to Baharpur	63.5
(c) Ishardi to Kushtia	22
(d) Kushtia to Jhenidah	26
(e) Jhenidah to Jessore	29
(f) Jessore to Khairia	40
	<hr/>
	236

45595

## Trunk route No.5

(a) Goalundo Ghat to Faridpur	22
(b) Faridpur to Sarisali	75.5
(c) Faridpur to Kamarkhali	20
(d) Kamarkhali to Mt Jheridaha	24.5
(e) Jheridaha to Maharpur	40
	<hr/>
	182

## Major roads

(a) Dacca to Tangail	65
(b) Tangail to Mymensingh	65
	<hr/>
	130

## Secondary High ways :

(a) Chittagong to Kaptai	29
(b) Rangmati to Malachari	60
(c) Rangmati to Chimbuk	39
(d) Doox-Rangach-Mahaichari	45
(e) Karanichat to Bahadurabad Ghat	15
(f) Chittagong to Rangach	35
(g) Rajpur to Chandpur	10
(h) Chittak to gravel source	12
	<hr/>
	259

Table III-4 shows the bus routes by districts upto 1961

TABLE III-4

<u>District</u>	<u>Route mileage</u>	<u>No. of buses</u>
Dacca	129	333
Myerensingh	450	104
Chittagong	742	349
Moulvib	321	105
Faridpur	44	2
Comilla	134	119
Chittagong Hill tract	47	25
Sylhet	403	343
Rajshahi	78	52
Dinajpur	361	38
Bogra	118	44
Fabna	148	65
Khulna	183	43
Barisal	114	40
Kushtia	127	29
Jessore	526	191
Rangpur	173	37
	<u>4145</u>	<u>1813</u>

Source: Transportation Survey of East Pakistan Army Corps of Engineers, Vol.III.

The buses transported 58,500,000 passengers in 1961. About 3,500 trucks moved 3,500,000 tons of freight in 1960. But in 1967, East Pakistan had 56,205 motor vehicles as registered. Of these 3,316 buses, 7,241 trucks, 15,849 cars, jeeps and station wagons, 25,724 cycles of two and three wheels, and 3,955 others. Less than 10% of the villages are accessible by a road of any type. Automobiles, trucks and buses are few in number.

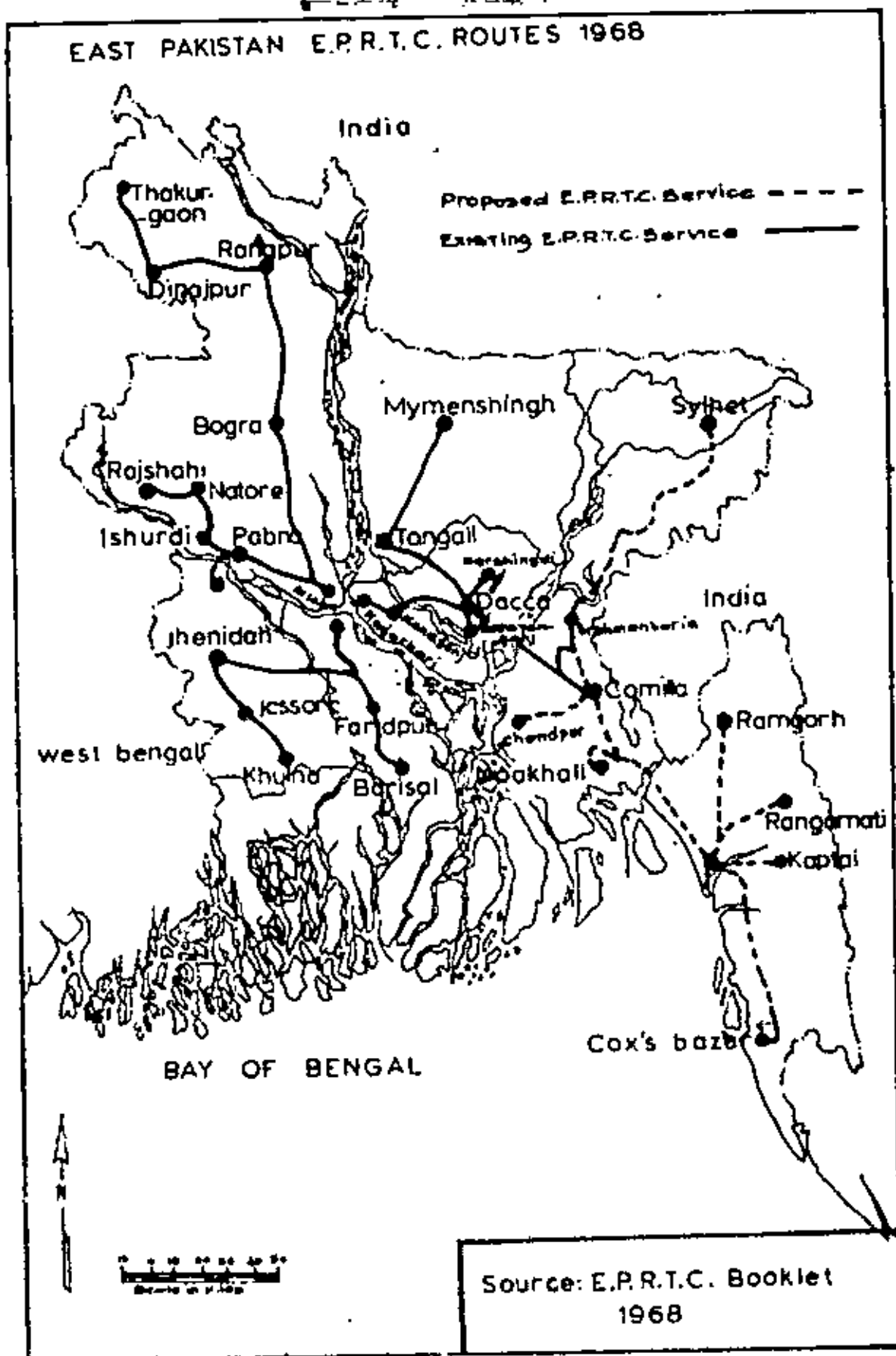
inproportion to the increasing population of the province. A great increase in demand for highway transportation can be expected from areas not served by water or rail. Truck transportation of freight will provide faster delivery.

### 3.31 E.P.R.T.C.

The East Pakistan Road Transport Corporation was established in 1961 to meet up the growing demand of urban traffic of Dacca. Dacca, a metropolis, with a growing population of more than a million has long been suffering from a chronic shortage of transport facilities. But the services of E.P.R.T.C. have been extended to connect the district head-quarters with the provincial head-quarter. This attempt has been taken from 1963 by extending its service to Tangail and Narayanganj. Subsequently the services were extended to cover almost all major highways of East Pakistan either by bus service or by coach service. The figure 21 shows the routes of E.P.R.T.C. operating services.

The bus services provided by East Pakistan Road Transport Corporation are absolutely passenger traffic. Passenger movements by E.P.R.T.C. bus services are direct competition with Pakistan Eastern Railway. These routes are (i) Comilla - Dacca (ii) Ishurdi-Dacca. Time factor is potential for this competition. Generally the officials and businessmen move to save time. This inter city movement of passengers will exert strong influence on social aspect of the economy of East Pakistan. Social isolation is in/ some areas of East Pakistan is economic isolation. Though the E.P.R.T.C. has been created to meet up the growing urban traffic of East Pakistan, improved roads will facilitate travel between the districts and the seat of the provincial government at Dacca and will promote community interest. The impact of the truck road system will develop a change in the pattern for the movement of commodities and people, and stimulate new areas of economic and social activity. The economic importance of the successful completion of inter-districts connections should be the primary factor for overall regional development of East Pakistan. The economic and social benefits gained by the adequate road system will accelerate opportunities for increased industrialisation and business enterprise.

# EAST PAKISTAN E.P.R.T.C. ROUTES 1968



Source: E.P.R.T.C. Booklet  
1968

FIG. NO 21



Because of general economic conditions prevailing in East Pakistan and the imperative need to improve the basic economy justification for roads must often be based on intangible benefits to the economy. The truck and bus can supply needed forms of transportation to many elements of the public. Truck operations around towns or cities and a potential part intercity operations. The latter dependent upon connections between cities or large economic and industrial centres and their effectiveness and efficiency is reliant on the correct location of truck routes. The bus serving many short haul passengers along the highway. With the comparatively uniform concentration of population, the average passenger trip is of a relatively short distance.

High way facilities are essential to the development of the various segments of the provincial economy. A truck high way system is foremost in the importance to connect principal areas of development. Industrial and perishable agricultural products needs ready transportation for distribution to ensure price level. Through inter district travel with connections to rail and water routes and areas of present and future development will provide an impetus to the economic development of the country.

As the economy of the nation improves, and new areas of business activity and industry develop a need will be generated for additional secondary and feeder roads to assist the growth and development of the rural areas of East Pakistan.

### 3.4 AIRWAYS

After partition the development of air services was essential both for interwing communication as well as internal travel. In recent years there has been a rapid development of internal provincial services. A wide network of helicopter services linking Dacca with Chalna, Barisal, Bogura, Hatis, Sandhp, Kushtia, Sirajganj, Rajshahi, Bogra, Rangpur, and Dinajpur. From Dacca internal flights are available to Sylhet, Sariatker, Comilla, Chittagong, Cox's Bazar, Jessore, Ishwardi and Thakurgaon. The figure 22 shows the existing airways of East Pakistan.

The demand for air transportation passengers within the province is not great

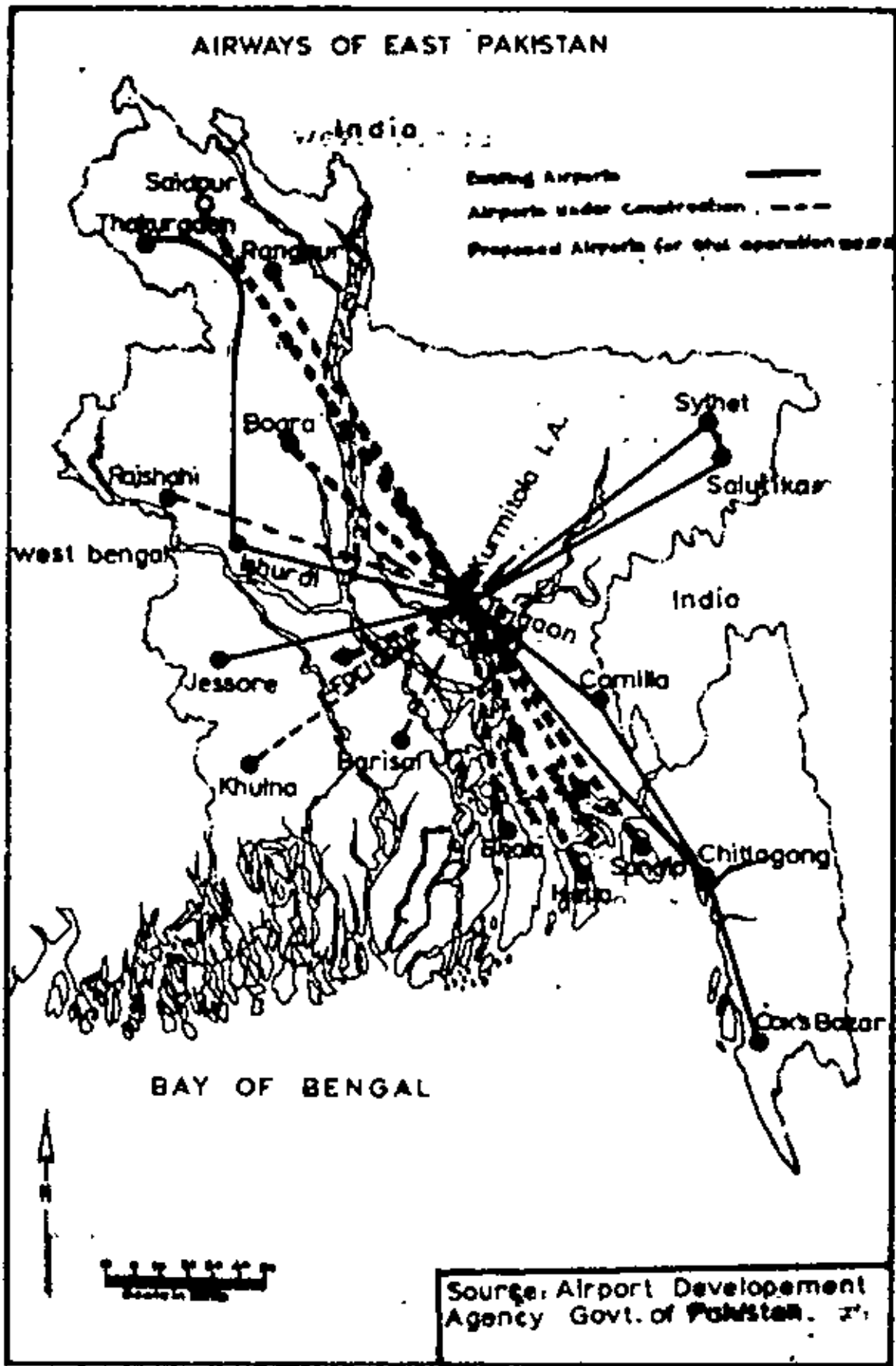


FIG. NO. 22

because the low personal income does not encourage the wide spread of costlier air transportation. The objectives of transportation in East Pakistan may be described as to bridge the time and space gap separating producer and consumer, either by the movement of the goods made by the producer (goods transport) or by the movement of the producer or consumer himself (passenger transport). The more efficient the transport services are the greater will be the volume of demand within reach of the producers, the wider the market and among productive resources.

As development is the end in East Pakistan so there should be positive correlation between rural development and standard of transport and distance from the commercial centres. Cash crop development of East Pakistan can be correlated with development of East Pakistan. The comparison of the rates of agricultural development associated with transport construction may indicate the following important characteristics :

- (i) The standard of transport in relation to journey and type of commodity.
- (ii) The location of the transport in relation to its surrounding terrain.
- (iii) The location of the transport in relation to areas of population pressure.

This complex relationships involved in rural development are suitable for quantitative analysis. Along side new or improved transports there is likely to be established new villages, the population of which come from isolated areas, sometimes quite near and take up the activities leading to the exchange of products.

Transportation systems of any under developed like East Pakistan are means of rural urban diffusion and interaction. This interaction with the help of transportation will initiate the extension of urbanisation towards the periphery. In rural areas of East Pakistan, the social attitudes are conservative. Only efficient transportation can bring the changing social attitudes which are the precondition to economic development.

Since mobility is essential to almost everything that underdeveloped country, like East Pakistan, is striving to accomplish, it follows that transportation is a factor in the success or failure of the entire development effort. A general sequence of units and stages in which transportation and progress toward higher levels of living are

closely related. The stages of transport development are as follows :

(i) The period of immobility and the traditional society;

(ii) The period of internal movements and the growth of trade.

(iii) In the process toward greater mobility and higher standards of living is that of transport mechanisation and industrialisation. A basic feature of this period is the profound switch from agriculture to industry and agricultural to non-agricultural employment.

(iv) This stage is the development of motorization.

(v) The last stage is the conquest of air and space.

East Pakistan's transportation is at the initial third stage, where mobility from agriculture to urban employment is taking place.

**CHAPTER IV**

**TRANSPORT INVESTMENT IN EAST PAKISTAN**

## CHAPTER - IV

## TRANSPORT INVESTMENT IN EAST PAKISTAN :

Transport systems almost always require substantial capital investment and budgeting. Capital budgeting refers to the investment decision. Investment decision encompasses the selection of projects, the timing of the investment, the determination of the amount to be invested within any given time period, and the arrangement of the financial means necessary for the completion of the projects. Planning transport investment is a difficult process. The allocation of funds among the several modes of transportation is the problems of investment strategy for economic development.

The choices to be made concerning investment in transportation may be divided into three categories that concern, first, the total amount to be invested in transportation (as opposed to investment in other sectors of the economy); second, the basic choices as to the division of investment among the different modes of transportation (rail, highway, water way and air way); and third, the remaining choices of investment policy subsequent to these basic decisions. A starting point for analysis is the exhortation to plan investment in transportation in a developing country in a manner that is integrated with general economic policy since general economic development is the goal. The basic characteristics of underdeveloped country like ours is capital scarcity and desire to proceed rapidly toward a higher level of output percapita. "Although transportation investment is not the only input needed to promote development, it is probably the major need in most underdeveloped countries and takes largest single share of investment funds".<sup>1</sup>

A simpler, practical procedure for taking into account the major inter-connections between transportation and rest of the economy involve the following steps :

- (1) A general review of the economy and its investment programmes;

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1. "Transportation in Rural Areas", R.S.P. Donney, *Statistics*, January, 1970.

(ii) A judgement as to whether the transportation sector of the economy is a "priority" sector in which investment should be made to stimulate development of the economy ; and

(iii) A study of whether the particular project is the most beneficial that might be undertaken.

In determining the investment feasibility of transport the following principles may be considered :

- (1) Transportation Projects should not be undertaken unless they show an adequate return on the investment.
- (2) The initial investment must be kept to a minimum consistent with safety and the purpose of the project.
- (3) A new project must go through a seasoning and development period.
- (4) Any revision in plans and design must be subjected to the same scrutiny and economic justification as the original design, to assure that it contributes to the economic integrity of the project.

Determining the proper overall size of the transport programs requires, in principle, a comparison of the marginal transport investments with those in other sectors, such as education, agriculture and industry. All transport investments are justified with a rate of return higher than the country's opportunity cost of capital. The transport programs should indicate not only the physical investments needed, their costs, priority and timing, but also how the programs should be financed. There are essentially three major sources of finance in East Pakistan (1) Charges on the users of transport services, revenues from general taxation and domestic borrowing and foreign aid.

\*In order to analyze the economic justification for an investment in transport

it is necessary to compare the projected monetary benefits with the estimated costs<sup>1</sup>. One of the oldest and soundest criteria of economic feasibility is the rate of return method using the basic location formula. This involves a comparison of the rates of return on investments from several alternative systems of different modes of transportation and locations.

The formula is  $\left( \frac{R-E}{C} \right) = P.R$

where R = Anticipated revenues;

E = Operating expenses including taxes and depreciation,

C = investment in plant and equipment;

P = rate of return.

Preparing this comparison involves the primary question of deciding to what extent East Pakistan should commit its limited revenues, resources and loan capacity to a long term investment. In addition to the specific transportation mode, there are multitude of alternate social overhead investments such as schools, hospitals, water resource projects, other transportation modes, and alternate transportation investments that could be undertaken. As well as personal or private ventures encouraged through changes in the tax structure.

Transportation investments will unquestionably produce changes in the economy and society as a whole. Any change traceable directly or indirectly to a transport investment can be considered a high way investment effect. Examples of direct effects are the lowering of transportation costs to the users. Transport investments like all other productive investments make it possible to expand the output of the economy.

1. "Economic and Engineering Feasibility Report on Faridpur-Jheridah-Jessore-Khulna Roads" p.15, Vol. 1, 1963, Sargor Engineers - Pakistan.

2. "An introduction to Transportation Engineering" by William, W. Hay, p.385.



#### 4.1 Cost-Benefit

Cost-benefit calculations attempt to assess the total cost and benefit to society of individual investments normally in effort to judge among competing alternatives.

##### 4.1.1 Economic Benefits

measuring economic benefits of transport projects is usually different than measuring economic costs. There are direct benefits such as comfort and convenience which cannot be measured in monetary units. There are indirect benefits which are improved transportation stimulates economic development.

The most important benefits from transport investment include:

- (i) Reduced operating expenses initially to the users of the new facility and also usually to those who continue to use the existing facilities;
- (ii) Lower maintenance costs;
- (iii) Fewer accidents and less damage to goods;
- (iv) Savings in time for both passengers and freight;
- (v) Increased comfort, convenience and reliability; and
- (vi) Stimulation of economic development.

Not all of these benefits result from all projects and their respective importance differs from project to project.

The most direct benefit from a new or improved transport facility, and frequently also the most important and the one most readily measurable in monetary terms, is the reduction of transport costs. While this benefit accrues initially to the users of the facility, competition or the desire to maximize profits leads them to share it in various degrees with other groups, such as producers, shippers and consumers. The cost reduction therefore benefits the nation as a whole and not merely the users of the facility.

Accident reduction is clearly an economic benefit, but not every transport improvement reduces accidents. Measuring the economic benefits involves two main steps. The first is estimate the reduction in accidents comparing the accident rate on the

existing highway as it would be in the absence of the improvement. The second step is to estimate the value of the accident reduction.

Best transport improvements reduce travel time. The value of time for passengers and freights can be translated into monetary unit. Time saved on the shipment of freight may well be more valuable in the less developed countries than in those more advanced.

That economic development requires adequate, effective transport services is axiomatic. In the context of national development it plays a strategic role in expanding the domestic markets and raising the location and level of economic and social activities

leads to the accelerated growth in industries, agriculture and other sectors. Its function as a factor input requirement is obvious. It enables goods and services to be transferred between and within production centres. Since of this movement is between urban and rural areas, transport provides an essential ingredient in the monetisation of agricultural sector and raising its productivity. This is especially true in the case of East Pakistan whose economy is heavily dependent on agriculture. It has also some beneficial effects in shifting production possibility function by altering relative factor cost. "Cheap and efficient transport also have the positive stimulus to the growth of large cities. Thus urbanisation is an indirect result of cheap transportation through latter stimulus to large scale production, territorial division of labour and the resulting exchange of commodities". 1

"It is important to note that in East Pakistan there are feeder roads everywhere to two miles along the highways. These are kutchas roads that link the villages within a radius of five miles with the pucca road. Some of the kutchas roads are motorable during the dry season. Bullock carts, buffalo carts and one-horse drawn hackney carriages are

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1. Locklin, Philip. D. "Economics of Transportation", p.10.

the main means of transportation on these roads. There are many sizeable villages along the highway with a dense population which requires a much expanded transportation system\*.

#### 4.1.2 Access Benefits

Increased accessibility will have a significant impact on the economic development of land currently in use of the province by encouraging more efficient planning and utilization. Access benefits resulting from road construction take the form of increased value of currently unmarketable crops and the more valuable land use in the case of access to areas previously served by inferior means of transportation. Accessibility is essential to the full utilization of existing agricultural production and mineral resources. It will have a significant impact on the economic development of land currently in use, either by upgrading the existing use or by making possible the substitution of a more desirable use for a less desirable one. The magnitude of the impact of accessibility will depend largely on the economic potentiality of the land and its inner resources.

The value of land and property development benefits derived from the existing or proposed will be a function in part of the economic potentials of the area served, the growth of the population, the entrepreneur spirit, skills and capabilities of the indigenous population. With a favourable economic potential in the province to be served, and a favourable population growth substantial land and property development benefits can be anticipated principally in the following areas :

- (i) Rise in the value of agricultural lands through increased marketability of crops, shift to more profitable crops and availability of supplies and services at lower costs;

- (ii) Community and industrial development throughout East Pakistan.

The magnitude of the gain in access benefits is difficult to separate from economic benefits.

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1. \*Economic & Engineering Feasibility Report on Faridpur, Jhenidah-Jessore-Roads\*, p.27

# PASSENGER CAR OPERATING COSTS AT VARIOUS SPEED

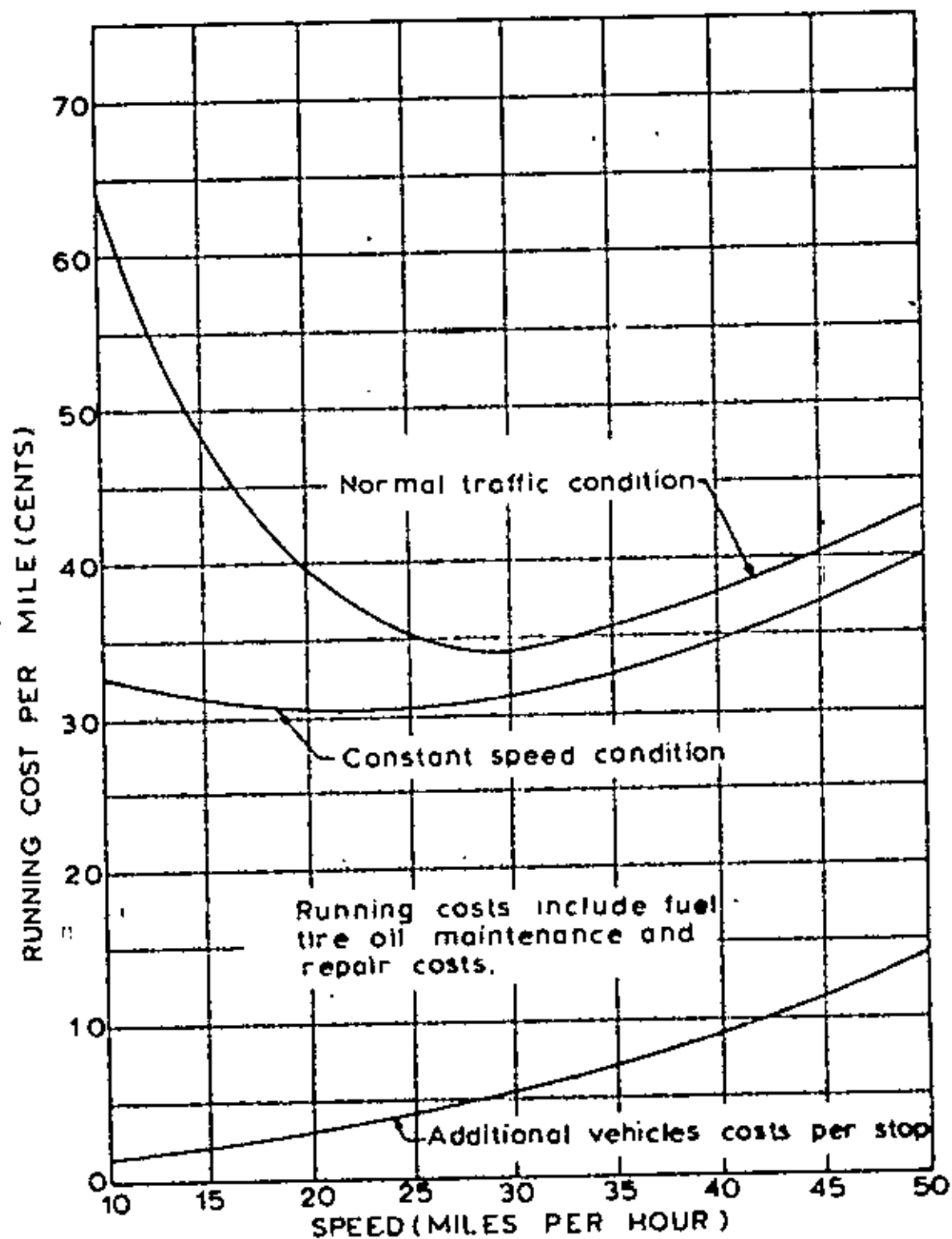


FIG. NO 23

Source: Traffic Engg. Handbook 1965

PASSENGER CAR OPERATING COSTS AT VARIOUS SPEED

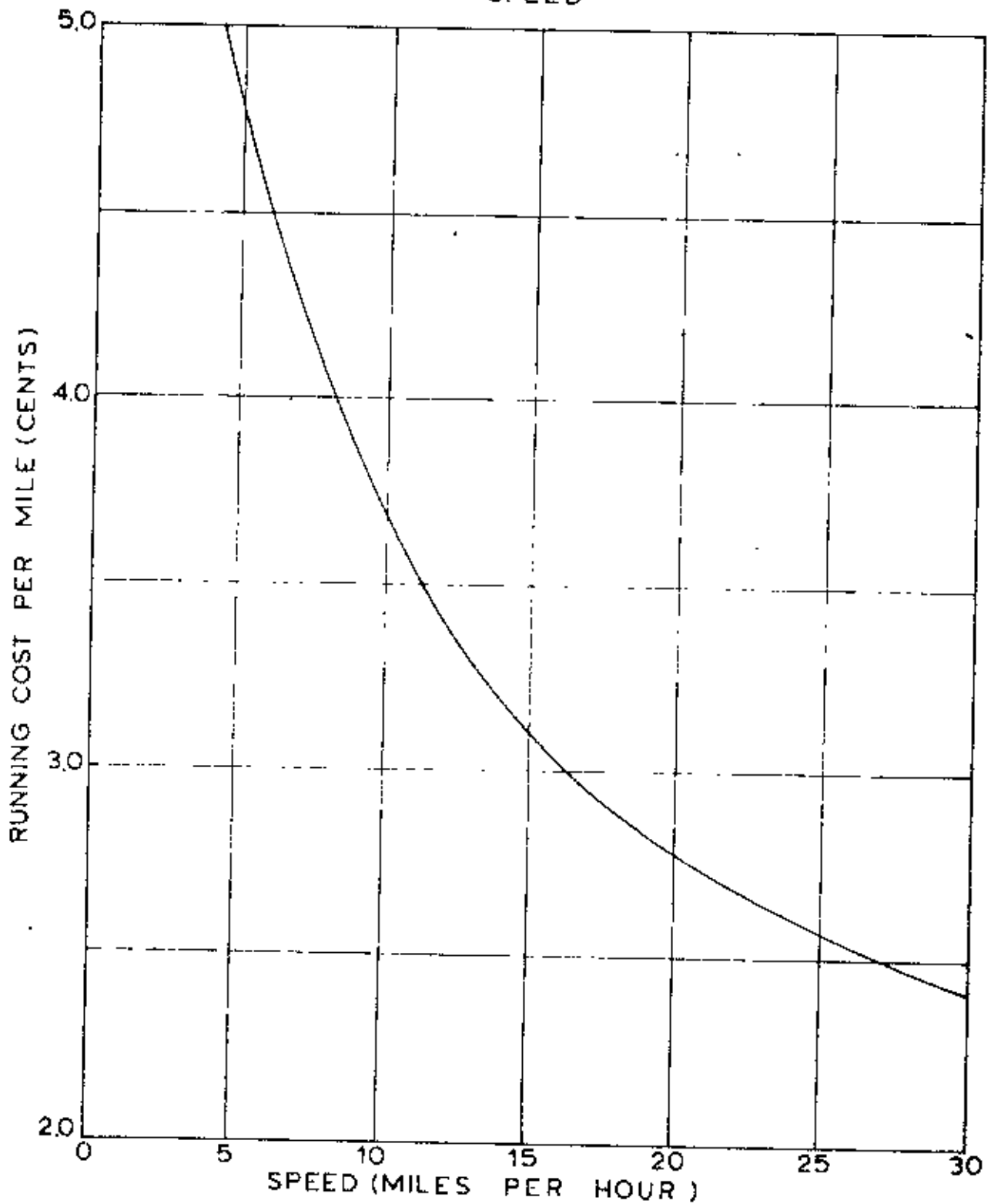


FIG. NO 23A

Source: Measuring Benefits of Govt. Investments "Urban Highway Investments", Herbert Mohring.

#### 4.1.3 Substitution Benefits

Road transportation benefits will have a mixed impact on other means of transportation in East Pakistan. The introduction of the improved road system will have a subsequent impact on railways and waterways transportation. Impact would come from more efficient truck, bus, and rickshaw transportation, as well as the greater convenience of pedestrian and car travel. The initial effect on the railroad would be to increase the traffic demand on the already overburdened rails as a result of the shipment of highway construction materials, equipment, food supplies and other freight required to meet the needs of the construction programme. This initial impact would last for the length of the construction period. The second impact on the rail roads during the construction period would be to increase the load and demands on the rail road because of greater access from the semi-completed sections of the road to key railroad facilities. Thus goods would be transferred to the various rail centres in increased quantities as sections were opened. Third the long range effect on the railroads, the eventual substitution of most of the short haul movement of goods and passenger between intermediate towns.

#### 4.1.4 User Benefits

Improvements in the moving of people and goods take the form of lower operating costs, reduced vehicle running and pedestrian walking time, increased motor carrier vehicle utilisation and net revenue, reduced transportation charges, greater driving pleasure and ease and convenience of travelling.

The rapid increase in the urban populations of East Pakistan is already an established fact. The transportation will allow for a greater dispersal of population and the possibilities of communiting and development of planned satellite communities and industrial estates along the arterial roads outside of the cities. This would allow a more economical employment of the highly dense rural population. Because of the dense rural population in East Pakistan, the situation is ideal for the development of a widely dispersed industrial base.

Such a programme has many obvious advantages such as allowing the worker to maintain subsistence farming for his family while being employed as an industrial worker, slowing the rapid growth of urban centres, stabilizing the rural population and facilitating better and more economical planning of the proposed industrial and rural development of East Pakistan. The rapid development of East Pakistan by the introduction of the existing transportation demonstrates the economic potential of the province. The expansion and improvement of the existing roads will ensure the continued development of the province. This can be accomplished by the increased regional transportation planning and development of East Pakistan.

In summary the following general benefits can be expected from improvement of the transportation of East Pakistan:

- (1) Uninterrupted all weather travel between the major cities of East Pakistan.
- (2) Increased movement of people and better distribution of goods and services all over the province.
- (3) Stimulation of community planning and the decentralization of industrial development.
- (4) Stimulation of agriculture and extractive industries, including better utilization of existing land.
- (5) Stimulation of the current industrial development by providing reliable facilities for transporting supplies of raw materials and the finished products.
- (6) In general, stimulates the local economy, initially, by large scale construction and wide spread related economic activity, and subsequently by providing access to the underdeveloped land and the sale of unmarketable crops.

## 4.2 Costs

### 4.2.1 Measuring Economic Costs

Measuring economic costs of transportation is substantially simpler than measuring its economic benefits. The economic cost of capital is very difficult to determine in the

absence of free markets, especially since prevailing interest rates also reflect such factors as inflation and deflation.

Three classes of costs for which shadow prices usually be determined. The first example is sales and other indirect taxes. The tax on gasoline is a cost to those who pay the tax, but it does not reflect economic costs to the country as a whole in the sense that an increase in the tax does not mean that more economic resources are required to produce a given volume of gasoline. A second example is wages. In most countries wage laws do not correctly measure the real or opportunity costs of labour. Where an economy like East Pakistan is marked by extensive unemployment and underemployment, the real costs of the type of labour involved are much less than actual wage rates. A final example concerns interest. Interest actually paid is the financial cost of capital, which frequently

no relation to its economic costs i.e. the opportunity cost of capital. Investment funds provided by the governments for transportation are often made available at rates below the cost to the government.

In addition to the use of shadow prices, there are other types of adjustment which are frequently necessary for an economic evaluation. The adjustments are of following types:

(i) Costs may be greater than anticipated because the work turn more difficult or more extensive, changes in relative prices should be allowed for to the extent that they are foreseeable and are likely to affect costs and benefits differently.

(ii) A second adjustment involves the treatment of interest during the construction period. Such interest is financed by loans, but do not count economic costs like labour, material, equipment, etc. Money is the means of procuring these real economic resources, so that interest should not be included in the economic costs of the projects.

(iii) A third adjustments deserves mention because it occurs quite often from the failure to define properly the scope of the project with the result that projects costs do not include all relevant costs. It becomes necessary to establish the additional costs of making the improvements earlier than would otherwise.



The basic purpose of the economic evaluation of a project is to measure its economic costs and benefits in order to determine its net benefits are at least as great as those obtainable from other marginal investment opportunities in the particular region of East Pakistan. It is sometimes stated that the value of a project should be measured by its contribution to the growth of national income as conventionally measured.

In order to measure economic benefits and costs and to compare them with other investment opportunities they must be expressed in monetary terms, which are the only practical common denominator. "In most developing countries gasoline taxes and other charges on the beneficiaries do not cover the costs of highways (including capital costs, maintenance and administration)." 1

These difficulties can be met if not completely eliminated, by the use of 'shadow prices' to reflect real economic costs and benefits more closely.

#### 4.2.2 Direct Operating Costs

In calculating the difference between costs at any average speed of 8 miles per hour and 14 miles per hour a study was made first of direct costs - fuel, oil, tires and maintenance repairs - at local prices. Physical quantities for a bench mark were taken from J. De Waille's quantification of Road users savings.2

However variation in these costs for steady running on level tangent paved roads are not appreciable at the lower range of speeds according to this study which takes no account of the impact of urban congestion on direct operation costs. The sudden and frequent stops with the accompanying speed - changes between them adversely affect direct costs. 3 Therefore data for cost differences at varying speeds, as shown in figure 23 and 23(A), were taken from the Traffic Engineering Hand Book 4, and the Chicago Area Transportation Study as presented by Harbert Mohring in urban Highway Investments.5

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1. "Sector and project planning in transportation", Hans A. Alder, p.38, International Bank for Reconstruction & Development.
  2. Jan De Waille, "Quantification of Road users savings", 1966.
  3. Directorate of Public Health Engineering, Govt. of East Pakistan", EON Annual Report No.1\*15
  4. John E Base Wold, "Traffic Engineering Hand Book", Institute of Traffic Engineers, 1965.
  5. Robert Dorfman - Editor "Measuring Benefits of Government Investments", 1965.

When the results of these two studies are averaged an increase in speed from 8 to 14 mile per hour yields a 23% saving in direct operating costs.

There is every reason to believe that without transportation improvement in East Pakistan, operating cost will be increased, because in the next 20 years demand for transportation will be tremendous for increasing volume of population and for the quick and efficient movement of goods and services.

#### 4.3 Cost-Benefit Comparison

Once costs and benefits can be measured in monetary terms, the results can be put into at least in three ways :

- (i) As a net benefit sum or surplus of savings over costs.
- (ii) As benefit cost ratios; and
- (iii) As internal rates of return.

The rate of internal return formula has the practical advantage that economists, financial experts and many businessmen have accepted the formula. Preparation of a development plan and the concomitant determination of relative priorities does require discounting by an opportunity cost of capital, so that this is the better method for countries planning their investments.

Comparison of costs and benefits of Dacca by Pass and penetrator Road, 1 is below for discussion.

For comparison the benefits derived are shown in the table IV-1 when transportation requirements varies by (A) 1.5 times output until 1980 and 1.2 times thereafter, and (B) 2.0 times output until 1980 and 1.5 times thereafter.

TABLE IV-1  
CASE I

	A (in million)	B (in million)
Benefits Total	356.4	478.0
Cost of project	87.1	87.1
Surplus or net benefits	269.3	390.9
Benefit cost ratio	4.09:1	5.49:1

1. "Economic & Engineering Feasibility Report on Dacca By Pass and Penetrator Road", Ansari & Whitney, 1968.

Contd. of Table IV-1

	A ( in million )	B ( in million )
Benefits in vehicle cost savings	166.5	227.3
Net over costs	79.4	140.2
Benefits cost ratio	1.9:1	2.61:1
Benefits in occupants time savings	189.9	250.7

Source: Amann & Whitney, 1968

TABLE IV-2

CASE II

	A ( In million )	B ( In million )
Benefits total	227.7	304.1
Cost of project	87.1	87.1
Surplus or Net Benefits	140.6	217.0
Benefit cost ratio	2.61:1	3.49:1
Benefits in vehicle cost savings	109.9	149.9
over costs	22.8	62.8
Benefits cost ratio	1.26: 1	1.72:1
Benefits in occupants time savings	117.8	154.2

Source : Amann & Whitney 1968.

Fig.24 for Assumption A the current worth of benefits at beginning of 1971 has been plotted with various interest rates. This has also been plotted for costs by obtaining current worth of the capital and maintenance of the projects with various interest rates . The interaction of the benefits and cost curves yielded the following internal

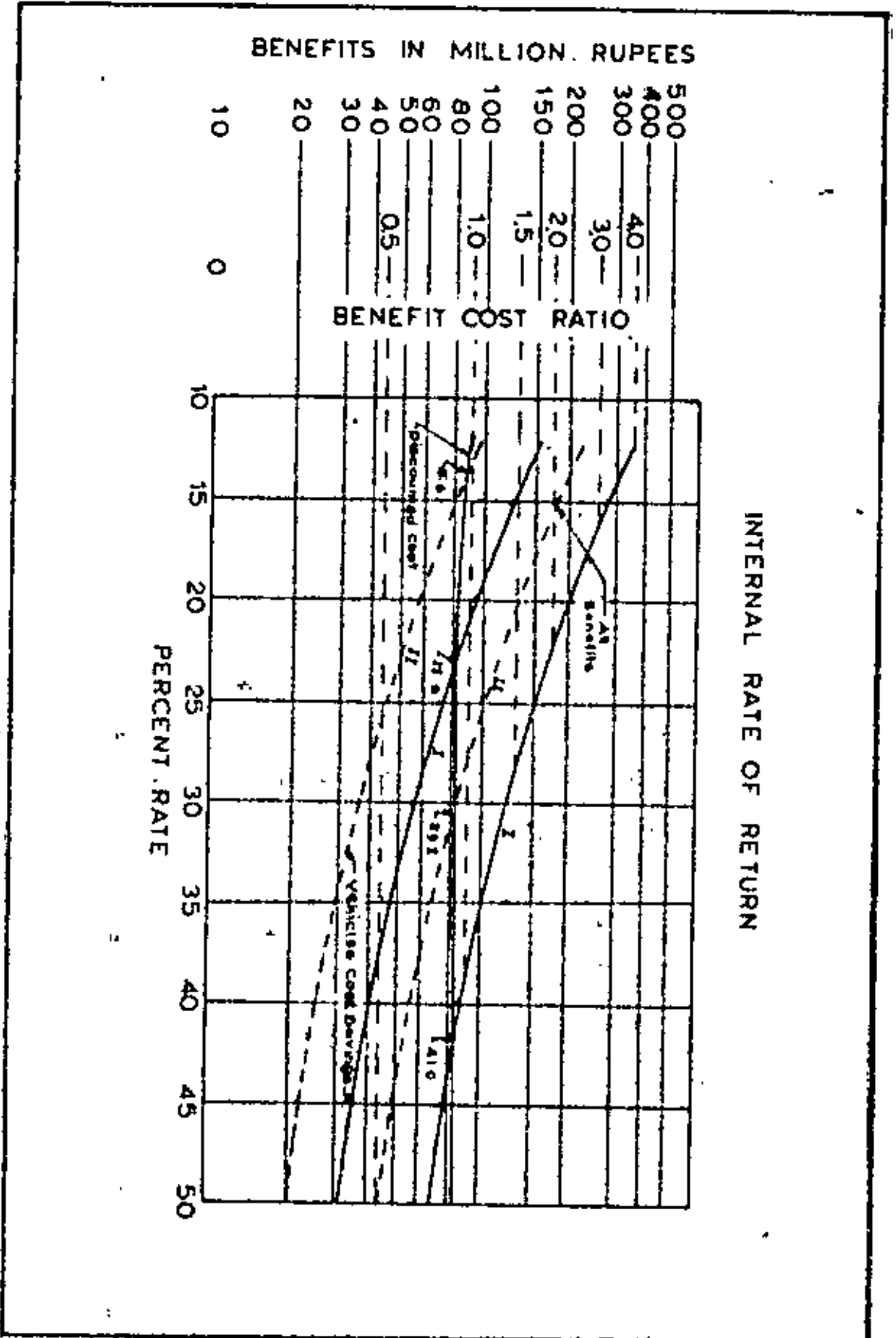


FIG. NO 24

rates future :

TABLE IV-3 (percent %)

	A		B	
	Case I	Case II	Case I	Case II
All benefits	41.0	29.2	46.0	34.0
Vehicle cost savings	22.6	15.6	27.2	19.8

Source : Ammann & whitney, 1968.

Transport system always substantial capital investment. If the whole system of transport would be in the hand of private enterprise, they would invest and develop according to profit basis. Since, transport service in our country is a matter of Government policy, whether a particular investment should be made or not is to be judged through the cost benefit ratio. This is to be viewed with a prognosis of feasible transport alternatives and their foreseeable social implications. Sufficient qualifications should be given while giving priority in any project or subsector of transportation. A particular type of transportation may require less investment, but for that reason only that sector should not be demanded neglecting other side because of higher costs. Future present, direct and indirect effects and benefits of the economy of East Pakistan as a whole should be counted.

#### 4.4 Transport Investment in East Pakistan

Expenditure in transport is functionally related to the growth of gross provincial product. The following equations show the study of transport investment on gross provincial Product (G.P.P.) :

$$Q_t = a + b Y_t \quad (i)$$

where,  $Q_t$  = total expenditure in transport in year  $t$ ,

$Y_t$  = gross provincial product in year  $t$ ,

$b$  = marginal coefficient for investment in transport,

$a$  = constant coefficient

Now we have the detailed picture of different means of transport -

Railways ( $Q_1 t$ )

Road ( $Q_2 t$ )

Waterways ( $Q_3 t$ )

Civil Aviation ( $Q_4 t$ )

The relevant equations are :

$$Q_1 t = a_1 + b_1 y t \quad (ii)$$

$$Q_2 t = a_2 + b_2 y t \quad (iii)$$

$$Q_3 t = a_3 + b_3 y t \quad (iv)$$

$$Q_4 t = a_4 + b_4 y t \quad (v)$$

where  $b_1$  = marginal coefficient for investment in railways  
 $b_2$  = marginal coefficient for investment in roads.  
 $b_3$  = marginal coefficient for investment in waterways.  
 $b_4$  = marginal coefficient for investment in civil aviation.

$a_1, a_2, a_3$  and  $a_4$  are corresponding constant terms.

The equation above is simple linear for simplicity of discussion. The growth in transport expenditure or facility may be quite fast in the initial stage of development while the growth of gross provincial product may be quite slow. Hence, the function instead of being simple linear, could be a parabolic one.

The study for investment analysis in transport sector of the economy of East Pakistan

is based on the data available from different sources. Since the data were not in the

1. Sources: Planning Commission, Final Evaluation of Second Five Year Plan of Pakistan (1960-65)  
 Planning Commission, Mid Plan review of the Third Five Year Plan (1965-70) of Pakistan  
 Planning Commission, 3rd Five Year Plan of Pakistan.  
 Planning Commission, Fourth Five Year Plan of Pakistan.  
 Planning Board, Govt. of East Pakistan "Annual development expenditure" 1968-1969.  
 Planning Board Economic Survey of East Pakistan.  
 Ministry of Economic Affairs Govt. of Pakistan, C.S.O. "Monthly Bulletin".  
 Twenty of Pakistan in Statistics - 1947-1967.  
 Pakistan Economic Survey.

form we used, it is to be computed to suit our purposes.

The study will reflect the marginal requirement coefficient in transport as a whole and separate coefficients for different means of transportation. Table IV-4 show the pattern of investment in various years from 1960-61 to 1968-69 along with the corresponding gross provincial product (G.P.P.)

TABLE IV-4

ACTUAL EXPENDITURE MADE ON TRANSPORT IN EAST PAKISTAN

(1960-61 to 1967-68)  
(Million rupees)

Year	Rail ways	Waterways	Road Transport	Civil Aviation	Total	Gross Provincial Product (G.P.P.)
1960-61	37.50	8.50	51.40	29.60	127.00	15836
1961-62	64.20	15.00	68.90	9.40	157.50	16767
1962-63	78.10	32.50	78.60	12.00	201.20	16825
1963-64	152.90	58.10	91.20	14.60	316.80	18671
1964-65	106.10	34.40	87.30	41.30	269.10	18065
Total Actual Expenditure during Second Five Year Plan	438.80	148.50	377.40	106.90	1071.60	
1965-1966	110.10	21.11	73.89	23.73	228.83	18627
1966-1967	132.64	46.57	72.89	45.08	304.18	18770
Total Actual Expenditure made during the first two years of the Third Five Year Plan	242.74	67.68	153.78	68.81	533.01	
1967-68 (Allocation)	150.16	79.48	162.31	49.15	437.10	20384
Total	831.70	291.66	693.49	224.86	2041.70	

- Sources: 1) Government of Pakistan, Planning Commission, Karachi "Final evaluation of Second Five Year Plan (1960-65) p.208.
- 2) Pakistan, Planning Commission, Rawalpindi "The mid Plan review of Third Five Year Plan (1965-70) p.230-235)
- 3) Pakistan Institute of Development Economics, Karachi, "Pakistan Development Review" Summer 1966, p.200
- 4) Govt. of Pakistan, Economic Affairs Division, C.S.O(Karachi) "Twenty Year of Pakistan in Statistics 1947-1967", p.3
- 5) Govt. of Pakistan, Ministry of Finance, Rawalpindi "Pakistan Economic Survey" 1967-68, p.3
- 6) Government of East Pakistan, Planning Board, Dacca, "Economic Survey of East Pakistan, 1967-68, p.66.
- 7) Government of East Pakistan, Planning Board Dacca, "Annual Plan for East Pakistan 1968-69" - p.67.
- 8) Government of East Pakistan, Planning Board, Dacca, "Annual Plan Public Sector 1968-69, p.61.

The computed marginal coefficient for transport as a whole to be 0.065 which in other words means that with a rise of rs.1 (Rupee one) in G.P.P., other things being equal price 6.5 may roughly be required for investment in transport. The relevant equation is  $Q_t = -914.428 + 0.065 Y_t$  (1)

where  $Q_t$  = Total expenditure in transport in year t.

$Y_t$  = Gross Provincial Product in year t.

The negative constant term explains that upto a certain level of Gross Provincial Product (G.P.P.) no investment in transport was required. In such a case economy was at a very primary stage. Most of the economic activities at that time was at subsistence level. With the gradual process of economic development, demand for transport is increasing at faster rate as shown in Table IV-5.

TABLE IV-5 PASSENGER MOVEMENTS AND CARGO CARRIED

Period	PASSENGERS CARRIED(000) TONS					CARGO CARRIED (000) TONS			
	Railway (a)	Road traffic (c)	Waterways (d) (mechanically propelled vessels)	Civil (c) Avia- tion	Rail (a)	Road Traffic through (b) Chittagong & Chalna Port(Inward & outward)	Volume of cargo handled by IWTA Mechanized fleet	Civil Aviation (b)	
1960-61	71,715	7,27	16,000	49	3,885	N.A.	3,572	2,550	0.7
1961-62	72,799	2,3592	20,000	104	6,303		3898	3,000	1
1962-63	72,002	3,6867	21,000	149	6,815		4729	3,140	1.5
1963-64	73,145	2,9372	22,000	177	6,784		5524	3,330	2
1964-65	71,325	1,0006	24,000		6,073		4288	2,940	
1965-66	67,196				5,439		5321		
1966-67	72,895				5,112				

Source: (a) Government of Pakistan, C.S.O. Monthly Bulletin, June 1968 p.1109

(b) Government of Pakistan, C.S.O. Monthly Bulletin p.1097-1098

(c) Government of East Pakistan, Bureau of Statistics, "Statistical Pocket Book" 1965

(d) Government of East Pakistan, Bureau of Statistics, "Statistical Pocket Book" 1965 p.354-355

\* Shows Government owned Bus Service only.



Separately computed the coefficient for different modes of transport and their results of the relevant equations are :

$$Q_1 t = -384.94 + 0.027 yt \quad (ii)$$

$$Q_2 t = -255.25 + 0.19 yt \quad (iii)$$

$$Q_3 t = -97.66 + 0.013 yt \quad (iv)$$

$$Q_4 t = -33.051 + 0.0034 yt \quad (v)$$

where  $Q_1$  = Railway  
 $Q_2$  = Road  
 $Q_3$  = Waterways  
 $Q_4$  = Civil Aviation.

One third of East Pakistan comprises of river for which the main transport system is water ways. Its economy is heavily dependent on river transport. Three-fourths of the total traffic is carried by waterways. There are 3,000 miles of perennial navigable waterways which extends to 4,500 miles during monsoon. 1

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1. "Basic Facts - 1967-68" Ministry of Economic Affairs, Govt. of Pakistan, Rawalpindi.

Goods are easily marketable with the low freight charges by water transport. Country boats carry large share than the mechanically propelled vessels. However, neither the investment pattern by the private enterprises in country boats nor adequate statistical data regarding its number and actual performance is known. Roughly they carry about 1,451,367 number and 1220275 ton of passengers and cargo respectively. It is about seven times greater than the mechanised vessels. 1 After the completion of Third Five Year Plan (1965-70), the movement of freight and passengers by water ways have been increased by 6 times, along with it the demand for railways and road have also increased. 2.

The Third Five Year Plan (1965-70) allocated Rs.261 million to E.P.I.W.T.A. The Table IV-6 shows that in the first two years of the plan period Rs.45 million was spent. The total allocation in water transport including East Pakistan Shipping Corporation (EPSC) National Shipping Corporation (NSC), Chaina Anchorage, permanent port at Passur river and navigational aid on the coast of East Pakistan stands at Rs.477.70 million. On the other hand railways share Rs.915 million, road transport Rs.1,060.41 million and that of Civil Aviation Rs.215 million. The total allocation during Third Five Year Plan was Rs.2668.11 million. From this it shows that the allocation to "Inland Water Transport" was 17.90% of the total allocation of East Pakistan to transport.

1. Hameed-ur-Rashid, "A Systematic Regional Geography and its Development Aspect" p.291.
2. The Review of Third Five Year Plan (1965-1970), Planning Commission, Govt. of Pakistan.

TABLE IV-6

## BREAKDOWN OF ACTUAL ANNUAL EXPENDITURE ON TRANSPORT IN EAST PAKISTAN

(Million rupees)

Sub-Sector	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68 (Allocation)
1. Railways (excluding Suspense)	37.30	64.20	78.10	152.90	106.10	110.10	132.64	150.16
2. Roads	48.20	63.40	77.10	91.10	65.00	72.58	69.42	140.61
3. EPIWTA	7.40	12.70	27.70	52.00	30.70	15.21	29.54	42.89
4. EPRTC	3.20	5.50	1.50	0.10	2.30	1.31	10.47	13.20
5. EPSC	-	-	-	-	1.80	1.72	2.17	1.64
6. Khaina Anchorage	0.60	1.20	3.90	1.70	1.70	3.05	4.24	11.00
7. N.S.C.	-	-	-	3.00	-	1.00	-	-
8. Mercantile Marine Academy Chittagong	0.50	1.10	0.90	1.40	0.50	-	0.90	0.90
9. Civil Aviation	29.60	9.40	12.00	14.60	41.30	23.73	45.08	49.15
10. Permanent Port of Pusur river	-	-	-	-	-	0.13	9.47	17.50
11. Navigational aid on the coast of E.P.	-	-	-	-	-	-	0.25	1.55
12. Bridges over Karnefull & Buriganga	-	-	-	-	-	-	-	8.50
<b>Total</b>	<b>127.00</b>	<b>157.50</b>	<b>201.20</b>	<b>316.80</b>	<b>269.10</b>	<b>228.83</b>	<b>304.18</b>	<b>437.10</b>

- Sources: 1) Government of Pakistan, Planning Commission, Karachi "Final evaluation of Second Five Year Plan (1960-65) page - 208.
- 2) Government of Pakistan, Planning Commission, Rawalpindi "The Mid Plan review of Third Five Year Plan (1965-70) page 230-235.
- 3) Pakistan Institute of Development Economics, Karachi. "Pakistan Development Review" Summer - 1966, page 200.
- 4) Government of Pakistan, Economic Affairs Division, E.S.O. (Karachi) "Twenty year of Pakistan in statistics -1947-1967", page - 5.
- 5) Government of Pakistan, Ministry of Finance, Rawalpindi "Pakistan Economic Survey" 1967-68, page - 35-
- 6) Government of East Pakistan, Planning Board, Dacca "Economic Survey of East Pakistan 1967-68, page - 66.
- 7) Government of East Pakistan, Planning Board, Dacca "Annual Plan for East Pakistan 1968-69 page 57.
- 8) Government of East Pakistan, Planning Board, Dacca "Annual Plan Public Sector 1968-69 page 61.

The resultant coefficient of water transport 0.013 states that investment in this sector was much below the requirement considering its economic activities.

The relevant coefficient of roadways is 0.19 though the Government claim that adequate efforts have been made to develop roads, the equation (iii) does not say so. Table IV-7 shows that though the growth of roads have been increased yet it is much below requirement. Road mileage per thousand population is 0.06 and per 100 square mile is 6.56. This figures themselves explain how inadequate and poor is roadways in East Pakistan.

TABLE IV-7

Year	ROAD MILEAGE						All Pakistan A + B	East Pakistan as per- centage of B
	A East Pakistan			B West Pakistan				
	High type	Low type	Total	High type	Low type	Total		
1960-61	1,040	150	1,190	8,827	11,534	20,281	21.571	5.59
1961-62	1,192	150	1,342	9,002	11,908	20,990	22,332	6
1962-63	1,392	150	1,542	9,327	11,680	21,007	22,549	6.83
1963-64	1,644	150	1,794	9,443	11,952	21,397	23,191	7.73
1964-65	1,885	150	2,035	9,971	11,781	21,752	23,766	8.44
1965-66	2,112	1,481	3,593	10,134	11,902	22,036	25,629	14.01
1966-67	2,204	1,481	3,685	10,354	11,902	22,256	25,941	14.20

Source: Government of Pakistan, Ministry of Finance "Pakistan Economic Survey" 1967-68, p.124.

Note: High type means roads having concrete or bituminous concrete surface or bituminous surface.

Low type roads stands for roads of stone, bricks, gravel or ordinary earth roads properly aligned and with drainage structures provided.

As per Table IV-7, East Pakistan has got a lesser mileage of roads than is expected in a desert. The railway system is not so developed. There has been no substantial expansion in railways. "Passenger trains remained as crowded as ever, and the railways were unable to carry all the freight available. The shortage of wagons remains acute".

Mr. E. W. James, gave the miles of highways per square mile of area of the following types of country shown in Table IV-8

TABLE IV-8

Type of Country	Road miles per square mile
Highly Developed Area	2.3
Highly Developed Flat Agricultural Areas	1.7
Well Developed Agriculture	1.7
Mountain Areas	0.7
Desert Areas	0.3
East Pakistan	0.07

The analysis is based on the expenditure made by the Government. It bears out that railway coefficient 0.027 is higher than roads and waterways. This is because of higher maintenance and replacement costs, repairing track and the cost of shifting some of the rail lines during rainy season.

Table IV-9 and Table IV-5 show the pattern of expenditure on the different modes of transport and their economic activities respectively.

1. James, E. W. Roads for India, p.24.

Quoted by A. Haenel "Road Transport in East Bengal" published in Pakistan Economic Journal Vol. IV, Annual Report 1954 No.2 p.243.

TABLE IV 2

EXPENDITURE PATTERN

1960-61 to 1964-65

1965-66 to 1969-70

Agency	SECOND PLAN PERIOD			THIRD PLAN PERIOD			
	Allo- cation	Actual expendi- ture	percentage of total (Ac- tual expendi- ture)	Alloca- tion	percentage of total Allocation	Expenditure during 1965-66 to 1966-67	Percentage implemented
1	2	3	4	5	6	7	8
Railways	427.70	436.80	40.94	915.00	34.29	242.74	26.52
Roads and roads transports	259.80	377.40	35.21	1060.41	39.75	153.70	14.50
Waterways (Including Shipping and ports)	93.50	148.30	13.85	477.70	17.90	67.68	14.16
Civil Aviation	80.00	106.90	9.97	215.00	8.06	58.81	32.00
<b>Total</b>	<b>861.00</b>	<b>1071.60</b>	<b>100</b>	<b>2668.11</b>	<b>100</b>	<b>533.01</b>	<b>19.97</b>

SOURCE :- (a) Government of Pakistan, Planning Commission, Karachi, "Final evaluation of Second Five Year Plan" (1960-65)

(b) The Mid Plan review of the Third Five Year Plan (1965-70)

(c) Government of East Pakistan, Planning board, Dacca "Annual Plan for East Pakistan, 1968-69."

Civil aviation is not so important as compared to other alternatives in East Pakistan transport. Coefficient of Civil Aviation is N.O.0034 which itself suggests that it claims a negligible portion of investment with the rise of Gross Provincial Product.

It is clear that there is a relationship between the marginal requirement for investment in transport and the gross domestic product of East Pakistan. Here it may be noted that Robert Sedove of World Bank holds that when a nation or a part of it is deficient in factors conducive to growth no amount of transport investment will create the economic dynamism that is so ardently desired. This qualification, however, can not be implied in the case of East Pakistan at the present stage, as is evident from the discussion. To help the growth of the economy at an accelerated pace sufficient investment should be undertaken in transport sector - especially in waterways and roadways.

The investment decisions made to day affect not only the standard of living of the present generation, but those of the future as well. Because the need to raise the rate of growth and income per capita in the less developed nations is great. Because the economic returns and social consequences of a purely laissez-faire approach can be so significantly enhanced, government intervention to improve the allocation and utilisation of resources is advantageous. The most effective way of doing this is by means of comprehensive planning.

In the absence of comprehensive planning, the transport planner must detail the investment in transport facilities to meet the requirements of other sectors in the

economy. This forms line to frame transport infra-structure programmes in the light of basic natural resources, geographic, demographic, trade and other economic factors as well as transport needs derived from anticipated population, agricultural or industrial centres and types of commodity and trade flows. It appears that improved transport investment decisions in the light of pertinent regional objectives can be made in East Pakistan.



**CHAPTER V**

**TRANSPORTATION AND REGIONAL DEVELOPMENT OF EAST PAKISTAN**

## CHAPTER V

## TRANSPORTATION AND REGIONAL DEVELOPMENT OF EAST PAKISTAN

A regional approach to planning in East Pakistan is urgent and imperative. To begin with, it is necessary to deal briefly with the concept and application of regional planning.

The concepts of regional planning can be found in the Geddian Philosophy of town and country planning. This philosophy of city survey was not confined to its immediate environs, but to the larger surrounding region.<sup>1</sup> His word subsequently became regional planning.

The concept of the metropolitan area as a logical planning unit has been discarded by the new approach of regionalism.<sup>2</sup> The regional planning concept goes beyond the metropolitan area. It is clear that the scope of regional planning is broad and varied. Therefore, it seems reasonable and desirable to define a region. A region has been defined in different ways.

The region may be loosely defined "as an area of land separated from the larger mass by some special characteristics of geography, economic activity, community organisation, social behaviour or administrative services, or by a combination of two or more factors".<sup>3</sup>

Regional planning has been widely acclaimed by the United Nations. It is stated that Regional Planning would provide the most suitable frame of reference for a balanced integration of development projects of national significance and those based on local initiative. Such comprehensive regional planning would apply to the development of metropolitan areas, to areas in which National Resources are being location of industries.

1. Patrick Geddes, *Cities in Evolution* (Rev. ed., London: Williams & Norgete, Ltd., 1949) p.129.
2. John Friedson, "The concept of apply a Planning Region", *Regional Development & Planning*, ed. Friedson & Alonso (The MIT Press) 1964, p.504
3. Commonwealth of Pennsylvania, *Country & Regional Planning*, Publication II, Dept. of Commerce, (September, 1963), p.3.

Comprehensive regional planning has already demonstrated its value in guiding the development of areas where natural resources are being exploited. Regional planning techniques applied to rural development programmes could be used to assist in the development of areas and in establishing a better urban-rural balance.<sup>1</sup>

The region as an appropriate unit of planning has been neglected and it has been taken over by the concept of space. The concept of regional planning formulated by Friedson states that : Regional Planning must be thought of as a scientific undertaking of a special kind. Primarily oriented to the future it looks to the relation between social purposes and spatial arrangements. Regional is concerned with the ordering of human activities in supra-urban space that is in any area which is larger than a single city. Regional planning focuses attention on supra-urban space while infra urban space is of course of primary importance in city planning.<sup>2</sup>

The regional planning concept has been influenced by the bid location theory in economics, nodality or central place theory in geography and considers the problem of resource allocation and development in regional land.<sup>3</sup> Friedson wrote that regional planning is oriented towards the problems of land use conflict and transportation. Regional Planning is primarily concerned with resource development. Regional Planning is made synonymous with regional development policy at the national level; with a process of decision - making and design in the elaboration of investment projects at the regional level; and with economic development programmes for sub-national areas.<sup>4</sup>

A national policy of regional development must be designed to deal with the diverse problems of development regions as a comprehensive system of inter dependencies. Regional policy should be consistent and adopted to the current plan in the evolution of an economic system and national aspirations, equalising regional incomes.

1. United Nations, Department of Economic and Social Affairs, Housing, Building Planning, Regional Planning (New York, 1959), p.1-2.
2. John Friedson, "Regional Planning as a Field of Study", Regional Development and Planning, OP. cit., p.63.
3. Ibid
4. Ibid

Nevertheless a conscious attempt to use transportation as a region shaping device is the essential component of regional development of underdeveloped region like East Pakistan. Scattered throughout East Pakistan at great distances from industrial and urban centres, the populated areas possessing great economic potentiality by virtue of their resources need development. The economic development of these remote areas of East Pakistan depends on : (1) during effective and economical systems for transporting goods and people into and out of these areas; (2) providing other services, especially communications, that will raise their standard of living to a level comparable with the norm achieved by, the industrial and urban centres of East Pakistan.

To provide effective and economical transportation from the urban and industrial centres to the under developed areas is more of regional and less of national responsibility. The volume of resources of the underdeveloped areas will move towards developed areas and in turn the exportable commodities will move towards the underdeveloped areas of East Pakistan. In both the ways the cost of operating the transportation system is important. If the persons who work and live in remote areas are to enjoy a satisfactory standard of living. They must also be furnished with economical and effective communications system.

Meeting these transportation and communication requirements probably can be accomplished by adopting current technology.

It is obvious that the conditions of resource exploitation and location of the resources govern the development of transportation and communication facilities for the underdeveloped areas but highly exploited areas. Characteristically, resource exploitation in such areas required large capital investment. With the increasing net product value, and if cheaper methods of transport can be developed, the capital available for resource exploitation is certain to grow. Increase in available capital and mechanization are fundamental to the successful adaptation of the state of the art in communication and transportation meet the needs of capital intensive and areas extensive regions. Development of such improved systems provides an opportunity to substitute communications for

transportation in an increasingly mechanised process of exploiting and distributing regional resources.

Fulfillment of the economic needs of such regions require some major adaptations of current transportation and communication technology. For the every important needs of passenger transport services providing desirable speed and reliability of service at reasonable operating costs are a necessity. An economically feasible unidirectional system for the transport of out bound materials must be provided. A method of importing and distributing consumer and other goods to the region at minimum fixed facility costs is needed. Finally these areas must have the efficient network of transportation linking with industrial and commercial activities.

The main forces which might be effectively used for the purpose of shaping regional development are (1) transportation and (2) the location of major employment centres. A reasonable degree of relationship between transportation and employment centres, would make it possible to achieve development patterns based on regional sub-centres. Transportation is clearly an active force in shaping regional development. It is only one of a constellation of interdependent active forces which determine and influence the patten of growing urban life of the developing regions.

#### 5.1 Transportation Policy:

Transportation is the link between geographically separated markets, where growth can maintain a balance only if transportation is provided in sufficient amount and at efficient routes. Regional demand and transportation costs initiate the responses of productive sector of the economy if it is divided into producing and consuming regions.

Efficient pricing of regionally separated activities requires that the difference between the prices of homogenous goods at different locations should not exceed the marginal cost of transporting these goods. In other words, if the difference equals the marginal cost of transportation, an inter-regional commodity flow will take place. If they are larger, socially profitable trade will be diminished, if they are smaller, specially unprofitable movements will be induced. In the latter case, there will be excessive demand for transportation services, the satisfaction of which results in the

waste of scarce resources. In either case economic growth must suffer..

Decentralised decision making bring about efficient transportation development. Private enterprise can not push transport investment to an efficient level. The following factors are responsible :

- (i) There are technical economics which are external to transportation;
- (ii) The private risk of investing in the fixed transportation plant is very high;
- (iii) The possibility of monopoly control in transportation.

The force of the under investment and monopoly argument disappears if the Government provides the fixed plant and the services. This is more congenial to road and other transport.

In contrast with private enterprise, public transportation investment may be excessive. paradoxically, this can happen even in instances where transportation appears to be a bottleneck. Underpricing of transportation services induces an unbalanced increase in the demand for transportation. This is so because entrepreneurs base their market decisions on monetary rather than real costs. If the price of transport services does not reflect the true costs with respect to transported inputs and goods. Also, the efficient use of locally available inputs may be by passed in favour of less efficient substitutes which require transportation.

For a monopolist, discrimination by value may have justification if excess capacity exists. But it is undesirable from the social point of view. Because it encourages excessive flows of bulk commodities and distorts the choice of location, it induces in the long run a greater demand for transportation than required to maintain efficiently a given rate of economic growth. Hence, increased amounts of scarce resources must be allocated to transportation or a bottleneck must develop. In both situation the rate of growth will be adversely affected.

Distortions caused by inefficient transport policies are to some degree irreversible. Badly located plants are there to stay and may attract for the ill-located investments to their neighbourhood. The longer the inefficient policies are

Maintained, the greater will be the geographical and technical distortions and the heavier will be the burden on the transportation system. But irreversibility has a meaning only in the short run. Introduction of efficient policies should motivate regional growth toward balanced development. The demand for transportation is inelastic in the short run; hence, rate adjustments are feasible.

Regional development is not a development about regions with fixed boundaries but about the spatial incidence of economic growth. Regional growth is externally linked by transportation system.

East Pakistan's geography and climate, combined with its economy and social outlook, have given it a distinctive pattern of rural settlements. Rural settlements are influenced by geographical factors and modified by other related historical and economic considerations.

Rural roads are an important factor in village location. It is most obvious that communications play a vital role in shaping the settlement pattern. However, the river is by far the dominant mode of transportation.

An overall scheme of regional transport should be worked out for the improvement of the country's balanced development. The location of these transportation systems would depend on regional geographic variations. They need to serve the broad regional and central areas. Their re-distribution of population will occur which is the symptom of regional economic growth by mobilizing men and materials along the line of transportation and communication channels of East Pakistan. These spatial processes give rise to the new distribution of settlement and link them with each other by transportation network. This transportation network will link rural areas with rural areas and with the central city, district town, small and medium size towns.

The systematic development of transportation is needed to stimulate the agricultural production causing fair price to the growers. Agricultural rural areas are the broad hinterland of the growing and commercial and industrial urban areas. Development at small and medium towns, markets and bazars would help to create a balance in rural

and an urban migration.

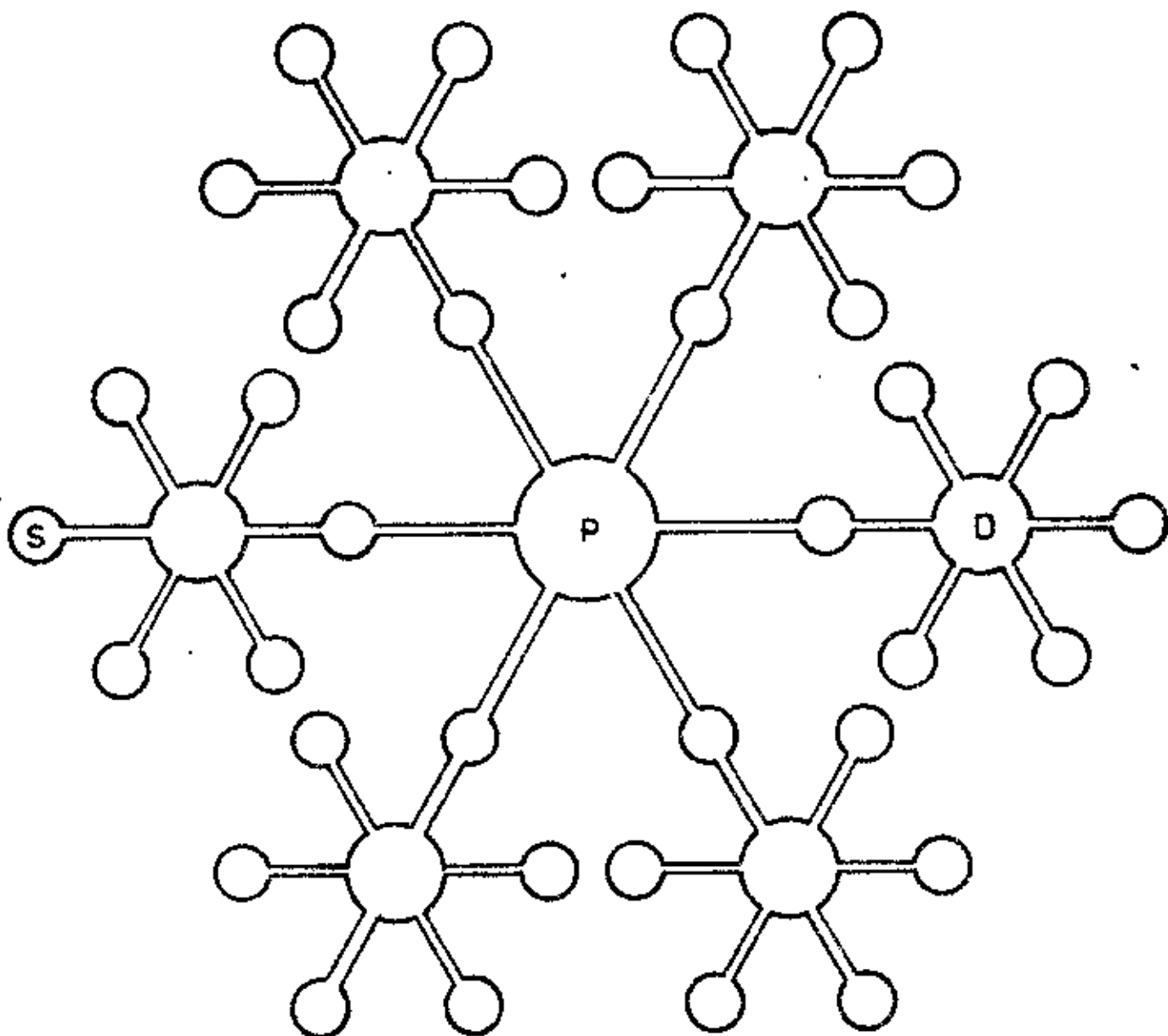
Each district town of East Pakistan should form the nucleus or central city, with present population linked with proper coordination in communications to its sub-divisional towns. Sub-divisional towns should again be linked with the thames and important bazars and market towns of East Pakistan. Figure 25 shows a model of transportation network and regional development of East Pakistan.

The system above should ensure at least the minimum efforts and ways to equalize the regional incomes and balanced development of East Pakistan.

শ্রী বিঃ গণ্ডিক



A MODEL OF TRANSPORTATION NETWORK FOR REGIONAL  
DEVELOPMENT OF EAST PAKISTAN







-  Provincial Head Quarter
-  District Head Quarter
-  Subdivisional Head Quarter
-  Transportation Network

FIG. NO. 25

**CHAPTER VI**

**CONCLUDING REMARKS**

CONCLUDING REMARKS

The Economy of East Pakistan is agrarian in nature and developing in spirit. Almost all the agrarian economies are underdeveloped. Underdeveloped countries are characterized with low standards of living and are peculiarly countries with inadequate methods of moving. In the latter part of the twentieth century newly emerged countries of the world are earnestly trying to achieve economic development.

The process of economic development of the underdeveloped countries have been started through planning mechanism. Promoting economic development without planning is like attempting to reach home port in a rudderless ship. Planning is the conscious allocation of resources and means to achieve ends. This conscious allocation of resources justify the classification of resources utilisation. This resource utilisation and mobilisation urges the grouping of more urgent and less urgent sectors of the economy. The more urgent sectors of the underdeveloped economy is its infra-structure. A major component of infra-structure of any underdeveloped economy is its transportation system. Without transport priority, any allocation of resources is sure to be the misallocation. So any ventures for regional economic development must take transportation system into consideration.

Any underdeveloped country, attempting to construct a regional transportation system or to formulate a national transportation policy must come to grips with a most difficult question : what are the regional purposes that the transportation system is intended to serve? Toward what larger ends should the transportation system be designed? All these questions invariably urges that the large and complex society of underdeveloped country embraces a multiplicity of conflicting objectives.

Transportation in any society serves a variety of conflicting and incommensurable objectives. The selection of a regional transportation system implies a choice among these goals. Such a choice can not be approached as a straight forward economic efficiency problem; it constitutes a high level policy decision.

The growing economy of East Pakistan is confronted with variety of problems for

her development. Within the scope of this thesis it has been attempted to determine the role of transportation and its planning for the overall regional development of East Pakistan.

The object of this thesis is to develop a rigorous framework of analysis and technique of thinking, by which rational decisions can be made concerning the complex problems of planning an optimum transportation system.

This study used many different principles and techniques in obtaining solutions to the problem of satisfying transportation demand. The urgency of the problem has left little time for objective evaluations of the techniques presently available, since each new study creates new sets of principles and techniques.

The need to day is an objective evaluation of the diversified methods developed to date, so that future research may be pursued toward the most useful ends. The benefits of research are greater the further they are spread. Because some of the work done within its affiliated organizations may be useful to others who are engaged in the practice of sound economic development.

To identify the exact nature of the problem both to-day and in the future, a comprehensive transportation study is required. In a comprehensive study, it is necessary to coordinate the activities of all organizations and individuals engaged in shaping the future of the region, which will include transportation planners, city planners, economists, social scientists, governmental officials, and other specialized personnel. However, the transportation planner must be aware of the gross effect which his plans will have on the regional development of East Pakistan.

The study consisted of the following main phases :

- (i) To discover the use made of the transport system and to establish the commercial and economic costs of making use of each mode of transport for any actual or desired movement over each part of the transport system.
- (ii) To establish the extent to which the present use of the transport system is optimal in terms of the use of economic resources and to propose realistic changes in tariffs to achieve the best possible use of the transport system.

(iii) To establish an investment programme that will allow the future demands on the transport system to be met at the lowest possible cost and that will enlarge the economic development of the province to the greatest possible extent.

Future survey should be designed to collect as much data as possible in origin destination form about the long distance movement of vehicles and various types of goods. In addition data should be obtained about the short distance trips involved in local distribution. This should intend to follow up this programme in order to :

(i) To meet the objectives of obtaining information on adjustments which may be necessary because of seasonal variations in traffic,

(ii) To give any further data which may be required for work on investment appraisals.

Such transport study cover the entire province and all modes of transport that have a significant role in the country's national economy, including railways, highways and highways transport, ports and shipping, airports and civil aviation.

Transport service in a riverine province like East Pakistan is itself a baffling problem. But hardly serious attention has ever been paid towards it from government side to improve it. Whatever little efforts have so far been made in this respect, these in most cases were all haphazard. Any major survey under these haphazard conditions is a very exciting challenge. Any attempt to conduct a survey is confronted with multifarious problems. Water transportation among other modes, needs much more attention to make an objective study taking all factors into account. This sort of survey needs starting by finding out how the present transport system is being used, and whether the use of the existing structure is optimal.

The survey should look into the crossings of major rivers, not only the bridges but the whole ferry system, which are weak at present. It should also look carefully at railways as it is important they be kept efficient and modern. It should also count and consider ports and the inland water system, where one of the most important question is the mechanisation of the country boats, large number of which are in permanent commercial use.

The starting point in the planning process, and an appropriate starting point is a description of the objectives of plan formulation. Ultimately the followings may be pursued :

- (i) To integrate short-term forecasts of growth prospects and resource requirements in various sectors of the East Pakistan economy into a consistent framework;
- (ii) To improve the coordination of policy formulation within the province;
- (iii) To provide for the private sector useful guide lines of the major developments expected during the coming year.

The evolution and development of any plan is of small value unless it is capable of being implemented and is practical to a sufficient degree to warrant such implementation. Throughout this study every effort has been made to weigh carefully the practical unless that will result from each of the individual improvement programmes together with the end result of the service of the province and the nation that may be expected from an orderly development of all modes of transport.

The first important things for this will be to get all the available statistics. Most developing countries do not have adequate, upto-date and readily accessible information about their transport system. It is obvious that without a clear idea of the quality and quantity of existing facilities and their utilization, rational planning for future requirements is hardly possible.

The quantity and sophistication of statistics needed for developmental planning in any country is dependent upon its present stages of development, the planning decisions need to be based on precise detailed information since investments in any area should raise the the level of economic activity.

A very special problem in less developed countries is the absence of basic statistics; this is frequently indecisive for the degree of accuracy and refinement possible in the analysis. Most of these countries, for example, initiated only very recently the collection of highway traffic data. Where statistics are available they are usually limited to simple

traffic counts; information on origin and destination of traffic or on the types of commodities carried on highways is hardly ever available. Little is usually known about vehicle operating costs and on different types of highway or about road maintenance expenditures on different types of surface. As a result, most new investments and allocation of maintenance expenditures have usually been made virtually without any detailed economic analysis of priorities. It is no doubt true that, within limits, some of the most obvious investments can be made simply by looking at a map and at the location of major industries and population centres. The absence of basic statistics, however, is not only a cause of the backward status of such analysis in this field but also an effect; because until recently economists have not focussed on the right questions, there has been little incentive for collecting the right statistics.

At this stage of development, the process of planning to the future encompasses long term, medium term and short term plans, annual progress appraisals, and individual project approval and review. Comprehensive planning operations such as these demand a continual expansion and improvements in the supporting statistical systems. If these improvements do not keep up with increasing demands, the decision-making functions of planning are severely handicapped.

A common problem in developing countries without a fully developed system is that too great a reliance is placed on studies and surveys that have not been carefully planned in relation to other requirements. Obviously there are times when special studies are the only answer to specific planning problems. However, there are two points that should be kept in mind by planners. First and foremost priority should be given to developing a sound comprehensive system that will take care of major planning needs. Second, when special surveys are needed, they should be carefully planned and carried out by experienced statisticians.

A factor contributing to a region's wealth and strength is transportability and accessibility to and effective utilisation of the nation's stores of natural resources.

The transportation system may be taken as coordinating and integrating agency of the economic system. The figure 26 shows the integrating and coordinating functions of transportation system.

As in most underdeveloped regions, the emphasis in transport coordination policies in East Pakistan is on the investment sector. Hence, the transportation system must be regarded as a whole and the investment needs of the various modes of transport or the various transport industries must be judged in this general context; i.e., not only must maintenance and improvement requirements be compared for all existing modes but the prospects for expanding the transport system through each must be assessed, the general aim being to reduce the transport cost and to improve quality of service.

Amongst the most important long-term problems in East Pakistan are the establishment of priorities for investments designed to expand and diversify the existing transport systems and, above all, general relations between road and rail transport. But past investments in the transport industries also raise problems regarding the coordination of services with a view to promoting economic development.

Transportation relates population to land use and integrates the entire region into one vast industrially productive unit. It unites the province and makes it essentially one people in its economy and culture. Transportation network is implicit in the modern theories of regional development which turn the various spokes of the understanding of regional structure and development of underdeveloped country like East Pakistan.

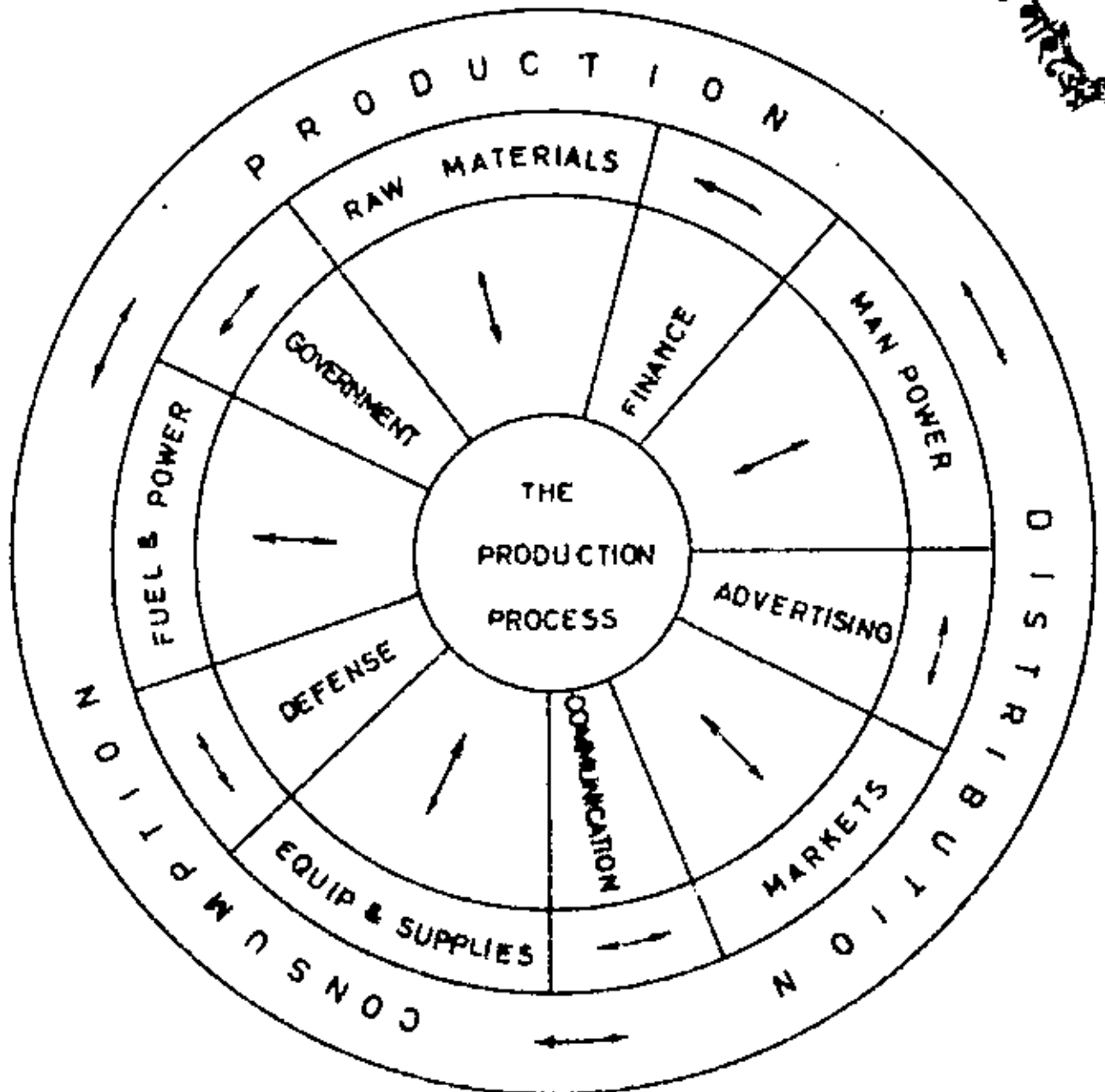
Transport is not an independent service but subordinate to other activities such as the location of economic activity, the desired density and distribution of the population. So even when a particular transport development favours decentralization, the final outcome may be centralisation.

The partial objective of this study is to recommend improvements in the country's existing transport services and to formulate a coordinated development programme for the transportation sector of the economy of East Pakistan. The existing transportation system is far behind to keep pace with the growing demand of East Pakistan. The inadequacies



INTEGRATING AND CO-ORDINATING FUNCTIONS  
OF TRANSPORTATION SYSTEM

DR. P. M. M. M.



ARROWS INDICATE INTEGRATING AND CO-ORDINATING FUNCTIONS OF  
TRANSPORTATION

FIG. NO. 26

of transportation system regarding the rural overall development. By efficient transportation system rural migration can be stopped by extending urbanised facilities and providing secondary and tertiary employment opportunities for over growing non-agricultural population at their village level or at some selected centres. To this end, the future study should provide :

(i) Recommendations for the improvement of the operation, planning, organisation, administration and management of each transport mode,

(ii) Recommendations for the improvement of Government transport policies, especially, policies for effective transport coordination; and

(iii) As further measures to assure the lasting and optimum effectiveness of the physical improvements, certain organizational modifications, generally as set forth may be adopted :

(a) Organisation of East Pakistan Transport Commission for the overall regulation of transportation.

(b) Changes in existing laws and regulations pertaining to transport matters.

(c) Reorganisations of departments and organisations dealing with various modes of transportation in East Pakistan.

(d) Technical aid and transportation programming

(iv) Recommendation for the collection and analysis of basic data such as hydrology, engineering standards, social and economic aspects of the economy.

(v) Recommendation for sending the local trainees of different back grounds abroad for training in the field of transportation planning.

The proposed East Pakistan Transport Commission shall review and summarise all available data on passenger and freight traffic in foreign and domestic commerce, by all modes of transport, on the principal routes within the province. Breakdowns shall be prepared of traffic flows by mode and by principal commodities, indicating significant seasonal variations inflow. This review shall cover the transport history of the province for the past years, where such data may be of importance to future development.

The commission shall identify and analyse any practices relating to fiscal, staff, rating of other matters, which may operate against the railway being non efficiently and in a sound, commercial manner. In this connection, where present and estimated future traffic densities indicate that any section of an existing line is uneconomic, the authority shall examine the availability and economic cost of possible alternative modes of transport.

Based on the foregoing, the authority shall :

- (a) identify needed improvements in maintenance on the existing railway lines;
- (b) assess the need for extension, modification or phased abandonment of lines, where justified by expected traffic; and
- (c) define changes in operating methods, equipment, and practices that would result in more economical railway service.

The authority shall review all available data and reports on the existing highway network. In addition, the authority shall review and comment on :

- (a) the government's plans for future highway development;
- (b) the policies, organisation, staffing, equipment, operation and executive capability of the agencies of the government responsible for planning, constructing and maintaining the highway system;
- (c) the major public and private highway transport enterprises and their capacity for providing present and anticipated services in intercity transport.

The commission shall study the country's ports and the coastal and inland waterways, its domestic shipping activities, and related transport enterprises, to assess the future role of maritime transport in the internal distribution system of the province .

The organisation shall analyse :

- (a) all available data and reports on port traffic, administration and access channels of the country's principal ports, and proposed new ports in locations.

- (b) the present domestic shipping fleet, its capacity, age, condition, operations and administration;
- (c) the cost of operation and maintenance of ports and of domestic shipping and the revenues currently derived from port and shipping operations.

The present status and future role of civil aviation must be determined on the following grounds :

- (a) the type and age of aircraft in use;
- (b) the facilities and conditions at major airports serving civil air traffic;
- (c) the organisation and management of airports and domestic air carriers;
- (d) the financial condition of domestic air carriers.

Finally the organisation shall prepare an outline of government policies and measures necessary to :

- (a) implement the recommended programme of new transportations in the transport sector; and
- (b) obtain the maximum benefits from both the existing transport infrastructure and from the proposed improvements. This shall include recommendations on :
  - (i) the formulation of appropriate criteria on which to base future investment and disinvestment decisions;
  - (ii) the establishment of rates and fares on government owned transport enterprises which reflect transport costs;
  - (iii) the improvements needed in the organisation of existing agencies responsible for administration, operation, regulation and planning in each mode of transport and the formation new agencies to perform these functions; and
  - (iv) the organisational requirement needed to develop and implement on a continuing basis coordinated transport policies and planning, including definition of the type of organisation that would be appropriate and viable, the extent of its authority, and its financial and staffing requirements.

Public policy towards transportation, however, is by means of exclusively motivated by economic considerations.

To adopt all of the conclusions reached at once would call for substantial reorganization of our whole administration and constitutional machinery. The impossibility of doing this in the practical world is obvious.

This realistic limitations does not mean however, that the whole theory is no more than an academic exercise in utopia with no relevance to the real world. New techniques and ideas are rarely adopted suddenly; they grow in acceptance of their value as proved in the practical world of experience. There is no reason why individual parts of this analysis should not be tried on a piece meal basis, without the immediate acceptance of other parts. Experience gained in this way would then be disseminated through meetings and conferences of experts, and the theory, as modified if necessary in the light of practical experience, would gain wider acceptance. At the same time problems countered in the evaluation of variables needed in the analysis would lead to variable research to establish the actual data and relationships.

An effective transportation system is an important part of the development of physical infra-structure which, in turn, determines the growth rates in a developing economy. In the context of national development, transport potential play a strategic role in expanding the domestic markets and urbanisation raising the level of social and economic activities, leading to accelerated growth in the productive sectors. For rapid regional economic development anywhere, transportation planning assumes an added significance in East Pakistan.

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