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D A C C A

PLANNING REGIONS : BANGLADESH

A thesis

by

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of

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T H E S I S

PLANNING REGIONS : BANGLADESH

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A B S T R A C T

Since the majority of the people in Bangladesh lives in rural areas, our national development plan should be based on rural development. In order to make national development meaningful, the villages must be developed. But how? The answer can be found through a balanced regional development approach that will transform the existing dichotomous Rural-Urban concept to a continuum one. For such a regional development plan, regionalization or delineation of planning Regions is a prerequisite task for the planners. This approach is a complex phenomenon in Bangladesh. The factors contributing to this approach are not only interrelated but also interdependent. In this thesis a large number of variables indicating status of development were analysed through a multi-varriate technique called ' factor analysis'. The choice of spatial unit in the process of regionalization is a very important consideration. In this study sub-division, the next smaller spatial unit to a district, was taken as the basic unit of analysis in order to identify the intra-micro-regional variations.

In the present research four categories of regions were identified. These are; (1) Urbanized Region ; (2) Developing Region; (3) Underdeveloped Region; and (4) Depressed Region.

The urbanized region is comprised of sub-divisions that contain within them major urban centres of Bangladesh. These are areas highly urbanised and show the highest degree of development. Most of the industrial belts of the country are located in and around these major centres.

The developing region primarily includes the sub-divisins of the districts of Dinajpur, Rangpur, Bogra, Pabna, Tangail, Comilla and Noakhali. These areas have better co-operative and irrigation facilities and also higher level of agricultural production. The communication system in these areas is more or less developed and some sorts of industrialization takes place.

The underdeveloped region is comprised of the districts of Jessore, Khulna, Faridpur, Barisal, Patuakhali, Mymensingh, Dacca and Sylhet. This region covers a vast area of Bangladesh including haor area of Mymensingh district, hilly area of Sylhet district and forest area of Khulna district. It particularly covers the entire coastal areas of Bangladesh. In these areas the success in regards to socio-economic development is relatively low.

The depressed region is scattered throughout Bangladesh. The main depressed areas are Chittagong Hill Tract, Sylhet, Rajshahi, Kushtia and Jessore Districts. In this region the agricultural Production is very low in comparison with other region of Bangladesh. This region's socio-economic status remains at a very low ebb.

It is found that the developmental tendency of Bangladesh grows diagonally from Dinajpur to Chittagong district. This development corridor includes most of the urbanised and developing regions. The remaining underdeveloped and depressed regions are situated on either sides of this development corridor.

Finally, a framework following the existing administrative setup has been suggested for developmental investments in order to achieve the desired balance between the developed & depressed regions of the Country.

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CHAPTER ONE

I N T R O D U C T I O N

1.1 BACKGROUND OF THE STUDY

Regional Planning is a new field of experience in most of the developing countries, including Bangladesh. Application of this planning approach bears promising hope for Bangladesh, where resources are very limited in relation to her need. The total land resources of Bangladesh have to be planned and developed to sustain the multitude of its manpower. The financial and other resources are still in a developing stage to meet the challenge. And that is why the planning should be very scientific, broad-based and foresighted. A balanced development of land on the basis of rational planning is an important step towards a better distribution of the benefits of development in all parts of the country. Now it is becoming increasingly apparent that for the success of any development plan, both a spatial and social framework of economic investments are necessary.* For economic and social efficiency, the process of planning cannot be spaceless. Further, social conditions are closely related to the spatial distribution of the benefits of development"[1]. The traditional indicators like gross national product, percapita income, savings rate, consumption etc. are all aggregative in nature and do not necessarily present a spatial

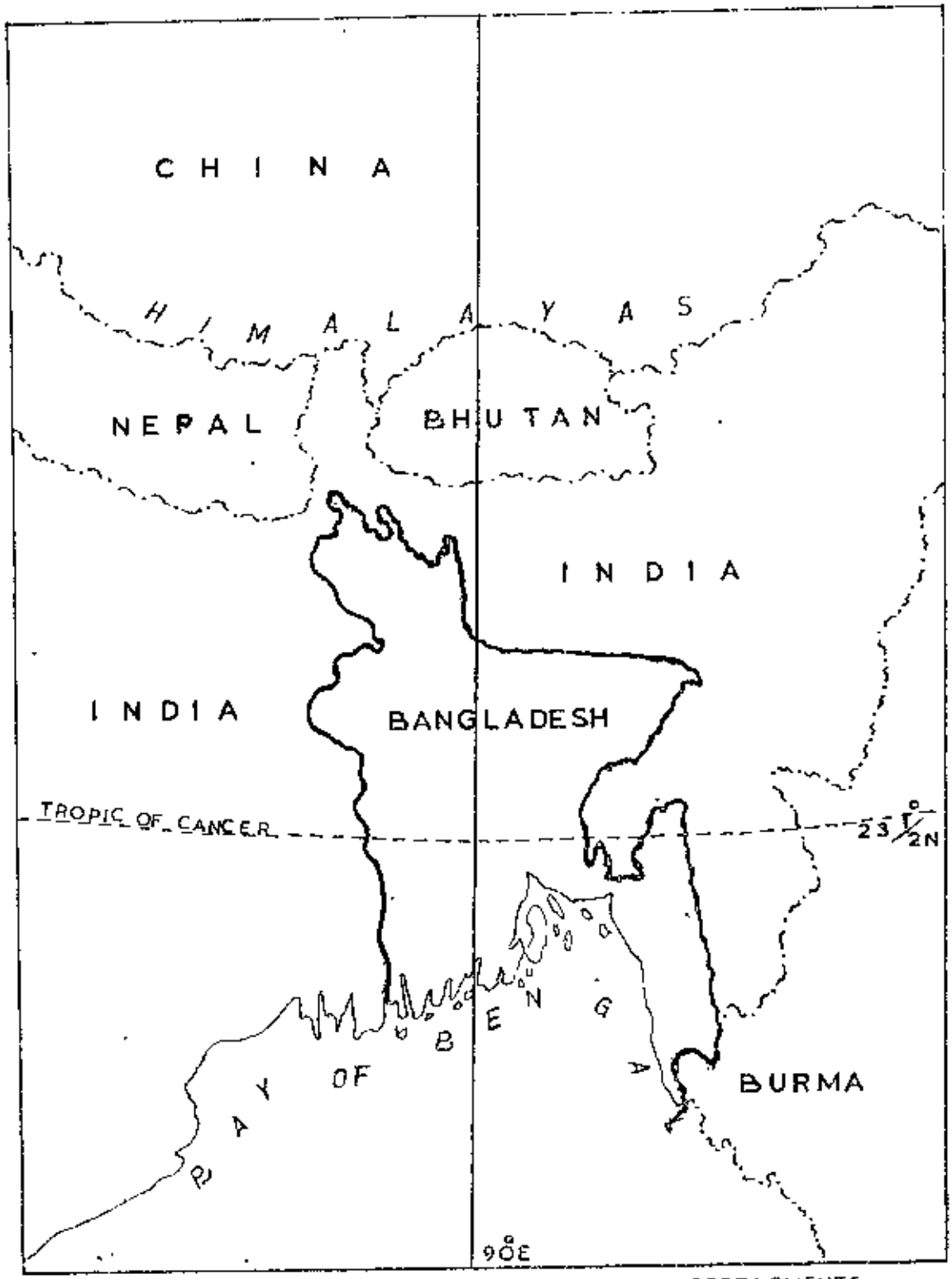
perspective of socio-economic change. Thus the use of the region as a spatial concept becomes a complementary dimension for economic planning. For consequent growth and development of the country as a whole, the nation will require a systematic approach to Regional Planning, a technique that is becoming popular in developing countries. So, substantial work needs to be done in this area for a successful application of this planning tool.

* Planning for economic development has concentrated most of its efforts on working within a macro-economic framework"[2]. In such a framework, regions play the role of basic interacting socio-economic units. Thus, identification of regions becomes a pre-requisite exercise in the process of Regional Planning for National Development. In the past, little or no attention was paid to the delineation of Planning Regions in Bangladesh. What was traditionally done, was a generalised division of the national space based on layman's idea. Except for certain geographical and administrative considerations, no other scientific criteria was applied in delineating those divisions. In order to identify such regions, one must select certain criteria which will help delineate the regions effective for the Regional Planning Programme. The decision may be either to accept the existing regions which may adapt themselves well to the problems of regional planning, or to utilize a process of regionalization in which the planner derives and justifies a set of planning regions.

MAP 1
BANGLADESH
AND
NEIGHBOURING COUNTRIES

0 50 100
MILES

N



SOURCE:- **HABITAT**, NATIONAL REPORT ON HUMAN SETTLEMENTS, BANGLADESH, 1976

1.2 REGIONAL PLANNING IN THE PROCESS OF ECONOMIC DEVELOPMENT

Human activities are distributed over the national territory in certain patterns that are neither arbitrary nor the workings of chance. Rather, these patterns result from the interdependencies that give form to the economic space. Spatial patterns will change with changing patterns of demand, level of technology and social and political organization of the nation. The economic and social development of the nation is reflected in its patterns of settlement, its patterns of commuting and migration and its reticulation of areas of urban influence[3].

Within the country like other developing nations, economic growth tends to be concentrated rather than dispersed, with urban centres dominating, organizing and controlling a surrounding regional hinterland. A major urban centre and its dependent region together form an economic unit, which is a subsystem of the larger(National) economic system. The possibilities of location of future economic activities like industry, markets, development of physical infrastructures (e.g. power, transportation and other relevant services), suggest an optimum pattern of regional development compatible with the overall resource position. It is logical to concentrate the organisation of these activities, so as to provide optimum benefit to maximum number of people at minimum cost. Because of its small resources endowment, Bangladesh is an area within which the best efforts of all concerned must be achieved if rapid economic development is to occur.

Bangladesh requires high levels of investment in all sectors of the economy in a balanced manner if this success is to be achieved. If traditional planning does not take into consideration the spatial aspect of resource distribution, this may contribute to the failure of our national development programme. Regional Planning in this respect may offer a structure within which spatial and social monitoring of the balance of the economic system is feasible. A region's economic growth is thus a function not only of its internal resources, but also of the nature and strength of the economic forces which originate in its main urban centre.

In developing regional plans, it is essential to understand the system by which economic growth of the country operates. It is very important to organise future regional development along certain guidelines, which would lead to the attainment of national and regional development goals. These guidelines delineate aspects of development policies towards particular parts of the country. As described by John Friedman, " Regional policy is a direct outgrowth of the triad which has the nation as a basic mark of reference. Nations are not homogenious ; development does not affect all parts of a nation equally; and planners need a link relating isolated projects to national goals. If regional policy reflects the existence of geographic or spatial inequalities, it also reflects an awareness of the importance of a regional approach to the implementation of national growth objectives ".... the newly evolving nations of Africa, Latin

America and Asia are beginning to appreciate the fact that national investment strategies require a subaggregation along regional lines"[4].

The outstanding feature of regional development plans is the co-ordination of various future economic and social activities in geographical space . This feature differentiates regional plans from sectoral development plans. The plans are the product of a continuous activity called regional development planning. This activity begins with collecting meaningful information which is needed in order to prepare a thorough analysis of the development problems of regions and an assessment of their potential.

Bangladesh is one of the world's poorest rural countries. About 90 percent of the population live in rural areas and over 75 percent are engaged in agricultural activities.[5] Percapita gross national product (GNP) and percapita income at current price is estimated at Taka 1403 and 1273 respectively in 1976-77, which is one of the lowest in the world.[6] Percapita caloric intake at 1800 per day, falls far below minimum required standard. It is very necessary to accelerate the growth of national gross products perhead and to make the fruits of development available to the poverty stricken masses of the country.

Given favourable political conditions, regional development planning could serve as an effective means of transforming a developing economy. And this approach could be instrumental in devising solutions for one of the fundamental problems of national development planning— disparities between regions within a national economy. A high rate of growth without spatial integration leads to regional imbalances and

spatially dual economies. Unless there is a perspective spatial plan for the country, it is not possible to stimulate in a balanced way the regional economic development of the country. This does not necessarily lead to the conclusion that socio-economic development of an area must be distributed evenly all over. Spatial planning for economic development should not attempt to create an 'even socio-economic space'. It should not work for equal distribution of economic activities all over the planning areas. It attempts rather towards a decentralised concentration, so that more growth centres can develop in each and every part of the country which will generate waves of development in all sectors of the economy, that will in course of time be spread all over. In our planning efforts we must be able to answer the question " who is getting what , where and when ? ".

1.3 THE CONCEPT OF THE REGION IN PLANNING

To understand regional planning, it is necessary to define first a region and then its characteristics which are useful and functional in economic development of a country. There are many different definitions of a region, depending on the field of study and the interests of people using the particular definition. Thus, for example, geographers speak of a geographical region, agricultural specialists of an agricultural region, urban planners of an urban region and so on. According to our comprehensive approach to regions, we are interested in a definition which would include all meaningful economic, social and physical aspects of regional development and not just one feature of them.

The idea of region has been used and abused over the years. There are numerous controversies and disagreement over its meaning reflecting the variety of disciplines involved in regional studies. According to some specialists, the region is a natural entity that can be positively identified and is termed as natural region. To others, it is merely a product of a method of classification. The concept of this region is to examine whether regions are natural phenomena or merely mental constructions. There are two divergent views—one subjective, and the other objective. The subjective view explains a region as a means to an end, an idea, a model, to help in the study of the world. It uses a method of classification or a device to segregate areal features, on the surface of earth. The objective view adopts an opposite idea explaining the region as an end in itself, a real entity, an organism, that can be identified and mapped.[7]

The regions are given various names by various workers, but the French writer on regional planning, Boudeville [8], used the terminology "homogeneous region". It can also be called the "statistically uniform region" or the "static region". This region is defined as a combination of areas exhibiting a certain statistical uniformity within a stated range. There are a number of different approaches to the definition of regions. Virtually all these fall within three main categories: (a) uniform or homogeneous regions; (b) nodal or polarised regions; and (c) planning or programming regions.

Uniform Regions: The view of a region as a natural homogeneous area is based on the idea that separate spatial units can be linked together on the basis of certain uniform characteristics. Such characteristics might include similar production structure, homogeneous patterns of consumption and like occupational distributions of the labour force. They might reflect geographical factors such as the ubiquity of a dominant natural resource or a similar topography or climate.

Nodal regions: The Nodal region may be defined as a point in geographical space where concentration of different activities takes place. The characteristics of this point determine the characteristics of the region. Nodal regions are the real regions of the earth and are composed of heterogeneous units, but these are closely interrelated with each other functionally. These functional interconnections are most clearly visible as flow phenomena-flows of population, goods and services, communications and traffic. These flows do not occur evenly over a region. Rather, the heaviest flows tend to polarise towards and from one or two dominant centres, which are usually large cities. In this sense, the nodal region focusses attention on the controlling centre of the region rather than on drawing the boundaries.

Planning regions: A third concept of the region is that of the planning region. This is a region defined for the purpose of coherent and unified government decision-making. Implementation

of a regional policy demands a capacity for action, and this rests with governments in most cases. Planning decisions may be ineffective if planning regions are defined indiscriminately. Regard must be given to functional linkages between separate spatial units, so that areas are not included in the planning region which have a higher degree of interdependence with nodes external to the region. But policy formulation also requires information and statistical data, and if these are collected only on a regional basis rather than by sub-regional building blocks, then there is no serious alternative for planning purposes to administrative regions. Consequently, it is now generally accepted that the nodal region is more appropriate than the homogeneous region for planning purposes. Richardson also accepts the superiority of the nodal region and warns that planning regions * may be badly delimited if their boundaries do not conform to the boundaries of natural economic regions. If, as is widely believed, the nodal region is the optimal planning unit, then planning decisions will be distorted if administrative regions are drawnup without regard to the functional linkages between centres, that is, if the region includes nodes which have greater interdependence with nodes outside the region[9].

THE CONCEPT OF REGION IN DEVELOPMENT PLANNING

Regional development planning means the use of resources in a proper direction, with a view to achieving maximum benefit by way of utilising available regional resources and manpower. Regional development planning as visualised in planning should be oriented towards the optimal use

of a region's natural and human resources in particular. A region is a physical and socio-economic entity possessing regional dimensions for development planning. It is not a matter of option or conceptual choice, but a reality which must be faced, coped with and shaped, in accordance with social needs and requirements.

Regional development planning is understood as a process of development pertaining to particular parts of a country called 'regions'. The size and number of these parts may vary but they should be large enough to bring to light features of development which have an impact on the entire area in question. Regional development planning is an integral part of onward national development planning. Even the most remote and apparently isolated areas of a country are tied in many ways with the development course of the entire country. Therefore, when dealing separately with the individual regions, one must always keep in mind the interdependencies between the regions and the country as a whole.

Regional development planning, like national development planning, is effected by structural changes in many fields: in a region's economy, in social and cultural attitudes of its inhabitants, in landuse patterns, in the settlement system, institutional setup and administrative capacities. All these changes require extensive periods of time to be accomplished. Therefore, regional development planning is a long process extending over periods from ten to fifteen and more years. This process can be broken down into shorter intervals which can be considered as consecutive stages of the longterm venture.

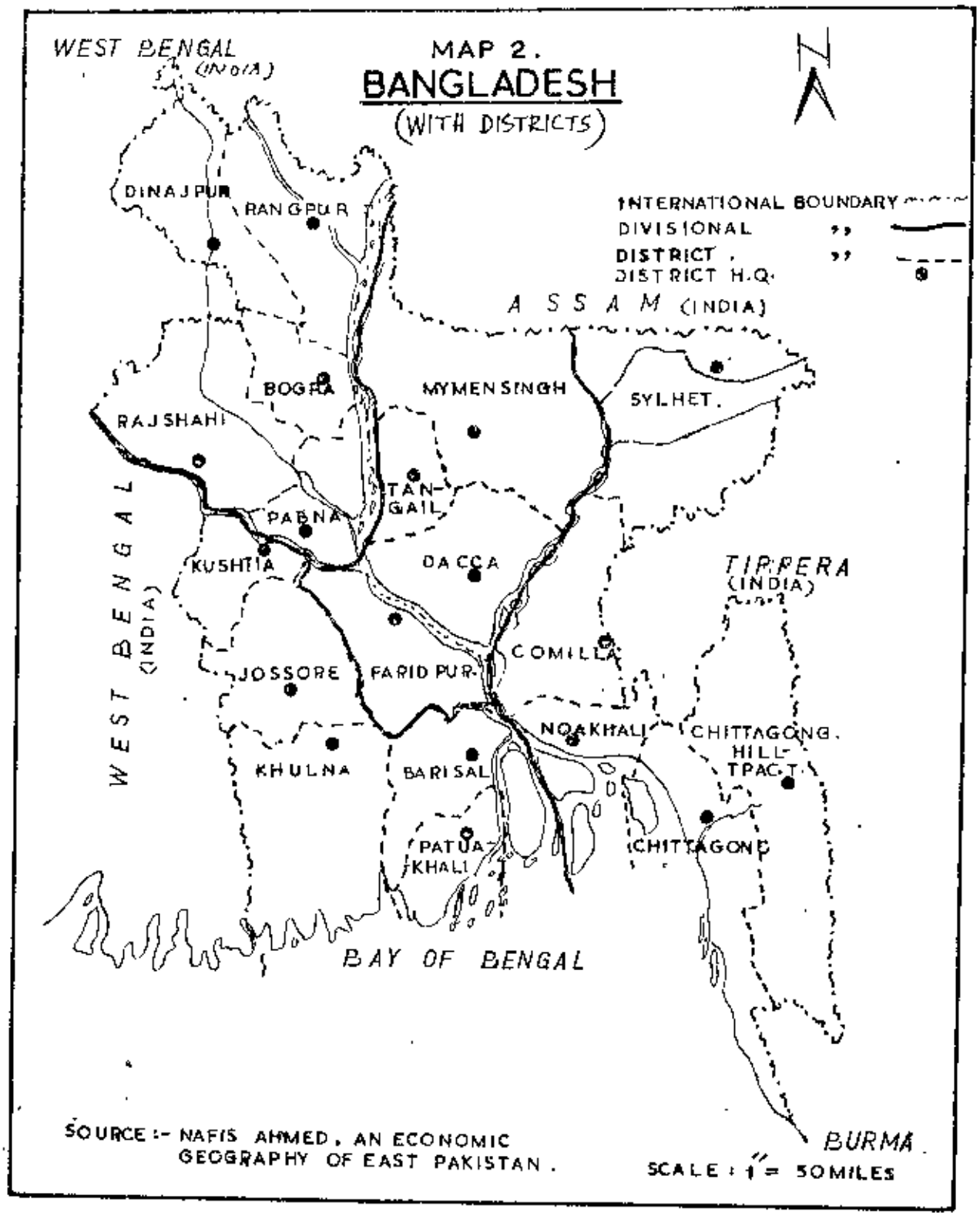
CHAPTER TWO

REGIONAL PLANNING IN BANGLADESH

2.1 REGIONAL PLANNING FOR BANGLADESH

Planning means use of resources in a proper direction, with a view to achieving maximum benefit by way of utilising available resources and manpower of particular geographical space. That regional planning is useful or necessary within the framework of general development efforts undertaken by nations and states is now virtually unquestioned. Within this framework, national and regional planning should be mutually complementary and supportive, but should not substitute for each other [10].

The problems associated with regionalization have drawn the attention of physical planners. In fact, a framework for regionalization requires close coordination between social, economic and physical planning. In order to evolve an optimum pattern of regional delineation one must integrate the economic, social and physical plan for the country. Research on the problems of regionalisation has not so far been seriously undertaken in Bangladesh. In particular, economists within or outside the government have taken very little interest in it. Only people who have done some useful work are geographers and physical planners of the country and abroad(a brief review follows in later pages in this Chapter).


WEST BENGAL (INDIA)
MAP 2.
BANGLADESH
(WITH DISTRICTS)
N
INTERNATIONAL BOUNDARY
DIVISIONAL ,,
DISTRICT ,,
DISTRICT H.Q.
DINAJPUR
RANGPUR
ASSAM (INDIA)
BOGRA
MYMENSINGH
SYLHET.
RAJSHAHI
TANGAIL
PABNA
KUSHTIA
DACCA
TIPPERA (INDIA)
COMILLA
JOSSORE
FARIDPUR
NOAKHALI
CHITTAGONG HILL TRACT
KHULNA
BARISAL
PATUAKHALI
CHITTAGONG
WEST BENGAL (INDIA)
BAY OF BENGAL
BURMA
SOURCE :- NAFIS AHMED, AN ECONOMIC GEOGRAPHY OF EAST PAKISTAN.
SCALE : 1" = 50 MILES

This state of affair is not surprising in view of the fact that formulation of a systematic and national regional development plan has till now been a low priority item on the agenda of national planning . Individual researchers however, have mostly been handicapped by non-availability of relevant data. The only source for most data on statistical regionalisation remains the government census publications. However, a study of only limited scope could be conducted with the data available from these sources.

URBAN GROWTH

Bangladesh is predominantly an agricultural country, only a fraction of its land space being occupied by urban areas. Historically, the present day major urban centres grew out of administrative centres. Urban growth received a new momentum when the British left the Indian Sub-continent. After the partition in 1947, some amount of industrialisation took place in and around the existing urban centres. As a result of which four towns, Dacca, Narayangonj, Chittagong and Khulna developed into large cities. In the post liberation Bangladesh, this tendency is likely to be more pronounced since Dacca remains the centre of activities of the national power elite groups. According to the 1974 census definition of urban centre, there are 119 urban centres in Bangladesh (see table-1).[11]

TABLE - 1

URBAN CENTRES OF BANGLADESH WITH POPULATION, 1974

URBAN CENTRES	POPULATION	URBAN CENTRES	POPULATION
1. Dacca City*	13,11,000	21. Faridpur Town*	46,000
2. Khulna City*	4,37,000	22. Nawabganj Town*	46,000
3. Chittagong City*	4,17,000	23. Bhairab Town	44,000
4. Narayangonj City*	2,71,000	24. Satkhira Town*	41,000
5. Barisal Town*	98,000	25. Narsingdi Town*	39,000
6. Rajshahi Town*	97,000	26. Satarkul Town	39,000
7. Saidpur Town	90,000	27. Gopalpur Town	39,000
8. Comilla Town*	86,000	28. Kishorgonj Town*	37,000
9. Jessore Town*	83,000	29. Sherpur Town	37,000
10. Mymensingh Town*	82,000	30. Mushtia Town*	36,000
11. Sirajgonj Town*	74,000	31. Chuadanga Town*	35,000
12. Rangpur Town*	73,000	32. Akhaura Town	35,000
13. Pabna Municipality*	62,000	33. Saidpur Town*	34,000
14. Dinajpur Town*	62,000	34. Ghorasal	34,000
15. Brahmanbaria Town*	62,000	35. Jhenaidah Town*	34,000
16. Chandpur Town*	62,000	36. Noakhali Town*	32,000
17. Jamalpur Town*	60,000	37. Madaripur Town*	32,000
18. Sylhet Town*	60,000	38. Kurigram Town*	30,000
19. Tangail Town*	52,000	39. Alamjee Nagar	30,000
20. Bogra Town*	47,000	40. Bajerhat Town*	28,000

TABLE - 1(Contd.)

URBAN CENTRES	POPULATION	URBAN CENTRE	POPULATION
41. Munshiganj Town*	28,000	61. Siddirganj Town	21,000
42. Khagdahar Town	28,000	62. Nagura Town*	20,000
43. Gaibanda Town*	27,000	63. Rangamati Town*	20,000
44. Patuakhali Town*	27,000	64. Ishardi Railway Coloney	20,000
45. Manikganj Town*	27,000	65. Sikalbahar Town	20,000
46. Char Lakhya Town	27,000	66. Nilphamari Town*	19,000
47. Netrokona Town*	26,000	67. Char Ishardi Town	19,000
48. Kanchan Town	26,000	68. Deraid Town	18,000
49. Majbari Town*	24,000	69. Mirzapur Town	18,000
50. Shahjadpur Town	24,000	70. Fatehpur Town	17,000
51. Paksey Railway Colony	24,000	71. DakhinkhanTown	17,000
52. Laksam Town	24,000	72. Habiganj Town*	16,000
53. Savar Town	24,000	73. Meherpur Town*	16,000
54. Lalmanirhat Town	23,000	74. Meherpur Town	16,000
55. Kawatkhali	23,000	75. Cox' Bazar Town*	16,000
56. Perojpur Town*	22,000	76. Thakurgaon Town*	16,000
57. Chowmuhani Town	22,000	77. Joypurhat Town*	16,000
58. Natore Town*	21,000	78. Patulia	16,000
59. Jhalokati Town*	21,000	79. Baruthan Town	16,000
60. Narail Town*	21,000	80. Paba Town	16,000

TABLE - 1(Contd)

URBAN CENTRE	POPULATION	URBAN CENTRE	POPULATION
81. Rami Town*	15,000	101. Kaliasankarpur Town	11,000
82. Sunamganj Town*	15,000	102. Parbatipur Town	11,000
83. Joydevpur Town	15,000	103. Kumarkhali Municipality	11,000
84. Kaliganj Town	15,000	104. Sapura Town	11,000
85. Kotchandpur Town	15,000	105. Mainamati Cantonment	10,000
86. Uttarkhan Town	15,000	106. Darsana Town	10,000
87. Mongleport	15,000	107. Gouripur Town	10,000
88. Rajibpur Town	14,000	108. Debhata Municipality	10,000
89. Gopalganj Town*	14,000	109. Sitakunda Town	10,000
90. Panchagarh Town	14,000	110. Ullapara Town	10,000
91. Bandarban Town*	13,000	111. Alamdanga Town	10,000
92. Chattak Cement Factory	13,000	112. Kulaura Town	9,000
93. Bhola Town*	13,000	113. Narogram Town	9,000
94. Santahar Railway Colony	13,000	114. Kaptail H.E. Project	8,000
95. Bahirchar Town	13,000	115. Sreemangal Town	8,000
96. Rangoti Town	12,000	116. Moheshpur Town	8,000
97. Hajiganj Town	12,000	117. Alamdanga Town	7,000
98. Sariah Town	12,000	118. Chandragona Town	6,000
99. Muktagacha Town	12,000	119. Malchity Town	5,000
100. Moulvi Bazar Town*	11,000		

SOURCE: Centre for Urban Studies, University of Dacca.

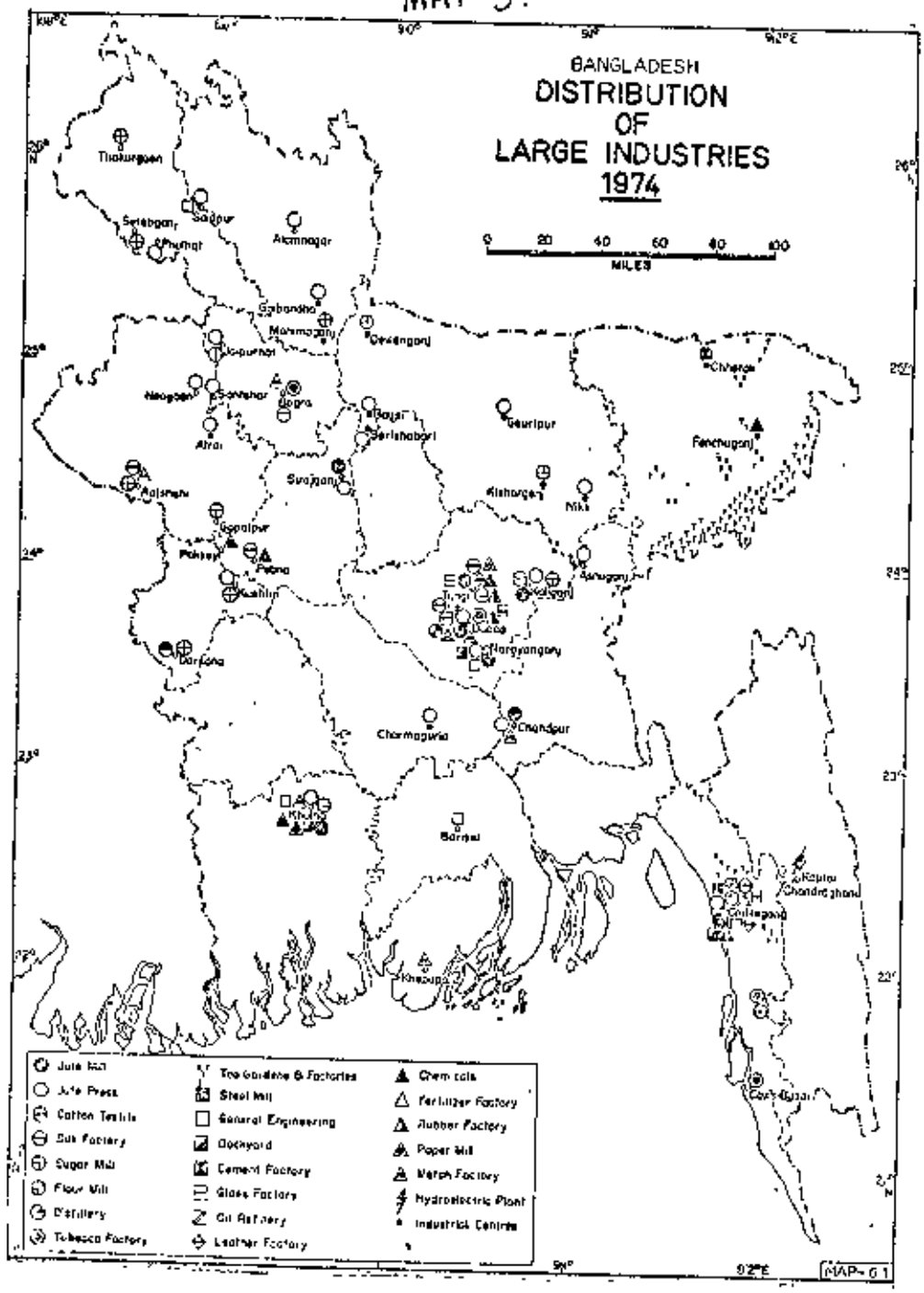
N.B. : Figures rounded to nearest '000.

* Sub-Divisional Headquarters.

Planning for the future growth and development of urban centres must be done within the framework of regional development. In recent years, the most important issue in development planning is the attainment of a balanced regional development. The present spatial perspective of the national economy tends to suggest that the above mentioned four cities have grown disproportionately, and benefitted only the regions around them while the other areas, remained backward and underdeveloped(see Maps 3 & 4). Often, the backward regions are the source of wealth promoting and sustaining the prosperity of primate cities but very little is done by the authority to allocate resources for the development of those regions. The identification of regional differences which are significant for development planning may present one approach to the regional planning. In the distribution of natural resources and population, Bangladesh shows considerable spatial diversity. North Bengal for example, is a potentially rich area for further development through increased agricultural production, industrialication, infrastructural development and flood and disaster protection. Some areas of the country are particularly backward in comparison to other areas and do not sufficiently participate in the development process of the country owing to their unfavourable location(e.g. peripheral areas). Yet for various reasons it may be necessary to take special action in order to speed up the development of these backward areas and to help their inhabitants increase their income and thereby induce them to stay in the area.

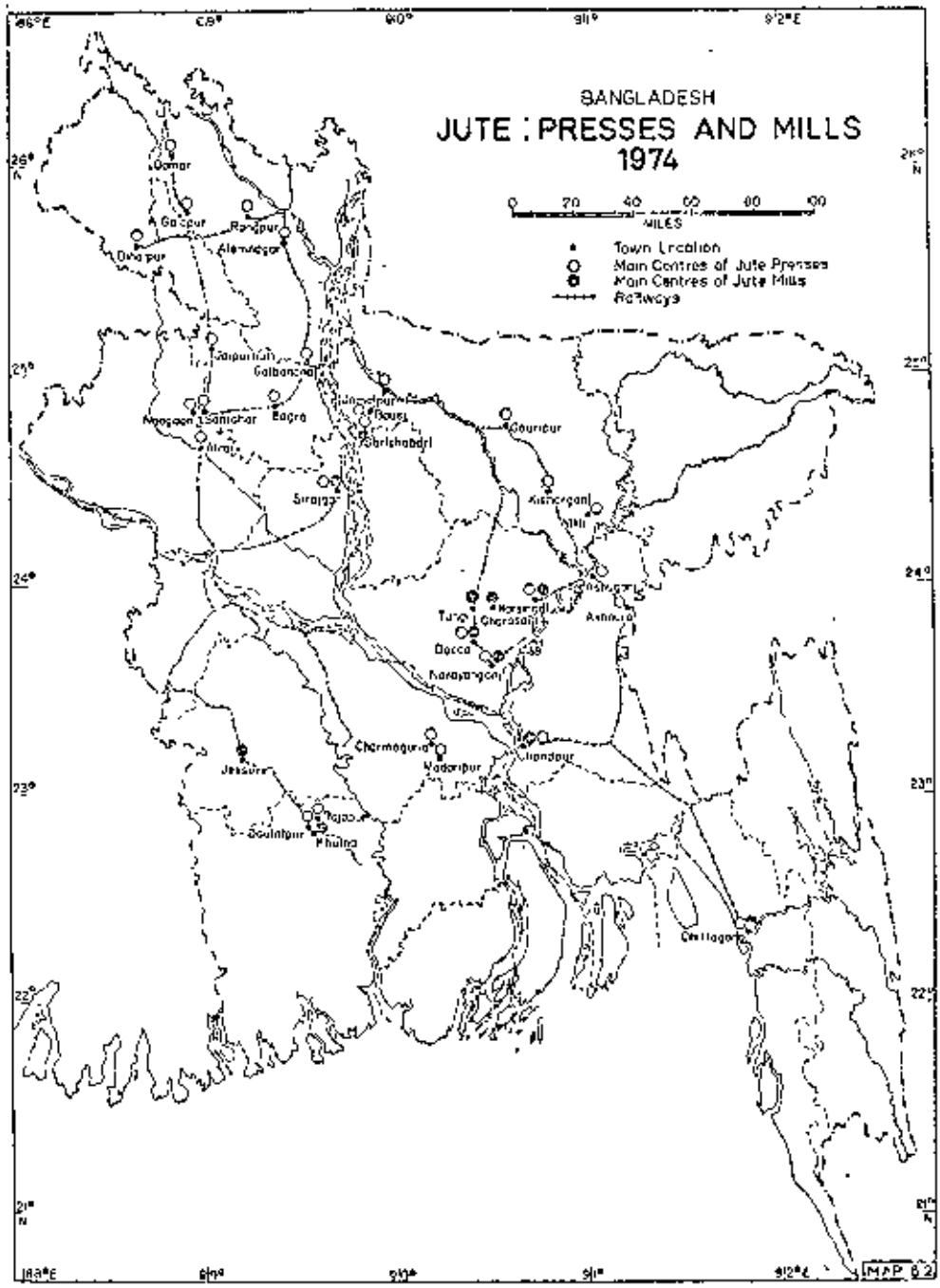
Regional aspects of economic development of Bangladesh have often been analysed and stressed in relation to the Western economies.

MAP 3.



Source: Nafiz Ahmed, A New Economic Geography of Bangladesh.

MAP 4.



Source: Nafiz Ahmed, A New Economic Geography of Bangladesh

Historically, the extensive phase of economic development right from the colonial period to modern times is responsible for creating large differences in income levels as well as economic activities. Governmental policies have been playing a major role in narrowing the developmental and investment gap between these regions after the liberation of Bangladesh.

2.2 INTER AND INTRA-REGIONAL DISPARITY

Regional disparity is a global phenomenon. It is not something which is peculiar to Bangladesh. No country in the world is characterised by inter or intra regional equality in development, as measured by various yardsticks e.g. per capita income; level of consumption; or other significant indices. Everywhere, perceptible regional variations are found in material prosperity. The rate of economic progress is uneven in space and time. "The lack of uniformity in resources endowment, man/land ratio, mineral deposits, climatic conditions etc. have caused regional differences in the level of percapita income all over the world"[12]. However, now a days , it may be said that balanced regional development is not a dream. It may be a reality when development is based on the proper regional plan. But its achievement presupposes hectic efforts on the part of the government and increased responsibilities on the entrepreneurs.

Regional disparities appeared in Bangladesh because of regional differences in resource endowment, characteristics of the

population, natural or acquired, impact of past political events and policies, or mere historical accident. Apart from these factors, income disparities inevitably result from the process of economic growth itself. Once development starts in a particular region, it tends to feed on its own momentum and gives that region a distinctive advantage over other regions. The reasons are quite well known. With the development process, various kinds of facilities like transport, education training and banking institutions, power and water supply, marketing connections, etc. come to be concentrated in the region concerned. Capital and entrepreneurial ability flow towards such regions to take advantage of these facilities. In consequence of such development, larger incomes are generated which lead to more consumption, more saving and investment, hence more growth. It is because of this that different parts (regions) of the country show uneven rates of growth and more advanced and less advanced regions emerge.

Development in the growing regions may have reactions on the less developed or backward regions, which can be favourable as well as unfavourable. Under the most favourable conditions, the growing region tends to stimulate economic activity in the less developed regions through creating demand for the latters' products like food, raw-materials mineral products etc., if such can be supplied by them. This stimulates production and employment and generates larger incomes in the less developed regions, thus increasing the latter's saving capacity and investment potential. This may start the process of development in the lagged regions as well.[13]

Such an impact has been called the " spread effect" by Gunner Myrdal[14] and " trickling down effect" by Albert Hirschman.[15] On the other hand, a developing region may have adverse effects on the underdeveloped regions of the country. Such effects have been called by Myrdal as " backwash effect" and by Hirschman as " Polarisation effect". These may result from the movement of productive factors from the less developed to the more developed regions, e.g., the best trained and the best educated persons would find it more remunerative to work in the more developed regions, entrepreneurial ability would expect to better reward in the growing region. Similarly, whatever capital is available in the backward region will tend to move towards the more developed region in the hope of better returns. This will denude the backward region of its talents and other resources and make the starting of the developmental process more difficult.

A significant problem in Bangladesh is the disparity in regional growth and development. During the Second and Third Five Year-Plan of Pakistan, economic activity and infrastructure focused mainly upon the three major urban regions of Dacca, Chittagong and Khulna creating disparities among regions of Bangladesh. Only the use of regional planning can attempt to reduce this disparity between these regions and try to achieve an intra-regional balance. In the First-Five-Year-Plan of Bangladesh increased emphasis was given upon comprehensive regional planning and development[16].

2.3 PREVIOUS STUDIES AND PRESENT OBJECTIVES

It follows from the above that Regional Planning should be the approach development planning in Bangladesh and towards that end the identification or delineation of regions is a pre-requisite. Although a full-scale study in this regard is yet to be undertaken in Bangladesh, the geographers and physical planners of the country and abroad made some progress in the delineation of planning regions.

THE UNDP PAK 25 PROJECT[17]

A study relating to this field was done by the United Nations under the UNDP PAK - 25 Project, titled, " Location and Planning of Cities in East Pakistan" with the help of Urban Development Directorate in 1968-69. The purpose of this project was to assist the Government of then Pakistan in a comprehensive study of the feasibility of location of new cities within the framework of a general urban development concept for East Pakistan(now Bangladesh) and the preparation of layout plans for two selected cities. This project was divided into two main divisions of work, one was Regional Planning and Development and other was Urban Planning and Development. The works were further divided into three sections.

Section- 1 included the collection of data and background information, general survey and organisation of Data Bank. This was used for further programming and physical development planning oriented towards solving problems relating to the location and planning of cities in Bangladesh.

Section -II was concerned with the preparation of an outline development plan. This indicated the physical development strategy, based on analysis of appropriate data and formulation of model concepts. These were general directions for development of productive forces of the country with special reference to location, planning and development of urban land and industrial complexes for the period upto 2000 A.D. As a result of these works, delineation of Planning Regions was done, for the perspective development of the country.

Section -III was concerned with the preparation of a Physical Regional Development Plan for one selected Planning Region of the country. The Regional Plan included programmes for economic, social and physical development of the Region and the elaboration of Physical Plans. These covered development of natural and man-made resources, industry, agriculture, land development, flood control, population settlements, trade, transportation services, facilities and utilities in the frame of the Region-with special reference to location, planning and development of urban and industrial complexes.

A methodological approach had been prepared by this project in order to collect the various types of data. Various types of regional maps of the Province were prepared. From the analysis of these regional maps, four sectors such as: industrial complex; agricultural areas; natural protection areas ; and perspective towns, were suggested. By superimposing these four sectoral maps, four types of Planning

Regions were achieved. In this process of regionalization no mathematical techniques were used. It was actually based on theoritical concept. It did not identify the regions which were actually depressed needing priority of both economic and physical development. Though less sophisticated methodologically, the project should be credited as a pionnering effort towards regionalization of Bangladesh for the purpose of development planning.

K. MOUDOOD ELAHI'S STUDY[18]

Another study by K. Moudood Elahi (1972) was directed for delineation of Geo-demographic Regions on the basis of 40 socio-demographic variables for the 17 administrative districts.[19] He also carried out a separate study on 37 urban centres with 25 socio-economic variables. The variables chosen were primarily taken from the different aspects of population along with some socio-economic variables on the basis of the 1961 Census. Variables like age structure, agricultural land holding, dependency ratio, sex ratio, marital status, literacy, labourforce, migration, religion, language, urbanization, family size etc. were included in this study.

From the analysis of the variables he had found seven dimensions, which were fairly large , to explain the desirable features of the population. The first three dimensions were the most important and explained the geodemographic regions of Bangladesh.

These three distinctive dimensions were ; (a) inactivity, especially of female population and dependency (plus some contribution from population density) ; (b) urbanism and cosmopolitanism (lesser ethno-religious or linguistic segregation); and (c) the population size. He also showed the distinctions in the regional pattern of population characteristics of urban and rural areas. As his study was concentrated in population structure and distribution this pattern of Geo-demographic Regions do not serve the purpose of overall Planning Regions.

RICHARD TABOR'S STUDY[20].

Another study was done by Richard Tabors in 1971. The purpose of this study was to develop a rational and a functional basis for the use of regions in the economic planning process of Bangladesh. In order to achieve this objective the research work first considered the previous trends in economic planning and supplemented this process with the addition of a spatial dimension. Second it looked at the previous experience in regional planning and suggested alternative definitions of planning regions. Third it developed a methodology for the delineation of multi-functional planning regions. Finally it tried to apply this methodology[21] to Bangladesh. In the methodology the mathematical techniques of iterative factor analysis and centroid grouping procedures were applied for grouping the districts of Bangladesh. The resultant district groupings based on various sectors of the economy were then combined to give the composite

groupings[22] of the districts to discern the multifunctional regional pattern.

Another attempt was made to define regions on the basis of intra-regional flows of information and political and administrative requirements for better functioning for the purpose of regional planning in Bangladesh.

This work was trying to identify a set of planning regions for the country and offering guidance to the Government Authority on Regional Planning. This work utilized the districts of Bangladesh as the basic data unit and as a result all intra-district diversities were lost in the process, resulting in a less sensitive delineation (i.e. regions were composed of several districts). Another limitation of this study was that the researcher did not identify the depressed regions which were actually present in the country and required special priority for development. Ignoring these limitations this work is no doubt a good effort in regionalisation of Bangladesh.

RESEARCH OBJECTIVES OF THIS THESIS

This present study has followed the approach used by Taborn but has tried to include all the information available at the sub-division level relevant for the delineation of planning regions(a sub-division is a smaller spatial and administrative unit than a district).The thesis has looked at the spatial dimension of socio-economic & physical development, paying particular attention

to its use in development planning for Bangladesh. There exist regional variations in the country in terms of various socio-demographic and economic characteristics. This thesis attempts to identify a set of planning regions that would both be logical and functional for the purpose of the National Planning with emphasis on balanced regional development. This study has tried to meet the deficiencies of those previous regionalisation efforts, and hopefully will add significantly to the study of statistical regionalisation for Bangladesh. The identification of the various types of regions, including those economically depressed ones needing priority in consideration, the National Development Programme, is of considerable importance to Bangladesh.

CHAPTER - THREE

METHODOLOGY AND RESEARCH DESIGN

3.1 DELINEATION OF PLANNING REGIONS

Regionalization is the process of delineating regions. This process may take several forms depending on the purpose of regionalization; the criteria to be used ; and data availability. The delineation of planning regions involves the grouping of spatial units which have similar characteristics, but differing significantly from units outside the region, on the basis of clearly defined criteria. The resultant region will never be perfectly homogeneous, but must be homogeneous within certain limits[23].

Regionalization is a relatively new approach in Bangladesh. There is need for basic research prior to the formulation of a regional development plan. Unplanned growth is undesirable since it may lead to both misallocation of resources as well as create problems that bring misery to people. As a late starter Bangladesh has the advantage of learning from the mistakes of others. It is becoming increasingly obvious that delineation of planning regions must be specific. It must be interms of the purpose for which it is to be used, or the function it is to serve. To develope a country as a whole, it is necessary to start with a regional plan for scientifically divided" Planning Regions".

Delineation of regions should minimize within region differences and maximize between-region differences. Delineation of planning regions attempts to locate or determine the natural territory of the region wherever boundaries are to be determined. It involves analysis of particular aspects of the planning process in its regional contexts, applying technique to the problems in planning exercises, and to some extent indicating the lines along which solutions to these problems may be sought. The variations between the regions are categorised, distinguishing 'prosperious' and 'less prosperous' regions through regionalisation.

Planning regions are geographical regions suitable for designing and implementing development plans for dealing with the regional problems. On the basis of criteria such as unemployment levels, activity rates and migration trends, planning regions could be defined. The identification of satisfactory planning regions may involve some compromise. This also assumes that the planning regions can actually be delineated and that the resultant regions are administratively viable, which introduces the problems of regionalisation.

3.2 METHODOLOGY

There are three major methodological approaches to the delineation of planning regions: (a) gravity model[24], (b) flow analysis (graph theory)[25] , and (c) factor analysis[26].

THE GRAVITY MODEL

The 'gravity model' is based on the empirical observation that flows of goods, people, and information vary directly with the size of the destination, and inversely with the distance between interacting zones or centres. Gravitational analysis is concerned with the theoretical forces of attraction between centres rather than the actual flows. The gravity model assumes that the interaction between two centres is directly proportional to the 'mass' of the centres and inversely proportional to the 'distance' between the centres. The variables used to measure mass and distance depend on the problem and data availability. In recent planning developments of the model, mass has been represented by a number of variables; e.g. population ; employment; income; expenditure; and retail turnover; and distance in physical terms; e.g. miles; time; price; and intervening opportunities.

$$T_{ij} = K \frac{P_i P_j}{d^2_{ij}}$$

where, T_{ij} is the gravitational force between centres i and j,

P_i and P_j are the masses of the two centres,

d_{ij} is the distance between them, and K is a constant.

FLOW ANALYSIS

Flow analysis delineates functional regions on the basis of the direction and intensity of flows between the dominant centre and surrounding satellites. The intensity of the flow decreases

with distance from the main centre, and increases when it approaches another centre. The boundary of the sphere of influence of the dominant centre occurs where the flow intensity is at a minimum. The flows may be of several types. They are often economic categorised according to type (such as cargo or passenger, road or rail) and purpose(such as shopping or commuting). They may also be social (such as the flow of students or hospital patients), political (such as the flow of government expenditure), or information (such as telegrams, newspapers and telephone calls). The latter may provide a good proxy indicator for the rest.

An interesting variation of the flow analysis is 'Graph theory'. This approach measures the relationships between selected groups of centres on the basis of flows between the centres. The number of telephone calls between the centres is the usual flow criteria. This provides a useful index of economic and social relationships. The flows are plotted in matrix form, from which the primary and secondary flows into and out of each centre can be identified. In this way the hierarchy of nodes can be found out on the basis of functional relationships with an area (see figures 1 & 2). Graph theory offers a technique which may be used to delineate nodal regions and which is particularly useful in identifying the hierarchical structure within a nodal system. The nodal system is normally identified by adherence to two major principles; (1) that a node is considered to be independent if its largest flow goes to a smaller centre; and

Telephone calls ('000's per day)to centre

Telephone calls ('000's per day) from centre	A	B	C	D	E	F	G	H	I
A		40		20					
B	10			60					
C				30					10
D		60			40				
E				30		10			
F					20		10		
G				50	50			20	
H					20		30		
I				10	40				

fig. 1. Flow matrix(Primary & secondary flows only).

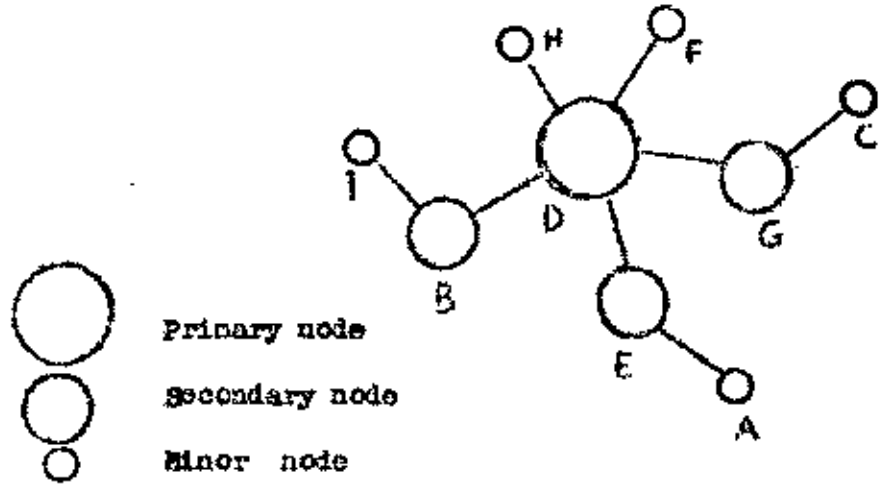


Fig.2. Network of functional relationships.

(2) the transitivity principle— if "P" is subordinate to "Q" and "Q" is subordinate to "R", then "P" is subordinate to "R". Graph theory has one major advantage; it is computationally simple and the hierarchical system can be constructed directly from the original data matrix.

WEIGHTED INDEX NUMBER AND FACTOR ANALYSIS

Another method is the weighted index number method[27] which has been outlined in its simplest form by Boudeville[28]. Sophisticated techniques such as cluster analysis and social area analysis are the outgrowth of this method. Any study area contains localities which may vary according to unemployment rates, percapita income levels etc. For policy reasons, there is a need to isolate the depressed region of this area. Taking the criteria individually, it is difficult to isolate the depressed region; but taken together and weighted, the depressed region can be isolated. The problems implicit in this method are the choice of the criteria, the choice of weights and the determination of acceptable homogeneity limits.

A more sophisticated method of regionalization is the "factor analysis" approach, pioneered by Berry[29] in the U.S.A. . Basically factor analysis isolates the common patterns of variation displayed by a data matrix, by combining existing variables into a much smaller number of factors. This method can be used to isolate the basic (i.e. most important) factors, and to group areas on the basis of factor loadings[30]. From the table of factor loadings (see Appendix-E) it is possible to identify the relative strength of the association between each variable and each factor. Thus , those variable which display a generally common pattern of relationship become associated and identified as a group. The central aim of factor analysis is the orderly simplification of a number of interrelated measures[31].

All these mathematical techniques, including factor analysis, are available for assistance in defining multi-functional regions. The sophistication of the available data for these techniques, however, greatly influence there usefulness for regional delineation. Whatever the methods and techniques used in regionalization, one thing should always be borne in mind; they are only tools which help to reach the proper planning decisions.

3.3 RESEARCH DESIGN

In this study factor analysis has been used for the purpose of regionalization. For delineation of planning regions factor analysis is in many respects appropriate. Any regional study involves a large number of demographic, social, economic and physical characteristics. Interrelation between them is a multivariate problem, which requires simplification and determination of the significant and independent elements. Factor analysis provides one of the most powerful methods to meet problems of this nature[32]. It incorporates the full set of inter connections in the data being analysed. It measures the extent to which a particular sub-area is associated with each of the factor, based on which sub-areas can be grouped into regions. The detailed statistical procedure of the analysis is complex and is beyond the scope of this present exercise. However, a summary presentation of the technique is outlined in Appendix-'A'. The following is a flow chart summerising the present research design (Figure -3).

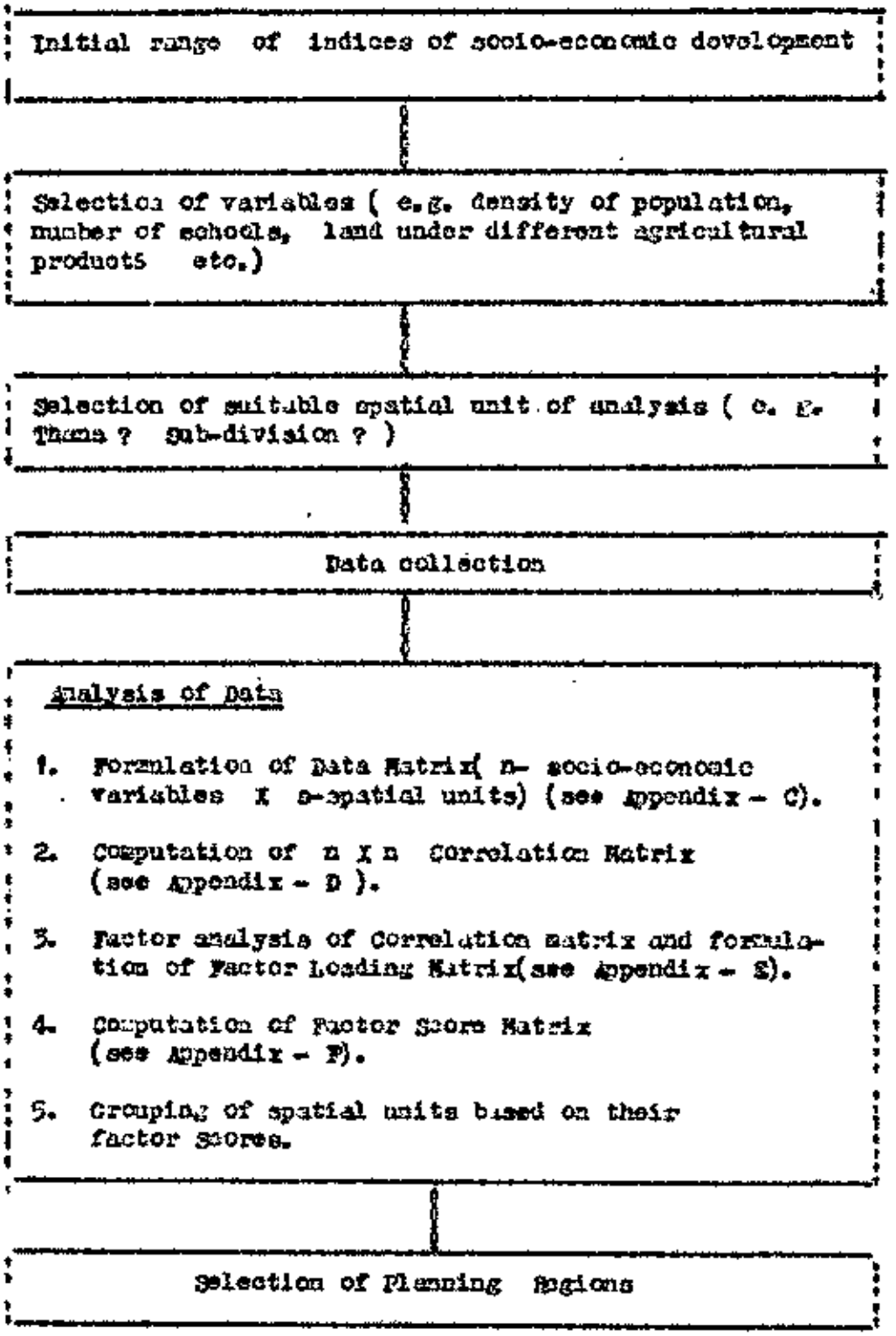


Fig. 3. Flow chart.

3.4 UNIT OF ANALYSIS AND VARIABLES

The first step in regionalisation is to divide the country into smaller areal units (base areal unit of analysis) so that their socio-economic characteristics can be compared. The choice of size of area will be governed by a combination of theoretical and practical considerations. Theoretically, the units should be comparable (i.e. similar in size and similar in regard to the characteristics under consideration). 'Size' depends on the characteristics under study. If they relate to the land, 'size' is physical area. If they relate to the people, 'size' will be determined by the population. There are also certain practical constraints which have to be taken into consideration, particularly the unavailability of data. The division should be made such that the required information can be made available for each unit. Secondly, it is useful to take administrative units as the unit of analysis. This will not only make quantitative comparison possible but will also facilitate the implementation of recommendations based on the results. The question now arises is what administrative unit shall be taken for the purpose of regionalization: division, district, sub-division or any other smaller unit ? It is an empirical fact that the smaller the units, the more homogeneous they are within. On the otherhand, the smaller the unit, the less will be the data available. The unit chosen should be small enough to result in a reasonable degree of homogeneity within each unit.

The choice is discretionary and depends largely on the purpose and scope of the study as well as the extent to which data are available and can be made available. In Bangladesh the lowest geographical unit suitable for regional studies could be a thana (police district), but unfortunately all types of required information are not available at this level. Most of the data are available at the district level. The level in between these two is the sub-division[33]. Under the present circumstances a sub-division is taken as the base areal unit of analysis[34]. Detailed information on population is available sub-division-wise from the 1974 census of population. Besides, the sub-divisions are of reasonably uniform population size. There are sixty sub-divisions on which data were available and were included in this study (see Map - 5). It should also be noted here that availability of reliable data at the required level is a condition for the application of more sophisticated planning methods. In order to have a good coverage of criteria for the purpose of regionalisation one should collect information in the following areas:

1. The natural conditions of the regions; including mineral and water resources, soil characteristics, climate and topography, landuse pattern.

2. Regional population; its structure, distribution, migratory tendency, employment and also living standards, level of income and consumption.

3. The economy of the regions; with the sectoral characteristics performance data, markets and potential for further growth, role in the national economy and ties with other regions.

4. Social development of the regions; including manpower supply and training , education, literacy, health, family and child care services, help for the elderly and youth programmes.

5. The spatial structure of the regions; including the settlement pattern, hierarchy of cities and their functions, development of metropolitan areas and the location of infrastructural facilities.

6. Institutional aspects; administrative and political structures and social organisations.

However, such a coverage was not possible in this present study for many reasons and had to remain satisfied with what was available from secondary sources(see Bibliography). Therefore, it was decided to include information on fifty socio-economic variables in this study. This information was been assumed adequate to reflect the developmental status of a region. Nonavailability of data for a particular point in time, forced the author to include information for different years. It has been assumed that this will not significantly distort the general outcome of this study.

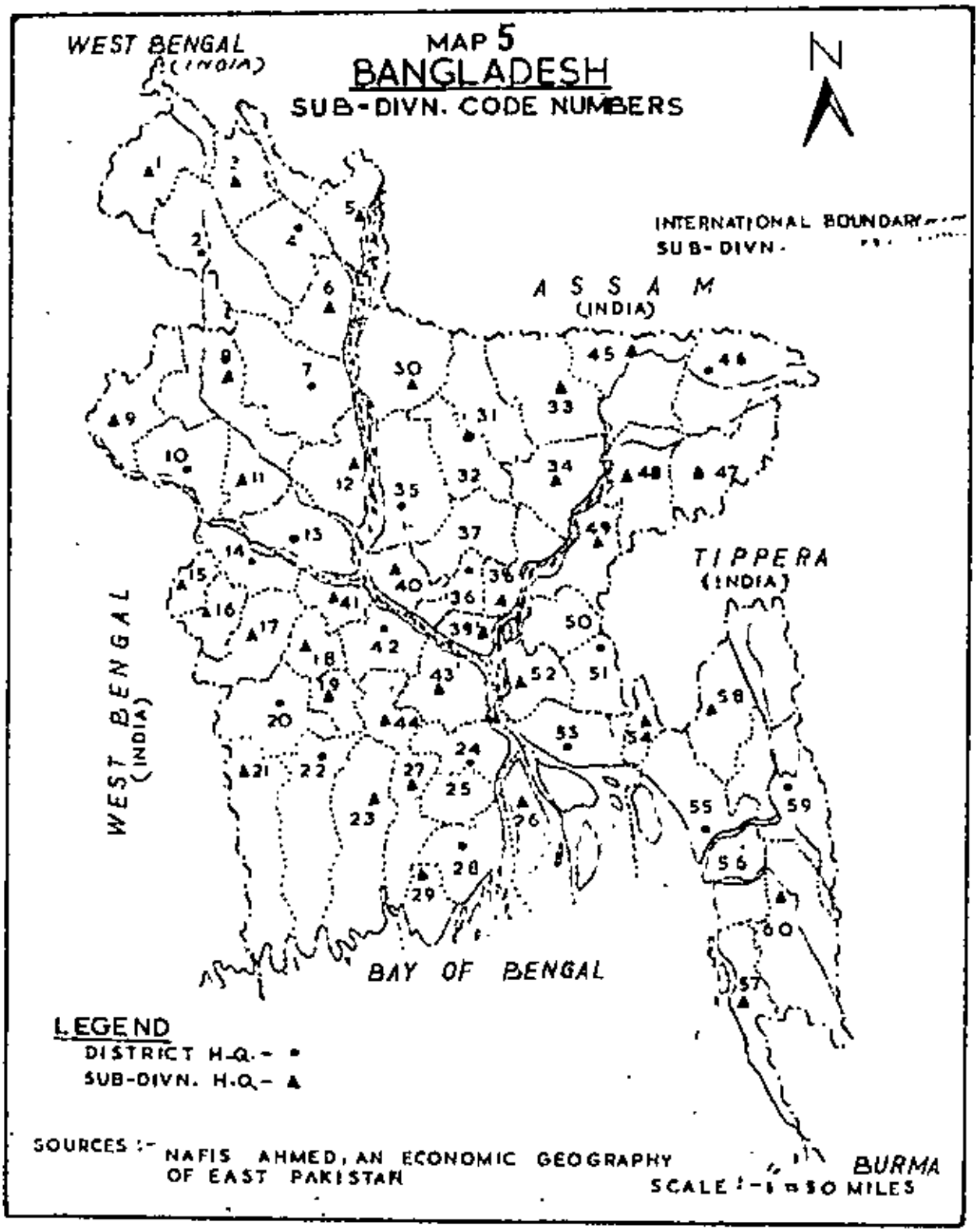

MAP 5
BANGLADESH
SUB-DIVN. CODE NUMBERS
N
WEST BENGAL (INDIA)
INTERNATIONAL BOUNDARY
SUB-DIVN.
ASSAM (INDIA)
TIPPERA (INDIA)
WEST BENGAL (INDIA)
BAY OF BENGAL
BURMA
LEGEND
DISTRICT H.Q. - •
SUB-DIVN. H.Q. - ▲
SOURCES :- NAFIS AHMED, AN ECONOMIC GEOGRAPHY OF EAST PAKISTAN
SCALE :- 1" = 50 MILES

TABLE - 2

Key to map - 5

SL. NO	NAME OF SUB-DIVISION	SL. NO	NAME OF SUB-DIVISION
1.	Thakurgaon	31.	Mymensingh Sadar North.
2.	Dinajpur Sadar	32.	Mymensingh Sadar South.
3.	Nilphamari	33.	Netrokona
4.	Rangpur Sadar	34.	Kishorganj
5.	Kurigram	35.	Tangail Sadar
6.	Gaibanda	36.	Dacca Sadar South
7.	Bogra Sadar	37.	Dacca Sadar North
8.	Nowgoan	38.	Narayanganj.
9.	Nawabganj	39.	Munshiganj
10.	Rajshahi Sadar	40.	Manikganj
11.	Natore	41.	Goalanda
12.	Sirajganj	42.	Faridpur Sadar
13.	Pabna Sadar	43.	Madaripur.
14.	Kushtia Sadar	44.	Gopalganj
15.	Meherpur	45.	Sunamganj
16.	Chuadanga	46.	Sylhet Sadar
17.	Jhenaidah	47.	Moulvi Bazar
18.	Magura	48.	Hobiganj
19.	Narail	49.	Brahmanbaria
20.	Jessore Sadar	50.	Comilla Sadar North.
21.	Satkhira	51.	Comilla Sadar South
22.	Khulna Sadar	52.	Chandpur
23.	Bagerhat	53.	Noakhali Sadar
24.	Barisal Sadar North	54.	Feni
25.	Barisal Sadar South	55.	Chittagong Sadar North.
26.	Bhola	56.	Chittagong Sadar South.
27.	Pirojpur	57.	Cox's Bazar
28.	Potuakhali Sadar	58.	Banghar
29.	Borguna	59.	Rangamati
30.	Jamalpur	60.	Bandarban.

THE SECTORS OF THE ECONOMY

In the present study, the Bangladesh economy has been divided into eight sectors[35] . These eight sectors cover the majority of the economic activities of the country . The variables (see Appendix -A for list of 50 variables selected) have been grouped under respective socio-economic-physical sector headings they represent. These sectors together reflect the main development perspective of a developing society.

1. The Demography Sector is comprised of the information regarding population (e.g. density of population, percentage of labourforce etc). It includes eleven variables.

2. The Agricultural Sector is comprised of information closely related to agricultural production (e.g. land under different crops, irrigation facilities etc.). The selection of variables was attempted to include most of the major crops and cropping patterns. This sector includes thirteen variables which is the largest number among these eight sectors.

3. The Industrial Sector has been represented by only one variable (though it is an important sector of the economy), because detail information were not available in this sector.

4. The Transportation or Physical Infrastructure Sector contains primarily road, rail and water transport. Information sources were limited in this sector also. It includes six variables only.

5. The Communication Sector comprises three variables (e.g. number of daily newspaper circulations, number of telephone connections and number of post offices). This sector also suffered from a paucity of information.

6. The Social Infrastructure Sector concentrates on education and health facilities available to the population within each of the sub-division. This sector includes six variables.

7. The Financial Infrastructure Sector comprises nine variables. The banking statistics available are insufficient to follow the flows of capital from one region to another. So, the financial structure was imputed from the number of bank branches, the number of co-operative societies, the number of markets or hats etc. located in a particular sub-division.

8. The Water Sector is the last and interesting sector which comprises only one variable (e.g. total riverine area). Bangladesh is a land of rivers. Its agriculture depends on supply of water. Its rivers and canals help in the flow of commodity from one place to another. So, the rivers of Bangladesh help not only in agriculture but also as a major transportation route of the country. Sometimes the rivers bring misery, too, to the people through destroying the crops by flood in almost every year.

Since one purpose of this study is to emphasise regional differences and spatial variations among the sub-divisions, a number of spatial variables derived from manipulation of the

census data and from the direct measurement of distances on maps are included[36].

Although the number of variables used in this study exceeds that used in any of the previous three studies(described in chapter two) in this field, the coverage is by no means full and complete. To date, there is particularly no information easily available on the total number of industry(all types)at the sub-division level. Dataappertaining to population change and industrial structure of the sub-division are inadequate. However, with the availability of a wider range of more refined and reliable statistical information in the future, such a study as the present one can always be repeated and the results, achieved at different points in time, can be compared.

CHAPTER - FOUR

BASIC DIMENSIONS OF THE REGIONAL SYSTEM

4.1 PREFACE TO THE ANALYSIS

The entire range of data processing as reported in this Chapter was carried out with the help of IBM 1620 computing system at the Bangladesh Atomic Energy Centre. Because of the system's limitations, the factor-analysis of fifty variables was very time consuming and the whole programme had to be partitioned into four parts [37]. The 50 x 60 raw data matrix was first reduced to a symmetric 50 x 50 correlation matrix (see appendix - B) which was then subjected to a Principal Axis Solution [38]. Ten dimensions (Table - 3) accepted for this analysis were rotated to a Normal Varimax position [39]. These ten dimensions were identified to have some recognizable significance. Factor scores (Appendix 'F') show each sub-division score on these ten dimensions.

The naming of dimension is one of the difficult jobs in this type of research and it has been often suggested to consider dimension names as a rough approximation, and not a comprehensive description of the characteristics constituting the dimension. If some of the variables are significantly related among themselves in a distinctive manner then they would form a dimension to

represent that unique interaction. The dimension is then named to identify the flavor of that interaction. The results of the analyses are provided in the Tables 5 to 14. Table 3 summarizes the percentage of the total variance accounted for by each of the 10 dimensions of the total variance of the 50 variables. The 10 dimensions together explained 83.82 percent of the total variance.

TABLE - 3.

Percentage of total variance explained by each dimension.

Dimensions	Percent variance
I	23.848
II	22.613
III	7.542
IV	6.274
V	4.670
VI	4.117
VII	4.078
VIII	4.073
IX	3.321
X	3.231
	83.820

Table-4 shows the percentage of the variance of each variable accounted for by all 10 dimensions. These values are the total sum of the squares of the correlations of a particular variable with all 10 dimensions.

TABLE - 4

Percentage of variance of each of the 50 variables accounted for by all 10 dimensions:

Variable (see Appendix -B)	Percentage	Variable	Percentage
01	84.39	17	83.12
02	86.58	18	72.42
03	87.02	19	78.45
04	72.77	20	83.04
05	85.23	21	79.80
06	98.70	22	84.44
07	97.22	23	98.29
08	94.85	24	9828
09	87.17	25	97.60
10	69.62	26	87.35
11	80.31	27	72.31
12	93.06	28	92.99
13	91.01	29	94.43
14	80.23	30	83.46
15	66.10	31	94.19
16.	60.50	32	92.41

TABLE - 4 (Contd)

Variable	Percentage	Variable	Percentage
33	91.05	42	87.43
34	85.27	43	90.42
35.	89.53	44	76.45
36	85.43	45	87.97
37	83.44	46	70.62
38	84.88	47	68.08
39	89.70	48	77.19
40	66.26	49	85.74
41	67.17	50	77.96

It is clear from Table-4 that some of the variables are better represented than other by the 10 dimensions, so that the extent to which the dimensions account for differences between the sub-divisions varies greatly between the variables least accounted for by the 10 dimensions are inland river ports(60.50 %) Navigable waterways in dry season(66.10%), land under sugarcane (66.26%), and under potato(67.17 %), land under triple crop (68.08%) and total katchu road (69.62%). On the otherhand, the number of variables which are summarized quite well by the 10 dimensions is quite large. This implies that the variations of a large number of the 50 characteristics are effectively captured by the 10 dimensions, a desirable feature of the factor analysis.

Appendix – E provides a 50 x 10 matrix of factor loadings, which are correlations of each one of the 50 variables with the 10 rotated dimensions. The factor loadings give an idea of the strength of the relationship between a variable and dimension. In order to facilitate interpretation of the dimensions, variables showing high correlations have been considered in the analysis. The first two dimensions, Urbanisation and Rural Growth Potential accounting for 23.84 percent and 22.61 percent of the total variance respectively, were considered major dimensions of the regional system. The remaining eight dimensions with percent of total variance explained are, Literacy(7.54), Socially Organized Areas (6.27), Railway Accessibility (4.67), Sugarcane Growing Areas(4.11) Grain Storage (4.07), Tobacco Growing Areas (4.07), Low lying Areas (3.32) and Fallowness (3.28).

4.2 DIMENSION- I : URBANIZATION

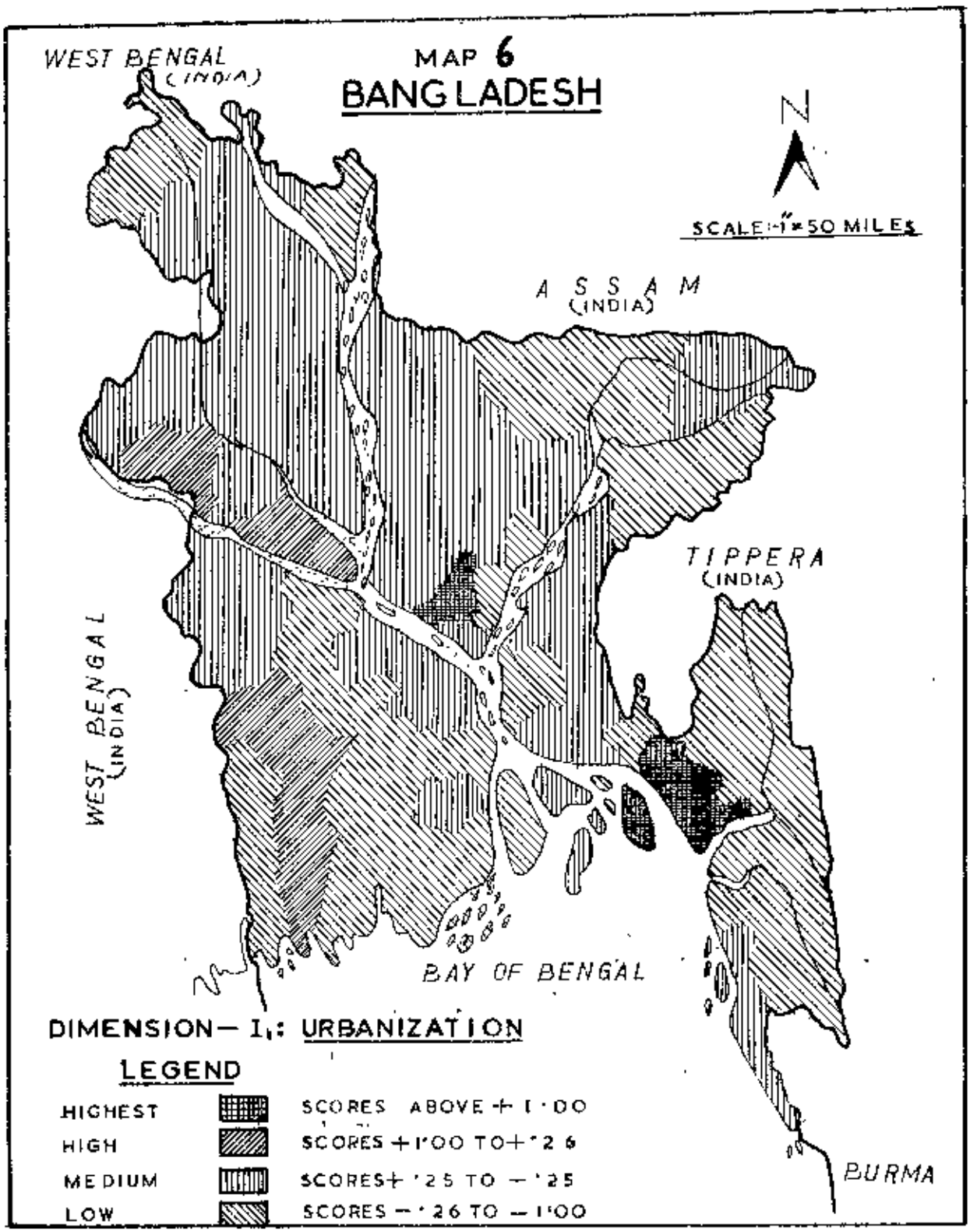
Dimension- I accounted for 23.84 percent of the total variance. It includes 17 variables with all positive factor loadings(see Table – 5). The associated variables with high loadings are the number of electric power consumers(0.988), the number of daily newspaper circulations (0.985), the number of telephone connections (0.979), total electric power consumption (0.974), total domestic electric power consumption (0.953), the number of bank branches (0.948) and the number of hospital beds (0.925). These variables together represent the Urbanisation tendency and identify the areas which are urbanised or developed.

As shown in the Map - 6, very high development (represented by high positive factor scores), is found in the Dacca Sadar South and Chittagong Sadar North sub-divisions (High positive score means those areas are also high on those variables positively related to the factor and conversely higher negative score means those areas are also high on those variables negatively related to the factor). The different status of those sub-divisions to the rest of Bangladesh reflect their role as capital city & main sea-port of the country.

The second group of factor scores (High scores) showing a medium-high level of urbanization, is represented by the sub-divisions, Khulna Sadar, Rajshahi Sadar, and Pabna Sadar. Khulna Sadar sub-division is important for industrial establishment and is the second sea-port city. Rajshahi is significant for being the divisional head-quarter and a University town. Pabna sadar sub-division is important for its geographical location as it is situated at the transport break-point of road and rail and have a big mental hospital.

The third group shows medium level of urbanisation and covers a large number of sub-divisions (having medium scores) of Bangladesh. These areas extended from the North-West to the South-East along the main rivers of Bangladesh. Sadar sub-divisions of Rangpur , Dinajpur, Bogra, Brantia, Mymensingh, Tangail, Faridpur, Barisal South, Sylhet Comilla North & South and Noakhali are included in this group.

The fourth group is represented by the low-level of urbanization in Bangladesh. The rate of development in these areas is comparatively lower than the average rate of development in the country. In those sub-divisions(Low score areas in the map)the economic activities are


WEST BENGAL (INDIA)
MAP 6
BANGLADESH
N
SCALE:-1"=50 MILES
ASSAM (INDIA)
TIPPERA (INDIA)
WEST BENGAL (INDIA)
BAY OF BENGAL
BURMA
DIMENSION— I1: URBANIZATION
LEGEND
HIGHEST
SCORES ABOVE + 1·00
HIGH
SCORES +1·00 TO+·26
MEDIUM
SCORES+ ·25 TO —·25
LOW
SCORES —·26 TO —1·00

lower and transportation facilities are relatively poor. The entire Chittagong Hill Tract district and some peripheral sub-divisions including Sundarban forest areas and hilly areas of Mymensingh and Sylhet districts are included in the group.

TABLE - 5

DIMENSION - 1: URBANIZATION

Variable No.	Variable Names	Factor loadings
06	Number of electric power consumers	0.988
24	Number of daily newspaper circulations	0.985
25	Number of telephone connections	0.979
07	Total electric power consumption	0.974
08	Total Domestic Electric power consumption	0.953
23.	Number of bank branches	0.949
26	Number of hospital beds	0.925
29	Number of College students	0.885
09	Total industrial electric power consumption	0.883
22	Number of cinema halls	0.852
01	Density of Population	0.797
28	Number of Colleges	0.764
11	Total pucca road	0.705
30	Number of College teachers	0.559
05	Percentage of civilian labour force (seeking work)	0.454
32	Number of Secondary school students	0.396
31	Number of Secondary school	0.368

4.3 DIMENSION - II: RURAL GROWTH POTENTIAL

Dimension-II grouped the variables highly associated with the rural growth potentiality. It accounted for 22.6% percent of the total variance. These are developing rural areas. This dimension includes 23 variables with all positive factor loadings (see map 7 and table-6) . Variables of high loading included in this dimension are the number of primary school students (0.908), the number of primary school teachers (0.866), land under aman (0.856), the number of primary schools (0.850) and the number of secondary school teachers (0.807). Together they represent a 'developing' index.

The sub-divisions characterized by high rural growth potential are Rangpur Sadar, Bogra Sadar, Jamalpur, Tangail Sadar, Chandpur and Feni Sadar. These sub-divisions characterised by substantial development in agriculture, recorded significantly greater share of land under aman, aus, potato and triple crops. In fact, the best land of these sub-divisions is devoted to the cultivation of rice. Water is necessary for the cultivation of boro and irri. The extra water is available through tubewells and canals in these sub-divisions. High intensity in cultivation in these areas is associated with improved farming practices. These areas are better than other rural areas in regard to agriculture, education, communication and marketing facilities.

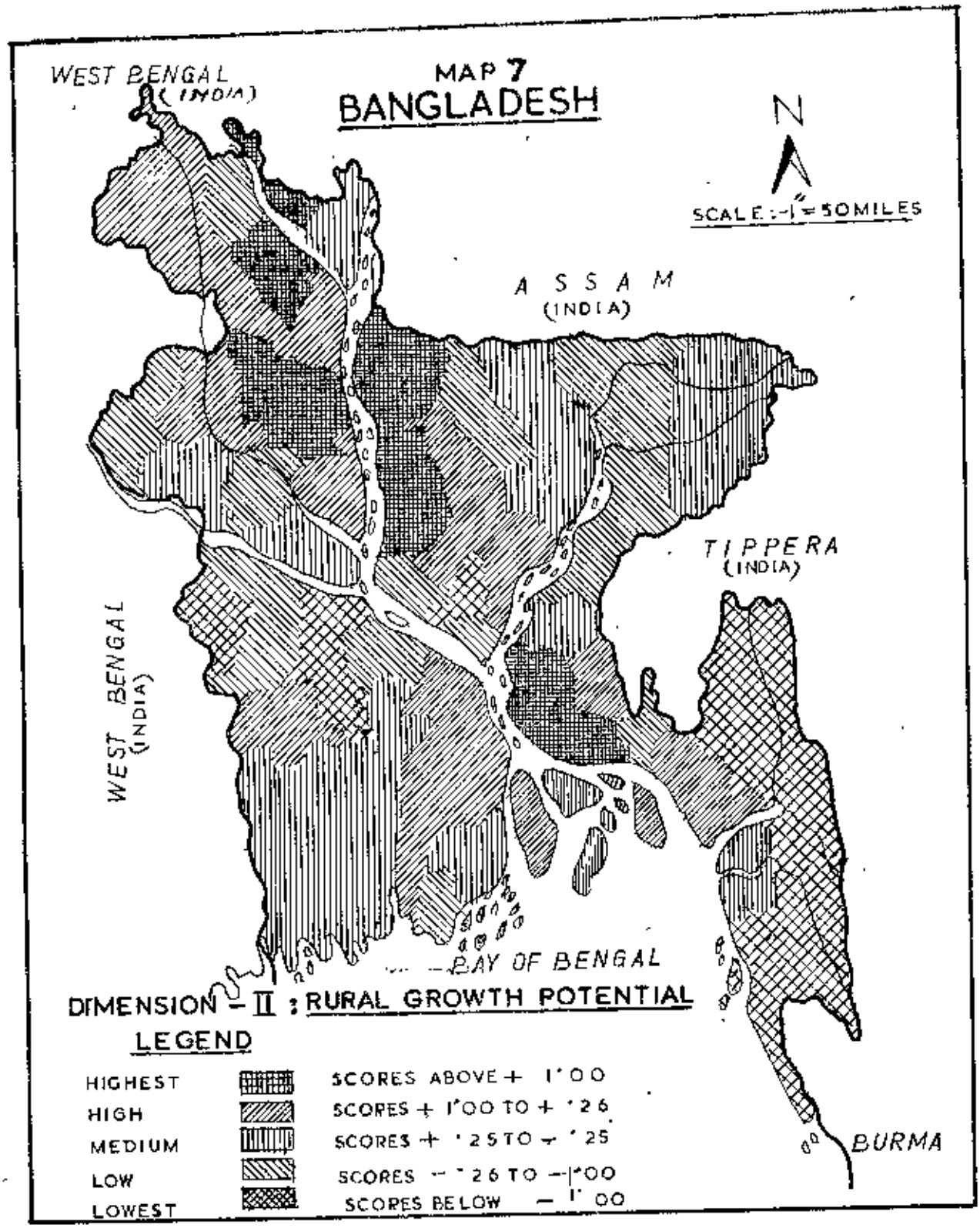
The second group represented by medium high factor scores included the Chittagong Hill Tracts, Comilla Sadar South, Mymensingh

Sadar South, Dacca Sadar North, Narayanganj, Madaripur, Barisal Sadar North, Pirojpur, Jessore Sadar, Sirajganj, Naogaon, Chuadanga, Dinajpur Sadar and Thakurgaon sub-divisions. These sub-divisions have sufficient facilities of education and other social services.

The third group with medium factor scores include Jhalakati Sadar, Moulvi Bazar, Comilla North, Netrokona, Kishorganj, Patuakhali Sadar, Satkhira, Khulna Sadar, Bagerhat, Pabna Sadar, Rajshahi Sadar and Kurigram sub-divisions. Haor areas of Mymensingh district, tea producing areas of Sylhet district and Sundarbon forest areas of Khulna district are included in this group.

The fourth group designated by the Chittagong Sadar South, Feni, Brahmanbaria, Sunamganj, Habiganj, Mymensingh Sadar North, Munshiganj, Manikganj, Faridpur Sadar, Barguna, Rajbari Sadar, Jhenaidah, Natore, Nawabganj and Nilphamari sub-divisions. These areas represented by medium low factor scores and relatively poor in agricultural production. These sub-divisions have limited water supplies for irrigation and poor in social facilities.

The fifth and last group of the dimension-II represented by lowest factor scores. This group included Meherpur, Chuadanga, Magura, Narail, Goalanda, Dacca Sadar South, Cox's Bazar and entire Chittagong Hill Tract district. These sub-divisions are comparatively poor in agricultural acreage. Chittagong Hill Tract district is backward


WEST BENGAL (INDIA)
MAP 7
BANGLADESH
N
SCALE :- 1" = 50 MILES
ASSAM (INDIA)
TIPPERA (INDIA)
WEST BENGAL (INDIA)
BAY OF BENGAL
BURMA
DIMENSION – II : RURAL GROWTH POTENTIAL
LEGEND
HIGHEST
SCORES ABOVE + 1·00
HIGH
SCORES + 1·00 TO + ·26
MEDIUM
SCORES + ·25 TO – ·25
LOW
SCORES – ·26 TO – 1·00
LOWEST
SCORES BELOW – 1·00

not only in agriculture but also in physical infrastructure and in economic activity. Dacca Sadar South sub-division represented extreme negative score on this dimension. This might have been due to lack of relative educational phenomena and also due to some incorrect information on this sub-division [40].

TABLE - 6

DIMENSION - II: RURAL GROWTH POTENTIAL -

Variable No.	Variable Names	Factor Loadings
35	Number of primary school students	0.908
36	Number of primary school teachers	0.866
30	Land under aman	0.856
34	Number of primary schools	0.850
33	Number of secondary school teachers	0.807
31	Number of secondary schools	0.789
19	Number of tube-wells	0.776
32	Number of secondary school students	0.774
20	Number of mats	0.772
50	Number of post offices	0.718
37	Land under aus	0.711
27	Number of rural health centres	0.689
47	Land under triple crop	0.665
10	Total Kutcha road	0.657

TABLE - 6 (contd)

Variable No.	Variable Names	Factor Loadings
41	Land under potato	0.572
45	Land under single crop	0.559
46.	Land under double crop	0.556
30	Number of College teachers	0.551
28	Number of Colleges	0.467
43	Land under Jute	0.392
14	Total riverine area	0.384
12	Total railroad	0.383
13	Number of railway stations	0.352

4.4 DIMENSION - III : LITERACY

Dimension -III, which accounted for 7.54 percent of the total variance, projected the dimension of literacy. It includes 9 variables of which 5 are positive and the rest are negative. The variables with high positive loadings are male literacy percentage (0.824) and female literacy percentage (0.813). High negative loading was scored by the area under jute production (-.606) which represents the opposite relation with the literacy(see Table-7). This may be logical in the sense that people involved in agriculture have lesser education.

The high factor scores represented the sub-divisions of Chittagong Sadar North and South, Chandpur, Kushtia Sadar, Rajbarat

and Pirojpur in map - 8 . In this group of sub-divisions both male and female literacy percentage is very high. In fact, the important seaports and river ports are situated in this group. Jute and aus production is very low in these sub-divisions due to the salinity in water.

The second group consisted of the sub-divisions, Rajshahi Sadar Raogaon, Satkhira, Narail, Gopalganj, Barisal Sadar North, Potuakhali Sadar, Sylhet Sadar, Dacca Sadar North, Narayanganj, Munshiganj, Comilla Sadar South, Feni and Chagalati. These areas were accounted for negative scores in the production of jute, aus and rape and mustard crops and have moderate to high literacy level.

The third group of factor scores included the sub-divisions Dinajpur Sadar, Bogra Sadar, Natore, Pabna Sadar, Nagura, Jessore Sadar, Sirajganj and Rangarh. These sub-divisions accounted medium factor scores.

The fourth group identified a large number of sub-divisions with medium-low factor scores. North-East and South - West corners of Bangladesh and the sub-divisions which are lying along side the rivers the Padma and the Meghna and their down stream are isolated in this group.

The fifth group of sub-divisions included Kurigram, Gaibandha, Sirajganj, Jamalpur, Mymensingh Sadar North, Netrokona and Tangail Sadar. It is interesting to note that these sub-divisions are situated on both sides of the rivers Teesta and Jamuna. These areas have greater share of land under jute production.

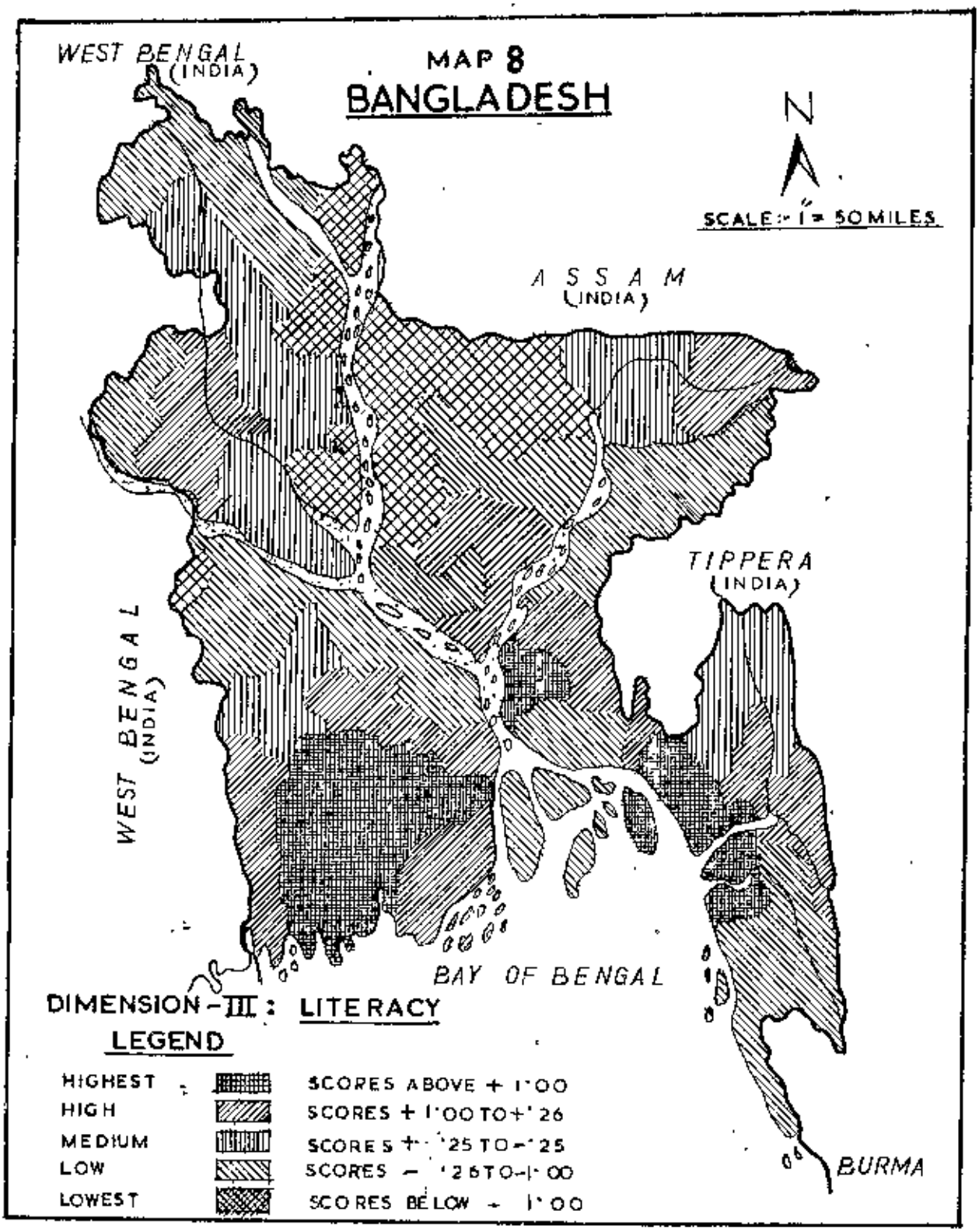

WEST BENGAL (INDIA)
MAP 8
BANGLADESH
N
SCALE :- 1" = 50 MILES
ASSAM (INDIA)
TIPPERA (INDIA)
WEST BENGAL (INDIA)
BAY OF BENGAL
BURMA
DIMENSION - III : LITERACY
LEGEND
HIGHEST : SCORES ABOVE + 1·00
HIGH SCORES + 1·00 TO + ·26
MEDIUM SCORES + ·25 TO - ·25
LOW SCORES - ·26 TO - 1·00
LOWEST SCORES BELOW - 1·00

TABLE - 7

DIMENSION- III:LITERACY

Variable No	Variable Names	Factor Loadings
02	Male literacy percentage	0.824
03	Female literacy percentage	0.813
15	Navigable waterways in dry season	0.598
16	Inland river ports	0.485
05	Percentage of civilian labour force (seeking work)	0.353
42	Land under rape and mustard	-0.411
46	Land under double crop	-0 .435
37	Land under aus	- 0.472
43	Land under Jute	- 0.606

4.5 DIMENSION - IV:SOCIALLY ORGANIZED AREAS

Dimension IV accounted for 6.27 percent of the total variance. It included 5 variables with all positive factor loading. The associated variables with high loadings (Table-8) were the land under boro (0.940) land under irrigation facilities(0.901) and number of co-operative socities (0.711). These variables with positive factor loading identify the status of social integration in the rural areas.

In the map - 9 the better organised areas for agricultural developement in Bangladesh are Netrokona, Kishorganj, Sunamganj, Habiganj and Brahmanbaria sub-divisions. Production of boro is highly related to the irrigation facilities. This area is situated in the Haor area of Mymensingh and Sylhet districts. Comparatively higher number of co-operative societies were found in this area. These areas seems to be well organized through co-operative system.

The second group comprised Bogra Sadar, Naogaon, Borguna, Dacca Sadar North, Sylhet Sadar, Chandpur and Cox's Bazar sub-divisions with medium high factor scores. Both irrigation facilities and boro cropping are significantly prominent in these areas.

Nawabganj, Rajshahi Sadar, Sirajganj, Pabna Sadar, Jamalpur, Mymensingh Sadar South and Haria, Dacca Sadar South, Manikganj, Madaripur, Khulna Sadar, Bagerhat, Pirojpur, Brahmanbaria, Chittagong Sadar North and South and Rangamati sub-divisions were included in the third group. This group comprised medium range of the factor scores representing medium status of organisational structures.

The fourth and last group included entire North and South Bengal except some sub-divisions of Rajshahi, Pabna and Khulna districts. A large areas of Bangladesh were covered by this group. In these areas the irrigation facilities were not sufficient and that is why there was a limited scope for HYV crop production.

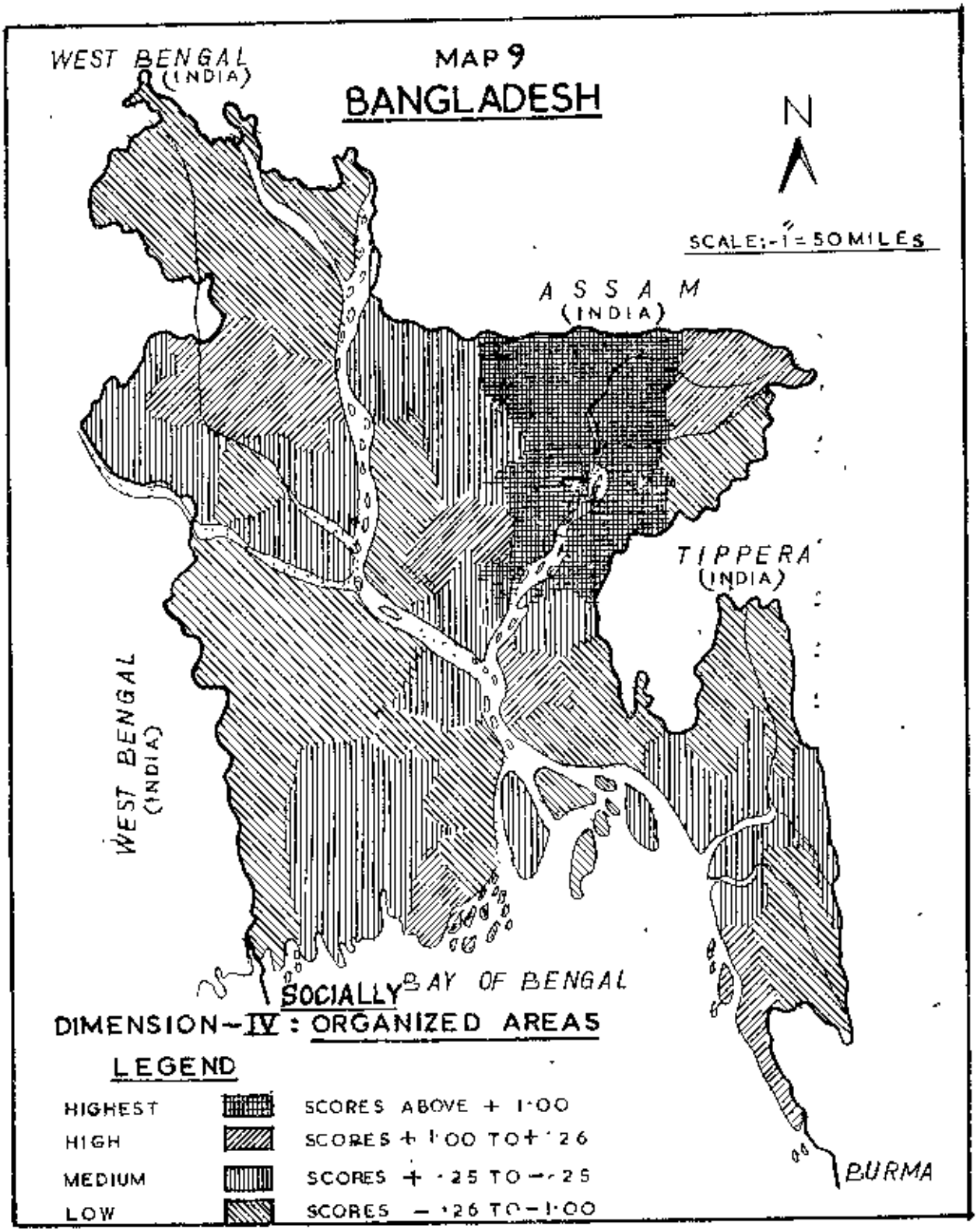

WEST BENGAL (INDIA)
MAP 9
BANGLADESH
N
SCALE:- 1" = 50 MILES
ASSAM (INDIA)
TIPPERA (INDIA)
WEST BENGAL (INDIA)
BAY OF BENGAL
BURMA
SOCIALLY
DIMENSION-IV : ORGANIZED AREAS
LEGEND
HIGHEST
SCORES ABOVE + 1·00
HIGH
SCORES + 1·00 TO + ·26
MEDIUM
SCORES + ·25 TO - ·25
LOW
SCORES - ·26 TO - 1·00

TABLE- 8

DIMENSION IV: SOCIALLY ORGANISED AREAS

Variable No	Variable Names	Factor Loadings
39	Land under boro	0.940
49	Land under irrigation facilities	0.901
21	Number of co-operative societies	0.711
27	Number of rural health centres	0.443
45	Land under single crop	0.374

4.6 DIMENSION V: RAILWAY ACCESSIBILITY

Dimension V explains 4.67 percent of the total variance of the 50 variables. Basically this dimension is related to accessibility measured by railroad network. This dimension includes only 2 variables with high positive factor loadings. These variables are number of railway stations (0.831) and total railroad (0.784) which is shown in the Table-9.

The first group isolates the areas of highly organised railroad network service. This group includes Kushtia Sadar, Goalanda, Moulvi Bazar, Habiganj, Brahmanbaria, Narayanganj, Comilla Sadar South and Chittagong Sadar North sub-divisions. Though some important railway junctions should fall in this group, but here we measure accessibility by the number of railway station, these are not included here.

The second group covers almost entire north-eastern part of Bangladesh except Dinajpur and Pabna districts and Naogaon and Nawabganj sub-divisions. Sylhet Sadar, Chittagong Sadar South, Faridpur Sadar and Jessore Sadar sub-divisions are also included in this group. These areas have significantly better accessibility in regard to Railway network.

The third group includes the sub-divisions namely; Dinajpur Sadar, Pabna Sadar, Khulna Sadar, Bagerhat, Kishorganj, Dacca Sadar North, Chandpur and Cox's Bazar. Since there is no railway line in Cox's Bazar sub-division, its score was possibly due to the effect of other variables related insignificantly.

Thakurgaon, Nawabganj, Rangpur, Jhenaidah, Magura, Barisal, Satkhira, Gopalganj, Barisal Sadar South, Barguna, Manikganj, Comilla Sadar North sub-divisions and entire Chittagong Hill Tract district comprise the fourth group of factor scores. These areas are relatively low on railway accessibility.

The fifth group includes Naogaon, Sirajganj, Tangail Sadar, Dacca Sadar South, Manikganj, Jamalpur, Madaripur, Barisal Sadar North, Pirojpur, Patuakhali Sadar, Bhola and Noakhali Sadar sub-divisions. These are areas usually having relatively least railway accessibility. Interestingly, Dacca Sadar South has few railway stations and relatively less railway mileage. So, it falls in the last group but it does not mean that Dacca Sadar South is less accessible. Same condition prevails in the case of Sirajganj sub-division. This indicates that the variables used here are not the most effective measures of accessibility.

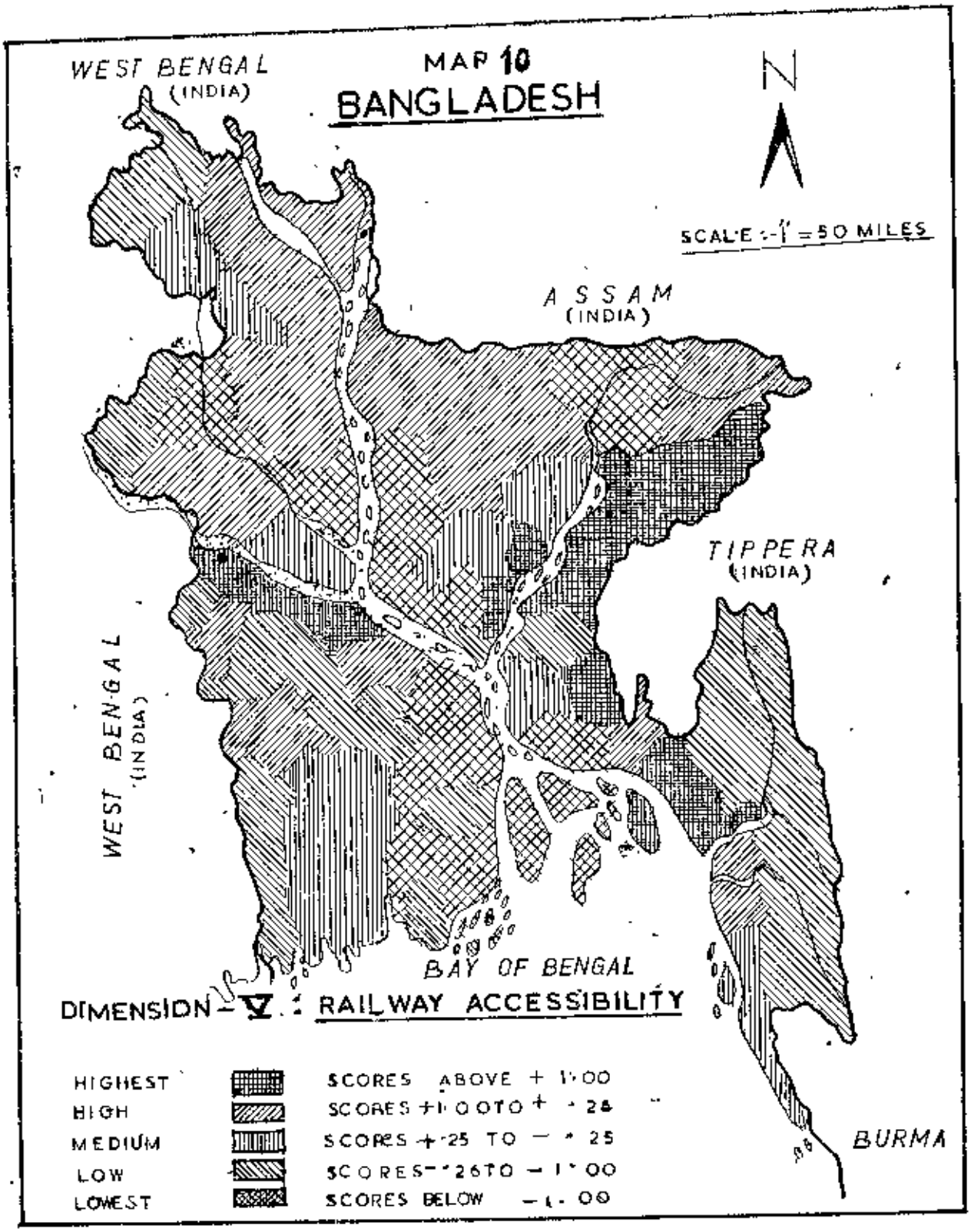

MAP 10
BANGLADESH
WEST BENGAL (INDIA)
N
SCALE :- 1" = 50 MILES
ASSAM (INDIA)
TIPPERA (INDIA)
WEST BENGAL (INDIA)
BAY OF BENGAL
BURMA
DIMENSION - V : RAILWAY ACCESSIBILITY
HIGHEST SCORES ABOVE + 1·00
HIGH SCORES +1·00 TO + ·26
MEDIUM SCORES +·25 TO - ·25
LOW SCORES -·26 TO - 1·00
LOWEST SCORES BELOW - 1·00

TABLE - 9

DIMENSION V : RAILWAY ACCESSIBILITY

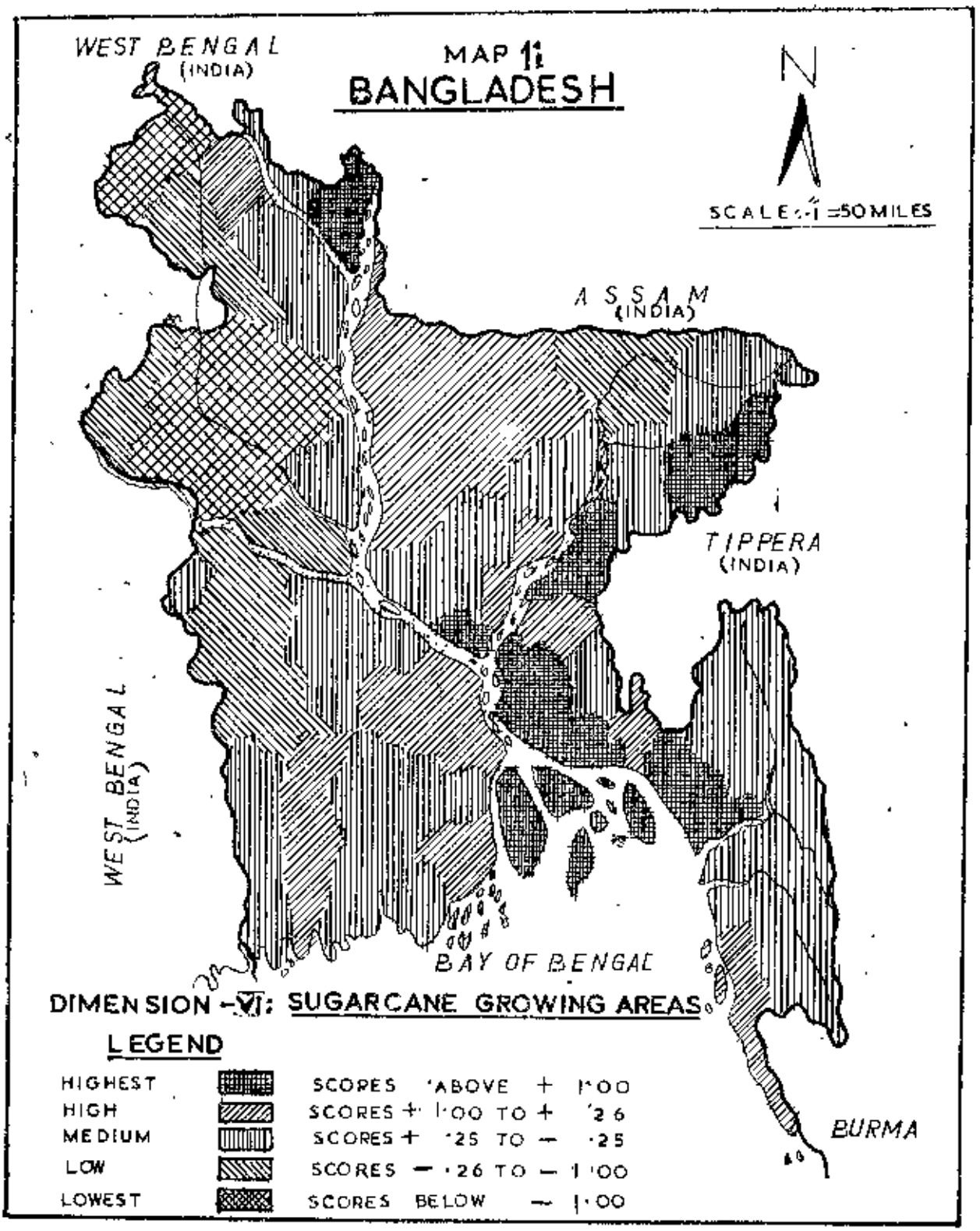
Variable No.	Variable Names	Factor Loadings.
13	Number of railway stations	0.831
12	Total rail road	0.734

4.7 DIMENSION VI: SUGARCANE GROWING AREAS

The dimension VI, which accounts for 4.11 percent of the total variance is identified predominantly with inland river ports(0.455) percentage of civilian labourforce(seeking work) (0.395), total riverine area (0.38), land under single crop(-0.392), land under potato (-0.399) and land under sugarcane (-0.716). The first 3 variables have positive factor loadings with low correlations and the last 3 variables have negative factor loadings (see table - 10).

The first group shows high positive factor scores in Kurigram, Moulvi Bazar, Brahmanbaria, Munshiganj, Chandpur, Noakhali Sadar, Chittagong Sadar North and Bhola sub-divisions (see map - 13). These are the riverine areas and very low amount of [redacted] land is used for sugarcane production. Sugarcane production is almost nil in Brahmanbaria sub-division(only 8 acres of land under sugarcane cultivation).

The second group of factor score identifies the Nilphamari, Meherpur, Chuadanga, Khulna Sadar, Tangail Sadar, Jamalpur, Kishoreganj Sadar North, Natrokona, Narayanganj, Comilla Sadar North, Feni and Cox's Bazar sub-divisions.


WEST BENGAL (INDIA)
MAP 11
BANGLADESH
N
SCALE:-1"=50 MILES
ASSAM (INDIA)
TIPPERA (INDIA)
WEST BENGAL (INDIA)
BAY OF BENGAL
BURMA
DIMENSION -VI: SUGARCANE GROWING AREAS
LEGEND
HIGHEST SCORES ABOVE + 1·00
HIGH SCORES + 1·00 TO + ·26
MEDIUM SCORES + ·25 TO — ·25
LOW SCORES — ·26 TO — 1·00
LOWEST SCORES BELOW — 1·00

The third group covers a large areas of Bangladesh including minor areas of Sylhet and Mymensingh districts, Sundarban areas of Khulna district (except Khulna Sadar) and entire Chittagong Hill Tract district.

The fourth group of factor score of dimension VI isolates the sub-divisions of Dinajpur Sadar, Nawabganj, Pabna Sadar, Kushtia Sadar, Jhenaidah, Jessore Sadar and Sirajganj. The areas have relatively high acreage of sugarcane production.

The fifth group having high negative factor scores represents a few sub-divisions such as Thakurgaon, Bogra Sadar, Naogaon, Rajshahi Sadar and Natore. In general, these are the areas of maximum sugarcane acreage in Bangladesh. Among these sub-divisions, Rajshahi Sadar and Natore are on the top.

TABLE - 10

DIMENSION VI : SUGARCANE GROWING AREAS

Variable No.	Variable Name	Factor Loadings
16	Number of inland river ports	0.455
05	Percentage of civilian labour force (seeking work)	0.393
14	Total riverine area	0.389
45.	Land under single crop	-0.392
41	Land under potato	- 0.399
40	Land under sugarcane	- 0.716

4.8 DIMENSION VII : GRAIN STORAGE

Dimension VII isolates another pattern by which the sub-divisions of Bangladesh are differentiated. It is essentially a grain storage dimension accounted for 4.07 percent of the total variance. It isolates only 3 variables with all positive factor loadings (see table - 11) . The associated variblea are the number of godowns for food grain(0.883), capacity of godowns for food grain (0.674) and land under rape and mustard(0.550).

The first group isolates Dinajpur-sadar, Rajbari-sadar and Brahmanbaria sub-divisions, with high factor scores(see map-12). Sub-divisions in the first group show a greater number of godowns for food grain with higher capacity. The cause of development of godowns in these areas may be due to either high or low accessibility. The godowns are generally established at the place where there is a high degree of accessibility because foodgrain should be able to reach places within a short time. If the godowns are situated at the remote place, the quick shipment of foodgrain will be difficult. On the other hand, the godowns may be established in the areas where the transport and communication systems are not so developed. In these areas the price of the crops becomes lower at the time of harvest. In order to control the price at that time, the crops are stored in the godown. This idea may or may not be true because most of the godowns are established by the Government often without any rationale.

The second group isolates, the sub-divisions namely, Thakurgaon, Kurigram, Sirajganj, Jatkhira, Netrokona, Sunamganj, Moulvi Bazar, Manikganj, Munshiganj and Chittagong Sadar North. This group shows a medium high level of factor scores of storage facilities.

The third group shows medium factor scores and includes a large number of sub-divisions of Bangladesh. The entire Chittagong Hill Tract district, Cox's Bazar, Sylhet Sadar, Kurigram, Nawabganj, Naogaon, Chuadanga etc. are situated far away from the Dacca City. These areas do not have enough storage facilities.

The fourth group also consists of a large number of sub-divisions with medium-low factor scores. North Middle areas of Bangladesh and Comilla, Noakhali, Potuakhali, Khulna, Faridpur and Kushtia districts are included in this group. This group enjoys comparatively lower degree of storage facilities.

The fifth and last group of this dimension includes only one sub-division i.e. Rajshahi Sadar. Though it is a divisional head-quarter, it shows lesser storage capability. The findings do not prove the expected relation of storage facilities with factors like transport system, agricultural output etc. that should influence the location of such facilities. The distribution seems to be random indicating lack of clear-cut government policy in this regard.

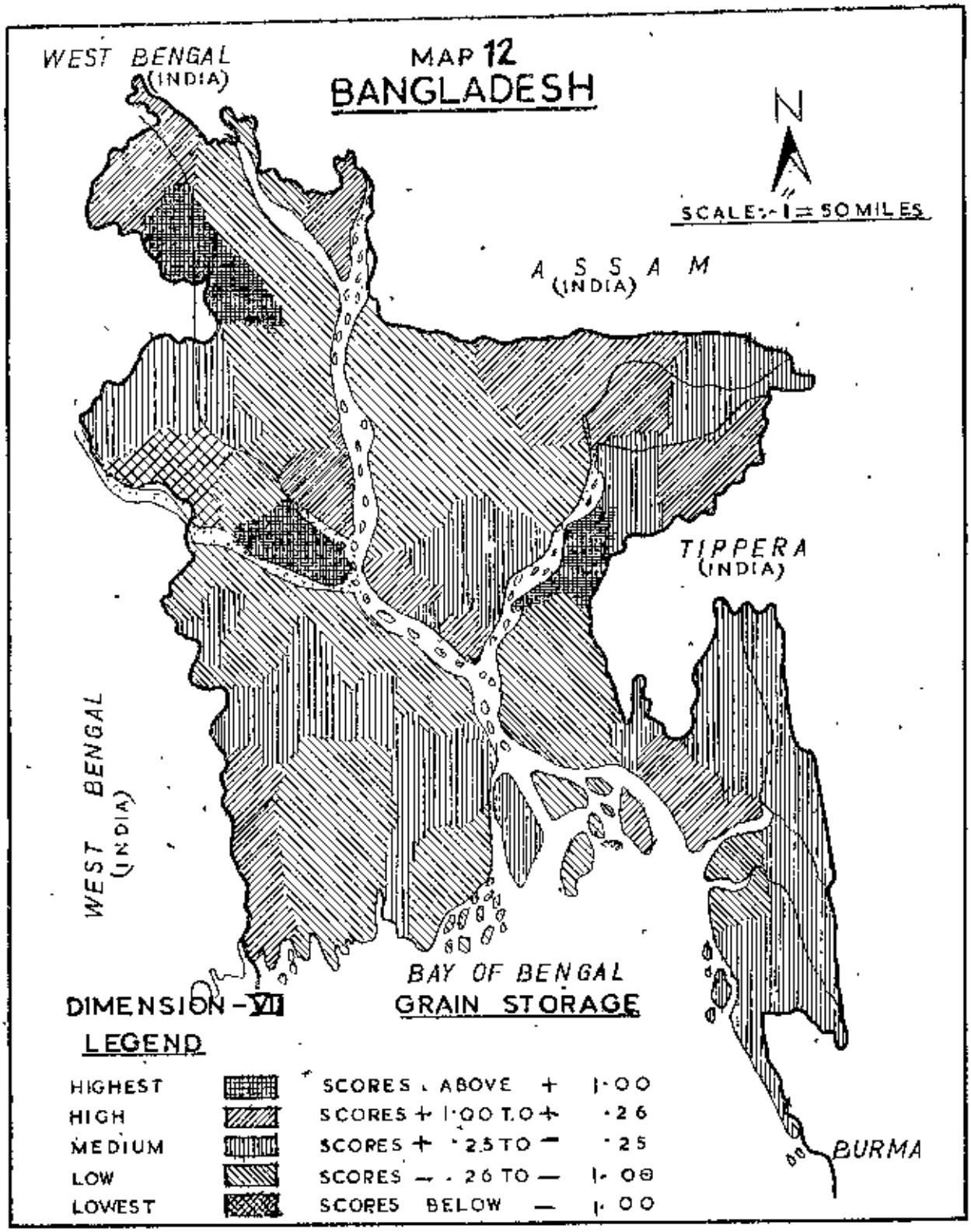

WEST BENGAL (INDIA)
MAP 12
BANGLADESH
N
SCALE:- 1 = 50 MILES
ASSAM (INDIA)
TIPPERA (INDIA)
WEST BENGAL (INDIA)
BAY OF BENGAL
BURMA
DIMENSION - VI
GRAIN STORAGE
LEGEND
HIGHEST SCORES ABOVE + 1·00
HIGH SCORES + 1·00 TO + ·26
MEDIUM SCORES + ·25 TO — ·25
LOW SCORES — ·26 TO — 1·00
LOWEST SCORES BELOW — 1·00

TABLE - 11

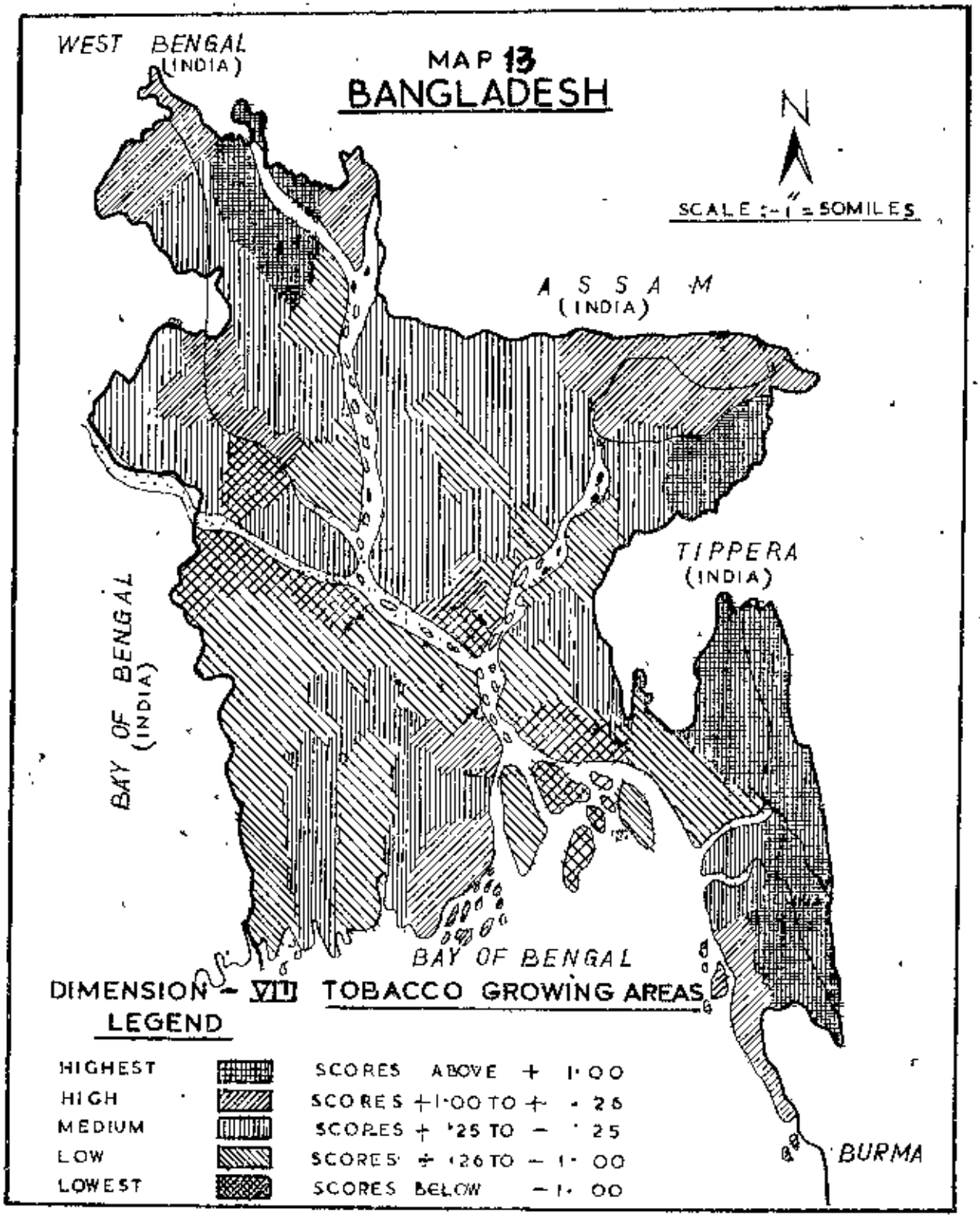
DIMENSION VII : GRAIN STORAGE

Variable No.	Variable Name	Factor Loadings.
17	Number of godowns for food grain	0.833
18	Capacity of godowns for food grain	0.674
42	Land under rape and mustard	0.550

4.9 DIMENSION VIII : TOBACCO GROWING AREAS

Another pattern of regional differentiation emerges on dimension - VIII which identifies tobacco growing areas of Bangladesh. This dimension (accounts for 4.07 percent of the total variance) also includes only 2 variables with positive factor loadings(table -12) . It isolates the areas of Bangladesh (Map - 13) on the basis of land under tobacco production (0.808) and percentage of civilian labour force those are working (0.803). It should be noted that the variables have equal factor loadings. The equal factor loadings indicate that the variables are equally responsible for the characteristics of the dimension.

The first group contains Ranggur Sadar, Nilphamari and Moulvi Bazar sub-divisions and entire Chittagong Hill Tract district. In these areas maximum amount of land is used for tobacco production. It also seems that tobacco growing areas employ relatively a significant number of labourers.


WEST BENGAL (INDIA)
MAP 13
BANGLADESH
N
SCALE :- 1" = 50 MILES
ASSAM (INDIA)
TIPPERA (INDIA)
BAY OF BENGAL (INDIA)
BAY OF BENGAL
BURMA
DIMENSION - VII TOBACCO GROWING AREAS
LEGEND
HIGHEST SCORES ABOVE + 1·00
HIGH SCORES +1·00 TO + ·26
MEDIUM SCORES + ·25 TO - ·25
LOW SCORES - ·26 TO - 1·00
LOWEST SCORES BELOW - 1·00

The next tobacco growing areas are Thakurgaon, Kurigram, Nilphamari, Sunamganj, Sylhet Sadar, Dacca Sadar South, Barisal Sadar North, entire Potuakhali district and Cox's Bazar sub-divisions. These areas show medium-high factor scores.

Most of the district sadar sub-divisions are included in the third group . A significant number of civilian labour force are found in working in the group. This group of sub-divisions represents medium range of factor scores.

The fourth group includes the sub-divisions, Gaibandha, Sirajganj, Chuadanga, Jhenidah, Magura, Jessore Sadar, Satkhira, Meherpur, Faridpur Sadar, Madaripur, Bhola, Mymensingh Sadar South, Narayanganj, Brahmanbaria, Chandpur, Feni and Chittagong Sadar North. These areas show medium-low factor scores.

The last group consists of a few sub-divisions such as Natore, Kushtia Sadar, Meherpur, Goalanda, Manikganj and Noakhali Sadar. In these areas lowest amount of land is used for tobacco cultivation because possibly the lands are not suitable for tobacco production.

TABLE - 12

DIMENSION VIII : TOBACCO GROWIN AREAS

Variable No.	Variable Names	Factor Loadings.
44	Land under Tobacco	0.808
04	Percentage of civilian labour force(working)	0.808

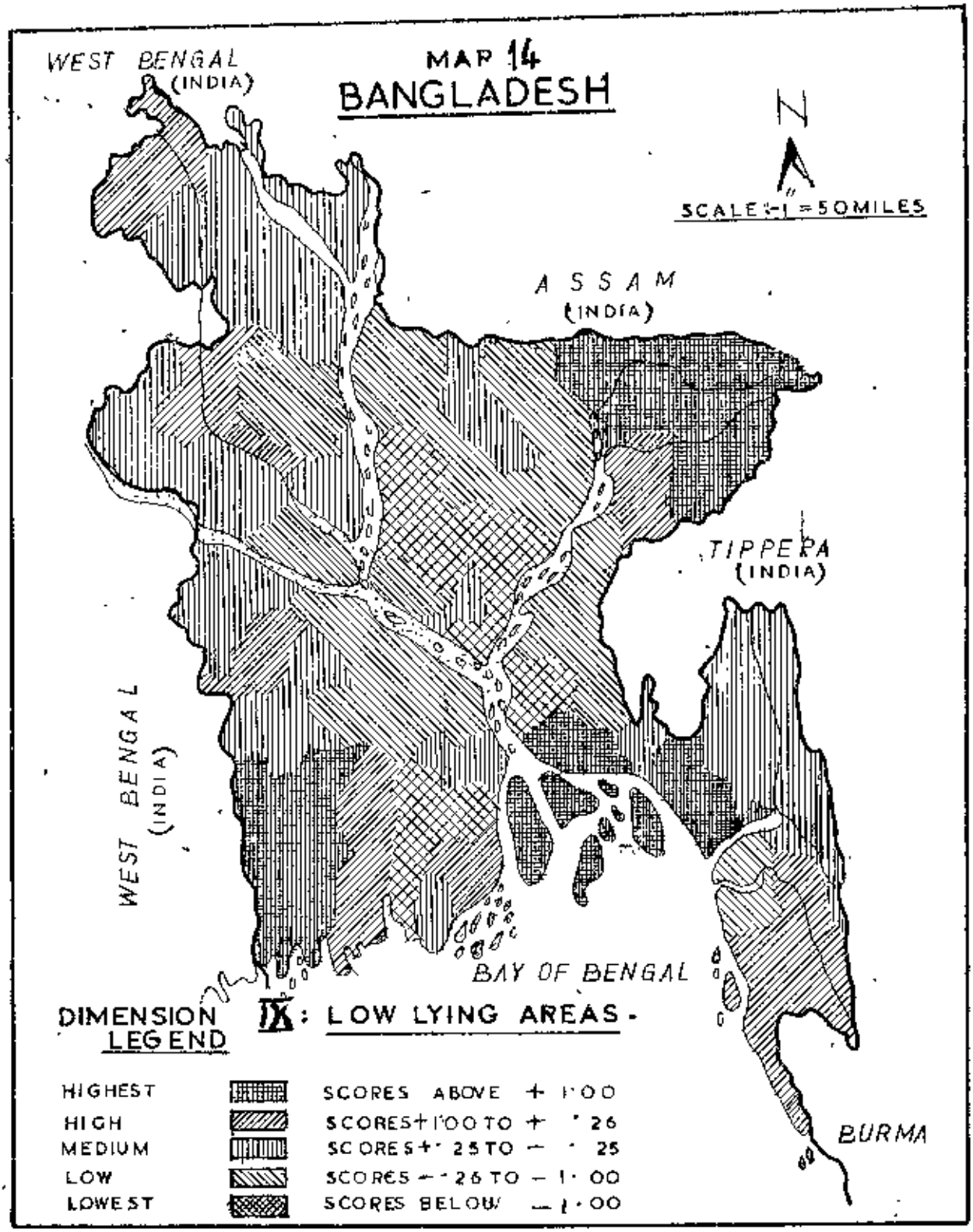
4.10 DIMENSION IX: LOWLYING AREAS

The interpretation of dimension IX which explains 3.32 percent of the total variance, includes 4 variables of which 'land under jute' has negative factor loading and other three (total riverine area, total katcha road and land under single crop) have positive factor loadings (Table -13) . This dimension helps identify lowlying riverine areas. The road condition and cropping patterns are directly correlated with the Physiography of the area.

The first group includes the sub-divisions, Satkhira, Khulna Sadar, Jhinaigati, Sylhet Sadar, Moulvi Bazar, Noakhali Sadar and Chittagong Sadar North. This group represents areas interwoven with numerous rivers. Since these riverine areas are more affected by flood water it is difficult to produce more than one crop in a year. So, agricultural production level is very low.

The second group contains Thakurgaon, Nilphamari, Jhenaidah, Nagerhat, Potuakhali Sadar, Habiganj, Cox's Bazar and Sundarban sub-divisions. This group contains medium -high level of factor scores.

The third group contains a large number of sub-divisions and is situated along the eastern boarder of Bangladesh. It also includes a large area of Chittagong Hill Tract district. These areas have medium level of factor scores.


WEST BENGAL (INDIA)
MAP 14
BANGLADESH
N
SCALE:-1" = 50 MILES
ASSAM (INDIA)
TIPPERA (INDIA)
WEST BENGAL (INDIA)
BAY OF BENGAL
BURMA
DIMENSION IX : LOW LYING AREAS -
LEGEND
HIGHEST SCORES ABOVE + 1·00
HIGH SCORES + 1·00 TO + ·26
MEDIUM SCORES + ·25 TO − ·25
LOW SCORES − ·26 TO − 1·00
LOWEST SCORES BELOW − 1·00

The fourth group of this dimension also contains a large number of sub-divisions. In these sub-divisions the land under jute production is more or less higher than the other groups of this dimension.

The fifth group explains the lowest level of factor scores and includes Kishorganj, Tangail Sadar, Dacca Sadar North, Narayanganj, Munshiganj, Chandpur, Barisal Sadar South and Pirojpur sub-divisions. In these areas flood is not so prominent and a relatively greater amount of land is used for jute production and usually more than one crop is produced in a year.

TABLE - 13

DIMENSION IX : LOWLYING AREAS

Variable No.	Variable Names	Factor Loadings
14	Total riverine area	0.534
10	Total Kutcha road	0.383
45	Land under single crop	0.381
43	Land under Jute	-0.419

4.11 DIMENSION X : FALLOWNESS

The regional difference of the sub-divisions in this dimension is based on 2 variables. These are percentage of civilian labour force (seeking work) with factor loading 0.381 and land under current fallow with -0.812. The former shows low correlation

co-efficient with the dimension(see Table-14). This dimension isolates the areas(Map-15) characterised by fallowness and unemployment. This dimension accounts for 3.23 percent of the total variance.

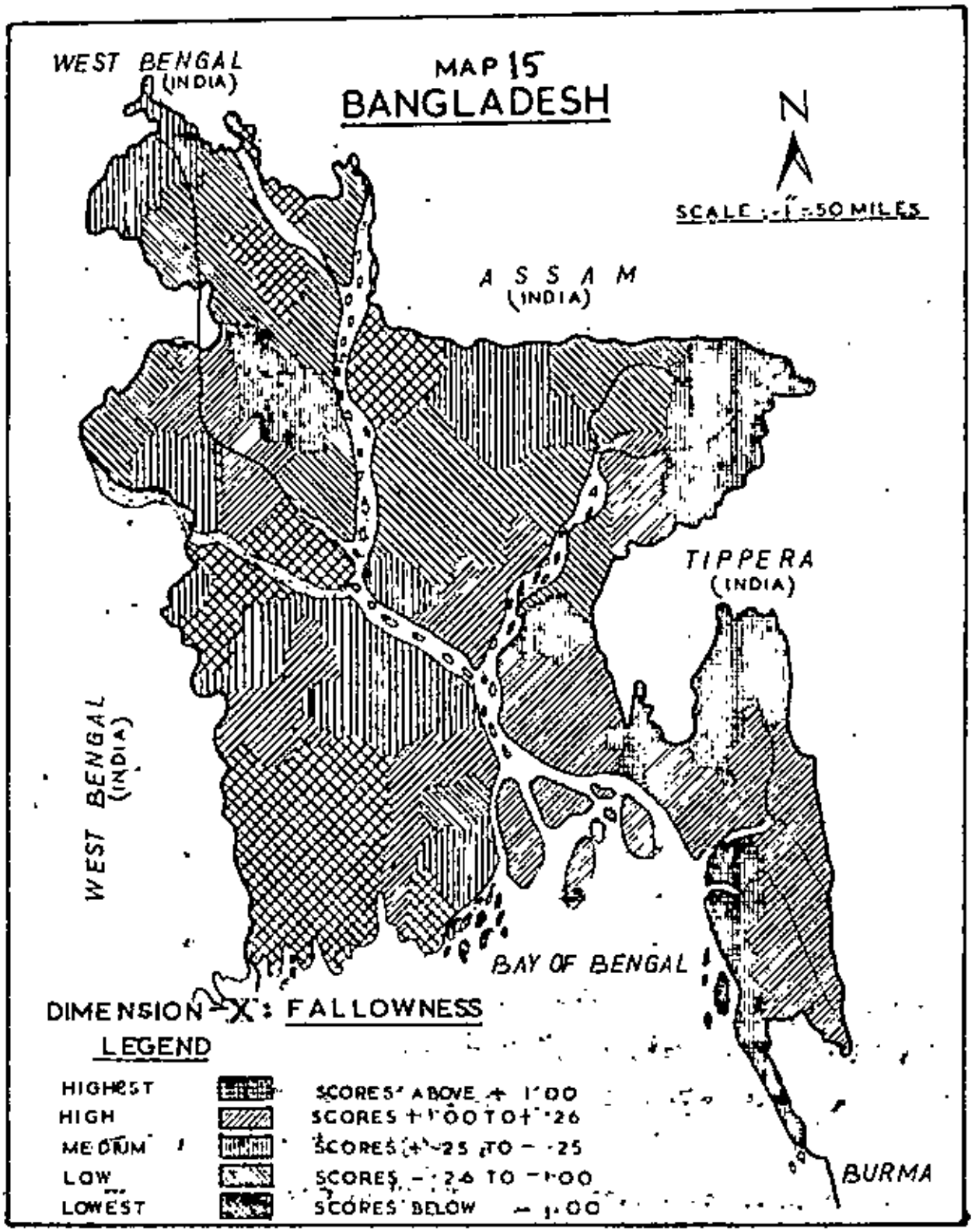
Bogra Sadar, Sylhet Sadar, Moulvi-Bazar, Comilla Sadar North, Feni, Chittagong Sadar South, Rangarh, and Cox's Bazar sub-divisions occupy first group with high positive factor scores. In these areas low percentage of fallow land is found.

Naogaon, Natore, Nagura, Jessore Sadar, Barisal Sadar North, Pirojpur, Bhola, Rabiganj, Dacca Sadar South, Narayanganj, Munshiganj, Comilla Sadar South, Chandpur, Noakhali Sadar, Chittagong Sadar North, Rangamati and Bandarban Sub-divisions occupy the second position of the factor scores.

The third group consists of Thakurgaon, Rajshahi Sadar, Meherpur, Jhenaidah, entire Faridpur district, Barail, Patuakhali Sadar, Mymensingh Sadar North, Netrokona and Manikganj sub-divisions. These areas represent medium factor scores.

The fourth group majorly covers northern side of Bangladesh, only Barisal Sadar South sub-division falls in the Southern part. This group of sub-divisions represents medium low factor scores.

The fifth and last group consists of Rangpur Sadar, Pabna Sadar, Kushtia Sadar, Chuadanga, entire Khulna district, Barguna


WEST BENGAL (INDIA)
MAP 15
BANGLADESH
N
SCALE :- 1" = 50 MILES
ASSAM (INDIA)
TIPPERA (INDIA)
WEST BENGAL (INDIA)
BAY OF BENGAL
BURMA
DIMENSION "X" : FALLOWNESS
LEGEND
HIGHEST SCORES ABOVE + 1·00
HIGH SCORES + 1·00 TO + ·26
MEDIUM SCORES + ·25 TO - ·25
LOW SCORES - ·26 TO - 1·00
LOWEST SCORES BELOW - 1·00

and Jamalpur sub-divisions. This group shows extreme low factor scores. The negative factor scores indicates that the areas are represented by high fallow land. The land of these areas are not properly utilized. The entire Sundarban forest areas are represented by this group. High fallowness indicates low economic activities in these areas.

TABLE - 14

DIMENSION X : FALLOWNESS

Variable No.	Variable Names	Factor Loadings
05	Percentage of civilian labour force (seeking work)	0.331
48	Land under current fallow	-0.812

CHAPTER - FIVE

PLANNING REGIONS

5.1 FINAL REGIONS

The final task of the present research work is the grouping of sub-divisions into several " planning regions". The regions should be such that they may be politically and administratively functional as well as logical. These regions should not be too large because it would be difficult to handle them and should not be too small to be inefficient. It should also be noted that planning is an administrative process and its structure is political in nature and as such it may slightly or considerably alter the regional configurations depending on the political requirements.

There are several grouping techniques available which identify clusters of subjects, based on certain selected criteria. Each cluster should be as distinct from one another as possible and internally as homogeneous as possible[41]. In this present study these techniques have been avoided because the application of these with the help of the available IBM 1620 system would be very tedious and time consuming. Instead, a simple grouping methodology thought to be adequate for the present purpose has been followed. Here it should be stated, however, that there is no universally accepted methodology for grouping the spatial units of a country into planning regions.

The first and second dimensions of this analysis isolate the important factors representing development status. The areal units have been divided on the basis of these two dimensions and then explained being supplemented by scores on other dimensions.

a. Urbanised Region : Areas with factor scores of range + .51 and above, on the first dimension.

b. Developing Region : Areas with factor scores of range + .51 and above on the second dimension.

c. Underdeveloped Region : Areas with factor scores of range + .50 to -.50 on the second dimension.

d. Depressed Region: Areas with factor scores of range -.51 and below on the second dimension.

The final picture of a regional pattern for Bangladesh is shown on map - 16. There are four planning regions into which Bangladesh has been divided according to the criteria explained above.

1. Urbanised Region: Dacca Sadar South, Chittagong Sadar North, Narayanganj and Khulna Sadar Sub-divisions.

2. Developing Region : Noakhali Sadar, Bogra Sadar, Tangail Sadar, Rangpur Sadar, Jamalpur, Chandpur, Sirajganj, Madaripur, Naogaon, Gaibandha, Dinajpur Sadar, Thakurgaon and Comilla Sadar South.

3. Underdeveloped Region: Pirojpur, Barisal Sadar South, Jessore Sadar, Mymensingh Sadar South, Dacca Sadar North, Bhola, Barisal Sadar North, Rajshahi Sadar, Kishorganj, Chittagong Sadar South, Sylhet Sadar, Comilla Sadar North, Narigram, Bagerhat,

Satkhira, Moulvi Bazar, Netrokona, Patuakhali Sadar, Pabna Sadar, Gopalganj, Jhenaidah, Mymensingh Sadar North, Faridpur Sadar, Nilphamari, Manikganj, Munshiganj and Brahmanbaria Sub-Divisions.

4. Depressed Region: Feni, Nawabganj, Habiganj, Natore, Jamalganj, Kushtia Sadar, Barguna, Magura, Cox's Bazar, Barial, Goalando, Chandanga, Meherpur, Rangamati, Rajgarh and Bandarban.

These four regions may be interpreted as spatial building blocks for regional planning. Their boundaries are not absolute, but are requirements of the administrative system(see map - 16).

URBANIZED REGION

The urbanized region is the region in which all urban functions prevail. The four largest cities of Bangladesh are included in this region. These four major urban areas are the three foci of the country(since Dacca Sadar South and Narayanganj sub-divisions become one unit). These three foci, Dacca (alongwith Narayanganj), Chittagong and Khulna isolate themselves as urbanized regions in the analysis. These regions have a high level of urbanization and industrialization and as such low level of advanced farming practices. In general, the agricultural activity in these areas is relatively less significant. The different types of urban facilities are highly concentrated in these areas.

In the case of literacy, Khulna Sadar and Chittagong Sadar North represent high literacy percentage. Narayanganj shows medium

and Dacca Sadar South shows lower level of literacy. Unexpectedly, Dacca represents a lower level of literacy. This was possibly due to the loss of some information on education.

Narayanganj sub-division represents high scores on organized area dimension, but Dacca Sadar South, Chittagong Sadar North and Khulna fall in the medium level because most of the characteristics of organized area dimension are rural oriented.

Khulna Sadar Sub-division shows a high level of fallowness (dimension- X), whereas Narayanganj and Dacca Sadar South represent medium level of fallowness, Chittagong Sadar North shows a low percentage of fallowness. Accessibility is an important indicator of developmental status. In this case only railway accessibility was been counted. Chittagong Sadar North and Narayanganj show high, Khulna Sadar shows medium and Dacca Sadar North as as low level of accessibility. The low score by Dacca Sadar South, as was explained earlier, does not mean that Dacca is an inaccessible area. This may have happened due to the fact that Dacca Sadar South has comparatively few railway stations and or has small mileage of railway line. If this accessibility was measured by the volume of train movement then Dacca would have scored very high.

DEVELOPING REGION:

The developing regions are the regions which have a tendency to be developed in respect of better communication, better educational and other social facilities and industrialization. The major portion of the North Bengal area covers these regions. North Bengal has a better spatial distribution of its industries and have substantial agricultural activities. Some areas of this region are very important for a particular agricultural production(e.g. Rangpur Sadar subdivision is important for tobacco cultivation). The agricultural development programmes in these areas have been promoted by irrigation schemes.

The literacy score is high in Chandpur and Comilla Sadar South Sub-divisions and low in Madaripur, Thakurgaon, Noakhali Sadar, Sirajganj, Jamalpur, Gaibandha and Tangail Sadar subdivision. Bogra Sadar and Nawabganj sub-divisions possess better co-operative system whereas Noakhali Sadar, Dinajpur Sadar, Rangpur Sadar, Tangail Sadar and Gaibandha subdivisions show lower level of co-operative system.

Medium level of fallowness prevails in the developing region. Bogra Sadar, Comilla Sadar South, Noakhali Sadar, Naogaon and Chandpur represent a lower percentage of fallowness while Tangail Sadar, Rangpur Sadar and Jamalpur show a high percentage of fallowness in this region.

The highly accessible areas of this region are Comilla Sadar South, Gaibandha, Rangpur Sadar, Bogra Sadar and Jamalpur sub-divisions, Thakurgaon, Noakhali Sadar, Sirajganj, Naogaon, Madaripur and Tangail Sadar represent very low accessible areas. It is interesting to note that Tangail Sadar possessing no railway line but falls in the category of low accessible areas instead of being in the lowest category. This was possibly due to the influence of other variables related in-significantly to the accessibility dimension.

UNDERDEVELOPED REGION

The underdeveloped region is that region in which the developmental activities, farming standard, communication infrastructure etc. are comparatively poor. This region covers a vast area of Bangladesh including a large portion of major area of Mymensingh district, hilly area of Sylhet district and Sundarban forest area of Khulna district. There are some areas in this region, where irrigation facilities are available and have introduced multiple cropping. In the sub-divisions of Mymensingh Sadar South and Sadar North, Netrokona, Kishorganj, Manikganj, Moulvi Bazar and Brahmanbaria, better irrigation facilities have initiated HYV crops. In other areas, agricultural production pattern is largely subsistance oriented with low value crops.

In regard to literacy, Barisal Sadar South, Perojpur, Nagerhat, Chittagong Sadar South, Patuakhali Sadar, Gopalganj, Satkhira and Barisal Sadar North represent high percentage of literacy. Moulvi Bazar, Nilphamari, Faridpur Sadar, Manikganj, Brahmanbaria, Bhola, Mymensingh Sadar South, Kishorganj, Jhenaidah, Mymensingh Sadar North Netrokona and Kurigram show lower level of literacy.

Underdeveloped regions in general show a moderate tendency in cooperative organisation. Areas having high score on this dimension usually will have better irrigation facilties, better organised cooperative activities and hence better agricultural production. Kishorganj, Netrokona, Brahmanbaria and Sylhet Sadar show a relatively better cooperative organisation and Kurigram, Nilphamari, Barisal Sadar South and North and Jessore Sadar have lower level of cooperative system.

High fallowness (see Dimension-X) in this underdeveloped region covers the sub-divisions, Pabna Sadar, Satkhira, Nagerhat, Kurigram, Barisal Sadar South and Kishorganj. Comilla Sadar North, Sylhet Sadar , Chittagong Sadar South and Moulvi Bazar show relatively lower fallowness. The overall condition of fallowness in this region is moderate.

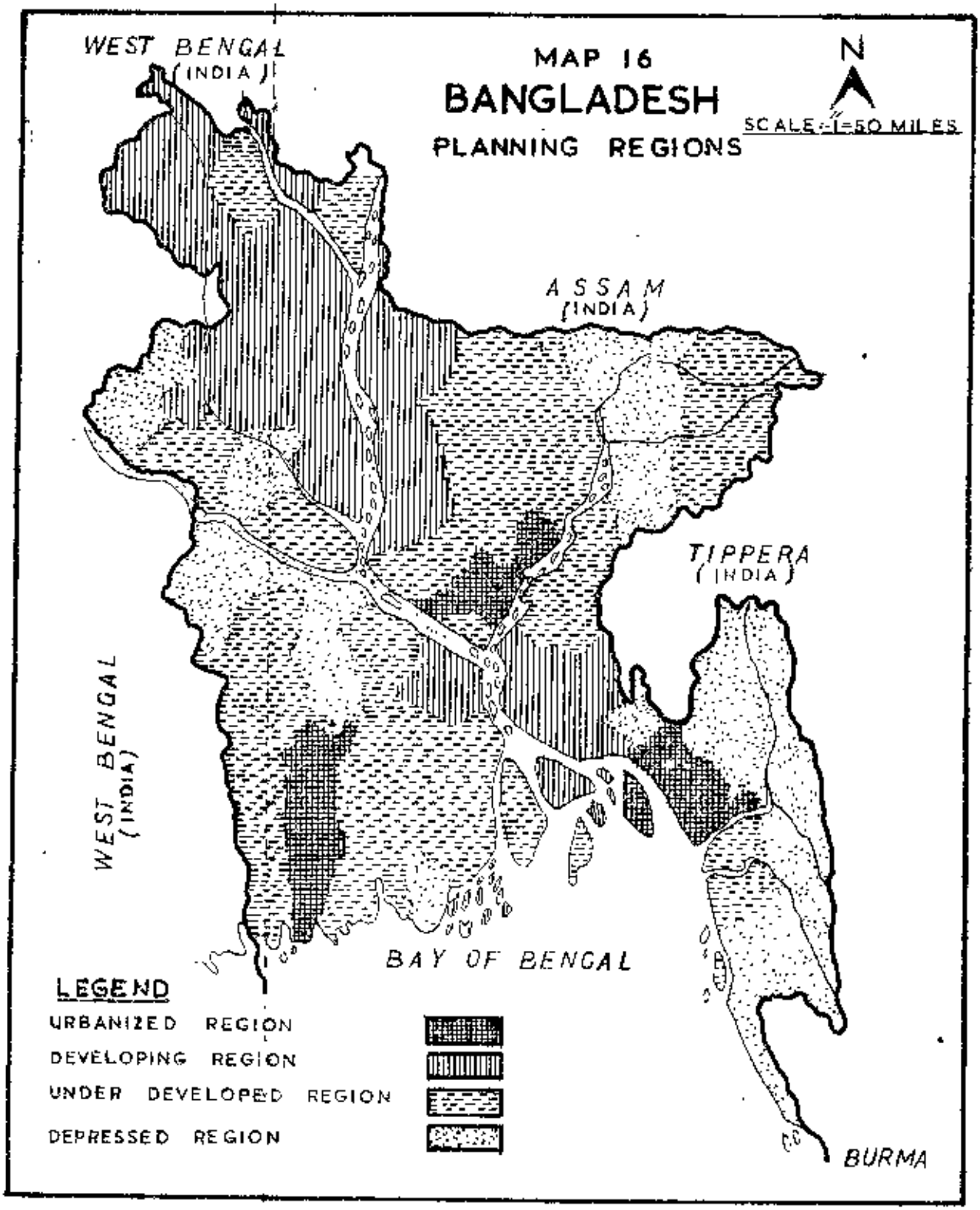
The accessibility status interms of railway linkage(see Dimension -V) varies over the underdeveloped region. Moulvi Bazar, Brahmanbaria, Chittagong Sadar South, Kurigram , Sylhet Sadar,

Mymensingh Sadar South, Rajshahi Sadar, Jessore Sadar and Faridpur Sadar are relatively good accessible areas, whereas Gopalganj, Barisal Sadar South, Munshiganj, Perojpur, Barisal Sadar North, Patuakhali Sadar, Manikganj and Bhola are the areas with least accessibility. In fact these sub-divisions with least accessibility do not have railway lines.

DEPRESSED REGION

A depressed region is one in which economic growth has lagged and in which the population enjoys a level of welfare substantially lower than that in other regions. The reason for the region's backwardness is that rapid growth has located elsewhere. Opportunities in other regions draw off its resources including capital and labour. The entire Chittagong Hill Tract district, a major portion of Sylhet district and entire Kushtia district can be characterised as depressed regions. Few other sub-divisions scattered over the country also fall under this category forming pockets of depressed areas. Agricultural production in these areas is very low.

In general this region shows a lower level of literacy. Only Barguna sub-division represents high literacy level. Goalanda, Kustia Sadar, Chuadanga, Bandarban and Meherpur show lower level of literacy. Habiganj and Sunamganj sub-divisions show better organizational status in respect of cooperative activities, whereas Natore, Goalanda Magura, Chuadanga and Feni show poor status on this dimension.


WEST BENGAL (INDIA)
MAP 16
BANGLADESH
PLANNING REGIONS
N
SCALE - 1"=50 MILES
ASSAM (INDIA)
TIPPERA (INDIA)
WEST BENGAL (INDIA)
BAY OF BENGAL
BURMA
LEGEND
URBANIZED REGION
DEVELOPING REGION
UNDER DEVELOPED REGION
DEPRESSED REGION

In the depressed region the high fallow areas are Chuadanga, Kushtia Sadar, Barguna and Nawabganj subdivisions and the low fallow areas are Sangamati, Habiganj, Bandarban, Cox's Bazar, Rangarh and Feni sub-divisions.

High railway accessible areas of the depressed region are Goalanda, Habiganj, Kushtia Sadar, Feni and Chuadanga and low accessible areas are Magura, Nawabganj, Barguna and Sunamganj subdivisions.

5.2 SPATIAL TREND OF DEVELOPMENT

From the map of planning regions (map 6), it seems that the developmental tendency of Bangladesh more or less runs diagonally from Thakurgaon to Chittagong Sadar North sub-division forming a central corridor. Most of the areas of urbanized and developing regions fall in this corridor. A few sub-divisions of underdeveloped region such as Nilphamari, Kurigram, Dacca Sadar North, Manikganj, Munshiganj, Comilla Sadar North and Brahmanbaria, and Feni subdivision of depressed region fall under this zone. These findings, contrary to the present public perception, show that the North Bengal Region is better developed compared to other regions in Bangladesh.

The underdeveloped and depressed regions are located on both sides of this developing corridor. Khulna Sadar is the only subdivision of urbanized area located within the underdeveloped region. Probably, it is due to the heavy industrial development in and around Khulna city.

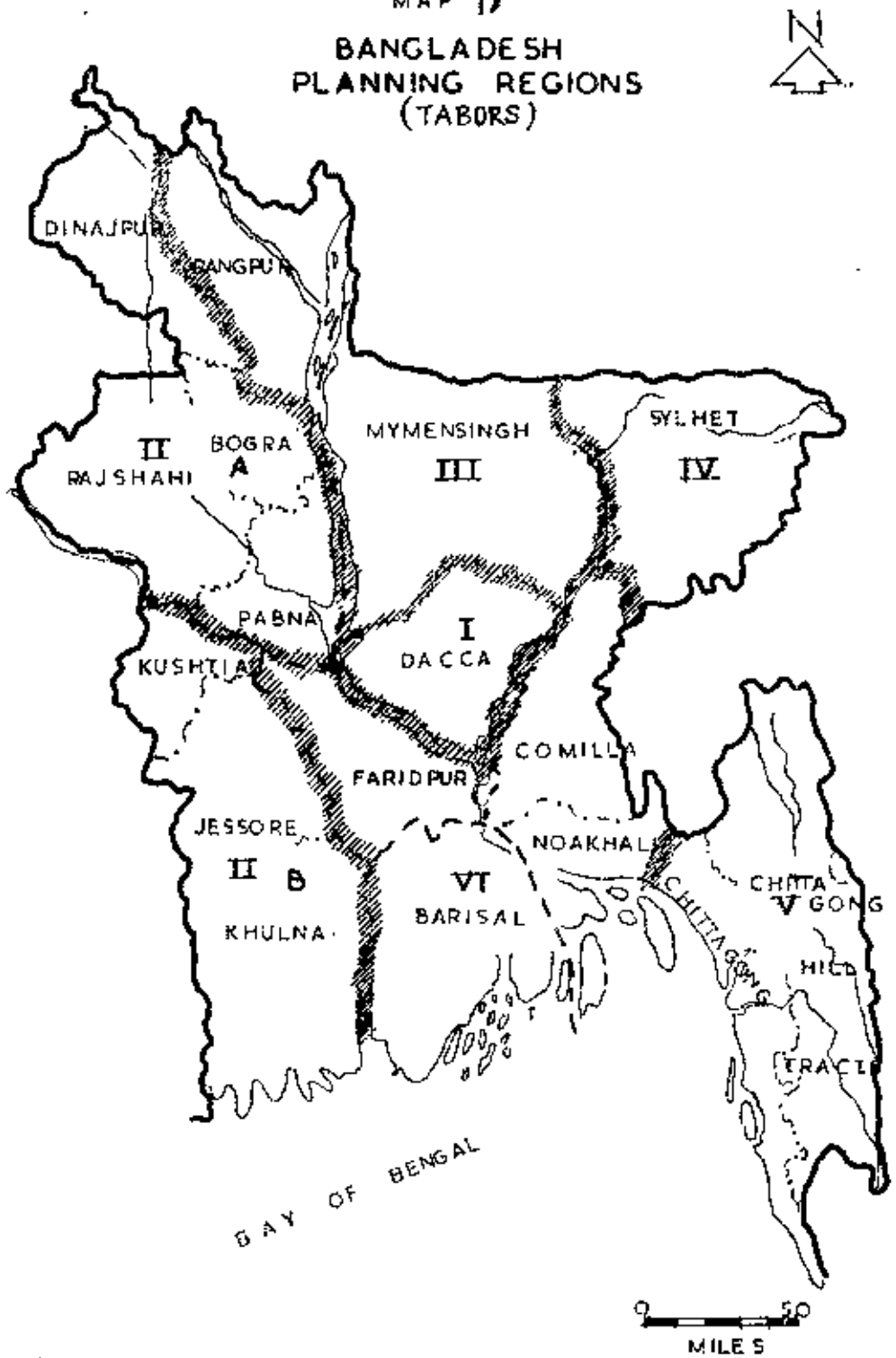
Excepting this most of the other sub-divisions in the South-West Region of Bangladesh have scored low on the developmental status. The North- East Region which include Sylhet and Mymensingh districts also are characterised by underdeveloped and depressed status. Most of the South-East sub-divisions, excepting only Chittagong Sadar North, show a very low developing character. Entire Chittagong Hill Tract district case to be qualified as depressed region.

5.5 COMPARISON WITH THE REGIONS OF RICHARD TABORS

Richard Tabors in his research report, "The Definition of Multifunctional Planning Regions: A Case Study of East Pakistan", divided Bangladesh into six regions, according to the criterion of similarity of characteristics and interdependencies between districts. His final regions have been shown in the map-17. He used districts as basic units of analysis and hence his regionalisation failed to identify the intra-district variations. This is quite obvious from the map 17. Tabors based on his study arranged the districts into the following regions: The region-I is the Central Region which isolates only Dacca district as a metropolitan city. The region-II is the Western Corridor which covers a large area of North and South Bengal. This region was again sub-divided into two sub-regions by the river Ganges, one contains Dinajpur, Bogra, Rajshahi and Pabna districts and another contains Kushtia, Jessore and Khulna districts. The region-III is the North Central Region isolates Rangpur and

MAP 17

BANGLADESH PLANNING REGIONS (TABORS)



SOURCE:- DEFINITION OF MULTIFUNCTIONAL PLANNING REGIONS: A CASE STUDY OF EAST PAKISTAN, BY RICHARD TABORS.

Mymensingh district. Sylhet district alone represents the region-IV the North Eastern region. The South Eastern Region isolates Chittagong and Chittagong Hill Tract districts as region-V, and the last one, the South Central Region includes the districts of Faridpur, Barisal, Noakhali and Comilla.

The present study in contrast have used sub-divisions, the next smaller spatial unit to a district, in order to reflect variations within them. The effectiveness of this intra- district variations in the process of regionalisation has been well identified in map - 16., the outcome of the present study.

Compared to map - 17, map 16 clearly discerns the patterns of development in Bangladesh with a better detail. It shows that, there are significant variations in respect of socio-economic development even within a district. This is an important fact that needs to be recognised in our efforts towards Balanced Regional Development.

CHAPTER - SIX

DEPRESSED REGION AND BALANCED DEVELOPMENT: A POLICY RECOMMENDATION

Whether or not to disperse the developmental investment is a major dilemma in development planning. Allocation of preferential investment to the depressed regions on equity grounds may limit economic growth in the short run, by failing to take advantage of the economies of scale of the developed regions. However, in the long run, the situation may be quite different. For the removal of barriers to growth in the depressed regions and the prevention of concentration of resources in the developed regions, the various objectives may be compatible with one another. Balanced regional growth may be seen more as a solution.

One interpretation of balanced growth is that depressed regions should grow faster than developed ones so that income levels tend to equalise. In this context, balance means convergence. Another interpretation is that the rate of growth in the depressed regions should keep pace with that in the developed regions. In this case, the nation and the constituent regions would grow at the same rate, but a consequence of this would be a widening of the absolute income differentials between depressed and developed regions. Due to the lack of resources in planning, it is obvious that some choices must be made in allocating resources to different regions. With the help of analyses like the present, however, one can set reasonable priorities for dealing with regional development in the country.

Policy makers and planners always face the question whether the longrun objective, based on criteria of economic and social efficiency, should be either to develop all regions to their maximum potential or to equalise the development of all regions (e.g. by levelling off percapita income) with consequent effects on the overall rate of growth.

Many planners feel that regional planning should aim at levelling off interregional disparities and inequalities. The functional division of goals between national and regional planning (with the emphasis on the general rate of growth in the first case, and on the social, physical and structural factors in the second) should not lead to a rift between the two kinds of plan. Also, so far as regional planning is concerned, a shift of objectives may intime be desirable. Such is the case in Western Europe, where previous preoccupation with regional social problems has recently given way to economic target planning. Other examples including India, where regional planners have contributed to the better utilisation of development potentials in the backward regions. As in anyother areas so also in regional problems, the developing countries, differ from the developed countries, even where their problems are to a certain degree similar, the solution adopted differ substantially.

In most developing countries there are striking contrasts and disparities between regions, clearly reflected in the very

unequal opportunity to participate in the socio-economic development process enjoyed by the various population groups. The excessive concentration of growth in a few centres or areas is accompanied by acute disparities in income and development levels between the various regions of the country.

The depressed regions characteristically show a higher than average rate of unemployment, a lower income perhead and a substantial net emigration. The difference between activity rates in developed and depressed regions is due to lack of employment opportunity. If regional plan and other policies can improve employment prospects in backward regions, activity rates will be pushed up towards atleast current national average level and labour reserves will be employed.

The concept of balanced regional development is gaining increasing importance in the literature relating to developmental planning. In every country where there are some distinct regions and differences in levels of income, employment and industrialization exist in between regions, the problem of balanced regional development becomes important. Even in developed countries of the world, it is being realised that the question of growth and development should be viewed from regional point of view and that overall rates of growth and the pace of industrialisation do not mean much unless all the regions of the country get an equal chance of development. Growth rates, expansion in employment opportunities

and industrialization should be also planned so that the entire citizenry may be equally benifitted. It is imperative that the country should try its utmost to develop its economy to make it reach the take-off and still more self perpetuating stage in the shortest possible space of time. It is obvious that the regional development approach to planning in Bangladesh is a very recent development. The important principle is to bring production as close as possible to the sources of raw materials and labour resources and regions of consumption of finished products in order to reduce labour losses.

Before making any recommendations it will be good to recall the very purpose of planning. In a developing country like Bangladesh a major purpose of planning should be an emphasis upon the liquidation of the social and economic disparities which are in existence within several of the regions of the country. This goal can best be achieved by concentrating on the following general priorities :-

i. Balance development of the regions and

ii. Stimulation of underdeveloped and depressed regions.

From the regionalization described in the chapter-five , the author suggests that for planning purposes further major developmental projects in the urbanized regions may better be avoided. The urbanized regions(Dacca, Narayanganj, Chittagong and Khulna) have already achieved a comparatively high level of development. Any large economic investment in such areas may create further imbalance in the longrun. Major development expenditure should be diverted to the

underdeveloped and depressed regions of the country in order to stimulate agricultural productions, small industries, business activities and economic productivity in general. However, it does not necessarily mean that no further investment should be made in the developed region. Minor project and even major programmes if felt necessary can be allowed in the already developed regions. Development pace work should be multiplied in the less developed regions but developed regions should not be allowed to suffer. It is also suggested that developing regions should be the next priority in the developmental plan.

FRAMEWORK FOR ALLOCATION OF FUNDS

Since the resultant planning regions are not contiguous and do not show any clear-cut spatial pattern of development and there are some practical problems in compromising with the existing administrative settings, it is better not to force them into contiguous regions. Instead, the regions could better be considered separately under different administrative Divisions for better administrative operation. This way, one administrative Division may have more than one categories of planning regions and the authority will take different policy decisions for different areas within its Division on the priority basis.

The national planning policy should be such that the allocation of funds should be made for each existing Division on priority basis. The amount of allocated funds of a particular Division will be determined by both area and its population size under depressed and

underdeveloped categories within this Division. In turn the Divisions will allocate funds to various Districts and Districts will distribute funds to various Sub-Divisions proportionate to their area and population size in depressed and underdeveloped regions. However, the planners and decision makers must be able to coordinate developmental potentialities within these depressed and underdeveloped regions. As for example, Chittagong Division contains the largest depressed area in Bangladesh. Its large forest reserves make it an area with great development potential. A greater amount of money and resources should be allocated for this Division. And the Division will then distribute this fund among the Sub-Divisions on the basis of regional variations. The respective Sub-Divisions will take initiative and the Districts will supervise over them.

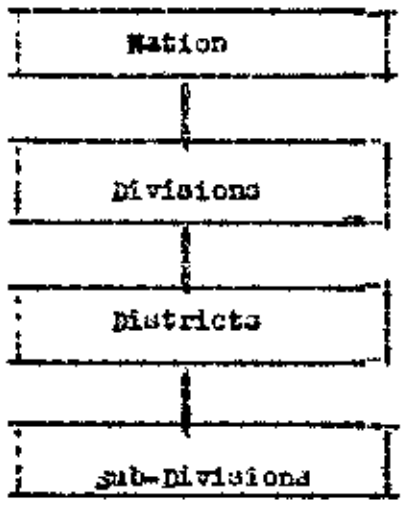


fig. 4 : Framework for allocation of funds.

With a better regional framework to work with, the social objectives hopefully can be achieved in a lesser time period.

NOTES:

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[3] For thorough discussion on spatial patterns, see The United Nations Programmes in Regional Development; An Introduction to Sub-National Planning. United Nations, New York, 1972.

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12 Anwar Iqbal Quraishi(general editor), The Third Five Year Plan and Other Papers; Published by the Pakistan Economic Association, 1965, p.211.

13 For further discussion on regional disparity ,see Anwar Iqbal Quraishi, The Third Five Year Plan and Other Papers, ibid pp.201-202.

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16 One of the objectives of the First Five Year Plan was to accelarate the rate of development expenditure and remedy the glaring deficiencies in the traditionally neglected fields of social and human resources development by improvement in education, heath, rural water supplies etc. all of which will also improve general capability and efficiency of work (The First Five Year Plan of Bangladesh, p. 10).

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[19] Elahi K.M., "Geodemographic Regions of Bangladesh", Oriental Geographer, vol. XVII, No. 1, 1973, P.7.

[20] Fabora R., The Definition of Multifunctional Planning Regions: A Case Study of East Pakistan, Center for Population Studies, Harvard University Cambridge, Massachusetts, 1971, No.6.

[21] In the methodology the author proposed a flow-chart in which seven steps were required to arrive at a set of multifunctional uniform regions. In step-1, the researcher selected the individual area (here called Specific Statistical Areas or SSAs) for analysis, not the variables. The geographic units were selected in Step-2, and the variables for each of the SSAs were selected in Step-3. The further step was a correlation and factor analysis of each of the selected SSAs. These were then grouped and mapped in step-5. The researcher, in step-6 evaluated the results of the analysis on each of the individual SSAs. Finally in step-7, a set of uniform regions were arrived.

[22] Composite grouping analysis may be done either through the selection of representative variables from each of the eight SSAs, or by utilizing the factor loadings from these eight SSAs. The author followed the latter process.

[23] Glasson J. ibid, pp. 23-24.

[24] Glasson J. ibid, pp. 27-29

[25] Glasson J. ibid, pp-26-27

[26] Glasson J. ibid, p-24

[27] For thorough discussion, see Glasson J. p.24

[28] Boudeville, J.R. ibid, Chaper-I Passim.

[29] Berry Brian J.L., A Method for Deriving Multifactor Uniform Regions, Przeglad Geograficzny XXXIII No.2 (1961), pp.263-279.

[30] Factor Loadings are the Correlation of the original variables with the newly derived components.

[31] The following works on factor analysis are found to be very useful. R.J. Rummel, Understanding Factor Analysis, Journal of Conflict Resolution, XI :4 pp.44-77; and D. Child, The Essentials of Factor Analysis, (New York: Holt, Reinhart and Winston, 1973) ; R. Frutchter and E.Jennings, Factor Analysis in H. Borko (ed). Computer Applications in the Behavioral Science, Englewood, 1962, pp-238-215; H. Harman, Modern Factor Analysis (and -ed. Rev. University of Chicago Press 1967); L. Kantaaki, The Use of Multivariate Methods in Regional Geographical Analysis, Fennia, Vol. 99, 1967-70, pp. 1-24(Sec-6); J.E. Royels, The Development of Factor Analysis, The Journalof General Psychology, vol. 58, 1958, pp. 139-164.

[32] For thorough discussion, see, Hoggett P., Locational Analysis in Human Geography; New York . St. Martin's Press, 1966.

[33] Sub-Division is one of the administrative units in between the district and thana. There are sixty four Sub-divisions altogether. Joypurhat, Jhalokati, Norsingdi and Sariatpur are the newly created sub-divisions which were not considered separately in this study because data were not separately available for these Sub-divisions. Joypurhat has been amalgamated with Bogra Sadar, Jhalokati with Barisal Sadar South, Norsingdi with Narayanganj and Sariatpur with Madaripur Sub-divisions in this study.

[34] The IBM 1620 system that was available to the author for data processing took almost 25 hours to process the data for 60 Subdivisions. This was another factor that influenced decision on both number of areal unit and number of variable to be included in this study. Direct Accessible Memory capability of the computer could not handle more than 50 X 50 matrix at a time and therefore, the Disk unit had to be used heavily for storing intermediate results.

[35] The framework was also followed by Richard Tabors in " The Definition of Multifunctional Planning Regions: A Case Study of East Pakistan"

[36] Information on road were collected from the direct measurement of distance on map of Bangladesh supplied by the Roads and Highways Department.

[37] The programme was adapted to this Computer installation by Dr. Shamsyet Hossain, Dept. of Urban and Regional Planning, BUET, Dacca.

[38] There are two major variations of the factor model known as Principal Component Analysis and Principal Axis Factor Analysis. The Principal Axis Factor Analysis model accepts only the variances common to all the variables and eliminate beforehand the variance unique to a variable. On the other hand, Principal Component Analysis accepts both types of variance and makes no distinction between them. The latter model was preferred for this study.

[39] Factors may be rotated in this multidimensional space so that each factor relates very strongly to a few variables and very little to the rest. This is done in order to have better explanatory character. There are several methods for factor rotation and normal varimax rotation is the popular one.

40 some information on education of Dacca metropolitan area had been lost, that is why Dacca Sadar South Sub-Division showed negative results in few dimensions.

41 Philip M. Lankford, " Regionalization: Theory and Alternative Algorithms", Geographical Analysis, vol. 1(1969), pp. 196-212.

APPENDIX- A

FACTOR ANALYSIS

The basic principle of factor analysis is the summation of a large set of data into a smaller and simple set of orthogonal factors which is the representative of the original variables. At the beginning, a correlation matrix holding simple correlations between various pairs of the socio-economic variables is created out of the original data matrix. This correlation matrix is then summerised by using the method of factor analysis to form a Factor Matrix. This factor matrix holds basic pattern(often called Factors or components) of interaction that exist among the variables. The next matrix derived by manipulating this factor matrix is called Factor Score Matrix. This final matrix classifies the various regions based on the chosen criteria, being defined interms of those basic patterns of interaction. The main outline of the procedure in bringing out these factors is given here in brief:-

1. Analysis of data matrix containing measurements on n-numbers of variables for each of s-units of observations(here sub-divisions).
2. Computation of nxn intercorrelated matrix (r) of s-observations.
3. Factor analysis of the correlation matrix of the n-variables.
4. Rotation of the resulting factors to a normal varimax position.
5. Computation of the factor scores of s-observations on the rotated factors.
6. Grouping of s-observations in a way that atte pts to maximise internal homogeneity of each group.

In this connection, it should be noted that the main factor analysis yields a first factor(dimension-1) that accounts for maximum variance, while the subsequent ones account for decreasing proportions of the total variance.

A P P E N D I X - B

LIST OF VARIABLES WITH IDENTIFICATION NUMBERS

Sectors	Identification No.	Variable Names
1. Demography (11 variables)	01	Density of population, 1974
	02	Male literacy percentage, 1974
	03	Female literacy percentage, 1974
	04	Percentage of civilian labour force (working), 1974
	05	Percentage of civilian labour force (seeking work), 1974
	29	Number of college students, 1974-75
	30	Number of College teachers, 1974-75
	32	Number of Secondary school students, 1974-75
	33	Number of Secondary school teachers, 1974-75
	35	Number of Primary school students, 1974-75
	36	Number of Primary school teachers, 1974-75
2. Agriculture (13 variables)	37	Land under aus in acre, 1973-74
	38	Land under aman in acre, 1973-74
	39	Land under boro in acre, 1973-74
	40	Land under sugarcane in acre, 1973-74
	41	Land under potato in acre, 1973-74
	42	Land under rape & mustard in acre, 1973-74
	43	Land aner jute in acre, 1973-74
	44	Land under tobacco in acre, 1973-74
	45	Land under single crop in acre, 1973-74
	46	Land under double crop in acre, 1973-74
	47	Land under triple crop in acre, 1973-74
	48	Land under current fallow in acre, 1973-74
	49	Land under irrigation facilities in acre, 1973-74
3. Industry (1 variable)	09	Total industrial electric power consumption in KWH, 1975

A P P E N D I X - B (Contd.)

Sectors	Identification No.	Variable Names	
4. Transportation (6 variables)	10	Total Katcha road in mile,	1970
	11	Total pucca road in mile,	1970
	12	Total rail road in mile,	1976
	13	Number of railway stations,	1976
	15	Total navigable waterways in dry season in mile,	1970
	16	Number of inland river ports,	1973
5. Communication (3 variables)	24	Number of daily newspaper circulations,	1976
	25	Number of telephone connections,	1975
	50	Number of post offices,	1970
6. Social infrastructure (6 variables)	19	Number of tubewells,	1970
	26	Number of hospital beds,	1975-76
	27	Number of rural health centre,	1975-76
	28	Number of colleges,	1974-75
	31	Number of secondary schools	1974-75
	34	Number of primary schools	1974-75
7. Financial infrastructure (9 variables)	06	Number of electric power consumers,	1975
	07	Total Electric power consumption in KWH,	1975
	08	Total Domestic electric power consumption in KWH,	1975
	17	Number of godowns for food grains,	1970
	18	Capacity of godowns for food grain in ton,	1970
	20	Number of hats,	1970
	21	Number of co-operative societies,	1970
	22	Number of cinema halls,	1976
	23	Number of bank branches,	1975
8. Water (1 variable)	14	Total riverine area in sq. mile,	1974

APPENDIX - C

DATA MATRIX

	01	02	03	04	05	06('000)	07('000	08('000)	09('000)	10
DINAJPUR DISTRICT										
Thakurgaon	897	30.6	8.9	34.8	0.6	0.9	88	14	56	3027
Dinajpur Sadar	1065	32.0	11.9	35.2	0.7	4.4	380	157	191	1724
RANAJPUR DISTRICT										
Nilphamari	1521	22.6	7.4	40.9	1.5	2.5	263	71	143	1105
Rangpur Sadar	1450	26.2	8.9	57.3	2.0	3.9	445	97	348	2645
Kurigram	1331	21.0	6.7	38.3	0.7	0.7	42	30	8	1024
Gaibandha	1630	24.1	8.7	32.3	0.8	1.6	56	24	32	2200
BOGRA DISTRICT										
Bogra Sadar	1486	30.8	13.0	34.9	0.8	7.5	781	362	398	1689
RAJSHAHI DISTRICT										
Naogaon	1144	29.7	11.8	38.1	0.7	2.4	162	90	25	1033
Nawabganj	1070	22.1	9.9	32.4	0.5	1.0	59	27	26	699
Rajshahi Sadar	1293	27.6	11.7	36.0	0.6	7.3	1063	214	392	1308
Natore	1167	27.2	12.1	27.2	0.6	1.2	84	25	59	1006
PABNA DISTRICT										
Sirajganj	1614	21.6	8.5	32.8	0.7	2.1	759	35	723	707
Pabna Sadar	1336	22.9	11.5	33.5	1.2	4.4	1077	140	671	684

APPENDIX -C(Contd)

	01	02	03	04	05	06('000)	07('000)	08('000)	09('000)	10
KUSHTIA DISTRICT										
Kushtia Sadar	1642	23.4	11.4	26.0	0.6	4.8	814	77	565	1033
Meherpur	1174	17.9	7.7	28.2	0.2	0.5	44	12	22	187
Chuadanga	1212	24.0	11.0	29.6	0.5	1.3	105	34	40	1369
JESSORE DISTRICT:										
Jhenaidah	1182	29.5	9.5	32.3	0.4	1.0	99	26	66	1215
Magura	1166	32.2	12.8	24.8	0.8	0.6	59	31	26	387
Narail	1305	33.7	16.2	32.4	0.8	0.3	34	10	21	352
Jessore Sadar	1432	34.5	14.3	33.4	0.8	5.0	2226	98	1889	980
KHULNA DISTRICT										
Satkhira	791	33.4	12.2	24.2	0.9	0.9	46	29	10	2145
Khulna Sadar	823	39.5	18.6	31.9	1.3	18.4	6617	392	6225	1005
Bagerhat	685	40.8	24.2	27.3	1.1	2.0	138	39	99	1003
BAKERGANJ DISTRICT										
Barisal Sadar(N)	1377	32.6	18.6	35.5	1.2	-	-	-	-	649
Barisal Sadar(S)	1919	44.3	27.6	30.1	1.4	6.5	558	262	219	918
Bhola	947	25.3	11.9	27.3	0.9	0.9	55	37	13	987
Perojpur	1723	34.5	27.5	34.6	1.3	0.9	154	14	125	731

APPENDIX - C(Contd.)

	01	02	03	04	05	06('000)	07('000)	08('000)	09('000)	10
POTUAKHALI DISTRICT										
Potuakhali Sadar	860	36.3	17.2	36.7	1.5	1.1	88	50	29	498
Bargone	955	37.0	20.2	27.0	0.7	-	-	-	-	726
MYMENSINGH DISTRICT										
Jamalpur	1566	17.6	7.8	35.7	0.7	2.0	144	49	57	2099
Mym. Sadar(N)	1746	20.0	8.8	40.6	0.6	-	-	-	-	1774
Mym. Sadar(S)	1581	24.1	12.6	32.7	0.7	3.5	446	93	353	1603
Netrokona	1111	21.5	9.8	39.4	0.6	0.9	33	13	7	953
Kishorganj	1597	21.2	9.3	36.0	0.6	2.4	516	59.	454	1093
TANGAIL DISTRICT										
Tangail Sadar	1587	24.8	10.5	31.3	0.9	1.7	297	65	82	1146
DACCA DISTRICT										
Dacca Sadar(S)	6731	42.7	26.2	34.1	2.8	119.2	42075	10878	20794	583
Dacca Sadar(N)	1523	30.8	14.2	35.3	0.9	2.0	572	32	263	601
Narayanganj	2897	28.8	14.1	34.2	1.5	18.0	8194	27	7811	942
Munshiganj	2509	33.3	17.2	24.8	1.1	2.5	567	62	501	275
Manikganj	1698	24.4	9.5	29.4	0.6	0.8	43	18	20	414

A P P E N D I X - H (Contd)

	01	02	03	04	05	06('000)	07('000)	08('000)	09('000)	10
FARIDPUR DISTRICT										
Goalanda	1326	26.9	11.3	25.9	0.5	1.2	113	10	32	467
Faridpur Sadar	1482	27.8	11.5	35.5	0.9	2.5	140	71	69	637
Madaripur	1681	25.1	9.8	31.6	0.8	0.8	65	24	39	338
Gopalganj	1476	35.1	16.7	34.2	1.2	0.7	51	39	9	178
SYLHET DISTRICT										
Sunamganj	835	25.3	11.2	35.2	0.6	1.0	740	37	697	358
Sylhet Sadar	1138	28.8	13.1	37.7	1.8	9.1	527	300	226	1008
Moulvi Bazar	951	31.0	13.7	33.0	2.7	2.2	310	287	18	718
Habiganj	1087	25.7	10.7	35.4	1.3	1.4	86	23	55	398
COMILLA DISTRICT										
Brahmanbaria	1991	25.5	10.6	36.6	1.1	3.2	424	115	289	642
Comilla Sadar(N)	2417	30.6	11.7	42.0	0.9	-	-	-	-	556
Comilla Sadar(S)	2295	36.0	15.8	31.5	2.2	8.4	1394	219	1084	1548
Chandpur	2343	36.1	19.3	31.3	2.1	5.5	1077	91	925	1330
NOAKHALI DISTRICT										
Noakhali Sadar	1475	34.2	16.3	27.1	2.1	3.3	918	57	655	4395
Feni	2135	40.2	15.2	22.4	2.0	1.7	252	45	182	1023

A P P E N D I X - C (Contd)

	01	02	03	04	05	06('000)	07('000)	08('000)	09('000)	10
CHITTAGONG DISTRICT										
Chittagong Sadar(N)	1787	42.2	19.0	31.3	3.3	36.6	21268	1244	19306	1261
Chittagong Sadar(S)	1934	41.9	27.6	32.7	2.2	1.8	103	19	50	996
Cox's Bazar	921	21.3	8.0	38.1	2.1	1.7	143	27	103	519
CHITTAGONG H.T. DISTRICT										
Rangarh	173	27.3	8.7	54.2	1.1	-	-	-	-	214
Rangamati	91	32.1	11.7	51.8	0.6	2.1	167	32	97	300
Bandarban	66	14.3	3.2	48.0	1.3	0.2	4	1	2	197

APPENDIX- C (Contd)

	11	12	13	14	15	16	17	18('0)	19	20
DINAJPUR DISTRICT										
Thakurgaon	104	46	9	10	35	-	26	533	2596	164
Dinajpur Sadar	121	68	17	8	11	-	643	13881	4339	237
RANGPUR DISTRICT										
Nilphamari	30	39	10	13	197	-	24	723	1691	86
Rangpur Sadar	70	90	19	33	64	-	20	630	4084	183
Kurigram	41	60	17	98	108	1	32	3440	3335	93
Gaibanda	89	68	14	58	76	1	13	450	4744	137
BOGRA DISTRICT										
Bogra Sadar	88	78	20	36	128	-	67	3786	9797	217
RAJSHAHI DISTRICT										
Naogaon	56	12	4	4	91	-	25	502	3623	130
Nawabganj	76	16	4	27	88	-	3	316	2304	49
Rajshahi Sadar	123	51	13	15	164	-	7	284	4197	113
Natore	47	37	10	7	61	-	2	1399	2112	48
PABNA DISTRICT										
Sirajganj	57	25	9	122	92	1	14	703	4971	105
Pabna Sadar	121	35	10	53	120	2	76	3780	3082	89

APPENDIX - C (Contd.)

	11	12	13	14	15	16	17	18('0)	19	20
KUSHTIA DISTRICT										
Kushtia Sadar	84	54	14	23	85	-	16	636	2249	80
Meherpur	82	-	-	6	6	-	2	60	654	14
Chuadanga	74	30	8	7	25	-	7	166	1140	43
JESSORE DISTRICT										
Jhenaidah	101	19	5	13	46	-	14	477	2513	96
Magura	45	-	-	14	92	1	3	50	1159	75
Narail	17	-	-	11	202	1	6	217	1079	63
Jessore Sadar	215	55	11	9	113	-	45	1570	5053	157
KHULNA DISTRICT										
Satkhira	172	-	-	148	390	1	17	7752	2799	181
Khulna Sadar	153	13	7	306	570	4	27	316	3063	107
Bagerhat	102	20	10	154	395	4	17	584	2471	118
BAKERGANJ DISTRICT										
Barisal Sadar(N)	51	-	-	121	406	2	7	120	1753	143
Barisal Sadar(S)	48	-	-	48	515	6	11	2005	2139	114
Bhola	36	-	-	429	209	5	10	402	2549	173
Pirojpur	60	-	-	44	349	6	11	520	2376	103

APPENDIX - C (Contd.)

	11	12	13	14	15	16	17	18('0)	19	20
PATUAKHALI DISTRICT										
Patuakhali Sadar	10	-	-	223	170	3	9	394	1535	61
Barguna	5	-	-	80	1078	1	7	410	73	61
MYMENSINGH DISTRICT										
Jamalpur	52	73	17	47	128	2	14	626	4845	155
Mym.Sadar(N)	71	35	10	5	65	-	16	830	1757	109
Mym.Sadar(S)	64	52	12	12	84	-	46	1330	3673	116
Netrokona	33	41	12	11	117	-	172	239	3078	108
Kishorganj	60	35	10	43	414	1	21	1382	4086	122
TANGAIL DISTRICT										
Tangail Sadar	51	-	-	42	37	-	10	655	3906	117
DACCA DISTRICT										
Dacca Sadar(S)	297	15	5	14	54	2	6	312	4371	23
Dacca Sadar(N)	85	40	11	12	462	-	13	653	4266	118
Narayanganj	88	67	21	52	270	3	30	715	5858	144
Munshiganj	10	-	-	48	134	10	21	1050	2868	41
Manikganj	25	-	-	56	75	1	19	852	2040	42

APPENDIX - C (Contd)

	11	12	13	14	15	16	17	18('0)	19	20
FARIDPUR DISTRICT										
Goalando	26	55	19	52	60	1	8	575	4701	68
Faridpur Sadar	83	40	10	37	152	1	10	409	3622	87
Madaripur	20	-	-	123	326	1	49	349	4815	104
Gopalganj	21	6	3	9	366	2	12	409	3029	78
SYLHET DISTRICT										
Sunamganj	18	14	2	16	395	4	7	1530	2426	120
Sylhet Sadar	113	54	12	19	252	1	13	570	2669	193
Moulvi Bazar	70	54	12	4	115	-	9	690	1871	162
Habiganj	55	55	21	11	154	2	6	589	2560	86
COMILLA DISTRICT										
Brahmanbaria	30	45	14	36	160	3	21	11106	4076	69
Comilla Sadar(N)	44	16	4	14	98	1	10	596	4023	53
Comilla Sadar(S)	113	50	14	3	44	1	24	1130	1604	137
Chandpur	30	25	9	80	275	6	24	480	4002	120
NOAKHALI DISTRICT										
Noakhali Sadar	141	20	8	475	218	1	23	6700	8484	201
Feni	57	32	10	24	29	-	9	421	2248	108

APPENDIX - C (Contd)

	11	12	13	14	15	16	17	18('0)	19	20
CHITTAGONG DISTRICT										
Chittagong Sadar(N)	208	77	24	202	183	2	20	12620	4844	171
Chittagong Sadar(S)	59	22	10	16	91	-	7	300	2124	142
Cox's Bazar	81	-	-	32	84	2	20	803	1880	60
CHITTA GONG H.T. DISTRICT										
Rangarh	3	-	-	-	42	-	6	154	285	21
Rangamati	19	-	-	7	231	1	4	95	324	24
Bandarban	2	-	-	1	160	-	1	50	232	11

APPENDIX - C (Contd)

	21	22	23	24	25	26	27	28	29	30
DINAJPUR DISTRICT:										
Thakurgaon	250	1	27	917	241	50	3	9	4996	134
Dinajpur Sadar	175	5	30	2211	1343	100	2	14	9530	263
RANGPUR DISTRICT,										
N ilphamari	23	1	16	1215	496	50	3	9	3982	149
Rangpur Sadar	130	4	25	2781	603	380	4	17	9098	359
Kurigram	57	2	21	1163	168	50	2	6	4510	118
Gaibandha	105	1	21	1404	249	34	3	11	6493	173
BOGRA DISTRICT										
Bogra Sadar	574	11	52	2746	1076	100	5	27	15996	515
RAJSHAHI DISTRICT:										
Naogaon	79	3	21	516	325	50	2	14	6005	204
Nawabganj	172	2	17	629	160	50	1	40	4927	196
Rajshahi Sadar	132	5	35	2846	1243	650	4	26	12663	529
Natore	42	1	17	971	220	50	1	13	4576	178
PABNA DISTRICT:										
Sirajganj	195	2	21	1243	294	50	3	12	7046	200
Pabna Sadar	275	4	35	1934	1040	550	1	23	13346	417

APPENDIX - C (Contd.)

	21	22	23	24	25	26	27	28	29	30
KUSHTIA DISTRICT.										
Kushtia Sadar	220	5	19	1455	1076	100	1	8	6386	172
Meherpur	53	1	4	394	55	50	2	1	867	22
Chuadanga	103	1	14	1079	262	50	-	9	4967	60
JESSORE DISTRICT:										
Jhenaidah	124	1	13	696	230	50	3	7	2425	110
Magura	42	2	6	362	92	50	1	3	2743	64
Narial	43	1	7	207	60	20	1	4	3608	91
Jessore Sadar	128	5	31	4278	820	100	2	16	13765	340
KHULNA DISTRICT										
Satkhira	54	1	19	730	187	50	3	6	3791	114
Khulna Sadar	89	7	50	6352	3082	140	2	15	16572	381
Bagerhat	83	1	18	1065	313	50	2	10	8153	195
BAKERGANJ DISTRICT										
Barisal Sadar(N)	225	-	10	507	16	-	2	8	5510	113
Barisal Sadar(S)	101	4	23	2239	844	400	2	12	14922	338
Bhola	176	1	15	440	116	50	3	4	2732	75
Perojpur	163	2	15	588	108	50	3	8	6178	129

APPENDIX - C (Contd.)

	21	22	23	24	25	26	27	28	29	30
POTUAKHALI DISTRICT										
Potuakhali Sadar	81	2	16	446	199	50	2	5	6956	108
Borguna	146	1	9	144	22	-	2	4	3702	58
MYMENSINGH DISTRICT										
Jamalpur	405	3	22	1234	301	50	4	14	10419	249
Myn.Sadar(N)	217	1	12	232	55	-	2	7	5857	122
Myn. Sadar(S)	272	3	21	3276	754	1100	2	12	13401	260
Netrokona	548	1	17	976	136	50	4	8	5513	144
Kishorganj	1112	6	27	1749	367	50	7	9	8337	164
TANGAIL DISTRICT										
Tangail Sadar	363	4	25	1448	298	50	3	13	19000	352
DACCA DISTRICT										
Dacca Sadar(S)	286	23	227	82463	39812	2825	1	44	47503	484
Dacca Sadar(N)	322	7	29	2066	99	-	2	9	7119	162
Narayangonj	681	11	61	7706	483	65	4	13	16003	262
Munshigonj	195	3	16	723	257	50	2	5	3399	100
Manikgonj	180	1	14	839	129	50	3	10	7377	158

APPENDIX - C (Contd.)

	21	22	23	24	25	26	27	28	29	30
FARIDPUR DISTRICT										
Goalanda	84	1	12	610	181	50	1	4	3976	93
Faridpur Sadar	229	1	21	935	436	100	2	8	6592	179
Madaripur	144	6	16	358	106	30	4	6	4471	99
Gopalganj	131	1	13	467	131	50	3	3	1354	74
SYLHET DISTRICT										
Sunamganj	577	1	27	893	161	30	3	3	1172	45
Sylhet Sadar	318	4	57	3915	1195	322	3	3	5943	222
Moulvi Bazar	187	1	35	1195	279	20	2	3	3131	49
Hobigonj	361	2	26	935	191	34	3	2	2652	36
COMILLA DISTRICT										
Brahmanbaria	580	3	27	1903	242	50	3	10	9039	181
Comilla Sadar(N)	243	-	16	118	40	-	4	8	6102	140
Comilla Sadar(S)	643	4	36	2819	1100	100	3	15	12539	366
Chandpur	524	3	28	1472	771	30	4	8	6640	175
NOAKHALI DISTRICT										
Noakhali Sadar	122	2	47	2036	714	150	5	16	9919	302
Feni	125	1	19	1348	282	50	2	4	3654	75

APPENDIX - C (Contd).

	21	22	23	24	25	26	27	28	29	30
CHITTAGONG DISTRICT:										
Chittagong Sadar(N)	401	8	134	22346	11998	658	4	27	26298	770
Chittagong Sadar(S)	584	-	21	1952	112	-	3	9	8277	205
Cox's Bazar	330	2	25	420	164	50	2	2	1283	39
CHITTAGONG H.T.DISTRICT:										
Rangarh	117	-	4	50	13	10	-	-	-	-
Rangamati	96	1	11	540	193	-	1	1	479	22
Bandarban	58	-	4	38	14	10	1	-	-	-

APPENDIX - C (Contd)

	31	32	33	34	35('0)	36	37('0)	38('0)	39('0)	40
DINAJPUR DISTRICT										
Thakurgaon	89	21129	1024	695	15262	2545	15576	27271	366	14455
Dinajpur Sadar	155	36797	1783	814	17875	1451	12026	29244	1051	15545
RANGPUR DISTRICT:										
Nilphamari	63	17476	825	461	10193	1982	14647	23629	454	1435
RangpurSadar	145	40223	1900	871	19258	3745	24222	42849	1390	10158
Kirigram	84	23302	1100	603	13332	2593	22123	25577	906	3612
Gaibanda	116	32178	1520	714	15787	3070	21786	30272	1805	12950
BOGRA DISTRICT										
Bogra Sadar	230	71599	2506	1172	23726	4698	25724	62109	4312	13920
RAJSHAHI DISTRICT										
Naogaon	142	35969	1761	691	15955	3801	8662	42502	6138	10250
Nawabganj	92	23304	1141	424	9790	2332	11934	20938	2017	3525
Rajshahi Sadar	110	27663	1364	526	12143	2893	13945	22088	2116	31110
Natore	79	20011	980	384	8867	2112	9192	19533	1882	33100
PABNA DISTRICT:										
Sirajganj	101	36057	1263	850	20494	4930	19916	31813	1324	6055
Pabna Sadar	108	37128	1300	634	15286	3677	11820	21051	3032	12265

APPENDIX - C (Contd.)

	31	32	33	34	35('0)	36	37('0)	38('0)	39('0)	40
KUSHTIA DISTRICT										
Kushtia Sadar	76	24419	1125	413	7992	1693	17776	6930	191	13980
Meherpur	22	7069	326	150	2903	615	6516	2566	142	2907
Chuadanga	37	11888	548	238	4605	976	10124	2809	311	7145
JESSORE DISTRICT										
Jhenaidah	77	16101	924	499	10918	2096	19808	18334	340	10410
Magura	59	12337	708	252	5514	1058	8596	9848	268	1330
Narail	56	11710	672	278	6083	1168	5494	9370	584	520
Jessore Sadar	142	29792	1704	595	13019	2499	22286	22683	845	3250
KHULNA DISTRICT										
Satkhira	124	38006	1451	595	13013	2380	3321	28648	457	2598
Khulna Sadar	144	44136	1685	592	12947	2368	2144	19007	2278	1329
Bagerhat	151	46282	1767	573	12532	2292	2856	28205	4049	1233
BARISHGANJ DISTRICT.										
Barisal Sadar(N)	96	32064	1171	395	12537	2054	14714	20890	2721	5717
Barisal Sadar(S)	207	69138	2525	447	14188	2324	8575	16082	2714	2003
Bhola	51	17034	622	396	12569	2059	14412	30558	1902	2106
Perojpur	134	44756	1635	654	20758	3401	8788	19944	4079	1734

APPENDIX - C (Contd.)

	31	32	33	34	35('0)	36	37('0)	38(·o)	39('0)	40
POTUAKHALI DISTRICT.										
Potuakhali Sadar	120	26280	1080	535	13108	2408	7674	36490	2788	550
Barguna	79	1730	711	383	9384	1724	3608	23617	2902	1624
MYMENSINGH DISTRICT:										
Jamalpur	158	53199	2196	849	18406	3821	32952	45555	5083	14255
Myn. Sadar(N)	72	24242	1001	367	7957	1652	17760	31101	3686	1928
Myn. Sadar(S)	142	47811	1974	531	11312	2390	22177	31294	6205	2402
Netrokona	67	22559	931	576	12488	2592	13373	34349	18131	638
Kishorganj	91	30640	1265	653	14157	2939	8995	21015	27417	7527
TANGAIL DISTRICT:										
Tangail Sadar	182	62438	2700	898	19280	4 066	48207	37720	4869	1385
DACCA DISTRICT:										
Dacca Sadar(S)	172	58136	1772	530	10033	2332	1916	4797	2263	640
Dacca Sadar(N)	152	51376	1566	745	14103	3278	14124	31302	8844	5520
Narayanganj	145	40010	1494	959	18154	4220	8451	22081	5522	4250
Munshiganj	58	19604	797	475	8992	2090	3108	10491	4138	3450
Manikganj	71	23998	731	429	8121	1888	8477	16274	654	2240

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APPENDIX - G (Contd.)

	31	32	33	34	35('0)	36	37('0)	38('0)	39('0)	40
FARIDPUR DISTRICT										
Gealanda	42	14146	605	279	6992	1116	6582	8007	165	5064
Faridpur Sadar	70	23576	1009	493	12405	1980	15058	15411	1682	6407
Madaripur	118	39742	1699	794	19898	3176	20288	27804	2583	11465
Gopalganj	90	30312	1296	499	12505	1996	12023	21164	1624	1100
SYLHET DISTRICT.										
Sunamganj	44	14036	484	795	14191	2624	3579	20814	39537	250
Sylhet Sadar	74	23606	814	996	17770	3287	6244	31224	7609	14
Moulvi Bazar	48	15312	528	672	11995	2218	9500	27481	4368	1665
Habiganj	47	14993	517	585	12227	2261	8429	24337	11386	2975
COMILLA DISTRICT:										
Brahmanbaria	72	28483	986	381	8716	1372	9711	24942	8528	8
Comilla Sadar(N)	75	29670	1028	590	15045	2124	12214	20989	1741	80
Comilla Sadar(S)	132	52219	1808	694	17697	2498	19000	29885	2424	710
Chandpur	144	56966	1973	1030	26265	3708	11816	17260	4780	243
NOAKHALI DISTRICT:										
Noakhali Sadar	174	65459	2123	1144	27273	4690	31036	62235	6065	
Feni	59	22196	720	384	9155	1574	12600	15165	2170	

APPENDIX - C (Contd)

	31	32	33	34	35('0)	36	37('0)	38('0)	39('0)	40
CHITTAGONG DISTRICT:										
Chitt.Sadar(N)	207	84001	2731	943	23899	4998	13303	25362	5181	3567
Chitt.Sadar(S)	110	44638	1452	639	16211	3323	8110	15932	7173	1393
Cox's Bazar	32	12986	422	353	8956	1836	3215	16142	4326	868
CHITTAGONG H.T. DISTRICT.										
Rangarh	10	2496	205	274	1644	658	2316	1886	1006	338
Rangamati	12	2995	246	346	2076	830	2807	869	1248	226
Banderban	1	250	20	211	1266	506	5066	819	511	166

APPENDIX -C (Contd)

	41	42	43('0)	44	45('0)	46('0)	47	48	49 ('0)	50
DINAJPUR DISTRICT:										
Thakurgaon	5253	29426	3432	1075	33718	13647	46500	42179	657	82
Dinajpur Sadar	7494	39055	1886	785	38797	15703	53500	44778	3028	100
RANGPUR DISTRICT:										
Nilphamari	4206	4700	7024	18440	11195	13800	24420	24950	2349	44
Rangpur Sadar	9230	24405	10465	39185	18084	32898	48140	45710	7373	83
Kurigram	3315	11755	9227	10769	28609	28607	34813	35948	3778	63
Gaibanda	3755	3370	12135	835	11278	22297	32677	29710	3836	53
BOGRA DISTRICT:										
Bogra Sadar	19350	12360	4263	700	39221	29115	39030	14090	10570	130
RAJSHAHI DISTRICT:										
Naogaon	9750	13800	2664	860	48614	6692	21480	10980	12727	92
Nawabganj	550	16870	492	395	26120	9196	10410	34530	4195	46
Rajshahi Sadar	7450	10450	2197	185	26746	10420	23570	14910	5901	65
Natore	1150	4730	1688	125	26497	7923	10060	9580	2513	45
PABNA DISTRICT:										
Sirajganj	2590	22965	4919	920	28284	15350	36820	39688	1603	92
Pabna Sadar	1735	21850	3897	795	23756	12745	23550	82745	3712	72

APPENDIX - G (Contd)

	41	42	43('0)	44	45 ('0)	46 ('0)	47	48	49('0)	50
KUSHTIA DISTRICT:										
Kushtia Sadar	962	7260	3615	518	21474	10310	3483	50726	3548	67
Meherpur	175	2150	2163	83	9420	3682	900	7723	389	23
Chuadanga	282	4550	3366	146	8273	6203	1282	59129	439	41
JESSORE DISTRICT:										
Jhenaidah	343	9250	2296	381	28597	9167	9819	19340	1303	59
Magura	170	5200	3115	235	13183	5700	7556	7116	649	52
Narail	275	5300	1190	250	13164	4634	5097	12214	795	58
Jessore Sadar	1250	11095	4396	200	30352	12606	22035	3086	1299	123
KHULNA DISTRICT:										
Satkhira	3170	2580	805	214	27216	4545	-	71959	420	101
Khulna Sadar	563	2263	659	277	19457	3622	-	79810	2392	111
Bagerhat	1073	895	624	1140	26693	6458	-	36745	4036	116
BAKERGANJ DISTRICT:										
Barisal Sadar(N)	806	1360	2395	10074	9745	9745	59011	12380	2021	141
Barisal Sadar(S)	786	970	460	1085	13263	5860	33210	7820	6644	79
Bhola	963	250	154	776	30812	6193	34621	4240	3906	97
Perojpur	915	860	163	709	20428	4550	29208	5780	5419	81

APPENDIX - C (Contd.)

	41	42	43('0)	44	45('0)	46('0)	47	48	49('0)	50
PATUAKHALI DISTRICT:										
Patuakhali Sadar	122	344	90	1575	27814	9810	9964	20110	2706	47
Borguna	148	243	36	664	18737	5489	8790	17966	3224	40
MYMENSINGH DISTRICT:										
Jamalpur	4300	11681	12889	3346	38056	33329	26104	57590	589	118
Myn.Sadar(N)	4085	6635	7259	992	13999	23531	8529	23940	3933	66
Myn.Sadar(S)	3638	7608	6951	882	11185	25618	12692	18470	6713	113
Nasirabad	3062	13235	8288	2243	18601	32741	12480	17470	3846	89
Kishorganj	5829	14622	9718	2548	28058	17104	17590	7490	24638	97
TANGAIL DISTRICT:										
Tangail Sadar	3029	24142	10989	1655	29345	21893	47573	27981	5312	97
DACCA DISTRICT:										
Dacca Sadar(S)	360	6500	1067	335	8630	4560	12100	15200	3636	119
Dacca Sadar(N)	770	14400	4826	1265	17882	19611	33630	14964	8577	90
Narayanganj	3060	9000	5130	1005	18999	12395	27850	2720	5754	120
Munshiganj	3930	6350	3138	345	7287	7970	12804	3939	5887	187
Manikganj	4495	13150	2574	350	13009	5515	41501	37625	668	65

APPENDIX - C (Contd.)

	41	42	43('0)	44	45 ('0)	46(0)	47	48	49('0)	50
FARIDPUR DISTRICT.										
Gaslands	435	3832	3513	1245	9901	9776	1675	15100	36	48
Faridpur Sadar	474	9920	7257	1530	17796	16297	5788	14360	1724	64
Madarpur	376	12275	5857	1719	17643	22145	20337	7160	2218	113
Gopalganj	195	5861	1954	1526	12645	11782	12200	16700	1422	81
SYLHET DISTRICT:										
Sunamganj	2145	5775	619	2245	46163	10235	15600	16790	42406	68
Sylhet Sadar	3285	2398	87	1179	31418	17530	17160	11835	8863	96
Moulvi Bazar	2290	1235	227	1285	21592	52518	57500	17970	5318	63
Habiganj	2645	4720	1111	1710	26547	11939	10815	9355	11871	83
COMILLA DISTRICT:										
Brahmanbaria	2190	12000	5316	2630	19090	16553	23688	18000	9998	110
Comilla Sadar(N)	6310	3452	3846	1495	13316	11944	18870	9400	2093	101
Comilla Sadar(S)	4675	1007	1689	1000	15284	14043	21165	16000	3742	114
Chandpur	6570	1410	3465	160	17630	14775	23067	13600	4682	131
NOAKHALI DISTRICT:										
Noakhali Sadar	2180	698	2107	110	46146	25739	42000	6520	6313	231
Feni	1330	247	89	20	6870	8730	2510	1540	1196	60

APPENDIX - C (Contd.)

	41	42	43('0)	44	45('0)	46(/0)	47	48	49('0)	50
CHITTAGONG DISTRICT:										
Chitt. Sadar(N)	3081	147	40	270	12508	15641	34145	2725	7676	139
Chitt.Sadar(S)	3650	350	-	1240	11311	7352	15940	2121	8608	101
Cox's Bazar	1133	263	3	1310	9265	6752	6650	6600	5139	49
CHITTAGONG H.T. DISTRICT:										
Ramgarh	55	3434	14	470	2371	2247	5700	500	826	13
Rangamati	560	575	78	362	3321	3639	6100	370	1027	7
Bandarban	1055	2021	1	883	2733	2274	3200	600	535	5

APPENDIX - D

C O R R E L A T I O N M A T R I X

Variable Number	01	02	03	04	05	06	07	08	09	10
01	1.000	.311	.408	-.191	.403	.793	.751	.789	.636	.005
02	.311	1.000	.920	-.268	.508	.346	.355	.286	.374	.032
03	.408	.902	1.000	-.323	.469	.331	.371	.342	.355	-.047
04	-.191	-.268	-.323	1.000	.072	-.020	-.033	-.005	-.049	-.043
05	. 403	.508	.469	.072	1.000	.489	.520	.396	.563	.103
06	.793	.346	.331	-.020	.489	1.000	.978	.967	.881	-.028
07	.751	.355	.371	-.033	.520	.978	1.000	.916	.953	-.039
08	.789	.286	.342	-.005	.396	.967	.916	1.000	.754	-.062
09	.636	.374	.355	-.049	.563	.881	.953	.754	1.000	-.015
10	.005	.032	-.047	-.047	.103	-.028	-.038	-.062	-.015	1.000
11	.451	.324	.262	-.181	.357	.670	.675	.586	.663	.364
12	-.109	-.162	-.224	.143	.147	.075	.088	-.023	.166	.434
13	.145	-.085	-.126	.061	.212	.114	.142	-.006	.239	.365
14	-.092	.211	.199	-.278	.207	.027	.074	-.038	.152	.354
15	-.131	.362	.422	-.130	-.003	-.055	-.040	-.089	.001	-.119
16	.203	.384	.492	-.234	.197	.087	.093	.045	.122	-.197
17	-.059	.022	-.066	.044	-.103	-.017	-.036	-.029	-.034	.154

APPENDIX - D (Contd)

Variable Number	01	02	03	04	05	06	07	08	09	10
18	.004	.146	.023	-.098	.174	.097	.166	.008	.273	.293
19	.327	.042	.013	-.103	.103	.202	.203	.127	.127	.479
20	-.057	.198	.110	-.083	.212	-.078	-.072	-.162	.009	.657
21	.271	-.044	.067	.058	.187	.112	.120	.045	.162	.036
22	.724	.262	.291	-.030	.362	.842	.812	.765	.758	.032
23	.732	.364	.364	-.036	.590	.948	.956	.868	.920	.104
24	.797	.319	.362	-.013	.458	.992	.969	.983	.853	-.032
25	.772	.323	.359	-.019	.458	.987	.982	.982	-.852	-.038
26	.716	.256	.330	-.006	.399	.903	.868	.894	.755	.029
27	.126	-.020	-.027	-.027	.129	-.062	-.041	-.131	.033	.414
28	.618	.270	.292	-.026	.339	.712	.694	.636	.663	.320
29	.741	.378	.427	-.003	.451	.852	.845	.767	.813	.171
30	.396	.312	.292	-.042	.392	.499	.527	.349	.608	.350
31	.378	.458	.467	-.165	.288	.339	.343	.238	.387	.467
32	.449	.455	.498	-.135	.424	.369	.391	.252	.454	.430
33	.341	.377	.395	-.139	.267	.267	.280	.166	.337	.487
34	.178	.162	.119	.039	.328	.115	.124	.014	.195	.517

APPENDIX - D (Contd.)

Variable Number	01	02	03	04	05	06	07	08	09	10
35	.225	.278	.268	-.094	.359	.075	-.095	-.021	.176	.528
36	.199	.159	.152	-.033	.264	.127	.157	.022	.241	.520
37	.049	-.270	-.267	-.002	-.083	-.156	-.156	-.159	-.140	.528
38	-.061	-.015	-.057	.015	.070	-.137	-.150	-.164	-.117	.648
39	-.027	-.119	-.016	-.071	-.025	-.033	-.019	-.038	-.002	-.063
40	-.069	-.215	-.234	-.075	-.319	-.074	-.097	-.083	-.098	.277
41	.069	-.067	-.145	.217	-.002	-.041	-.078	-.072	-.064	.400
42	.002	-.325	-.380	.185	-.330	-.049	-.072	-.032	-.099	.230
43	.129	-.505	-.441	.195	-.284	-.123	-.134	-.108	-.144	.317
44	-.007	-.150	-.188	.502	.173	-.044	-.060	-.040	-.065	.250
45	-.169	-.027	-.051	-.157	-.178	-.121	-.144	-.130	-.137	.426
46	.018	-.264	-.255	.170	.162	-.100	-.107	-.101	-.093	.408
47	.106	.072	.013	.084	.246	-.026	-.016	-.047	.011	.385
48	-.117	-.180	-.177	-.096	-.220	-.030	-.055	-.038	-.059	.300
49	-.003	-.044	.022	.095	.026	.002	.009	-.014	.029	-.003
50	.403	.353	.383	-.291	.335	.227	.239	.147	.282	.447

APPENDIX - D (Contd.)

Variable Number	11	12	13	14	15	16	17	18	19	20
01	.451	.109	.145	-.092	-.131	.203	-.059	.004	.327	-.057
02	.324	-.162	-.085	-.211	.362	.364	.002	.146	.062	.198
03	.262	-.224	-.126	.199	.422	.492	-.066	.023	.013	.110
04	-.181	.143	.061	-.278	-.130	-.234	.044	-.098	-.103	-.083
05	.357	.147	.212	.207	-.003	.197	-.103	.174	.103	.212
06	.670	.075	.114	.027	-.055	.087	-.017	.097	.202	-.078
07	.675	.088	.142	.074	-.040	.093	-.096	.166	.203	-.072
08	.586	-.023	-.006	-.038	-.089	.045	-.029	.008	.127	-.162
09	.668	.166	.239	.152	.001	.122	-.034	.273	.237	.009
10	.364	.434	.365	.354	-.119	-.197	.154	.293	.479	.657
11	1.000	.311	.310	.156	-.115	-.126	.128	.337	.378	.352
12	.311	1.000	.955	-.174	-.298	-.298	.261	.311	.516	.527
13	.310	.995	1.000	-.090	-.254	-.230	.236	.342	.533	.473
14	.156	-.174	-.090	1.000	.278	.324	-.070	.228	.289	.308
15	-.115	-.198	-.254	.278	1.000	.343	-.139	-.037	-.103	.054
16	-.126	-.298	-.230	.324	.343	1.000	-.113	.012	-.004	-.057
17	.128	.261	-.236	-.070	-.139	-.113	1.000	.558	.181	.380

APPENDIX - D (Contd.)

Variable Number	11	12	13	14	15	16	17	18	19	20
18	.337	.311	.347	.228	-.037	.012	.558	1.000	.359	.422
19	.378	.516	.532	.289	-.103	-.004	.181	.359	1.000	.573
20	.352	.527	.473	.308	.054	-.057	.380	.422	.573	1.000
21	.040	.295	.343	-.129	.065	.111	.042	.125	.318	.268
22	.637	.263	.285	.009	.017	.077	.104	.159	.490	.140
23	.748	.242	.285	.111	-.051	.071	.018	.263	.371	.132
24	.651	.053	.083	.000	-.079	.051	-.023	.083	.181	-.104
25	.644	.029	.060	.014	-.082	.053	-.014	.103	-.156	-.120
26	.627	.105	.105	-.021	-.106	.025	-.011	.097	.184	-.071
27	.064	.302	.308	.250	.156	.077	.031	.189	.599	.544
28	.720	.387	.384	.069	-.117	-.046	.127	.292	.584	.306
29	.720	.225	.288	.105	-.044	.064	.064	.243	.452	.176
30	.661	.470	.481	.169	-.059	-.008	.126	.407	.579	.433
31	.509	.318	.327	.263	.157	.127	.191	.353	.668	.591
32	.467	.288	.339	.302	.143	.193	.089	.369	.659	.539
33	.447	.333	.339	.233	.088	.087	.166	.346	.659	.539
34	.296	.475	.471	.248	.058	.073	.198	.295	.744	.734

APPENDIX - D (Contd.)

Variable Number	f1	f2	f3	f4	f5	f6	f7	f8	f9	f10
35	.279	.372	.386	.366	.110	.184	.179	.326	.721	.733
36	.342	.441	.443	.267	.011	.053	.264	.246	.731	.716
37	.068	.377	.295	.123	-.290	-.299	.046	.070	.520	.430
38	.130	.405	.364	.371	.012	-.107	.258	.325	.653	.748
39	-.126	.058	.078	-.053	.240	.155	.004	.037	.116	.153
40	.123	.396	.320	-.146	-.205	-.267	.197	.071	.264	.183
41	.063	.486	.429	-.135	-.196	-.132	.262	.215	.553	.517
42	.094	.340	.255	-.234	-.288	-.292	.560	.265	.323	.282
43	-.087	.462	.369	-.148	-.209	-.201	.040	-.053	.392	.177
44	-.089	.329	.233	-.074	-.064	-.123	-.014	-.057	.041	.171
45	.201	.189	.158	.277	.063	-.045	.255	.254	.468	.598
46	.013	.613	.524	-.011	-.175	-.246	.145	.132	.464	.505
47	.071	.327	.242	.150	-.086	-.035	.284	.287	.409	.603
48	.235	.188	.154	.107	.002	-.087	.197	.156	.028	.148
49	-.061	.114	.110	-.056	.212	.179	-.004	.101	.175	.231
50	.379	.185	.243	.466	.101	.384	.121	.355	.670	.560

APPENDIX - D (Contd.)

Variable Number	21	22	23	24	25	26	27	28	29	30
01	.271	.724	.732	.797	.772	.716	.128	.618	.741	.396
02	-.044	.262	.364	.319	.323	.256	-.020	.270	.398	.312
03	.067	.291	.364	.362	.359	.330	-.027	.292	.427	.292
04	.058	-.030	-.036	-.013	-.019	-.006	.027	-.026	-.083	-.042
05	.187	.352	.590	.458	.458	.399	.129	.339	.451	.392
06	.112	.842	.948	.992	.987	.903	-.062	.712	.852	.499
07	.120	.812	.956	.969	.967	.868	-.041	.694	.845	.527
08	.045	.765	.868	.983	.982	.894	-.131	.636	.767	.349
09	.162	.758	.920	.853	.852	.756	.033	.663	.813	.608
10	.035	.032	.104	-.032	-.038	.029	.414	.320	.171	.350
11	.040	.637	.748	.651	.644	.627	.064	.720	.720	.661
12.	.295	.263	.262	.033	.029	.103	.302	.387	.255	.470
13	.345	.285	.285	.083	.060	.105	.308	.384	.288	.481
14.	-.129	.009	.111	.000	.014	-.021	.250	.089	.105	.169
15	.065	.017	-.051	-.079	-.082	-.106	.156	-.117	-.044	-.059
16	.111	.077	.071	.051	.053	.025	.077	-.046	.064	-.008
17	.042	.104	.018	-.023	-.014	-.011	.031	.127	.064	.126

APPENDIX - D (Contd.)

Variable Number	21	22	23	24	25	26	27	28	29	30
18	.125	.159	.263	.065	.103	.097	.189	.292	.292	.407
19	.318	.490	.371	.181	.156	.184	.599	.584	.452	.579
20	.268	.140	.192	-.104	-.120	-.071	.544	.306	.176	.433
21	1.000	.310	.231	.091	.059	.037	.606	.198	.248	.232
22	.310	1.000	.856	.809	.784	.743	.155	.782	.860	.635
23	.231	.856	1.000	.929	.923	.854	.106	.784	.883	.649
24	.091	.809	.929	1.000	.995	.911	-.081	.688	.828	.449
25	.059	.784	.923	.995	1.000	.911	-.099	.682	.814	.449
26	-037	.743	.854	.911	.911	1.000	-.088	.732	.821	.539
27	.606	.155	.106	-.081	-.099	-.088	1.000	.239	.133	.319
28	.198	.782	.784	.688	.682	.732	.239	1.000	.900	.900
29	.248	.860	.883	.828	.814	.821	.133	.900	1.000	.808
30	.232	.635	.649	.449	.449	.539	.319	.900	.808	1.000
31	.214	.567	.465	.306	.293	.345	.412	.724	.690	.780
32	.338	.549	.513	.332	.322	.363	.465	.691	.701	.775
33	.237	.480	.395	.236	.229	.300	.441	.678	.647	.779
34	.437.	.369	.340	.079	.057	.064	.669	.455	.353	.526

APPENDIX - D (Contd.)

Variable Number	21	22	23	24	25	26	27	28	29	30
35	.390	.285	.285	.042	.032	.050	.692	.462	.356	.556
36	.370	.370	.342	.098	.082	.116	.609	.563	.420	.625
37	.094	.033	-.054	-.140	-.149	-.072	.379	.271	.180	.337
38	.188	.088	.046	-.146	-.154	-.094	-.592	.340	.155	.387
39	.666	.044	.057	-.026	-.039	-.038	.423	-.053	-.028	.049
40	-.089	.096	-.035	-.082	-.875	.018	.189	.336	.040	.286
41	.339	.221	.082	-.006	-.069	-.018	.536	.401	.164	.418
42	.122	.173	-.006	-.034	-.042	.007	.141	.285	.136	.229
43	.237	.056	-.105	-.101	-.124	-.064	.373	.147	.095	.126
44	-.064	-.010	-.047	-.034	-.045	.002	.203	.084	-.019	.101
45.	.182	.080	.028	-.133	-.135	-.125	.398	.244	.049	.233
46	.250	.061	.045	-.090	-.105	-.094	.423	.155	.077	.193
47	.145	.106	.114	-.021	-.036	-.018	.387	.296	.193	.314
48	-.164	.007	-.029	-.047	-.032	.004	-.122	.137	.098	.167
49	.582	.121	.115	.000	-.009	.012	.388	.051	.026	.066
50	.342	.364	.367	.203	.187	.196	.525	.449	.434	.479

APPENDIX - D (Contd.)

Variable Number	31	32	33	34	35	36	37	38	39	40
01	.378	.449	.341	.178	.225	.199	.049	-.061	-.027	-.069
02	.458	.455	.377	.162	.278	.159	-.270	-.015	-.119	-.215
03	.467	.498	.395	.119	.268	.152	-.267	-.057	-.016	-.234
04	-.165	-.185	-.139	.039	-.094	-.033	-.002	.015	.071	-.075
05	.288	.424	.267	.328	.359	.264	-.083	.070	-.025	-.319
06	.339	.369	.267	.115	.075	.127	-.156	-.137	-.033	-.074
07	.343	.391	.280	.124	.095	.157	-.156	-.150	-.019	-.097
08	.238	.252	.166	.014	-.021	.022	-.159	-.164	-.036	-.083
09	.387	.454	.337	.195	.176	.241	-.140	-.117	-.002	-.098
10	.467	.430	.487	.517	.528	.520	.528	.648	-.063	.277
11	.503	.467	.447	.296	.279	.342	.068	.130	-.126	.123
12	.318	.288	.333	.475	.372	.441	.377	.405	.058	.396
13	.327	.339	.339	.471	.386	.443	.295	.364	.078	.320
14	.263	.302	.233	.248	.366	.267	.123	.371	-.053	-.146
15	.157	.143	.088	.058	.110	.011	-.290	.012	.240	-.205
16	.127	.193	.087	.073	.184	.053	-.299	-.107	.155	-.267
17	.191	.089	.166	.198	.179	.264	.046	.258	.004	.197

APPENDIX - D (Contd)

Variable Number	31	32	33	34	35	36	37	38	39	40
18	.353	.369	.346	.295	.326	.346	.070	.325	.037	.071
19	.668	.659	.651	.744	.721	.731	.520	.653	.116	.264
20	.591	.539	.581	.734	.733	.716	.430	.748	.153	.183
21	.214	.338	.237	.437	.390	.370	.034	.188	.666	-.089
22	.567	.549	.480	.369	.285	.370	.033	.088	.044	.096
23	.465	.313	.395	.340	.285	.342	-.054	.046	.057	-.035
24	.306	.332	.236	.079	.042	.098	-.140	-.148	-.026	-.082
25	.293	.322	.229	.057	.032	.082	-.149	-.154	-.039	-.075
26	.345	.363	.300	.064	.050	.116	-.072	-.094	-.038	.018
27	.412	.465	.441	.669	.692	.609	.379	.592	.423	.089
28	.724	.691	.678	.455	.462	.563	.271	.340	-.053	.336
29	.690	.601	.647	.353	.356	.420	.180	.155	-.028	.040
30	.780	.775	.773	.526	.556	.625	.337	.387	-.049	.286
31	1.000	.948	.969	.688	.756	.757	.450	.607	-.023	.169
32	.948	1.000	.950	.701	.985	.746	.435	.534	.037	.046
33	.969	.950	1.000	.676	.767	.745	.360	.594	-.020	.174
34	.688	.701	.676	1.000	.922	.914	.479	.729	.282	.115

APPENDIX - D (Contd)

Variable Number	31	32	33	34	35	36	37	38	39	40
35	.756	.785	.767	.922	1.000	.921	.505	.731	.185	.117
36	.757	.746	.745	.914	.921	1.000	.500	.725	.181	.266
37	.450	.435	.560	.479	.505	.500	1.000	.605	-.094	.237
38	.607	.534	.594	.729	.731	.725	.605	1.000	.147	.187
39	-.023	.037	-.020	.282	.185	.181	-.094	.147	1.000	-.133
40	.169	.046	.174	.115	.117	.266	.237	.187	-.133	1.000
41	.425	.370	.410	.555	.481	.530	310	.595	.107	.327
42	.241	.115	.253	.307	.243	.453	.402	.329	.022	.395
43	.208	.185	.314	.267	.239	.281	.668	.249	.107	.221
44	.065	.018	.096	.143	.127	.122	.206	.222	-.019	.044
45	.389	.249	.340	.581	.540	.590	.292	.688	.368	.315
46	.267	.277	.318	.529	.449	.436	.390	.615	.177	.116
47	.424	.409	.416	.535	.568	.600	.513	.529	-.0006	.171
48	.167	.096	.172	.087	.074	.162	.136	.163	-.161	.216
49	.078	.104	.062	.347	.250	.259	-.082	.190	.910	-.036
50	.629	.690	.618	.638	.695	.612	.326	.537	.158	.048

APPENDIX - D (Contd)

Variable Number	41	42	43	44	45	46	47	48	49	50
01	.069	.002	.129	-.007	-.169	.018	.106	-.117	-.003	.408
02	-.067	-.325	-.505	-.150	-.017	-.264	.072	-.180	-.044	.353
03	-.145	-.380	-.441	-.188	-.051	-.255	.013	-.177	.022	.383
04	.217	.185	.185	.302	-.157	.170	.085	-.096	.085	-.291
05	-.002	-.330	-.284	.173	-.178	.162	.246	.220	.026	.335
06	-.041	-.049	-.123	-.044	-.121	-.100	-.026	-.030	.002	.227
07	-.078	-.072	-.134	-.060	-.144	-.107	-.016	-.055	.009	.239
08	-.073	-.032	-.108	-.040	-.130	.101	-.047	-.038	-.014	.147
09	-.064	-.099	-.144	-.063	-.137	-.093	.011	-.059	.029	.282
10	.400	.230	.317	.250	.426	.408	.385	.300	-.003	.447
11	.063	.074	-.087	-.089	.201	.013	.071	.235	-.061	.379
12	.486	.340	.462	.329	.189	.613	.327	.188	.114	.185
13	.429	.255	.369	.233	.158	.524	.242	.154	.110	.243
14	-.135	-.234	-.148	-.074	.277	-.011	.150	.107	-.056	.466
15	-.196	-.288	-.209	-.064	.063	-.175	-.086	.002	.212	.101
16	-.132	-.292	-.201	-.123	-.045	-.246	-.035	-.087	.179	.384
17	.262	.560	.040	-.014	.255	.145	.284	.192	-.034	.121

APPENDIX - D (Contd.)

Variable Number	41	42	43	44	45	46	47	48	49	50
18	.215	.265	-.053	-.057	.254	.132	.287	.156	.101	.355
19	.553	.223	.392	.041	.468	.464	.409	.028	.175	.670
20	.517	.282	.177	.171	.598	.505	.603	.148	.231	.560
21	.339	.122	.237	-.064	.182	.250	.145	-.164	.582	.342
22	.221	.173	.056	-.010	.080	.061	.106	.007	.121	.364
23	.082	-.006	-.105	-.047	.028	.045	.114	-.029	.115	.367
24	-.066	-.034	-.101	-.034	-.133	-.090	-.021	-.047	.000	.203
25	-.069	-.042	-.124	-.045	-.135	-.105	-.034	-.032	-.009	-187
26	-.018	.007	-.064	.002	-.125	-.034	-.018	.004	.012	.196
27	.336	.141	.373	.203	.398	.423	.387	-.122	.388	.525
28	.401	.285	.147	.084	.244	.155	.296	.177	.051	.449
29	.164	.136	.095	-.019	.049	.077	.193	.098	.026	.434
30	.418	.229	.126	.101	.233	.193	.314	.167	.006	.479
31	.425	.241	.208	.065	.389	.267	.424	.167	.078	.629
32	.370	.115	.185	.018	.259	.277	.409	.096	.104	.690
33	.410	.253	.314	.096	.340	.318	.416	.172	.062	.618
34	.555	.307	.267	.143	.581	.529	.535	.087	.347	.638

APPENDIX - D (Contd)

Variable Number	41	42	43	44	45	46	47	48	49	50
35	.481	.243	.239	.127	.340	.449	.368	.074	.250	.695
36	.530	.453	.281	.122	.390	.436	.600	.162	.259	.612
37	.310	.402	.668	.206	.292	.590	.513	.136	-.082	.326
38	.595	.329	.349	.222	.688	.615	.529	.163	.190	.537
39	.107	.022	.107	-.019	.368	.177	-.006	-.161	.910	.158
40	.327	.395	.221	.044	.315	.116	.171	.216	-.036	-.048
41	1.000	.372	.297	.271	.390	.392	.406	.058	.260	.302
42	.372	1.000	.451	.248	.394	.290	.438	.406	.062	.069
43	.297	.451	1.000	.380	.022	.584	.251	.247	.024	.126
44	.271	.248	.380	1.000	-.049	.304	.246	.166	.070	-.050
45	.370	.394	.022	-.049	1.000	.217	.289	.182	.464	.361
46	.382	.290	.584	.304	.217	1.000	.525	.110	.117	.280
47	.406	.438	.251	.246	.289	.525	1.000	.011	.092	.376
48	.058	.406	.247	.166	.182	.110	.110	1.000	-.157	-.015
49	.260	.062	.024	.070	.464	.117	.092	-.157	1.000	.164
50	.302	.069	.126	-.050	.361	.280	.376	-.015	.164	1.000

APPENDIX - E

FACTORY LOADING MATRIX

Varimax Rotated Factor Loadings

Variable Number	01	02	03	04	07	10	08	09	05	06
01	.797	.159	-.018	-.002	-.082	.134	-.128	-.337	-.029	.160
02	.285	.169	.824	-.158	.047	.178	-.085	.035	-.025	.086
03	.324	.150	.813	-.064	.061	.102	-.150	-.097	-.085	.146
04	-.020	-.093	-.167	.111	.041	.120	.808	-.062	.020	-.057
05	.454	.205	.353	-.038	-.030	.381	.253	.185	.274	.393
06	.988	-.030	.065	.016	.002	.037	.015	.029	-.017	.036
07	.974	-.027	.088	.022	.012	.037	-.007	.039	.039	.087
08	.953	-.097	-.018	-.002	-.007	.065	.039	.011	-.154	.019
09	.883	.029	.163	.039	.029	.013	-.036	.092	.184	.129
10	-.004	.657	-.154	-.149	-.012	-.166	.067	.383	.177	-.081
11	.705	.228	.072	-.117	.109	-.135	-.153	.319	.225	-.167
12	.113	.380	-.269	.064	.132	-.051	.158	-.041	.784	-.185
13	.143	.352	-.180	.094	.124	-.038	.046	-.035	.831	-.112
14	.006	.384	.159	-.086	-.092	-.194	-.222	.584	-.180	.389
15	-.117	.018	.598	.290	-.163	-.333	.015	.060	-.181	.172
16	.033	.054	.485	.196	-.012	-.089	-.203	-.162	-.206	.455
17	-.019	.161	-.056	-.028	.863	-.064	.006	-.061	.084	-.101

APPENDIX - E (Contd.)

Variable Number	01	02	03	04	07	10	08	09	05	06
18	.124	.280	.080	.027	.674	-.106	-.142	.203	.287	.105
19	-.245	.776	-.179	.123	.038	-.002	-.192	-.017	.169	-.083
20	-.079	.772	.086	.099	.266	.002	.053	.270	.242	-.061
21	.122	.284	-.030	.711	.016	.131	-.082	-.310	.247	.113
22	.852	.230	.052	.138	.050	-.046	-.032	-.147	.051	-.108
23	.948	.160	.084	.099	.051	.079	-.004	.122	.124	.034
24	.985	-.050	.017	.008	.002	.053	.025	.025	-.055	.042
25	.979	-.065	.027	-.008	.016	.046	.023	.047	-.068	.837
26	.925	-.009	.016	-.033	-.021	-.016	.047	.003	-.022	-.051
27	-.052	.689	-.072	.448	-.121	.075	.027	-.022	.094	.088
28	.764	.467	.055	-.044	.040	-.120	.020	-.049	.106	-.302
29	.883	.330	.116	-.034	.013	-.110	-.038	-.121	.078	-.037
30	.559	.551	.197	-.061	.042	-.149	.009	-.036	.301	-.240
31	.368	.789	.318	-.076	.045	-.195	-.046	-.132	.049	-.117
32	.396	.774	.318	-.025	-.018	-.115	-.094	-.158	.116	.059
33	.308	.807	.241	-.101	.002	-.210	-.040	-.190	.084	-.076
34	.121	.850	.039	.274	.091	.035	.081	.065	.129	-.005

APPENDIX - E (Contd.)

Variable Number	01	02	03	04	07	10	08	09	05	06
35	.085	.908	.158	.150	.064	.012	-.001	.021	.070	.066
36	.159	.866	.053	.159	.172	-.052	.033	.009	.065	-.111
37	-.080	.711	-.472	-.227	-.138	-.082	.014	-.140	.013	-.021
38	-.116	.856	-.125	.085	.088	-.058	.099	.225	.008	-.079
39	-.037	.074	-.020	.940	.000	-.001	.003	.005	-.014	.072
40	-.029	.196	-.185	-.106	.046	-.154	.101	-.042	.162	-.716
41	-.022	.572	-.087	.183	.135	.142	.229	.149	.172	-.399
42	.019	.318	-.411	.026	.550	-.289	.189	-.252	-.116	-.320
43	-.055	.392	-.606	.040	.161	-.344	.159	-.419	.154	.082
44	-.033	.175	-.109	-.037	-.092	-.182	.808	-.025	.136	.063
45	-.110	.559	-.040	.374	.199	-.114	-.141	.381	-.197	-.292
46	-.069	.556	-.435	.069	.014	.045	.245	-.035	.324	.167
47	-.009	.665	-.103	-.092	.318	.197	.156	-.052	-.060	.073
48	.005	.077	-.111	-.165	.184	-.812	.065	.113	.063	-.086
49	.001	.144	.075	.901	.012	.032	.082	.051	-.021	-.085
50	.237	.718	.140	.111	.068	.016	-.267	.041	.006	.291

APPENDIX - F :

FACTOR SCORE MATRIX

SUB_DIVISIONS	01	02	03	04	07	10	08	09	05	06
Thakurgaon	-.27	.57	-.80	-.35	.74	-.02	.80	.95	-.54	-1.41
Nilphamari Sadar	-.22	-.34	-.53	-.56	-.50	-.28	2.34	.03	.34	.53
Dinajpur Sadar	-.14	.64	-.02	-.55	6.67	-.41	.06	-.09	.16	-.82
Rangpur Sadar	.00	1.47	-.27	-.61	-.50	-1.09	5.57	-.12	.90	-.12
Kurigram	-.26	.67	-1.57	-.57	.33	-.64	.41	-.24	.73	1.20
Gaibanda	-.22	.67	-1.24	-.69	-.97	-.40	-.26	-.18	1.00	.02
Bogra Sadar	.14	2.64	.21	.71	-.28	1.11	-.15	-.71	.80	-2.70
Naogaon	-.21	.72	.38	.58	.00	.67	.49	.48	-1.58	-2.62
Nawabganj	-.09	-.59	-.44	-.20	.11	-.64	-.25	.15	-.71	-.88
Rajshahi Sadar	.33	.22	.34	-.08	-1.03	.17	-.16	.04	.60	-3.71
Natore	-.25	-.68	.07	-.57	-.68	.26	-1.02	.23	.50	-2.73
Sirajganj	-.09	.91	-1.18	-.24	.35	-.43	-.26	-.07	-1.12	.09
Pabna Sadar	.40	-.15	.00	-.20	1.13	-2.26	-.02	-.40	.18	-.69
Kushtia Sadar	.03	-.81	-.57	-.43	-.38	-1.11	-1.18	-.22	1.15	-.86
Meherpur	-.22	-1.65	-1.10	-.44	-.38	.23	-1.04	.09	-.37	-.13
Chuadanga	-.15	-1.53	-.62	-.82	-.19	-1.21	-.64	.10	.75	-.18
Jhenaidah	-.24	-.27	-.85	-.41	-.37	.16	-.65	.66	-.48	-.95
Magura	-.30	-1.03	-.06	-.76	-.12	.39	-.71	-.21	-.51	.04
Narail	-.35	-1.11	.54	-.61	-.01	.22	-.10	-.32	-.58	-.06
Jessore Sadar	.28	.45	-.03	-.75	.00	.29	-.76	.16	.53	-.86

APPENDIX - F (Contd.)

SUB DIVISIONS	01	02	03	04	07	10	08	09	05	06
Satkhira	-.32	.00	.70	-.40	.53	-2.03	-.97	2.15	-.27	.05
Khulna Sadar	.61	-.24	1.95	-.21	-.33	-2.96	-.15	1.19	.16	.53
Bagerhat	-.36	.02	2.14	-.21	-.40	-1.26	-.52	.44	.24	-.03
Barisal Sadar(N)	-.43	.31	.66	-.70	.01	.48	.33	-.21	-1.10	.94
Barisal Sadar(S)	-.05	.46	3.13	-.69	-.24	-.58	.23	-1.83	-.76	.04
Bhola	-.44	.32	-.64	-.05	-.11	.45	-.91	2.39	-1.72	1.48
Pirojpur	-.42	.48	2.37	-.07	-.11	.47	.20	-1.05	-1.04	.25
Patuakhali Sadar	-.35	-.07	.86	-.33	-.30	.10	.45	.96	-1.22	.39
Barguna	-.63	-.84	2.03	.30	-.60	-1.22	.33	.19	-.82	-.12
Jamalpur	-.16	1.52	-1.61	-.12	-.96	-1.67	-.18	-.85	.69	.33
Mym.Sadar(N)	-.21	-.29	-1.31	-.22	-.45	-.18	.25	.01	.41	.27
Mym.Sadar(S)	.22	.38	-.74	-.25	-.51	-.43	-.33	-.86	.64	.14
Netrokona	-.29	-.04	-1.47	1.26	.64	-.07	.20	-.59	.34	.94
Kishorgonj	-.05	.20	-.79	3.99	-.50	-.53	-.25	-1.02	.13	-.03
Tangail Sadar	.10	2.00	-1.36	-.62	-.36	-.65	-.02	-1.76	-2.27	.28
Dacca Sadar(S)	7.07	-1.01	-.51	-.01	-.19	.53	.28	.00	-1.66	.19
Dacca Sadar(N)	-.08	.34	.41	.47	-.05	-.44	.17	-1.04	.10	-.17
Narayangonj	.67	.61	.18	1.01	-.11	.40	-.62	-1.19	1.49	.58
Munshigonj	-.22	.37	.45	.21	.48	.27	-1.39	-1.74	-.83	1.79
Manikgonj	-.15	-.38	-.58	-.48	.46	-.08	-.15	-.67	-1.23	.13

APPENDIX - F (Contd.)

SUB_DIVISIONS	01	02	03	04	07	10	08	09	05	06
Goalanda	-.31	-1.18	-.54	-.57	-.30	.00	-1.24	-.26	1.63	.10
Faridpur Sadar	-.12	-.36	-.57	-.27	-.44	-.22	-.30	-.46	.53	.08
Madaripur	-.23	.89	-.75	-.15	-.38	-.06	-.48	-.70	-1.52	.54
Gopalganj	-.44	-.21	.72	-.35	-.21	.05	.13	-.76	-.52	-0.60
Bunwaganj	-.36	-.71	.19	5.07	.30	-.30	.31	1.12	-.1.23	-.28
Sylhet Sadar	-.01	.14	.29	.99	-.05	1.10	.54	1.55	.72	.24
Moulvi Bazar	-.38	.00	-.53	-.26	.47	2.14	1.01	.39	1.16	1.20
Habiganj	-.36	-.64	-.28	1.42	-.07	.79	-.14	.55	1.19	.09
Brahmanbaria	-.04	-.47	-.63	1.05	1.45	-.27	-.56	-.82	1.01	1.61
Comilla Sadar(N)	-.24	.13	-.26	-.15	-.42	1.06	.24	-.85	-.44	.28
Comilla Sadar(S)	.13	.56	.73	-.29	-.44	.99	-.19	-.60	1.49	.13
Chandpur	-.26	1.14	1.27	.34	-.37	.65	-.27	-1.84	.17	1.26
Noakhali Sadar	-.04	3.20	-.82	-.49	-.56	.84	-1.37	4.07	-1.01	1.72
Feni	-.28	-.50	.26	-.99	-.19	1.79	-.71	.17	.92	.36
Chitt. Sadar(N)	2.19	.98	1.63	-.05	.77	.60	-.33	1.23	3.09	1.04
Chitt. Sadar(S)	-.33	.19	1.86	.18	-.41	1.67	.08	-.72	.95	-.16
Cox's Bazar	-.19	-1.08	-.34	.30	.04	1.05	.27	.76	-.13	.66
Rangarh	-.41	-1.92	-.03	-.46	.23	1.09	1.49	.20	-.37	-.07
Rangamati	-.42	-1.79	.49	-.25	-.03	.71	1.38	.10	-.41	-.21
Banderban	-.38	-1.99	-.77	-.26	-.11	.82	1.14	.55	-.37	-.13

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