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TRANSPORT INFRASTRUCTURE AND ECONOMIC PERFORMANCE OF BANGLADESH AND INDIAN BORDERING STATES

"In the year 2025, all of the transportation modes will continue to play critical roles in the global economy, whether for transporting goods over long distances between nations or for shorter movements to and from intermodal terminals"

– Excerpt from the Statement by Rodney Slater, Secretary, U.S. Department of Transportation in the International Transportation Symposium, October 20, 2000, Washington, DC.

Abstract

The purpose of this paper is to review the role played by transport infrastructure in regional development. The findings of the paper have implications for future regional policies. First, disparities in both per capita income and infrastructure facilities among Indian bordering states and Bangladesh have been rising over time. Second, the relative positions of the bordering states have continued to remain weirdly unchanged in terms of any definition of development. Third, transport infrastructure, particularly port facility, has larger role to play in determining the future of mutual development of this region. The most strenuous task of the policy makers must be to undertake common transport

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policy by which to reduce regional inequalities in various physical and social infrastructure facilities rather than simply to target equalisation of public investment across regions. Otherwise, the on-going reform process may be badly thwarted by the potential social disharmonies, which have been gathering momentum everywhere.

1. INTRODUCTION

The impact of technological change in the transport sector since the late nineteenth century has been as dramatic as in other spheres of life. Four particular innovations stand out in this respect: the spread of railways, the popularisation of motor vehicles driven by internal combustion engines, the introduction and dramatic growth in longhaul air travel (specially by jet aircraft) and the utilisation (or containerisation) of sea freight. However, their adaptation has not been universal across the world.

As the first decade of 21st century begins, new challenges present themselves to the citizens of one of the backward regions of the world, namely India and Bangladesh.¹ Among the most important are the concerns about the environment, economic productivity, and international competitiveness, and a rearrangement of strategic transport relationship. Our future quality of life and economic prosperity depend crucially on how we choose to meet these new challenges.

It is well established that transport infrastructure is an important factor in the economic development across regions as well as countries. Transport often gives rise to effects that are not limited to the transport sector itself. The attractiveness of locations for situating economic activities depends, among other things, on their relative accessibility and, with that, on the quality and the amount of transport infrastructure.

Regional development is the result not only of a proper combination of private production factors such as labour and capital, but also of infrastructure which leads to a higher productivity of private production factors. Conversely, a neglect of infrastructure leads to lower productivity of the other production factors. The desired balance between private and public infrastructure in regional development has been the subject of much theoretical and ideological debate. Hirschman (1958) has pointed out, however, that it is illusory to think that a balanced development is possible. Given the lumpiness of transport infrastructure projects, one will often have relatively long periods of excess supply or demand.

This paper reviews some of the ways in which transport infrastructure may be "important" in increasing economic prosperity and thereby quality of life in India (read eastern and north-eastern Indian states bordering Bangladesh) and Bangladesh. The sequence of this paper is as follows. Section 2 deals with selected theoretical aspects of the transport sector and regional development and their relevance to the present topic. Economic performance of Bangladesh, India and its states bordering Bangladesh is discussed in Section 3. Critical issues relating to the port sector of bordering states of India and Bangladesh are dealt in Section 4. Finally, conclusions and policy implications are briefed in Section 5.

2. TRANSPORT INFRASTRUCTURE AND REGIONAL DEVELOPMENT: THEORY

Modernisation theory has been the most widespread and powerful paradigm – in the sense of the influence of its adherents rather than of its innate explanatory power – in Transport Studies, and probably also Development Studies, since the World War II. The objective of development was deemed to be the pursuit of modernity through the modernisation of a country or region's economy through industrialisation along the line of Western experience. Perhaps the

best known exposition of modernisation theory is that popularised by Walt Rostow, who put forward a model of economic development comprising four successive stages, from pre-industrial to post-industrial, through which developing countries should pass. Geographers, most notably John Friedmann, translated Rostow's model into spatial terms, developing a four-stage model in which a single, dynamic and modernised urban core expands through the urban hierarchy and across rural periphery, progressively reducing urban-rural disparities, and producing a homogeneous and fully integrated modern development space.

Not much was perceived in translating these theoretical propositions and models to developing countries contexts, and no account was taken of the very great differences in actual reality. A widely cited example of this, which also illustrates the point well, is Taaffe, Morrill and Gould's (1963) model of transport network development, based on research in West Africa. The model developed by Taaffe, Morrill and Gould exemplifies the modernisation theoretical approach to transport network evolution. The model comprises six distinct phases in a manner comparable to Rostow's stages of growth. Phase - 1 comprises of the establishment of a series of separate trading zones and small ports along the coastline. These act as points of interaction where locally produced goods are exchanged for imports. In the second phase, trading routes begin to penetrate the hinterland from the coast. This enlarges the catchment of those ports and brings the traders into contact with new groups of people and different resources located at newly developed hub centres. Phase 3 is characterised by the extension of these hinterlands through the construction of lateral feeder routes from the trunk links. Each of the growing ports still has its own distinct network and hinterland, though. The fourth phase marks the beginning of interaction between these different local/regional

systems and the emergence of intermediate urban centres. As economic development proceeds and new resources, e.g. mineral deposits, are exploited or transport interchanges and administrative centres are required, such new nodes in the interior develop. Forging of an increasingly integrated network reduces the need for so many ports and trade is increasingly concentrated in one or two large ports, either the largest city or the one with the most favourable port facilities and location. Most, if not all, of the small ports gradually disappear. But connectivity increases rapidly between core centres and core ports (sixth phase).

In some recent works, Fujita and Mori (1995a, 1995b, 1996) have explained the evolutionary model of spatial economic development in which agglomeration economies and the hub-effect of transport nodes interplay in the making of major cities. Their model explains the irreversibility of spatial economic development such as the continuing prosperity of port cities even after initial advantage of water-access had become irrelevant. It is also shown that in order to decentralise industries from the core region to a periphery region, a temporary protection of industries in the periphery by worsening the transport connection with the core for a short period of time may be desirable. But their findings may not be necessarily true in case of an economy where port system is still under-utilised. A review of literature suggests three possible relationships between transportation and development: (i) a positive effect on the development process - the expansion in directly productive activities being a direct result of providing improved transportation facilities, (ii) a permissive effect on the development process, because transportation does not independently produce directly productive activities or subsequent increases in the level of economic growth, (iii) a negative effect occurring when an over investment in transportation reduces potential growth in directly

productive activity and consequently, lead to an absolute decline in the level of income per capita (Gauthier, 1970).

Improvement of transport infrastructure influences both production and household consumption. It leads to a reduction of transport costs and/or travel times. This may give rise to substantial redistribution and spillover effects among economic groups and also among regions. In order to analyse the differential effects of improvements of transport infrastructure on regional development, we shall discuss the relation between transport and interregional trade.

The standard model of interregional trade is recalled from Rietveld and Nijkamp (1993) and illustrated in Figure 1. Exports take place from region 1 (India) to region 2 (Bangladesh) when the transport cost is less than the difference in equilibrium price for a certain good in the two regions. Compared with the situation without trade an additional surplus is created consisting of area A (accruing to producers in region 1) and area B (accruing to consumers in region 2). Thus, both the regions benefit from trade according to the model.

Improvement of infrastructure leads to a decrease in transport costs and hence to an increase in transport volumes. The equilibrium price in region 1 (India) will increase, and the price in region 2 (Bangladesh) will decrease. Thus, in region 2 (Bangladesh), consumers benefit from the improvement of infrastructure, whereas producers are negatively affected. In region 1 (India) it is the other way around. In employment terms, region 1 (India) benefits, but region 2 (Bangladesh) is hurt by the improvement of transport infrastructure. This is one of the best examples of how non-price factor like transport facility can affect price and change both the composition and direction of bilateral trade (Rauch, 1991; Marjit and Roychaudhury, 1997; EXIM Bank, 1998).

The model described above is a partial equilibrium model. It deals with the market for only one good. General equilibrium models are better equipped to analyse the effects of changes in infrastructure, but they are of course more complex (see for instance, Tinbergen, 1957; Takayama and Judge, 1971; Takayama and Labys, 1986). Figure 2 (which has been taken in adjusted form from Pluym and Roosma (1984)) presents some of the main effects when more than one sector is considered. In this case the net effects are difficult to predict. Intermediate deliveries play a complicating role. In addition, there may be compensating forces in the regions in which employment is negatively affected by increased competition. Prices of the products concerned will decrease, so that consumers can spend more on other products, part of which will be produced in the same region.

In addition to production factors such as labour and private capital, transport infrastructure plays a role as an input in production process. An improvement of transport infrastructure services plies that a regional economy can make use of its private production factors in a more productive way. Better transport infrastructure means that less capital and labour are needed to reach the same production level.

There are essentially two ways for analysing the productivity gains induced by transport infrastructure improvements. The first takes place at the firm level by measuring carefully the reductions in (transport) costs, which can be achieved by infrastructure improvements. The second occurs at the aggregate regional level by investigating the contribution of the production factor infrastructure to regional production, taking into account the contribution of other production factors. This entails the use of regional production functions.

In the preceding paragraphs we discussed the productivity and relocation effects of transport infrastructure separately. Here we shall focus on the relationship between transport costs and trade flows, derived from Amano and Fujita (1970) model. A simple illustration of this topic is given in Figure 3.

In a system consisting regions B (Bangladesh), I (India) and N (Nepal), infrastructure between B and I is improved, leading to a decrease in transport costs between B and I for all goods in both directions. The effect on the trade share of region N (the region not directly involved) is unambiguously negative according to this model. For the regions directly involved, the effect on trade shares is not clear, however. The loss on the home market has to be traded off against an increased penetration on the market of the other regions. One thing is clear, namely that the sum of trade shares for B and I together will increase as a consequence of the improvement of infrastructure. The conclusion is that although it is not obvious which of the regions directly involved in the improvement of transport (infrastructure) will be winner, the regions not involved will certainly be losers.

It is very often misconceived that improvements of infrastructure lead to a zero-sum game. As can be seen from Figure 1, it is not only trade shares that change but also total trade volumes. Improvement of infrastructure does not only redistribute existing trade flows but may also generate large trade volumes. Taking into account of this generation effect and other indirect effects it is no longer obvious that a zero-sum result will arise. In the Amano-Fujita model, generation effects occur among others because the reduction in transport costs leads to an increase in value added which leads in turn to an increase in labour supply, investments and most importantly, consumer's benefit and savings.

Processes in the long run (relocation of capital and persons) caused by changes in transport infrastructure are even more difficult to predict. However, a causal relationship (short run and long run) exists between transport infrastructure and quality of life.

2.1 Transport Infrastructure and Quality of Life

In the early 1960s, “quality of life” emerged as a central focus of public policy due to increasing social problems such as urban and regional poverty, poor race relations, inadequate health care, and insufficient housing. Terleckyj (1975) was the first social scientist to frame an analytical system to ease falling quality of life through restructuring transport sector. Later, Looney and Fredericksen (1981), Eberts and Duffy-Deno (1989), and Munnell (1990) extended Terleckyj’s work to the context of infrastructure sector and found that higher investments in public infrastructure brings economic prosperity and thereby improve quality of life.

Sadly enough, quality of life in this part of the globe has not yet become a concern for existence. When co-operation in the transport sector is the agenda, issue of “quality of life” must be addressed. Table 1 indicates some of the more important linkages between transport infrastructure and quality of life. To focus on the potential gains from infrastructure investment, the set of candidate projects is limited, at least conceptually, to those that yield a Pareto improvement along the various quality-of-life dimensions. For instance, the construction of expressway may reduce congestion and thereby support better health (improved air quality due to less smog), greater safety (fewer accidents), recreational activities (better access), economic opportunity (improved access to suburban jobs), and leisure (more discretionary time). Such are the cases like Bangbabandhu Jamuna Multipurpose Bridge (BJMB) in Bangladesh, and Durgapore Expressway in West Bengal through which people

have been benefited a lot from improved infrastructure facilities. But the particular highway/bridge construction may also involve disamenities to certain segments of the population, and by diverting commuters from mass transportation to automobiles, may increase air pollution. At present, concern is widespread about whether existing and projected infrastructure facilities can adequately support quality of life requirements and improvements of a population of 200 million of this region in the ways indicated in Table 1. It is very difficult to foresee any quantified method explaining the time frame to achieve absolute attainment of improved quality of life *at par* with developed regions. Instead, the best we can accomplish here is to discuss issues related to some operational projects to trace the effects of changes in (transport) infrastructure on regional development. This will be the subject of our next sections.

3. ECONOMIC INTEGRATION: BANGLADESH AND INDIA IN SOUTH ASIA

MHHDC (2000) starts reviewing economic growth primarily in the context of the South Asian economy in the following fashion:

“At the beginning of the new millennium, South Asia stands at the crossroads between hope and despair: hope because tremendous progress has been made since the region became independent; despair because their progress has been neither adequate nor equitable. South Asia has emerged as one of the most poorly governed regions in the world. South Asia enters the 21st century with 515 million people in absolute poverty, some 400 million illiterate adults, and approximately 80 million malnourished children”

While discussing transport infrastructure, poor quality of social sector of this region cannot be ignored. Why? Beyond the neo-classical simplification of classifying different factors into only

capital and labour, the indispensable role played by social overhead capital (SOC) that is used to build up infrastructure facilities, in helping productive activities directly and indirectly was recognised by the pioneers of development economics (Fleming, 1955; Hirschman, 1958; Myrdal, 1958). An economy's (transport) infrastructure network, broadly speaking, is the very socio-economic climate created by the institutions that serve as conduits of commerce. Some of these institutions are public, others private. In either case, their roles can be conversionary - helping to transform resources into outputs - or diversionary - transferring resources to non-producers. As in other sectors, services generated by private infrastructure are guided by the same classical profit motive. But the dominant presence of the public sector in generating infrastructure services is guided by two fundamental motives of the welfare state: achieving social equality and dealing with market failures. The first is related to the redistribution objective thereby penalising the efficient citizens. The second justification for government intervention, particularly in the LDCs follows, from the fact that markets may fail to produce an efficient outcome (Hirschman, 1958). Its role is very critical in reducing natural inequality among different regions within a country. An equitable growth in social sector always helps physical (transport) infrastructure sector to grow rapidly. Naturally, if more and more regions of Bangladesh and Indian bordering states converge to each other with better social and economic infrastructural endowments and per capita income, both economies will gain more from undertaking construction of expressway or bridge or modern port. Moreover, geographical factors like the Ganga - Brahmaputra - Meghna (GBM) basin and its mineral and agricultural wealth, and strategic access to Fareast and Southeast Asia provide the basis for the eastern region's convergence (Sobhan, 1999).

Conversely, better transport infrastructure also helps improve social sector. One crude example of this particular aspect may be cited here from some of our recent works (Ghosh and De, 2000b and 2001b). The authors have found a high degree of association between transport facility and literacy rate among 26 Indian states for the last quarter century. As is well known, transport facility is the backbone of any economy. The gains from improved transport facilities exert their positive impact through faster mobility of labour, materials and goods thereby reducing transaction costs as well as by saving time for further engagement. In a country like India where at best 54% people are literate, and most villages do not have a primary school, states with better transport facilities naturally have higher literacy rates. The same is true for infant mortality rate too. Improved transport facilities must have paved the way for better access to various health care facilities, as supply of the latter is much more inadequate than even primary school. That is, better transport facility may ultimately end up with lower infant mortality rate. Thus where the poor have little access to market means of transport other than walking, they have to forego time which could be spent on such economic activities which provide immediate survival. On the other hand, higher literacy rate and telephone mainline may also be responsible for lower infant mortality rate. It is also found that the failure of government investment (particularly state governments of West Bengal, Bihar, and North-eastern states) in social and institutional health schemes is so appalling that even the common man believes in 'to go to hospital is to prepare for the funeral'. The causality may be either through better access to knowledge and information or through higher income in literate families or both.

As evident from Table 2, India is a major player not only in South Asia but also in the developing world as a whole. In sheer GDP, she has a place among the top ten nations in the world with

75% share of total South Asian GDP. In terms of the conventional indicators of development, her achievements are not very bad. On the other hand, she has been moderately successful in reducing poverty, but in absolute terms, total number of poor people in India is more than twice the population of Bangladesh. While India has managed to cross South Asia average in poverty reduction, infant mortality rate, adult literacy rate, and life expectancy at birth, Bangladesh failed to perform well in all aspects except female literacy rate where the country has even performed much better than developing countries average. However the question is: if India took 54 years to reduce poverty level from 60% to 30% with better reflection in associated social indicators then how long both the countries (India and Bangladesh) will take to converge to "no poverty" level when both the countries are having more or less same population growth rate. Perhaps no such affirmative diagnostics may be drawn. Instead, we may presume that if both the countries cooperate each other in all possible spheres of economy and life and also with the rest of the world with higher degree of openness and liberalisation then time is not too far to achieve parity in per capita income.

This account may be supplemented by Table 3. As evident from the final two rows, Bangladesh has done a great deal in terms of traditional definition of "openness". From 1980-81 to 1999-2000, trade orientation in Bangladesh has increased from 19.30% to 27.90% of GDP. On this count, both India and Nepal (being land locked) have been far below the desired course of globalisation. But given low rate of domestic capital formation (as represented by savings and investment rates), Bangladesh might undertake a bit of cautious approach, otherwise, it would be difficult for her to absorb external shocks with higher service sector (or the so called parasite

sector). But, it is clear that both the countries have gained from liberalisation, starting more or less at the same period due to the balance of payment crisis in the beginning of 90s. Since service sector of both the countries contributes more than 45% to GDP, transport, being an important part of service sector, is certainly playing a pivotal role in regional development. In recent period, Bangladesh has registered substantial improvement in gross domestic savings and investments. A common feature of this table may be noted that both India and Bangladesh have been increasingly tending towards the rest of the world in terms of exports and imports where the transport sector definitely has a much larger role to play.

As it is well known that the requirements of growing economic activity, increasing urbanisation, and urgency of environmental improvement have all created a huge demand for infrastructure in developing countries. In the last decade, investments in "economic services", comprising such physical infrastructure as electric power, transport, water supply, and telecommunications, have accounted for (30 - 50)% of public investments, amounting to about (3-5)% of GDP. In the case of China, this reached over 7% of GDP. As can be seen from Tables 4 and 5, the power and transportation sectors typically account for the bulk of public infrastructure investment. Differences in geography and level of economic development may perhaps be the main reasons for variation of investment in public infrastructure sector across the countries. China has exceptionally done well in the transportation sector with the help of private sector during the last two decades and for that matter, at present, share of transportation sector in GDP has just doubled from 2.44% to 4%. One lesson may be that if Chinese provinces tend to converge towards each other in terms of per capita income during 1974-1998 where transportation facilities played the major catalytic role (Choi

and Li, 2000), why not India and Bangladesh take urgent steps to strengthen their transport infrastructure for reducing regional inequalities. India has taken steps towards completion of National Highway Development Project (NHDP) and Bangladesh too has been successful in developing her road networks in last five years as a part of Asian Highway project (Khan, 2000).² However, more co-ordinated efforts should be initiated for improvement of rural roads and time-bound completion of on-going projects so that regional inequality reduces fast. With the help of India, Bangladesh may take initiatives for gauge conversion and capacity enhancement of her railway networks, particularly in Sirajganj – Dhaka – Chittagong, and Chittagong - Dhaka - Sylhet sectors. Similarly, with the help of Bangladesh, landlocked Indian bordering states should take actions to upgrade their road networks. To take forward the joint initiative, time is ripe to take immediate actions to announce a Common Transport Policy (CTP) taking India, Bangladesh, Nepal and Bhutan as founder members similar to the steps taken by the European Commission of Ministers of Transport (ECMT, 2000).³

3.1 Bangladesh and Bordering States of India

Primarily, Bangladesh is surrounded by West Bengal, Assam, Meghalaya, Mizoram and Tripura. However, ethno-geography and bio-geographic similarities among the north-eastern states compelled us to include other north-eastern states, which are not sharing borders with Bangladesh. Hence, we focus here on bordering states of India namely Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura and West Bengal just to discuss their level of infrastructural stocks, income and trade.⁴ As we pointed out in one of our recent studies that one of the major obstacles to intra-SAARC integration or rather integration between bordering states of India and Bangladesh is the poor infrastructure

facilities (Ghosh and De, 2000a). Being one of the poorest regions of this sub-continent as they are, there is a high degree of simultaneity among all the nine members of bordering states of India insofar as the Government initiatives in undertaking the liberalisation policies are concerned.

The bordering states as a whole represent 11% of India's geographical area and 12% of India's total population. Table 6 contains information regarding present economic profile of these states and Bangladesh. Urbanisation is generally low, except in Assam, Mizoram and Nagaland. The region has much lower population density than Bangladesh. This may be due to the fact that more than 30% of the area is hilly terrain and green biosphere thereby implying low population density. However, West Bengal and Bangladesh has more or less same population density. The economy of bordering states is stagnant and sharing 11% of India's GDP for last 25 years or so. But in terms of penetration of economic infrastructure, this region has done better than that of Bangladesh, and as a matter of fact, bordering states have attracted higher FDIs than that of Bangladesh.⁵

Nonetheless, the regional economies of this region are simple, heavily deficit and dependent on the rest of the country for basic needs. All eight units of the north-eastern states are Special Category States whose development plans are almost entirely centrally financed on the basis of 90% grant and 10% loan (Government of India, 1997). The development funding pattern for these Special Category States accords them some sort of built-in preferential treatment. There is no agricultural surplus and limited capital formation and entrepreneurial skills. Assam had seen some earlier development around tea, oil and timber. The region is, however, basically pre-industrial despite having a number of saw mills and plywood factories, cement plants and other miscellaneous

enterprises apart from oil and coal. Handlooms and handicrafts, once the pride of the north-eastern states, are on the decline but have a considerable potential if given contemporary functionality through design, marketing, capital and other inputs.

However, the region is bountifully endowed with bio-diversity, hydro-potential, oil and gas, coal, limestone and forest wealth. It is ideally suited for a whole range of plantation crops, spices, fruits and vegetables, flowers and herbs, much of which could be processed and exported. There is also huge potential for the development of a viable tourism sector. The north-eastern region tends to be seen as a distant outpost, some kind of land's end. Yet, it was until recently a crossroads and a bridge to Southeast and East Asia, with its great rivers ending in ocean terminals at Kolkata, Haldia and Chittagong.

There are four deficits that confront the Northeast: a basic needs deficit; an infrastructural deficit; a resource deficit; and most important, a two-way deficit of understanding with the rest of the country which compounds the others. In terms of per capita income and other standard development indices such as power, road length, hospital beds, the Northeast ranks well below the (India) national average. Only in literacy it stands high (yet this too can be misleading as vocational training and entrepreneurial skills are scarce). The schooling infrastructure is inadequate, including that of trained teachers. Imphal has 28 intermediate colleges which, in the absence of matching employment opportunities, is adding to problems of educated unemployment, frustration, drugs and insurgency. The right overall balance and linkages are missing. Perhaps lack of proper infrastructure like narrow roads, absence of seaports, collapsing sewerage systems, deteriorating railway services, periodic landslides, frequent water shortages, widespread malnutrition, and rampant growth of informal sector, and suspect health care facilities bear the crumbling conditions of this region's

infrastructure. The utmost question is that with low level of infrastructural stocks can these states compete in the international trade with the neighbouring countries? Or, do the existing infrastructural stocks put these states along with Bangladesh for concentrating on "win-win" trade and transport strategy? While carrying out the second-generation reforms, these are the issues, which need proper attention of the policy makers of both the countries.

4. ISSUES RELATING TO THE PORT SECTOR OF BANGLADESH AND INDIAN BORDERING STATES

India and Bangladesh are endowed with extensive coastline of about 6000 kms and 750 kms respectively.⁶ If we look at the bordering states of India and Bangladesh, there are total three major seaports namely Kolkata, Haldia and Chittagong – all three as a whole handles approx. 46 million ton (MT) of port traffic at present, and individually handles 10 MT (Kolkata), 21 MT (Haldia) and 15 MT (Chittagong). Haldia is a bulk port and handling basically POL, iron ore, coal and few container boxes whereas Kolkata and Chittagong handle mixed type of cargoes such as bulk liquid, bulk solid, and break bulk (containerised and non-containerised). All the three ports are river-based tidal ports and suffering from lower draft for which bigger vessels with 10- distance are concerned.⁷ 15 mtrs. draft cannot visit the port. As a corollary, these three ports have been working as feeder ports in the container segment, and are feeding mainly Colombo and Singapore (see Figure 4). However, comparatively Chittagong is better placed than Kolkata and Haldia in so far as draft and pilotage

Due the locational advantage and better navigational aids, Chittagong port is successful in attracting more container boxes than Haldia and Kolkata. With slightly higher average annual growth rate

of container traffic, Chittagong port presently handles approx. 293,070 boxes whereas Kolkata and Haldia together handle only 175,620 boxes (see Table 7). Despite this, inter-port shipments between Kolkata–Haldia and Chittagong is very low. In 1999-2000, only 508 boxes as export consignment sent to Bangladesh via Chittagong from Kolkata–Haldia and 15 boxes as export consignment of Bangladesh sent from Chittagong to Kolkata–Haldia (see Table 8). If lack of sea borne cargo is the prime cause for low presence of container traffic in this route then advancement of road networks between India and Bangladesh has taken away most of the sea borne traffic. The ocean shipping industry has been dramatically transformed in the past 25 years. Ships have generally become faster and larger, and intermodal container shipping has replaced breakbulk cargo on many routes (U.S. Department of Transportation, 2000). Due to advancement of road network coupled with global alliance of shipping companies and expansion of fleet sizes, Kolkata–Haldia–Chittagong sector has appeared as least preferred business area of liner shipping agencies. This has been reflected in Table 8. None of the noted transnational shipping lines has any such great presence in Kolkata–Haldia–Chittagong sector. However, if these three ports take co-ordinated efforts for the improvement of terminal productivity and back up logistic networks then liner business might come back again (Khan, 1993).

Considering geographical and environmental limitations for handling more and more POL and bulk solid cargo such as coal, iron ore, etc., and also due to the rapid technological advancement in containerisation, future of these ports lies on container cargo only. On this count, Chittagong appears to have better prospect than Kolkata and Haldia. But to the extent potential hinterland has a

strong positive influence on port expansion, Kolkata and Haldia are a bit better placed.

By now we must agree that economic performance of a country or a region is increasingly shaped by both technological advances and by its capacity to participate in the global production system characterised by extensive outsourcing, “just-in-time” deliveries, and the ever-more common shipment of semi manufactured goods, spare parts and final goods between production and assembly centres scattered across the globe. The deciding factor for sustainability of any infrastructure utility under the liberal economic regime is the ability to cope with newer developments. Due to poor performance of Kolkata port, cargo has been diverted to Vizag (located 650 kms away from Kolkata on the east coast) and even to Jawaharlal Nehru (located 1780 kms away from Kolkata on the west coast). While the port of Singapore or Laem Chabang (in Thailand) clears a vessel within couple of hours, ports in this area take 2 to 3 days by applying mixed pool of skilled and unskilled labour forces and semi-advanced technology under a scarce financial health of the port. Ports of this part of the globe are over employed and mostly running with unskilled labourers. Current arrangements for cargo handling for Indian and Bangladeshi ports are anything but not conducive to fast handling and turnaround (Ghosh and De, 2001a; De and Ghosh, 2001b). While West Port Malaysia, terminal operators of Port Klang in Malaysia, makes more than 70 moves per hour in handling container boxes by using super fast RTGs and thereby have earned *Fastport* Standards, most of our ports are just not globally competitive in terms of any crude measure. These shortcomings are especially critical for the container trade, as the waiting cost of large capital-intensive container vessels is high.

Also in the road sector, a trade consignment takes minimum 4 to 6 days for clearance from Indian border to Bangladesh side and vice versa. The present legal arrangement between India and Bangladesh prohibits Indian vehicle (or Bangladeshi vehicle) to cross each other's border for delivering the consignment to the ultimate user(s). Generally, a consignment needs minimum 22 documentations, more than 55 signatures, and minimum 116 copies for the final approval taking into account both sides. Due to this complex, lethargic and primitive procedures, pilferage is rising high day-to-day which often changes the composition and direction of trade (Subramanian, 1999).⁸ As a matter of fact, due to this, on the one hand products are becoming costlier and on other, both port and road sectors are losing cargo. To meet this challenge, the suggestion of The World Bank (1999) was this way:

“South Asian economies need to develop regional transportation and transit system that offers efficient transportation options and low ‘transaction costs’ that are competitive with those found elsewhere. As the ‘half life’ of many new products become shorter and shorter and the spatial distribution of supply and demand points changes rapidly in such a system, what is transported, how it is transported, and to where and from where transported, are all rapidly changing. Wealth generation is becoming increasingly tied to the capacity to participate in this emerging ‘Knowledge Society’ and global production and trading system. The price of admission for a country or a region to this dynamic global system is a transportation and transit system that offers an exporter short time spans between order and delivery, and predictable and reliable deliveries. In order to plugged into this wealth-creating machine, South Asian economies must develop a transportation and transit facilitation system that will greatly reduce current physical and non-physical barriers to transportation and transit – by means of both physical infrastructure (such as multi-modal corridors and terminals) and

non-physical infrastructure (reformed policies and procedures, regulations, and incentives for efficient transportation and transit)”

Now, if we consider physical infrastructure like logistic network, then Chittagong port has some limitations because the port is not yet connected by BG (electrified) railway track and not equipped with modern box handling equipments. Now a days, a container port has to be connected by BG (electrified) railway track and should have access to exclusive expressway with the hinterland. With modern container freight station (CFS) and distribution networks, today's container port is often functioning as *distriport* like Singapore, Rotterdam, and Bremen. In this respect, both Kolkata and Haldia ports are better placed than Chittagong. Even the new port, which is coming up at Kulpi in the South 24 parganas district of West Bengal has better logistic networks than that of Kolkata.⁹ While Chittagong's problems are truly external, Kolkata and Haldia are mostly suffering from internal problems. Apart from easing out all external hindrances, these ports must be prepared to accommodate larger, next-generation ocean-going vessels and to provide efficient intermodal connections to rail and road.

In India, there is stiff competition between road and railway sectors in handing container freight. Indian Railways has started direct container train services between (i) Kolkata and Delhi, (ii) Kolkata and Chennai, and (iii) Kolkata and Amingaon (Assam). The Indian Railway Authority is providing legal guarantee to the users (exporters and importers) for compensation if the cargo train fails to reach Delhi or Chennai within 48 hrs. from the time of departure from Kolkata. Similar services have been started between Mumbai-Delhi, Mumbai-Chennai, and Delhi-Chennai routes. As a matter of fact, due to this, approx. 25% of break bulk cargo that was earlier used to be transported by the road sector has now shifted to rail.

Now, Indian Railways is planning to spread the similar services between major ports and industrial hubs. Under this backdrop, if Bangladesh Railway Authority connects Mongla port with Bongaon (in India) via Khulna by BG railway track then inter-country goods movement will be faster, safer and easier. If it is done then export cargo from Bangladesh will reach to Delhi or Mumbai within 4/5 days, which now takes minimum 15 days by road and 18 days by sea. Certainly, this network will help Mongla/Chittagong port to attract Southeast Asia-bound foreign trade cargo from India (say West Bengal). Similarly, industrial belts of Khulna and Jessore districts will get access to use Kolkata and Haldia ports if the consignment is for Middle East, Africa or Europe. Above all, this will generate economic opportunity in the backward regions of Bangladesh and India. On the same way, north-eastern bordering states can use Chittagong port, provided there is good road and BG railway track connecting this region with the port.

At present day, cargo needs to be handled quicker and cheaper without damage with as few numbers of workers as possible. Inefficient ports, whether through lack of integrated transport network, outdated work practices or obsolete facilities, can stall a country's growth even in a borderless world. The unreliability and poor quality of other complementary infrastructural services often add to the costs of production of exportables and adversely affect a country's international competitiveness. Rising inefficiencies in ports have forced the governments all over the world to deregulate the port system. Many governments have begun to deregulate economic activities and decentralise decision making, with the objective of increasing financial viability and productive efficiency of the public sector. Towards this direction, governments across the world are presently reformulating the way they control, regulate, and manage ports, with the general principle of reducing direct intervention and where feasible, the use of the private sector for

typical port operations is being introduced. When capacity enhancement is the need of time, ports of this part of the globe should also take drastic measures to improve performance with the help of private sector.¹⁰

Why we need better co-operation among the ports of Indian bordering states and Bangladesh? First, the port sector in several erstwhile developing countries has been undergoing transformation from a subsistence infrastructure resource into a more capital intensive, commercially oriented facility during last two decades. On the other hand, India and Bangladesh (other South Asian ports too) have lately thought about taking some steps leading to deregulation of their port sector. Indian and Bangladeshi ports are currently characterised by the existence of obsolete and poorly maintained equipment, hierarchical and bureaucratic management structures, weak co-ordination between the port authorities and users of the ports, lack of synchronisation of working times, excessive labour, and in general, an institutional framework that is considerably in variance with government's overall economic objectives (De Monie, 1995; Peters, 1997; De and Ghosh, 1998; Haralambides and Behrens, 2000). Second, considering the region's entry into the second stage of reform, port reform will help us to assess potential benefits of moving to a deregularised port sector under a liberal trading regime when more than 80% of the region's foreign trade pass through seaports. For instance, performance generally stimulates traffic, and hence the benefits of performance augmenting factors might be responsible not only for redistribution of existing traffic but also for attracting new manufacturers/suppliers. Hence, both the countries should take immediate steps in reforming port systems so that their ports work as "engine of growth" rather than acting as "trade deterrent".

We have good examples of success stories of North American Free Trade Association (NAFTA), Southern African Development Corridors (SADC), Mercosur – the South American Customs Union, through which improved transportation and transit have created great value to the regional economies (Lakshmanan and Anderson, 1999). The following lessons outlined from the aforesaid great transportation facilities will help to prepare a roadmap towards co-operation in the transport sector between Bangladesh and Indian bordering states.

- There should be harmonisation of technical standards such as truck size and weight regulations, or else costs for cross-border movement of goods will go up.
- Sometimes residual economic regulation, especially in the form of cabotage rules and restrictions on the movement of certain goods and on specific modes of transportation increase the cost of cross-border movement. While planning a common transport policy, these issues should be addressed.
- Less and less border inspection except strategic areas – ‘one stop service’.
- Simplification of documentation and clearance procedures.

To conclude, both the countries along with Bhutan and Nepal should take immediate initiatives to formulate a CTP on the basis of sub-regional transport network through which the following issues, among others, may be resolved as confidence building measures.

- (i) to take immediate steps for easy movements of Bangladeshi vehicles in the Phulbari corridors;
- (ii) to permit Indian goods to be transported through Bangladesh to and from north-eastern part of India;

- (iii) to allow north-eastern bordering states to use Chittagong port and western Bangladesh districts to use Kolkata, Haldia and Kulpi (upcoming) ports;
- (iv) to upgrade all MG railway track into BG track in north-eastern bordering states and in Bangladesh. Particularly capitals of north-eastern bordering states should be connected by BG track with Dhaka and Chittagong, and similarly district capitals of Southwest Bangladesh with Kolkata.

5. CONCLUSIONS AND POLICY IMPLICATIONS

In the forgoing analysis, we have seen that (i) disparities in both per capita income and infrastructure facilities among Indian bordering states and Bangladesh have been rising over time, (ii) the relative positions of the bordering states have continued to remain weirdly unchanged in terms of any definition of development, (iii) transport infrastructure particularly port facility has larger role to play in determining the fate of regional development of this region. The findings of the paper have implications for future regional policies. The most strenuous task of the policy makers must be to undertake common transport policy by which to reduce regional inequalities in various physical and social infrastructure facilities rather than simply to randomly target equalisation of public investment across regions. Otherwise, the on-going reform process may be badly thwarted by the potential social disharmonies, which have been gathering momentum everywhere.

So far as Governments of India and Bangladesh are concerned, they have different options with respect to transport infrastructure. First, they may invest in infrastructure as a response to serious bottlenecks taking place due to an expansion of private sector. This leads to a passive strategy: transport infrastructure is following private investment. Another option is that governments use transport

infrastructure as an engine for national or regional development. This implies an active strategy where transport infrastructure is leading and inducing private investment. Although both the approaches have some pros and cons, many countries have used the latter approach to attract private investment vis-à-vis regional development.

The development of one of the backward regions of the world depends also upon how these two countries co-operate with each other and open their resources as a complimentary to each other's benefits through a "win-win" way. At a time when the bordering states of India are becoming poorer, rising openness and integration of both countries may help the region grow faster by adopting new technology. And, technological change can be influenced by each country's openness to each other and trade. The openness of an economy also increases domestic imports of goods and services, which include new technology. Thus, a country's openness will improve domestic technology; production processes will be more efficient; and hence productivity will rise. Therefore, a domestic economy that is open to world trade may grow faster than protected or closed economies.

Also to note that beyond economic co-operation between bordering states of India and Bangladesh, there is also requirement of how India and her neighbouring countries are co-operating with each other. There are some studies which present empirical evidence that countries with open, large and more developed neighbouring economies grow faster than those with closed, smaller, and less developed neighbouring economies (Vamvakidis, 1996, 1998).

Trade liberalisation is a necessary but not a sufficient condition. To achieve any substantial progress in international trade and whole-

hearted economic co-operation between India and Bangladesh, we must give utmost priority to the development of infrastructural facilities (De and Ghosh, 2000). Added to this, complimentary policy reform accompanied by improved procedural and operational efficiency in the transport sector is essential to support trade liberalisation of India and Bangladesh.

Notes

1. India and Bangladesh jointly account about 16% of the world population and only 2% of total land area. However, their share in world output is a mere 6%. Further, their share in world merchandise trade is about 1%. About half of the world's poor inhabits in this part. These two countries are also low-income economies with per capita GDP (PPP) ranging from US\$1000 to US\$1600 (World Bank, 2001).
2. NHDP comprising golden quadrilateral (GQ) and North-South and East-West (NSEW) corridors is the first major capacity enhancement road projects taken by the Government of India (through National Highway Authority) under the financial help from The World Bank, OECF, and ADB (NHAI, 2001). The main component of NHDP includes:
3. The European Conference of Ministers of Transport (ECMT) is an inter-governmental India are still far below the India-average in transportation and communication services.
4. In a study Ghosh and De (2000b) found that a region, which is endowed with improved infrastructure facilities, attracts higher

FDIs under a liberal economic regime :

GQ	NSEW
<ul style="list-style-type: none"> ▪ Length: 5952 km (on realignment: 5834 km) ▪ Connecting Delhi, Kolkata, Chennai and Mumbai 	<ul style="list-style-type: none"> ▪ Length: 7300 km ▪ Kashmir to Kanyakumari – 3948 km (with a spur to Cochin) - NS ▪ Silchar to Porbandar – 3465 km – EW
Total 629 km completed (4-laned stretches)*	Total 648 km completed (4-laned stretches)*
Total 1211 km is under implementation, and likely to be completed by March 2002	Total 272 km is under implementation, and likely to be completed by March 2002.
Target year of completion: 2003	Target year of completion: 2007

* as on February, 2001

Villages of	Transportation		
	Connected with	Bus stop within	Railway station
	pucca road	2 kms	within 5 kms.
	(%)	(%)	(%)
North-Eastern States	21.20	63.60	15.20
West Bengal	14.10	56.40	35.90
Best Indian States	85.30	94.70	62.80
	(Kerala)	(Kerala)	(Orissa)
India Average	36.80	64.50	22.40

Villages of	Communication	
	Post office	Telephone
	within 2 kms.	within 2 kms.
	(%)	(%)
North-Eastern States	63.60	28.80
West Bengal	79.50	47.40
Best Indian States	94.70	85.50
	(Kerala and	(Tamil Nadu)
	Andhra Pradesh)	
India Average	70.20	50.90

Source: NCAER (1999)

5. In India, there are total nine costal states namely Gujarat, Maharsatra, Karnataka, Goa, Kerala (west coast) and Tamil Nadu, Andhra Pradesh, Orissa, West Bengal (east coast). These nine states have in total 13 major and 179 minor ports. Among these 13 major ports, six are located in the west coast (Kandla, Mumbai, Jawaharlal Nehru, Mormugao, Cochin, New Mangalore) and seven in the east coast (Ennore, Chennai, Tuticorin, Paradip, Vizag, Kolkata, Haldia). Four of the major ports viz. Kolkata, Mumbai, Chennai, and Mormugao are more than 100 years old. Cochin and Vizag ports have recently celebrated their golden jubilee. The ports of Kandla, Tuticorin, New Mangalore and Paradip came into existence after independence. Jawaharlal Nehru port became operational only after 1989. Ennore (in Tamil Nadu) is the first corporate port of India, having come into existence in 2000. Out of 179 minor ports including 13 non-working ports, 120 ports belong to west coast comprising 67% of total Indian minor ports, 24 ports belong to east coast and the rest, 35 belong to Union Territories. Due to the lack of overseas cargo, some maritime states like Andhra Pradesh and Kerala closed down few minor ports that are called non-working ports. Maharastra has the highest number of ports – two major and 53 minor. Next to it is Gujarat where one major and 40 minor ports are situated. Ports in India are classified as 'Major Ports' and 'Other (minor) Ports'. Major ports come under the jurisdiction of the Central government and primary responsibility for the development and management of minor and intermediate ports rests with the state government within the purview of Indian Ports Act, 1908. In Bangladesh there are two major seaports – Chittagong and Mongla, governed by Ports Act, 1908. Besides, there are also as much as 20 inland waterway ports in Bangladesh.

6. Kolkata and Haldia ports are located approx. 231 kms and 120 kms from Sandhead respectively. An inward vessel generally takes approx. 10 hrs. to reach Kolkata and 7 hrs. to Haldia. However, a deep-drafted outward vessel with three anchorages enroute takes approx. 36 hrs. from Kolkata and 6 hrs. from Haldia to reach Sandhead. Due to the locational advantage of Chittagong port, a vessel only takes 4 hrs. to reach the port from the point of call and vice versa.
7. Procedural complexities are often worked as deterrent to India-Bangladesh trade. Some of such obstacles may be noted from the following tables.

Road Routes	Transit Time (Days)	Border Crossing Delays (Days)	Transfer Time (Days)	Total Time (Days)
Kolkata – Petropole – Benapole – Dhaka	1.5 – 2	0.5 – 2	1 – 2	4 – 6
Patna – Hili – Dhaka – Chittagong	10 – 15	1 – 3	0.5 – 2	11.5
Guwahati – Shillong – Dawki – Tamabil – Chittagong	6 – 10	0.5 – 2	0.5 – 2	7.5

Road Routes	Border Crossing Costs (US \$ / ton)	Transit Costs (US \$ / ton)	Transfer Costs (US \$ / ton)	Loss Costs (% of value of goods)
Kolkata – Petropole – Benapole – Dhaka	2- 3	64	7 – 8	1
Patna – Hili – Dhaka – Chittagong	5 – 6	77	9 – 11	1.5
Guwahati – Shillong – Dawki – Tamabil – Chittagong	5 – 10	8 – 10	7 – 8	< 1

Source: Subramanian (1999)

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8. The Kulpi port has good transport linkage. Some of the logistics networks are as follows. (a) Roadways: State Highways (SH) 1 & 3 connect the port site with rest of the country. Up gradation of SH 1 into National Highway is also under consideration; (b) Exclusive Expressway: Construction of 48-kms new six-lane expressway between Kulpi and Kolkata is planned; (c) Railways: Kulpi is connected by BG electrified railway network. The total railway length between Kulpi and Kolkata is 65 kms; (d) Waterways: Port site is connected by National Waterways 1 and 2. There is ample opportunity for inland transportation from Kulpi to North-eastern and Northern parts of the country; (e) Airport: Nearest international airport is Kolkata, located 103 kms. from the project site. Construction of an airport at Kulpi is also under consideration; (f) Helipad: Helipad is also planned in the first phase of construction of the project. The feeder routes like Kulpi – Kolkata–Kulpi, Kulpi – Haldia – Durgapore – Kulpi will be given priority; (g) Pilotage: Pilots of Kolkata Port Trust will be doing the piloting and also mooring/unmooring of Kulpi-bound vessels on-behalf of the port authority. A permanent pilot station is also planned at Kulpi. One may consult **Appendix 1** for basic information of port of Kulpi.
9. In some of their recent works, Ghosh and De (2000c) and De and Ghosh (2001a) have found a direct causal relationship between port traffic and performance in Indian ports. Authors have seen that port with better performance always attracts higher traffic and most of the Indian ports provide evidence towards the fact that performance causes traffic in India.

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APPENDIX 1

Due to the shortfall of capacity of the ports of Kolkata and Haldia and for generation of economic activities in the backward areas, the Government of West Bengal took decision in 1994 for setting up a port-based economic zone at Kulpi, located at 78 kms downstream of Kolkata on the east bank of river Hooghly (diagonally opposite of Haldia). A special purpose vehicle company called Bengal Port Ltd. is promoted by Mukand-Keventer Consortium & Associates and West Bengal Industrial Development Corporation Limited for the implementation of this project. The concept realised: a port city with integrated port facilities, industrial park, distri-parks, free trade zone (Special Economic Zone), commercial and residential amenities. When fully completed, it will (i) handle more than 2 million ton of overseas cargo in the 1st year of operation, (ii) attract more than Rs.20,000 crore (US\$6 billion) of domestic and foreign investments, (iii) accommodate over 200 large, 450 medium, 750 small and 1200 tiny industrial units, (iv) generate business volume of US\$7942 million of exports and US\$608 million of imports in the 1st year of commercial operation (2003-04). Total length of the proposed riverside jetty for 1st phase of construction is 700 mtrs. which can accommodate three *handymax* vessels at a time. Kulpi port's berths are set in naturally deep waters of 10 mtrs. and are supported by 600 mtrs. turning basin, which will allow for two-way passage of vessels. Length, width and draught of vessels which are likely to visit the port are 178 mtrs., 25 mtrs., and 7- 8 mtrs.

respectively. Kulpi being located further downstream and due to its locational advantage, it is envisaged that the port will be having better performance than Kolkata and Haldia ports. While at present Kolkata and Haldia ports take approximately 5 to 6 days to clear a vessel, it is expected, a vessel will be cleared within 2 days from the port of Kulpi (CES, 1998).

Table 1. Transport Infrastructure and Quality of Life

Particulars	Highways	Mass Transit	Airport
Attributes of Human Habitat			
Health	Increased air quality	Increased air quality	
Safety	Reduced accidents	Reduced accidents	Reduced accidents
Recreation	Increased access	Increased access	Increased access
Economic Opportunity	Increased employment	Increased employment	Increased employment
	Increased access	Increased access	
Leisure	Increased discretionary time	Increased discretionary time	Increased discretionary time

Source: Aschauer (1999)

Table 2. Basic Human Development Indicators: India and Bangladesh

Particulars	Unit	Year	India	Bangladesh	South Asia	Developing Countries
Total population	Million	2000	1014	129	1326	4867
Annual population growth	%	1995-2	1.70	1.60	1.80	1.80
Life expectancy at birth	Years	1998	63	58	63	62
Adult literacy rate	%	1997	54	48	51	71
Female literacy rate	%	1997	49	70	46	63
Infant mortality rate	(per 1000 live births)	1998	69	79	72	64
Population below poverty line	%	1999	30	48	46	27
Real GDP per capita per annum	(PPP, US \$)	1997	1670	1050	1600	3240
Total GDP at market price	(US\$ bln.)	1999	440	46	580	980

Source: The World Bank and UNDP.

Table 3. Economic Indicators of Selected South Asian Countries

Particulars	India	Nepal	Bangladesh
Real GDP per capita per annum (PPP, US\$)			
1960	619	584	621
1997	1670	1090	1050
GNP per capita annual growth rate (%)			
1965-80	1.50	na	-0.30
1980-95	3.20	2.20	2.20
Share of Agriculture Sector (as % of GDP)			
1977	38.20	63.90	37.50
1998	27.50	40.50	22.40
Share of Industry Sector (as % of GDP)			
1977	23.00	11.20	25.00
1998	26.10	25.20	28.20
Share of Service Sector (as % of GDP)			
1977	38.80	24.90	37.50
1998	46.40	34.30	49.40
Gross Domestic Savings (as % of GDP)			
1981-1990	21.40	12.00	2.10
1994-2000	23.10	12.90	17.60
Gross Domestic Investment (as % of GDP)			
1981-1990	22.80	19.10	13.10
1994-2000	23.80	22.60	21.10
Share of Export (as % of GDP)			
1980-81 to 1991-92	5.10	4.60	8.00
1992-93 to 1999-2000	8.40	7.40	12.50
Share of Import (as % of GDP)			
1980-81 to 1991-92	8.20	na	11.30
1992-93 to 1999-2000	11.50	12.30	15.40
Current Account Balance (as % of GDP)			
1994-2000	-1.40	-6.50	-1.60

Note: na means not available

Source: The World Bank

Table 4. Share of Public Infrastructure Investments in Total Public Investment*

(In %)

Country	Sector	1986-87	1988-90	1991-93	1994-96	1997**
China #	Power	26.93	27.55	22.67	18.70	
	Transportation	14.79	11.87	14.70	21.27	
	Communication ##					
	Subtotal	41.72	39.41	37.37	39.97	
India \$	Power \$\$	25.66	26.32	27.80	26.75	
	Transportation	11.32	10.37	11.20	11.03	
	Communication	3.02	5.72	6.85	8.66	
	Subtotal	40.00	42.41	45.85	46.44	
Indonesia	Power	11.49	11.61	11.46	14.55	11.77
	Transportation @	15.22	19.13	19.52	22.95	21.08
	Communication @@	0.35	0.38	0.39	0.59	0.77
	Water @@@	4.30	3.66	4.17	3.90	4.14
	Subtotal	31.35	34.78	35.54	41.98	37.76
Malaysia	Power	11.35	8.77	7.12	5.48	6.51
	Transportation	20.34	19.26	23.84	22.77	24.23
	Communication	5.07	0.04	0.03	0.05	0.05
	Water +					
	Subtotal	36.77	28.07	31.00	28.30	30.79
Philippines	Power		21.44	27.75	23.19	27.11
	Transportation		17.34	16.49	16.75	18.77
	Communication		1.68	3.01	1.02	1.22
	Water		4.31	3.88	2.05	3.67
	Subtotal		44.77	51.14	43.01	50.76

Notes : * Based on budget allocations. ** Based on proposed budget. # China figure for 1994-96 is average for 1994-95 only. ## Included in expenditures on transportation sector. \$ India figure for 1994-96 is the average for 1994-95 only. \$\$ Includes expenditures on gas and water. @ Includes expenditures on tourism sector. @@ Includes expenditures on information sector. @@@ Includes expenditures on housing sector. + Includes expenditures on power sector.

Source: Desai and Brooks (1999)

Figure 5. Share of Public Infrastructure Investments in GDP*

(In %)

Country	Sector	1986-87	1988-90	1991-93	1994-96
China #	Power	4.45	4.35	4.37	3.65
	Transportation	2.44	1.87	2.91	4.15
	Communication ##				
	Subtotal	6.89	6.22	7.28	7.81
India \$	Power \$\$	3.1	2.62	2.51	2.36
	Transportation	1.37	1.04	1.01	0.97
	Communication	0.36	0.57	0.62	0.76
	Subtotal	4.83	4.22	4.14	4.1
Indonesia	Power	0.9	0.96	0.96	0.97
	Transportation @	1.19	1.6	1.62	1.52
	Communication @@	0.03	0.03	0.03	0.04
	Water @@@	0.34	0.31	0.35	0.26
	Subtotal	2.46	2.9	2.96	2.78
Malaysia	Power	0.88	0.64	0.46	0.34
	Transportation	1.64	1.44	1.55	1.42
	Communication	0.54	0	0	0
	Water +				
	Subtotal	3.06	2.08	2.02	1.77
Philippines	Power		1.1	1.67	1.72
	Transportation		0.83	0.98	1.23
	Communication		0.08	0.18	0.07
	Water		0.21	0.23	0.16
	Subtotal		2.22	3.06	3.18

Notes: * Based on budget allocations. ** Based on proposed budget. # China figure for 1994-96 is average for 1994-95 only. ## Included in expenditures on transportation sector. \$ India figure for 1994-96 is the average for 1994-95 only. \$\$ Includes expenditures on gas and water. @ Includes expenditures on tourism sector. @@ Includes expenditures on information sector. @@@ Includes expenditures on housing sector. + Includes expenditures on power sector.

Source: Desai and Brooks (1999)

Table 6. Economic Profile of Bordering states (BSs) of India and Bangladesh*

Particulars**	UNIT	BSs	Bangladesh	(India)
Area	Share in India (%)	11	4.50	
Population (2001)	Share in India (%)	12	12.72	
Population Density (2001)	Per Sq. Km. of Area	190	874	(308)
Literacy Rate (2001)	(%)	58	48	(54)
PCCE (1998-99) (a)	Kwh	112	81	(290)
NSDP in 1970-71 (b)	Share in India (%)	11	na	
NSDP in 1998-99 (b)	Share in India (%)	11	12.80	
PCI in 1970-71 (c)	US \$. (at current price)	89	na	(320)
PCI in 1998-99 (c)	US \$ (at current price)	265	365	(430)
Railway Density (1998-99)	Km/000 Sq. Km of Area	9.16	3.36	(19.25)
Road Density (1998-99)	Km/000 Sq. Km of Area	583.78	270.66	(862.60)
Telephone Mainlines (1997-98)	Per 1000 population	1.96	3.12	(3.88)
Seaport Traffic (2000-2001) (d)	Million Ton	31	16	(281)
Landport Traffic (2000-2001) (e)	Million Ton	1.96	na	(66)
FDI (1991-1998) (f)	US \$ billion	2.21	1.22	(20)

Notes: *Arunachal Pradesh, Assam, Manipur, Mizoram, Maghalaya, Nagaland, Sikkim, Tripura and West Bengal. ** Considers average data of nine BSs. (a). Per Capita Consumption of Electricity. (b) Net State Domestic Product (New Series). (c) Per Capita Income (New Series). (d) Overseas traffic handled by Calcutta, Haldia seaports for BSs and Mongla and Chittagong ports Bangladesh. (e) Overseas traffic handled by Amingaon and Cossipore ICDs, and border posts like Petropole and Hili. (f) Accumulated data, considers only approved projects.

Sources: 1. Various issues of Economic Survey, Govt. of India (www.nic.in). 2. Various issues of Profile of States, CMIE, Mumbai (www.cmie.org). 3. Preliminary Results of 2001 Census, Register of Census Operation, Govt. of India (www.nic.in). 4. The World Bank (www.devdata.worldbank.org).

Table 7. Port Throughput of Bordering States of India and Bangladesh**(a) Total Cargo Handled**

Year	Kolkata (MT)**	Haldia (MT)**	Chittagong (MT)**
1991-92	4.16	11.82	7.00
1995-96	6.12	15.41	10.30
1999-2000	10.31	20.71	14.87
AAGR(%)*	18.48	9.40	14.05

(b) No of Containers Handled

Year	Kolkata (^{'000} TEUs)	Haldia (^{'000} TEUs)	Chittagong (^{'000} TEUs)
1991-92	57.81	9.00	92.83
1995-96	121.31	3.84	180.84
1999-2000	147.3	28.32	293.07
AAGR(%)*	19.35	26.83	26.96

(c) Volume of Containers Handled

Year	Kolkata (MT)**	Haldia (MT)**	Chittagong (MT)**
1991-92	0.80	0.12	1.82
1995-96	1.81	0.06	2.34
1999-2000	2.12	0.44	3.82
AAGR(%)*	20.63	33.33	13.74

Notes: *Average Annual Growth Rate for the period 1991-92 to 1999-2000 ** MT means million ton Data

Sources: 1. For Kolkata and Haldia ports, various issues of Administrative Report of Kolkata Port Trust, and also www.portofcalcutta.com. 2. For Chittagong port, www.cpabd.com

Table 8. Linewise Export/Import to/from Bangladesh from /to Kolkata and Haldia

(a) Year: 1999-2000

Line	TEUs	B.B Cargo* (Tonnes)	Total (Tonnes)	Share (%)	Service	Line	TEUs	B.B Cargo (Tonnes)	Total (Tonnes)	Share (%)	Service
A.C.L	264	0	3876	49.75	Feeder	U.L.A	0	0	16506.20	99.02	Feeder
A.P.L	143	0	2175	27.92	Feeder	HANJIN	4	0	80.81	0.48	Feeder
M.I.S.C	92	0	1591	20.43	Feeder	P&O	9	0	48.38	0.29	Feeder
ORAM	6	0	108	1.39	Feeder	M.I.S.C	2	0	34.76	0.21	Feeder
HUB	2	0	35	0.46	Feeder						
KMTC	1	0	5	0.07	Feeder						
Total	508	0	7791	100		Total	15	0	16670.15	100	

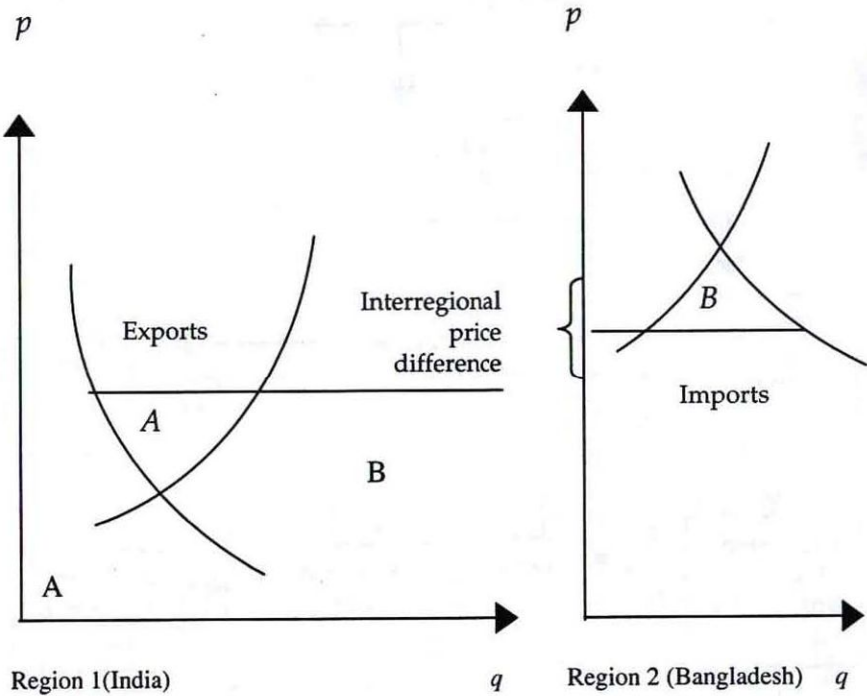
(b) Year: 1996-97

Export ¹						Import ²					
Line	TEUs	B.B Cargo* (Tonnes)	Total (Tonnes)	Share (%)	Service	Line	TEUs	B.B Cargo* (Tonnes)	Total (Tonnes)	Share (%)	Service
B.S.C	46	4028	4755	75.43	Both	P&O	28	0	359	75.29	Feeder
N.O.L	93	0	859	13.63	Feeder	NPIL	8	0	110	23.09	Feeder
I.C.S	21	0	414	6.57	Feeder	CHOYANG	1	0	8	1.62	Feeder
E.O.L	0	113	113	1.79	Direct						
Y.M.L	7	0	68	1.08	Feeder						
C.L.I	2	0	36	0.57	Feeder						
CHOYANG	2	0	26	0.42	Feeder						
H-LLOYD	2	0	19	0.31	Feeder						
P.I.L	2	0	7	0.11	Feeder						
T.F	1	0	6	0.10	Feeder						
Total	176	4141	6304	100		Total	37	0	477	100	

Notes: * Breakbulk cargo (non-containerised). 1. Export to Bangladesh. 2. Import from Bangladesh.

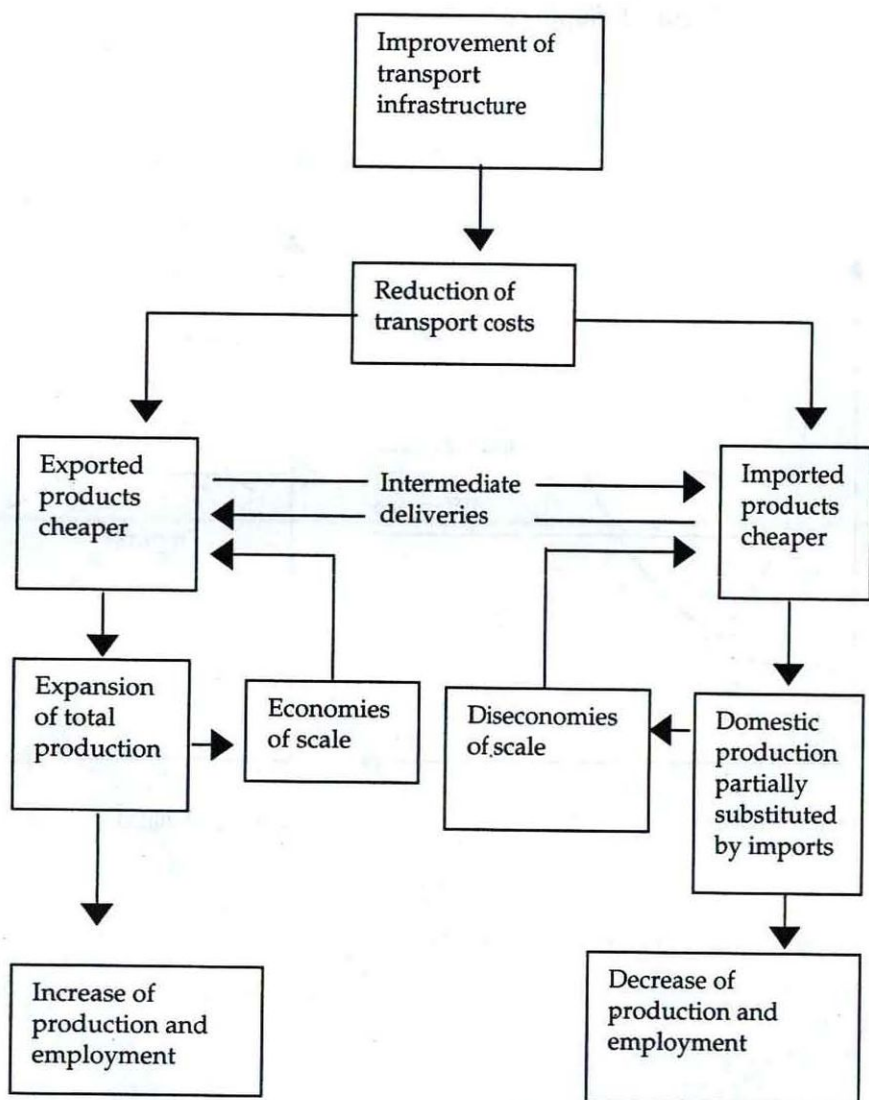
Data Sources: EXIM India, Kolkata (www.exim-india.com)

Figure 1. Supply and Demand in Two Regions



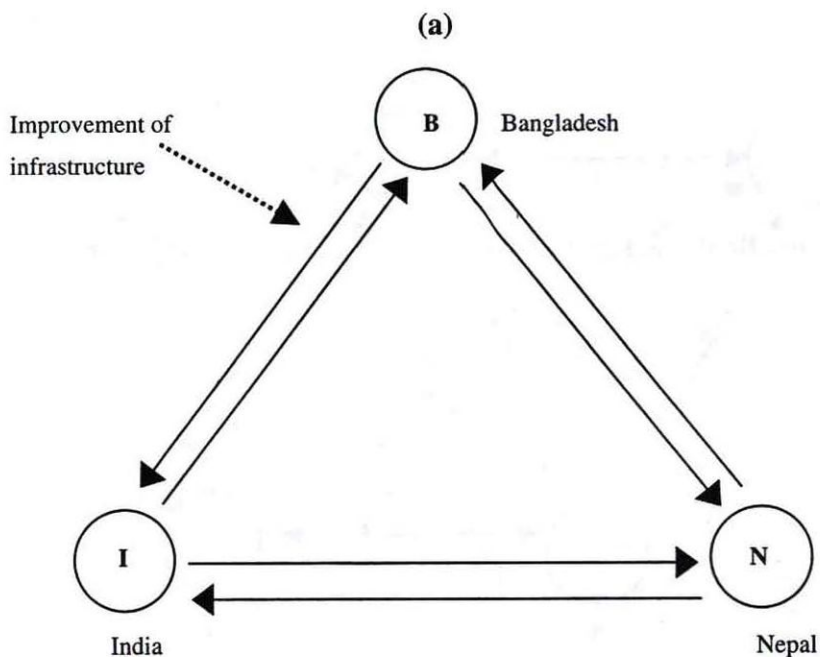
Source: Rietveld and Nijkamp (1993)

Figure 2. Effect of Improvement of Transport Infrastructure



Source: Rietveld and Nijkamp (1993)

Figure 3. Response of Trade Flows to Transport Cost Reduction in a Three-region Framework



(b)

Origin	Destination		
	B	I	N
B	-	+	0
I	+	-	0
N	-	-	0

Figure 4. Liner Shipping Networks between Ports of BSs and Bangladesh

