SAARC

SAARC REGIONAL MULTIMODAL TRANSPORT STUDY (SRMTS)

Prepared for the SAARC Secretariat

June 2006

SAARC REGIONAL MULTIMODAL TRANSPORT STUDY (SRMTS)
Prepared for the SAARC Secretariat
June 2006

SAARC REGIONAL MULTIMODAL TRANSPORT STUDY (SRMTS)

Prepared for the SAARC Secretariat

June 2006

Published by
SAARC Secretariat
P.O. Box: 4222
Kathmandu, Nepal
Tel: (977-1) 4221785, 4226350, 4231334
Fax: (977-1) 4227033, 4223991
Email: saarc@saarc-sec.org
Web-site: www.saarc-sec.org

Printed by: WordScape, Nepal

PREFACE

At the Twelfth SAARC Summit (Islamabad, 4-6 January 2004), the Heads of State or Government emphasized that for accelerated and balanced economic growth it is essential to strengthen transportation, transit and communication links across the region.

Subsequently, SAARC Regional Multimodal Transport Study (SRMTS) has been conducted with a view to enhance transport connectivity among the Member States of SAARC to promote intra-regional trade and travel. SRMTS is a comprehensive Study covering all modes of transport - road, rail, maritime, aviation and inland waterways.

The Report of the SRMTS has been appreciated by the higher SAARC bodies and its recommendations have now been prioritized. The SAARC Leaders have called for early implementation of the recommendations contained in the Study. I am also pleased to mention that action is being taken to extend SRMTS to include Afghanistan.

I commend the national and regional consultants for conducting the Study successfully.

I also wish to express my appreciation to the Asian Development Bank (ADB) for providing technical and financial assistance (under ADB RETA 6187: Promoting South Asian Regional Economic Cooperation) in conducting the SRMTS.

The Report of SRMTS is a rich source of reference containing information on transport connectivity and its relevance to socio-economic development in South Asia.

Chenkyab Dorji
Secretary General of SAARC

ACKNOWLEDGEMENTS

The principal authors of this report were the team of Regional Consultants, consisting of the following:

- Dr Mohammed Rahmatullah (Team Leader);
- Mr S K Mishra (Regional Consultant);
- Mr Mohammad Jamshed (Regional Consultant);
- Prof Amal Kumarage (Regional Consultant);
- Capt Mohammed Shafi (Regional Consultant); and
- Capt Alim Shaikh (Regional Consultant).

The report was principally based on input from the national teams during Phase 1 of the project and the national teams were as follows:

Bangladesh
Mr Matin Talukder (Team Leader), Mr Mohammed Ataur Rahman, Mr Mohammed Abdus Sattar and Mr Ashraful Alam Sarkar;
Bhutan
Mr Tashi Wangyal (Team Leader);
India
Mr S K Mishra (Team Leader), Mr R K Singh, Mr Sudhir Rangnekar, Mr S B Basu and Mr Ghanshyam Singh;
Maldives
Mr Hussain Naeem (Team Leader);
Nepal
Dr Pushkar Bajracharya (Team Leader), Mr Chinpal Rauniar and Mr Ananda Bahadur Shrestha;
Pakistan
Mr Sajid Mansoor (Team Leader), Mr Shahud Iqbal, Mr Imtiaz Hussain Rizvi and Mr Iefan Naqvi;
Sri Lanka
Prof Amal Kumarage (Team Leader) and Dr P Ramachandran.

The team would like to acknowledge the valuable contribution provided by the personnel at the SAARC Secretariat, including HE Mr. Chenkyab Dorji, Mr. Y. K. A. Rohanajith, Mr. Sufiur Rahman, Mr. Rajiv K. Chander, Ms. Leiileen and Mr. S. C. Sharma. The team is especially grateful to Mr Rohanajith for his valuable advice and guidance and to his immediate staff for arranging the various technical workshops.

The project was undertaken with funding provided by the Asian Development Bank (ADB) specifically for this project. The ADB team who contributed to the study included, Mr. Sultan H. Rahman, Mr. Masaaki Nagata, Mr. Bishnu Pant, Mr. Shunso Tsukada, Mr. Prianka Seneviratne, Mr. Binod Karmacharya, Ms. Pawitra Gurung and Ms. M. Serrano. The team is especially grateful to Mr Pant and Mr Karmacharya for their project coordination and arrangements in relation to the various meetings and to Mr Tsukada and Mr Anthony Bayley (ADB RETA Consultant), who acted as peer reviewers and assisted the teams in the preparation of both the national and final reports.

ABBREVIATION

ADB	Asian Development Bank
ASA	Air Service Agreement
ASEAN	Association of South East Asian Nations
ASYCUDA ++	Automated system for customs data
BCN	8 wheel air brake rail wagon
BCX	8 wheel vacuum braked covered rail wagon
BG	Broad gauge (rail)
BIA	Biman International Airways
BOO	Build Own Operate
BOT	Build Operate Transfer
BR	Bangladesh Railways
CAA	Civil Aviation Authority
CFS	Container Freight Station
C&F	Clearing and Forwarding
CTD	Customs Transit Declaration
CVOR	Aviation Radar System
DME	Distance Measuring Equipment
DTI	Direct Trader Input
DVOR	Aviation Radar System
DWT	Deadweight tonnage (of ships)
ECO	Economic Cooperation Organisation
EDI	Electronic Data Interchange
FCL	Full Container Load
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GMS	Greater Mekong Sub region
GNI	Gross National Income
HDI	Human Development Index
HSD Oil	High Speed Diesel
ICAO	International Civil Aviation Organisation
ICES	Indian Customs and Excise System
ICD	Inland Clearance Depot
ILS	Instrument Landing System
IR	Indian Railways
IWT	Inland Waterways Transport
JNPT	Jawaharlal Nehru Port Trust
KN	Kilonewton
LCL	Less than Container load
MG	Metre gauge (rail)
ODA	Overseas Development Aid
PCU	Passenger Car Equivalents
PIA	Pakistan International Airways
POL	Petroleum and Oil Liquids
PPP	Purchasing Power Parity
RETA	Regional Technical Assistance
Roro	Roll-on roll-off vessels
RMGC	Rail Mounted Gantry Crane
RMQC	Rail Mounted Quay Crane
RTGC	Rubber - tyred Gantry Crane
SAARC	South Asian Association for Regional Cooperation
SAFTA	South Asian Free Trade Area
SRMTS	SAARC Regional Multimodal Transport Study
STS	Ship to Shore Gantry Crane
TEU	Twenty foot Equivalent Unit – Containers
TIR	Transport International Routers
TPH	Thimpu – Phuentsholing Highway
UN-ESCAP	United Nations – Economic and Social Commission for Asia and the Pacific
WCO	World Customs Organization

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Recognizing the importance of transport integration in South Asia, the Islamabad SAARC Summit in 2004 decided to strengthen transport, transit and communication links across the region. It was in pursuance of this decision that the SAARC, with financial and technical support from the ADB, initiated the *SAARC Regional Multimodal Transport Study* (SRMTS) with the main objective of enhancing multimodal transport connectivity among SAARC member states.

In a highly competitive world economy, transport cost is a significant determinant of competitiveness, making an integrated and efficient transport network an essential element of the enabling environment. South Asia inherited an integrated transport infrastructure from the British, but this was fractured not only by the partition of India but by its political aftermath and now needs to be rebuilt within the context of greater political harmony in South Asia. Integration of the transport network of South Asia is especially crucial to countries such as Nepal and Bhutan and regions such as North East India as this could serve to end their landlocked or semi-isolated status and provide shorter transport and transit links.

The SRMTS was undertaken in 2 phases. Under Phase I, country reports were prepared with the help of national experts that focused on identification from respective country's perspective of the transport corridors/gateways, both existing and potential, with main focus on freight traffic. Information was also compiled on major physical and non-physical barriers along the corridors/gateways that need to be addressed to make these corridors/gateways suitable for carrying enhanced intra-regional traffic.

Under Phase II an in-depth analysis of the basic data compiled under Phase I was undertaken by the Regional Consultants and a number of Regional Corridors /Gateways were selected based on certain criteria, for further investigation to establish regional connectivity among all the SAARC member states.

A regional overview of South Asia revealed that it is one of the fastest growing economic regions in the world with over 5% growth rate per annum. But at the same time, more than 400 million people still live below poverty line in South Asia and it still hosts 39% of the world's poor living on less than US$ 1.0 per day, despite the fact that incidence of poverty declined in the region from 41.3% in 1990 to 31.3% in 2000.

In the context of intra-regional trade among the SAARC member states, it was observed that this trade has not picked up as yet. Until recently, the intra-regional export trade was only around 5% of the total export. Studies revealed that there is tremendous potential for growth in intra-regional trade, once the political environment becomes supportive and transport network gets integrated.

During the second half of the twentieth century, the transport system of the mainland countries of South Asia has developed only in a national context, with little consideration given to cross border issues of compatibility, uniformity of standards in infrastructure and equipment design. Similar problems however, did not occur in island states. To achieve the long term objectives of SRMTS, the regional connectivity of the transport system needs to be re-established and their capacities augmented to cater to the increased traffic that is anticipated to move along intra-regional corridors.

Based on initial identification of corridors/gateways under Phase I, a more rigorous analysis was undertaken to select corridors of regional significance. This resulted in selection of 10 Regional Road Corridors, 5 Regional Rail Corridors, 2 Regional Inland Waterways Corridors, 10 Maritime Gateways and 16 Aviation Gateways. Further assessment of these corridors/gateways revealed their physical and non-physical barriers and specific measures were suggested to address them.

With regard to ***road transport***, it was observed that trucking has become a dominant mode in South Asia and has been catering to 65-70% or more of the movement in the mainland countries. It was also noted that the SAARC countries had 3.82 million kms of road network in 2002, which accounted for 10 per cent of the world road network. Percentage of paved roads varied between 25% in Bangladesh to 63% in Pakistan with India at 53.2%. An assessment of physical barriers of the road corridors revealed that quite a good quality road network exists and 90% of the road corridors totalling around 8,800kms has 2 or more lanes and a large chunk of regional road corridors in India and Pakistan are in fact 4-lane divided highways. It was also found that less than 5% of the corridors need physical improvement and another less than 5%, mostly near the border areas, needs widening up to 2 lanes.

In the context of regional road corridors, one of the most crucial non-physical barriers appeared to be the lack of a bilateral transport agreement to facilitate uninterrupted movement of goods and vehicles across the borders between India and Bangladesh, as well as between Pakistan and India. As a result, goods are required to be transhipped at the border between the trucks of neighbouring countries. Some of the other important physical/non-physical barriers identified included the lack of parking, immigration and customs offices, baggage scanning equipment, telephone and warehousing at several border posts, as well as EDI/IT and standardization of working hours and weekly holidays, as well as use of complicated customs procedures and lack of transparency in inspection.

With regard to ***rail transport***, it was observed that South Asia has one of the largest railway networks in the world, spreading over 77,000 route kms of which Indian rail network alone covers 63,465 route kms. About 70% of this network is broad gauge largely in India, Pakistan and Sri Lanka, while in Bangladesh only about 25% of its network is broad gauge. In this context, it was observed that although the railway network historically played a significant integrating role in the socio-economic development of this part of the world, over the years it has been losing its market share to the road transport. This trend is being reversed by infusion of huge investments in railway development plans in India, Bangladesh and Pakistan. Once the integrated transport system of South Asia becomes operational and the rail network is available for movement of intra-regional trade, rail should be able to capture most of its lost traffic, particularly the long distance traffic in which it has a cost advantage.

In the context of regional rail corridors, some of the major barriers that are posing problems in intra-regional movement by railway include the lack of standardization of technologies, operation and maintenance practices including different types of gauges, braking systems, incompatibility of rolling stock etc. Some of the other major physical barriers included inadequate loop lengths, some missing links of shorter lengths in the borders areas, lack of physical infrastructure at interchange points, load restrictions on bridges, lack of coordination for gauge conversion programmes on different railway systems and capacity constraints in certain sections of the identified corridors.

Among the non-physical barriers identified along the rail corridors, the most crucial one was the lack of a multilateral rail transport agreement. Other non-physical barriers included manual handling of documentation, duplication of customs checks, limited working hours, restrictions on movement of open wagons and oil tankers, uni-directional traffic and the suspension of rail-cum-ferry services between Sri Lanka and India.

With regard to *regional inland waterways corridors*, it was observed that it serves the interest of only Bangladesh and India, where levels of traffic both intra-country and transit had been reducing over years, although during certain periods bilateral traffic has been substantial. It was, however, recognized that inland waterways transport has great potential to provide a cost effective transport service between India and Bangladesh. To this end, one of the most crucial non-physical barriers identified was the renewal of the protocol between India and Bangladesh only on a monthly basis.

Some of the major physical barriers identified in the regional inland waterways include high rates of siltation, bank erosion, inadequate navigational aids and draft restriction of 1.83m, as well as poor condition of jetties, piers, lack of sufficient storage, cargo handling equipment and support craft. In addition there is no container handling capability along inland water transport system. Cargo carrying vessels were also old, repair facilities inadequate and hinterland connectivity of the inland ports was found to be poor.

With regard to ***maritime transport***, South Asia is endowed with about 25 major ports, of which 10 were selected as gateways of regional significance. In 2003, these 25 ports together handled 366.22 million tonnes of traffic, including 5.85 million TEUs of containers. Container throughput growth for Bangladesh, India and Sri Lanka has been impressive. Bangladesh recorded a growth rate of 19.17% during 2002–2003 and India reached 19.17% during 2000–2003. Sri Lankan growth rate was 11% during 1995–2000, and Pakistan had just 7.2% during the same period.

The major barriers identified in regional maritime gateways included likely capacity constraints at many of the gateways, together with heavy siltation at channels where depths fluctuate with tide. Channel markings were also not adequate and suffer from poor maintenance. Cargo and ship handling equipment, as well as floating craft were found to be quite old in many gateways. Poor road and rail connectivity, lack of ICDs and CFS were other major physical barriers, besides lack of roro ferry vessels and passenger handling facilities at Cochin and Tuticorin.

The non-physical barriers which were found to be impacting port performances include lack of professional management and computerisation, as well as EDI/IT to link up stakeholders. Customs procedures were found to be too complicated, cumbersome port documentation was still in use and labour unrest were also noted in some maritime gateways. The absence of a bilateral agreement for ferry service between Colombo and Tuticorin/Cochin was also noted as a major non-physical barrier if such a service could be developed.

With regard to ***air transport*** it was found that around 251 weekly flights were operating between different regional destinations, and in 2004 they carried around 2.23 million passengers and 36,602 tonnes of freight. The overall passenger growth in intra-regional travel has been one of the highest in the world at 12% per annum, while for freight it has been an equally impressive 7.5% per annum over the period 2001–04.

In the context of aviation gateways, some of the major physical barriers that could have major impact on the performance of the 16 gateways included likely capacity constraints at several gateways for both passengers and cargo, in terms of runways, parking areas for aircrafts, passenger handling areas, cargo processing facilities (green channel, cold storage, etc), as well as security and baggage handling facilities. It was also observed that in Bangladesh that many of the aircraft were quite old and needed replacement.

The non-physical barriers in aviation gateways that are impacting on growth in aviation sector in South Asia included the limited number of direct flights resulting in the need for transfers and involvement of travel even outside the region, the low use of air travel compared to economic conditions, the high air fare and airport charges compared to other regions and visa restrictions.

In order to address various physical and non-physical barriers highlighted above, various measures that could be contemplated/initiated were indicated in the respective chapters dealing with different corridors and gateways. But in order to develop a roadmap for establishing a SAARC regional multimodal transport system that would be capable of meeting the potential demand for intra-regional traffic, a detailed exercise was undertaken. In this context, to identify the particular regional connectivity that could meet the specific requirement of a SAARC member country, the inherent characteristics and capabilities of different modes in carrying goods and passengers over certain distances were carefully evaluated and the summary findings are presented in Table 24 Chapter 9 of this report. Table 25 of the same chapter indicates the type of measures that should be taken to address the major barriers, both physical and non-physical, over different time frames (2006–2010, 2011–2015 and beyond).

Since the type of measures to be taken, as indicated in Chapter 9, were too many, it was necessary to prioritize the issues that SAARC should be promoting to enhance regional connectivity. To assist the SAARC Governments in taking a concerted action from a regional perspective, a few ***core issues*** are highlighted here under various regional corridors/gateways, where attention should be focused on priority basis:

Regional Road Corridors

- Development of transport and transit agreements between India, Bangladesh and Pakistan to allow through movement of freight;
- Improvements of the roads through Bihar, West Bengal, and Bangladesh to assist Nepal, Bhutan and Bangladesh in reducing transit costs;
- The last few kms of road corridors up to the international borders should be treated as part of National Highways;
- Development or construction of modern border crossings between India and its neighbours (both sides) in order to facilitate transit of both passengers and freight;
- Adoption of facilitation measures and simplified customs procedures for efficient clearance of goods across the border points.

Regional Rail Corridors

- Augmentation of sectional capacity along the identified corridors to handle the projected and potential growth of intra-regional traffic;

- Standardization of technologies including track, rolling stock and signalling. Coordination for standardization/rationalization of the gauge conversion programmes;
- Provision of identified physical infrastructure at inter-change points, yards, terminals and transhipment hubs;
- Construction of missing links on the corridors;
- Strengthening of bridges and permanent way to enable through movement of loaded broad gauge freight trains in the region; and
- Development and adoption of a multilateral rail transport agreement by the SAARC member states to facilitate barrier-free movement across the region.

Regional Inland Waterways

- The existing inland waterways protocol between Bangladesh and India should be renewed, each time, for longer periods say up to 5 years;
- Joint assessment should be made by Bangladesh and India of the future role that inland waterways can play in regional connectivity and whether this justifies investment in dredging and vessels replacement; and
- To make inter-country traffic movement by IWT attractive, more ports of call in Bangladesh should be allowed.

Regional Maritime Gateways

- Need to expand port capacity, especially to handle more container traffic, particularly at Colombo (as the regional hub), Chittagong, Haldia and Male;
- Plan and augment rail, road and pipeline connectivity at all ports;
- Improved port and trade facilitation measures needed to reduce dwell times;
- Improved dredging to maintain water depths as well as channel marking, especially at Chittagong, Colombo, Kolkata/Haldia and Port Qasim; and
- Introduce professional management capability, and encourage private sector involvement in port development and operations.

Regional Maritime Corridor (Passenger)

- Re-commissioning of Passenger Ferry Service between India and Sri Lanka.

Regional Aviation Gateways

- Promotion of low cost carrier concept by each country;
- Development and redesign of international passenger terminals, especially at Bhutanese, Indian and Nepalese airports;
- Improvements in radar systems/ILS to increase runway capacity to international maximums;
- Need to assess adequacy of lay-out, staffing and IT aids for immigration, customs and security facilities at all airports for both passengers and cargoes;
- Feasibility of new airports, especially in Bhutan; and
- Introduction of commercial practices in airport management and encouraging private sector in development and management of airports.

General View

Finally, what is required is the coordinated and focused commitment of SAARC member states to resolve the identified physical and non-physical barriers in order to put in place a SAARC Regional Multimodal Transport System that requires only nominal investments.

1.0 BACKGROUND

The globalization of economies is now a universal phenomenon that has resulted in the integration of national economies at both regional and sub-regional levels. The international production system is being increasingly characterized by a new division of labour that often involves the breakdown of production into sub-activities are spread across national boundaries. This is making production and consumption of goods and services increasingly multi-national in character and individual economies increasingly interdependent. A more liberalized regime of trade and transport coupled with advances in international logistics, information technology, electronic documentation, cross-border facilitation measures, streamlined customs procedures, etc., have greatly expanded the scope for international trade in goods and services with consequent increased demand for movement both within and across the national boundaries.

In a highly competitive world economy transport cost is a significant determinant of competitiveness, making an integrated and efficient transport network an essential element of the enabling environment for economic integration at any level. The provision of physical infrastructure in the form of an integrated transport network is essential, but not a sufficient condition in itself for efficient international movement. It is essential in addition to have adequate facilitation measures to address all the non-physical barriers so that goods, vehicles and people can move freely across international borders.

SAARC, an association of seven countries of the region consisting of Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka (Afghanistan is expected to join in the near future) was established in 1985 and has been working towards promoting regional cooperation among member states. SAARC has been focusing its attention in the past mostly on trade cooperation and it is now turning towards the issue of transport integration, which is integral to the operationalisation of SAFTA. However, the pioneering decision of Islamabad SAARC Summit in January 2004 impressed everyone, as it committed itself to intensify cooperation in a number of areas, including '*strengthening transport, transit and communication links across the region'*.

South Asia inherited an integrated transport infrastructure from the British, but this infrastructure was fractured not only by the partition of India but by its political aftermath and now needs to be rebuilt within the context of greater political harmony in South Asia. Across the mainland of South Asia the original transport infrastructure is already in place, but in many areas has fallen into disuse and needs upgrading. Apart from the inconvenience to travellers, these barriers have raised the cost of travel and trade. For example, Bangladesh imports cotton from Pakistan, but a consignment of cotton can take anywhere up to 40 days to move from West Punjab to Chittagong via Karachi, with transhipment in either Colombo or Singapore. If a container of cotton could be put on a freight train leaving Lahore and moving across India, this could possibly reach Dhaka within 4 days. Similar possibilities exist across the region that could greatly reduce costs and travel/transit time.

Integrating the transport network of South Asia would be especially crucial to the fortunes of countries such as Nepal, Bhutan and regions such as North East India because this would serve to end their landlocked or semi-isolated status. Nepal, Bhutan and the North Eastern region of India within such a framework would have the benefit of improved access to the ports and important economic centres of the region and choice of route and mode. The island states of the Maldives and Sri Lanka in the south of the region also require enhanced

connectivity with the rest of SAARC. In this respect improving connectivity by maritime and air transport are especially relevant.

The intra-regional multimodal transport connectivity in Europe has provided foundational support to the convergence of economies, growth and development of trade amongst the EU member countries. Various initiatives for promotion of intra-regional transport connectivity taken earlier by UN-ESCAP and other sub-regional organizations like ASEAN, GMS and ECO of Central Asia have had remarkable success. Their experiences could be a great source of encouragement for SAARC in its efforts to strengthen transport links across their region.

Being inspired by the Islamabad SAARC Summit decision and recognizing the importance of transport integration in South Asia, SAARC, with financial and technical support from the ADB, initiated the *SAARC Regional Multimodal Transport Study* (SRMTS) with the main objective of enhancing multi-modal transport connectivity among SAARC member states, so as to promote intra-regional trade. Actual work on the SRMTS was undertaken in two phases. Under Phase I, starting in August 2005, country reports were compiled with the help of national experts from each of the member countries focusing on:

- Identification from their respective country's perspective of the main intra-regional transport corridors and gateways, both existing and potential, with the main focus being on freight transport and secondary focus on passenger and ferry services where freight and passenger services are commonly combined;
- Examination of the performance of these corridors and gateways and identification of the major physical and, wherever possible, non-physical barriers that inhibit the efficient movement of intra-regional freight; and
- Preparation of materials, wherever possible, for development of a roadmap in Phase II of the project, for addressing these constraints so as to enhance intra-regional connectivity.

Each of the national teams, based on secondary sources of information, consultations and interviews with concerned and relevant officials and field visits to important transport hubs, prepared their country reports. Despite the best efforts of the national consultants, it was not possible to collect all the data in the optimal formats, particularly those relating to non-physical barriers including facilitation measures at the border crossings, mostly due to the non-availability of the required data. These country reports in their final draft form were presented at the Phase I Regional Workshop on SRMTS held at Kathmandu on 16–17 December 2005. These reports were thoroughly deliberated upon at the workshop, where issues relating to the implementation of the Phase II of SRMTS were also discussed and a draft outline (content) of Phase II Report was tentatively agreed upon. At the first Technical Coordination Meeting held in Kathmandu on 12 March 2006, the draft outline (content) of Phase II Report was further discussed and modified. A second Technical Coordination Meeting was also held in Kathmandu on 29–30 April 2006 to finalise sector inputs and to discuss the process to be used in development of the roadmap. A Final Workshop was held in Colombo at which the draft report was presented to the SAARC Secretariat and representatives from the member states.

This report prepared by the combined efforts of the six Regional Consultants includes a Regional Profile indicating the socio-economic scenario of SAARC region and highlights the role that transport could play in integrating the countries of the region. In this context, the report also indicates as to how a selection was made of the major corridors and gateways of

regional significance in the different modes of transport—road, rail, inland waterways, maritime and aviation—for in-depth analysis and identification of their physical and non-physical barriers, including any institutional weaknesses obstructing the efficient movement of freight traffic. Based on further analyses of the information concerning physical and non-physical barriers, together with measures to address the barriers, a proposed roadmap has been developed and is presented in this report. The roadmap is for consideration by SAARC and includes some recommended selected priority measures needed to address the most critical barriers, in order to promote efficient and fully-integrated multimodal transport connectivity among SAARC countries.

2.0 REGIONAL PROFILE

2.1 General Background

The South Asian region—Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan and Sri Lanka (see Map 1)—is not only one of the fastest growing economic regions in the world with an annual average growth rate of over 5% per annum, but is expected to grow at an even faster pace in the second half of the first decade of the 21st Century. These countries cover an area of 4,480,000km^2 and have 1.4 billion inhabitants in 2003, representing more than a fifth of the total world population, but only 2.1% (726 billion US$) of world GNP. The average per capita income was $510 according to the World Bank Development Report 2005. The SAARC region is also notable for its large and rapidly growing population and the member countries of the region are also among the most densely populated and poorest countries in the world. While collectively they account for only 3% of the world's land area, they account for more than one-fifth of the world's population. They generate about 2.0% of global GDP and 1.2% of world trade, but less than 1.0% of world foreign investment and tourism revenues.

Map 1: The SAARC Region

Despite rapid economic growth during the 1990s, the nations in the region have among the lowest per capita incomes in the world. India is by far the largest South Asian country in terms of population, Gross Domestic Product (GDP), and land area, followed by Pakistan and Bangladesh. In 2003, India experienced a growth rate in real GDP of 8.2%, while Pakistan and Bangladesh experienced growth rates of 5.5% and 5.2% respectively. India's GDP growth was 6.4% in 2004, with Pakistan at 5.1% and Bangladesh at 5.3%. There is great diversity among SAARC member countries, in terms of size, level of economic and social development, geography, political systems, languages and culture. In terms of the size of the economy, the variations range from about US $493 billion in India to only US $0.6 billion in Bhutan and Maldives. There are also great variations in the per capita GNP, ranging from US $2,262 in Maldives to US $241 in Nepal. In terms of purchasing power parity (PPP), the per capita GNP ranges from US $1,360 in Nepal to US $3,260 in Sri Lanka, while the PPP for India is US $2,820, and that for Pakistan and Bangladesh are US $1,860 and US $1,600 respectively. This diversity needs to be recognized in any assessment of the potential of these countries for future regional cooperation (see Table 1).

There is also a great diversity in the levels of human development. The Maldives and Sri Lanka score high levels on the Human Development Index (HDI), with India slightly lower and the other SAARC countries with similar scores (see Table 1). Substantial progress has however, been made in many aspects of human development in the region. For example, regional average life expectancy has increased from 49 years in 1970 to 63 years in 2002. South Asia is currently going through a transition as it strives to implement effective economic, political, social and legal structures to support sustained growth.

Table 1: Selected SAARC Regional Indicators

Indicator	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri Lanka
GDP in US $ billions	51.9	0.7	600.6	0.7	5.9	82.3	18.2
GDP per capita (US $)	376	835	564	2,441	237	555	948
GDP per capita (PPP$)	1,770	2,120	2892	n/a	1,420	2,097	3,778
HDI value	0.52	0.54	0.60	0.75	0.53	0.53	0.75
HDI rank	139	134	127	96	136	135	93
Total Population (mln) 2003	136.6	0.635	1,070.8	0.3	26.1	151.8	20.4
Population below national poverty line (%) 1990-2002	49.8	31.7	28.6	n/a	42	32.6	25
Share on income: richest 20% to poorest 20%	4.6	n/a	4.9	n/a	5.9	4.8	5.1
ODA received (US $ millions)	1,393.4	77	942.2	18	466.7	1,068.4	671.9
Exports and Imports of goods & services (as % of GDP)	34	65*	30	151	46	40	78

Note: Data refer to 2003, *is for 2002; *Source*: UNDP-Human Development Report 2005.

2.2 Population

In 2002, the SAARC Region had a total population of nearly 1.4 billion. The three most populous countries of the region, India, Pakistan and Bangladesh, collectively accounted for 97% of this population, with India (the world's second most populous country) alone accounting for 77%. In 2002, the average population density of the SAARC Region was 310 persons per km^2 being nearly seven times the world average, which is 46 persons per km^2. However, within the region, the population densities of the member countries vary

considerably from only 19 persons per km^2 in Bhutan to more than 973 persons per km^2 in the Maldives.

In some of the SAARC member countries, population continues to grow at a fast rate. For example, in four out of the seven member countries—Bhutan, Maldives, Nepal and Pakistan—population growth did not fall below 2% per annum during the period 1998–2002. In other countries, particularly in Bangladesh and Sri Lanka, population is growing only marginally faster than the world average, which was 1.2% per annum in 2002.

Such population growth will have tremendous impact on the demand for transport infrastructure and services available in South Asia, particularly as transport integration takes place. It has been observed that transport demand grows much faster compared to the growth of population and the economy. To avoid congestion and overcrowding, it will be essential to create additional transport capacity and enhance efficiency, in order to improve transport integration.

2.3 General Development Trends

Among the major decisions of the Islamabad SAARC Summit, a roadmap towards an economic union in South Asia was defined with the SAFTA agreement being the first step towards such a union. It was further agreed that implementation of SAFTA, which began on 01 January 2006, should be completed between 2009 and 2013. It is expected that with the meaningful enactment of SAFTA, along with trade policy reforms in the South Asian countries, that intra-regional trade will increase significantly in the years to come.

It is encouraging to note that in the recent years, the SAARC Region has recorded one of the fastest rates of economic growth of any region in the world. Between 1998 and 2002, the consolidated GDP of the SAARC Region grew at a rate averaging 5.1% per annum. This was much faster than the average annual growth rate of South East Asia of 2%, and only slightly slower than that of the fastest growing East Asia region that had growth averaging 5.8% per annum during the same period. Due to the favourable weather conditions that contributed to increased crop production in 2003, GDP growth rate in South Asia further accelerated to 6.9%, more than Southeast Asia's 4.6% and East Asia's 6.5% over the same period.

An economic analysis of the various factors that have contributed to improved overall economic performance in South Asia has revealed that it was, to a large extent, due to the structural reform and liberalization policies applied by most countries in the 1980s. Such reforms encouraged market forces and the private sector to drive economic growth, as distinct from previous policies that had focused more on state-led development.

However, if South Asia's intra-regional trade is to grow rapidly, among others, this will require integration of the transport infrastructure of the region. This calls for cooperation in the strengthening of transportation, transit and communication links across the region, including harmonization of standards and simplification of customs procedures and other similar trade facilitation initiatives to minimise the non-physical trade barriers in support of investment in the transport infrastructure.

2.4 Trade Cooperation

Despite the fact that SAARC is trying to move towards an *Economic Union*, intra-regional trade is still one of the lowest in the world. In 1980, the total intra-regional export trade to their total export was only 4.9% and only increased marginally to 5.0% in 2003 (See Table 2). In the last decade, intra-regional trade showed a significant increase mostly through imports from India by all countries in the region, except Pakistan. Nearly two-thirds of the total value of intra-regional trade was estimated to have been accounted for by just two bilateral trades, Bangladesh/India with 33%, and India/Sri Lanka with 30%. Next in order of significance were India/Nepal trade with 13% and India/Pakistan with 7.8% of intra-regional trade respectively.

The basic reason for the low intra-regional trade profile could be that the pattern of production of SAARC member countries are more or less the same and that their industrial structure is also similar because they all are producers of agro-based commodities and primary products. However, various research studies on informal trading practices among SAARC countries indicate that the proportion of such trade could be significant. If the share of such informal trade could be taken into account, the share of intra-regional trade could be easily twice as much as revealed by official trade figures.

While SAFTA is slowly getting implemented, bilateralism has become a preferred option to stimulate intra-regional trade. For example India has entered into bilateral free trade agreements with Nepal, Bhutan and Sri Lanka and in the case of Bangladesh a bilateral free trade agreement is under negotiation.

Table 2: Total Intra-Regional Exports and Imports of SAARC Countries and Its Share to Exports-Imports with the World (1980-2003)

Country / Year	% of Total Export to World						% of Total Import from World					
	1980	**1985**	**1990**	**1996**	**2001**	**2003**	**1980**	**1985**	**1990**	**1996**	**2001**	**2003**
Bangladesh	68.5 (8.7)	77.4 (7.7)	60.0 (3.5)	60.89 (1.8)	92.09 (1.9)	109.20 (2.1)	96.7 (3.7)	87.8 (3.5)	257.0 (7.0)	1129.7 (12.0)	1299. 1 (10.6)	168.05 (11.6)
Bhutan	n/a	n/a	n/a	97.10 (98.2)	106.65 (98.6)	116.88 (99.1)	n/a	n/a	n/a	80.61 (79.0)	152.37 (85.7)	193.37 (92.5)
India	307 (3.6)	22 (2.2)	487 (2.7)	1650.0 (5.0)	2051.0 (4.7)	2785.0 (4.9)	141.0 (0.9)	125.0 (0.7)	97.0 (0.4)	198.0 (2.6)	504.0 (2.7)	754.00 (2.8)
Maldives	2.1 (26.2)	4.1 (17.0)	7 (13.4)	10.99 (18.6)	16.99 (22.3)	15.69 (13.9)	4.7 (23.0)	6.5 (9.1)	18.0 (13.0)	60.60 (19.8)	93.16 (23.5)	114.18 (22.3)
Nepal	23.9 (37.8)	45.8 (33.6)	15.0 (6.9)	74.10 (19.2)	243.80 (33.1)	335.18 (50.6)	104.9 (47.8)	96.7 (33.0)	52.0 (11.5)	457.00 (29.8)	178.53 (19.1)	238.05 (23.7)
Pakistan	165.7 (6.3)	145.4 (5.3)	223 (4.0)	240.00 (2.6)	264.00 (2.9)	342.00 (2.9)	124.5 (2.3)	95.1 (1.6)	121.0 (1.6)	293.00 (2.5)	295.00 (2.9)	314.00 (2.6)
Sri Lanka	73.2 (7.0)	53.3 (4.2)	59 (3.6)	109.00 (2.7)	157.72 (3.3)	350.07 (6.8)	131.3 (6.5)	117.9 (6.4)	184.0 (6.9)	647.00 (7.9)	714.47 (8.1)	1175.4 (12.9)
Grand Total	**640 (4.9)**	**551 (3.6)**	**861 (3.1)**	**2242.18 (4.5)**	**2931.7 (4.6)**	**4054.0 (5.0)**	**603.0 (2.4)**	**529.0 (1.9)**	**729.0 (1.9)**	**2866.0 (4.5)**	**3234.6 (4.4)**	**4397.2 (4.6)**

() – indicates percent.

Source: Direction of International Trade, IMF, Various Issues.

The outcome of these bilateral free trade agreements has been very encouraging. For example, Sri Lanka and India signed such a bilateral free trade agreement in 2001 and in the following year the value of their bilateral trade registered a 48% increase, with Sri Lanka's exports to India increasing from US$71 million in 2001 to US$168 million in 2002 and India's exports to Sri Lanka increasing from US$ 604 million in 2001 to US$831 in 2002.

Trade and transport are, however, two sides of the same coin. For effective implementation of SAFTA, it will be essential to have an efficient and integrated transport system within South Asia. In the context of globalisation, to remain competitive sub-regionally it is essential to have an integrated transport system to reduce travel time and cost. Global trade and the associated economic growth of a country or a region depend critically on developing an efficient transport and logistics environment that can provide just-in-time logistics and reliable delivery, as well as ensure quality of service.

2.5 Stimulating Investment

The move towards SAFTA will be meaningless unless the issue of stimulating investment in the region, particularly in the less developed areas, is accelerated. The substantive point of a free trade area is for small economies with narrow markets, such as Bangladesh, Bhutan, Nepal and Sri Lanka, to be able to use the incentive of the larger South Asian market to stimulate enhanced investment from within and without the countries. In Bangladesh, as in Sri Lanka, it is widely believed that the expectation of servicing a market of 1 billion people in India will open up new investment horizons in their country. Domestic entrepreneurs seeking to access global financing and foreign enterprises, particularly from East and South East Asia seeking entry into the large and growing Indian market, will be encouraged by SAFTA to rethink their investment plans. In this context, it should be noted that an efficient transportation system has a direct bearing on Foreign Direct Investment (FDI). Countries and regions that have well developed and integrated transport and communications system are better placed in attracting FDI compared to those that suffer from chronic shortage of such infrastructure.

Given the opportunities for unrestricted access to an integrated South Asian market, deep structural changes in their production capacities that can expand and diversify the basket of goods available for export are essential to transforming the fortunes of the smaller economies of South Asia.

2.6 Poverty Situation

SAARC region's per capita income is still the lowest among the world's regions, despite having achieved rapid economic growth rate over the last several years. In 2002, the per capita gross national income (GNI) for the SAARC member countries ranged from US$230 in Nepal to US$2,200 in the Maldives. For the whole of South Asia it was around US$460, only slightly above the figure of US$450 recorded for Sub-Saharan Africa, which had the lowest per capita GNI in the world.

Despite the rapid economic growth over the last few decades, South Asia still remains the region with the largest number of people living in poverty with more than 400 million people still living below the poverty line. The incidence of poverty declined substantially from 41.3% in 1990 to 31.3% in 2000. Despite such gains South Asia, which accounts for 22% of the global population, is home to 39% of the World's poor living on less than US$1 per day. In this context, there is, however, clear evidence that the absolute number of the South Asian population living on less than US$1 per day has been declining over years, though the rate of decline has not kept pace with the world average. While in South Asia this rate has declined at 0.5% per year during the period 1981 and 2001, the number of poor people in the rest of the world declined much faster at around 2.1% per year over the same period.

It is well recognized that economic growth does help reduce the incidence of poverty. The effectiveness of economic growth in reducing poverty levels, however, varies between different parts of a particular country and between different countries in the region. Generally, the incidence of poverty has been relatively high in some rural, remote and less accessible areas, as well as in some of the border areas of South Asian countries. For example, in Nepal, the incidence of poverty in the mountainous areas is around 55% but in the more remote mid and far western districts, it is as high as 70%. Such rural, remote and border areas that have lagged in economic development can benefit substantially through new economic opportunities that can be created with improvements in regional transport connectivity and the resulting facilitation of trade and travel. Regional cooperation can, thus, help reduce poverty by opening up new economic opportunities in border areas and as such these efforts should be promoted actively.

While South Asia has been successful in achieving high rates of economic growth, gains with regard to poverty reduction have been limited by the absence of pro-poor growth. It is also crucial that for growth to have an impact on poverty, it has to be sustained for relatively long periods of time. In the context of this growth and development, transport could among others play a crucial role. In order to achieve a 6–7% growth rate across the region, which is essential for alleviating poverty and reducing underdevelopment, transport and other associated infrastructure development, shall have to be accorded high priority. Improvements in transport connectivity within South Asia would provide enhanced access to markets and greater opportunity for participation in the regional economic process. This could make a substantial dent on poverty. It would also open up opportunities for development of tourism in the region that would have a substantial beneficial impact on employment.

2.7 Trends in Transport Development

The level of transport development is one of the important determinants of economic performance of a nation/region. Availability of transport is crucial in providing an impetus to economic activities, especially for regional and international trade. This section presents an overview of trends in transport development in the South Asian region.

In the context of road transport, the SAARC countries had 3.82 million kms of road network in 2002, which accounted for 10% of the world road network. Between 1993 and 2002, the road network of India, Bangladesh, and Pakistan grew at an average annual rate of 2.6%, 3.7% and 3.2% respectively. Of the South Asian countries, Nepal had the most rapid road network growth during the period 1993–2002, which averaged at 6.5% per annum. Regarding the percentage of paved roads out of total roads, Bhutan was at the top of the list in South Asia in 2002, having nearly 60% paved roads. Other countries such as Bangladesh, Pakistan, India, Sri Lanka and Nepal had shares of 25.00%, 63.0%, 53.20%, 40.70% and 39.20% respectively. Vehicle density and motorization rates are also important indicators to measure a country's level of transport development. Average annual growth rate of the total vehicle fleet of South Asian countries, including two wheelers, over the period 1993–2002 was 8.5% in India, 5.5% in Sri Lanka, 6.5% in Bangladesh, 7.2% in Pakistan, and 10% in Nepal. The vehicle density (vehicles per 1,000 route kms) was low in India at 23.3 (2002), while 17.8 in Nepal (1999), 12 in Bangladesh (2002), 7 in Sri Lanka (2001), 5.9 in Bhutan (2001) and 5 in Pakistan (2001).

With regard to rail transport, South Asia has one of the largest railway networks in the world, spreading over 77,000 route kms, including the Indian Railway network with 63,465 route

kms. About 70% of the entire network in South Asia is broad gauge largely in India, Pakistan and Sri Lanka. In Bangladesh, only about 25% of the network is broad gauge. Although the Railway network historically played a significant integrating role in the social and economic developments in this part of the world, over the years it has been losing its market share to the Road Transport. At present, approximately 30% of freight and 20% of passengers are being carried by Railway with the share of the Road Transport accounting for about 70% of freight and 80% passengers. This trend is however, witnessing signs of change. During the last four years, Indian Railways has been able to achieve 7% to 8% growth rate in its freight and passenger traffic.

South Asian countries vary markedly in terms of freight carried by their respective Railways. During the period 2001/2 to 2004/5, the freight traffic on Indian Railways increased from 492 million to 602 million tonnes, while the net tonne kms increased from 312 billion in 2000/1 to 407 billion net tonne kms in 2004-05. Sri Lankan Railways also witnessed significant growth in freight traffic from 88.2 million in 2000 to 136.9 million net tonne kms in 2004. In Pakistan and Bangladesh, freight traffic indicated decline by over 10%. Another significant indicator of the rail freight traffic is the freight haul distance that the freight train moves on an average and is an important indicator of the financial viability of the rail freight business. On Indian Railways, the lead/average freight haul distance of freight traffic increased from 660kms in 2000/1 to 677kms in 2004/5. In Pakistan, the freight traffic leads also improved to 750kms in 2002/3. However, there has been a decrease in average freight haul distance in Bangladesh from 280kms in 1997/8 to 265 in 2002/3 and in Sri Lanka from 100kms in 1997/8 to 80kms in 2002/3.

Regular rail traffic is interchanged between Pakistan–India, Nepal–India and Bangladesh–India under Bilateral Agreements. The trends of present inter-country trade indicate largely one-sided rail traffic in the form of export traffic moving by rail from India to Pakistan, Bangladesh and Nepal. Indian Railway wagons are allowed to move inside Bangladesh and Pakistan. With regard to rail-bound passenger traffic, currently movement takes place between India and Pakistan through two inter-change points. Presently, there is no passenger traffic moving by rail between Bangladesh and India. There is, however, huge growth potential of intra-regional freight and passenger traffic by rail.

The regional rail connectivity in South Asia has also been identified as one of the most significant links in the overall Trans Asian Rail network from Kapikule in Europe to Hanoi in South East Asia. The Inter-Governmental Agreement by UN-ESCAP has identified the rail link across Pakistan, India and Bangladesh as a corridor of international significance.

In the context of maritime transport, South Asia is endowed with large number of ports, of which only 25 can be treated as prominent ports of this region. In 2003, these 25 ports together handle 366.22 million tonnes of traffic, including 5.85 million TEUs of containers. Container throughput growth for Bangladesh, India and Sri Lanka had been impressive. Bangladesh recorded a growth rate of 19.17% during 2002–2003 and India reached 19.17% during 2000–2003. Sri Lankan growth rate was 11% during 1995–2000, but declined to only 4.19% during 2000–2003. The growth rate was lowest in Pakistan at just 7.2% during the period 1995–2000.

With regarding aviation sector, at present there are 20 airports/gateways within the SAARC region from which there are 251 weekly flights to other regional destinations. There are 28 aviations corridors between these aviation gateways, which saw airlines operating a total of

18.8 million kms in 2004, carrying 2.23 million passengers and producing a total of 1,805 million passenger kms. The corridors also carried 36,602 tonnes of freight and produced 36 million freight tonne kms in the same year. The air transport sector made a significant stride in coping with the growth of international and domestic traffic in South Asia. The overall passenger growth in intra-regional travel has been one of the highest in the world at 12% per annum, while in freight travel, it has been an equally impressive 7.5% per annum over the period 2001/4. Indian air transport market has emerged as one of the brightest spots in the global aviation arena. Both international and domestic sectors combined have witnessed growth rates of 9.4%, 11.4% and 22.4% during the years 2002/3, 2003/4 and 2004/5 respectively. The development of air transport is particularly critical for the island states not only for effective communications but for development of their tourist industry that represents an important part of their economy.

Inland water transport in South Asia constitutes a very small part of the total transport network of the region. Out of total freight traffic of about 900 million tonnes by all modes of surface transport in 2001–02, IWT accounted for only 25 million tonnes and shared 3% of the total South Asian freight traffic in the same year. In terms of tonnes kms, the share of IWT was less than 1%.

2.8 State of Transport Cooperation

To facilitate and sustain the economic integration process in today's interdependent world economy an integrated transport system at the regional level is essential. South Asia being geographically contiguous, it is much easier to strengthen its transport connectivity provided the concept enjoys widespread political support. For various historical, political and economic reasons, the surface transport networks in South Asia still continue to remain fragmented and their potential as engines of economic growth at the regional level remain largely unrealized. This is happening despite the fact that the basic infrastructure facilities to establish mutually beneficial intra- and inter-regional transport linkages already existing in many countries. The absence of such integration is having an adverse impact on economic competitiveness and impedes intra-regional trade. Following the partition of British India, the transport systems of South Asia have developed only in the national context. As a result, little consideration was given to cross-border issues of compatibility, uniformity of standards in infrastructure and equipment design.

Out of the seven SAARC countries, two are islands (Maldives and Sri Lanka) and the remaining five are mainland countries. Besides air transport that serves all SAARC countries, maritime transport directly serves only 5 countries, since Nepal and Bhutan are landlocked. In addition, there are three other modes of transport namely road, rail and inland water transport that have the potential to provide direct surface transport connectivity between the remaining five countries and water transport that only connects two countries.

In relation to freight transport, the maritime mode is the most well used for connectivity with external markets, but less prominent in relation to intra-regional trade. Generally, the connectivity is reasonable between all the major ports, but is reliant in many cases in transhipment through hub ports, thus extending transit times.

Air transport in respect of freight is still relatively undeveloped, even though freight charges are considered low on many routes. Almost all intraregional airfreight movements are carried

on passenger aircraft as underbelly cargo, with few all-freighter movements. However, overall service connectivity is considered reasonable given the extensive passenger network.

Rail is an important mode of surface transport for longer lead freight traffic given its wide range of connectivity with Indian Railway network and its strong market share in carriage of bulk and semi-bulk products between the countries of the region like Bangladesh, Pakistan and Nepal with direct rail connections. However, it is constrained by the technical problems related to different gauges, track structures, signalling and incompatible rolling stocks. It has as a result not been able to break into the value added freight markets such as containers and special products. This has been achieved in a spectacular way by Indian Railways for internal containerized cargo movement on its network. The absence of a multilateral agreement for direct intra-regional movement has also been a constraint and as a result the full potential of railway as a mode of transport has not been fully exploited.

Road transport has grown rapidly but is particularly constrained by the lack of cross border agreements between India and Bangladesh and India and Pakistan that means that any cross border traffic has to be unloaded and reloaded, as through transport is not permitted, thus raising freight costs. Bhutan and Nepal are almost totally dependent on road transport for bilateral trade and for much of their third country trade. The road mode is therefore constrained by a number of non-physical barriers that adversely affect its connectivity in addition to minor infrastructure problems in relation to poor road conditions on some corridors.

In relation to development of passenger transport, passengers choose the mode of travel on considerations of availability, affordability and convenience in terms of time and cost. Logically, over long distances air travel is the natural mode of choice. The trend of falling airline fares has made air travel much more affordable. SAARC countries are also working towards removing or lessening the infrastructural and institutional hurdles inhibiting inter-country air transport links.

Rail transport is convenient for overnight journeys and intermediate distances that can be covered within a reasonable period of time. Affordability is generally not an issue with rail travel but with the emergence of low-cost airlines with highly competitive fares, rail travel over very long distances could face increasing competition in future. However, due to lack of bilateral agreements, long distance inter-country passenger movement has not developed to the desired levels as yet.

Road travel is most convenient for short distances. It scores over other modes by virtue of providing door-to-door services but it would not be a modal choice for passenger journeys extending beyond 12 hours, unless the same is compensated by highly attractive low fares with reasonable comfort or where there are constraints in respect of other modes. Due to limited scope of present agreements for inter-country direct bus passenger movements, the full potential of this mode has not been exploited. Ferry links, when available, are also a preferred mode among commuters.

Within certain overlapping ranges of distances, two or more modes could be alternative options. For a large number of intra-regional journeys, however, use of two or more modes in succession is the norm. The challenge for national and SAARC transport planners is to provide a framework encompassing all the transport modes within which the choice of

travellers is determined by economic considerations without the restrictive constraint of non-availability of one or the other mode.

The institutional framework for handling international traffic is generally well-developed in respect of air travel but less so in respect of other modes. SAARC region is no exception. This report has made an attempt to suggest measures to strengthen the institutional arrangements in respect of air travel and bring in similar arrangements for intra-SAARC rail and road travel, especially among those countries sharing land borders, such as Pakistan, India, Nepal, Bhutan and Bangladesh.

The present state of transport cooperation in South Asia, in the various modes is indicated in the following sections.

2.8.1 Road Transport

Freight

In South Asia, road transport is the dominant mode and its importance is growing in all countries. Most of the trading between India and its neighbours takes place along the land routes. The border between India and Bangladesh has ten important road-based check posts. The facilities at Banglabandha (Bangladesh)/Fulbari (India)–Panitanki (India)/Kakarvitta (Nepal) are exclusively for Bangladesh–Nepal bilateral trading. All freight traffic by road to and from Bangladesh needs transhipment at the border due to the absence of a through-transport agreement signed by both countries. Bangladesh has recently adopted an axle load limit of 10 tonnes, as such there is now no difference in the axle load limits between India, Bangladesh, Nepal and Bhutan, though there are different limits applicable to smaller roads. The Benapole (Bangladesh)/Petrapole (India) route carries the heaviest traffic by road, accounting for about 80% in terms of value and 50% by volume of India's exports to Bangladesh. Currently, around 300 trucks are moving daily via Benapole–Petrapole border point.

Between India and Nepal, there are 19 official trading points of which 15 are more active. Out of these, only six are consistently being used, of which Birgunj, Bhairahawa and Biratnagar handle between them around 80–85% of the total international traffic of Nepal. India allows trucks from Nepal and Bhutan to operate on designated transit routes within India. Indian trucks are allowed anywhere into Nepal, but are given a limit of 72 hours to return to India. Nepalese trucks need permits for every trip to India with a validity of three months, but they are allowed to the nearest market towns and rail-heads in India freely. India allows Bhutan to use Phuentsholing (Bhutan)–Changrabandha (India)–Burimari (Bangladesh) for their trade with Bangladesh, but this corridor is not allowed for third country trade.

Passenger

There are two established routes between Bangladesh–India for passenger movement. The Dhaka to Kolkata and vice versa direct bus operation started in 1999 and has been doing well. The Dhaka–Agartala bus operation started in 2003, but is currently still a loss making one due to a variety of problems. On February 2005, two Bangladeshi private transport companies—"Shamoli Paribahan" and "SR Travels" jointly started the bus service between Dhaka and Shiliguri (Assam) in cooperation with a private sector operator of Indian TATA Sumo microbuses.

Between Delhi and Lahore there was a cross border bus services once a week in either direction started in 1999 but it was suspended in January 2002. These services resumed operation again from July 2003. The landmark fortnightly bus service between India and Pakistan-administrated Kashmir was launched on 7 April 2005 for the first time in nearly 60 years. Recently another two bus services between Lahore and Amritsar and Nankana Shahib and Amritsar have commenced.

With regard to movement between Nepal, Bhutan and India, national citizens are allowed to move freely by road without any visa and there are frequent bus services either between the countries or between border points and key cities.

2.8.2 Rail Transport

Freight

Among the mainland countries of South Asia, Bhutan has no rail link and Nepal has a link to the Indian railway network, but only a single link with Indian Railways network connected to the ICD at Birgunj. Bangladesh, India and Pakistan have extensive rail networks and before partition of India in 1947 the intra sub-continental movements were mainly carried out by the railway. Although these physical links are still there, only limited cross border movement of freight by rail is taking place between Bangladesh and India, Pakistan and India and between Nepal and India. The volumes of freight traffic being moved by rail are however far less than the potential and projected growth of inter-country traffic.

Currently, three broad gauge (BG) rail corridors are active for export and import traffic between India and Bangladesh. On the western side, between Pakistan and India, there are two BG corridors that are currently providing connectivity, though one crossing is restricted to passengers only at present.

Between India and Bangladesh, Indian rail wagons are pulled by Bangladeshi locomotives only over a short distance inside the country to a point where transhipment takes place. Present axle load restriction over Jamuna Bridge in Bangladesh prohibits the movement of broad gauge loaded wagons and containers to pass through, even though a dual gauge railway network exist up to Joydebpur (near Dhaka). Bangladesh Railway (BR) wagons do not cross the Indian border as the rolling stock is incompatible with the air-braked stock of Indian Railways. Similar problems exist between Pakistan and India. Furthermore, lack of coordination for gauge conversion programmes on Indian Railways (IR) and dualisation on Bangladesh Railways may further impede the prospects of uninterrupted, unigauge through intra-regional movement by rail.

Between India and Nepal, rail movements are entirely on broad gauge railway link connecting Kolkata port and other destinations in India with Birgunj ICD that started operation from July 2004. There is limited freight movement by rail between India and Pakistan, partly due to the indicated problem of lack of standardisation of infrastructure and rolling stock. It is however important to note that the current railable traffic is almost entirely one-sided i.e. from India to Bangladesh, Nepal and Pakistan. Empty wagons are being returned back to India as there is no railable traffic from these countries. This is currently resulting in a huge under-utilization of the existing transport capacity.

Passenger

Among the mainland countries of South Asia, passenger movement by railway takes place only between India and Pakistan. The Samjhauta (friendship) Express resumed its operation in January 2004, after more than 2 years suspension of services. The twice-weekly passenger train operates between Lahore and Attari (India) opposite Wagha in Pakistan. The overnight train from Delhi arrives at Attari where passengers get into Samjhauta Express for their onward journey to Lahore. Another train connection was inaugurated in February 2006 on the South Western side of India between Munabao–Khokhrapar to link Karachi with Jodhpur in India. Although there exists a huge potential for passenger traffic between India and Bangladesh, the passenger services have yet to be started.

2.8.3 Inland Water Transport

Freight

Among the South Asian Countries, inland water transport links are available only between India and Bangladesh. Indian transit traffic and Indo-Bangladesh bilateral traffic moves along these IWT routes under a protocol. This is the only transit facility for India through Bangladesh for serving the requirements of North-East Indian States. However, the IWT routes are highly underutilised, partly due to a number of physical and non-physical barriers, of which the lack of a long term protocol is considered the major constraint.

Passenger

There is no inter-country passenger movement by inland water transport.

2.8.4 Maritime Transport

Traditionally maritime transport has been a dominant mode of transport in South Asia, in terms of carrying exports and imports between SAARC member states. In this process, a number of maritime gateways flourished over the years and has been contributing in the socio-economic development of each member state. Some of the maritime gateways that contributed a great deal in establishing maritime connectivity between SAARC member states in the past include Chennai, Chittagong, Colombo, Karachi, Kolkata and Mumbai. However, other maritime gateways have been making substantial contribution in handling regional trade in the recent years due to the growth in containerisation and others have the potential to do so, including, Cochin, Haldia, Tuticorn, JNPT, Mongla and Port Qasim. In addition, given its island status the port of Male is also critical for connectivity between the Maldives and other SAARC countries.

A key issue is the limited draft present at all of the SAARC ports except Colombo. All the other ports are unable to accommodate 4th generation container vessels, assuming the demand were present, and as a result much of the intra-regional traffic is routed through container hubs, of which only Colombo is in the region. This can have the effect of significantly increasing transit times on intra-regional traffic. In addition, almost all ports have capacity problems in relation to handling container traffic and required appreciable investment to handle projected demand.

2.8.5 Air Transport

Even though air transport has seen phenomenal growth over several decades, the SAARC region lags behind many other regions in terms of its usage of air travel. Historically, the SAARC region developed its air travel links with Europe and more lately with East Asia and the Middle East. It did not develop the intra-regional corridors or a regional network in the same manner. However given the opening up of trade barriers and the anticipated relaxation in personal travel restrictions, it is expected that there will be a high growth potential for regional travel. There is evidence to this already in some corridors such as between Sri Lanka and India, two countries which have adopted more liberal aviation policies in recent years. Freight transport also stands on the threshold of rapid growth.

However, connectivity between the regional centres, especially the capital cities in terms of direct flights is still very low. The cost of travel is relatively high when compared to other regions. There is a deficiency of investment to keep pace with the demand for airport capacity, particularly in relation to the provision of modern terminals and additional runway capacity. There are still many regulatory barriers in some countries in the region that prevents greater competition in service provision. Moreover, the region has not developed strong hub operations for efficient regional transfers.

2.8.6 Border Crossings

Besides physical links, considerable difficulties exist at the land border crossings between South Asian countries. The basic constraints are the lack of bilateral agreements, inefficient customs operations, lack of transparency of inspection procedures, need for informal payments and inadequate preparation of customs documentation by shippers, etc. An unusually long time is taken for scrutiny, checking and completion of documents followed by lengthy examination routines. None of the borders yet have on-line customs IT connectivity to facilitate clearances. Banking, medical, communication, warehousing, security and fire fighting facilities are deficient and wayside amenities are absent in many cases. For want of adequate parking areas for trucks, vehicles are parked on the road creating acute congestion. At most of the border points, there is only one exit route for both passengers and goods. This creates considerable inconvenience for the users and the lack of segregation is contrary to international best practice, as well as counter to the customs developments promoted under the Revised Kyoto Convention. The lack of transport agreements allowing the direct movement of freight vehicle across the borders results in border congestion due to the need for transhipment. This process not only increases transport costs considerably but results in increased damage to products, pilferage and incidences of unauthorised payments.

3.0 IDENTIFICATION OF KEY CORRIDORS/GATEWAYS

In order to have smooth efficient movement of both goods and passengers across the South Asia region and with a view to achieving the specific objective of SRMTS to enhance transport connectivity amongst SAARC member countries so as to promote intra-regional trade, an attempt was made to identify the main existing and potential corridors and gateways. Under Phase I of SRMTS, the country reports already examined existing and potential corridors/gateways that could serve as SAARC corridors for inter-country movement, but studied these corridors/gateways from the individual country perspective. All the identified corridors/gateways were reviewed and those that were considered to have the highest potential to serve as the SAARC corridors catering to the needs of two or more countries were selected for further assessment. An audit trail of this selection process is shown in the following sections by mode.

3.1 Road Corridors

3.1.1 Road Corridors Considered

In the recent years, in South Asia, road transport has become the most dominant mode of transport internally and its importance has been growing continuously in all the countries. So far, much of the trading between India and its mainland neighbouring countries is taking place along land routes, particularly via the road corridors.

A good number of road corridors were considered by the country reports, including both the existing and the potential corridors. Except between Nepal, Bhutan and India, there is no direct movement of road freight transport across the border between India and Bangladesh and between Pakistan and India as indicated in Chapter 2. At the Bangladesh–India and the Pakistan–India borders goods are required to be transhipped as no direct through road transport movement across the border is allowed. However, the potential of freight movement by road between the mainland countries of South Asia is tremendous, once such a through transport movement can be facilitated.

In the country reports prepared under Phase I of SRMTS, a total of 18 regional road corridors (both existing and potential) were identified. These corridors are shown below in Table 3.

Table 3: Main Road Corridors in the SAARC Region (as identified under Phase 1)

Existing Road Corridors			
	Corridor	**Countries**	**Inter-change Points**
1	Lahore–New Delhi–Kolkata–Petrapole–Benapole–Dhaka (2,322 kms)	Pakistan, India & Bangladesh	Wagha(Pakistan)/Wagha Border (India), Petrapole (India) /Benapole (Bangladesh)
2	Karachi–Lahore–New Delhi–Nepalgunj–Kathmandu (3,147kms)	Pakistan, India & Nepal	Wagha (Pakistan)/Wagha (India), Nepalganj (Nepal)
3	Kathmandu–Kakarvitta–Phulbari–Banglabandha–i) Mongla (1,362kms) or ii) Dhaka–Chittagong (1,442kms)	Nepal, India & Bangladesh	Kakarvitta (Nepal) /Panitanki (India), Phulbari (India)/Banglabandha (Bangladesh)
4	Kathmandu–Kakarvitta–Phuentsholing–Thimphu (1,011kms)	Nepal, India & Bhutan	Kakarvitta (Nepal)/Panitanki (India), Jaigon (India)/ Phuentsholing (Bhutan)
5	Kathmandu–Kolkata/ Haldia (1,323kms)	Nepal & India	Birgunj (Nepal)/ Raxaul (India)

6	Shillong–Sylhet–Dhaka–Kolkata (721kms)	India & Bangladesh	Dawki (India) /Tamabil (Bangladesh), Benapole (Bangladesh) / Petrapole (India)
7	Shillong–Sylhet–Chittagong (513kms)	India &Bangladesh	Dawki (India)/Tamabil (Bangladesh)
8	Agartala–Akhaura–Dhaka–Kolkata (478kms)	India & Bangladesh	Agatala (India)/ Akhaura (Bangladesh), Benapole/ Petrapole
9	Thimphu–Phuentsholing–Jaigon–Kolkata/Haldia (1,039kms)	Bhutan & India	Phuentsholing (Bhutan)/ Jaigon (India),
10	Thimphu–Phuentsholing–Jaigaon–Burimari–i) Dhaka–Chittagong (966kms) and ii) Mongla (880kms)	Bhutan, India & Bangladesh	Phuentsholing / Jaigaon (India), Chengrabandha(India) / Burimari (Bangladesh)
11	Kathmandu–Bhairahawa–Sunauli–Lucknow (663kms)	Nepal & India	Bhairahawa (Nepal)/Sunauli (India)
12	Biratnagar–Kolkata (689kms)	Nepal & India	Biratnagar(Nepal) / Jogbani (India)
13	Maldha–Shibganj–Dhaka (344kms)	India & Bangladesh	Mehdipur (India) /Sonamosjid (Bangladesh
14	Srinagar– Muzaffarabad (159kms)	India & Pakistan	Kaman Posti (India)/ Chokothi (Pakistan).
Potential Road Corridors			
15	Samdrup Jongkhar (Bhutan)–Guwahati (India)	Pakistan & India	n/a
16	Munabao– Khokhropar	India & Pakistan	Munabao (India)
17	Amritsar– Nankana Saheb	India & Pakistan	n/a
18	Jammu–Sialkot	India & Pakistan	n/a

3.1.2 Approach to Corridor Prioritization

The above mentioned corridors were identified in view of their importance in carrying the bilateral traffic between the South Asian countries, with most of these corridors carrying both goods and passengers. There are, however, a number of corridors that have been identified because of their potential at some future time to serve as key regional corridors becoming more active anytime as and when the countries involved decide to develop these corridors for the movement of goods and passengers.

However, keeping in view the specific objectives of SRMTS, an attempt was made to identify the corridors that are likely to have greater regional significance and therefore need to be further developed on a priority basis. In this exercise, a number of criteria were considered in selecting the priority corridors. The main criteria used were:

- Volumes and trend of existing traffic and the potential of the corridor to carry future traffic;
- Potential to provide direct connectivity by enabling through movement across the region;
- Ability to provide access for landlocked countries/states to ports or to other major transport networks;
- Potential to provide short cut routes that would bring major transport cost savings; and
- Need to revitalise historical links or provide linkages for meeting socio-political requirements.

3.1.3 List of Selected Corridors

After careful application of the criteria indicated under section 3.1.2, the following 10 road corridors of greater regional significance were identified for further detailed assessment. It is expected that the following corridors when fully developed would enable smooth movement of intra-regional freight and passenger traffic and contribute to the overall economic development of SAARC region. The selected regional road corridors are shown in Table 4.

Table 4: Selected Road Corridors for Prioritization

	Corridor	Countries	Basis of Selection
SHC 1	Lahore–New Delhi–Kolkata–Petrapole/Benapole–Dhaka–Akhaura/Agartala	Pakistan, India & Bangladesh	Potential to carry major intraregional traffic and Potential to providing shorter route leading to transport cost savings
SHC 2	Kathmandu–Birgunj/Raxaul–Kolkata/ Haldia	Nepal & India	Access to landlocked Nepal to Indian ports
SHC 3	Thimphu–Phuentsholing–Jaigon–Kolkata/Haldia	Bhutan & India	Access to landlocked Bhutan to Indian ports
SHC 4	Kathmandu–Kakarvitta–Phulbari–Banglabandha–Mongla/Chittagong	Nepal, India & Bangladesh	Access to landlocked Nepal to Bangladeshi ports
SHC 5	Sandrop Jongkhar–Guwahati–Shillong–Sylhet–Dhaka–Kolkata	Bhutan, India & Bangladesh	Potential to providing shorter route leading to transport cost savings
SHC 6	Agartala–Akhaura–Chittagong	India & Bangladesh	Shorter access to Chittagong port for Indian North Eastern States
SHC 7	Kathmandu–Nepalganj–New Delhi–Lahore–Karachi	Nepal, India & Pakistan	Potential of the corridor to carry future traffic
SHC 8	Thimphu–Phuentsholing–Jaigaon–Burimari–Mongla/Chittagong	Bhutan, India & Bangladesh	Access to landlocked Bhutan to Bangladeshi ports
SHC 9	Maldha–Shibganj–Jamuna Bridge (Bangladesh)	India & Bangladesh	Potential to provide direct connectivity to carry future traffic
SHC10	Kathmandu–Bhairahawa–Sunauli–Lucknow	Nepal & India	Potential of the corridor to carry future traffic

3.2 Rail Corridors

3.2.1 Rail Corridors Considered

Railways have the potential of becoming one of the most important transport modes in the context of SAARC, particularly for intra-regional movement of goods and passengers between India, Bangladesh, Pakistan and Nepal. Sri Lanka does not have any direct rail link with India. Bhutan and Maldives do not have rail networks.

A number of rail corridors were considered in the Phase 1 Country Reports for inter-country movement. These included both the existing and the potential corridors of regional significance. The existing corridors are currently used for transportation of goods and passengers along nominated interchange points, under the respective bilateral transit agreements. The railway network in the SAARC member countries consists mainly of a broad gauge network that is generally compatible with each other, except the metre gauge network east of Dhaka in Bangladesh.

The rail links of regional significance, both existing and potential, that were identified in the country reports prepared under SRMTS Phase I are listed in Table 5.

Table 5: Regional Rail Corridors identified in Phase 1

	Corridor	Countries	Inter-change Points
1.	Ranaghat (India)–Dhaka (Bangladesh)	India & Bangladesh	Gede (India)/Darsana (Bangladesh)
2.	Bongaon (India)–Khulna (Bangladesh)	India & Bangladesh	Petrapole (India)/ Benapole (Bangladesh)
3.	Old Malda (India)–Ishurdi Jn. (Bangladesh)	India & Bangladesh	Singhabad (India)/ Rohanpur (Bangladesh)
4.	Amritsar (India)–Lahore (Pakistan)	India & Pakistan	Wagha (Pakistan)/Attari (India)
5.	Jodhpur (India)–Karachi (Pakistan)	Pakistan & India	Munabao (India)-Khokhrapar (Pakistan)
6.	Birgunj (Nepal)–Kolkata (India)	Nepal & India	Birgunj (Nepal)/ Raxaul (India)
7.	Birgunj (Nepal)–Mumbai (India)	Nepal & India	Birgunj (Nepal)/ Raxaul (India)
Potential Rail Corridors			
8.	Barsoi (India)–Parbatipur (Bangladesh)	India & Bangladesh	Radhikapur (India)/Birol (Bangladesh)
9.	New Maynaguri (India)–Lalmonirhat (Bangladesh)	India & Bangladesh	Changrabandha (India)/Burimari (Bangladesh)
10.	Karimganj (India)–Kulaura (Bangladesh)	India & Bangladesh	Mahishasan (India)/Shahbazpur (Bangladesh)
11.	Colombo (Sri Lanka)–Chennai (India)	Sri Lanka & India	Talaimannar (Sri Lanka)/Rameswaram (India)
12.	Badarpur (India)–Bhairab (Bangladesh)	India & Bangladesh	Agartala (India)/Akhaura (Bangladesh)
13.	Jammu (India)–Sialkot (Pakistan)	Pakistan & India	n/a
14.	Jayanagar (India)–Janakpur (Nepal)	Nepal & India	n/a
15.	Hashima (India)–Phuentsholing (Bhutan)	India & Bhutan	n/a

3.2.2 Approach to Corridor Prioritization

The above-mentioned corridors were identified largely based on the existing bilateral traffic between the SAARC member countries. The seven identified existing corridors primarily involve three broad gauge rail connections between India and Bangladesh through which there is regular movement of freight. The broad gauge connectivity between Nepal and India primarily caters to the transit traffic meant for Nepal that passes through Kolkata/Haldia ports. There is no passenger movement by rail between Nepal and India. The rail connectivity between India and Pakistan through Wagha handles both passenger and small quantities of freight traffic. Another broad gauge connection was operationalised recently between India and Pakistan by commissioning of the railway link between Munabao and Khokhrapar for passenger traffic. The other eight corridors identified existed historically and/or have the potential to be developed as future rail corridors.

In order to achieve the specific objective of SRMTS and to establish efficient transport connectivity amongst SAARC member States for promoting intra-regional trade, an attempt was made to identify the priority corridors that are of greater regional significance. To undertake this task, the following criteria were considered in selecting the corridors:

- Pattern and quantum of existing bilateral and intra-regional freight and passenger traffic;
- Connectivity to enable intra-regional through movement of passengers and goods;
- Requirement of landlocked countries to have access to the ports and major transport networks;
- Ability to reduce transit and travel times across countries;
- Potential for revitalizing and strengthening of historical/dilapidated rail links; and
- Infrastructural requirements for development of missing links.

3.2.3 List of Selected Corridors

Based on the application of the criteria indicated under 3.2.2, the following 5 rail corridors of greater regional importance were identified for detail assessment (see Table 6). It is expected that once these corridors are fully developed, and all the physical and non-physical constraints are addressed properly, efficient rail connectivity will be established between the concerned SAARC countries.

Table 6: List of Selected Corridors

	Corridor	Countries Served	Basis for Selection
SRC 1.	Lahore (Pakistan)–Delhi/ Kolkata (India)–Dhaka (Bangladesh)–Mahishasan– Imphal (India)	Pakistan, India & Bangladesh	Potential growth of intraregional traffic Reduced distance and shorter transit time
SRC 2.	Karachi (Pakistan)–Hyderabad–Khokrapar–Munabao–Barmer–Jodhpur (India).	Pakistan & India	Shorter route for intra-regional traffic Access to Karachi Port and potential third country traffic
SRC 3.	Birgunj (Nepal)–Raxaul–Haldia/Kolkata (India)	Nepal & India	Access to the landlocked Nepal Potential corridor for third country and bilateral traffic
SRC 4.	Birgunj (Nepal)–Raxaul–Katihar (India)–Rohanpur–Chittagong (Bangladesh) with links to Jogbani (Nepal) and Agartala (India)	Nepal, India & Bangladesh	Access to Chittagong Port for Indian and Nepalese traffic Shorter route for North Eastern States of India through Bangladesh
SRC 5.	Colombo (Sri Lanka)–Chennai (India)	Sri Lanka & India	Restoration of old rail ferry link to provide passenger and goods access from the island Sri Lanka to mainland South Asia

3.3 Inland Waterways Corridors

3.3.1 Inland Waterway Corridors Considered

Water transport is still considered to be the cheapest mode of transport in terms of costs/km for freight, as well as passenger movements. In the SAARC region the largest inland waterways exist in India and Bangladesh. In Pakistan, though the Indus River is used for inter-city transportation it is not in the true sense of organized inland waterways. Sri Lanka's narrow channel between India and Northern Sri Lanka, the Palk Strait is considered to be the part of its inland waterways, whereas, other SAARC States do not have any waterways of commercial interest.

A number of inland waterway corridors were identified in the Country Reports prepared under Phase I of SRMTS. These included both the existing and the potential corridors of

regional significance. The existing corridors are currently used for transportation of transit traffic between India and Bangladesh, as well as inter-country traffic for which there are a number of ports of call designated under the bilateral transit agreement.

The existing and potential inland waterway corridors that were identified in the Country Reports are shown in Table 7.

Table 7: Existing and Potential IWT Corridors

	Corridors	Length (in kms)	Countries served
1	Kolkata–Haldia–Raimongal–Mongla–Kaukhali–Barisal–Hizla–Chandpur–Narayanganj–Aricha–Sirajganj–Bahadurabad–Chilmari–Pandu	1,439	India and Bangladesh
2	Kolkota–Haldia–Raimongal–Mongla–Kaukhali–Barisal–Hizla–Chandpur–Narayanganj–Bhairabbazar–Ajmiriganj–Markuli–Sherpur–Fenchuganj–Zakiganj–Karimganj	1,318	-do-
3	Rajshahi–Godagari–Dhulian	<100	-do-
4	Karimganj–Zakiganj–Fenchuganj–Sherpur–Markuli–Ajmiriganj–Bhairabbazar–Narayanjanj–Chandpur–Aricha–Sirajanj–Bahadurabad–Chilmari–Dhutbri–Pandu	1,231	-do-

3.3.2 Approach to Corridor Prioritization

The above mentioned corridors were identified largely based on the existing bilateral and transit traffic that is being carried between Bangladesh and India. The four corridors mentioned above primarily use only five major rivers—Brahmaputra/Jamuna, Padma/Ganges, Meghna, Hoogly and Bhagirathi—passing through these two countries.

In order to achieve the specific objectives of SRMTS, an attempt was made to identify the inland waterway corridors that have relatively greater regional significance, and, therefore may need to be further developed on priority basis. In this exercise, a number of criteria were considered in selecting the priority corridors. The criteria used were as follows:

- Existing traffic volume along the corridor and the potential of the corridor to carry future traffic; and
- Ability to provide direct waterway connectivity for the north-eastern part of India to sea ports at Kolkata/Haldia.

3.3.3 List of Selected Corridors

After careful application of the criteria indicated under sub-item 3.3.2, the following two IWT corridors of greater regional significance were selected for detailed assessment. It is expected that the following corridors when fully developed would facilitate faster movement of bilateral freight traffic between Bangladesh and India, as well as Indian transit traffic across Bangladesh. This initiative would contribute a great deal to rejuvenating the traditional water transport routes between Bangladesh and India for carrying certain type of commodities for which this mode of transport is still considered most cost-effective. The selected regional IWT corridors are shown in Table 8.

Table 8: Selected IWT Corridors

	Corridors	Countries served
SIWC 1	Kolkata–Haldia–Raimongal–Mongla–Kaukhali–Barisal–Hizla–Chandpur–Narayanganj–Aricha–Sirajganj–Bahadurabad–Chilmari–Pandu	India and Bangladesh
SIWC 2	Kolkota–Haldia–Raimongal–Mongla–Kaukhali–Barisal–Hizla–Chandpur–Narayanganj–Bhairabbazar–Ajmiriganj–Markuli–Sherpur–Fenchuganj–Zakiganj–Karimganj	Do

3.4 Regional Maritime Gateways

3.4.1 Regional Maritime Gateways considered

The sea ports being the gateways of a country play a significant role in its socio-economic development. Even after major development of roads and rail transport in the recent decades, maritime transport continues to play a dominant role in carrying the external trade of most of the countries. Many cities of the world grew around their ports. This is the case even in the SAARC region with Chennai, Chittagong, Colombo, Karachi, Kolkata and Mumbai that grew centring on their port role.

The country reports, prepared under Phase I of SRMTS identified 19 maritime gateways that are important in carrying the external trade of SAARC countries. These maritime gateways are currently handling national/regional, as well as international traffic. The identified gateways are shown in Table 9.

Table 9: Identified Maritime Gateways

SAARC State	The coast line		Principal Ports for SAARC Trade
	Facing	Coastal Distance	
Bangladesh	Bay of Bengal	580kms	Chittagong Mongla
India	Arabian Sea on West Coast	7,517kms	Kandla Mumbai Mormugao New Manglore JNPT Cochin
	Bay of Bengal on East Coast	n/a	Chennai Haldia Kolkata Paradip Vishakhapatnam Tuticorin
Maldives	Indian Ocean	Comprises of Islands 1190 corals and stretches 470.	Male
Pakistan	Arabian Sea	1,100kms	Karachi Port Bin Qasim
Sri Lanka	Indian Ocean	1,600kms	Colombo Trincomallee

3.4.2 Approach to Gateway Prioritization

The above mentioned maritime gateways were identified on the basis of their importance in carrying traffic between South Asian countries, as well as international traffic. Some of the gateways were identified because of their historic importance, while there are a few others that assumed importance because of their ability to handle deeper draft vessels or the availability of modern handling facilities, especially to handle container traffic.

To achieve the main objectives of SRMTS, an attempt was made to identify the maritime gateways that have relatively greater regional significance and could contribute effectively in handling intra-regional trade, and therefore deserve to be further developed on priority basis. A number of criteria were used in prioritizing the gateways and these were as follows:

- Existing traffic volume handled;
- Potential to handle future traffic, especially intra-regional container traffic; and
- Ability to provide access for landlocked countries/states to sea ports.

3.4.3 List of Selected Gateways

The above noted criteria were carefully applied to assess the relative importance of the gateways. This resulted in the selection of the following 10 Maritime Gateways for further assessment. It is expected that these gateways when fully developed and their physical/non-physical barriers addressed properly will be able to make a significant contribution both individually and collectively in the economic development of SAARC region. The selected maritime gateways are shown in Table 10.

Table 10: Selected Regional Maritime Gateways

SAARC State	Principal Ports for SAARC Trade	Basis of Selection
Pakistan	Karachi Port Bin Qasim	Potential to handle future traffic Potential to handle future traffic
India	JNPT. Kolkata / Haldia Cochin Tuticorin	Potential to handle intra-SAARC traffic Ability to provide access for landlocked countries to sea ports Potential to handle intra-SAARC traffic Potential to handle intra-SAARC traffic
Bangladesh	Chittagong Mongla	Ability to provide access for landlocked countries and regions to the sea ports
Sri Lanka	Colombo	Potential to handle international and intra-regional container traffic as a hub port
Maldives	Male	Potential to handle future traffic

3.4.4 Maritime Passenger Corridor

There are currently no ferry services operating between SAARC countries. However, in Phase 1 the national teams from India and Sri Lanka identified that evaluations had been undertaken into the possibility of establishing regular ferry services between Colombo and either Cochin or Tuticorin as an alternative to Rail Corridor 5, which had the problem of restricted draft and adverse weather conditions during the monsoon period. It was therefore decided to assess this potential link in addition to Rail Corridor 5.

3.5 Regional Aviation Gateways

3.5.1 Aviation Gateways Considered

At present there are 20 airports within the SAARC region from which there are flights to other regional destinations. These 20 airports are considered as regional aviation gateways and are listed in Table 11, along with the regional passenger movements to/from each airport and their total international (i.e. including SAARC Region) traffic.

Table 11: Present Aviation Gateways in SAARC Region

Airport	Regional Passenger Movements (2004)	Regional Freight Movements in Tonnes (2004)	Total International Passenger Movements (2004)	Country
Dhaka	316,106	2,741	3,102,708	Bangladesh
Chittagong	11,264	0	396,919	
Paro	27,920	24	52,522	Bhutan
Delhi	488,798	3,249	4,694,582	India
Mumbai	187,505	1,930	5,499,862	
Chennai	453,662	3,053	2,346,019	
Kolkata	225,061	818	607,555	
Trivandrum	187,822	1,642	872,516	
Bangalore	106,730	288	678,206	
Trichy	84,876	18	-	
Varanasi	34,907	-	-	
Cochin	48,345	174	1,006,072	
Calicut	22,192	80		
Hyderabad	26,288	129	749,072	
Gaya	4,808	-		
Male	353,777	5,400	1,432,967	Maldives
Kathmandu	423,176	1,810	1,500,000	Nepal
Karachi	258,706	2,948	2,203,949	Pakistan
Lahore	34,780	256	1,307,881	
Colombo	1,305,386	12,204	4,676,946	Sri Lanka

In addition to the above, the following 5 gateways given in Table 12 were proposed for consideration as it is likely they would develop as regional gateways in the near future.

Table 12: Potential Aviation Gateways to SAARC Region

Airport	International Passenger Movements (2004)	Country
Sylhet	158,000	Bangladesh
Goa	359,866	India
Guwahati	361	
Bhairahawa	n/a	
Islamabad	1,258,212	Pakistan

3.5.2 Approach to Gateway Prioritization

It is necessary to prioritize and select the gateways to be most significant for intra-regional transport during the study period 2006–2021. This prioritization has been carried out based on the following criteria:

- SAARC present regional passenger movements;
- SAARC current regional freight tonnage movements;
- International passenger movements processed; and
- Presence of traffic generating and attracting features for potential regional traffic in the immediate future, particularly with respect to:

    - cultural ties leading to visiting relatives and friends from other countries in the region;
    - potential for regional tourism; and
    - fast development as industrial or commercial centres.

The selection process has been carried out by prioritizing only the existing regional gateways in order to select those which should qualify on the above criteria. This is shown in Table 13, wherein each of the 20 airports presently having regional traffic movements have been ranked according to criteria 1, 2 and 3 given above. The 5 gateways proposed for the future have been analysed according to criterion 3 and 4. The overall rank has been computed by a weighted ranking with each criterion given equal weight.

Table 13: Ranking of Existing Aviation Gateways

Airport	Rank of Regional Passenger Movements	Rank of Regional Freight Movements	Rank of Total International Passenger Movements	Overall Rank
Colombo	1	1	3	1
Delhi	2	3	2	2
Chennai	3	4	5	3
Male	5	2	8	4
Dhaka	6	6	4	5
Karachi	7	5	6	6
Mumbai	10	7	1	6
Kathmandu	4	8	7	8
Trivandrum	9	9	11	9
Kolkata	8	10	14	10
Bangalore	11	11	13	11
Lahore	15	12	9	12
Cochin	13	13	10	12
Hyderabad	17	14	12	14
Trichy	12	17	17	15
Paro	16	16	16	16
Varanasi	14	19	18	17
Calicut	18	15	19	18
Chittagong	19	18	15	18
Buddhagaya	20	20	20	20

The first 16 aviation gateways arrived by the ranking above has been selected so that there is at least one gateway from each country and that the capital cities of each country are also included. The exception to this is the case of Pakistan where Lahore is considered as the proxy airport, as Islamabad does not handle regional traffic at present. However, Islamabad will be included as a Potential Gateway. Furthermore, it is noted that each of these 16 gateways also process international traffic outside of SAARC, with the exception of Trichy.

3.5.3 List of Selected Gateways

The final list of the 16 selected gateways and 9 potential gateways is given in Table 14.

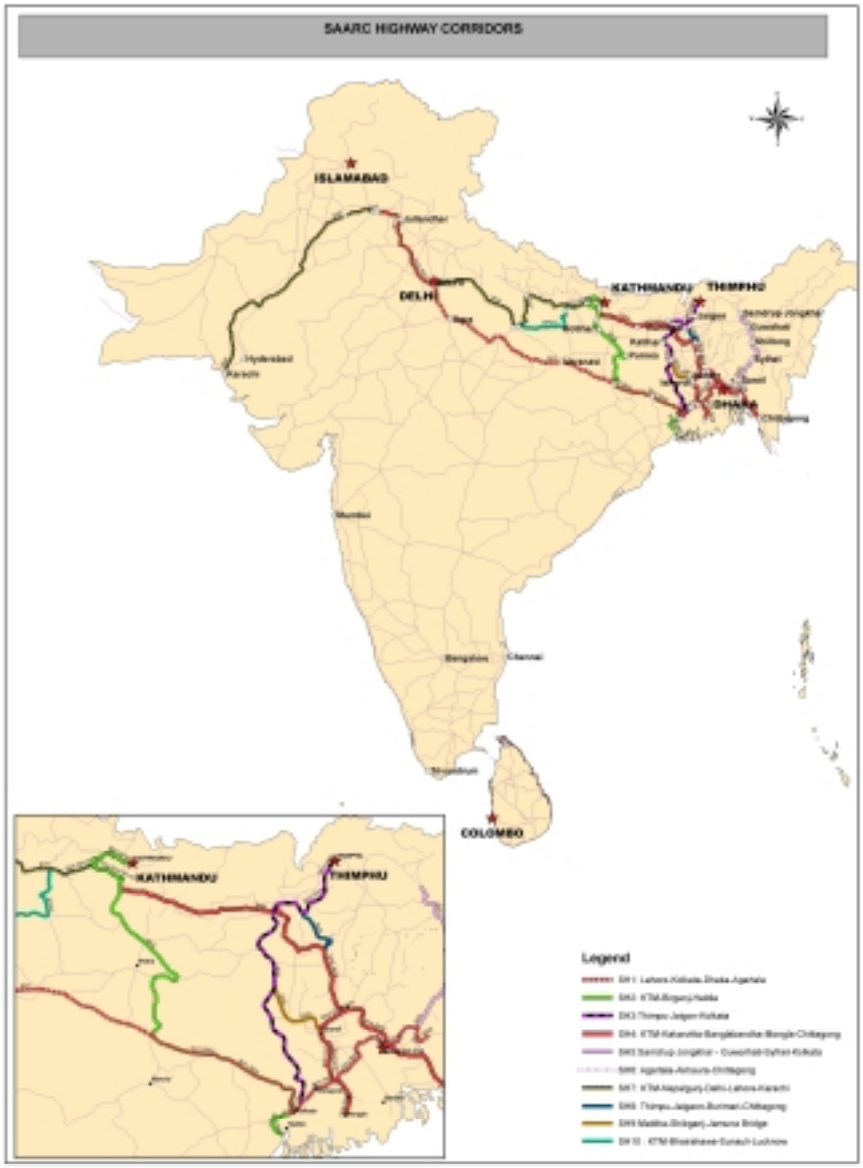
Table 14: Selection of Aviation Gateways

Airport	Country	Rank/Feature for Consideration
Selected Aviation Gateways		
Dhaka	Bangladesh	Ranked 5
Paro	Bhutan	Ranked 16
Delhi	India	Ranked 2
Mumbai		Ranked 6
Chennai		Ranked 3
Kolkata		Ranked 10
Trivandrum		Ranked 9
Bangalore		Ranked 11
Trichy		Ranked 15
Cochin		Ranked 12
Hyderabad		Ranked 14
Male	Maldives	Ranked 4
Kathmandu	Nepal	Ranked 8
Karachi	Pakistan	Ranked 6
Lahore		Ranked 12
Colombo	Sri Lanka	Ranked 1
Potential Aviation Gateways		
Chittagong	Bangladesh	Ranked 18
Sylhet		An international airport which can commence regional flights
Varanasi	India	Ranked 17
Calicut		Ranked 18
Gaya		Ranked 20
Goa		A fast growing international airport which can easily develop to a regional gateway
Guwahati		
Bhairahawa	Nepal	
Islamabad	Pakistan	A major international airport, serving the capital city, which should be developed as a regional gateway as well

4.0 SAARC REGIONAL ROAD CORRIDORS

In Chapter 3 of this report 10 road corridors of regional significance were identified. In this chapter details of these corridors in terms of their description, physical and non-physical barriers, as well as measures to address those barriers, are indicated corridor by corridor (See Map 2).

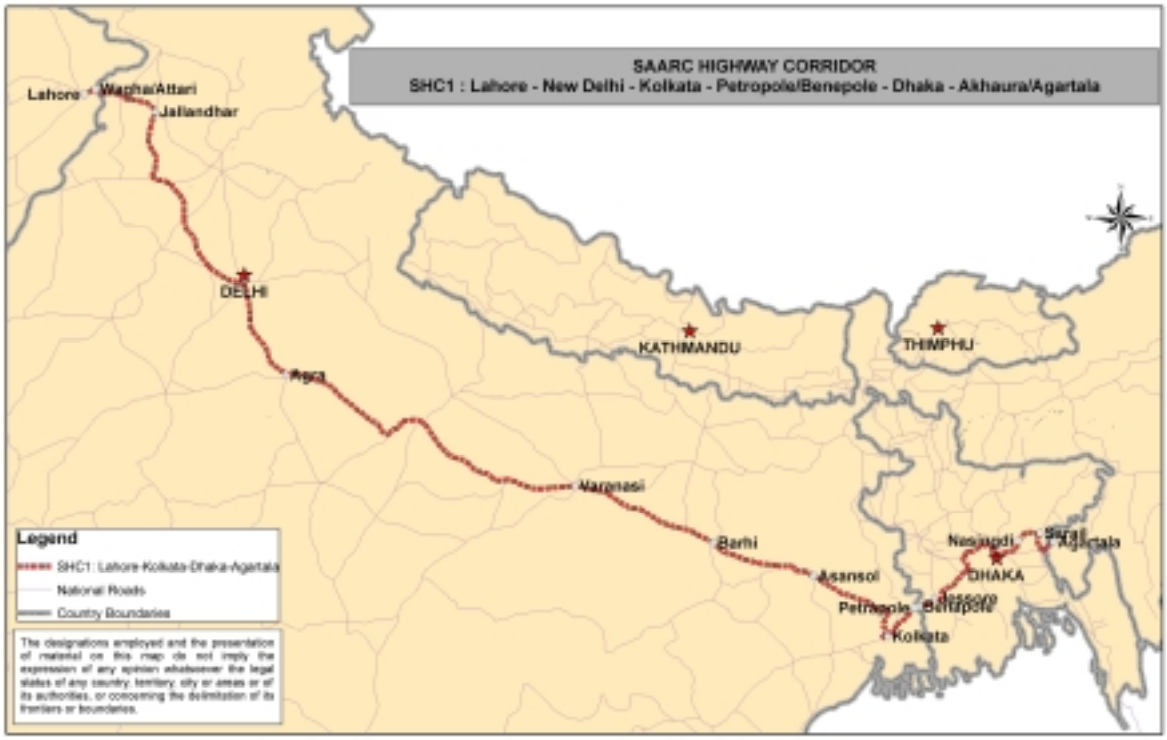
Map 2: Selected SAARC Road Corridors



4.1 SAARC Road Corridor 1: Lahore–New Delhi–Kolkata–Petrapole/Benapole–Dhaka–Akhaura/Agartala (2,453kms)

This corridor starts at Lahore crosses the border at Wagha (Pakistan)/(India) and reaches New Delhi using the NH-1. From New Delhi to Kolkata it follows the Golden Quadrilateral Network and reaches Petrapole (India)/Benapole (Bangladesh) using the NH-34 and NH-35. The corridor then uses National Highway N-706 up to Jessore, N-702 up to Magura and then the N-7 to reach Daulatdia on the west bank of Jamuna River. After crossing the river, from Paturia, the corridor follows the N-5 to reach Dhaka. From Dhaka it follows the N-2 and N-102 up to Dharkar and then R-120 to reach Akhaura (Bangladesh). From Akhaura, the corridor follows the NH-44 to reach Agartala (See Map 3).

Map 3: SAARC Road Corridor 1



In Pakistan, the Lahore to Wagha (27kms) section is dual-carriageway for the first 16kms and the rest is a 2-lane (7m) road. The condition of the road is good. The traffic on the dual-carriageway varies between 7,000–9,000 vehicles per day.

In India, the Attari to New Delhi (492kms) section is a 2-lane (7m) road up to Jalandhar (105kms) and has a traffic level of about 23,470 PCU per day up to Amritsar. The Jalandhar–New Delhi section (387kms) is a 4-lane divided carriageway in good standard. The New Delhi–Kolkata (1,461kms) road is part of the Golden Quadrilateral Network and is 4-6 lanes in good condition. The Kolkata–Petrapole (95kms) section consists of the Kolkata–Barasat (20kms) link that is a 2-lane (7m) road in good condition but the portion from Barasat–Petrapole/Benapole (Bangladesh) is only an intermediate 2-lane (5.5m) standard road in fair condition.

In Bangladesh, the Benapole–Dhaka (247kms) section is a 2-lane (7.3m) road with 3.0m shoulder on both sides in good condition. The ferry services across the Jamuna River are quite efficient but if the motorists want to use the Jamuna Bridge, the distance will be increased by about 120kms and the travel time by 1.5 hours despite the condition of the extended road being good. From Dhaka to Dharkhar (121kms), the road has an average width 6.3–7.5m with shoulder width of 2.0–3.0m and is in good condition. From Dharkhar to Akhaura (15kms) the corridor follows the regional highway No. R-120, which is under reconstruction to build a 3.5m wide pavement, and this partly follows the alignment of the existing Zilla road (Z-1202). From Akhaura to Agartala (5kms), the road has a 5.5m wide pavement in good condition carrying about 2,743 vehicles per day.

Passenger Traffic

At present limited bilateral passenger traffic is plying on this corridor between India and Pakistan, as well as between India and Bangladesh. These are governed by bilateral agreements permitting a number of bus services on specified days.

The bus services between India and Pakistan consist of four trips per week between Delhi (India) and Lahore (Pakistan) and a weekly service each way between Amritsar and Lahore and Amritsar and Nankana Sahib. Around 700 passengers per week each way use the service between Delhi and Lahore, but less than 50 per week do so between Lahore/Nankana Sahib and Amritsar (these services having started only in January/March 2006 are yet to stabilize).

The bus services between India and Bangladesh consist since 1999 of 12 weekly services carrying 35 passengers per bus between Kolkata and Dhaka through the Petrapole–Benapole border. The Indian and Bangladeshi operators ply two buses at a time on each alternate day, except on Sunday when no services are operated. The trips involve a ferry crossing of about 8kms from Daulatdia on the west bank of River Jamuna to Paturia or Aricha within Bangladesh. The ferry services operate round the clock and pose no constraint for the services. A bridge over the River Padma is under planning that will eventually do away with the ferry crossing altogether between Paturia/Aricha and Daulatdia.

Around 1,600 passengers on average use the Indian services to reach Dhaka every month and around 1,900 passengers similarly avail of the Bangladeshi services to reach Kolkata. The services are extremely popular—demand invariably exceeding supply. Bridging the gap are several buses that operate from Kolkata to Petrapole and Dhaka to Benapole. Their passengers alight and cross over the border after completing the formalities to board another bus across the border. Around 400 passengers cross the border daily in this fashion. These are locally called Kata (‘broken’ in Bengali) services.

Scheduled bus services are also plying between Agartala and Dhaka with most of the passengers originating from Agartala being bound for Kolkata. They have to change buses thrice at Dhaka, Benapole and Petrapole to be able to reach Kolkata and also have to pay a passenger tax of 300 taka. Under the terms of the agreement and protocol, each country runs a service on alternate days returning to the origin the next day, thus ensuring a daily service between Agartala and Dhaka. The 141kms journey takes about four to five hours, partly on account of poor road conditions over 15kms distance and partly due to slow clearance at border crossing. The patronage is poor with only 50–60% cent seat occupancy.

No service is plying between Pakistan and Bangladesh through India on this corridor. Similarly through bus services between Agartala and Kolkata through Dhaka also do not yet exist.

It has been projected in the Phase 1 country report of Bangladesh, on the basis of roughly 1% annual growth that the passengers crossing the border at Benapole–Petrapole would go up from 305,803 in 2005 to 355,027 in 2010–15. However, the estimate of the present level of traffic by Indian authorities is around 200,000 per annum. It is possible that information on many passengers who cross over by foot is not captured. Regardless of this discrepancy, it should be noted that the passenger flows on this corridor are at present limited to bilateral bus services, either the regular cross-border type or Kata services. These are also constrained by infrastructural and institutional bottlenecks at the border. The average historical growth rate may, therefore, not accurately predict the future potential. A two-fold increase in frequency of Kolkata–Dhaka bus service is likely to be immediately used up by the existing unmet demand. The Dhaka–Agartala bus service, which is not well patronized now, will also be inundated with demand if the problems associated with the service are resolved.

There is a huge latent demand on this corridor that could be tapped if the neighbouring countries were able to address the infrastructural and institutional hurdles coming in the way of realisation of the full potential. It is, however, unlikely that regular bus services from one end of the corridor to the other (e.g. Lahore–Dhaka–Agartala) would ever be viable owing to the long distance involved.

4.1.1 Physical Barriers

Within Pakistan, there is no physical constraint along the corridor Lahore–Wagha, but at the border crossing point at Wagha warehousing/storage and loading/unloading facilities to international standard are not available to handle the cargo that has to be transhipped due to lack of through trucking services. The custom examination is conducted at a location other than the border terminal and this can result in delays, as well as further increasing transport costs.

Within India at the Wagha border point there is no parking space for trucks or space for unloading the goods for checking. Along the corridor from Attari–Delhi–Kolkata–Petrapole, the Barasat–Petrapole section has narrow pavement (only 5.5m wide) and the road passes through towns/cities and as a result remains congested resulting in slow transits. The Petrapole border crossing is operating close to its capacity and as a result there is a lot of pressure on the Central Warehousing Corporation facilities. There is no physical constraint from Akhaura to Agartala, but the facilities at the Agartala border post are inadequate.

Within Bangladesh at Benapole the capacity of the infrastructure is insufficient to handle efficiently the current levels of cargo. The road from Brahmanbaria to Dharkhar is a narrow 2-lane road in good condition and the Dharkhar to Akhaura section is a single-lane road and is in poor condition, which slows down the speed of both freight and passenger transport. In addition, the border crossing facilities have not been developed as yet at Akhaura.

4.1.2 Non-Physical Barriers

Generally speaking, the three countries covered by this corridor are facing similar problems, such as lack of agreements for smooth movement of freight and/or vehicles between the

countries, and those relating to delays in cargo clearance, facilitation or speed money payments, cumbersome transportation documentation and customs procedures, etc. Some of the delays are associated with the preparation of customs documents and inspections due to a lack of standardisation of documentation and implementation of modern customs procedures. For example, at the India-Bangladesh border, a consignment needs at least 22 documents, more than 55 signatures, and a minimum of 116 copies for the final approval, according to a recent World Bank report. Each country requires different documents, such as transit, export, and import declarations. Exporters are required to prepare separate documents on each side of the border resulting in errors in the transposition process. Furthermore, the region uses different product classification systems for commodities—the Standard International Trade Classification is used by Pakistan and the Harmonization System (HS) by other countries. This contributes to a general lack of transparency and problems in product classification in trade. Other problems are lack of through bills-of-lading, availability of EDI systems, lack of harmonisation of office hours and holidays across the border, difficulties in obtaining visas, restrictions on vehicle movement between countries, overloading of vehicles, etc. Although most of the above problems are common to all, country wise non-physical problems are discussed below.

Within Pakistan at present there is no agreement between Pakistan and India for freight and vehicles movement, thus all traffic has to be transhipped. At Wagha, customs checking is carried out at a place other than within the terminal premises, which results in delays and increased transport costs. There continues to be the absence of a simplified legal framework and unified customs documentation between India and Pakistan.

Vehicle overloading is a major cause of premature pavement deterioration and is an impediment to the sustainable development of the highway network. This problem is continuing due to the lack of appropriate legislation with provision for strict punishment, including heavy fines and cancellation of business registration for certain period, for violators. The design of the vehicles with the predominance of rigid vehicles and articulated transport with only two axles on the drive unit will inevitably lead to a high risk of overloading.

Within India lengthy delays occur frequently at the borders and in unloading at customs temporary storage warehouses. At the India–Bangladesh border, weekly holidays are on different days. The Bangladeshi Customs are closed on Fridays and often on Saturdays. Nothing can be processed on a holiday. On the Indian side, while cargoes can be processed on Sundays, which is a holiday, there is no appraisal service available on that day. Under present procedures in use, only 300 trucks per day are able to cross the border line for transhipment of goods. The Agartala check post is located in heavily populated suburbs of Agartala and this also results in delays.

Within Bangladesh there is no bilateral agreement between Bangladesh and India for smooth inter-country vehicle movement. As a result, transhipment of cargoes takes place at the border from one vehicle to other. This transhipment of cargo is carried out either by unloading the cargo in the warehouses of the other country or directly from one vehicle to another at the ‘no-mans’ land at both the Benapole and Akhaura border points.

Average dwell time of cargo passing through the border is in the order of 7–15 days, caused by delays in the logistic chain i.e. mainly the delivery of documents to clearing and forwarding (C&F) agents by importers. However, the lack of transparency of inspection

procedures and inadequate documentation are also cited as major constraints. The lack of cheque clearing facilities at Benapole forces clearing agents to travel to Jessore to deposit money in a customs account and then to return to Benapole with receipts to show that the necessary payments have indeed been made and this leads to additional delays in clearance. There are also high charges associated with cargo insurance.

In relation to passenger traffic, delays in obtaining visas are the main constraint for the India Pakistan bus services. The Kolkata–Dhaka and Dhaka–Agartala bus services on the other hand are beset with a number of problems such as passengers have to wait for inordinately long hours for customs and immigration clearance at Petrapole/Benapole border. Complaints of harassment at the hands of security personnel are also often heard from passengers. The Indian operator has long been complaining of difficulties in remittance of sale proceeds from Dhaka. The operators also have complaints regarding difficulties in obtaining work permits for staff working for their operations in the other country.

Schedules of Agartala–Dhaka and Dhaka–Agartala bus services entail a delay/waiting time of two hours at Dhaka for passengers bound for Kolkata. Indian passengers from Agartala also complain having to pay travel tax of Taka 300, delays at immigration and customs check-posts especially at Benapole, timings of the immigration and customs offices some times forcing the passengers to stay overnight at Dhaka and problems regarding permission to carry Indian currency.

There is no comprehensive motor vehicle agreement setting a framework for uninhibited plying of passenger carrying vehicles across the national borders, including temporary import of personal vehicles for private journeys or commercial vehicles for specified tours. Furthermore, there is no concept of transit through another country to reach a third country or another part of the home country. Non-homogenisation of customs and immigration requirements of the three countries is another barrier, particularly regarding the list of items to be permitted duty-free to visitors, uniform amount of foreign exchange to be permitted without declaration, list of prohibited items and baggage allowance etc.

For some of the bus services plying now, obtaining visas presents a problem to the passengers. While there are valid security concerns in the sub-continent that might entail a certain amount of procedural delay, ways have to be found to simplify the visa issuance procedures and remove, as far as possible, restrictions on the movement of citizens of other SAARC countries. Passengers intending to board Amritsar-Lahore/Nankana Sahib bus services, for example, have to travel to High Commission of Pakistan in Delhi to obtain visas. A visa processing agency at Amritsar, if not a full-scale consulate, would greatly alleviate the difficulties.

There are standing inter-Governmental mechanisms between India and Pakistan and India and Bangladesh, under the terms of the agreements to hold periodic discussions at operator/Government level to take stock of and sort out issues brought out above. However, the pace of change achieved is not compatible with the demands of corridor users.

4.1.3 Measures to Address Barriers

To address the physical barriers, it is necessary to improve facilities at the Wagha border posts and to widen the road from Barasat to Petrapole, including construction of by-passes around some of the towns along this corridor. It is also necessary to increase the capacity of

Petrapole border if the existing constraints on cross border movement of freight continue. Work has already been initiated to address constraints related to cargo handling at Benapole, through the implementation of the project “Development and Expansion of Benapole Land Port”. It is also essential to improve facilities at the Akhaura and Agartala border posts and widen the road from Brahmanbaria to Akhaura.

However, the optimum solution is not seen as the construction of yet more facilities at the borders at Wagha and particularly at Benepole/Petrapole. Modern logistics is about minimalisation of links in the logistics chain. This means that there is a need for through-transport to eliminate the need for such load transfers at the border that represent a break in the logistics chain, add costs and increase damage and pilferage. The strategy of construction of yet more facilities merely encourages the current non-optimal solution. Indeed, if and when through-transport is permitted, such facilities would become largely redundant.

To address the non physical barriers effectively, a comprehensive approach is required, involving relevant government ministries, agencies and the private sector. The most important non-physical barrier appears to be the lack of an agreement to facilitate uninterrupted movement of goods and/or vehicles across the borders between Pakistan and Bangladesh, as well as between India and Pakistan. It is recognised that there are vested interests on either side of the border, particularly transport operators/syndicates, who fear that opening up through-transport would damage their interests.

In essence, there are a number of problems that need to be addressed either consecutively or concurrently. The first problem relates to the lack of a transport access agreement that would grant the road transport of one country the right to ply on the road of another in relation to bilateral trade, but excluding any rights of cabotage. This is generally regarded as a freight transport agreement and may or may not contain conditionalities such as the need for permits, reciprocal movements etc. Such agreements normally only relate to the vehicle, rather than the cargo. Whilst such bilateral agreements tend to be specific in that they address the needs of the respective countries, it is critical that they are developed within an overall framework that would allow the possibility of them being integrated into trilateral or multilateral agreements at a later stage, if this were desirable.

Secondly, there will probably be a need for a Customs agreement that provides for the temporary importation of vehicles from one country to another whilst undertaking movements in connection with the above transport agreement. This is usually based on international conventions, but could possibly be integrated within the transport agreement.

At this stage this would allow transporters from one country to undertake cross border movements and eliminate the need for transfer of goods at the border, with consequent savings in costs. However, the ultimate aim is to promote through transport that would allow the goods to transit through the border to the inland destination for final clearance or through to another border into a third country (or back into the first country). There are two different types of transit—internal and international. Internal transit is the movement from the border to an inland point of clearance. International transit is a movement that enters the country and then exits that country—i.e. the goods are not for domestic consumption. An international transit is both third country traffic and goods from one part of a country to the other through another country, such as between Kolkata and the North East States transiting through Bangladesh.

This would require a customs transit agreement. Such agreements are based on the need for security against goods being 'lost' in transit with consequent loss of customs revenue and usually specify the nature of that security, be it a financial guarantee, particulars of the vehicles, method of customs sealing etc. Whilst the TIR Convention is the most well known, it is recognised that given the profile of the transport fleets in the region that ratification of this Convention may be difficult (though Pakistan is expected to ratify shortly). Nonetheless, there are a number of models around the world on which such a bilateral or even regional agreement could be based. It is important to note that this will need to be a Customs Agreement, rather than a transport agreement as it covers the cargo rather than the vehicles.

It is suggested that a phased approach be adopted. Firstly, the issue of transport access should be addressed bilaterally, prior to addressing the more complex transit issue. While it would be desirable to have these agreements developed, negotiated and implemented concurrently, a consecutive approach may be more practical and bring benefits at an earlier stage. SAARC may consider a model transport access agreement and model customs transit agreement that could be used by the countries with necessary changes.

The ADB funded SASEC Subregional Corridor Operational Efficiency Study, May 2005, made an analysis of the economic impact of the above mentioned non-physical barriers. It was found that out of a total cost of US$32.83 per tonne for transporting goods from Kolkata to Dhaka, the costs at Petrapole/Benapole border for loading/unloading, facilitation payments, border clearing agents fees, excess line haul and cargo detention cost, insurance costs etc. came to a significant portion of about US$ 21.00 per tonne. However, if transport facilitation could be improved by adopting working schedule of seven days/24-hours at Benapole/Petrapole, allowing trucks to travel freely between India and Bangladesh, reducing insurance cost, application of IT at borders, etc, there could be huge savings in the costs of transportation. In addition, the travel time between Kolkata and Dhaka, could come down from present 7–15 days to 2–2.5 days if the existing non physical barriers could be removed. This demonstrates the potential benefits that could be generated by development of bilateral transit and transport agreements.

The passenger tax on Indian passengers boarding Agartala–Dhaka services is also a non-physical barrier that needs to be removed. A re-scheduling of Agartala–Dhaka bus services to give direct connection to Dhaka–Kolkata bus services and in the long run, commencement of direct Agartala–Kolkata services through Dhaka would greatly facilitate travel.

4.2 SAARC Road Corridor 2: Kathmandu–Birgunj–Kolkata/ Haldia (1,323kms)

This corridor starts at Kathmandu and reaches the border point at Birgunj/Raxaul (India) passing through Mugling, Narayanghat and Hetauda. From Raxaul, the corridor follows the NH-28A, NH-28, NH-31, NH-34, NH-6 and NH-41 to reach Kolkata/Haldia. (See Map 4)

To Nepal, the road from Kathmandu to Birgunj (276kms) has a 6-7m wide pavement and the road condition is good. The corridor then uses parts of the East-West and Tribhuvan Highways. In India, the section between Raxaul and Kolkata/Haldia (1,047kms) is a 2-lane road and the condition is generally good, except about 180kms in Bihar state that is in poor condition. The traffic on the Motihari–Raxaul section varies from 5,750–8,000 PCUs per day, including 550–1,000 trucks.

Map 4: SAARC Road Corridor 2

As regards passenger traffic, there is no regular bus service between Kathmandu and Kolkata. An agreement for commencement of such a service along with other inter-city/inter-country services has been finalized but not yet been signed by both the countries. Approximately 3,500–4,000 passengers move in each direction between Raxaul and Birgunj per day. Precise details of the origin and destination of such passengers is not known but most of them are likely to be from border areas visiting near-by places on the other side of the border, apart from persons going to or coming from Nepal before or after using the train services on Indian Railways network. Border-crossing between India and Nepal for nationals of both the countries is unrestricted and Indian and Nepalese vehicles cross in to each other's territory under informal arrangements.

While bus services between Kathmandu and Kolkata may not be viable in view of the long distance and consequently the long transit time involved, (a trial run conducted by Government of West Bengal, India in September 2004 indicated that a one-way trip would take almost three and half days to complete), facilitation of an arrangement to encourage passenger traffic from Kathmandu to important towns on the corridor in India, such as Muzaffarpur and Motihari and from Kolkata and other towns in India, such as Asansol and Dhanbad, to those in Nepal on the corridor could be developed based on demand.

4.2.1 Physical Barriers

Within Nepal one of the major constraints is the long distance involved from Kathmandu to Birgunj (276kms) that could be reduced to 120kms if a new 'Fast Track Road' were built. Along the existing corridor, a 36kms section from Mugling to Narayanghat faces frequent landslides. In addition, a number of bridges along the Hetauda to Pathalaiya section are only single lane and could become a major constraint as traffic increases. Congestion at the Birgunj border point is a frequent phenomenon with the Customs yard for road-based cargo being inadequate.

Within India, bad road conditions, particularly in Bihar, reduce truck speeds to 20kms per hour over an approximately 180kms section and consequently adds one whole day to the journey time. The section Motihari–Sagauli–Ramgarhwa–Raxaul (N.H. 28A, around 50kms distance), the road leading to the check-post passing through the congested town of Raxaul, a major level crossing close to the check-post and the narrow 2-lane bridge over the River Sirsiya that flows near the border are all cited as problems.

There is significant congestion at the border point at Raxaul. Parking space at Raxaul for unloading goods for checking is not available and the immigration office lacks in basic amenities and baggage scanning facility. Most of the work of the office is performed in the yard in front of the office building. There is no waiting hall or seating arrangement for passengers. The office at present only handles 7–8 visitors a day from third countries at present but if there are regular bus services bringing in larger number of third-country citizens significant improvements will be required. The absence of foreign exchange facility is also a deficiency that needs to be addressed if regular bus services are to ply.

4.2.2 Non-Physical Barriers

In Nepal there is an absence of through bills-of-lading provided by the shipping lines. This means that the importer has to separately arrange for the land transportation and this increases the overall door-to-door costs. The reasons for the lack of through bills is due to problems relating to the lack of suitable legal frameworks, traffic imbalances, reliability of transport services and the availability of container transport resources. In essence, the present conditions favour unstuffing of containers in Kolkata/Haldia, rather than be carried through as FCLs to Nepal.

There is a problem associated with customs inflexibility regarding the timing of arrival of goods. If cargo arrives after 15:00 hrs, it is not processed on the same day because the Customs Office closes at 17:00 hours. In addition, facilitation payments in India and the imposition of bonds discourage Nepalese truck owners from taking their trucks to Kolkata/Haldia, although they are allowed to under existing agreements. It should be noted that similar problems apply to Indian trucks entering Nepal.

Nepalese manufactured goods have free access to the Indian market but not the foodstuffs, which are required to pass through Indian regulations of quarantine. This leads to delays at the borders, sometimes up to 10–12 days as samples have to be sent to Kolkata for testing. The 'Indian Standards Institute' does not readily accept standards set by the counterpart 'Nepali Standards Bureau' and this causes problems in relation to many cargoes.

Very high insurance/bond prices are charged by Indian Customs when associated with 'sensitive cargoes', even though these do not reflect the losses sustained. Rather, it may be a reflection of the monopoly powers now enjoyed by the Indian National Insurance Company. In addition, abandoned Nepali cargo cannot easily be disposed of at Kolkata and Haldia ports. There is lack of security in some of the remoter areas along the corridor and as a result trucks sometimes do not travel at night. At present, there is no computerisation at the borders and therefore, documentation is processed manually.

As regards passenger traffic, on face value there is no non-physical barrier as the movement between India and Nepal is relatively unrestricted. However, more formal arrangements in the form of a comprehensive motor vehicle agreement governing movement of personal and commercial passenger carrying vehicles would be required to bring in a predictable and easily understood system of fees to be paid, number of days to be allowed in other country's territory, number and frequency of time-tabled bus services between designated points etc.

4.2.3 Measures to Address Barriers

Investment is needed to build the 'Fast Track' road between Kathmandu and Birgunj as this would significantly reduce transit times in Nepal. However, the most important measure would be to address the problem of the 180kms through Bihar which is seen as a priority by Nepalese traders and transporters. As indicated this adds a whole day to the transit. Investment is also needed to improve facilities at both the Birgunj and Raxaul border points and development of a road-based freight station at Birgunj.

In the context of non-physical barriers, there is a need to promote the system of through bills of lading and to standardize the Indian Customs Transit Declaration (CTD). Both Indian and Nepalese authorities should also address the various non-physical issues mentioned above through mutual consultation, particularly the formalisation of the road transport arrangements between the two countries.

4.3 SAARC Road Corridor 3: Thimphu– Phuentsholing–Jaigon–Kolkata/Haldia (1,039kms)

From Thimphu, the corridor follows the Thimphu–Phuentsholing Highway (TPH) to reach the border at Phuentsholing/Jaigon (India). From Jaigon, the corridor uses state roads up to Hansimara and then follows the NH-31, NH-31C and NH-34 to reach Kolkata. From Kolkata it follows the NH-6 and NH-41 to reach Haldia (See Map 5).

In Bhutan, from Thimphu to Phuentsholing (172kms) the road has an average pavement width of 3.65m with an average shoulder width of 1m on either side and is in good condition. On average, about 1,153 vehicles move on this road in each direction daily. The average number of trucks that cross the Phuentsholing/Jaigon border post is about 100-150 per day.

Map 5: SAARC Road Corridor 3

In India, the distance from Phuentsholing/Jaigon to Kolkata is 738kms with the entire corridor being 2-lane paved road in good condition. Part of the corridor, the NH-31 and NH-31C, is being widened to 4-lanes under the East-West Corridor Development Programme and the NH-34 from Dalkola to Kolkata is also being widened to a 7.0m wide carriageway. The road from Kolkata to Haldia (129kms) is also a 2-lane paved road and the condition is good. Haldia can also be accessed from Kolkata (77kms) using NH-6, part of Golden Quadrilateral that is being upgraded to 4-6 lanes.

As regards passenger traffic 12 bus services offering 336 seats in each direction operate between Thimpu and Phuentsholing. In addition, there are 3 scheduled bus services from Phuentsholing to Siliguri per day. The link to Siliguri is important as it provides connectivity to the New Jalpaiguri railway station and Bagdogra airport in India. These services are operated by a private Bhutanese company. The scheduled services between Phuentsholing and Kolkata are run by Bhutan Post-4 services each way offering 156 seats per week.

Unfortunately, the patronage of this service was indicated as poor. In addition, the North and South Bengal Transport Corporation operate two daily bus services between Jaigon and Kolkata (80 seats) and also runs chartered bus services to Bodh Gaya, Bihar during the winter season with around 40 buses hired each season. Plenty of taxi services are also available from Jaigon to various destinations in India.

As in the case of Nepal, India and Bhutan share a free border for movement of passengers. The border crossing procedures is also relatively simple and rarely exceeds a few minutes. In view of the free movement already taking place, it is felt that the trend rate of growth would be maintained. It is however worth noting that the present arrangement is informal. With increased prosperity and population levels and the concomitant growth in cross-border traffic, the present informal arrangements would in the long run need to be replaced by a formal arrangement under a comprehensive motor vehicle agreement.

4.3.1 Physical Barriers

Within Bhutan, the major constraint is the narrow road (3.5 m wide pavement) from Thimphu to Phuentsholing that is 172kms long and has a number of sharp bends. Though the road condition is good, the alignment is subject to closure during the monsoons due to frequent landslides. There are steep slopes at some points, where the road surface becomes slippery in the winter when the road gets icy due to the low temperature. Due to the steep gradients, there is weight limitation with a six-wheel truck being only allowed to carry a maximum of 8 tonnes within Bhutan. The Phuentsholing border post also lacks parking space, proper equipments (cranes, forklifts, etc.) and insufficient counters at the customs office.

Within India there are no physical constraints along the corridor Jaigon–Kolkata/Haldia, other than the inadequacy of separate parking areas at the Jaigon border post for checking of vehicles. This can result in congestion on the roadside, especially in the case of bunched arrivals.

4.3.2 Non-Physical Barriers

Within Bhutan, the lack of through–bills-of-lading, slow customs clearance and lack of common standardized formats for documentation, including electronic documentation, are major constraints, thus similar to the situation in Nepal.

Within India there is no formal agreement for vehicular movement between India and Bhutan, though there is an informal understanding resulting in vehicles crossing each others borders. There is usually a lengthy time required for road transit from Kolkata to Phuentsholing. The delay is principally caused by the operators seeking to avoid penalties for overloading. In addition, the trucks carrying Bhutanese cargo are subjected to unofficial payments that add to the costs, though this may be linked with the previous problem in that this is often related to avoiding official overloading charges by travelling at night.

As regards passenger traffic, there are no major non-physical barriers at present, barring alleged complaints of harassment of Bhutanese passengers by mobile customs inspectors in India. In the long run, the lack of a comprehensive motor vehicle agreement and harmonized customs procedures could pose a constraint to unhindered growth of inter-country passenger and freight traffic.

4.3.3 Measures to Address Barriers

The key measures are that investments are needed to improve the road sections in Bhutan and the border facilities at both Phuentsholing and Jaigon. In the context of non-physical barriers, there is a need to promote the use of a system of through bills of lading, as well as standardized formats for documentation. However to address other non-physical barriers, Indian and Bhutanese officials concerned should hold mutual consultation meetings, particularly to develop a formal motor transport agreement.

4.4 SAARC Road Corridor 4: Kathmandu–Kakarvitta–Phulbari–Banglabandha–i) Mongla (1,314kms) or ii) Chittagong (1,394kms)

This corridor starts at Kathmandu and uses the East-West Highway to reach the border at Kakarvitta (Nepal)/Panitanki (India) and then it follows the NH-31C, NH-31 and SH-12A for short stretches and partly a state road of West Bengal to reach Phulbari (India) /Banglabandha (Bangladesh). From Banglabandha, the corridor follows the N-5 up to Hatikumrul and then it follows two different routes—one follows the N-507, N-6, N-704 and N-7 to reach Mongla and the other uses the N-405, N-4 and N-3 to reach Dhaka. From Dhaka the corridor follows the N-1 to reach Chittagong (See Map 6).

Map 6: SAARC Road Corridor 4

In Nepal, the road from Kathmandu to Kakarvitta is about 600kms. The road from Kathmandu to Pathalaiya is common to this as well as Corridor-2. The length of this section is 227kms and the condition is good, except for the section between Mugling and Narayanghat (36kms). The remaining section of the road from Pathalaiya to Kakarvitta

(373kms) is 6–7m wide and the condition is good. In India, the road from Panitanki to Phulbari/Banglabandha (44kms) is of 2-lanes standard and the condition is good. Traffic along this section is low at less than 50 trucks per day.

In Bangladesh, the road from Banglabandha to Mongla (670kms) has an average pavement width of 7.3m with 2.4–4.0m shoulders on both sides. The condition of the entire road is good. The Banglabandha–Dhaka–Chittagong corridor (750kms) uses the same road N-5 up to Hatikamrul and then crosses the Jamuna Bridge to reach Dhaka and then to Chittagong. The entire road has an average pavement width 7.5m and shoulder width 2.0–4.0m on both sides. The road condition is good.

As regards passenger traffic at present about 75 persons from third countries cross the border between Panitanki and Karkavitta. Similar figures in respect to Phulbari and Banglabandha are not available. The immigration office at Panitanki functions round the clock. As human movement is inseparably linked with trade movements, increased passenger movement could be expected between Nepal and Bangladesh on this corridor. There was reportedly a proposal from the Government of Bangladesh in the past for a bus service between Dhaka and Kathmandu on this route, though the feasibility and viability of the service has yet to be seriously examined. The existing infrastructure for handling passenger movement between India and Nepal at Kakarvitta and India and Bangladesh at Phulbari–Banglabandha would need to be reassessed to take care of this requirement in the future.

4.4.1 Physical Barriers

Within Nepal along the corridor from Kathmandu–Kakarvitta, as indicated earlier, the 36kms section from Mugling to Narayanghat faces frequent landslides. In addition, a number of bridges along the Hetauda to Pathalaiya section are only of single lane and will become a major constraint as traffic increases.

Within India the only constraint is the lack of permanent offices at Phulbari border post. Immigration facilities for processing third country citizens would need improvement. Foreign exchange facilities do not exist at Panitanki and Phulbari. With the present level of traffic of around five trucks a day the condition of the 2.5kms long road leading to the border within India with its restricted one lane width is not a serious constraint, but could emerge as one in the future as traffic increases.

Within Bangladesh there are no physical constraints along Banglabandha–Mongla and Banglabandha–Chittagong corridors, except that there is presently an axle-load limit of 8.2 tonnes, although all new roads are now being built to 10 tonne axle-load limit and that there is a restriction on the movement of loaded containers by road due to weight limitation on some bridges. The border post at Banglabandha lacks permanent facilities covering immigration, customs, post office and telephones.

4.4.2 Non-Physical Barriers

Within Nepal the constraints are the same as those indicated under Corridor 2: Kathmandu–Birgunj–Kolkata passing through Birgunj and Raxaul.

Within India, trucks cannot move freely at any time of the day between Bangladesh and Nepal. The trucks must be escorted as a convoy at a time mutually agreed between the parties

concerned. In the recent years, traffic movement between Bangladesh and Nepal along this corridor has been a maximum of 10 trucks per day. Indian customs officers are normally informed two hours in advance of a convoy's arrival and are summoned from Phulbari Customs Station, 2.5kms from the border for checking and clearance of the cargo.

Within Bangladesh there is lack of transparency in custom inspection and procedures. At the border, cargoes are required to be transhipped between Bangladeshi registered vehicles and Nepali registered vehicles. This activity adds to costs and causes delay. Another important constraint is that when Bangladeshi customs officers are required to clear cargoes, they must be summoned from Panchagarh, 50kms away.

As regards passenger traffic there is no agreement for plying of regular passenger services between Nepal, India and Bangladesh.

4.4.3 Measures to Address Barriers

Investments are needed to improve the road conditions in Nepal, and to a lesser extent in India, and to establish Immigration/Customs offices in both Phulbari and Banglabandha.

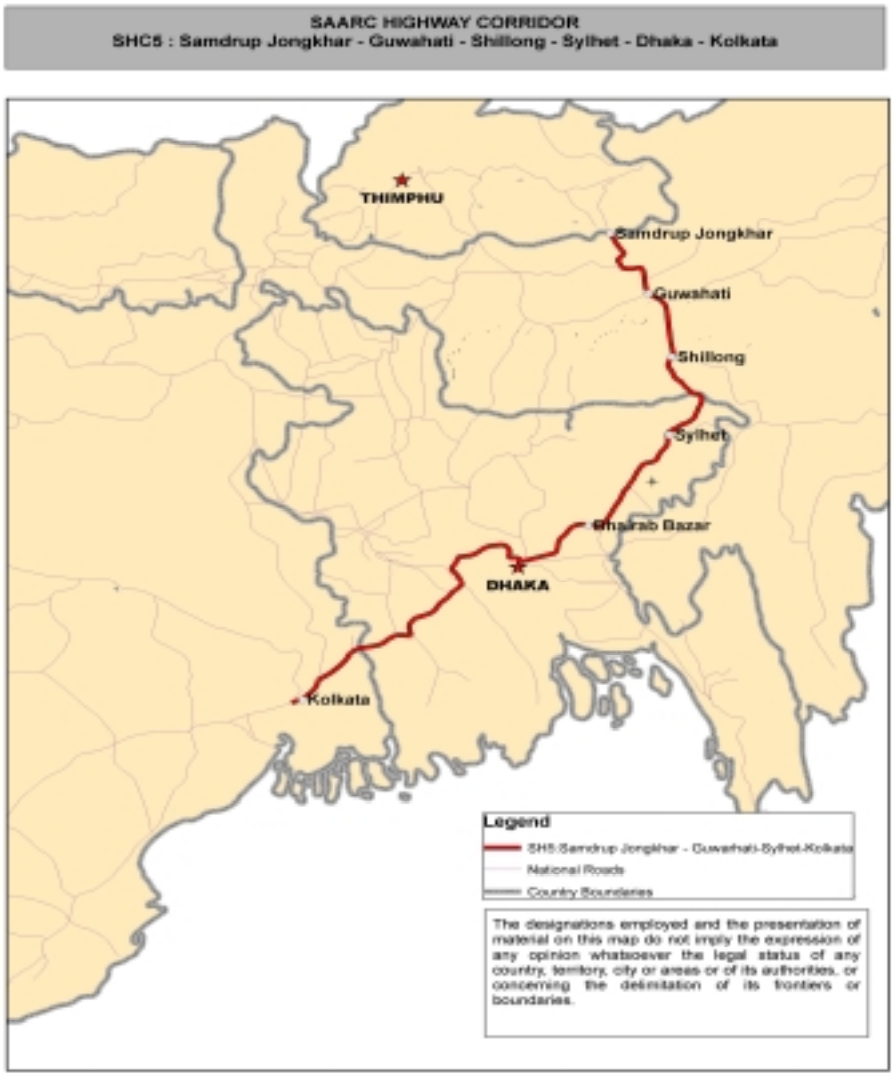
In the context of non-physical barriers, some of the solutions suggested under Corridor I, such as the adoption of bilateral transport and transport agreements are required. It is recognised that this corridor would require either a trilateral or 'back-to-back' bilateral agreements, thus emphasising the importance of developing bilateral agreements under an overall framework. Once cargo and passenger movements pick up through this corridor, improved customs and immigration facilities, as well as foreign exchange facilities, could be justified at the Phulbri and Banglabandha border posts. In addition, there is a need for development of a passenger services agreement to promote bus services.

4.5 SAARC Road Corridor 5: Samdrup Jongkhar–Shillong–Sylhet–Dhaka–Kolkata (906kms)

This corridor starts at Samdrup Jongkhar (Bhutan) to reach Guwhati (India) and from Guwhati reaches the border post at Dawki/Tamabil (Bangladesh) through Shillong using the NH-40. From Tamabil, it uses Bangladesh National Highway N-2 to reach Sylhet and Dhaka. From Dhaka, this corridor uses the same route as that of Corridor 1 to reach Kolkata (See Map 7).

In India, Samdrup Jongkhar–Guwahati (81kms) is a part of state highway and the Guwahati – Shillong–Dawki section is part of the Asian Highway AH-1. Guwahati–Shillong (104kms) section is generally a two lane road but some portions are still to be widened to the full 2-lanes. Condition of this section is partly good and partly fair. The Shillong–Dawki (83kms) road is of two-lane/single lane standard and is generally in good condition.

Map 7: SAARC Road Corridor 5



In Bangladesh, the Dawki/Tamabil–Sylhet–Dhaka section (296kms) has an average pavement width of 7.5m and shoulder width of 2.0–3.0m and its condition is good. The section from Dhaka to Kolkata is already covered under Corridor 1.

Present level of traffic is around 100 trucks per day from India and no loaded vehicles from Bangladesh. It has been estimated by RITES that the traffic will grow at the rate of 4% per annum up to 2010 and by 5% thereafter.

As regards passenger traffic, at present bus services are running between Guwahati–Shillong and Shillong–Dawki. Although there are no bus services from Guwahati or Shillong to Dhaka or other intermediate points, such as Sylhet in Bangladesh, around 3,000 persons are known to cross the border every year. The potential for passenger traffic on this route is not considered high, but students and businessman would find the corridor useful to save time and cost. It is projected by a recent study by RITES that around 60 passengers would be crossing the border per day by 2010 and the number would go up to 70 by 2015 and 80 by 2020.

Discussions between Government of India and Bangladesh for bus services on this route between Dhaka–Shillong and Dhaka–Guwahati are at a preliminary stage. The route could also someday link Agartala to Shillong through Bangladesh, drastically reducing the transit times over current alternative methods of travel.

4.5.1 Physical Barriers

Within India the cantilever bridge on the outskirts of Dawki, constructed in 1932, has a load restriction of only 6 tonnes. At the Dawki border post, there is no parking space. The physical constraints along Dhaka–Kolkata section have already been indicated under Corridor 1. Within Bangladesh there is no physical constraint from Tamabil to the Benapole border post along this corridor, except the problem of the axle-load limit of 8.2 tonnes.

4.5.2 Non-Physical Barriers

In general, the facilitation constraints are more or less similar to those of other corridors passing through Bangladesh and India. The non-existence of a comprehensive motor vehicle agreement between India and Bangladesh is considered to be the major non-physical barrier. The only visa office for Bangladesh in the North East India is in Agartala.

4.5.3 Measures to Address Barriers

Investments are needed to construct a new bridge at Dawki, as well as to provide parking facilities at the Dawki border post. In addition, investment is needed to widen some sections of the road between Guwahati and Dawki, as well as between Barasat and Petrapole, including construction of the by-passes highlighted under Corridor 1. In the context of non-physical barriers, some of the solutions suggested under Corridor I, such as the development of transport and transit agreements will be important, even though at this stage the volumes are relatively low.

A Bangladeshi visa office in Shillong or Guwahati would be helpful, as would multi-entry visas for Indian citizens travelling from Guwahati or Shillong to Kolkata through to Dhaka.

4.6 SAARC Road Corridor 6: Agartala–Akhaura–Chittagong (227kms)

This corridor starts from Agartala (India) and follows the NH-44 to reach the border at Akhaura (Bangladesh). From Akhaura, the corridor follows the R-102 up to Dharkhar and then N-102 up to Comilla and N-1 to reach Chittagong (See Map 8).

In India, the corridor from Agartala to Akhaura (5kms) has a 5.5m wide carriageway carrying about 2,743 vehicles per day and is in good condition. In Bangladesh from Akhaura to Dharkhar (15kms) the corridor uses a regional highway that has 3.5m wide pavement and the condition is fair. The road from Dharkhar to Comilla (56kms) has 6.3m wide pavement and the condition is also only fair. The section Comilla–Chittagong (151kms) has 7m wide pavement and the condition is good.

Map 8: SAARC Road Corridor 6

4.6.1 Physical Barriers

Within India, there is no major physical constraint from Agartala to Akhaura, except that the road is of narrow 2-lane standard. However, the facilities at the Agartala border post are considered to be inadequate and being located in the heavily populated suburbs of Agartala and this results in delays. Within Bangladesh the road from Akhaura to Dharkhar is a single-lane road and its condition is only fair. The portion from Dharkhar to Comilla is also a narrow 2-lane road in need of improvement. In addition, border crossing facilities have yet to be developed at Akhaura.

4.6.2 Non-Physical Barriers

Within India the Agartala check post in Bangladesh no freight transport is allowed to cross borders. Goods are transhipped at the borders and taken inside the respective country in their own trucks.

4.6.3 Measures to Address Barriers

Investments are required to improve the border facilities at the Agartala and Akhaura posts. The road from Akhaura to Dharkhar needs to be widened, as well as improvements to be made to the Dharkhar–Comilla road section. In the context of non-physical barriers, there is the same need to develop bilateral transport and transit agreements as without them trade along this corridor will remain constrained.

4.7 SAARC Road Corridor 7: Kathmandu–Nepalganj–New Delhi–Lahore–Karachi (2,643kms)

This corridor starts from Kathmandu and reaches Nepalganj, using partly the Mahendra Highway and then the East-West Highway. From Nepalganj, the corridor uses the NH-28C, NH-28 and NH-24 to reach New Delhi. From New Delhi the road crosses the border at Wagha and reaches Lahore where it then uses the National Highway No 5 to Hydrabad and the M9 motorway to Karachi (See Map 9).

Map 9: SAARC Road Corridor 7

Nepalganj is 510kms away from Kathmandu. The Mahendra Highway is a 2-lane (6–7m) wide road and the condition is good and the East-West Highway is 6m wide and its condition is also good.

In India, the section between Nepalganj–Barabanki (154kms) is a 1–2 lane road and the condition is only fair. Within this section, the portion Nepalganj–Baharaich has only 3.75m wide pavement and the width of Baharaich–Barabanki portion varies from 5.5–7m. The traffic on the Nepalganj to Baharaich section varies from 5,700 to 7,100 PCUs per day with 250–320 trucks daily and the traffic on Baharaich–Barabanki section varies from 8,100 PCUs to 10,600 PCUs per day with 880–1,000 trucks daily. The Barabanki–Lucknow section (30kms) is a four lane road, while Lucknow–New Delhi is a 2–4 lane road. The condition of both of these roads is good.

The road between Delhi and Lahore is described in the section on Corridor 1. In Pakistan a section between Lahore to Hyderabad (1,200kms) is a 4 lane dual carriageway and the condition of the highway is good with 7.25m wide pavement on either side with 1.3m shoulders on each side. From Hyderabad the corridor uses Motorway (M-9) which is 144kms in length up to Karachi. Passenger traffic on this section varies from moderate to high traffic for example 5000 vpd (N-5) to 13,000 vpd (M-9).

As regards passenger traffic flow overall figures are not available. No scheduled bus services between Kathmandu and Indian cities of Lucknow, Kanpur and Delhi are plying at present. As stated earlier, an agreement for such bus services has been finalized, but not yet signed. Like other India–Nepal border check posts, vehicles of each country can cross over to the other country's territory under the existing informal arrangement. The potential for traffic on this route is high as it connects the major cities of North India to Kathmandu.

4.7.1 Physical Barriers

Within Nepal there are no major physical constraints at the Nepalganj border post or along the corridor up to Kathmandu. Within India, the Bahraich to Rupaidiha road is bad in patches. 25kms of the road is single lane of which 15kms between Nanpara and Rupaidiha is stated to be particularly bad.

4.7.2 Non-Physical Barriers

Within Nepal there is no formal agreement for vehicular movement between India and Nepal, though Nepalese trucks are also allowed to enter India and travel up to the nearest market towns. Indian vehicles can come to Nepal on payment of fees prescribed by the Nepalese authorities to discharge their cargo and return empty within 72 hours.

4.7.3 Measures to Address Barriers

Investment is needed to widen and improve the road from Bahraich to Rupaidiha (India) and from Nanpara to Rupaidiha (India) to 2-lanes.

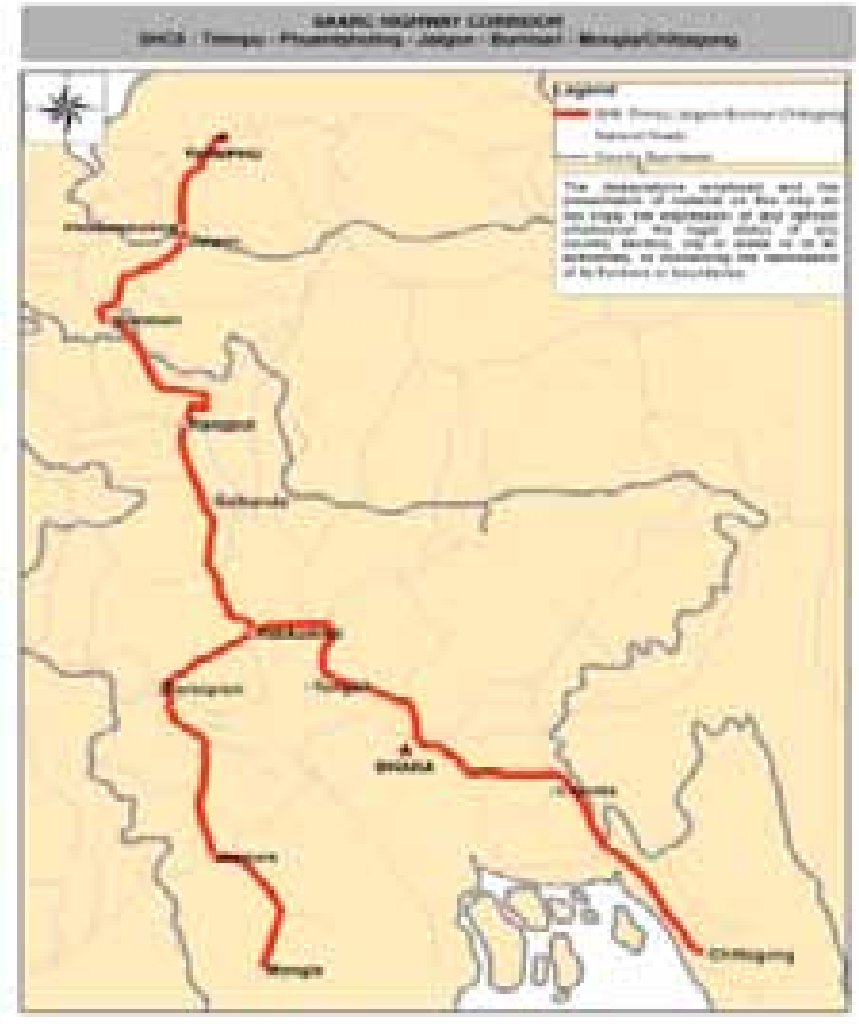
To address the non-physical barriers indicated above, concerned officials of India and Nepal should undertake consultation and come up with mutually acceptable solutions to develop formal agreements to replace the existing informal arrangements. In this respect the

agreement between India and Nepal needs to be signed and a comprehensive motor vehicle agreement needs to be finalised and signed.

4.8 SAARC Road Corridor 8: Thimphu–Phuentsholing–Jaigon–Chengrabandha–Burimari–i) Chittagong (966kms) and ii) Mongla (880kms)

From Thimphu, the corridor follows the Thimphu–Phuentsholing Highway (TPH) to reach the border at Phuentsholing/Jaigon (India). From Jaigon, the corridor uses the NH-31 and NH-34 to reach the Bangladesh border post at Burimari. The corridor then uses the N-509, N-506 and N-5 to reach Hatikumrul. From Hatikumrul, the corridor follows two different routes, to reach Mongla it follows the N-507, N-6, N-704 and N-7 and to reach Chittagong it us the N-5, N-405, N-4, N-3 and N-1 (See Map10).

Map 10: SAARC Road Corridor 8



In Bhutan, the corridor from Thimphu to Jaigon follows the same route as that of Corridor 3. In India, the road from Jaigon to Burimari (110kms) is a 2-lane standard road in good condition. In Bangladesh, the road from Burimari to Rangpur (139kms) has a pavement width of 5.5m with 2m shoulder on both sides and the condition is also good. From Rangpur to Mongla (459kms), and from Rangpur to Chittagong (545kms), these sub-corridors use the same routes as those detailed under SAARC Road Corridor 4.

The present level of traffic at the Burimari border is 95 trucks per day from India and 8 per day from Bangladesh. It has been estimated by RITES that the traffic will grow at the rate of 8% per annum up to 2010 and by 6–7% thereafter.

As regards passenger traffic according to a recent study by RITES, the Chengrabandha–Burimari border crossing handles about 80,000 passengers per annum or roughly 220 per day. (The figures according to the Country Report by Bangladesh are 25,000 passengers per annum). These passengers are mainly Bangladeshi students who study in Indian schools in Darjeeling and other nearby areas and those travelling for medical treatment in India. A small number of traders numbering about 20 per day also travel from Bhutan to Bangladesh. They use the Indian taxi/bus services in India and Bangladesh taxi/bus services in Bangladesh after crossing the border. There is a visa free travel arrangement between Bhutan and Bangladesh.

Two private companies, namely Shyamtee Paribahan Songstha (SPS) from Bangladesh and S.R. Travels from India, have jointly started a bus service in February, 2005. Bangladeshi passengers make the overnight journey from Dhaka to reach Burimari in the morning. They then cross-over Chengrabandha after completing immigration and customs formalities at Burimari and then use the service provided by S.R. Travels. Discussion on a direct bus service between Dhaka and Siliguri is at a preliminary stage.

It has been projected by RITES that the passengers crossing on the corridor at the border point may rise to 280 per day by 2010, 340 per day by 2015 and 394 per day by 2020. (The projection made by the country report of Bangladesh puts the figure at around 57,000 passengers in 2010, 93,000 passengers in 2015 and 125,000 in 2020, i.e., 156, 255 and 343 per day in 2010, 2015 and 2020 respectively).

4.8.1 Physical Barriers

Within Bhutan the physical constraints of Thimphu–Phuentsholing corridor have been covered under SAARC Road Corridor 3. Within India the inadequacy of separate parking place at the Jaigon border post for checking of vehicles is the only problem and this often leads to congestion on the roadside. Within Bangladesh there is no physical constraint along this corridor, except lack of facilities, such as warehousing, parking areas, open yard, etc. at the Burimari border post and the axle-load limit of 8.2 tonnes. All major new roads are being constructed based on axle-load limit of 10 tonnes.

4.8.2 Non-Physical Barriers

Within both Bhutan and India the constraints are already indicated under Corridor 3. Within Bangladesh there is no agreement between Bangladesh, Bhutan and India for smooth movement of vehicles between these countries and as a result goods are required to be transhipped at Burimari. Other barriers are similar to those indicated under SAARC Road Corridor 4.

These growth projections could be realised or exceeded if formal arrangements for border crossing of both personal and commercial passenger carrying vehicles under a comprehensive motor vehicle agreement were to be put in place and minimum necessary facilities at customs and immigration check-posts such as electric connection, radio network, telephone, baggage scanners, waiting hall/lounge for passengers and computers were also to be provided.

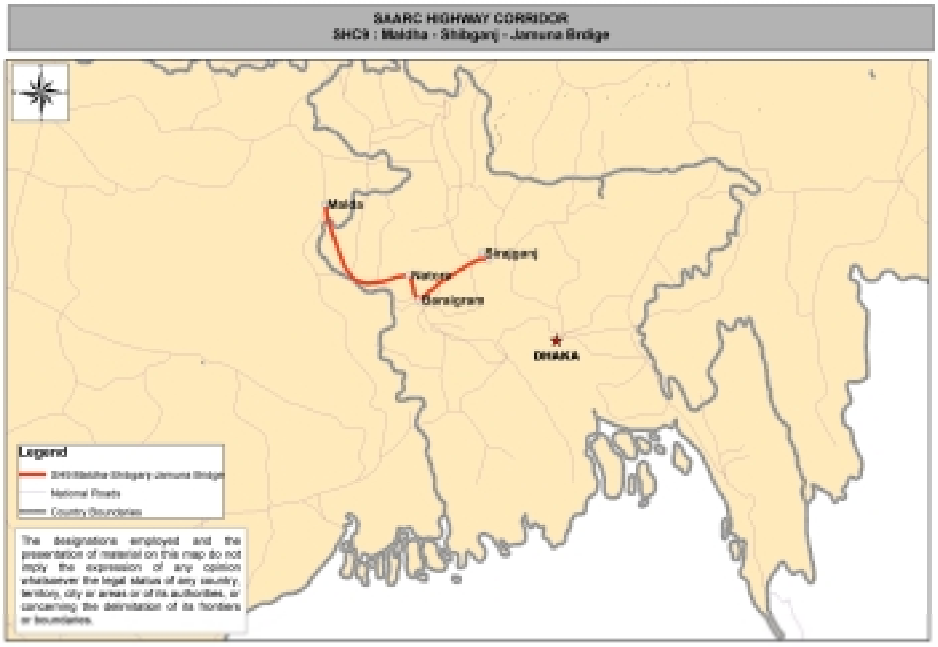
4.8.3 Measures to Address Barriers

Investments are needed to improve the facilities at both the Burimari and Jaigon border posts. In the context of non-physical barriers, some of the solutions suggested under Corridor I could facilitate smooth movement of both goods and vehicles between Bhutan, India and Bangladesh.

4.9 SAARC Road Corridor 9: Maldha–Shibganj–Jamuna Bridge (Bangladesh) (252kms)

This corridor starts at Maldah and follows the NH-34 to reach the border at Mehdipur/Sonamosjid (Bangladesh). From Sonamasjid, it uses Zila road Z-6801, Z-6816 and Regional road R-680 up to Rajshahi (See Map 11).

Map 11: SAARC Road Corridor 9



In India, the Maldah–Mehdipur (13.5kms) section is of intermediate lane (5.5m) standard and is in poor condition. The average number of trucks that cross Mehdipur/Sonamosjid border post is about 100–125 per day in both directions.

In Bangladesh, the corridor from Sonamasjid to Rajshahi (82kms) follows partly Zila and partly Regional highways, both having 3.5m wide pavement. The condition in both cases is only fair. Rajshahi to the Jamuna Bridge (157kms) has an average pavement width of 7.5m and shoulder width 2.0–4.0m and its condition is good.

As regards passenger traffic, it is estimated that presently 15,000 passengers cross over between India and Bangladesh on the corridor (41 per day) and the projections are 17,500 in 2010 and 21,500 in 2020, i.e., 48 and 59 per day respectively in 2010 and 2020.

4.9.1 Physical Barriers

Within India, the Maldah–Mehdipur road section needs widening to full 2-lane width and its condition improved so that it can handle the potential future traffic efficiently. In addition, the facilities at Mehdipur border are inadequate. Within Bangladesh the Sonamasjid–Rajshahi (82kms) section needs widening to full 2-lane road to take care of anticipated future traffic.

4.9.2 Non-Physical Barriers

Due to the lack of a bilateral agreement, like any other road border points between Bangladesh and India, no freight transport is allowed to cross the border. Goods are transhipped at the border and taken inside the respective countries using their own trucks. There is an established land port at Sonamasjid that is providing reasonably good service.

4.9.3 Measures to Address Barriers

Investments are needed to widen the road from Maldah to Mehdipur (India) and Sonamsjid to Rajshahi (Bangladesh). Investment is also required to increase facilities at the Mehdipur border post (India). To address the non-physical barriers, a solution similar to SAARC Road Corridor 8 should be considered.

4.10 SAARC Road Corridor 10: Kathmandu–Bhairahawa–Sunauli–Lucknow (663kms)

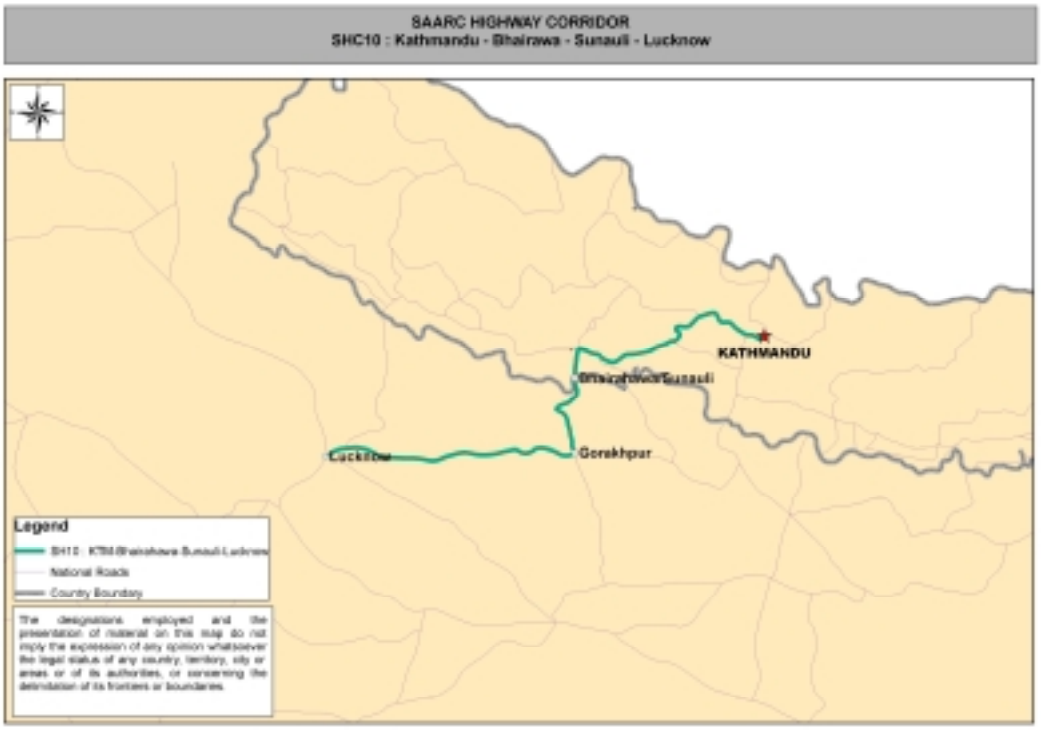
This corridor starts from Kathmandu and reaches the border point at Bhairahawa/Sunauli (India) using the Prithivi and Mahendra Highways. From Sunauli, it follows the NH-29 and NH-28 to reach Lucknow (See Map 12).

In Nepal, the Kathmandu–Bhairahawa section (281kms) has 6–7m wide pavement and the condition of the road is good. The section Bhairahawa–Sunauli (8kms) is a 2-lane road and its condition is also good.

In India both the sections, namely Sunauli–Gorakhpur (94kms) and Gorakhpur–Lucknow (280kms), are 2-lane roads and are being further developed to dual-carriageways under the East-West Corridor Programme of the National Highway Authority of India. Currently, the roads are in good condition. The traffic on the Sunauli–Gorakhpur section varies from 7,500-9,500 PCUs per day, including 770–1,200 trucks.

As regards passenger traffic the potential is very high, both on account of tourism and trade - related travel. Around 4,000 persons cross the border along this corridor from India to Nepal and 3,100 from Nepal to India every day. As in case of other India–Nepal corridors, road transport goes on under informal arrangements and is not particularly constrained by the absence of a comprehensive motor vehicle agreement at this stage. However, lack of scheduled bus services is a constraint. As the passenger movement on this corridor is likely to grow, more formal arrangements and strengthening of border infrastructure will be needed to facilitate such growth.

Map 12: SAARC Road Corridor 10



4.10.1 Physical Barriers

Within Nepal there is no constraint along this corridor, other than in relation to border facilities which are almost non-existent. The lack of a bank means that customs collections are required to be taken to the Bhairahawa city bank office, thus causing delays. Within India there is no physical constraint between Sunauli to Lucknow but at the Sunauli border post, parking space is inadequate and there is no space for unloading goods for checking. The immigration facility is located in a busy market area and lacks facilities like baggage scanning, toilet and rest room.

4.10.2 Non-Physical Barriers

Similar to those indicated under SAARC Road Corridor 7.

4.10.3 Measures to Address Barriers

Investment is needed to increase facilities at both the Bhairahawa and Sunauli border posts. There is also a need to relocate the immigration office at Sunauli. To address the non-physical barriers indicated above, concerned officials from India and Nepal should discuss the issues to find a mutually acceptable solution.

4.11 Overall Measures to Develop the Road Corridors

The discussion on the ten corridors brings out clearly that there are by and large common physical and non-physical barriers on all corridors except that they vary in degree vis-à-vis the level of traffic crossing the border. It is also seen that the cross-border traffic is generally at a much lower level compared to the intra-country traffic in each of the countries due to

mostly institutional and infrastructural hurdles for inter-country traffic to attain its true potential.

Removal of infrastructural constraints i.e. widening and strengthening of the roads and provision of border check-posts with the necessary staff, equipment and facilities would require specific attention by national Governments.

It is often the case that the last miles of the roads leading to the border check-posts are not on national highways and lie within the lower hierarchy of roads (State/local). Since Central Government is likely to command more resources than the lower tiers of Government, one way of addressing the issue would be to take over these roads, reconstruct them to the required standard and ensure their sustained maintenance as National Roads. In case domestic resources fall short, recourse to multi-lateral institutions for assistance on soft terms could be an option.

Upgradation of border check-posts could be standardized with the concept that the passenger and freight streams should be segregated and the facilities dealing with passengers should house essential services such as immigration, customs, police, baggage scanning /examination, and parking facilities for vehicles both in arrival and departure areas. The plan should also include support services such as banks with foreign exchange facilities, post offices, communication facilities, tourist information centres, waiting halls, canteen and refreshment stalls and public conveniences. Staffing and equipment provisions must be tied to the level of existing and potential traffic through the check-posts. Since many of the check-posts are located in remote areas, provision of power back-up and accommodation for essential staff would also need to be built in.

The coordination for investment for upgradation of these check-posts should ideally be responsibility of the Central Government of each of the countries. It is understood that the Government of Bangladesh has constituted a single authority for management of border facilities. Similar models could be followed by other countries.

A standard draft agreement to allow free movement of motor vehicles of one country to another on the designated corridors including transit access to the countries to reach another SAARC country or other countries beyond could be evolved by SAARC for discussion and adoption among the members. SAARC also could coordinate to conclude the discussion in a time-bound manner.

It should be noted that SAARC undertook a Customs Study in 2004 and formed a Group on Customs Cooperation to enhance trade facilitation in the region. The key recommendations of that study were as follows (comments in brackets relate to recommendations from this study):

- Simplification and Standardisation of the Goods Declaration Form (preferably using the UN-standardised format of the Single Administrative Document SAD as this is common to most of the Customs IT systems);
- Standardisation on use of the 8 digit HS Code (the report proposed use of 10 digits but based on other regions this is not recommended as it makes it more complex);
- Development of a simple and uniform transit form (a simplified SAD or TIR Carnet – type form might be most appropriate);
- Specific and uniform list of items permitted entry duty free;
- Specific list of items not allowed;

- Uniform foreign exchange limits;
- Uniform baggage allowance limits by road/air and sea (not agreed as outside the remit of Customs and trade facilitation); and
- Consultation with relevant Transport Ministries to permit temporary import of cars for private purposes, buses for conducted tours and pilgrimages and to allow cargo vehicles up to the consignees unloading venue (the latter strongly endorsed).

Subject to the comments in brackets, these facilitation measures remain relevant and await implementation. They would do much to reduce the congestion at the road borders.

Along with the above-cited long-term and medium-term measures, some immediate initiatives to address the deficiencies of existing bus services can be undertaken bilaterally by the countries involved. These would include removal of irritants in the existing services, augmentation of services and adding new services by agreement. India and Bangladesh have much to gain from such initiatives. India and Pakistan could also think of increasing the frequency of the existing services and adding more such services.

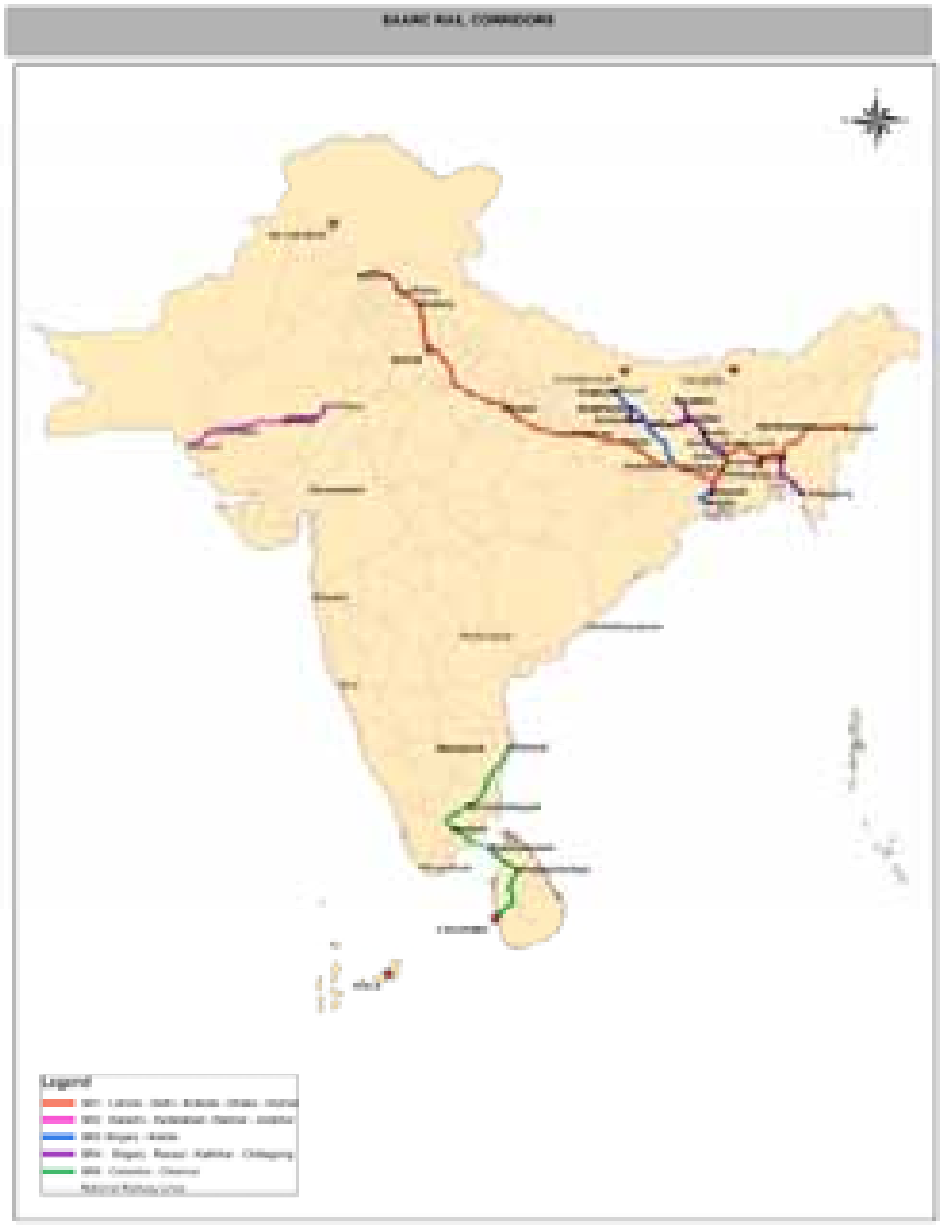
4.12: SAARC Road Corridors: Major Barriers and Measures at a Glance

Corridors	Physical Barriers				Non-physical Barriers	Measures to Address Barriers
	Narrow Roads	Roads with poor condition	Lack of facilities at border	Others		
1	2	3	4	5	6	7
SAARC Road Corridors (Corridors are generally of 2-lanes, except in India and Pakistan where some sections have 4-lanes)	(a) Barasat–Petrapole (75kms, 5.5m) in India; (b) Dharkhar–Akhaura (15kms, 3.5m) in Bangladesh; (c) Thimphu–Phuentsholing (172kms, 3.65m) in Bhutan; (d) Baharaich–Rupaidiha (25kms, 3.5m) in India; (e) Maldah–Mehdipur (13.5kms, 5.5m) in India; and (f) Sonamasjid-Rajshahi (84kms, 3.5m) in Bangladesh.	(a) Barakar–Jarkhand and beyond in Bihar (180kms) in India; (b) Nanpara–Rupaidiha (15kms) in India; (c) Dharkhar-Comilla (56kms) in Bangladesh; (d) Maldah–Mehdipur (13.5kms) in India; and (e) Sonamasjid–Rajshahi (84kms) in Bangladesh.	(a) Parking at Phuentsholing (Bhutan), Dawki, Raxaul, Jaigon and Sunauli in India, Burimari (Bangladesh) and Attari (Pakistan); (b) Immigration/Customs office at Phulbari (India) and Banglabandha (Bangladesh); (c) Baggage scanning and toilet facilities at Attari (Pakistan); (d) Cranes, forklifts and sufficient customs counters at Phuentsholing (Bhutan); (e) Post office and telephones at Banglabandha; (f) Warehousing and open yard at Burimari; (g) Freight station at Birgunj (Nepal); (h) Check post and immigration offices at Agartala and Sunauli (India) need shifting; (i) Central Warehousing Corporation at Petrapole (India) need protection from rain.	(a) Towns along Petrapole–Kolkata road (India) face continued congestion; (b) Distance along present route between Kathmandu and Birgunj (Nepal) is too long; (c) Bridges along Hetauda–Pathalaiya (Nepal) are old and 1-lane only and (d) Weight limit on 75 years old cantilever bridge at Dawki (India).	(a) Lack of: (i) Bilateral and/or Regional agreements for movement of vehicles across borders between Bangladesh, India and Pakistan; (ii) EDI/IT system, and (iii) 'Through bills of Lading'; (b)Cumbersome and complicated customs procedures and involves in India-Bangladesh border, 22 documentations, more than 55 signatures, and minimum 116 copies of papers for the final approval; (c) Different documentation at different border points; (d) Lack of: (i) Standardisation of Indian Customs Declaration (CTD); (ii) Harmonisation of working hours and weekly holidays across the borders, (iii) Enforcement of restriction on overloading of vehicles, (iv) Security in some areas along the corridors (v) Transparency in inspection procedures.	Measures to address non-physical barriers are: (a) Adoption of bilateral transport agreements allowing through transport; (b) Adoption on international conventions allowing transport temporary entry; (c) adoption on transit agreements to eliminate the need for border clearances; (d) Introduction of customs and immigration IT systems at the borders; (e) Promotion of 'Through bills of Lading'; (f) Simplification and harmonisation of customs procedures; (g) Adoption of similar documentation at all border points; (h) Standardization of Indian Customs Declaration (CTD); (i) Harmonisation of working hours and weekly holidays across the borders; (j) Controlling overloading of vehicles through strict enforcement of regulations; (k) Strengthening security measures at the border crossing; and (l) Introducing transparency in inspection procedures. Measures needed to address physical barriers are: (a) Widening of some narrow sections (see column 2) to 2-lane paved roads. (b) Improvement of conditions of certain road sections (see column 3) to 2-lane standard paved roads, especially the roads through Bihar; (c) A number a facilities need to be provided at border crossings (see list in column 4); (d) Construction of: (i) Town by-passes along Petrapole-Kolkata road (India); (ii) 'Fast Track' road between Kathmandu and Birgunj (Nepal); (iii) 2-lane bridges to replace the old one-lane bridges along Hetauda-Pathalaiya (Nepal) and (iv) a new bridge at Dawki (India) to replace 75 years old cantilever bridge; (v) Improved warehousing at Petrapole border.

5.0 SAARC REGIONAL RAIL CORRIDORS

The description of the rail corridors identified as priority in Chapter 3 (see Map 3) includes the existing rail network in the respective countries including the originating/terminating points, border crossings and interchange locations, existing gauge, status of sections with single/double/multiple lines, major infrastructural features, the sectional capacity along the corridors, location of ICDs, terminals and the major yards.

Map 13: Selected SAARC Rail Corridors



Physical barriers are basically those factors that adversely affect the smooth flow of intra-regional rail traffic on the identified corridor. These barriers include the deficiencies in the existing railway infrastructure in terms of sectional capacity constraints, difference in gauges require en route transhipment of cargoes, incompatibilities of rolling stock both goods wagons and locomotives, varying track structures prohibiting through movement of wagons

with maximum axle load, inadequate capacity of the loop lines/holding lines at the border inter-change points and in sections, as well as other infrastructural requirements depending upon the projected growth of traffic on the identified corridors.

Non-physical barriers to intra-regional connectivity primarily concern the issues of trade and transit facilitation. Non-physical barriers have a direct and immediate effect on the flow of intra-regional traffic. Such barriers involve issues ranging from the procedural factors at the interchange points/gateways to the larger bilateral transport and trade agreements that also often work against the smooth flow of intra-regional traffic. In a sense, trade facilitation is the most significant of the non-physical barrier that affects the entire scope of the logistics of moving goods through gateways or at the customs checkpoints and inter-change points at national borders. A broader concept could include a number of inter-related factors including procedural issues, modernisation and streamlining of related regulatory requirements, harmonization of technologies and a review of bilateral agreements.

The five identified Regional Rail Corridors are indicative of tremendous potential for growth of intra-regional traffic, savings in transportation costs and reduction in transit times, that combined would contribute to the potential economic and trade development of the SAARC member states.

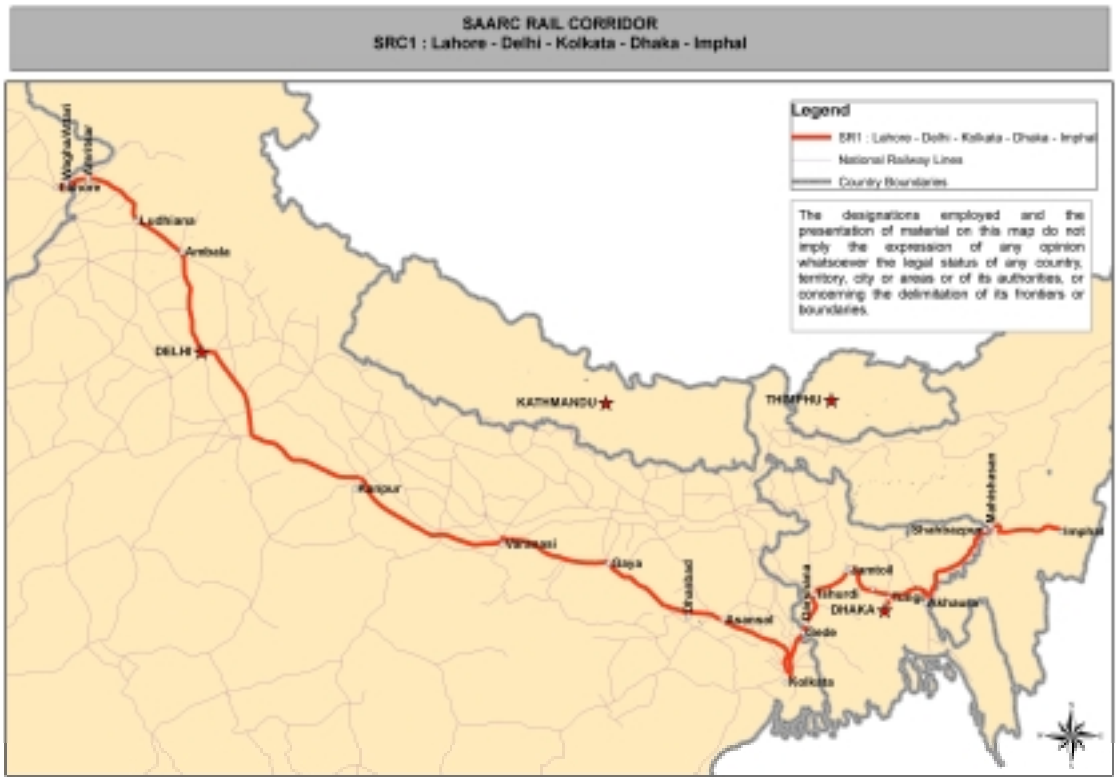
5.1 SAARC Rail Corridor 1: Lahore–Delhi–Kolkata–Dhaka–Imphal (2,830kms)

The corridor starts in Lahore in Pakistan and connects with the Indian Rail network at Attari through Wagha. It extends across northern India from Attari to Gede before entering Bangladesh at Darshana. Darshana to Shahbazpur, the corridor connects Joydebpur, Dhaka and Akhaura in Bangladesh and thereafter enters India again through Mahishasan border point to Imphal (See Map 14).

This rail corridor connects Lahore (Pakistan)–Delhi/Kolkata (India)–Dhaka (Bangladesh) and Imphal (India). This is the most significant regional rail corridor connecting Pakistan, India and Bangladesh largely by broad gauge railway network (excepting on the eastern side of Bangladesh that is presently on metre gauge).

The corridor originates at Lahore in Pakistan that is further connected with rest of the Pakistan railway network. The broad gauge rail link from Lahore turns eastwards towards Indian border 28kms away. Wagha is the last station on the Pakistan Railway connecting with Attari, the first station on the Indian Railway. Wagha–Attari is the main interchange point between Pakistan and India through which passenger and freight traffic is exchanged under a bilateral agreement in force from 1976. The connectivity between India and Pakistan is on broad gauge, thus allowing compatibility for movement of similar kinds of rolling stock i.e. locomotives and wagons other than air-braked stock and commodity specific wagons.

Map 14: SAARC Rail Corridor 1



In India the corridor from Attari extends all the way to Kolkata, a distance of 2,032kms. The rail link between Attari and Delhi is single line between Attari–Amritsar for 23kms and thereafter on broad gauge double line for 451kms up to Delhi via the major junction stations of Jalandhar, Ludhiana, Ambala Cantt. This route is entirely electrified, excepting the 23kms Attari–Amritsar section. The sectional capacity for handling the freight and goods traffic on this corridor is currently saturated on a few sections.

Most of the rail traffic moving from India to Pakistan consists of de-oiled cake, seeds, sugar, maize, general goods, fodder and rubber in train loads. In addition, the less than train load traffic is carried in freight wagons attached to the passenger train i.e. 'Samjhauta Express' running between the two countries. Mostly, the goods wagons/trains return back empty from Pakistan or with only part back-loading. The commodities currently being transported by rail from Pakistan to India are rock salt, dates and handicrafts etc. The traffic between India and Pakistan was suspended from 30th December 2001 to 15th January 2004, but has now been resumed and the trend of growth indicates significant potential for bilateral trade. Under the current bilateral agreement only a certain type of rolling stock i.e. BCX (covered 8-wheeler Freight Car) is permitted to move between the two countries and this has a restricting effect on the potential growth of traffic, especially on containerised cargo movement by rail between the two countries.

This corridor further extends from Delhi to Kolkata on double line broad gauge rail link, which is fully electrified and capable of handling high volumes of both passenger and freight traffic. This 1441kms long section also happens to be one of the most significant and busiest rail routes on Indian Railways' network and is provided with multiple lines, marshalling

yards, ICDs and junctions from where other important railway lines take off. Between Attari, near the Pakistan border to Kolkata, there is no missing link and/or change of gauge.

Kolkata (Howrah) onwards to Gede the route is again broad gauge, electrified and double line up to the inter-change point. There is an alternate route for Gede, especially for the movement of freight traffic by-passing the busy suburban sections. The link from Shaktigarh to Gede via Naihati–Ranaghat is utilised for most of the freight traffic for Bangladesh. Ranaghat, which is 43kms short of Gede, is the serving station for both Gede–Darshana and Petrapole–Benapole inter-change points between Indian and Bangladesh Railways. The third inter-change point at Singhabad–Rohanpur is connected via another rail route.

The corridor enters Bangladesh at the Gede–Darshana interchange point. This interchange point is also the most significant point currently handling on an average about 60 trains per month, including 30 loaded trains to Bangladesh from India and the same number of empty rakes from Bangladesh to India. These goods trains carry general goods, food grain, maize, ballast etc. to Bangladesh. The pattern of rail-bound freight traffic is, however, entirely one-sided i.e. loaded traffic is moved from India to Bangladesh and the empty wagons are returned back to India. There is no traffic from Bangladesh to India at present causing under-utilization of the existing transport capacity.

In Bangladesh, the corridor connects Darshana with Dhaka (290kms) via Ishurdi Jn., Joydebpur and Tungi. Further eastwards of Tungi, the corridor connects Shahbazpur, the last station on Bangladesh Railway via Akhaura and Kulaura (266kms). The section between Darshana and Ishurdi in Bangladesh is on broad gauge and between Ishurdi junction to Joydebpur on dual gauge (metre and broad gauge single lines). From Joydebpur onwards, the section up to Dhaka is on metre gauge, as is the section between Joydebpur to Shahbazpur via Akhaura and Kulaura.

The corridor, through the last station on Bangladesh Railway—Shahbazpur, enters into India on metre gauge connecting Mahishasan station. The section on Indian Railways from the interchange point is on metre gauge up to Karimganj (10kms from Mahishasan). However, the entire section from Mahishasan to Jiribam (116kms) is being converted to broad gauge and from Jiribam to Tupul near Imphal (98kms) is being constructed with a new broad gauge line.

SAARC Rail Corridor 1 is, therefore, on broad gauge with some dual gauge sections all the way from Lahore to Joydebpur in Bangladesh and thereafter on metre gauge system on the eastern side of Bangladesh. For movement of any potential through freight traffic, transhipment would be necessary at Joydebpur or short of it and thereafter again in India at Karimganj with the existing infrastructure at present.

Although, there is no through traffic on this corridor at this stage between Pakistan and Bangladesh or from Kolkata in India to its North Eastern States transiting across Bangladesh due to various physical and non-physical barriers, through connectivity on this corridor would greatly assist third country trade, access to ports/ICDs, growth of intra-regional traffic and reductions in transit times.

As regards passenger traffic the only inter-country rail passenger service on this corridor at present is between Delhi (India) and Lahore (Pakistan), a biweekly service known as ‘Samjihauta Express’ is run between the two countries. This is governed by a bilateral

agreement signed in 1976 that has been extended from time to time. Two passenger trains are running every week each way between Delhi and Lahore, though these trains do not physically run through between Delhi and Lahore. Under the terms of the agreement, each of the countries provides the rake and locomotive to cross the border for six months alternately. The train from Delhi runs (through Ambala and Amritsar) up to Attari (India). The passengers disembark, go through the immigration and customs check at Attari and re-board the train, provided by either India or Pakistan depending on their turn, placed at the other side of the fence. After reaching Wagha, the passengers once again go through the necessary clearances and the train runs up to Lahore. The journey from Lahore to Attari is also performed similarly and the passengers board the train from Attari to Delhi after necessary clearances. The train consists of ten cars with a capacity of around 600 passengers and ten freight cars, which are also attached to the train. The average seat occupancy is around 80%. The service carries 60,000 passengers per annum each way. On certain special occasions when a large number of Sikh pilgrims visit Nankana Sahib and other holy shrines, the demand is high and additional special trains are run.

The customs and immigration facilities are inadequate, the procedure is slow and often the whole process takes anywhere up to 4-5 hours. The service could be increased if associated facilities at border crossing and visa issuance etc. can be taken care of.

There are no rail passenger services between India and Bangladesh, although discussions for such service have taken place between the two countries from time to time. Considering the distance it is unlikely that rail passenger traffic would develop all the way between Lahore and Imphal or Lahore and Dhaka. However, facilitation of a bilateral/trilateral framework could bring into existence services on segments of the corridor on which such services might be viable. It is expected that services such as Lahore to Kolkata, Dhaka to Kolkata and Delhi, Imphal to Kolkata via Dhaka and Kolkata to Dhaka etc. could become possible if such a framework were developed.

5.1.1 Physical Barriers

As this regional rail corridor connects Pakistan Railway network with Indian and Bangladesh Railway networks, it is important to consider the physical barriers within each country separately.

Pakistan

The physical barriers can be summarised as follows:

- Rolling stock restrictions permit only BCX type of wagons (8-wheeler covered wagons) for movement between India and Pakistan and this limits transportation of specific commodities by rail, especially POL and container wagons. The containerised cargo meant for Pakistan that currently moves via the longer route through JNPT port could easily move via Wagha–Attari interchange point using a much shorter route; and
- Lack of air-braked locomotives and freight wagons on Pakistan Railways.

India

The physical barriers are summarised as follows:

- The rolling stock permitted for inter-country movement is only of the BCX type restricting further movement of containerised cargo, POL and other commodities that could be moved in open wagons;
- The section capacity between Ludhiana–Delhi is restricted in certain sections;
- The Delhi–Kolkata (Howrah) route is the busiest freight and passenger corridor on Indian Railways and has capacity constraints in the Delhi–Mughalsarai section that may hamper future growth of traffic, both intra-regional and domestic;
- India–Bangladesh freight traffic is also restricted to BCX (vacuum braked covered eight wheeler wagons) due to the inability of Bangladesh locomotives to haul air-braked freight wagons and inadequate holding capacity of loops and terminals;
- Movement of containers is currently restricted in addition to other types of rolling stock including open wagons meant for raw materials and coal etc. These restrictions hamper the growth of intra-regional traffic and inter-country traffic between India and Bangladesh; and
- Interchange of freight trains with Bangladesh at Gede–Darshana interchange point and with Pakistan at Wagha–Attari is currently restricted to daylight hours only.

Bangladesh

Physical barriers are summarised as follows:

- Inadequate infrastructure in terms of the short loop lengths, yard lines and terminals;
- Inability of the locomotives to haul full train loads;
- Mechanical signalling and track structures that restrict the speeds of freight trains;
- Restrictions on the movement of broad gauge loaded trains and containers over the Jamuna Bridge;
- Excessive wagon turnaround times on Bangladesh Railway restricting the inflow of freight traffic into Bangladesh;
- Metre gauge from Tungi to Dhaka and Tungi to Shahbazpur and Chittagong via Akhaura will restrict any potential through movement of broad gauge freight wagons to the port of Chittagong and to the interchange point at Shahbazpur with India without transhipment/gauge change;
- Section capacity constraints between Tungi–Bhairab junction;
- Kulaura–Shahbazpur section is not in operation at present; and
- Lack of dual gauging of Tungi–Shahbazpur section and Tungi–Chittagong sections.

5.1.2 Non-Physical Barriers

Between India-Pakistan

Apart from the restriction on the movement of a specific type of freight wagon, there is no restriction on the volumes of cargo that could be moved between the two countries. Although, by and large the demand from trade has been met on sides, railways being the most economical and fuel efficient mode of transport, there is significant potential for movement of containerized cargo, raw materials and POL products between the two countries. Raw

materials, including coal, iron ore, gypsum and limestone etc. could also be moved in bulk in the open eight wheeler wagons. However, this would be largely dependent on the willingness of both the countries to revise the bilateral rail agreement permitting movement of all types of rolling stock.

There are issues involving timely availability of the exact type of rolling stock to meet the demands of trade and industry to send traffic to Pakistan that is restricted on account of particular type of rolling stock. Cargo meant for Karachi that is often moved in less than trainload quantities has to be transhipped at Lahore and thereafter moved to Karachi. Movement of containers, if permitted, between the two countries could result in potential traffic flow of containerized cargo from the North Indian hinterlands to destinations in Pakistan and a possible international multi-modal movement to and from the port of Karachi.

Between India-Bangladesh

On the Indian side, Ranaghat is the main custom clearance point, about 44kms short of Gede. After the check by customs, the sealing of wagons is undertaken at this station and once cleared the rakes are moved onwards to Bangladesh. At Gede there is a final inspection by the Indian customs staff to ensure that the seals are still intact. This can take up to two hours and only after the final inspection is complete, the rake is allowed to move to Darshana. At Darshana (Bangladesh), the rakes received from India are marshalled and reassembled into train sets according to their individual destinations within Bangladesh. Normally the rakes received from India consisting of 35 BCX's are divided into two to three portions and moved to other destinations including Noapara, a river port about 96kms from Darshana and to Ullapara, a transhipment point. Only in about 25% of cases does the whole rake move towards a single destination. Marshalling of rakes is consequently a major exercise that also gets adversely affected due to the non availability of shunting locomotives and limited holding capacity in yards.

On arrival of trains from India, Bangladeshi customs undertake checking of about 10% of wagons. In the case of chemicals, samples are sent to Dhaka for testing and goods are released against bonds. Custom clearance takes about two hours with the entire work being undertaken manually. Only after the clearance has officially been given, the C&F agents make an onward booking for the intended destinations. The C&F agents have also been highlighting the problems connected with advance payments, poor condition of wagons, pilferage of cargo and matters connected with insurance companies. Security considerations also cause delays and restrictions on free movement of traffic e.g. the flow of traffic between India and Bangladesh is restricted to daylight hours.

The non-physical barriers for inter-country and intra-regional rail-bound traffic are considered relatively minor compared to the physical barriers, as the rail traffic in the region is primarily of a bilateral nature and that too is one-sided with India being the origin point or the dispatcher of the loaded consignments and Bangladesh being the destination for this traffic. There is practically no return traffic to India and the rail wagons are returned in empty condition.

5.1.3 Measure to Address Barriers

The measures required to address the physical barriers are indicated below:

- The section between Wagha and Lahore in Pakistan is single line and non-electrified, whereas most of this corridor in India is double line and electrified. Electrification of the corridor between Wagha and Lahore and between Amritsar and Attari would enable through movement of freight trains without a change of traction;
- Sectional capacity for handling the projected growth of traffic on the double line electrified section i.e Amritsar–Delhi is saturated on quite a few sections requiring augmentation of capacity by either low-cost inputs like automatic block signalling or by major investment in laying additional railway lines;
- The sectional capacity on the double line broad gauge section between Delhi and Mughalsarai is also highly saturated requiring immediate inputs for augmentation of capacity and other enhancement measures;
- The section between Mughalsarai–Sonnagar may also face capacity constraints in view of the projected growth of freight traffic to the northern Indian hinterlands;
- Sonnagar–Howrah and Howrah–Gede sections are currently capable of handling the existing traffic. However, capacity augmentation works would be required to handle future growth of traffic;
- In Bangladesh, Darshana–Ishurdi is a broad gauge double line section. However, Ishurdi–Joydebpur is a dual gauge section i.e. enabling single line broad gauge and single line metre gauge train movements, thus restricting the capacity. Beyond Joydebpur, the corridor in Bangladesh is only on metre gauge. It will be necessary to convert the metre gauge sections into either broad gauge or dual gauge to facilitate through movement of freight trains without transhipment;
- The restriction on movement of loaded broad gauge freight trains, including loaded container trains across the Jamuna Bridge between Saidabad and Ibrahimabad is the most important bottleneck on this corridor and restricts movement of through loaded trains beyond Saidabad in Bangladesh. Strengthening of the existing bridge or construction of a new bridge is, therefore, a key infrastructural requirement on this corridor. However, as an interim measure, a transhipment hub may be established at Ishurdi;
- The loop lines on Bangladesh Railway are of inadequate length and unable to accommodate a loaded train received from India. Extension of the loop lengths and increasing the capacity in yards would enable movement of train load consignments to the destinations without being marshalled in the yards;
- The rolling stock currently being interchanged between India and Pakistan and India and Bangladesh is restricted to BCX wagons. As most of the rolling stock on Indian Railways is of modern design, i.e. air-braked 8-wheeler stock, both Pakistan and Bangladesh need to introduce similar rolling stock and permit use of air-braked wagons for intra-country traffic;
- The limitation to use only one type of wagon also restricts growth of intra-regional traffic of mineral ores, coal and petroleum products. Movement of open wagons or specialized oil tank wagons should be permitted;
- The last section of this corridor that enters the Indian North Eastern States at Mahishasan point is currently under conversion to broad gauge. This work needs to be completed in a priority basis up to Jiribam, along with the construction of a new broad gauge line up to Tupul (Imphal) to provide through connectivity;

- In Bangladesh, the section between Kulaura–Shahbazpur is presently out of commission and needs to be restored and upgraded, preferably with dual gauging or conversion to broad gauge; and
- The facilities for immigration and customs at rail inter-change points i.e. Wagha–Attari, Petrapole–Benapole, Gede–Darshana, Mahishasan–Shahbazpur would require a critical reassessment. While Wagha–Attari has a modicum of facilities that would need augmentation, other points do not have passenger-landing facilities. Customs/Immigration infrastructure along with waiting halls and visa-issuance /processing offices would need to be planned.

The measures required to address the non-physical barriers are as follows:

- The inter-change of rail traffic between India and Pakistan is governed under the bilateral agreements between the two countries and is monitored on a regular basis by the authorities of the two railway systems. However, the bilateral agreements may have to be reviewed for operationalising any such intra-regional corridor that would carry third country traffic and transit across another country on its rail network. The current bilateral agreements may have to be revised to a trilateral or multilateral agreement for such through intra-regional rail movements;
- Compatibility of rolling stock and infrastructure is also directly related to the non-physical barriers. The restriction on utilisation of a certain type of rolling stock adversely affects the trade and imposes an unwarranted restriction on free and timely movement of intra-regional traffic. Consequently, there is a need for removal of the wagon-type restriction;
- The current arrangement of a 10 day period zero balancing between India and Pakistan imposes artificial restrictions on the flow of the traffic from India to Pakistan. Similarly, the excessive turnaround time taken by Bangladesh Railway in returning the Indian Railway wagon fleet also restricts further loading of goods from India to Bangladesh. These constraints need to be addressed urgently;
- The flow of traffic between India and Bangladesh and India and Pakistan is restricted to day-light hours and this needs to be extended to round-the-clock working to minimise delays;
- The customs check during daytime and in certain cases at two locations i.e. at Ranaghat and Gede, also involve additional time and resultant delays. The feasibility of eliminating the second check at Gede should be examined;
- Lack of computerisation of the customs procedures affects the intra-regional traffic in all the three countries. Electronic Data Exchange under a synchronized system needs to be evolved by the Customs to enable expeditious clearances at the border;
- The restriction on movements of less than trainload traffic (wagon loads) by Indian Railways and the inability of Bangladesh Railways to move the full rakes to major yards/destinations without marshalling involves further delays and inconvenience to trade. Augmentation of loop lines and holding lines capacity is necessary to mitigate this problem; and
- A multilateral agreement incorporating various components including streamlined procedures for documentation and electronic data transfer would greatly facilitate intra-regional traffic and also the inter-country traffic.

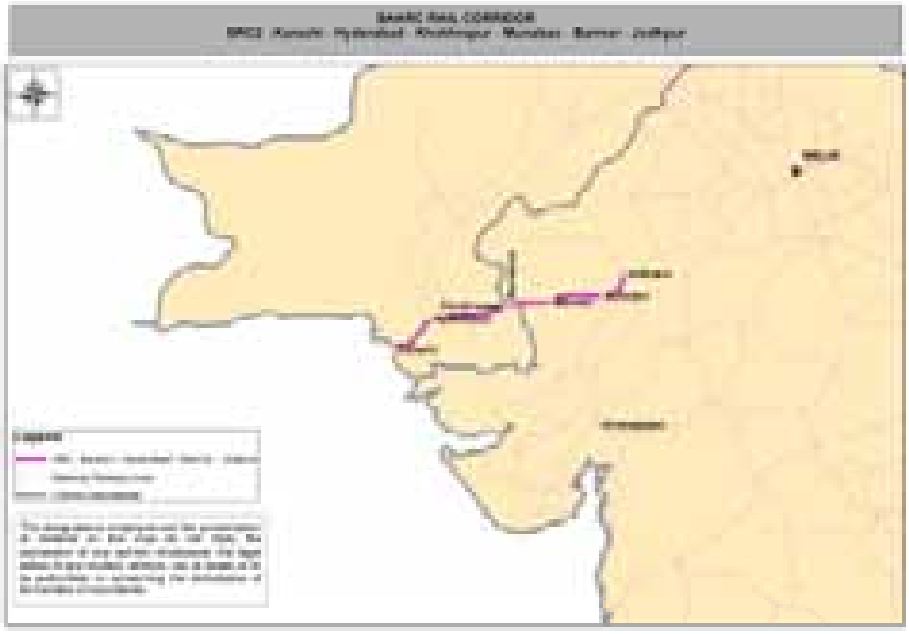
5.2 SAARC Rail Corridor 2: Karachi–Khokhrapar–Munabao–Jodhpur (707kms)

This corridor starts at Karachi, runs to Khokhrapar and crosses the border to the Indian station of Munabao and then extends through to Jodhpur (See Map 15).

This rail corridor connects Karachi (Pakistan) and Jodhpur (India) and presently provides connectivity to the entire Indian Railway network, thereby providing intra-regional connectivity through to Bangladesh and Nepal. This corridor is the latest rail link between India and Pakistan commissioned only on 15th February 2006.

This corridor in Pakistan originates from the major port and commercial centre of Karachi with ICDs for handling international cargo and connects northern Pakistan on broad gauge double/single line network. From this main line route, a rail link moves eastwards from Hyderabad to Mirpur Khas. Hyderabad–Mirpur Khas had been converted to broad gauge earlier, but Mirpur Khas–Khokhrapar has only recently been converted to broad gauge and provides the extension up to the border of India to the inter-change point called the Zero Station on Pakistan Railways. The section between Hyderabad–Khokhrapar currently undertakes movement of only one passenger train but has adequate sectional capacity for running of additional freight and passenger trains with the track structure and signalling being adequate to handle loaded freight and container trains.

Map 15: SAARC Rail Corridor 2



This identified corridor passes through the inter-change point at Munabao, the first station on the Indian side. Further, the single line broad gauge connectivity is available all the way to Jodhpur 327kms away, a major junction and ICD. The section between Munabao–Barmer–Samdari–Luni currently serves the remote areas of the State of Rajasthan and the border towns. Along with gauge conversion from metre gauge to broad gauge, the track structure and signalling has been provided that matches the main line railway network, making the section suitable for handling potential freight traffic with higher axle loads. This corridor is at present non-electrified and, therefore, compatible with the Pakistan Railway network. Barmer is the first major station 118kms from Munabao. Samdari is the next junction station from

where a metre gauge single line takes off for Bhildi. The work of gauge conversion of this line is in progress. On completion of the gauge conversion work, direct broad gauge connectivity would be available connecting the Ports of Kandla, Mundra and Pipavav with this corridor. At Luni Junction, which is 297kms from Munabao, the major Western Indian Railways network gets connected to this corridor. From Jodhpur, which is a major station, a Divisional Headquarter of the Railways and major container depot, 3 major rail routes take off connecting rest of the Indian Railways network.

Passenger services between Khokrapar and Munabao have recently commenced. The service at present comprises a single train service per week with seven coaches. Under the agreement, Pakistan Railways and Indian Railways would provide the rolling stock and locomotive alternately for six months of the year. At present, the same is being provided by Pakistan Railways. The train from Mirpur Khas (Pakistan) known as 'Thar Express' comes to Munabao on Saturdays at 1230 hours and leaves back at 1500 hours. The passengers disembark, go through the security and immigration formalities and board the waiting Indian train to Jodhpur. Meanwhile, the train from Jodhpur known as 'Link Express' arrives at 0730 hours in the morning on Saturdays and leaves back at 1400 hours. The passengers from Jodhpur go through the clearances and board the 'Thar Express'. A similar arrangement would come into existence when, the six-monthly turn for India comes—the Indian train would run from Jodhpur to Khokrapar from where passengers could go up to Mirpur Khas on the corresponding train of Pakistan Railways. Although the train service has a capacity of more than 400 passengers, so far each train has arrived/departed with less than 100 passengers on an average. According to Railway officials, the load factor is gradually improving. Once the service stabilises and the issuance of visas by both the countries matches the capacity of the train, it is expected that the service would be fully utilised.

This corridor has tremendous potential for transportation of goods traffic between the two countries of the region and even third country cargo. Significant volumes of freight traffic, which is currently moving from Central India to Pakistan travels a distance of 1,000–1,500kms on Indian Railway system and is thereafter handed over at the existing goods inter-change point between India and Pakistan through Attari–Wagha. This distance could be reduced by about more than 1,000kms, if the same traffic especially the de-oiled cake is moved from the Central Indian locations to the central and southern destinations on Pakistani Railway using this corridor.

The corridor is also significant from the point of view of accessibility of North Indian hinterlands, which are potential sources of containerized cargo to the Port of Karachi. Karachi could provide a shorter route for the international inward and outward cargo from North India, compared to the distance it has to travel to and from JNPT at Mumbai. In some cases, the containerised cargo for Pakistan from North India moves to JNPT and thereafter by ship to Karachi directly or undertaking a longer detour via Dubai Port. Such containerised cargo for Karachi and its hinterlands could be moved via this corridor, thus saving time and costs. The opening of this rail connection has been welcomed by the trade and industry in both the countries. Both the Governments are now considering providing necessary infrastructure at the border stations for handling potential freight traffic.

5.2.1 Physical Barriers

The main physical barriers in each country are as follows:

Pakistan

The major constraint is that the inter-change is currently restricted to passenger trains only, with no infrastructure for handling freight traffic having been provided at Khokhrapar or Zero Point Station. Pakistan Railways are examining the feasibility of developing such facilities.

India

Munabao station has been commissioned as the main inter-change point on the Indian side with all the required facilities to handle the passenger traffic including Customs, Security and Immigration facilities. However, infrastructure for handling goods trains including yard lines, goods sheds and customs check points, etc. are yet to be provided at this station on the Indian side. Indian Railways are examining the feasibility of developing the necessary infrastructure at this inter-change point. With the growth of traffic from the ports of Gujarat, there may potential be some capacity constraints later on the single line sections of freight services develop as expected.

5.2.2 Non-Physical Barriers

The main non-physical barriers identified are as follows:

- Under the bilateral agreement only passenger trains can operate. There is, at present, no agreement for undertaking goods train inter-change on this link. Accordingly, there are potential non-physical barriers to the handling of freight trains;
- The customs and immigration facilities have been recently reviewed and provided for the level of traffic anticipated on the corridor. However, the process of clearance is reportedly slow and it takes up to 5 hours on certain occasions to clear the entire trainload of passengers often resulting in disruption of the scheduled departure of the trains; and
- The present passenger service is not a point-to-point service between Karachi and Jodhpur.

5.2.3 Measures to Address Barriers

The main measures required to address the barriers are as follows:

Physical Barriers

- The newly converted broad gauge line between Mirpur Khas and Khokhrapar in Pakistan is currently single line and non-electrified. As and when the traffic growth justifies, this section may have to be double tracked with provision of electrification, keeping in view the overall development of the railway network and the traffic requirement;
- The track structure for the newly-laid broad gauge line and for rest of the system should be adequately upgraded to enable running of loaded goods trains and container

trains all the way to Karachi to the standard currently being maintained on Indian Railways to ensure compatibility;
- The rolling stock should be upgraded to the improved air-brake type of stock, including open, covered, oil tanks and container flats to enable smoother and speedier movement of freight trains in the region; and
- Required infrastructure, including additional holding lines, warehouses and facilities for train examination/customs examination may have to be provided at both the inter-change points i.e. at Zero Point Station/Khokhrapar in Pakistan and Munabao in India, as and when the decision to run goods trains is taken by both the countries.

Non-Physical Barriers

- The Bilateral Agreement, which provides for running of passenger trains between the two countries on this corridor should be expanded to include movement of goods trains between the two countries, not only on a bilateral basis but also for the potential third country traffic transiting across India to Bangladesh/Nepal;
- This being a new inter-change point, the customs and railways documentation should be totally computerised. Railway procedures for registering indents for rakes/wagons at the point of origin in the respective countries, supply of rakes/wagons to the trade in time-bound manner, quicker transportation and reductions in delays en-route and at the border points should be ensured. Similarly, the customs and security procedures and clearances should be streamlined so as to facilitate quicker and faster movement of goods traffic on this corridor;
- A monitoring mechanism between the two railway systems should be put in place to sort out the bilateral problems and issues; and
- The agreement should be reviewed by both the countries to enable and facilitate point-to-point inter-city services between Karachi and Jodhpur.

5.3 SAARC Rail Corridor 3: Birgunj–Raxaul–Kolkata Port/Haldia (704/832kms)

This corridor starts at the ICD at Birgunj in Nepal and enters India at Raxaul and extends onto the Indian Railway network through to Kolkata/ Haldia (See Map 16).

This regional corridor connects Birgunj (Nepal) with the Ports of Kolkata and Haldia in India. This is the most significant corridor for Nepal, handling over 95% of rail traffic to and from Nepal. The opening of the Birgunj ICD on 16th July 2004 paved the way for the direct train services from Kolkata Port to the new rail-based ICD. In the initial phase, third country 20/40 ft containers only were carried on flat wagons ex. Kolkata and Haldia Ports. Currently over 90% of the third country container traffic is being moved from Kolkata Port to Birgunj, and small volumes of traffic from Haldia Port to Birgunj. Bilateral traffic to Birgunj ICD has also been recently permitted. During 2005-06, the total number of trains that ran between Kolkata Port and Birgunj was 120—an average 10 container trains per month carrying 70 TEUs per train. Third country bulk movement has also now started in covered wagons and during 2005/6 about such 12 rakes have been handled.

This corridor has been extended by a 30kms broad gauge single line link between Sugauli–Raxaul–Birgunj with the 6kms extension inside Nepal connected directly with the ICD. The corridor in India connecting Kolkata is on BG including single line for a distance of about 137kms up to Muzaffarpur, double line between Muzaffarpur to Samastipur (52kms), double line up to Barauni (51kms) and thereafter connected to the electrified double line all the way

to Howrah/Kolkata Port. Birgunj–Kolkata Port via Naihati is 704kms and Birgunj– Haldia via Howrah is 832kms. The single line section between Sugauli and Muzaffarpur handles very heavy passenger traffic and the sectional capacity utilisation is currently over 110%. This corridor uses the Delhi–Howrah route of Indian Railways at Sitarampur Jn. near Asansol and the section between Asansol and Howrah handles high volumes of passenger and freight traffic, provided with electrified quadruple, triple and double lines in respective sections.

Map 16: SAARC Rail Corridor 3

While this is primarily a freight corridor and the possibility of passenger services on this corridor is yet to be explored. Raxaul however provides passenger services to Kolkata with an express train service (‘Howrah-Raxaul Mithila Express’) that is plying between the two stations. The train offers both air-conditioned and ordinary sleeper cars and takes 16 hours for the journey. There are several other express trains between Kolkata and Darbhanga/Samastipur/ Muzzafarpur that are important railway stations on this corridor. In future, in case the demand for extension of service to Birgunj comes up, the same can be organized under a bilateral arrangement.

5.3.1 Physical Barriers

The main physical barriers are as follows:

- The section between Birgunj to Muzaffarpur is only single line. The capacity utilization on this section is already over 110% and this causes constraints in moving additional freight traffic to Birgunj ICD in future unless measures to address the capacity constraints are put in place;
- The section from Muzaffarpur to Barauni experiences capacity constraints and involves a change of traction short of Kiul on the main line, which is electrified, causing scheduling problems and delays to freight movement;
- The corridor joins the main corridor No.1 (Delhi-Howrah), described in Chapter 5.1.1, which is one of the busiest corridors of Indian Railways. The section between Asansol to Howrah suffers from capacity constraints; and
- The transit time of over 70 hours between Kolkata Port and Birgunj is excessive due to these constraints.

5.3.2 Non-Physical Barriers

The main non-physical barriers are as follows:

- The Birgunj ICD has all the facilities of the dry port operation but the official working hours are only 7 hours a day adversely affecting clearance of cargo and meeting the needs of importers;
- The automated custom system (ASYCUDA++) has already been introduced at the major custom points in Nepal, however documentation procedures for clearance of goods are still time consuming;
- Lack of usage of through Bills-of-Lading and mechanism to accept a Combined Transport Bill-of-Lading;
- Timely availability of wagons at Kolkata Port; and
- Procedural and documentation delays at Kolkata Port.

5.3.3 Measures to Address Barriers

The measures required to address these barriers are as follows:

- Indian Railways in its developmental plans has included capacity augmentation programmes in various sections, including improvement of signalling, provision of crossing stations, additional loop lines, by-pass lines and augmentation of capacity at terminals. Provision of double and triple lines has also been planned in the sections requiring capacity augmentation but the same needs to be prioritized for implementation;
- Introduction of customs IT enabling procedures and simplification of customs documentation at Birgunj;
- Customs procedures in Kolkata Port which are complicated needs reviewing and simplifying in relation to transit traffic by rail;
- It would be desirable to undertake handling of third country traffic to and from Nepal at Haldia Port in addition to KOPT. Currently, negligible traffic is being handled at Haldia Port, which has adequate facilities and with growth at KOPT constraints are

likely, so transfer of some of the growth to Haldia will be necessary to maintain levels of service; and

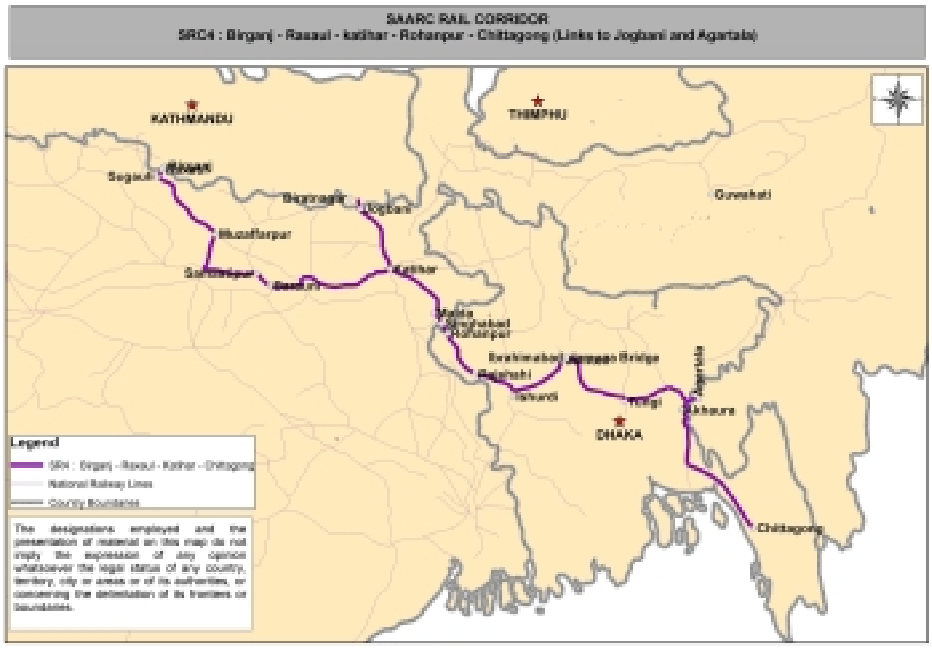
- Immigration facilities for third-country nationals and customs facilities for passengers would need to be developed in case the passenger service is to be extended to Birgunj.

5.4 SAARC Rail Corridor 4: Birgunj–Katihar–Chittagong Port (1,146kms)

This corridor also starts at Birgunj in Nepal and connects through to the Indian rail network at Raxaul and runs south east to the Bangladesh border crossing at Rohanpur. In Bangladesh the corridor then extends down to the port of Chittagong. In addition, there is a link line from Akhaura to Agartala and from Jogbani (See Map 17).

This regional corridor connects Birgunj (Nepal) with the port of Chittagong (Bangladesh) through India. The corridor originates at the Birgunj ICD in Nepal and enters India at Raxaul Junction and thereafter continues up to Barauni Junction following the rail route identified as Corridor 3 in section 5.3. The corridor thereafter takes the rail route via Katihar Junction and Malda Town in India to Singhabad, the last station on Indian Railways and the interchange point with Bangladesh. Another existing rail link from Jogbani to Katihar in India has been identified as part of this corridor. Jogbani is the last station on Indian Railways at the Nepal border. A further proposed connectivity to Biratnagar (Nepal) with Jogbani (India) would provide a second rail route connecting Nepal with India and Bangladesh. From Singhabad interchange point in India this corridor is connected to the Bangladesh Railway network via Rohanpur, Abdulpur, Ishurdi, Tungi, Akhaura and finally terminating at Chittagong. This identified corridor has also been envisaged with a possible extension connecting Akhaura in Bangladesh with Agartala in India (a new broad gauge line connecting Agartala with Kumarghat is under construction on Indian Railways).

Map 17: SAARC Rail Corridor 4



This identified corridor is single line along large stretches, doubled track in places with broad gauge, dual gauge and metre gauge in different sections. There are missing links between

Jogbani–Biratnagar and Akhaura–Agartala. The corridor currently handles intra-country traffic between India and Bangladesh that is interchanged at Singhabad–Rohanpur. In addition, the corridor in the Birgunj–Barauni section handles the third country cargoes (container trains) from Kolkata/Haldia Ports to Birgunj. The section between Raxaul to Katihar deals with very heavy passenger and freight traffic on the Indian Railway network. Rohanpur to Abdulpur Junction in Bangladesh, the broad gauge single line section by and large handles inter-country traffic i.e. loaded traffic moving from India to Bangladesh in train loads and empty wagons being returned back from Bangladesh to India. The rest of the section from Abdulpur/Ishurdi to Joydebpur is on single line dual gauge. The Joydebpur to Chittagong section is metre gauge single and double line. Excepting Joydebpur to Bhairab junction, the rest of the sections are capable of handling the present level of traffic.

The present interchange of traffic between India and Bangladesh consists of wheat, maize, ballast and de-oiled cake being sent from India in train loads consisting of BCX wagons. The traffic flow is one-way, as there is no traffic from Bangladesh to India and the empty wagons are returned by the Bangladesh Railways, resulting in underutilisation of transport capacity.

5.4.1 Physical Barriers

Significant physical barriers on this identified rail corridor in Nepal, India and Bangladesh are summarized as follows:

Nepal

- The Nepalese section may need to be doubled to handle the projected traffic; and
- Rail infrastructure, including holding lines in the ICD at Birgunj, is inadequate to handle the projected growth of the traffic.

India

- Raxaul to Muzaffarpur is 131kms broad gauge single line and non-electrified section. The section, Sugauli–Muzaffarpur is saturated and any growth of freight or passenger traffic on this section may not be possible without double tracking as this section currently has more than 100% capacity utilisation;
- Muzaffarpur–Samastipur section has one single line section that adversely affects the sectional capacity, which is adequate in the rest of the double line section, but drastically reduced in the Khudirambose– Karpurigram single line section causing a serious bottleneck;
- Samastipur–Barauni having been converted to double line and provides adequate line capacity. However the growth of passenger trains merging at Bachhwara causes capacity constraints in the Bachhwara–Barauni section;
- Barauni– Katihar single line broad gauge section handles high volumes of freight and passenger traffic. Being a single line section, it suffers from acute capacity constraints with the utilisation sometimes being over 150%. This results in high incidence of planned detention of goods trains and very excessive running time in the section due to crossings and the precedence of passenger trains over goods trains;
- Katihar is a major yard and a junction station for multi directional broad gauge and metre gauge traffic. The existing railway yard, despite having segregated metre gauge and broad gauge networks, affects the growing broad gauge movement and terminal operations with detentions and consequent increases in transit times;

- Katihar–Kumedpur broad gauge single line section is also suffering from capacity constraints with the growth of both passenger and freight traffic in this section;
- Kumedpur–Malda town is a 60kms long broad gauge section with double tracking in some sections. The single line portion between Eklakhi–Harishchandrapur handles significant passenger and freight traffic and is saturated;
- Whereas Singhabad (India) has 4 full length running lines, Rohanpur (Bangladesh) has only 3 yard lines capable of accommodating a freight train consisting of only 30 BCX wagons. As the composition of train loads on Indian Railways is 40 BCX, load-shedding by detaching 10 BCX wagons from every rake is undertaken at Singhabad yard causing delays to the loaded stock. These detached wagons are consolidated and moved as a rake of 30 wagons. The inadequate holding line capacity on Bangladesh Railways thus adversely affects through movement of loaded traffic; and
- Delays are also caused due to the non-availability and untimely availability of locomotives from Bangladesh to carry the loaded trains from Singhabad.

Bangladesh

- Whereas this corridor in India is entirely on broad gauge single/double line, on Bangladesh Railway the corridor is on broad gauge single line, dual gauge and metre gauge single/double line causing gauge changes and capacity constraints. For through cargo movement, transhipment from broad gauge to metre gauge would be required;
- Rohanpur interchange point has three lines with a holding capacity for only a 30 wagon BCX rake causing marshalling and detachment of 10 wagons from each rake at Singabad;
- Rohanpur–Ishurdi on Bangladesh Railway starts with Rohanpur interchange point with India. This single line broad gauge 122kms long section has a weak track structure between Rohanpur to Rajshahi restricting the speed of the trains to 20kmph. Rajshahi–Azimnagar track is in good condition but again the track condition is extremely poor on Azimnagar–Ishurdi section;
- Ishurdi–Mooladuli is old broad gauge line with speed restrictions connecting Ishurdi bypass junction coming from Rohanpur side to Mooladuli on dual gauge;
- Jamtail to Joydebpur is a 110kms long newly constructed dual gauge track. The rail bridge over the Jamuna River is unfit for movement of loaded broad gauge wagons and containers due to load restrictions. This results in most of the intra-regional traffic coming from India moving only as far as Jamtail and thereafter moving across the River Jamuna through ferries to the final destinations by road. The load restriction on the Jamuna bridge is the most significant bottleneck/choke point on Corridors 1 and 4 and hinders any through movement to Dhaka/Chittagong from India;
- Joydebpur–Tungi–Akhaura is a metre gauge single line section. The capacity is saturated in Tungi–Bhairab section due to merging traffic at these junctions; and
- The missing link between Akhaura–Agartala is required to provide connectivity of this corridor with North Eastern States in India.

5.4.2 Non Physical Barriers

The main non-physical barriers of this corridor are as follows:

- The trade has been experiencing a shortage of wagons for exporting goods from India in view of restrictions imposed on movement of only a certain type of rolling stock to Bangladesh;
- The turnaround of wagons for a short lead movement inside Bangladesh is on the high side and adversely affects availability of wagons for subsequent loadings; and
- The agreement for permitting BCN type of air-braked wagons was operationalized on an experimental basis. However, in view of inadequate loop capacities and inadequate hauling powers of Bangladeshi railway locomotives for a rake of 40 BCNs, the loading in BCN rakes had to be discontinued.

5.4.3 Measures to Address Barriers

The key measures required in order to address the barriers on this corridor are as follows:

- Indian Railways, in its developmental and expansion program, has included various capacity augmentation measures, which would take care of the potential growth of intra-regional traffic on this corridor. Some of the major upgradation plans are as follows:

  - Patch doubling of Barauni–Khagariya section;
  - Doubling of Mansi– Kathiar section;
  - Gauge Conversion of Kathihar–Jogbani section;
  - Gauge Conversion of Katihar–Barsoi section;
  - Remodelling of Katihar yard; and
  - Doubling of Kumedpur–Malda section.

- Bangladesh Railways has also developed a road map for strengthening the railway network. Some of the areas identified for development connected with the identified corridor are as follows:

  - Rehabilitation of main railway line sections;
  - Upgradation of track and signalling;
  - Conversion of MG line into DG from Joydebpur to Dhaka;
  - Conversion of vacuum-brake stock into air-brake stock;
  - Remodeling and rehabilitation of Rajshahi–Kulaura–Akhaura railway yards; and
  - Double tracking and electrification of Dhaka–Chittagong railway line.

- The most important impediment in movement of regional traffic by rail through Bangladesh is the load limitation for BG trains over Jamuna multi-purpose bridge. Strengthening of this bridge to make it fit for movement of loaded BG trains or construction of a new bridge has to be undertaken as a priority. In the absence of the flexibility of movement of loaded BG trains/container rakes across this bridge, no through intra-regional connectivity can be operationalised. However, provision of a transhipment hub in the interim period may be considered short of Jamuna Bridge;
- Under the uni-gauge policy, Indian Railways is undertaking massive gauge conversion program to convert all the important metre gauge routes to broad gauge. In Bangladesh, the broad gauge/dual gauge system connects the western parts of the country up to Joydebpur. It is also planned to extend the dual gauge system between Joydebpur and Dhaka. For through regional connectivity, conversion of metre gauge

line into dual gauge would be required from Joydebpur to Akahuar with an extension to Agartala in India and also from Akahura to Shahbazpur for its onward connection with the broad gauge network on Indian Railways. Similarly, the proposed doubling of Dhaka–Chittagong metre gauge section may be considered for one broad gauge and one metre gauge lines to enable through movement of intra-regional broad gauge trains from Nepal and India all the way to Chittagong Port;

- There are constraints of long turnaround times for the freight wagons handed over to Bangladesh, inadequate loop capacities, marshalling of wagons and poor infrastructure in terms of track and signalling that are now getting the attention of Bangladesh Railways. These works will have to be taken as a national priority for ensuring growth of intra-regional trade on this corridor;
- The bilateral agreements also need to be looked at to make them multilateral in order to ensure movement of third country and transit traffic through these corridors across the region. The bilateral agreements which currently govern the rail transportation between India–Bangladesh and India–Nepal should be reassessed with a regional perspective to bring about procedural uniformity; and
- Installation of IT enabled electronic data exchange and documentation would have significant impact on trade.

5.5 SAARC Rail Corridor 5: Colombo–Chennai (1,025kms)

This corridor starts at Colombo and extends northwards up to Talaimannar Pier on the Sri Lankan Railway network. Thereafter the corridor was connected to Rameswaram in India through a ferry link and onwards on rail link to Chennai (See Map 18).

This regional corridor would connect Colombo (Sri Lanka) with Chennai (India). The corridor originates at Colombo and takes the northern broad gauge single line rail route to Talaimannar Pier, a distance of 337kms. 72kms of this network is double and triple track. The suburban section from Colombo to Ragama is triple track and the 58kms section from Ragama to Polgahawela is double track. The services on its northern most section i.e. Medawachchiya to Talaimannar Pier have been suspended from June 1990 due to civil conflict in this part of Sri Lanka. Although Sri Lanka does not have continuous rail connectivity across the sea to the Indian railway terminal of Rameshwaram, a ferry service operated between these two points under a bilateral agreement administered by the respective railways from 1940 to the mid 1980's. In its last year of operation in 1984 this service carried 120,000 passengers with the number of passengers being almost the same in each direction.

However, when this service was operational, it was open only for about six months of the year due to closure during the monsoon period. The channel that was used for ferry services is considered too shallow for navigation of modern day vessels. The ferry link of 35kms from Talaimannar Pier in Sri Lanka to Rameshwaram in India would provide connectivity with Chennai, 653kms away, through the Indian Railways network. The 161kms long section from Rameshwaram to Madurai Junction is under gauge conversion from metre gauge to broad gauge. Further from Madurai to Chennai the 492kms long section is largely a broad gauge single line section up to Villupuram. Double tracking of Madurai–Dindigul 69kms section is also in progress. The Villupuram–Chennai 162 km long section is a double line section with one metre gauge and one broad gauge electrified lines. The Indian railway network connecting this corridor at Rameshwaram provides linkages with all the major industrial centres, ICD's and ports throughout IR network.

Map 18: SAARC Rail Corridor 5

Although currently this corridor between Sri Lanka and India is not operational due to the civil strife in the northern provinces of Sri Lanka, and the consequent suspension of the service, nevertheless this remains a potential corridor of regional significance connecting the island country of Sri Lanka with the South Asian subcontinent. This route has also been identified as the designated link of international significance for the Trans Asian railway network.

However, the problem of operationalising the ferry link is seen as critical. The ability to maintain services during the monsoon period with a reasonable level of reliability is important. Several alternatives have been examined in the past including construction of a bridge across the Palk Strait.

It should be noted that this corridor is considered as an alternative to the possible development of direct ferry services between Colombo and either Tuticorin or Cochin that are described in section 7.11.

5.5.1 Physical Barriers

The main physical barriers are as follows:

- The ferry service would need to be operational on an all year round basis to make the link attractive from both a freight and passenger perspective;
- This link has the potential of transporting significant passenger traffic between the two countries. The train services carried sizable passenger traffic in the past between Colombo and Talaimannar and between Chennai and Rameshwaram with the ferry providing the connectivity. These services are currently not in operation in Talaimannar–Medawachchiya section of Sri Lankan Railways. Restoration and upgrading of the infrastructure will be required as and when it is decided to restore these services by the two Governments; and
- Indian Railways is already converting the remaining metre gauge sections between Manmadurai to Rameshwaram facilitating through broad gauge connectivity all the way to Chennai. However, the single line section between Madurai–Dindigul is having serious capacity constraint requiring doubling.

5.5.2 Non-Physical Barriers

The main non-physical barrier in the event of an improvement in the security situation is that the revival of the bilateral agreement will be required in view of the potential growth of passenger and freight traffic not only between the two countries but also for third country traffic.

5.5.3 Measures to Address Barriers

- Examination of the options to develop a rail cum road connection across the Palk Strait;
- Restoration and upgradation of infrastructure including track signalling and rolling stock is required to be undertaken by Sri Lankan Railways, especially in Medawachchiya–Talaimannar Pier section;
- Gauge conversion of Manmadurai–Rameshwaram section needs to be completed as a priority by Indian Railways;
- Doubling of the Madurai–Dindigul single line section should be expedited to augment the sectional capacity; and
- A comprehensive bilateral agreement should be developed to provide intra-regional transport connectivity between Sri Lanka and India that would provide further intra-regional connectivity for both passengers and trade.

5.6 Potential of Rail Corridor Development

These five identified Regional Rail Corridors are indicative of tremendous potential in terms of growth of intraregional traffic, savings in transportation costs, and reduction in transit

times and therefore provide greater trade facilitation and the economic development in the SAARC member states. Some of the corridor-wise potentials are indicated below:

Corridor 1

The corridor of over 2,800kms with an almost continuous rail link has the potential of moving intra-regional cargo via the shortest and the fastest mode i.e. Railways. Lahore–Dhaka containerized cargo currently moving by a much longer rail-sea-road network (Lahore–Karachi–Chittagong–Dhaka) could move on this shorter and faster corridor saving on transportation costs and the transit time rather significantly.

Various essential commodities moving from destinations in India to its North-Eastern states could also be moved on this corridor drastically reducing the transportation costs and the transit time (Kolkata–Badarpur via Guwahati is 1,356kms on the existing rail route against 682kms via Gede–Akhaura–Shahbazpur on this identified corridor). Opening of this corridor for container traffic would result in movement of sizable containerised cargo between India and Pakistan on a much shorter route of just about 190kms between Ludhiana and Lahore, against the present much longer rail cum road cum sea movement (over 3,000kms) via Delhi–Mumbai–Dubai/Karachi–Lahore.

Corridor 2

This 707kms corridor connects both Pakistan and Indian Railway networks on broad gauge rail link without change of gauge and traction, and consequently provides through connectivity with Bangladesh and Nepal. It also provides a much shorter route for commodities being transported from central India to Pakistan. De-oiled cake, food grain and fodder, which currently moves by rail from Central India to destinations in Central and Southern Pakistan travel for over 1,900kms with a transit time of over 7 days, could be transferred to this corridor covering a much shorter distance of only 700kms with a transit time of only 1 to 2 days.

Corridor 3

This 700kms long broad gauge rail corridor provides the shortest and the fastest access for the traffic to and from land locked Nepal. It connects the port of Kolkata, which is currently handling the bulk of third country traffic for Nepal, and Haldia that can handle the entire projected growth of this traffic. The corridor provides the fastest transit time for containerised rail bound traffic and various capacity augmentation measures by Indian Railways and ports shall further improve the transit times.

Corridor 4

This corridor provides access to Nepalese traffic from Birganj and Biratnagar to the port of Chittagong in Bangladesh and to the Dhaka ICD. It could also provide additional connectivity from Biratnagar in Nepal to Chittagong port in Bangladesh via Katihar. Another link of this corridor can provide connectivity between Akhaura in Bangladesh with Agartala in India facilitating through movement of commodities from central India to its north eastern states via a much shorter route across Bangladesh. (Howrah–Agartala via Guwahati is 1,561kms against 502kms from Howrah to Agartala via Joydebpur and Akhaura in Bangladesh).

Significant savings in transportation costs and transit time could be achieved by operationalizing this corridor.

Corridor 5

This 1025kms long broad gauge rail corridor has the potential of connecting Colombo in Sri Lanka with Chennai in India and could provide further connectivity to the island country of Sri Lanka with other SAARC member states through the Indian Railway network. It could also be utilised for the movement of containerised traffic with transhipment to sea vessels for movement across the channel connecting to the Indian mainland.

5.7 Overall Measures to Develop the Rail Corridors

In the railways sector, absence of an enabling framework to run intra-SAARC passenger services is the major barrier. SAARC could think of drafting a standard Rail Service and Transit Agreement to facilitate discussion and adoption of such a framework by the countries concerned namely, Pakistan, India, Nepal, Bangladesh and Sri Lanka (for the rail service with a ferry bridging). Achieving network continuity and infrastructural compatibility would require investment on new lines on the missing links and strengthening of non-compatible sections (such as Joydebpur–Chittagong–Akhaura in Bangladesh). Until that time, operational solutions in the form of connecting trains and road bridging could be devised. However, all this would depend on a framework agreement to enable such rail services.

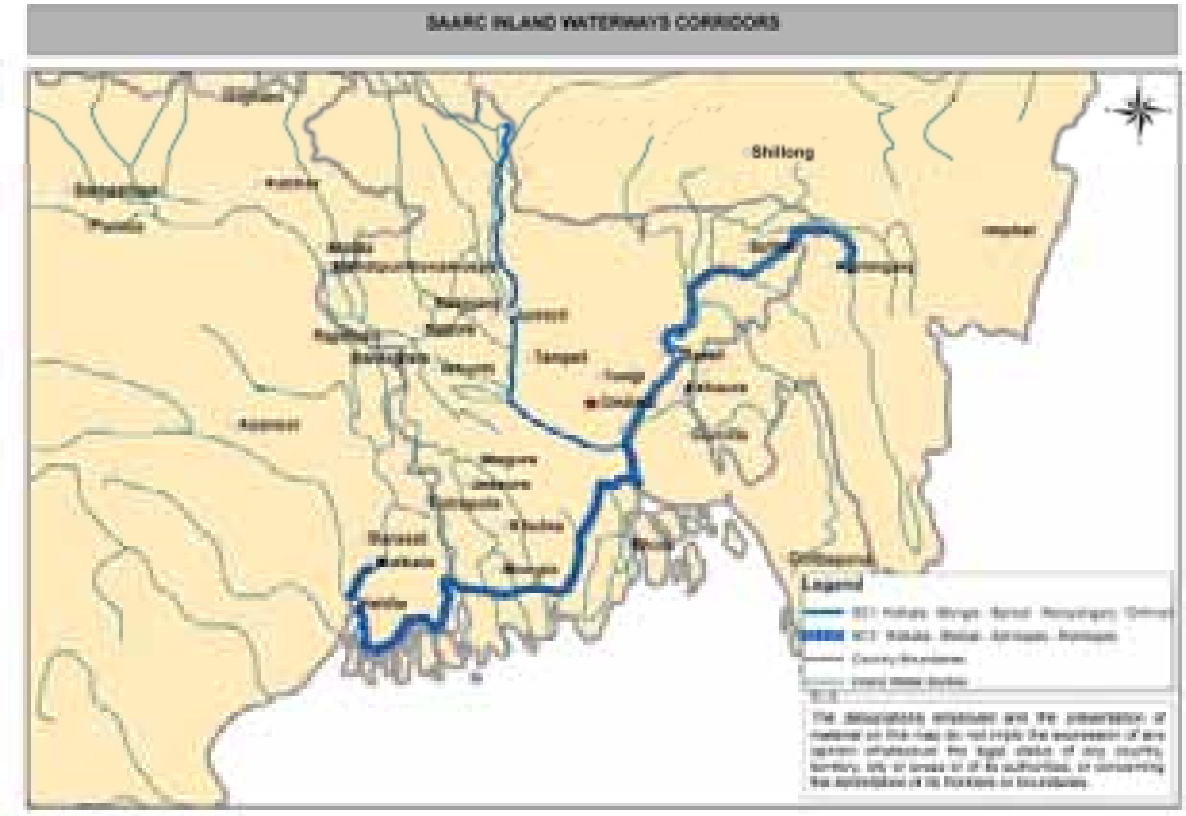
5.8: SAARC Regional Rail Corridors: Major Barriers and Measures at a Glance

Corridor	Physical Barriers	Non-physical Barriers	Measures to address Barriers
1	2	3	4
Rail Corridors The five identified rail corridors include different types of gauges including broad gauge/metre gauge and dual gauge. Corridors have single lines/double line and multiple lines. Rail-cum-ferry link has been identified between Sri Lanka and India.	(a) Non-availability of air-braked fleet of rolling stock in Pakistan and Bangladesh. (b) Lack of infrastructure for handling freight traffic at Munabao-Kokhrapar interchange points. (c) Restriction on movement of BG loaded trains across Jamuna Bridge. (d) Inadequate loop lengths and yard holding lines at Rohanpur, Darshana and other station in BR. (e) Absence of transhipment hub at Ishurdi/Sirajnagar. (f) Metre Gauge sections in Tungi-Dhaka, Joydebpur-Akhaura and connected sections. (g) Missing link from Akaura to Agartala. (h) Kulaura-Shahbazpur section out of commission. (i) Medawachchiya-Talaimannar Pier Section out of commission. (j) Inadequate capacity at ICD Birgunj and Kolkata Port. (k) Missing link between Biratnagar and Jogbani. (l) Capacity constraints in Delhi–Mughalsarai, Mansi–Katihar and Katihar–Barsui sections. (m) Missing link between Agartala–Akhaura. n) Absence of connectivity between Jiribam–Tupul.	(a) Munabao–Kokhrapar restricted for passenger traffic only. (b) Absence of Multilateral Rail Transport Agreement for intra-regional traffic. (c) Restriction on movement of open wagons and oil tanks between India, Pakistan and Bangladesh. (d) Excessive turn-round time affecting trade requirements. (e) Restriction on movement of passenger trains between India and Bangladesh. (f) One-sided traffic and non-utilisation of wagon capacity. (g) Manual documentation, duplicity of customs checks and restricted working hours. (i) Suspension of rail-cum-ferry services between Talaimannar-Rameshwaram.	(a) Induction of compatible rolling stock in India, Pakistan and Bangladesh to ensure through movement. (b) Develop infrastructure to handle freight traffic at Munabao–Khokhrapar. (c) A Multilateral Agreement between the SAARC member States to facilitate growth of intra-regional traffic & barrier-free intra-regional rail traffic. (d) Strengthening of the existing/construction of new Jamuna Bridge. (e) Augment the holding capacity of loop and yard lines. (f) Development of transhipment hub short of Jamuna Bridge. (g) Construction of rail link between Akhaura and Agartala and restoration of Kulaura–Shahbazpur section. (h) Conversion of metre gauge sections beyond Joydebpur to broad gauge/dual gauge. (i) Restoration of Medawachchiya–Talaimanner railway line in Sri Lanka and Ferry link between Talaimannar and Rameshwaram. (j) Capacity augmentation works required in identified sections on Indian Railways. (k) Speedy completion of gauge conversion works. (l) Development of Dedicated Freight Corridor on Delhi–Howrah route.

6.0 SAARC REGIONAL INLAND WATERWAYS CORRIDORS

Among the SAARC countries, only Bangladesh and India have an organized network of inland waterways and services that are catering for the transit and inter country movement of freight traffic between these two countries. In Chapter 3 of this report, two inland waterways corridors of regional significance were identified. In this chapter, details of these corridors together with their physical and non-physical barriers, as well as measures that could be taken to address these barriers are indicated corridorwise (See Map 19).

Map 19: SAARC Inland Waterway Corridors



6.1 SAARC IW Corridor 1: Kolkota–Haldia–Raimongal–Mongla–Kaukhal–Barisal –Hizla–Chandpu –Narayanganj–Aricha–Sirajganj–Bahadurabad–Chilmari–Pandu (1,439kms)

This corridor begins in India, passes through Bangladesh and then re-enters India. The overall length is 1,439kms, with 310kms in India from Kolkata to the border on the Raimongal River, 767kms in Bangladesh and 362kms onwards in India up to Pandu on the upper reaches of the Brahmaputra River. This corridor from Kolkata via Haldia to the Bangladesh border follows the Bagirathi and Hooghly rivers.

The present route passes through the '*Tiger Reserve Area'* and there are calls for barge movements to be shifted out of this sensitive area. The channel through the Indian part of the Sunderbhans is, however, not officially designated. Consequently, the night navigation facilities have been provided only on the first part. The only aids on the second part are channel markings. Within the Indian sections, a 2.0m deep navigation channel is, at least in

theory maintained on the Brahmaputra as far as Digbrugarh, 768kms from the Bangladesh border. The water transport companies operating along this corridor, however, dispute the above claims and report that depths of 1.8m or less are usually available between Dhubri and Guwahati and that beyond Guwahati the available real depth is only 1.5m.

Within Bangladesh, from Raimongal (border point on West Bengal side) to Daikhawa (border point on Assam side), the corridor follows a number of rivers and canals within Sunderbhans and later follows some major rivers namely, Arialkha, Meghna, Padma, Jamuna and Brahmaputra. Draft available along the entire length from Raimongal to Daikhawa (767kms) varies between 1.83m and 3.66m. For movement of vessels along this corridor, a draft restriction of 1.8m is applicable. Along this corridor within Sunderbhans, there is the Gabkan Canal, which is 20kms long but is presently wide enough to permit only one way movement.

Under a 'Protocol on Inland Water Transport and Trade' both inter-country and transit traffic are allowed to move along this corridor. However, an analysis of traffic movement indicates that India has not been able to make optimal use of this corridor to carry transit traffic between North East India and Kolkata. Over the years, transit traffic along this corridor went down from 21,940 tons in 1994/5 to 6,625 tons in 2001/02. Traffic picked up slightly in 2004/5 when it reached 15,100 tons of which 11,500 tons moved along this corridor. The intra-country traffic movement along Corridor 1 has also been fluctuating significantly. In 2001/2, the traffic carried by both Bangladesh and Indian vessels was around 106,828 tonnes and it went up to 413,832 tons in 2004/5.

6.1.1 Physical Barriers

Within Bangladesh there is high rate of siltation and bank erosion along this corridor and as a result it becomes risky for the vessels to navigate along these waterways. The draft restriction for whole year navigation along the corridor from Raimongal to Daikhawa is around 1.83m. Extensive dredging is required to maintain these waterways for which funds are not available. Major parts of the corridor suffer from navigational hazards, like shallow waters, narrow width of channels and inadequate navigational aids. As a result night navigation is possible only along certain sections. In this context, it is important to recognize that unless there is sufficient potential traffic, installation of navigational aids for day and night movement cannot be justified, though equally it is recognised that this may be a 'catch 22' situation.

The condition of piers, jetties and other infrastructure is generally poor. There is lack of storage facilities, cargo handling equipment and existing support craft such as pilot boats, mooring boats and survey boats are short in supply or many are unserviceable. No facilities are available for container handling on the piers.

Shortages of skilled manpower and the presence of labour unrest are common problems in the entire Bangladesh waterways system. Most of the vessels used for cargo carrying are very old and as a result their operating costs are high. Many of the vessel's own cargo handling gear are obsolete. Vessel repairs are not up to standard and consequently break-downs are regular features, causing delays in movement of goods.

Within India similar to Bangladesh, most of the waterways suffer from navigational hazards like shallow waters, narrow widths of channels in the rivers, siltation, bank erosion, shrinking of rivers in dry seasons. There are inadequate navigational aids and difficulties are being

faced in maintaining them due to frequent thefts. The poor condition of wharves, jetties, platforms at the inland ports are also contributing negatively to the productivity of transporters, operators and traders.

There is lack of cargo handling equipment at almost all the inland ports and landing stations. Most of the inland ports also do not have sufficient spaces or sheds to store cargo. As a result, goods get damaged by rain and other adverse weather conditions. Hinterland connectivity is also a major constraint. In many places proper road and rail connectivity is not present. The IWT system cannot deal as yet with containerised cargo moving under a Multimodal Transport (MMT) system. There are shortages of adequate vessels and the fleet is old and obsolete. In addition, there is lack of skilled manpower and the unionisation of labour has combined to reduce the productivity of the inland water transport system.

6.1.2 Non-physical Barriers

Between Bangladesh and India there is a bilateral Trade Agreement, which was signed on 4th October 1980. This Agreement also states that, '*the two governments agree to make mutually beneficial arrangements for the use of their waterways, roadways and railways for commerce between the two countries and for the passage of goods between two places in one country through the territory of the other'* (Article VIII). Thus, while the Agreement allows for the later formulation of transit and transport agreements, such presently are not part of this Agreement.

Subsequently, a '*Protocol on Inland Water Transport and Trade' (04/10/99) – with attached "Agreed Minutes of the Bilateral Meeting for the Renewal of the Protocol on Inland Water Transit and Trade between Bangladesh and India held in India from 26/10/99 to 28/10/99"* was signed. This protocol, for clear mutually beneficial co-operation, derives directly from the provision of Article VIII of the above mentioned trade Agreement.

Movement of vessels between Bangladesh and India is taking place within the provisions of this protocol. However, this protocol on inland water transport is currently being only renewed on a monthly basis and this is considered to be the main and foremost obstacle on this IWT corridor between Bangladesh and India. One month is not enough for the transporters to book cargoes and vessels and organise their schedules to carry on the business. As a result, only a small number of vessels are plying on both inter-country and transit routes, thus trade is suffering and the very spirit of agreement is getting lost.

In addition, the lack of sufficient ports of call is also discouraging movement of inter-country trade by IWT. Currently, the ports of call in India are Kolkata, Haldia, Pandu, and Karimganj and on the Bangladesh side Khulna, Mongla, Narayanganj and Sirajganj. Traffic destined for other locations in Bangladesh, such as Barisal, Bhairab Bazar etc., incur additional transhipment costs from the nearest port of call.

6.1.3 Measures to Address Barriers

Extensive and continuous dredging would be needed to improve the navigability of the rivers. Investment would also be needed to improve the conditions of piers, jetties, replace the old cargo handling equipment, build new storage, replace old support craft like pilot boats, mooring boats, etc. Further investment would be needed to install additional navigational aids to facilitate night navigation, introduce container handling facilities, replace old and outdated

cargo carrying vessels, and to improve vessel repairing facilities/yards. It would also be important to take up programmes for human resource development to produce skilled manpower for the IWT sub-sector, as well as adopting efficient management techniques to increase productivity and address the persistent labour problems.

On the non-physical side, efforts would be needed to motivate the Government of Bangladesh to go for renewal of the existing protocol for a longer period, say for a few years, each time. The lack of such an agreement is considered to be the primary constraint that needs urgent addressing.

In addition, the question of allowing more ports of call within Bangladesh for inter-country traffic should also be considered positively. It is also important to recognize the possible future role of IWT when the SAARC initiative for transport integration takes shape. A strategic study on the potential role of IWT should be undertaken jointly by Bangladesh and India.

6.2 SAARC IW Corridor 2: Kolkota–Haldia–Raimongal–Mongla–Kaukhali–Barisal–Hizla–Chandpur–Narayanganj–Bhairabbazar–Ajmiriganj–Markuli–Sherpur–Fenchuganj–Zakigunj–Karimganj (1318kms)

This corridor also starts from Kolkata (India) and follows the same route as Corridor 1 all the way up to Narayanganj (741kms). Out of a total direct distance of 807kms from Raimongal to Zakiganj/Karimganj, the draft restriction for the portion from Raimongal to Narayanganj (431kms) is already covered under Corridor I. From Narayanganj to Zakiganj/Karimganj (381kms) the corridor follows the Meghna and Kusiyara rivers. The draft available along this corridor varies between 1.83m and 3.66m during rainy season (June–October), but during dry season (November–May) the draft gets limited to 1.0m and as a result navigation is discontinued. During the rainy season draft restriction of 1.83m is applicable along this corridor.

With regard to transit traffic movement, Corridor 1 has been dominant carrying around 50% to 70% of the traffic. In 2001/2, Corridor 2 carried around 2,750 tonnes, as against 3,875 tonnes carried by Corridor 1. In 2004/5, the share of Corridor 2 was even less, as it carried only 3,600 tons, as against 11,500 tons carried by Corridor 1.

6.2.1 Physical Barriers

Since this corridor follows the same route as that of Corridor 1 for part of the distance, the physical barriers are consequently almost identical to those indicated under that corridor. There is however, on this corridor a restriction of traffic movement during the months of November to March every year, as the draught available reduces to 1.0m during that period and in the other 7 months a draught restriction of 1.8m applies.

6.2.2 Non-Physical Barriers

The existing bilateral agreement/protocol signed between Bangladesh and India for Inland Water Transport covers physical movement along both corridors. As such, the non-physical barriers highlighted under Corridor 1 are equally applicable to this corridor.

6.2.3 Measures to Address Barriers

Measures suggested under Corridor 1 apply equally to Corridor 2.

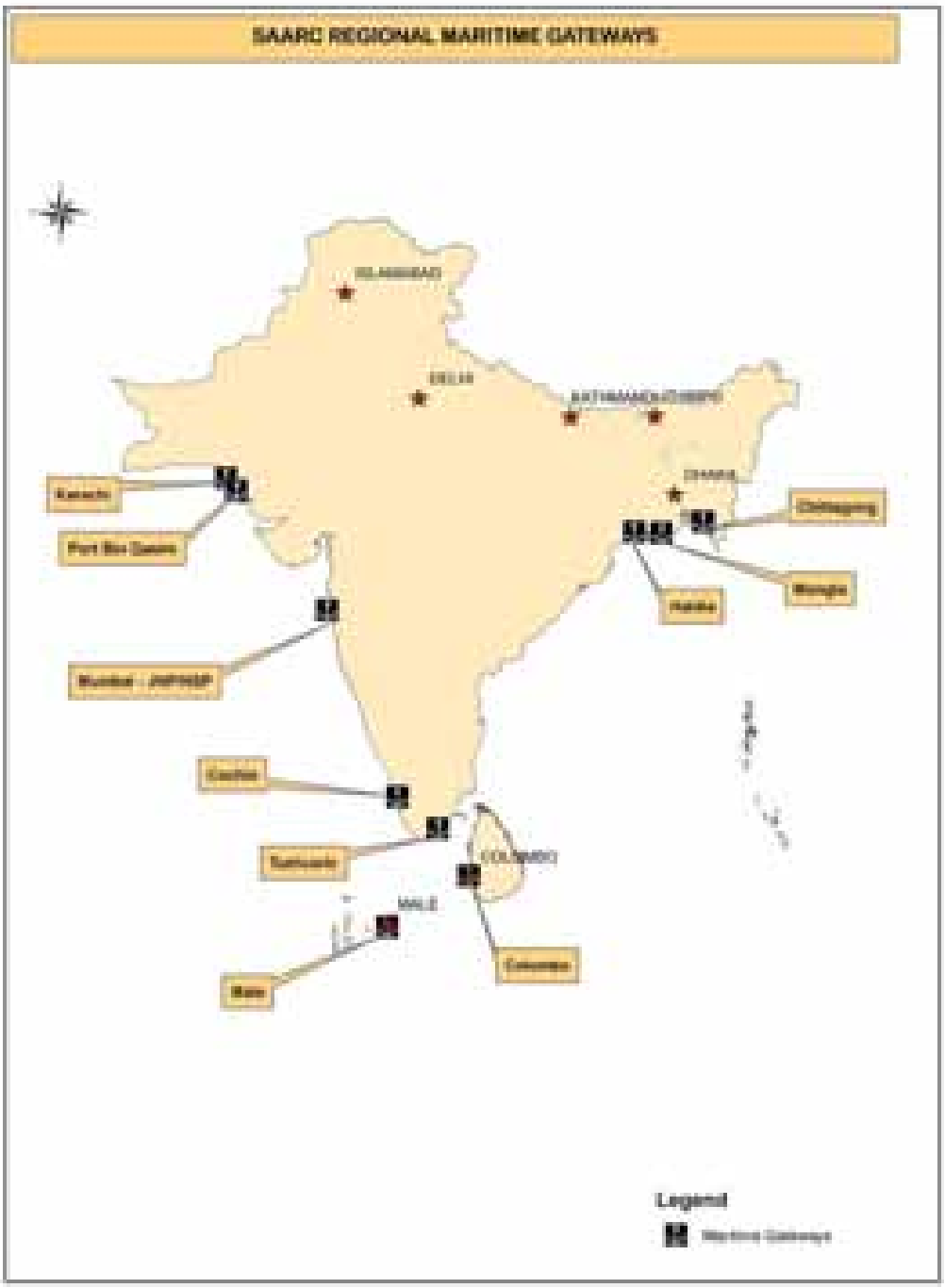
6.3 SAARC Regional Inland Waterways Corridors - Major Barriers/Measures at a Glance

Corridors	Physical Barriers	Non-physical Barriers	Measures to Address Barriers
Regional Inland Waterways	**Within Bangladesh** (a) High rate of siltation and bank erosions along the corridors; (b) The draft restriction for the whole year navigation from Raimongal to Daikhawa is around 1.83 m; (c) Navigational hazards, like shallow waters, narrow width of channels, and inadequate navigational aids along major part of the corridors; (d) Poor conditions of piers, jetties and other infrastructures; (e) Lack of storage facilities, cargo handling equipment, support crafts and survey boats etc.; (f) No facilities are available for container handling on the piers; (g) Cargo carrying vessels are very old; and (h) Vessel repairs are not up to the mark. **Within India** (a) Navigational hazards like shallow waters, narrow widths of channels in the rivers, siltation, bank erosions, shrinking of rivers in dry seasons; and inadequate navigational aids; (b) Poor condition of wharves, jetties, platforms at the inland ports; (c) lack of (i) Cargo handling equipments, and (ii) Sufficient spaces or sheds to store the cargo, at almost all the inland ports, and landing stations; (d) Poor hinterland connectivity; and (e) Shortages of adequate vessels and the fleet is old and obsolete.	**Between Bangladesh and India** (a) The existing protocol on inland water transport is currently being renewed on a monthly basis, which is the main and foremost obstacle on this corridor. One month is not enough for the transporters to book cargoes and vessels and organize the schedules to carry on with the business; (b) Lack of sufficient ports of call for movement of inter-country trade by IWT. (c) Shortage of skilled manpower and presence of labour unrest.	Measures required to address non-physical barriers are : (a) Renewal of the existing protocol for a longer period, say for a few years, each time; (b) Allowing more ports of call within Bangladesh for inter-country traffic; (c) Undertaking a strategic study jointly by Bangladesh and India on the potential role of IWT; (d) Adoption of efficient management techniques to increase productivity and handle labour problems, with care; (e) Undertaking programmes for human resource development to produce skilled manpower. Measures required to address physical barriers: (a) Extensive and regular dredging to maintain the navigability of the rivers; (b) Improving the conditions of piers, jetties; (c) Replacing the old cargo handling equipments, support crafts and cargo carrying vessels; (d) Installation of additional navigational aids to facilitate night navigation; (e) Building new storage; (f) Improving vessel repairing facilities/yards; and (g) Introducing container handling facilities.

7.0 SAARC REGIONAL MARITIME GATEWAYS

In Chapter 3 of this Study, ten maritime gateways of regional significance were identified (See Map 20). In this Chapter, detailed descriptions of these gateways, together with their barriers and measures to address those barriers are presented gateway-wise/port-wise.

Map 20: SAARC Gateway Ports



7.1 SAARC Maritime Gateway1: Karachi Port (Pakistan)

Karachi is the largest city and the premier port of Pakistan and handles all variety of imports and exports. It was established in 1887 after promulgation of the Karachi Port Trust Act 1886. It has been developed in planned phases over the years and now has become a port with modern facilities. The harbour is divided into the lower harbour and the upper harbour. There are three mooring berths and three oil piers located in the lower harbour, whereas the two container terminals and 23 multipurpose berths are all located in the upper harbour.

The physical limitations of the port are that the approach channel is 2,870m long, 180m wide and about 12.2m deep, with the port entrance channel being 1,550m long, 200–600m wide and 12.2m deep. The depth at the oil piers for tankers is 13.4m; whilst at the East Wharf berths for general cargo vessels it is only 10.4m and at the Juna Bander general cargo berths the depth is just 9.1m. The Pakistan International Container Terminal (PICT) has a depth up to 11.5m and the West Wharf and Karachi International Container Terminal (KICT) have a depth up to 10.4m. The storage area on the East Wharf is 69,815sqm, the West Wharf 64,590sqm and the M.I.Yard/Juna Bunder 15,812sqm.

In 2004/5 466 vessels berthed at the East Wharf, 67 at Juna Bunder 310 at the West Wharf, 294 at the oil piers, 333 at KICT and 230 at PICT, totalling 1,586 vessels. Berth occupancy for this period was PICT 75%, KICT 45%, oil piers 80%, East Wharf 30–62%, West Wharf 63–71% and Juna Bunder 20–40%. The average waiting times for container vessels was 18.1 hours, for general cargo 21.6 hours, for fertilizers 20.2 hours, rice carriers 73.2 hours, crude oil tankers 34.7 hours, HSD oil 30.3 hours, naphtha 56.4 hours and palm oil/molasses 40 hours.

The type and volume of cargo handled by KPT in the year 2003/4 was general cargo 9.988 million tonnes (93% of national volume), dry bulk 3.875 million tonnes (54% of national volume), liquid bulk 14 million tonnes (77% of national volume), together totalling 27.86 million tonnes. The total number of containers handled was 824,753 TEUs (67% of national volume).

Karachi International Container Terminal (KICT) is the largest container facility being equipped with 4 STS gantry cranes and other support equipment, reach stackers, fork trucks etc. It handled 400,000 TEUs in 2004, representing 48% of total TEUs of Karachi Port and 33% of national total. The terminal is close to reaching its maximum technical capacity of 500,000 TEUs and has consequently commenced expansion plans to raise its capacity to 750,000 TEUs by year 2010.

Pakistan International Container Terminal (PICT) is located on the East Wharf at Berths 6–9 and commenced operations in 2003. It now has two STS gantry cranes and other support equipment. It is much smaller than KICT and only handled 91,000 TEUs in 2004, about 11% of Karachi Port containers. PICT is rapidly doubling up its designed capacity of 250,000 TEUs, but is facing a shortage of space. It is developing land outside the port across the road to relive the pressure on the container yard area. PICT is indicating that they are achieving 30.3 moves per hour.

Containers are also handled extensively at the conventional berths using ship’s gears and then transferred to the various container yards operated by the stevedoring companies.

The port has launched the 'landlord' concept by which KPT will retain ownership of the land and waterways, but lease out land and facilities to the private sector for the physical operations.

7.1.1 Physical Barriers

The channel and inner harbour of Karachi Port are usually subject to heavy siltation during the monsoon seasons. Consequently, continuous dredging is undertaken throughout the year to attempt to maintain published depths. The problem is not helped in that city refuse is also being discharged in the adjacent creeks, not only causing pollution but increasing the siltation problem.

The access road to the port passes through the congested central city area; therefore port traffic finds it difficult to gain access and exit through the adjacent road network. This is compounded by the city administration often imposing timing restrictions on port traffic passing through the city. Thus, the port traffic therefore may have to wait many hours to pass through the city and residential areas. This has created a bottleneck for the port activity, though steps are underway to build an overhead bridge and underpasses to enable freer passage of the port traffic.

Railway connectivity to the conventional berths and container terminals is available, but insufficient wagon supply is a major problem. This means that containers are not being taken away rapidly inland to the rail-connected ICDs, adding to the congestion within the container berths. In addition, the rail transport of containers is not efficient with high transit times being experienced.

7.1.2 Non-Physical Barriers

Dock and port labour are heavily unionised with the dock labour being regulated by the Karachi Dock Labour Board (KDLB) that levies money on each tonne of cargo handled in Karachi Port. The dock labour is expensive when compared to their service output. This has contributed to the high cost and to some extent inefficiency of the port and efforts are being made to reduce the port labour and dissolve the KDLB. For many years stevedores have been taking the KDLB labour but then substituting them with external labour in order to raise performance levels.

The industry feels that the port is generally costly in terms of their tariff and these additional costs have to be passed on to the trade in return for less than efficiency performance. The financial inputs do not justify the physical outputs. Overheads remain high, procedures are still too restrictive and decisions and execution relating to modernisation and reform are slow in implementation.

The storage areas of the port are heavily congested, due to the slow clearance of cargo. This is caused by a combination of factors, such as the high free storage time, complex customs and port procedures and consignees lack of awareness and preparation of documentation. As with other ports in the region many importers tends to maximise their usage of the port's warehouses because they do not have their own storage capacity. By storing within the port they can therefore save costs and sell direct from the port warehouse to the end-user. Recent surveys also suggest that some importers lack the financial resources to clear their goods and depend on deposits from the end-user to enable them to pay the duties and charges. This

practice inevitably leads to some lengthening of storage times. This is then compounded by the shortage of both rail and road transport.

Container dwell times remain high. The main reasons cited are incorrect filing of data, the customs examination process and the 7 days free time allowed on import containers. Customs have now launched CARE computer system but this is still only at a trial stage. EDI/IT systems have been installed but traders are not aware of how to use the system and despite some progress essentially the port and customs processes remain manually based.

7.1.3 Measures to Address Barriers

The Pakistan economy is expected to grow at the rate of 6.5–8.5% over the next ten years with 2005 yielding a growth of 8%. That being the case, it is essential that maritime sector enhances the port capacities and facilities to properly serve the expected growth rate. Traditionally, the ports have always missed the planned development completion dates, but the delivery of sector improvements is now even more critical and thus urgent steps are needed to ensure timely completion of projects.

KPT recognise that the port is likely to be short of container capacity despite the expansion programmes of both PICT and KICT to raise their combined capacity to 1 million TEU, almost double the present throughput. However, the problem is likely to increasingly become berth occupancy and there KPT are examining the possibility of constructing a new facility in the Keamari groyne area.

Dredging is already in arrears and needs to be addressed as a priority, as it is already starting to restrict ship access and performance. Major projects such as capital dredging, widening of the channel, increasing turning circles and reclamation of further land to increase storage areas to overcome yard congestion are all urgent requirements if the port is to enhance its performance.

Access roads passing through the city should be built in such a way that port traffic can transit freely between the port area and the national road network. In this respect the southern and northern by-pass roads should be built and if possible a third link over the M.A.Jinnah Road should be constructed to cater for the ever growing traffic of the port.

Steps are to be taken to address the port labour and dock labour problems by reducing the port labour and dissolving the KDLB. The workers may be allowed to join private port operators. This would improve the port performance, increase throughput and reduce the port charges. However, it is recognised that this is a major change and consequently may be difficult to implement quickly.

Customs should quickly widen the scope of reforms so that whole trade can benefit. This means expediting their introduction of the Pakistan Customs Computerized System (PaCCS) with increased direct trader input capability and the implementation of risk management facilitation methodologies. Increased usage of IT/EDI Systems should eventually reduce paperwork and thus reduce the cargo dwell times. It is disappointing that the roll-out of PaCCS has been so slow compared to other international customs systems that normally have only a 6 month pilot and then roll out over 2 years.

The rates and charges should be rationalized to make the port more competitive and should reflect the nature of the services actually provided. The dominant position of Karachi has meant that there has been an incompatibility between the charges levied by various official bodies such as KPT and KDLB and the service outputs achieved in relation to these charges. Simplification and reform of the charges is considered important by the port community.

7.2 SAARC Maritime Gateway 2: Port Bin Qasim (Pakistan)

Port Muhammad Bin Qasim is situated towards the head of Phitti Creek, about 20 nautical miles east of Karachi Port. This is the second major port of Pakistan and was established in 1983 by constructing the Marginal Wharf that contains seven berths and one iron/ore/coal berth (IOCB) for Steel Mills of Pakistan. The port is managed by the Port Qasim Authority (PQA). The Chairman and the Board Members are appointed by the Government to represent user departments and trade bodies. PQA functions are mainly on a 'landlord' basis with most of the port operations and control being in private hands.

The port comprises of several specialized independently operated terminals located along the Phitti Creek. Vessels up to 75,000 DWT are regularly handled, with tankers and bulk carriers with a draft of 11m able to be berthed. Container vessels with a draft of 10.5m and general cargo vessels of 9.5–10m can be berthed at the Marginal Wharf. The multipurpose terminal at the Marginal Wharf (MW) has seven berths. Berth No.1 handles edible oil tankers up to 25,000 DWT with a draft of 9.5m and Berths No.2–4 handle vessels of 35,000 DWT with up to 10m draft, usually dry bulk and rice vessels.

The Qasim International Container Terminal (QICT) is established on Berths 5–7 and is leased out to the private sector on BOO terms. It commenced operations in 1997 and has 6 STS gantry cranes and supporting equipment. The quay wall is 600m long with an 11m draft and can accommodate vessels up to 2,500 TEUs. This is the only container terminal at Port Bin Qasim and its capacity is stretched handling 518,000 TEUs in 2005. There are plans to increase the capacity to 850,000 TEUs by 2010.

The Engro Vopak Chemical Terminal is an integrated liquid bulk chemical terminal, also servicing LPG vessels. It can handle vessels of 10m draft. In 2004, it handled 761,000 tonnes of liquid bulk. The FOTCO Oil Terminal handles crude and petroleum products from tankers up to 75,000 DWT with maximum draft 11m. In 2005 it handled 4.5 million tonnes against its rated capacity of 8 million tonnes.

Iron Ore and Coal Berth (IOCB) service the import and export requirements of Pakistan Steel Mills and are connected to the mill through a 4.5kms long conveyor belt to carry the ore and coal from the berth to the mills. It is leased out to the steel mills, but berth maintenance remains the responsibility of PQA. It has a draft of 11m and thus can handle panamax vessels. A total of 2.9 million tonnes was handled in 2004. IOCB commenced its operations in 1980, before the port was formally brought into operation.

The port overall handled in the year 2003/4, general cargo 740,000 tonnes (7% of the national volume), dry bulk 3,315,000 tonnes (46% of national volume), liquid bulk 4,079,000 tonnes (23% of national volume) totalling 8.134 million tonnes and containers 402,000 TEUs being 33% of national volume.

Port labour is the responsibility of the private sector. There is no unionisation or dock labour board involved and this has been seen as one of the key benefits of the port.

7.2.1 Physical Barriers

The navigation channel leading from the sea to the wharves is about 45kms long and is always subject to heavy siltation, particularly during the south west monsoon period. This channel is therefore required to be dredged regularly to maintain its committed depths. The channel and alongside drafts and turning circle only permit the handling of container feeder vessels, rather than 3rd/4th generation container vessels.

The permissible draught at the port is reduced up to one meter during the monsoon season (15th May to 15th September) each year by the management. The situation is of great concern for the shipping lines as they can incur heavy fines if they do not keep the track of changes. Such changes are publicised through notifications so that the shipping companies can load their vessels according to the notified permissible drafts well in advance. Also the reduction in draft is not the same every year as it depends upon how much dredging work was carried out during the year. The shipping lines suffer losses from having to pay extra lighterage expenses, fines to the port authority and face delays in berthing if vessels arrive with higher drafts than permitted.

The vessels are not berthed in the night due to the absence of channel markers. This is because the markers are being stolen or swept away due to the strong ebb currents and the very soft bed of the channel. The Port Authority has made attempts to maintain the navigational marks but failed to do so and therefore shipping suffers berthing and sailings are delayed.

7.2.2 Non-Physical Barriers

The port and customs clearance procedures are still manually based and involve excessive paperwork. Customs reforms in the form of the introduction of IT systems and modern control techniques have yet to be introduced in the port. Given that the priority in introducing such system is in Karachi, there may be some delay before such changes are implemented at Port Qasim. However, being a smaller port with less container and general cargo there will always be less bureaucracy that impinges on performance.

Traders take advantage of free time, which is higher than in Karachi at 10 days, resulting in high dwell times. As in Karachi, many importers do not have warehousing or are selling goods ‘from the container’ and thus maximise the time the goods remain stored within the port area. Road and rail connectivity is good, though there is the same shortage of trucks and railway wagons and this increases dwell time.

7.2.3 Measures to Address Barriers

One of the major problems in the port is the draft constraint. Although maintenance dredging is carried out on a regular basis, insufficient work is done to eliminate the need to reduce the drafts in the monsoon seasons. The 45kms long channel is difficult and expensive to maintain depths and therefore, it is in the best interest of the port and the trade that capital dredging up to 11.5m be carried out once, such that seasonal changes are not made every year. To achieve

this, the port has to gear up its resources for funding the project, including installation of navigational marks so that night navigation could also be carried out round-the-clock.

The container terminal that is handling 518,000 TEU is up to capacity and it is imperative that the expansion up to 850,000 TEU is undertaken as soon as possible in order to ensure that this port remains competitive with Karachi.

Port and customs should establish IT/EDI systems to minimise the paperwork and simultaneously reduce the free period allowance. This would reduce the dwell time and make the port more efficient as a transit rather than a storage facility. The PaCCS programme should be extended to QICT as soon as possible. There may be scope for development of a port community system that links the Customs, PQA and the various agents and operators.

The Government of Pakistan has taken steps to enhance the capability of railways and highways, including the transport sector, under the National Trade Corridor improvement programme. The port should fully participate and take advantage of the scheme and improve rail connectivity and availability of wagons for its present and future needs.

The Government must pay attention towards port management. The frequent changes in senior management have resulted in inconsistency of implementation of on-going development plans. Special attention needs to be paid to capacity building and human resource development programmes.

7.3 SAARC Maritime Gateway3: Jawaharlal Nehru Port Trust (JNPT) (India)

Jawaharlal Nehru Port is situated near Mumbai on the Maharashtra State Coast facing the Arabian Sea. It was commissioned in 1989 under the administrative control of the Central Government of India and is built on the mainland, south east of Elephant Island and opposite to the city of Mumbai across Thane Creek. The port was mainly built for container handling, but also handles dry and liquid bulk and automobile exports.

It has emerged as the foremost container handling port in India and handles almost 65% of the country's total container volume. The present design capacity of the port is 33.10 million tonnes and 2.3 million TEUs (as of March 2005), whereas the port handled 31.2 million tonnes cargo, including 2.7 million TEUs during 2003/4. The port has 12 berths consisting of 2 oil berths, 2 fertilizer berths, 6 container berths and 2 general cargo berths.

The port is divided into two administrative blocks, one controlled by the Jawaharlal Nehru Port Trust called JNPT and the other owned and administered by 'Nhava Sheva International Container Terminal' (NSICT), which is a modern container terminal commissioned in 1999. The JNPT container terminal is the larger of the two container terminals in terms of size but not in throughput. It is fitted with 8 RMQC, 18 RTGC, 3 RMGC and other supporting equipment. NSICT is a consortium led by P&O Ports Australia, with control of management, operation and development for up to 30 years on a BOT Basis, though P&O has recently been bought by Dubai interests. NSICT was made fully operational in the year 2000. NSICT comprises of a 600m quay and 20 hectares of reclaimed land used for container storage. The terminal is fitted with 3 RMGC, 2 Super Post Panamax, 6 RMQC, 29 RTGC and other supporting equipment and handles more containers than the JNPT facility.

A third terminal by Gateway Terminal India Ltd—a JV of Maersk and CONCOR is getting built at a cost of around US$ 200 million through re-development of a bulk terminal as a container terminal and is likely to be commissioned shortly. This would add 1.3 million TEUs of capacity. The port is also considering calling bids for a fourth terminal.

The port has 6 covered sheds of about 110,760sqm in total—one warehouse with 4,000 TEUs capacity, plus 7 others with a total capacity of 18,116 TEUs. There is an open bulk storage area of 148,850sqm for handling containers with a storage capacity of 28,550 TEUs and liquid cargo storage of 118 tanks with a total capacity of 629,990 tonnes.

The container traffic has an average berthing period of 37 hours, which is considered to be long given the average loadings per vessel. It is estimated that port traffic would increase from the present 31.2 million tonnes to 73 million tonnes by the year 2014.

The port has channel of 10 nautical miles with a 350m width and an 11m draft. While it is an all weather port the channel is subject to heavy siltation, therefore, the dredging process is carried out round the year. At present, large vessels with draft of 12.5m navigate through the shared channel of Mumbai Port using the tidal window. Deepening and widening of the main harbour channel (22.5kms) and the JNP channel (7.2kms) has been planned to increase it from 12.5m to 14m which would enable handling vessels up to 6,000 TEUs (present capacity is up to 4,500 TEUs).

JNP is well connected with the major highways and rail network. The closest suburban railhead is CBO Belapur. The Port is handling 12 to 14 trains per day each way. Work is in hand to enhance capacity by 50%. Doubling of rail-track between Panvel and JNPT has been taken up and is likely to be completed soon. The Port is connected through NH-4B to Mumbai–Pune Expressway and Mumbai–Goa Highway (NH-17). It is also connected through State Highway 54 to Suburbs of Mumbai and Ahamedabad. Four-laning of NH-4B from Port to the connecting points on the National Highways has been completed and the work of four-laning SH-54 is being implemented by a SPV of NHAI, JNPT and an investment arm of Government of Maharashtra. The port is supplemented by a number of Container Freight Stations (CFS) and empty container storage areas in the immediate vicinity of the port. The CFS activity is not restricted to the standard of handling of LCL cargo but is used to also process FCL cargo, thus freeing up space within the container yards.

7.3.1 Physical Barriers

JNPT encompasses an area of 10 sqkms. The port is presently working at its designed capacity whereas growth of traffic is projected to reach 5.5 million TEUs and 73 million tonnes by the year 2014. Thus, there will be increasing congestion both within the container yards and alongside unless the port is developed. NSICT in particular has a very high slot utilisation level that will be difficult to maintain. The strategy of moving containers rapidly to the CFS has been effective in combating yard congestion, but many of these CFSs are also now becoming increasingly congested.

There is major congestion around the Jarwahar Customs with vehicles waiting in the immediate vicinity, especially export traffic waiting for the ‘let for export’ clearances. CONCOR is responsible for the movement of containers by rail to the ICDs. There are major capacity problems on the Mumbai–Delhi link that slows the speed of container block trains. This has been one of the major reasons for developing alternative west coast ports and

rerouting of container traffic to other less congested ports that have better rail access to Delhi. The proposed Dedicated Rail Freight Corridor project of Indian Railways would greatly help to address the problem.

Whilst the terminals have an abundance of handling equipment, much of it was installed in 1989 and thus the port lacks the modern high performance equipment available at other ports. In addition, the JNPT terminal in particular has not adopted modern maintenance practices and this will lead to increased equipment redundancy and downtime unless changes are implemented.

The approach channel is considered too shallow and narrow for the latest large container vessels and tankers.

7.3.2 Non-Physical Barriers

The principal non-physical barriers remain the trade and port facilitation constraints. Customs have introduced automation through their ICES automated clearance system at Jarwahar Customs. Unfortunately, there were a number of problems in its implementation. There was an underestimate of the sheer numbers of entries that resulted in the system crashing regularly leading to a lack of confidence in the system. Though this technical problem has been resolved, nonetheless there is a still a high reliance on supporting paperwork. There is some evidence to suggest that individual officers failed to 'buy-in' to the automation process and that the automation has resulted in duplicate systems, rather than the intended progress towards a paperless system, though this situation is being addressed by Customs.

This is not solely a Customs problem in that the customs clearing houses have been slow to take up the opportunity of direct trader input (DTI) whereby they can make entries direct from their offices rather than use the service centres at the port. The residual reliance of the service centres results in peaking of customs entries in the morning with a possibility of physical examination in the afternoon. This creates an uneven workload for customs and delays in examination with high overtime payments. There is some evidence that the brokers consider the DTI as a potential threat to their future and may not have given the required support towards its successful implementation.

Indian Customs are committed to the concept of risk management to reduce the number of physical examinations. At present almost all consignments are examined, though only in most cases a sample of each consignment. While this results in delays and potential governance risks, it also increases significantly the areas required for such examinations. There is virtually no space or equipment for the examination to be undertaken at the port container yards so such examinations have to be undertaken at the CFS. This requirement to some extent compromises the very benefits of FCL door-to-door shipments. Another problem is that risk management requires the use of post audit inspection methodologies to validate the non-examined entries. Many importers are reticent about this post audit process because of the risk of backdated claims for duty on products that have already been sold. Most would prefer to 'know where they stand' at the time of import so that they can ensure that they can recover the duty liability from the end-user.

One reason for the high number of export examinations is the large number of export promotion schemes that involve a payment back to the exporter. Not only does this delay the

export but causes congestion around the port area whilst the necessary export clearance documentation is obtained from Customs prior to entry of the container into the port.

The progress made in computerisation in relation Customs has not been matched by all the other authorities. There is still a high reliance on traditional paperwork to be able to extract the cargo out through the port gate.

7.3.3 Measures to Address the Barriers

As indicated the port is presently working at its designed capacity whereas, growth of traffic is estimated to reach 5.5 million TEUs and 73 million tonnes by the year 2014, thus there is need for enhancement of the port capacity by developing new terminals to alleviate the current problems and to meet the future demands. There is a development program centred on the redevelopment of the redundant bulk terminal to provide a new container facility. It is of paramount importance that this development is implemented and commissioned on time, thus taking some of the pressure off the existing facilities.

Work on improvement of the access roads by widening/repairing them until such time as by-passes or some mass transit corridors are planned for fast track movement of the port traffic is to be expedited. A project costing slightly less than US$1 million to improve internal roads, develop new link roads and parking areas has been taken in hand. The portion of the access road between the container gate complex and the ROB junction needs immediate attention for the smooth flow of traffic. Development of about 20 hectares of land behind the shallow water berth has been developed as a container yard to get an area of approximately 36,000sqm in the first phase. The ICD yard has also been improved to facilitate handling of containers by RMGCs and reach stackers. Deepening and widening of the approach channel and harbour basin is required for accommodating the large sized 4th generation main line vessels.

It is critical that the progress in the Customs reform continues. The goal of development of paperless systems and implementation of the concepts of the Revised Kyoto Convention are important for India as a whole, but especially at JNPT in expediting imports and export movements through the port. However, this progress has also to be matched by all the other organisations, including JNPT to improve the port facilitation.

7.4 SAARC Maritime Gateway 4: Cochin Port (India)

Cochin port is situated on the West Coast of India in Kerala State (Malabar Coast) on the estuary of the Periyar River. This estuary and its back waters form a fine natural harbour about 10.5kms upstream from the Arabian Sea. This is the major deep water port south of Mumbai and is also an important naval base.

The port is under the control of the Central Government and administered by Cochin Port Trust. The harbour is built on Willington Island that is bordered on both sides by the Mattancherry and Ernakulam channels and connected to the mainland through road and railway connections with lifting span bridges. The approach channel is 1km long, 200m wide and 13.8m deep.

The Mattanchery Channel is 9.14m deep, 244m wide and 4,080m long. The Ernakulam Channel is 10.7–11.7m deep, 244m wide and 4,720m long. The wharves are also called

Mattanchery Wharfs, 670m in length having four berths each with 9.14m depth and the Ernakulam Wharf, 918m in length having six berths with a similar draft.

The port consists of a vast estate covering 1,940 acres, including land at Puthuvypeen, Vallarpadam, the south end reclamation area and one dry dock. There are 16 berths, including 7 berths with associated warehousing and 3 oil jetties. There is a well-equipped container terminal with a CFS and it is fitted with 2 STS gantry cranes and necessary support equipment. The 'Rajiv Gandhi Container Terminal' (RGCT) is situated at Quay Nos 8-9 on Ernakulam Wharf and is 414m in length with a 10.7m draft.

The port has a dedicated fertilizer berth 207m long with a 10.7m draft to accommodate up to 86,000 DWT vessels. The coal berth has a draft of 9.14m, the Boat Train Pier and No 1 Cochin Oil Terminal have a draft of 11.7m and can handle vessels up to 115,000 DWT with maximum 231m length and the North Tanker berth has a 9.14m draft and can accommodate vessels up to 30,000 DWT. The port has large storage areas containing 13 sheds with 36,690sqm on Mattanchery wharf, 12 sheds with 23,032sqm on Ernakulan Wharf. The CFS consists of one shed of 1,000sqm.

The port handled in 2003/4, 381 container vessels with 51,985 TEUs import and 77,725 TEUs export and around 32,802 imported and 7,452 exported empties. Total cargo handled by the port was 11.42 million tonnes import and 2.68 million tonnes export in 2003/4, including break bulk, dry bulk and liquid bulk. Present rated capacity of the port is 15.50 million tonnes and it is estimated that its traffic will increase from 14.1 million tonnes in 2004/5 to 45 million tonnes by the year 2014. It is planned that capacity may be increased to 58.5 million tonnes by 2014. The present container capacity is 2 million TEUs and this is estimated to increase to 2.5 million TEUs by the year 2014.

Average pre-berthing detention is less than 5 hours, turnaround time 2.6 days and the average output per ship berth day is around 8,000 tonnes. The total number of vessels calling in 2005 was 1,126, including 9 cruise vessels.

7.4.1 Physical Barriers

As with most Indian ports Cochin port is operating at close to its full capacity, therefore, there is need to enhance the capacity in line with projected traffic. The channel and harbour channels are subject to siltation due to flow of Periyar River some times high and some times low according to seasonal rains and river bank erosion.

As the port development on the existing Willingdon Island has reached a saturation point, further developments are being planned at Vallarpadam—an island located on the northern side of the present road. The International Container Transhipment Terminal, LNG Regasification Terminal, International Bunkering Terminal, International Cruise Terminal and the Special Economic Zone, among others, coming up at Vallarpadam would require rail and road connectivity.

7.4.2 Non-Physical Barriers

The non-physical barriers are the same as trade and port facilitation constraints indicated for JNPT. Clearly, as a smaller port the constraints tend to be less of a barrier but nonetheless as traffic increases so will these barriers, unless remedial action is taken.

7.4.3 Measures to Address Barriers

The port is generally operating at its rated capacity. Plans are to be made to improve the existing infrastructure and facilities and to expand the port by means of reclamation and development of south end of Willington Island. The port is also adopting the 'landlord' concept to attract private investment. An International Container Transhipment Terminal Project at Vallarpadam, dredging at Rajiv Gandhi Container Terminal Berth to 12.5m, a bunkering, reclamation and development of the land at southern end of Wellingdon Island and development of the Passenger Terminal are the on-going works to augment capacity. Another BOT contract has been signed with M/s India Gateway Terminal Pvt. Ltd. to establish a separate International Container Transhipment Terminal at Vallarpadam with road connectivity to Vallarpadam being included in the long-term plan of road connectivity to ports, a part of National Highway Development Project (NHDP). A techno-economic survey for the feasible rail alignment is also under way.

Dredging costs are very high as compared with the amount of dredging obtained, suggesting that port may adopt a policy of dredging under draft basis on an annual basis. Strict monitoring through surveys is required to achieve required results.

The port needs to commence a capacity building programme for port management and development, including enhancement of its operational capabilities. This would improve port performance, reduce operational costs and enhance productivity of the port.

7.5 SAARC Maritime Gateway 5: Tuticorin Port (India)

Tuticorn Port is one of the premier ports in Tamil Nadu State and is situated on the southern tip of the Indian peninsula. The town is also known as Tultukkudi and is the largest commercial centre for maritime trade in the Gulf of Mannar. The port itself is divided into two zones. Zone A is the newly built port (1974) and Zone B is the oldest (minor) port (1868). It has been serving the neighbouring countries of Sri Lanka and Maldives and the coastal area of India. Both, the newly constructed Zone A and old minor port Zone B were merged together in April 1979 to create the Tuticorin Port Trust (TPT) under the Major Port Trusts Act 1963.

Tuticorin Port is an artificial deep-sea harbour formed with rubble mound-type parallel break waters projecting out to sea for about 4kms. The harbour basin extends to about 400 hectares of protected water area and is served by an approach channel 183m wide and 2,500 m long, is dredged to a depth of 12.5m and is oriented in a south east direction. The turning circle, located within the harbour basin, has a diameter of 488m with a dredged depth of 11.9m.

Zone A comprises of 9 general cargo berths, one POL jetty, two coal jetties and one container terminal. Zone B comprises of shallow berths mostly used for lightering vessels. The general cargo berth drafts vary and can handle vessels from 20,000–35,000 DWT. The oil and coal jetties have a draft of 10.7m and can accommodate vessels up to 50,000 DWT.

The Container Terminal (Berth No.7) has been leased out to a joint venture company of Singapore Port Authority and SICAL since 1998. The terminal actually started its operations in December 1999. The estimated capacity of the terminal is 3.6 million tonnes and has a quay length 370m, being able to accommodate vessels up to 35,000 DWT and 190–275m in length.

The port has 2 transit sheds and 4 warehouses, as well as 3 overflow sheds inside the port area and one shed outside. There is 30,000sqm of warehousing and 285,000sqm of storage within the port area.

The port has a design capacity of 15.8 million tonnes and it handled 13.68 million tonnes in 2003/4. Container handling reached 213,000 TEUs in the year 2002/3. It is projected that by the year 2014 Tuticorin port shall be handling 2.0 million tonnes of POL, 12.5 million tonnes of coal, 12 million tonnes of containerized cargo (about one million TEUs) and about 8.7 million tonnes of general cargo. The total tonnage projected to be handled is about 35.2 million tonnes by year 2014. The port is, therefore, gearing up to meet the targets for which port has initiated incentive programmes and is developing further facilities to attract traffic. The incentives given are a rebate of 10% in marine charges for new container services, new scale rates for vessel-related and cargo-related charges with a restructuring of the wharfage for cargo groups and simple and easy to understand scale of rates.

With regard to infrastructure, the port has plans to increase the existing depths of channel to 14.6m, the harbour basin up to 14m, widening of port entrance from 162m to 230m to meet the future container traffic and to attract mainline vessels drawing up to 12.8–13m drafts.

The port has good road and rail connectivity. The road connectivity is through two lane road to NH45B (Tuticorin to Madurai), NH7A (Tuticorin to Tirunelveli) and NH7 (Tirunelveli to Bangalore). Four laning of NH7A (47.2km) is in progress and four laning of NH45B has been planned to be taken up under NHDP III. The port is well connected to the Indian Railway Network on a BG link. Surveys for doubling of Chennai–Tuticorin link and BG conversion of Tirunelveli–Quilon and Tanjavur–Kumbakonam–Vilupuram stretch of MG are in progress. Presently there are two rail rakes being despatched each week to inland ICDs—one train leaving for Bangalore on every Sunday and another train leaving on Wednesday.

7.5.1 Physical Barriers

The port traffic is nearing to its maximum capacity, as the rated capacity of the port is 15.8 million tonnes and cargo throughput is expected to reach 17 million tonnes in 2006. This is the figure given by the Government to port authority to achieve. The port is confined to development of its existing estate with only limited expansion to adjacent areas possible.

Due to the draft constraints, the port is handling only feeder vessels. This means that main line vessels are not calling Tuticorin port directly. All its containers are discharged at Colombo or Singapore by main line vessels before they are brought to this port by feeder vessels, thus extending overall door-to-door transit times.

Road borne traffic through Tuticorin Port is increasing every year. Madurai–Dindigul section is a vital link for movement of the port traffic. This is presently a single line and needs to be doubled. The access road and service roads are weak, narrow and remain highly congested. The main roads available at present were developed in the early 1960s and service roads and approach arm road were built in 1975–76. Intensive container movements and heavily loaded cargo traffic calls for adequate and targeted maintenance of internal roads. As indicated above, four-laning of Tuticorin–Madurai Road (NH-45B), around 128kms has been recently awarded.

7.5.2 Non-Physical Barriers

Though turnaround time is indicted as less than 3 days, cargo dwell times can be high and is attributed to restrictive customs procedures and complicated port procedures. These factors particularly adversely affect vessels coming for thermal coal, POL and bulk cargoes. The port and trade facilitation delays at other Indian ports are also present at Tutucorin.

7.5.3 Measures to Address Barriers

There is need for development of infrastructure and facilities to increase the port capacity to cater for the projected traffic. The general cargo berths are already becoming congested and urgent development work on construction of berth No.9 needs to be initiated. In addition, another rail is required so as to provide the flexibility to install shore loaders and quay cranes. In order to handle dry bulk cargoes, such as copper concentrate, rock phosphate, etc. a northern cargo berth may have to be constructed alongside the North Breakwater. These developments combined will increase the capacity of the port.

In order to attract main line vessels to further facilitate the trade and transport, it is necessary to optimize the approach channel and inner harbour. Deepening of channel and harbour basin up to 14–14.6m could attract the mother vessels and reduce the cost of freight and create more business for the port. The Inner Harbour development project should also include widening of the harbour entrance from the sea. While such a development may be in the interests of Tuticorin Port, there must be some questions as to whether the demand for such a ‘hub’ facility is sufficient to justify such developments, especially with Colombo being in such close proximity.

The condition of the roads needs to be improved through repairs followed by the implementation of routine maintenance. In addition, widening and strengthening is required, preferably to provide a 4 lane main road and other internal roads with the establishment of a good traffic management system.

The Customs modernisation and reform programme needs to be implemented at this port. Given that there is limited demand for container traffic in its immediate catchment area, clearly under the projected developments there will need to be particular emphasis on introducing expeditious procedures for cargo handled at the port to or from other parts of India, given the strong competition from Chennai, Cochin and even JNPT.

7.6 SAARC Maritime Gateway 6: Kolkata/Haldia (India)

Kolkata is the oldest major river port of India. It is situated on the eastern bank of the River Hooghly. Port capacity is around 43.9 million tonnes the port handled 46.21 million tonnes in the year 2004/5 with berth utilization reported to be about 94%. The depths of berths vary from 9.8m to 13.6m. All the berths are secured by the lock system, though vessels are also moored in the river along the bank. The port is administered by Calcutta Port Trust.

Distance of the navigable channel from the sea to the docks is 226kms with a depth of around 8m and with about 45m wide. The turning circle is 190–288m in diameter. Kolkata Port has installed navigational aids to facilitate the pilotage passage throughout the Hooghly River such as, lighthouses, light vessels and an automatic tide gauge. The Syledis chain system is

being replaced gradually by Differential Global Positioning System (DGPS) and Vessel Traffic Management System (VTMS).

Six berths are dedicated for container handling and 7 berths for oil handling. All together the port has 33 berths handling 9.945 million tonnes in 2004/5, registering a 14.4% growth rate. The port also feeds the two landlocked SAARC States—Bhutan and Nepal—as well as its own catchment area.

Kidderpore Docks (KPD) has 18 berths, 6 mooring buoys and 3 dry docks. Netaji Subhas Docks (NSD) consists of 10 berths, 2 mooring buoy and 2 dry docks. The Budge Budge River Moorings (BBRM) consists of 6 petroleum wharves and anchorages (Diamond Harbour) at Saugar Roads and Sand-heads. Kolkata docks have 154,524sqm of transit sheds, 167,915sqm of open storage and 654,078k/litres liquid cargo storage tanks.

The Virtual Jetty at Saugor was built in February, 2004 for handling large size vessels (Panamax) drawing up to 10.5m draft. This jetty is said to have multiple advantages, such as berth flexibility in vessel operation with no waiting time for favourable tide and no restriction on vessels dimensions. All types of dry bulk can be handled at this jetty.

The container terminals occupy six berths and have 3 x 35.5 tonne RTGs and other supporting equipment. The KDS container terminal handled 89,156 TEUs import and 70,086 TEUs of export totalling 159,242 TEUs by volume and 2.357 million tonnes of containerized cargo in the year 2004–05. Container vessels of up to 16,500 DWT can be handled at these berths.

Commodity-wise the port capacities as of March 2005 were POL 3.6 million tonnes, general break bulk 2.8 million tonnes, containers 3.4 million tonnes and 283,050 TEUs giving a total capacity of 9.8 million tonnes. Projected estimates show that KDS would be handling about 16.6 million tonnes and capacity may be enhanced to 21.58 million tones by the year 2014.

The port has initiated the installation of EDI system using a web-based integrated solution, instead of VAN based solution. It has developed online cargo and container operation system. Both Customs and the port community are being integrated in a manner that will provide the shipping community with more prompt services though eliminating delays in the transfer of physical documents between customs, bank and shipping agencies.

Haldia Port is also a major river port commissioned in 1977 on the western bank of River Hooghly, close to Kolkata Dock System. Haldia is known as Haldia Dock Complex (HDC). The terminals are located inside the locking system to protect the vessels from varying levels of the river water and fast flow of stream currents. It is situated 121kms upstream on the Hooghly River from the sea. The river passage at places has minimum depths of 6.7m and the minimum width of the navigable channel is 46.7m. It has one turning circle inside the lock with a 549m diameter. All the berths are inside the lock except for the three oil terminals. Vessels of up to 40,000 DWT can berth inside the docks. The berth occupancy is high and varies between 60–80%.

The Haldia container terminal occupies two berths and has a maximum capacity of 1.2 million tonnes or 100,000 TEUs. It is equipped with a 30 tonne yard gantry crane and other supporting equipment, but is dependent on ships gear for quayside handling.

HDC has 25,070sqm of transit sheds and 531,676sqm of open storage areas. There are three oil jetties located on the river for large vessels, two small jetties in the river for handling oil carried by barges and 12 berths inside impounded dock system. The capacity of oil jetties is 17 million tonnes, one iron ore berth of 1.5 million tonnes, two thermal coal berths of 7 million tonnes and 7 general cargo berths of 7.4 million tonnes. Total capacity of HDC is 34.1 million tonnes and it handled 32.58 million tonnes of cargo in year 2003/4. It is estimated that volume of the cargo would increase up to 56.74 million tones by the year 2014, for which the capacity of the docks would need to be increased up to 73.76 million tonnes.

HDC has good connectivity with rail and road network. KDS is situated at a distance of 10kms from the junction of NH2 and NH6 and at a distance of 25kms from the NH34. Upgradation of the connectivity to KDS including 1.7kms elevated link is being undertaken. KDS is also well connected to the Indian Railways network through the Sealdah-Budge Branch Line of Eastern Railway. HDC is connected to NH41 that further links up with NH6 in the rest of the country. Four laning of 52.2kms stretch of NH41 from Kolaghat to Haldia is being implemented. Presently the Panskura-Haldia Branch Line of South Eastern Railway connects HDC to the Trunk Railways, a distance of 58.1kms. This is a single line that has been partly doubled, Panskura to Rajgoda 15kms.

Kolkata services the east of India and the neighbouring SAARC states of Nepal and Bhutan. The ports have a vast hinterland catchment area that comprises almost half of the Indian States (whole of eastern and north eastern regions). Haldia was developed to augment the increasing traffic at Kolkata with ports working under one administration of Calcutta Port Trust (CPT).

7.6.1 Physical Barriers

Kolkata Port has reached its maximum capacity and congestion is anticipated soon. The channel depths vary and it has a shallow draft. The turning circle is too small, thus restricting the size of vessels able to call at the port. The locks are narrow and aged and the cargo handling equipment is dated and frequent breakdowns are reported.

Haldia Port has also reached its maximum capacity. Cargo handling equipment, especially the container handling equipment is old. There is shortage of storage and back up area. River locks are narrow and have grown old. The access road is congested and in poor condition and rail connectivity is dependent on a single line from Panckura.

The draught limitations in the river mean that large sized vessels cannot enter the port. Entry of feeder vessels is also restricted to tidal timings. The maximum dimensions of vessels accepted by HDC are 172 x 24.3m. Tidal bores in the river have been one of the constraints to shipping and the tidal waves during spring tides make an onrush at times with greater height in the river making it difficult for a ship to remain at the moorings.

Pilotage times are high and it increases if the vessels are low powered. The sharp bends in the river also restrict the length of the vessel and increase pilotage time further according to length of the vessels. In Haldia docks, though the turning circle is larger than KDS, it is still not enough if larger vessels are to be brought. The rainy season further aggravates the situation. Siltation rate is so high that it becomes difficult for the management to accurately maintain the depths.

Around 40% of the traffic of HDC is handled through the railways. The single line has only a capacity of 18 pairs of trains. The present traffic strains the capacity to saturation. The remaining 43kms of single line needs to be doubled quickly.

7.6.2 Non-Physical Barriers

The non-physical barriers are generally the same as those relating to JNPT. The importance of efficient trade and port facilitation procedures at both ports is especially important for Nepal and Bhutan. Those involved in the movement of such transit cargoes complain of delays in being able to move their cargoes out from the port, especially citing the need for extensive examination checks.

7.6.3 Measures to Address Barriers

KDS has rated capacity of 9.80 million tonnes, whereas it has handled 8.69 million tonnes in year 2003–2004, which indicates that port has almost reached its designed capacity. Projected traffic is about 16.6 million tonnes by the year 2014, almost doubling the volume being handled presently. Therefore, there is need to develop more infrastructures either at KDS or HDC. It is expected that traffic for the major ports would grow at the compound annual growth rate of 7.43%, so both KDS and HDC must gear up the resources to cater for this growth. From the studies on KDS it is envisaged that KDS would not be able to take further expansion due to the paucity of space and limited river depths between Haldia and Kolkata. Therefore, focus is to be made on expansion of Haldia port.

On the other side HDC handled 32.57 million tonnes in the year 2003/4 against its rated capacity of 34.10 million. Projected traffic estimates are 56.74 million tonnes by the year 2014. This indicates that the port is presently working at close to its maximum capacity and thus needs expansion and enhancement of facilities. If the inland waterways become fully operational the volume of traffic on these ports could increase substantially. Immediate efforts are required to increase the capacity of the ports or to develop another port nearby to cater for the estimated growth.

An increase in the rate of dredging is required to clear the accumulated amount of dredging material in the river, otherwise with the rate at which siltation occurs it is feared that the port may become inaccessible to even medium-sized vessels. In addition, preventive measures need to be taken against tidal bores and the on-rush during spring tides. A study needs to be conducted to find the ways and means to protect the ships in the river from this natural phenomenon.

KDS may have to initiate a comprehensive programme for modification/replacement of port vessels and replacement/refurbishment/acquisition of the cargo handling equipment. HDC also has to gear up its efforts to enhance the capacity of facilities and capabilities of its infrastructures, such as procurement of ship-to-shore gantry cranes for container handling, replacement of present yard gantry cranes with the procurement of at least 4 RTGS cranes. Therefore, therefore the programme is essentially to increase productivity by means of investment in equipment. The port has already procured a RTGC crane for KDS and two ship-shore gantry cranes and two stacker-cum-reclaimers for handling ore and container respectively at HDC, constructed two new berths at HDC and constructed new pilotage facilities.

The need to improve both port and trade facilitation is particularly critical given the space constraints. Basically it will be critical to reduce transit and dwell times to make more effective use of the limited open and closed storage areas. In addition, there is a need to develop road infrastructure inside and outside the docks, including drainage system, improve backup area with railway connectivity inside and outside HDC and also undertake river bank protection works near the Sondhia column.

7.7 SAARC Maritime Gateway 7: Chittagong Port (Bangladesh)

Chittagong is the premier port of Bangladesh and handles more than 80% of the country's import and export trade. The port is situated about 20kms upstream from the sea (Bay of Bengal) on the estuary of the River Karnaphuli. Throughput in 2004–05 was 20 million tonnes of cargo, including 750,000 TEUs.

There is an existing container terminal that has now been supplied with four container gantry cranes to enhance performance, as previously all container vessels had to use ships gear. To support the high growth in container traffic, a new container facility with a 1,000m quay is under construction. This new facility will provide an additional 5 berths and 22 acres of backup land for container yards. This facility is expected to come into operation within the current year.

The Port Authority has future plans to possibly construct another container terminal at Jetty No.11, 12 and 13 and there are plans to construct an ICD next to Dhirasram Railway Station at Ghazipur, about 35kms from Dhaka and at Pangaon in the River Buriganga, near Dhaka, an inland water transport-based ICD is also planned.

7.7.1 Physical Barriers

Chittagong being a river port suffers from heavy siltation such that channel depths between the sea and the wharves can change considerably. It is sometimes beyond the control of the Port Authority to maintain published channel depths. Tides are semi-durinal and ranges from 1.4–4.8m but the ebb current is very strong, thus creating difficulties for low-powered vessels to navigate. Because of siltation, there is also restricted night navigation until midnight.

The port is highly congested and operating beyond its capacity. The cargo handling equipment is insufficient to meet current levels of demand, both in relation to conventional and specialised cargo handling. As with many ports in the region the equipment utilisation levels are below international benchmarks.

7.7.2 Non-Physical Barriers

The problems at the main container terminal are compounded by the decision that none of the container freight stations (CFS) outside the port limits is allowed to handle imported cargo. This means that 85% containers have to be destuffed within the port area. Not only does this almost defy the logic of the port being a ‘transit’ facility, but it also congests the container yards.

The inland movement of containers by road is not properly developed, due to load restrictions on some bridges on the national road network. The alternative method of carriage by rail is compromised in that Bangladesh Railways is not fully equipped to handle all the potential

demand for movement of container traffic destined for Dhaka. Inland water transport is also not ready to handle containers. This leads to increased demand for unstuffing within the port limits, thus raising dwell times. At 20–22 days the container dwell times are far above those at other ports on the sub-continent.

Poor trade and port facilitation are considered to be a major constraint being reflected in the high dwell times. The port and customs procedures remain traditionally manually-oriented with continued reliance in significant amounts of paperwork. Progress towards the customs concepts embodied in the Revised Kyoto Convention remain slow to be implemented.

The port has a negative image in relation to labour unrest, restrictive practices and resultant poor productivity. These conditions not only exacerbate the situation but suggest that significant change will be difficult to implement. The port continues to rely on manpower that lack appropriate skills, especially in relation to mechanical handling, due to shortage of technical training.

The management of the port has been criticised by the port community. There has been a lack of introduction of modern port practices, institutional strengthening and use of IT such that overall improvements in port management and facilitation have been limited. Users complain that the charges are high, especially in relation to the quality of service received in relation to those charges.

7.7.3 Measures to Address Barriers

A port expansion programme needs to be undertaken to increase the capacity of the port to cater to the increasing trade. The Port must acquire modern cargo handling equipment to increase its throughput, both in relation to ship-shore and container yard operations. More container freight stations should be built near the port so as to relieve the congestion within the port. However, these will not be effective unless such CFSs can handle import cargoes and thus the regulations will need to be modified.

Merely providing more equipment will not resolve many of the port's problems. Without skilled, trained operators and development of incentive schemes, productivity is unlikely to rise to the required levels. This suggests that a more comprehensive port productivity programme is required than solely relying on capital investment.

Road and railways systems need to be improved to meet future traffic demand of the Port and to carry containers up to inland destinations. A major problem is the movement of containers between Chittagong and Dhaka. Initial indications are that only 35% of containers destined for Dhaka proceed as FCLs by either rail or road. It is critical that this percentage is raised through investment in the rail network and with specialist wagons to the carry units from the container yards through to ICD facilities in or close to Dhaka. In addition, improvement in the road network, especially the strengthening of bridges to accommodate container transport is important. Inland water transport container terminals could be built on major inland port, say Narayanganj, near Dhaka. Container carrying barges should be procured to transport containers between sea ports and inland water transport-based container terminals.

The port needs to improve its operational efficiency for which experienced professionals should be appointed at the top tiers of management. Given the dependence of Bangladesh on

a single port for its international trade, it is paramount that appropriate management and institutional resources are allocated to enable it to achieve international standards.

As indicated port and trade facilitation represents a major non-physical barrier. It is imperative that Bangladesh Customs implement a comprehensive WCO reform and modernisation programme towards the implementation of the standards contained in the Revised Kyoto Convention. The more widespread usage of IT with electronic clearance systems with DTI linkages and implementation of risk management techniques will be essential to facilitate traffic through the port.

In parallel the port should install IT/EDI systems to increase its efficiency and better management of the Port. Old and obsolete rules and regulations should be reviewed and revised to meet the modern needs of the shipping industry. The management of the port must reduce overhead expenditures and address the social and economic requirements of the port labour. The port should also consider adopting privatization policy to encourage private investment in port development, operation and management, as has been adopted at other SAARC ports.

Clearly, there is significant potential for the development of transport corridors to the North Eastern States of India and this would generate additional traffic for the port. However, it should be recognised that critics suggest that it should improve its capability in handling Bangladesh cargo before it attempts to increase throughput by attracting additional transit cargoes. Nonetheless, the port does offer opportunities for the movement of Indian cargoes that would be beneficial to both parties. Critical to this goal would be the development of bilateral transport and transit agreements. Even though initially volumes may be small, it is recognised that such agreements take some time to negotiate and an early start to the process is essential.

7.8 SAARC Maritime Gateway 8: Mongla Port (Bangladesh)

Mongla is a riverine and second port of Bangladesh and is located in the south-western part of the country at the confluence of Passur River and Mongla Channel, approximately 130kms upstream from the Bay of Bengal and surrounded by the mangroves of Sunderbans, a World Heritage site. The port has the capacity to handle 6.5 million tonnes of cargo annually. However, port is presently handling only about 15% of the total trade of Bangladesh consisting of approximately 1.7 million tonnes of cargo, including 27,000 TEUs and is operating at less than 50% of its capacity.

The port consists of 5 multi-purpose berths equipped with dock-side cranes, mobile cranes and fork-lift trucks, storage transit sheds, warehouses, open areas and mid-stream facilities consisting of 8 moorings berths, 21 anchorage berths, barges and floating crafts. Essentially, the port was a river port that was then provided with a quay. The port maintains adequate water depths in the channel for safe operation of vessels day and night. Vessels drawing 7.0–8.5 metre draught can berth at jetties and anchorage respectively.

7.8.1 Physical Barriers

River passage is long and dependant on the tidal range. There is a heavy rate of siltation in the river and the harbour such that deep draught vessels cannot easily navigate the river passage and where there are also insufficient navigational aids.

Vessels discharging cargo at the mid stream berths often face difficulties with old lighterage and inadequate number of craft. There is no container terminal or ICD/CFS and the cargo and container handling equipment are insufficient and old resulting in frequent breakdowns. The port is subject to labour unrest and has a high reliance on non-skilled labour.

However, the major physical barrier has been its lack of connectivity with the key areas of demand within Bangladesh. The port was originally developed to handle goods to and from lighters. At that stage its connectivity via the waterway system was sufficient, but the development of the shore terminal immediately placed reliance on surface transport modes that were not there. There is no rail connection and the road connectivity has only improved significantly after the opening of the bridge over Bhairab River. Though the inland waterway connectivity remains good, no containers can be transported to inland destinations along waterways due to non-availability of suitable inland container carrying vessels and inland waterway container terminals.

7.8.2 Non-Physical Barriers

Despite the low throughput of cargo relative to the capacity, the overall port performance remains low. This is part due to poor management of the port operations with old and obsolete regulations, part on poor labour productivity, part on lack of modern equipment and part on the continued use of traditional manually-based port and trade facilitation systems. These all combine to generate high vessel and container turnaround times and high non-operational time.

7.8.3 Measures to Address Barriers

Mongla has the potential to achieve high growth, especially given the problems at Chittagong. However, this potential has yet to be realised. Given the proximity to Chittagong and Kolkata/Haldia and the draft restrictions clearly the port is not particularly attractive to container lines, especially given its poor connectivity. Consequently, further improvements in road connectivity are essential to attracting clients, given the problems in rail linkage and the situation on inland water transport described in Chapter 6. Merely having resources will not generate demand, as the history of Mongla proves.

There has to be a recognition that if Mongla is to attract customers it will need to fight for it and that means raising the standards to levels above those in the competing ports. This means that port management and operations need to be improved through the introduction of professionals and highly qualified persons with relevant experience. Cargo and container handling equipment needs to be replaced with higher lifting capacity units, more safety features and higher levels of automation. Lighters and tugs that are too old should be replaced with modern crafts for better performance. More aids to navigation need to be installed to facilitate safe movement of maritime traffic. Protection of river bank is also necessary to reduce the rate of siltation and the navigation channel should be dredged and deepened to bring in larger vessels.

Customs reforms are also an essential part of port performance. The system of inward/outward clearance of cargo must be standardized and harmonized. Trade and transport facilitation programmes should be introduced by using simple and uniform documents and declarations. The cargo clearance procedures need to be simplified and international best practices should be adopted. IT/EDI system need to be installed in the port and in the customs

domain, so that delays and dwell time are kept at minimum. Labour reforms are most essential. Port labour should be educated, trained and their social and economic problems addressed to bring in efficiency to the port operation.

In the near future, Mongla port may be called upon to handle regional traffic from Nepal and Bhutan. Greater attention should therefore, be given to its overall development and enhancement of efficiency as the port of Chittagong is already getting congested and there is limited scope for further expansion. To make use of the railway system for port connectivity, efficient arrangement for transfer of containers need to be made at Khulna rail head. CFS and inland container terminals should be developed for movement of containers by waterways, for which specialized barges should be procured. The private sector should be encouraged to build container terminals with modern equipment to handle future traffic.

7.9 SAARC Maritime Gateway 9: Male Commercial Harbour (Maldives)

Male port, officially known as Male Commercial Harbour (MCH), is situated on the Male Island. Male atoll contains 107 islands, of which Male is the principal island. It is also the capital and premier sea port of Maldives. The port consists of an outer harbour and an inner harbour. The inner harbour is situated on the north and south west sides of Male Island and is protected by a low breakwater connected to the land at each end. The port limits are extended to Hulhu Male', a man-made island located north-east of the airport island, and this at present provides a storage area for empty containers, thus reducing congestion at the Male Commercial Harbour.

Male Commercial Harbour has 5 multi-purpose berths, 3 on the West side and 2 on the East side of the terminal, where all types of dry cargoes are handled but there is only a draft of 3.5m. Another berth, 101m long with a 10.5m draft, has been constructed on the north side of the terminal for larger sized vessels, together with container handling facilities with open storage area for container stacking. Male Commercial Harbour has a design capacity for handling 21,119 TEUs, whereas it already handled 30,666 TEUs in 2004. Average dwell time was 13 days and berth occupancy 80%. The container handling equipment consists of 2 reach stackers, 2x25 tonne fork lift trucks, 1x10 tonne forklift, 1x13 tonne forklift, a prime mover with a 20 ft and a 40 ft trailer.

Male is located 411 nautical miles south west of Colombo and 326 nautical miles south west of Indian Port of Trivandrum. There are frequent shipping services between Male and Sri Lanka and the Indian ports of Mumbai, Tuticorin, Trivandrum and Chennai. Containerised Indian cargo mostly is transhipped via Colombo. The Maldives economy is growing at an estimated 7.8% but is highly dependent on imports. Since there is no significant industry in Maldives, therefore, most containers are returned empty.

The Male Commercial Harbour is administered by the Maldives Port Authority (MPA). The Authority has initiated development of two other ports, namely Kulhudhuffushi and Hithadhoo. These are declared official ports and allowed to handle foreign vessels. Since the MCH cannot be expanded to meet the future demand due to paucity of space, both of these ports when properly developed could share the traffic of MCH in future.

Cargo growth rate in the last three years has averaged 4.7% per annum. The port handled about 635,083 tonnes of cargo and it is estimated that cargo growth rate will increase up to

9.8% and by the year 2015 it would be 765,658 tonnes. Container traffic could also increase from 34,000 TEUs to 95,000 TEUs by 2015.

7.9.1 Physical Barriers

The port operates far above the designated capacity and as a result heavy congestion occurs in the port. Berth occupancy is very high at more than 80% and a delay in berthing occurs resulting in high ship turnaround times. However, the major problem is the limited open storage space and the scarcity of land for further expansion.

The port is located in the north west of Male and not only does this mean that the port area can only be extended to the maximum by reclaiming the inner harbour on the west side of the terminal. The port creates significant traffic congestion due to the conflict between urban and port traffic. Due to a lack of space for facilities such as CFS all containerized cargo is destuffed in the open storage areas inside the port. Customs usually require the contents of the container laid out for inspection, thus creating more congestion in the yard and delays in delivery. It should be recognised that an island such as Male is not ideal for containerisation given the problem of delivering such large units to the point of final delivery. This will always mean that a major proportion of containers will require unstuffing within the port or transferring to a CFS to relieve congestion in the container yard, though this operation may in itself lead to increased congestion outside the port area.

There is a shortage of modern cargo and container handling equipment, and that available is often old and subject to frequent breakdowns. There is no quay side container crane, thus the port is totally reliant on geared container ships that inevitably have a slower rate of discharge compared to use of shore equipment.

7.9.2 Non-Physical Barriers

There appears to be some lack of coordination between the port management and port community with essential development planning not keeping pace with demand. This is demonstrated by the fact that the port is already handling well in excess of its design capacity and yet only now is detailed master planning being undertaken on how to address the problem. This suggests a lack of a pro-active approach, though equally credit should be acknowledged that the port is actually able to handle this excess demand.

A key problem is the lack of a proper law to regulate, develop and operate the port industry. The management of the ports by the MPA has to follow the normal Government regulations. This paves way for the development of the sector in an ad-hoc manner and the activity of the sector thus lacks coordination and efficiency.

Effective port and trade facilitation represent the other key non-physical barriers. This is reflected in the high container dwell time of 15 days. It is considered that the traditional manually-based approach with high levels of supporting documents and physical examination is not compatible with modern maritime logistics. The lack of adequately trained staff in all the areas of port operation and in IT in the facilitation process highlights the slow progress in introducing modern facilitation technologies.

7.9.3 Measures to Address Barriers

There is a need to expand port capacity on a priority basis for which additional land will probably have to be reclaimed. The port is currently undertaking a Port Masterplan using external consultants to develop options on how best to expand the port's capacity. One option is likely to be development of a new port area away from the current congested site.

However, in the meantime interim action is necessary to address the current congestion issue. There is a need for additional equipment to be able to introduce high-density stacking methods, and for this, investing in RTGs for the container yard should be considered seriously. In addition, much of the container handling equipment is old and requires replacement. The 10 days free storage time is high by international standards and may well add to the congestion as importers will always tend to maximize their usage of free storage time, especially as many lack their own storage facilities.

The lack of an external CFS is also an issue that needs to be addressed as soon as possible to reduce the need to stuff and unstuff within the port area. Allocating a separate area for the de-stuffing, customs inspection and clearing operations could help resolve this problem, but identifying an alternative site is difficult.

The port and especially the trade facilitation issues need to be addressed with some urgency in order to reduce the dwell times. This will required development of IT/EDI solutions as well as new approaches on cargo clearance.

To improve the port performance, coordination and efficiency a needs based human resource development plan is necessary and should be implemented as soon as possible.

The MPA needs to have the correct legal framework by having proper law regarding the ports and the maritime sector, and the management of MPA needs to be given more autonomy from the normal Government rules and regulations by privatization or further commercialization so as to be able to run the ports more efficiently.

7.10 SAARC Maritime Gateway 10: Colombo Port (Sri Lanka)

Colombo Harbour is artificially formed by three breakwater walls that enclose the harbour and protect it from sea waves. This is the principal port on the west coast of the country. Vessels can enter through two entrances i.e. west entrance 230m wide and 15m deep and the north entrance 185m wide with a 12m depth. The harbour basin is maintained at 15m depth.

Initially the port was operated by three different organizations:

- The Port Commission was established in 1953 that was responsible for construction, maintenance, operation and pilotage and the supply of equipment;
- The Port Cargo Corporation, established in 1956, was responsible for all types of cargo handling; and
- The Port Tally and Protective Service Corporation was established in 1967 and was responsible for on board tallying and watchmen services.

The three organizations were mostly non-cooperative to each other, therefore, port efficiency and reputation was compromised. The Government reacted and formulated an authority under

Act of Parliament No.51 of 1979 and created the Sri Lanka Port Authority (SLPA), amalgamating all the three organizations. The SLPA has the control not only over the port of Colombo, but other ports of Sri Lanka.

The port has thee container terminals, the Jaya Container Terminal (JCT), South Asian Gateway Container Terminal (SAGCT) formerly known as Queen Elizabeth Quay, and the Unity Container Terminal (UCT). SAGCT is leased out to private sector and the other two are under the administrative control of Sri Lanka Port Authority (SLPA). In addition, there are multi-purpose passenger piers and oil berths in the harbour. This port is classified mainly as a transhipment port given that it can handle 4th generation vessels and transhipment traffic accounts for about 70% of the total container traffic, out of which 75% is accounted for by the SAARC countries. The Port Authority is planning to make this port into the 'Mega Hub' port of the region.

The container terminals are fully equipped and computerized for real-time container operations. They are the result of massive investment and careful planning such that they are able to offer the international shipping industry and regional shipping all the modern facilities that are considered best in terms of technology, efficiency and quality services.

The Jaya Container Terminal (JCT) has a capacity of 2.0 million TEUs, whereas it handled 1.3 million TEUs its capacity can be enhanced up to 2.4 million TEUs. It has a storage capacity of 45,668 TEUs and is fitted with 14 container gantry cranes, 39 RTGC and 4 RMGC. There are 4 mainline and 2 feeder berths and the facility is operated by the SLPA.

The South Asia Gateway Terminal (SAGT) is leased out to SAGT on a BOT Basis. It has a total area of 22.2 hectares, a stacking capacity of 26,250 TEUs and reefer capacity of 900 TEUs. The design capacity of the terminal is one million TEUs that can be enhanced up to 1.2 million TEUs. In 2004, it handled 900,000 TEUs. It is equipped with 9 super-post-panamax cranes and 27 transfer cranes. The quay has a length of 1,005m and a draft of 15m.

The Unity Container Terminal (UTC) is the smallest of the three facilities consisting of two berths, 210m and 130m in length, with drafts of 11m and 9m respectively. It has 3.9 and 3.2 hectares of land and has a design capacity of up to 300,000 TEUs. UTC handled 14,182 TEUs in the year 2004. It is equipped with 8 RTGC and other support equipment. The stacking capacity is 8,000 TEUs and the terminal is operated by SLPA.

Railway tracks are available within the port but are not used for transportation of container traffic. This is not surprising given that domestic container traffic is less than 30%, whereas, transhipment for international and regional destinations is 70% and above. Projected rate of growth is 10% per annum up to year 2010. Because of the imbalance in trade of the region, there is substantial flow of empties. Berth occupancy of the container berths is 75–80% and quay-side cranes performance is around 25 moves per hour, thus being compatible with international norms.

Apart from the above mentioned three container terminals, Colombo Port has the Unity multipurpose berths, Bandaranaike Quay, Prince Vijaya Quay, Guide Pier, South pier, a feeder berth and one dry dock. Colombo Port handled 3,883 vessels, 31.3 million tonnes of cargo and 2.221 million TEUs in the year 2004, out of which transhipment containers were 1.531 million TEUs.

7.10.1 Physical Barriers

The port is reported to be working near to its rated capacity. The berths are mostly occupied, as indicated by the 75–80% berth occupancy level, and therefore at times berthing delays are encountered. The area of harbour basin is limited; as such it is difficult to manoeuvre large sized ships within the basin, thus adding to the berthing delays.

Given the high throughput and limited yard areas, there is significant congestion within the various container terminals. The total reliance on road transport for distribution services compounds the congestion both within the port and the surrounding road network. Many of the vehicles and roads are not designed for heavy container transport.

7.10.2 Non-Physical Barriers

Frequent changes in the management of the port have had an adverse impact on the overall efficiency, particularly as it has compromised continuity in policy and its implementation. It is considered by the port 'community' that the port has lacked management with the drive to push through decisions relating to development and downsizing/restructuring or the labour force to match future needs.

Colombo suffers the same port and trade facilitation problems common in the region, though in some ways this is less severe given the major transhipment function. However, it has a significant effect on import and export traffic and therefore leads to high dwell times, especially in relation to CFS activities. At this stage there is no automated customs clearance system with DTI links and therefore there is the same reliance on manual systems with high examination levels.

7.10.3 Measures to Address Barriers

There is an immediate need for expansion of two of the container terminals (JCT and UCT) to reduce the congestion. Limitation of harbour basin is a serious concern that needs to be improved through the adoption the appropriate engineering solution. Increasing the capacity of the harbour to meet future demand by implementation of the South Harbour Project with dredging of harbour is an immediate requirement to accommodate larger mother vessels. The private sector should be encouraged to invest in port infrastructure development and operations.

Policy reforms are necessary to improve the management of the port and its performance. Implementation of new terminal management systems could be useful with the introduction of round-the-clock operations in the port being required. The various regulatory bodies need to be pro-active and decisive and there need to be a development 'champion' to ensure that the necessary developments take place and are completed on time.

There is a major demand for development and implementation of a port and trade facilitation programme. This should be based on the introduction of an automated customs clearance system with DTI capability, development of risk management techniques and linkages between the customs, ports and agents on the basis of a 'community-type' IT system so as to eliminate data duplication between the parties.

7.11 SAARC Regional Maritime Corridors

7.11.1 Colombo - Tuticorin

A shipping service operated between Colombo and Tuticorin, a distance of 140 nautical miles or 260kms before 1947. The service was suspended at that time in the wake of civil unrest. Two decades ago, both India and Sri Lanka decided to revive this maritime link and accordingly a passenger jetty was constructed at Tuticorin. A passenger jetty at Colombo already exists. However, the decision to open up service had to be abandoned, in part due to security. However, as recently as 2004 both Governments indicated their approval in principle to re-launching of this service. This service would primarily satisfy the requirements of tourists to visit the sacred city of Madurai, located 212kms north of Tuticorin. The ferry would be a roro service capable of carrying cars, buses and trucks.

7.11.2 Colombo – Cochin

An alternative proposal was discussed between National Governments of Sri Lanka and India for the launching of a roro ferry service between Cochin in Karnataka State of India and Colombo. The distance between these two ports is 310 nautical miles or 574kms.

7.11.3 Physical Barriers

There is no vessel for the above mentioned ferry services. It is estimated that the capital investment for this purpose would be in the region of US$10 million. Customs, immigration, banking, telephones facilities and passenger waiting hall at all terminals are not yet constructed there, though a passenger jetty at Tutucorin exists.

7.11.4 Non-Physical Barriers

An intra-governmental agreement will be required for the relaunching of these ferry services.

7.11.5 Measures to Address Barriers

Investment is needed by way of the procurement of a new modern ro-ro type ferry. Construction of suitable passenger jetty at Cochin may also be needed if that route were to be selected. Customs, immigration, banking facilities and waiting hall for passenger would need to be developed. Agreement between the two Governments would need to be put in place to allow the services to operate.

However, the primary requirement is for a detailed feasibility study to be undertaken to establish the potential viability of such a link, particularly given the growth in air services. This may change the orientation of operations possibly more towards freight rather than passenger, or alter the mix in relation to selecting the optimum type of vessel.

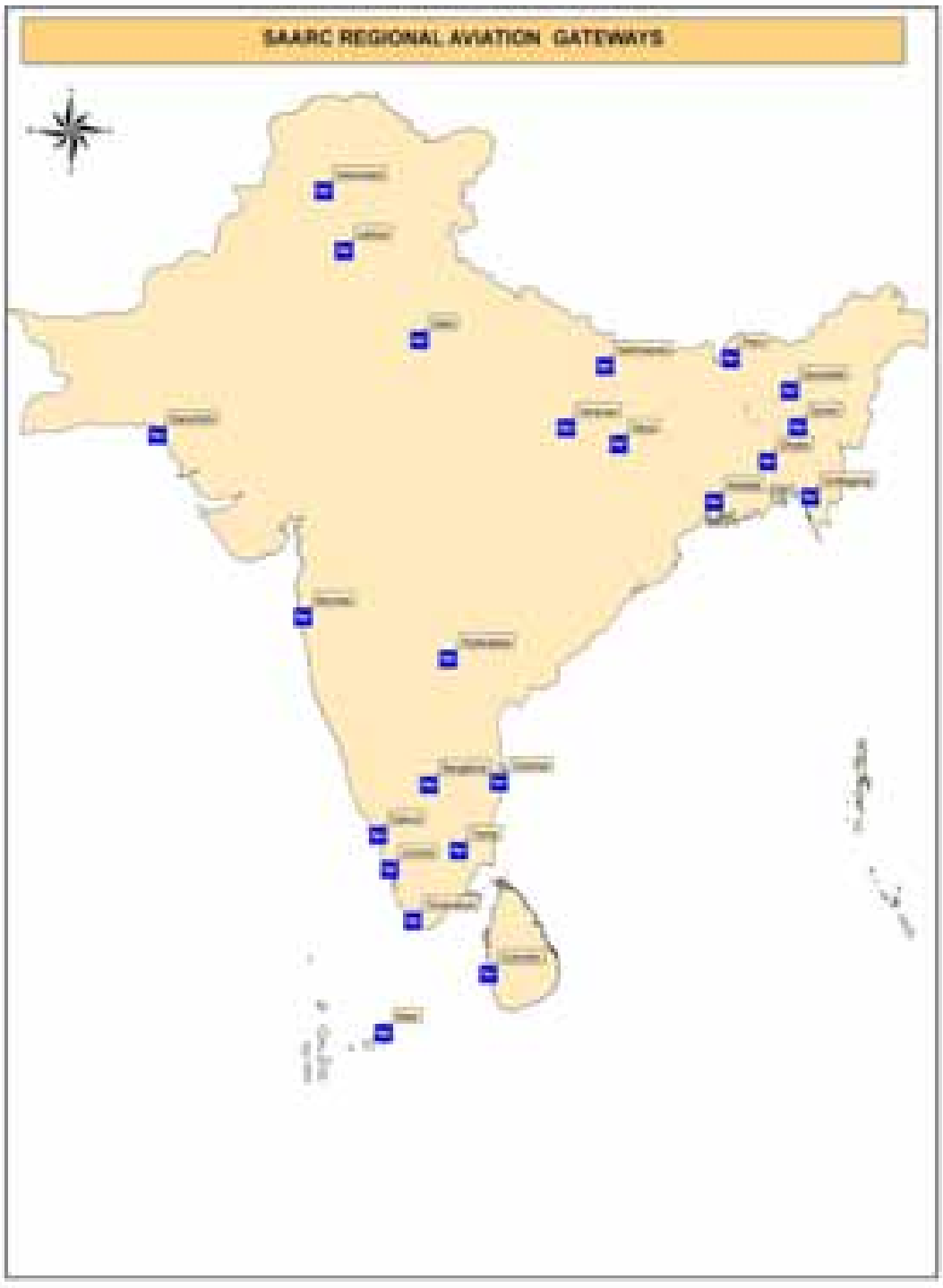
7.12: SAARC Regional Maritime Gateways: Major Barriers and Measures at a Glance

Corridors	Physical Barriers	Non-physical Barriers	Measures to Address Barriers
Regional Maritime Gateways Karachi, Bin Qasim JNPT Kolkata/Haldia Cochin Tuticorin Chittagong Mongla Male Colombo)	(a) Heavy siltation at Karachi, Bin Qasim, Cochin, Kolkata, Chittagong and Mongla; (b) Port capacities have almost reached their maximum limits and congestion could build up anytime at Kolkata, Haldia, Cochin, JNPT (India), Male (Maldives), Qasim (Pakistan), Colombo (Sri Lanka) and Chittagong (Bangladesh); (c) Not adequate channel depth available which again fluctuates considerably with tide and over seasons at Chittagong, Mongla (Bangladesh), Haldia, Kolkata (India) and Qasim port; (d) Lack of adequate channel marking and their poor maintenance for night navigation at Qasim (Pakistan) and Chittagong; (e) Cargo and ship handling equipments, and floating craft are old and insufficient at Mongla, Chittagong, Male, Karachi, Kolkata, Haldia, Tuticorin and JNPT (India); (f) Rail connectivity with hinterland is in a very poor state at Chittagong, Mongla (Bangladesh), Haldia, and Qasim (Pakistan); (g) Poor road connectivity at Haldia, JNPT, Tuticorin, Karachi, Colombo and at Chittagong for container carrying; (h) No water transport based connectivity at Chittagong and Mongla for container movement to inland destinations; (i) Harbour area and channel depths are not sufficient to accommodate new generation larger vessels at Kolkata, Haldia, JNPT, Karachi, Qasim and Truticorin; (j) No ICDs and CFS at Chittagong, Mongla and Male; (k) Lack of storage at Male; (l) Lack of RoRo ferry vessels and passenger jetty at Cochin and facilities at both Tuticorin and Cochin.	(a) Poor port administration and management and lack of professionally experienced officials impacting productivity at Chittagong Mongla, Karachi, Haldia and Male; (b) No EDI/IT systems are available to link up customs, ports and stakeholders, and no computerization for port operation at Chittagong, Mongla, Kolkata, Haldia, Karachi, Qasim, Male and Colombo; (c) Customs Procedures are too complicated and time consuming at all ports; (d) Labour unrest exists at Chittagong, Mongla, Kolkata, Haldia and Qasim; (e) Lack of bilateral agreement between Colombo and Tuticorin/Cochin; (f) Ports are managed under normal Government rules and regulations with limited autonomy and without a proper law for ports in Male.	Measures to address non-physical barriers are: (a) Port administration and management to be improved by inducting professionally qualified and experienced management staffs at Chittagong, Mongla, Haldia, Cochin, Tuticorin, Male and Bin Qasim; (b) Introduction of EDI/IT to link up customs, ports and stakeholders together with computerization of port operations at Chittagong, Mongla, Kolkata, Haldia, JNPT, Tuticorin, Cochin, Karachi, Qasim, Male and Colombo; (c) Introducing reforms in customs operation as per WCO standards at Karachi, Tuticorin, Male, Chittagong and Mongla; (d) Training of port labourers and addressing their socio-economic problems at Chittagong, Mongla, Haldia, Tuticorin, Cochin, Qasim and Male; (e) Bilateral agreement needed to relaunch ferry service between Colombo and Tuticorin/Cochin; (f) To give the port management more autonomy in Male with a suitable framework. Measures required to address physical barriers are: (a) Regular dredging to maintain adequate depths at Karachi, Bin Qasim, Cochin, Kolkata, Chittagong and Mongla; (b) Channel marking for night navigation and maintaining them regularly at Qasim and Chittagong; (c) Procuring cargo and ship handling equipment and floating craft at Mongla, Chittagong, Male, Qasim, Karachi, Kolkata, Haldia, Tuticorin, Cochin and JNPT; (d) Revitalizing railway system, procuring new wagons and flat cars at Chittagong, Haldia, Cochin, Tuticorin, and Qasim; (e) Improving road connectivity at Haldia, JNPT, Tuticorin, Colombo and at Chittagong for container carrying; (f) Encouraging water transport based connectivity for container movement to inland destination from Chittagong and Mongla; (g) Expanding port capacities by building additional berths/terminals at Kolkata, Haldia, Cochin, JNPT, Karachi, Qasim, Chittagong, Mongla, Male and Colombo; (h) Deepening the channel and harbour basin to accommodate larger vessels at Kolkata, Haldia, JNPT, Karachi, Qasim, Chittagong and Mongla; (i) Building new ICDs and CFS at Chittagong and Mongla; (j) Reclaiming land for port expansion at Male, Karachi and Cochin; (k) Construction of storage at Male; (l) Encouraging private sector involvement; (m) Procurement of ferry vessels, as well as building passenger handling facilities at Tuticorin and Cochin

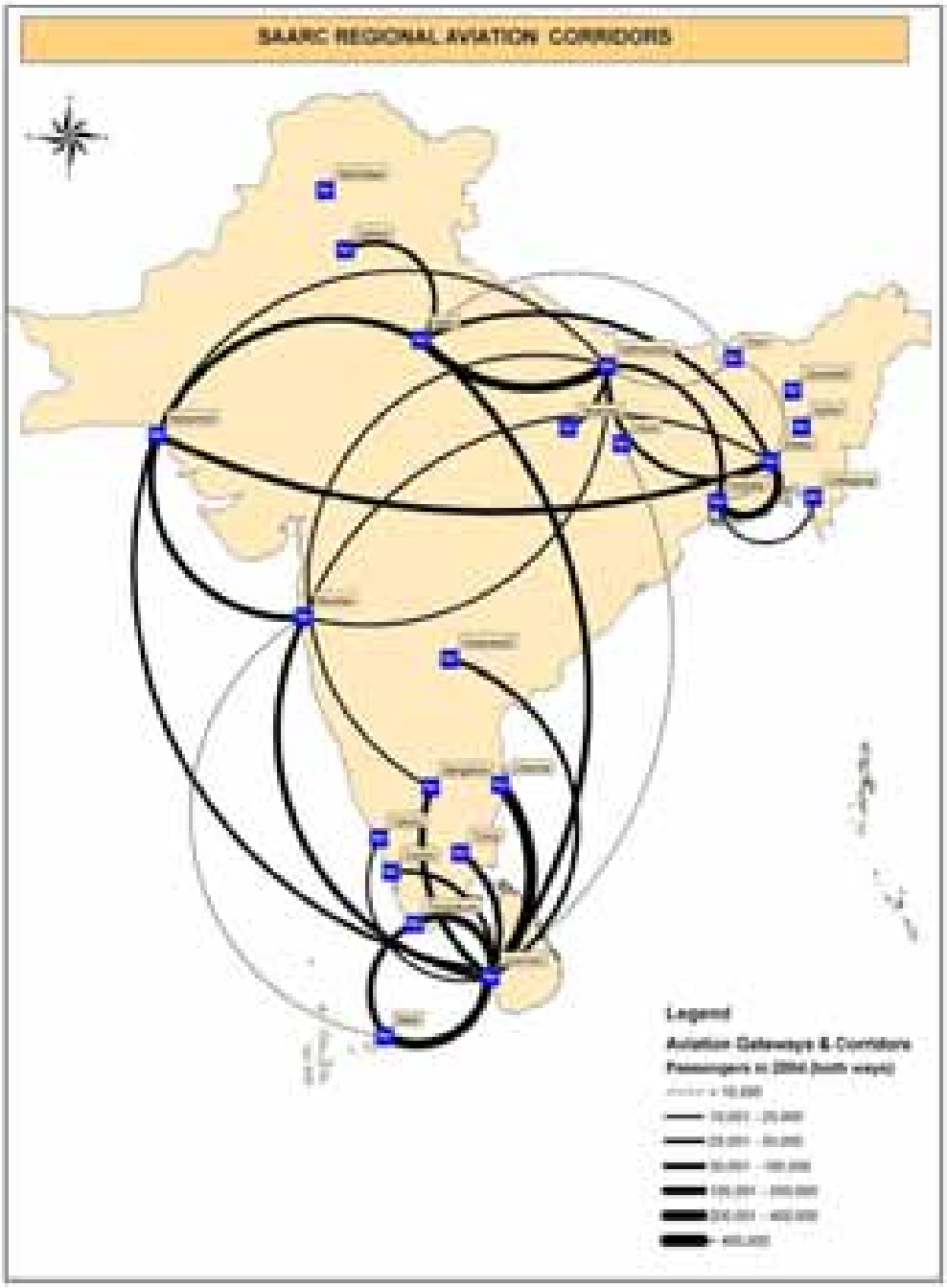
8.0 SAARC REGIONAL AVIATION GATEWAYS

The selected Aviation Gateways covered in this study based on the criteria discussed in Chapter 3 are shown in Map 21 and the services between them are shown in Map 22.

Map 21: SAARC Aviation Gateways



Map 22: SAARC Aviation Corridors



8.1 Present Status of Aviation Travel within SAARC

Air transport has been the fastest growing mode of transport over the last few decades in most parts of the world. It has made vast advances in both passenger as well as cargo transport. The present state of air transport in the SAARC region compared to world travel as given by the International Civil Aviation Organization (ICAO) is shown in Table 15.

Table 15: Share of Worldwide Aviation in SAARC Region 2004

	All Countries	SAARC Region	%
International Passenger Movements (million)	1793	134	1.90
Regional Passenger kms (billion)	361	1.80	0.50
Regional Freight Movements (tonnes 000's)	23,000	32.60	0.15

Note: ICAO recorded 593 million international passengers carried, assuming 50% of trips have on average 1 transfer, this would mean 3 trip movements (i.e. initial boarding, final alighting and boarding and alighting at transfer point for 50% of trips) making up an estimated 593x3 movements= 1779 million movements

The table shows that the region's share of international passengers is only 1.9%; while that of its regional passengers is even lower at 0.5%. It should be borne in mind that even in this low percentage, a large proportion is made up of tourists and those originally from SAARC countries who are now expatriates and resident in other parts of the world. Thus, travel under taken by residents within SAARC would be actually lower than that indicated in Table 15.

Closer inspection shows that per capita indicators given in Table 16, of use of air travel within the SAARC region lags very much behind other regions, even such as Sub Saharan Africa that has a much lower income level than compared to SAARC. While appreciating the fact that aviation, similar to other modes of transport, is correlated with increase in incomes, the extremely low indicators of use shows that aviation within SAARC is one of the least developed modes of transport particularly for intra-regional mobility.

Table 16: Comparison of Regional Aviation in SAARC with other Regions 2002

Region	Intra Regional Passengers Carried (million)	Regional Trips Per 1000 Capita
Africa	6.3	11
Asia/Pacific	47.6	13
Europe	125.4	133
Middle East	10.3	21
North America	125.4	381
South America & Caribbean	19.0	34
TOTAL	**334.1**	**52**
SAARC (given within Asia/Pacific above)	**1.8**	**1**
Comment regarding travel within SAARC region	*Only 0.5% 1(in 200) of World wide regional traffic*	*Lowest aviation use in the world, lower than sub-Saharan Africa.*

While domestic air travel is outside the remit of this study, the data available in the country reports show that domestic air travel in SAARC countries is also one of the lowest in the world compared to other regions of similar economic standing. The possible reasons for this situation together with suggestions for improving mobility will be discussed in Chapter 9.

8.1.1 Air Services Agreements (ASA)

Air Services between countries within SAARC are governed by a number of different bilateral agreements. Most of these are reciprocal in allowing either country to have an equal number of airlines operated to any one or more designated location by any one or more airlines designated by each country.

Within the seven countries in SAARC, there can be a maximum of 21 ASAs, if each of the 7 countries was to have ASAs with each of the other 6 countries. Table 17 shows the number of flights per week allowed in the present ASAs in the top right hand triangle of the table, while the weekly number of flights in operation at present is given in the corresponding opposite cell in the bottom left hand triangle of the same table (given in **bold italics**). The shaded empty cells in the diagonal of the table refer to domestic flights, which are not covered under ASAs and are also not the object of this study.

Table 17: Flights allowed by ASAs and presently operated between SAARC Countries (in one direction)

Country	B'desh	Bhutan	India	Maldives	Nepal	Pakistan	Sri Lanka
Bangladesh		2	60	X	n/a	n/a	3
Bhutan	***0***		49	X	7	X	X
India	***29***	***8***		40	60	24	7*5 (metros) others unlimited
Maldives	***X***	***X***	***4***		X	X	unlimited
Nepal	***7***	***3***	***41***	***X***		n/a	X
Pakistan	***4***	***X***	***14***	***X***	***2***		unlimited
Sri Lanka	***0***	***X***	***107***	***27***	***X***	***5***	

From Table 17 it can be seen that India has ASAs with all other 6 countries while Bangladesh, Nepal, Pakistan and Sri Lanka have with 4 other countries and Bhutan has with 3 other countries, while the Maldives has ASAs with only 2 other countries. Of the maximum of 21 possible ASAs between these countries, 14 are in place as indicated in Table 17.

Each of these ASAs is unique as they are separate bilateral agreements. However, in most cases an equal number of services are allowed to each country. In the case of Sri Lanka, many of the ASAs do not have specific limitations in the number of flights. Moreover, the Prime Minister of India has made an offer in the recently concluded SAARC summit at Dhaka to all other SAARC countries, without any prejudice to the existing rights, the facility of daily services to the six metro cities in India—Delhi, Mumbai, Chennai, Kolkata, Hyderabad and Bangalore—and unlimited access to 18 tourist gateways—Patna, Lucknow, Guwahati, Gaya, Varanasi, Bhubneshwar, Khajuraho, Aurangabad, Goa, Jaipur, Port Blair, Cochin, Thiruvananthapuram, Calicut, Amritsar, Vishakapatnam, Ahmedabad and Tiruchi.

This offer is on a reciprocal basis and is to be formalized through exchange of Diplomatic Notes. Acceptance of this offer would significantly open up the bilateral traffic rights between India and other SAARC countries. The steps taken particularly by India and Sri Lanka can be seen as important initiatives in opening up of the regulatory regime towards an eventual open skies policy within SAARC.

However, in reality, on many routes the number of flights allowed by the ASAs has not materialized due to the demand levels not been sufficient. In fact, two of these routes have been discontinued with the service between Paro and Dhaka as well as the service between Dacca and Colombo being closed due to commercial non-viability.

Routes on which capacity has been reached, such as from Colombo to many Indian destinations, the ASAs have been amended from time to time to accommodate the changing requirements. In each of these service arrangements, the service levels allowed by the bilateral service agreements have not been reached. However, some restrictions apply to the 6 metro cities identified by India namely, Delhi, Mumbai, Chennai, Kolkata, Bangalore and Hyderabad. The Male–Trivandrum service also has capacity demand.

8.1.2 Routes & Features of Services between Selected Gateways

As shown in Table 18, there are a total of 251 intra-regional flights in SAARC.

Table 18: Flights per week and passenger per annum between selected aviation gateways (in both directions)-2004

	1.Dhaka	2.Paro	3.Delhi	4.Mumbai	5.Chennai	6.Kolkata	7.Trivandrum	8.Bangalore	9.Trichy	10.Cochin	11.Hyderabad	12.Male	13.Kathmandu	14.Karachi	15.Lahore	16.Colombo
1.Dhaka			35,910	16,897		167,092							31,109	65,098		
2.Paro			9,606			9,840							8,474			
3.Delhi	2	3											264,346	62,750	34,780	81,406
4.Mumbai	2											1,693	16,269	77,476		75,225
5.Chennai																453,662
6.Kolkata	23	5											36,886			
7.Trivandrum												80,140				107,683
8.Bangalore													13,841			92,889
9.Trichy																84,876
10.Cochin																48,345
11.Hyderabad																26,288
12.Male				1			3									271,998
13.Kathmandu	7	3	31	2		3		2						17,364		
14.Karachi	4		3	5									2			36,018
15.Lahore			6													
16.Colombo			7	7	36		12	7	10	11	7	27		5		

On the bottom-right hand triangular half of Table 18 is a breakdown of the services operated at present between the 16 aviation gateways selected for this study. This shows that there are only 28 direct flight connections between them. After reducing for domestic travel within the country as shown by the shaded cells, it can be observed that only 28 of the other 83 cells are filled with flight details. This means that approximately only 1/3rd of the selected aviation

gateways have direct flight connections between them. Even among the top 8 of the gateways (Colombo, Delhi, Chennai, Mumbai, Male, Dhaka, Karachi and Kathmandu) there are only 15 direct flights from a total of 28 possible connections, which returns a Directness Index of around 54%, as opposed to 100% if all 8 gateways were connected to each other through direct flights.

It is only within the top 4 aviation gateways (Colombo, Delhi, Chennai and Mumbai) that there are direct flights between all of them and hence Directness Index of 100%. Moreover, between the 7 SAARC capitals, of a possible 21 direct connections only 9 connections (less than ½) are operative. The Directness Index in this case is a poor 43%. This clearly shows that direct connectivity between the capitals in particular is extremely deficient.

Table 19: Passenger Movements and related information on SAARC Corridors

From	To	Flights per week (One way)	Passengers in both directions 2004	Passengers in both directions 2001	% Increase of passengers 2001-2004	Distance (km)	Aircraft kms operated 2004	Passenger kms Carried 2004	Return Economy Fare ($)	Fare per km US$
	Delhi	2	35,910	13,357	169	887	184,496	31,852,170	$455.50	$0.26
	Mumbai	2	16,897	9,575	76	1,171	243,568	19,786,387	$509.00	$0.22
	Kolkata	23	167,092	163,297	2	146	349,232	24,395,359	$134.00	$0.28
	Kathmandu	7	31,109	47,153	-34	415	302,120	12,910,235	$224.00	$0.27
Dhaka	Karachi	4	65,098	68,712	-5	1,464	609,024	95,303,472	$546.00	$0.19
	Delhi	3	9,606	7,256	32	1,344	419,328	12,910,464	$630.00	$0.23
	Kolkata	5	9,840	4,727	108	550	286,000	5,411,725	$380.00	$0.35
Paro	Kathmandu	3	8,474	5,438	56	488	152,256	4,135,312	$488.00	$0.39
	Kathmandu	31	264,346	221,892	19	893	2,879,032	236,060,978	$300.00	$0.17
	Karachi	3	62,750	48,714	29	1,064	331,968	66,766,000	$247.00	$0.12
	Lahore	6	34,780	26,094	33	457	285,168	15,894,232	$163.00	$0.18
Delhi	Colombo	7	81,406	44,386	83	2,444	1,779,232	198,956,264	$570.50	$0.12
	Male	1	1,639	-						
	Kathmandu	2	16,269	21,733	-25					
	Karachi	5	77,476	92,259	-16	870	452,400	67,404,120	$200.00	$0.11
Mumbai	Colombo	7	75,225	29,424	156	1,530	1,113,840	115,093,485	$387.50	$0.13
	Chennai	36	453,662	318,493	42	668	2,500,992	303,045,882	$175.00	$0.13
	Trivandrum	12	107,683	104,420	3	360	449,280	38,765,700	$130.00	$0.18
	Bangalore	7	92,889	-		806	586,768	74,868,534	$174.00	$0.11
	Trichy	10	84,876	41,476	105	440	457,600	37,345,220	$139.00	$0.16
	Cochin	11	48,345	-		502	574,288	24,268,939	$156.00	$0.16
	Hyderabad	7	26,288	-		1,160	844,480	30,493,500	$300.00	$0.13
	Male	27	271,998	207,686	31	829	2,327,832	225,486,342	$220.50	$0.13
Colombo	Karachi	5	36,018	30,789	17	2,403	1,249,560	86,550,053	$325.00	$0.07
	Kolkata	3	36,866	21,866	69	643	200,616	23,704,838	$260.00	$0.20
	Bangalore	2	13,841	14,548	-5					
Kathmandu	Karachi	2	17,364	-						
Trivandrum	Male	3	80,140	69,509	15	671	209,352	53,773,605	$200.00	$0.15
TOTAL of Selected 16 Gateways		236	2,227,881	1,612,801	38		18,788,432	1,805,182,815		
TOTAL of all SAARC Gateways		251	2,301,051	1,640,774			19,534,528	1,834,045,795		
% in Selected Gateways		94	97	98			96	98		

The top-left hand triangular half of Table 18 gives the number of passengers travelling between two gateways. Each such route is referred to as a corridor. There are 28 such corridors considered in this study. Table 19 shows the details of these corridors. It should be

noted that of the 251 weekly return flights operated within SAARC, 236 (or 94%) flights are made between the 16 gateways that were selected, further justifying the method of selection.

As shown in Table 19, these 28 corridors saw airlines operating a total of 18.8 million kms in 2004, carrying 2.23 million passengers and producing a total of 1,805 million passenger kms.

The corridors also carried 36,602 tons of freight and produced 36 million freight tonne kms in the same year. This indicates that the average number of passengers in an aircraft is just above 100 and average freight load is 2 tonnes per aircraft movement.

As shown in Tables 18 and 19, much of the present demand for passenger travel within SAARC region is confined to routes that have a strong socio-cultural linkages, such as Colombo–Chennai (453,662 passengers) or Dhaka–Kolkata (167,092 passengers). Other strong linkages are Colombo–Male (271,998 passengers) for tourism (which of course is made up of passengers mostly from non-SAARC countries) and Delhi–Kathmandu (264,346 passengers) for trade and tourism. These four routes alone make up over 40% of the entire demand for intra-regional air travel within SAARC.

The heavy flows between Colombo–Trivandrum (107,683 passengers) is also indicative of the choice of passengers to fly to destinations that are the cheapest (i.e. instead of flying to Chennai) and thereafter taking cheaper surface transport. This traffic, mostly comprising of a wide cross section of people from all walks of life, would possibly have used the Talaimannar –Rameshwaran ferry were it still operational. Intra-regional corridors connecting the major commercial centres such as Mumbai–Colombo, Delhi–Dhaka, Delhi–Karachi, Dhaka–Karachi, Colombo–Karachi and Kathmandu–Dhaka are still of moderate traffic levels, ranging between 15,000 to 80,000 passengers per year. This shows that commercial and business travel within SAARC has still not grown to its full potential.

As regards freight, the flows on the 28 corridors and the associated service parameters are given in Table 20. The heaviest freight flows are centred on Colombo, which accounts for more than 50% of the intra-regional freight movements. The other gateways handling significant quantities of freight are Delhi, Mumbai and Dhaka. The heaviest freight flows are on the Colombo– Male corridor, followed by Colombo–Chennai. These have flows between 50 to 100 tons per week (both ways) per week. It is possible that these routes could be investigated for full freighter operations, rather than underbelly cargo transport only. Any lowering of costs could lead to new trade opportunities between these gateways. Unfortunately, corridors such as Delhi–Colombo or Kathmandu–Delhi, Bangalore–Kathmandu or Colombo–Bangalore that can only be connected with multi modal transport operations or expensive road transport have not yet developed large trade flows. Perhaps some attention on these corridors might be necessary to exploit the cost-effectiveness of air transport on such routes.

Table 20: Flows and associated details for freight flows between Selected Aviation Gateways

From	To	Tonnes 2004	Tonnes 2001	Distance (kms)	Growth 2001-04 (%)	Tonne kms 2004	Total Cost US$ per ton	Freight Rate US$ per Ton km
Dhaka	Delhi	1,436	601	139	887	1,273,289	510	0.57
	Mumbai	931	1,008	(8)	1,171	1,090,201	355	0.30
	Kolkata	1,429	2,217	(36)	146	208,634	130	0.89
	Kathmandu	300	411	(27)	415	124,500	500	1.20
	Karachi	1,386	2,707	(49)	1,464	2,029,104	520	0.36
Paro	Delhi	9	8	13	1,344	12,096	2,000	1.49
	Kolkata	15	9	71	550	7,975	1,000	1.82
	Kathmandu	24	6	300	488	11,712	1,000	2.05
Delhi	Kathmandu	2,742	2,079	32	893	2,448,160	480	0.54
	Karachi	485	327	48	457	221,417	-	-
	Lahore	512	189	171	2,444	1,250,407	500	0.20
Mumbai	Male	-	-	-	-	-	1,990	-
	Kathmandu	157	120	31	-	-	-	-
	Karachi	1,550	778	99	870	1,348,065	210	0.24
Colombo	Chennai	6,107	4,364	40	1,530	9,342,945	955	0.62
	Trivandrum	2,301	2,722	(15)	-	-	140	-
	Bangalore	559	-	-	668	373,412	280	0.42
	Trichy	36	51	(29)	360	12,960	155	0.43
	Cochin	348	-	-	806	280,488	240	0.30
	Hyderabad	258	-	-	502	129,516	275	0.55
	Delhi	1,316	733	80	1,160	1,526,560	975	0.84
	Mumbai	1,222	425	188	-	-	1,145	-
	Male	9,817	7,517	31	829	8,138,293	335	0.40
	Karachi	2,285	1,664	37	2,403	5,489,654	1,020	0.42
Kathmandu	Kolkata	191	340	(44)	643	123,071	310	0.48
	Bangalore	16	12	33	-	-	-	-
	Karachi	191	83	132	-	-	-	-
Trivandrum	Male	983	823	19	671	659,258	325	0.48
TOTAL of the 16 Selected Gateways		**36,602**	**29,188**	**25**		**36,101,715**		
TOTAL of all Gateways		**36,762**	**29,189**	**26**		**36,171,784**		

According to ICAO publications the estimated freight tonnes carried for 2004 on all international routes world wide was 23million tonnes. Thus, the movements within SAARC of 36,602 tonnes make up only 0.15% of this. This amounts to very low utilization of aviation for freight transport. However, it also stems from the fact that trade between SAARC countries also remain far below the desired levels.

8.1.3 Growth rates of Passenger & Freight Traffic

Passenger

Tables 19 and 20 also give the passenger and freight growth rates for the period 2001 to 2004. On the passenger side, the selected aviation corridors have recorded a healthy growth of 12% per annum, well above the projected averages for any region made by ICAO, the

maximum of which is 6.9% for Europe and for Asia/Pacific. The corridors with the highest growth have been those with moderate traffic levels where frequencies have been increased in recent times such as Colombo–Mumbai and Colombo–Trichy. These corridors have been subject to increased competition and have shown annual growth rates of over 30%. The major corridors, as well as those with moderate flows, with the exception of Dhaka–Kolkata and Mumbai–Karachi have also shown relatively high growth rates of 5-10% per annum. The smaller corridors on the other hand have shown mixed results with some growing (e.g. Kathmandu–Varanasi) and other shrinking (e.g. Kathmandu–Bangalore).

Freight

The freight traffic has also grown at a lesser rate of 7.5% per annum during this period. The largest corridors, namely Colombo–Male and Colombo–Chennai, have recorded around 10% growth rates, which indicate the potential for rapid growth in freight traffic as frequencies increase. The other corridors have had mixed results with the large majority experiencing moderate to high growth and a few experiencing moderate decreases. Sri Lankas' projected freight growth rate of 12.2% per annum for the period 2005–2009 has been cited as the 3rd fastest in the world according to the ICAO. All this indicates that increasing flights in the region will lead to a rapid growth in freight traffic by air within SAARC. This of course can be further developed by trade agreements and liberalizing trade barriers, which will in turn provide the base for sustaining such growth in the long-term. The recent free trade agreements signed between many of the SAARC countries is timely and an opportune time to harness the potential of existing freight traffic service by air within SAARC and even to venture into all-freighter services.

8.1.4 Fares & Rates

Passenger

The unit fare per km of travel between the selected SAARC aviation gateways is shown in Figure 1. The fare rate is computed from the published return economy fare as shown in Table 17. It can be observed that the unit rate decreases with distance as expected. The lowest rates are around US 10 cents per km with the exception of Colombo–Karachi which records US 7 cents. As there are very few discounted fares offered on these corridors, these rates are effectively the market rate. Compared to rates in Northern America and Europe and even in the East Asia, the rate per km is significantly higher for intra regional travel in SAARC. Even when compared to non-SAARC international routes, such as Delhi–Bangkok or Colombo–Hong Kong or to most European destinations, it is possible to get fares with much lower unit costs. The competition between airlines has forced the fares lower and many of them offer cut rates fares from time to time.

Moreover, as can be shown from the scatter plot in the figure, there are a set of corridors which are consistently around 50 to 100% more than the corresponding fare level for the same distance. The two groups (trend curves) of data points clearly separate corridors associated with particular gateways. The higher priced corridors are most often associated with Paro, Kathmandu, Kolkata and Dhaka. The corridors with the lower unit rates are associated with the busier gateways served by routes with more competition, such as Colombo, Delhi, Karachi and Mumbai.

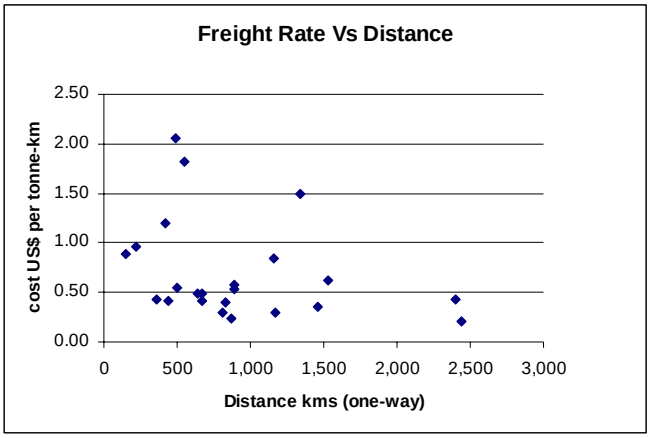


Figure 1

Freight

For freight traffic the corresponding Figure 2 shows similar trends with Paro, Kathmandu, Kolkota and Dhaka exhibiting higher costs on corridors associated with those gateways. The only exception is the Colombo–Chennai route that is also the heaviest freight corridor which shows 62 cents US where in terms of economies of scale should be lower.

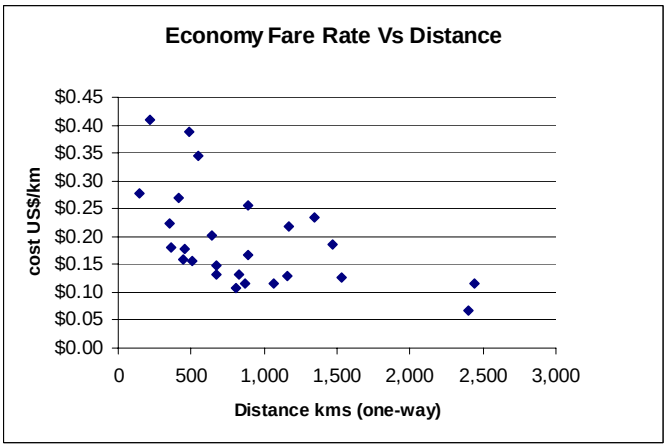


Figure 2

The lowest freight rates in the region appear to be around US cents 20 to 25 per tonne km, which when compared to maritime and railway freight charges are still significantly higher. However, these costs are competitive to road transport, especially when there are high costs associated with border crossings and delays.

8.1.5 External Barriers for the Growth of the Aviation Industry

World aviation statistics reveal that approximately 1/4th of all airline passengers' travel within Northern America or within Europe. A further 6% travel within Asia. This means that as economies grow and mature within a regional context, travel within the region also increases. Presently, due to past development trends, which have associated the SAARC region initially with Europe and more lately with East Asia, most airline operations from the selected gateways in SAARC are to these two regions.

However, Colombo, particularly after Sri Lanka signed of the trade agreements with India, has seen a phenomenal increase of around 30% per annum in traffic with India over the last 4–5 years. This clearly indicates the possibility of increasing mobility and connectivity between countries in the region when the barriers to travel and trade are been progressively lifted. There are two areas where the removal of external barriers will boost air travel within the region opening up more gateways, greater access to markets and cheaper costs. These are as follows:

- Need for streamlining of visa procedures for personal travel within the region, particularly for travel that will generate business and commercial activities. Some countries notably Nepal and Sri Lanka have taken initiatives in this regard, where visas are granted on arrival. The SAARC Visa Exemption scheme has been slowly expanding to cover more categories. However, it still covers only a very small fraction of travellers. This may be expanded so that at least regular bona fide passengers can have a special SAARC Visa obtained from their own governments; and
- Gradual removal of trade barriers between SAARC countries and free trade agreements between them.

8.1.6 Aviation Gateways and Hubs

Presently, the SAARC region has 20 gateways from which regional travel occurs and a further 5 airports handling sizeable international travel. For a region that has a population of over 1.4 billion, this works out to around one airport per 60 million persons. In mature economies such as Northern America and Europe and more recently in some countries in Eastern Asia and the Middle East, the number of airports has increased drastically. Europe has 91 gateways of a significant size, while Northern America has nearly 100. This means that eventual saturation requirements would be around one airport per 5 million persons. There are in fact 22 airports in the Middle East and 30 in Sub-Saharan Africa indicating a greater accessibility to airports in those regions when compared to SAARC.

It is therefore noted that SAARC region will need to embark on a plan to increase the number of airports starting with the 16 potential gateways over the next 15 years. This may be possible through upgrading some domestic airports to regional airports and in turn upgrading some regional airports to international airports.

For regional traffic to grow, the numbers of both these types of airports should increase. Domestic airports increase the accessibility to air travel and international airports can increase the viability of regional airports, as transfers can be undertaken through them. This can most effectively be performed through the development of regional aviation hubs. Presently, travel between those SAARC countries in the south of the region, namely Maldives and Sri Lanka, and those in the northern part of the region, such as Bangladesh, Nepal and Bhutan, is most often done through a hub located outside the SAARC region such as Bangkok, Doha or Dubai.

The identification of such hubs within SAARC is a complex issue and beyond the scope of this report. However, it is possible to consider the following aspects with respect to features of a hub in order to initiate some studies in this regard over the next 5 years:

- There should be a strong airline that can develop hub operations;
- There should already be several well-developed regional corridors from this airport;
- The locations should be such that international to regional flight transfers can be made frequently and cost effectively; and
- The airport must have capacity for expansion.

In this respect a preliminary recommendation is made based on the data available, to study the following gateways as potential regional hubs:

- *Colombo,* which has the largest amount of turnover of international and regional passenger combined and is the base for Sri Lankan Airlines;
- *Delhi,* which has the largest number of all passengers movements, including a wide network of domestic corridors and is the home to Jet Airways and Sahara Airlines; and
- *Mumbai,* which handles the largest number of international passengers in the region and has a strong domestic network and is home to Indian Airlines that is now to be merged with Air India, the airline that serves domestic and regional routes.

And potentially in the longer term future:

- *Dhaka,* which is an Eastern Gateway to SAARC region and which is home to Biman Airlines; and
- *Islamabad or Karachi or Lahore* with more regional and domestic operations with Pakistan International Airlines as a promoter.

It will also be strategic to initiate as many direct routes between SAARC capitals and major gateways in the region in order to improve the Directness Index. For instance there are many possible services, such as the following: a route between Male–Colombo–Buddhagaya–Kathmandu to cater to tourists who may wish to have different holiday experiences, as well as to promote inter-regional tourism and trade. Such a flight could be scheduled to coincide with connections to Delhi, Karachi and Mumbai from Colombo as a hub. Similar arrangements at other hubs may also be possible.

8.1.7 Skilled Persons for Aviation Industry

Because of the rapid development of the aviation industry, there is a need to develop regional training facilities for all grades of skilled persons. Airline pilots, flight engineers, ATCs, managers and logistics experts will be required to manage the expanded systems.

8.2 Description of SAARC Gateways

8.2.1 Dhaka (Bangladesh)

Along with Zia International Airport in Dhaka there are 7 other conventional full-scale airports in Bangladesh and 5 domestic airports. At present, there are air service agreements for all SAARC countries, except the Maldives. However, operations from Dhaka are only to three countries and five destinations—Kolkata, Delhi, Mumbai, Karachi and Kathmandu.

A total of 64 flights a week are operated between these airports with average load factors of 60–70%. Flights to Colombo and Paro were discontinued a few years ago due to commercial reasons. The ageing aircraft of Biman Bangladesh Airlines are reported to result in regular flight delays. In addition, Bangladesh has bilateral agreements with 38 other countries, of which 24 destinations are presently served. Dhaka–Chittagong and Dhaka–Sylhet are popular domestic routes, each having over 50 flights a week.

Biman Bangladesh Airlines (BBA), the state-owned airline company, operates flights on all established domestic routes, as well as its international flights. GMG Airlines is privately owned, operates domestic flights within Bangladesh on all established routes and has recently started limited international flights in the SAARC region.

The Dhaka Zia International Airport has two international and one domestic terminal. It has a runway of 3,200 x 46m. The airport extended its passenger terminal facilities recently and some additional passenger and cargo handling equipment has also been installed. This has resulted in improvements in both passenger and cargo handling and processing. A new warehouse has been built for better handling of export cargo. The airport handled 3,102,708 passengers in 2004.

Physical Barriers

There is scope for expansion by means of another runway at Dhaka. The fleet of F-28 aircraft are old with spares not being available. This is indicated as the primary cause of flight delays and cancellations.

Non-Physical Barriers

The airport has not yet developed modern passenger processing techniques or green channels for cargo inspection.

Measures to Address Barriers

In order to improve the services and for better maintenance, the Government has decided to engage the private sector in development at Zia International Airport (DAC). There is a programme for replacement of CVOR by DVOR and installation of new DME. A new terminal is being developed for export cargo.

8.2.2 Paro (Bhutan)

Bhutan has only one airport, located in Paro. It is about 2,200m above sea level and is about 65kms by road south-west of Thimphu, the capital city. The airport has a single runway with a length of 1,985m.

The high mountains that surround the Paro valley impose severe approach restrictions making the airport entirely dependent on visual flight rules (VFR) and effectively limiting airport operations to daylight hours. It is also closed during rainy or cloudy conditions, which often occur during the monsoon season. Strong winds in early spring also make it necessary to confine all take-off and landing activities to the early morning hours. Furthermore, the need for steep climbing after take-off makes it necessary to reduce aircraft payloads in response to temperature changes. The overall result is that severe delays and disruptions to scheduled

services are often unavoidable. Druk Air flights are often diverted to Kathmandu or Kolkata, sometimes with delays of days, rather than just hours. Given the various constraints aircraft utilization is estimated at only 3–4 hours a day, compared to global average of 15 hours a day.

Bhutan has bilateral ASAs with India, Nepal and Bangladesh, but has no air links with Pakistan, Sri Lanka and the Maldives. Following the signing of the ASA with India in 2005, it was agreed that India would allow Druk Air to operate flights to Mumbai, Chennai and Guwahati. This agreement also allows Druk Air to fly to Singapore and Dhaka after intermediate stops in India. The 2005 agreement provides Druk Air the opportunity to expand its flights to and from India from 12 to 49 flights a week. However, only 11 flights including the three through Kathmandu operate at present.

Druk Air is the designated airline of Bhutan. It has a limited fleet of older and smaller aircraft. The ASAs grant airlines reciprocal rights to operate flights in and out of Bhutan. However, no carriers from other countries operate flights to Paro due to the low passenger volumes and the operational limitations of Paro Airport.

Physical Barriers

The main constraint of the airport arises from its location. Since Paro Airport is positioned in a narrow valley surrounded by mountains, it can handle only smaller aircraft that can adjust to the highly restrictive runway approach. Due to the absence of ILS, the airport operates only in daylight hours and favourable weather conditions. Studies estimate that the airport can be used for only 300 days a year and remains inoperable for the remaining 65 days due to low cloud cover and rain.

While airport handing is reasonably quick and efficient with one plane, the services can get stretched when two planes (with about 200 passengers) either take-off or land at short intervals. The terminal gets crowded, visa counters are inadequate and the luggage conveyor belt is not large enough to accommodate the baggage for such groups. There is also a need for extra processing counters to handle large groups of passengers.

Non-Physical Barriers

There are difficulties for passengers in purchasing Druk Air tickets in other SAARC countries, other than in India and Nepal, due to lack of interline ticketing arrangements.

Measures to Address Barriers

As most of the physical problems are associated with the physical geography and topography, as well as climatic conditions, the solution is to build an alternative airport with instrument landing facilities and provisions for landing during the hours of darkness. The options for another airport where such conditions exist are to be explored at locations in south central part of Bhutan.

In July 2005, Bhutan announced that a feasibility study for the establishment of an all-weather international airport at Gelephu would be conducted. In addition, feasibility studies for regional airports in Bumthang in central part, Phuentsholing in the south and Yongphula in eastern Bhutan are also to be undertaken. The studies are expected to commence in 2006.

The only confirmed sector development in relation to infrastructure is the extension of the runway at Paro Airport by 160m and 120m on either end. This extension is needed to further ensure the landing and take-off safety of larger aircraft, like the Airbus A319. Once completed, it will help to ensure greater degree of safety.

8.2.3 Indian Airports

There are 14 airports providing gateways to SAARC destinations. Although there are 61 airfields in the country capable of supporting operations by B-737-300 aircraft, the top 10 airports handle 85% of the traffic. The concentration of traffic on Mumbai and Delhi airports in particular presents an imbalance—52% of the national traffic. Chennai, Kolkata and Bangalore airports account for another 22% of the traffic. The 9 aviation gateways in India selected for this study are as follows:

- Delhi;
- Mumbai;
- Chennai;
- Kolkata;
- Trivandrum;
- Bangalore;
- Cochin;
- Hyderabad; and
- Trichy.

India has ASAs with all of the other SAARC countries. This allows for the airlines designated by Sri Lanka daily services to 6 metro cities of Delhi, Mumbai, Chennai, Bangalore, Hyderabad and Kolkata and unlimited access to another 18 tourist gateways in India namely, Patna, Lucknow, Guwahati, Gaya, Varanasi, Bhubneshwar, Khajuraho, Aurangabad, Goa, Jaipur, Port Blair, Cochin, Thiruvananthapuram, Calicut, Amritsar, Vishakapatnam, Ahmedabad and Tiruchi.

The Air Services Agreement with the Maldives entitles both the countries to 1,800 seats per week in each direction, of which 200 seats are outside the bilateral entitlement. Recently the designated airlines of Maldives have been permitted to operate 7 flights per week to Chennai and Trivandrum, but as yet there is no service from the Maldives side.

The Air Services Agreement between India and Bangladesh entitles each country to 30 services per week in each direction to the specified points of call—Dhaka and Chittagong in Bangladesh and Kolkata, Mumbai and Delhi in India. Presently, Indian Airlines operates 3 services per week and Bangladesh Biman 24 services per week—i.e. 2 services per week each to Delhi and Mumbai and 20 services per week to Kolkata. In addition, GMG Airlines operates 6 services a week to Kolkata.

The Air Services Agreement between India and Pakistan allows the Indian Airlines and Pakistan International Airlines to operate 12 services per week on three designated routes; (i) Karachi and Mumbai; (ii) Karachi and Delhi and (iii) Lahore and Delhi. Presently PIA operates 3 services per week between Karachi and Delhi, 4 services per week between Lahore and Delhi and 5 services per week between Karachi and Mumbai, i.e. its full entitlement. Indian Airlines is operating only 2 services per week between Delhi and Lahore.

The Air Services Agreement between India and Nepal entitles each country to operate 6,000 seats per week in each direction with Delhi, Kolkata, Mumbai, Patna, Varanasi, Bangalore and Lucknow as points of call in India and Kathmandu and 3 other points to be specified for Nepal.

Bilateral air services agreement between India and Bhutan allows the designated airlines of Bhutan to intermediate 5th freedom rights to Kathmandu and beyond 5th freedom rights to Singapore, Dhaka and Bangkok. It is also agreed to add Guwahati as a point of call in India with beyond fifth freedom rights to Bangkok. Gaya already exists as a point of call in India for the designated airline of Bhutan. Flights to these agreed additional points are yet to be developed. Under the current arrangements, the frequency of flights per week has gone up to 49 from 12 all operated by Druk Air of Bhutan. The Indian carriers are entitled to 49 services per week but there is no operation by any Indian carrier yet.

The designated airlines of India are Air India, Indian Airlines, Jet Airways and Air Sahara. According to the present policy, only airlines with 5 years continuous experience in the domestic sector and minimum fleet size of 20 aircraft are permitted to operate on international routes. A number of domestic airlines have come up in the last few years. They will have to fulfil the requirements before they are considered for international operations, including on SAARC routes.

The Indian Country Report did not identify barriers by airport. As such, all Indian Airports considered in this study will be described together.

Physical Barriers

It is estimated that by 2010, international passenger figures will go up from the present level of 19.45 million to 35 million. Similarly for the domestic sector, the figure is set to rise from 20 million at present to 59 million in 2010. While the potential for growth in the civil aviation sector, both domestic and international, is immense, there are infrastructural hurdles that could stand between the potential and the actual achievement. The most significant of the physical constraints is the capacity for aircraft parking. As against current availability of 141 parking bays for domestic operations and 73 parking bays for international operations, orders placed by all airlines put together are 284 for domestic and 118 for international operations.

Table 21: Passenger Capacities of Selected Indian Airports and Present Demand

Name of the Airport	Airport Code	No. of International Passenger Terminals	Annual Capacity of each Terminal (in million)	No. of International Passenger per year in wards/out wards (2004)
Mumbai	BOM	3 (S)	12.90	5,499,862
Delhi	DEL	1	5.34	4,694,582
Chennai	MAA	1	3.00	2,346,019
Bangalore	BLR	1	0.50	678,206
Kolkata	CCU	1	0.88	607,555
Hyderabad	HYD	1	0.73	749,072
Trivandrum	TRV	1	1.12	872,516
Cochin	COK	1	n/a	1,006,072

Table 21 shows that Bangalore and Hyderabad airports are already saturated for the present levels of passenger handling. Several others will reach passenger handling capacities saturation over the next 5 years. Table 22 gives the corresponding values for freight handling. In this case there are no immediate capacity problems in the short term.

Table 22: Freight Handling Capacities of Selected Indian Airports and Present Throughput

Airport	Airport Code	No. of International Cargo Terminals	Annual Capacity of each Terminal MT	Sqm of each terminals	Tonnage Throughput per year (in MT) (2004)
Mumbai	BOM	1	407,000	47,000	273,265
Delhi	DEL	1	660,000	45,000	237,923
Chennai	MAA	1	230,000	23,000	146,443
Bangalore	BLR	n/a	n/a	n/a	64,433
Kolkata	CCU	1	146,000	5,000	30,529
Hyderabad	HYD	n/a	n/a	n/a	13,924
Trivandrum	TRV	n/a	n/a	n/a	22,287
Cochin	COK	n/a	n/a	n/a	18,210

Due to runway and ATC constraints (Delhi and Mumbai airports have single runways); the number of flights that can be handled per hour at major airports is lower than the international standards. As a result, there are frequent delays at airports, particularly during the peak hours.

Non-Physical Barriers

The non-physical barriers identified in the country report were as follows:

- There is a shortage of pilots and flight engineers to keep pace with the anticipated growth. This is already apparent, but could be exacerbated by the scorching pace of growth;
- The airport charges are higher in India compared to the charges in the nearby regions. Although low cost airlines have made an entry, the tariffs offered by them are not as low as those offered by low cost airlines in the Gulf and South East Asia; and
- The average import dwell time in the international cargo terminal is about 185 hours, which is on the high side. There is no green channel facility at the Cargo Terminal for cargo movement, including those to SAARC countries. Only the cargo coming in from the Export Processing Zone/100% export unit is not examined by the Customs.

Measures to Address Barriers

Significant efforts have been made to modernize and enhance the airport infrastructure. Two Greenfield airports at Bangalore and Hyderabad are under construction and are likely to be completed by 2008–09. Final decisions on the restructuring of Delhi and Mumbai airports are expected shortly. The other projects currently underway are shown in Table 23.

Table 23: Development Projects at Indian Gateway Airports

Airports	Status
Delhi	New International Terminal Complex Phase II will be completed. Installation of automatic storage and retrieval systems for import handling in conceptual stage. New conveyor belt for cargo handling also in conceptual stage. 6 parking stands to be added by October 2006.
Mumbai	International courier terminal in tender stage; new heavy cargo wing and common user domestic cargo terminal in design stage. New automatic storage and retrieval system for import handling in conceptual stage. 7 parking stands to be added by June 2006.
Chennai	New International Terminal Complex Phase II will be completed. Integrated Cargo terminal Phase III for imports in planning stage. Construction of a common user cargo terminal for domestic use in design stage. 3 parking stands to be constructed by July 2006.
Kolkata	New International Departure building is to be constructed. Apron extension. Metro link over head corridor is to be constructed. New Integrated Cargo Terminal- Phase I under construction. State-of-the–art centre for perishable cargo to be constructed. New automatic storage and retrieval system for import handling in conceptual stage.
Trivandrum	New International building is to be constructed.
Bangalore	Expansion and modification of terminal building to be completed. Greenfield airport.
Hyderabad	Extension of apron. Extension of arrival terminal. Greenfield airport.
Cochin International	Privatise the Airport.

In addition to these, mechanization of cargo handling with implementation of ICNS and web based EDI & and bar coding is in progress at all metro airports.

It should be noted that the Indian Government has approved the privatisation of the main airports on the basis of concession agreements. Under these arrangements the concessionaire will be responsible for all airport infrastructure development on a BOT basis. Tendering has been completed for both Delhi and Mumbai airports.

In addition, the Government of India is attaching importance to the following developments of the aviation sector:

- Adoption of a comprehensive Civil Aviation Policy;
- Augmentation of Airport Infrastructure with greenfield airports at Bangalore and Hyderabad, restructuring of Delhi and Mumbai airports and 30 smaller cities identified as candidates for Public Private Partnership airport projects;
- Augmentation of manpower by capacity enhancement for pilot training with a new National Flying Training Institute being proposed at Gondia and continued Government assistance to Flying Clubs/Aero Clubs;
- Strengthening public sector airlines—Air India and Indian Airlines with induction of new modern fleet;
- Encouraging Indian carriers to optimally utilise the bilateral traffic rights to various countries;
- Gradual liberalization of the bilateral traffic rights with foreign countries on key traffic routes;
- Gradual liberalization of the charter regime;
- India has a unilateral Open Sky Policy for cargo and is encouraging other countries to also allow reciprocal open sky rights for cargo movement to the Indian carriers;

- Encourage competition in all aspects of air services so that the traveling people have greater choices available at affordable cost; and
- Ensure a sound Safety and Security System in Civil Aviation.

8.2.4 Male (Maldives)

Aviation is the most important mode of travel between the Maldives and other countries. However, the Maldives is connected directly by air to only two of the SAARC countries. The established air routes are between Maldives and Sri Lanka, and Maldives and India, by Male –Colombo and Male–Trivandrum routes respectively.

Malé International Airport is the only airport serving international passenger flights at the moment. The main runway at Male International Airport is 3,200m in length and has a peak hour landing and takeoff of 20 flights. One of the domestic airports, Gan Airport, has now been upgraded and renamed as Gan International Airport and it is now ready to service international passenger flights, but as yet there are no such services. The Male International Airport is located in Hulhule Island near the capital Male' serviced both scheduled and chartered flights from 36 airlines in 2004. As the country's biggest industry is tourism, flights from Europe, the Far East, Asia and Middle East are frequent with over 700,000 travellers from various countries using the airport in 2004. The domestic passenger traffic is smaller and amounts to about 300,000 passengers each way.

The Maldives has entered into ASAs with Sri Lanka and India. There are more than three daily flights operating on the Male–Colombo corridor. The two established airlines, Sri Lankan and Emirates operate 54 flights weekly in this route with an average occupancy of only 57%, which is quite low in international terms mostly due to flights coming from Europe and Middle East serving both Male and Colombo. On the other hand, the Colombo–Trivandrum corridor has seven flights every week operated by Indian Airlines in each direction with seat occupancy levels of over 80%. It should be noted that during the holiday season the occupancy is 100% for several days with waiting lists for flights. The main reasons why passengers travel on this route are for medical, studies and vacation purposes. However, the fact that Air Maldives the designated airline of the Maldives does not operate to any international destination does not give the Maldives adequate leverage to respond to demand increases.

On the other hand, over 4,500 domestic flights were operated by the state-owned Island Aviation Services between the four domestic airports and the Male' International Airport in the year 2004. There were over 60,000 flights by sea planes operated by two private companies, between the float plane platforms of the International Airport and the resort islands.

Physical Barriers

There are delays at times during security screening when the number of passengers to be processed exceeds three flights concurrently. The terminal at these times becomes congested and lacks proper services. The forecasts show that with traffic increases in the near future, the existing terminal building will be too small to meet the anticipated demand.

With regard to freight, the cargo handling area needs to be expanded with additional infrastructure. There is no green channel. The limited processing space for the import cargo

and export cargo is the main identified problem. As there are significant amount of perishables imported from the India and Sri Lanka, and frozen fish is exported to Sri Lanka and other countries, an appropriate cold storage area was also identified as being required.

Non Physical Barriers

The passenger traffic between the two gateways, Colombo and Trivandrum, is operating with high occupancy levels. The service between Trivandrum and Male' in particular needs an increase in the capacity by having additional flights. It should be noted that this should be done at least for the peak seasons.

Measures to Address Barriers

As the tourism sector continues to dominate the Maldivian economy, development of the aviation sector is vital. The international airport in Hulhule' island had several development plans and continues to implement them. A Master Plan is scheduled and the bidding process is underway now. The terminal building is now being shared for both the domestic and international flights and the cargo terminal is operating in excess of its design capacity. Under the ongoing development projects in the airport, the following services are planned to be developed or to be rebuilt:

- An Extension of the Departure Terminal;
- A new Domestic Terminal;
- A Control Tower, including new Air Traffic Service Building;
- A new power station with new HV distribution network; and
- Extended range VHF communication system.

8.2.5 Kathmandu (Nepal)

Nepal has only one international airport in Kathmandu—the Tribhuvan International Airport (TIA). The runway dimensions are 3,300 x 45m. Flight operations are mostly confined to daylight hours, though recently flights have begun operation after 18:00 hrs. The Civil Aviation Authority of Nepal has developed a modern cargo complex for import and export traffic. This terminal is 7,700sqm at ground and level with 2,500sqm at a second level, totalling 10,200sqm. The full design capacity of the terminal is 24,000 tonnes exports and 12,000 tonnes imports. It is anticipated that this will be sufficient to cope with the demand for the next 10 years. The passenger flows exceeded 1.5 million in 2004 and the cargo movement from the airport reached almost 19,000 tonnes in 2003.

There are six regional corridors from Kathmandu——namely to Dhaka, Kolkata, Paro, Delhi, Mumbai and Bangalore. The most popular corridor is with Delhi having 40 flights a week in each direction followed by Dhaka with 9 flights. The designated airlines of Nepal are Royal Nepal Airlines and Cosmic Air.

Physical Barriers

Though there is sufficient capacity at the passenger terminal at TIA, the current scheduling leads to delays and a negative image, in particular, to international passengers. The procedures of X-raying on entry, the payment of airport tax, immigration, and x-raying prior to the gates all result in long queues at peak times of activity, whereas at other times the

facility is almost unused. In addition, there is a shortage of gate lounges during these peak periods. This will constrain future growth unless rescheduling takes place or practices are changed.

Non-Physical Barriers

The country report has not identified any specific non-physical barriers, though it should be recognised that the queuing problem is as much non-physical as physical.

Measures to Address Barriers

The airport has sufficient capacity to handle the forecasted traffic provided that the load could be spread more evenly over the day. The current congestion problems arise due to the concentration of flights between 1200–1500 hrs. Whilst it is recognised that some timings relate to connectivity through hub airports such as Bangkok, nonetheless there should be some scope to spread the loadings.

The passenger terminal is not of a modern design sufficient to handle tourist traffic in particular. In addition to resolution of the queuing problems mentioned above, the layout and facilities within the main passenger departure area are poor and underutilised, whereas the boarding gate area is over utilised. Thus, there is some scope for replanning the layout to make it more effective.

8.2.6 Karachi and Lahore (Pakistan)

Currently among the 25 operational airports, Karachi and Lahore serve as the main hubs for air travel activities involving international/domestic traffic, followed by Islamabad, Peshawar and Quetta. Modern airport terminal complexes at Karachi and Lahore have been developed on the concept of satellite systems as far as infrastructure facilities and services are concerned. Karachi has two runways of 10,500 x 150 feet and 11,155 x 148 feet. Lahore also has two runways 10,860 x 151 feet and 9,515 x 151 feet respectively.

Pakistan has ASAs with India, Bangladesh and Sri Lanka. It operates flights to all three countries. Pakistan International Airlines is the designated airlines of Pakistan.

Physical Barriers

The physical issues involved in Pakistan's aviation sector are identified as follows:

- Though air terminal complexes at both the airports have been constructed at Karachi and Lahore with ample capacity, these airports lack cargo centres and adequate cargo handling equipment; and
- Lack of modernisation of security systems at all airports with state-of-the-art equipment to ensure safety and security.

Non Physical Barriers

The main non-physical barriers are as follows:

- The Civil Aviation Authority of Pakistan has assumed a dual role. It is the service provider as well as the regulator for the air transport sector in Pakistan. Thus, there are times when there may be a conflict of interest with the dual role of CAA;
- The higher user charges at airports have resulted in bankruptcy of many new airlines and many foreign airlines have stopped coming to Pakistan;
- The landing charges for different types of aircrafts at different airports in Pakistan are much higher than in other countries of the region and thus need to be rationalized; and
- Existing training facilities for technical, operational and ground personnel needs to be upgraded to produce professionally sound work.

Measures to Address Barriers

Pakistan has an aviation policy that includes:

- Encouraging competition through optimisation of the number of private airlines services. An open sky policy based on reciprocity principles and bilateral agreements are proposed to be adopted. This policy mainly aims at liberalization of air travel market to attract more foreign airline operations in Pakistan;
- Conditions to be made conducive for increasing the number of freight airline operators; and
- Encouraging private sector investment in the development of new airports on a BOT basis. Cargo handling facilities and security system also need to be modernized at the airports.

There is lack of infrastructure/terminal facilities for cargo services at the major international airports (Karachi and Lahore, etc.) in Pakistan. Realizing this, the CAA is executing projects to augment the capacity of the Jinnah Terminal at Karachi and the New Terminal Complex at Lahore where facilities are being established for the supervision of cargo export. The on-going works would be continued/completed during the next five years. In addition to the on-going projects, CAA plans to undertake a number of major development projects during the next five year plan (2005–10).

8.2.7 Colombo (Sri Lanka)

There are 13 domestic airports in Sri Lanka and its only international airport, the Bandaranaike International Airport (BIA) is located north of Colombo City. BIA is operational 24 hours each day and is managed by the state-owned Airport and Aviation Services (Sri Lanka) Ltd. (AASL). The runway is 3,350 x 45m and the airport has recently made operational its first pier with 10 air bridges. Its cargo handling areas are over 36,000sqm.

During 2004, 37 international airlines, including 8 cargo airlines, operated in Sri Lanka. The number of passengers who passed through the BIA and freight tonnage handled increased by 25% and 18% respectively in 2004. There has also been a growth in transit passengers of 26% per annum during the last six years.

Sri Lanka has entered into 59 bilateral air services agreements under the Government's pursuit of a liberalized market access on a reciprocal basis, four of which are with SAARC countries, namely India, Maldives, Pakistan and Bangladesh, though there are presently no flights with Bangladesh.

Sri Lanka had direct flights between 3 other SAARC countries in 2004 with 106 direct flights per week to 10 Indian cities with 5 flights per week to Karachi in Pakistan (with 2 more negotiated last year) and a further 27 flights per week to the Maldives. Chennai in India had the highest number of flights to a single destination amounting to 36 flights per week. Sri Lankan Airlines (UL) is the only designated airline for Sri Lanka. It has a fleet of 14 wide body aircraft in service at the moment.

Physical Barriers

The facilities that will be inadequate for the next 5 years, e.g. by around 2010, are identified as the passenger terminal (building and apron), car parks, air navigation systems and utilities (i.e., power, water, sewage).

The ground access to BIA is not ideal. The fact that it is located 32kms from the commercial centre of Colombo and not in close proximity to any centre of tourist attraction has not enabled BIA to develop to its full potential as a transit point.

While a number of different locations have been studied for a second international airport in Sri Lanka, over the years, the area identified for this purpose is in the southern part of Sri Lanka. An initial location in Kuda Oya was investigated in 2004, but a new location further towards the coast in the vicinity of Weerawila is now being investigated. This is expected to attract charter flights to begin with, as it is closer to the popular tourist areas in the south. Preliminary estimates have forecasted that 5% of the total national passenger traffic could be diverted to a 2nd airport within 15 years of commencement of operations.

Non-Physical Barriers

The following non-physical barriers have been identified:

- High Ground Handling Charges—as the exclusive rights for ground handling have been given to the national carrier, the high level of their ground handling charges are considered to be discouraging other carriers from calling at BIA. However, the monopolistic situation which has been given to Sri Lankan Airlines is to be terminated from 31st March 2008. Thereafter, the Government will be in a position to create another ground handler in order to provide a competitive environment and consequent reduction in ground handling charges;
- Low Cost Carriers—given that the per capita incomes of the vast majority of people in most SAARC countries is well below that which enables air travel, it is considered most advantageous to introduce low-cost airlines in the SAARC region to tap in to this vast market. It is held that such an initiative would result in a phenomenal increase in air travel within the SAARC region. The Government has already taken some initiatives in this regard with the Civil Aviation Authority having granted provisional license for 3 local operators to commence operations to Indian destinations for a predetermined period in order to evaluate their performance;

- Fully-fledged Open Skies policy for Passenger Travel—presently, most passenger air services within SAARC countries are operated under bilateral agreements. With the exception of Maldives, all other bilateral agreements with Sri Lanka stipulate traffic restrictions to other destinations by restricting 5th freedom of traffic rights. This hinders the commercial viability that could sustain the development of air services between points in SAARC countries that may have lower traffic loads at present;
- Liberalisation of Air Services—another persistent problem in the region has been identified as the protection offered to State-Owned airlines, especially when it is the foremost designated airline of a country. The consequent need and opportunity to monopolize a given market does not permit other smaller carriers to enter and offer lower cost service. This is considered a major impediment for developing air routes connecting Sri Lanka to other SAARC destination to its true potential. This is well-illustrated by the rapid growth of air travel with India since 2001 that has topped 45% p.a., when carriers other than the two state owned airlines were designated as national carriers. The fares on most routes have reduced, while frequencies have tripled and destinations have doubled from 5 to 10.
- Attracting major Airlines—Sri Lanka faces several deficiencies in attracting major airlines. Of them, insufficient related infrastructure and inadequate ancillary services, such as high cost bunkering services, poor road transportation and insufficient accommodation constitute the major shortcomings. This has inhibited Sri Lanka from emerging as a main hub, harnessing its strategic geographical advantage.

Measures to Address Barriers

The following measures are being undertaken to address these barriers:

- Sri Lanka has embraced a progressive policy of foreign charter and freighter operators being allowed operations to Sri Lanka under an ‘open skies’ policy;
- The plans for a second airport are being pursued; and
- There are plans to develop the BIA at Colombo under continuing Japanese assistance.

8.3: SAARC Regional Aviation Gateways: Major Barriers and Measures at a Glance

SAARC Regional Aviation Gateways (16)	Physical Barriers	Non-Physical Barriers	Measures to Address Barriers
▪ Dhaka, Paro, Delhi, Mumbai, Chennai, Kolkata, Trivandrum, Bangalore, Trichy, Cochin, Hyderabad, Male, Kathmandu, Karachi, Lahore, Colombo	▪ Passenger and freight travel by air is expected to increase rapidly, especially if some of the present barriers are removed. There will be a capacity problem at airports for both passengers and cargo. ▪ Low use of air travel when compared to population and economic conditions in the region. ▪ Presently, travel within the region lacks directness requiring many transfers, sometimes having to go outside the region. ▪ Aircraft fleet is old in Bangladesh needs replacement.	▪ Presently, air fares are high when compared to other regions, especially on routes connecting Bhutan, Bangladesh and Nepal. ▪ Airport charges are considered high when compared to other regions. ▪ Visa restrictions discourage travel within the region. ▪ Male-Trivandrum route has high load factors.	The Measures to address Physical Barriers are: ▪ Need to expand existing facilities by additional runways (e.g. Dhaka), parking areas (e.g. most Indian airports) passenger processing areas (e.g. Delhi, Bangalore, Chennai, Hyderabad, Male, Kathmandu); cargo processing facilities- including 'Green Channel' and cold storage (e.g. Male, Karachi, Lahore & Dhaka), security systems (e.g. Karachi & Lahore) and baggage handling facilities (e.g. Paro, Kathmandu). ▪ New airports (e.g. 2nd airport for Sri Lanka, Bhutan), encourage 'greenfield' airports with private sector investments; upgrade existing domestic airports to regional airports, so that there are at least 40 regional airports within 10 years. ▪ To undertake a regional study to facilitate the formulation of regional aviation hubs at selected gateways. The Measures to address Non-Physical barriers are: ▪ To widen the existing SAARC visa exemption scheme so that regular bona fide passengers can travel freely and more often. ▪ There is a need to introduce an 'open skies policy' within the SAARC region in order to promote more liberalization and competition on routes within SAARC. ▪ Undertake studies to improve airport management efficiencies and reduce costs and to make airports managed as commercial agencies rather than regulatory agencies. ▪ Each country to promote at least one 'low-cost' operator. ▪ Encourage freighter operations on routes that have sufficient cargo demand (e.g. Colombo–Male) or Colombo–Delhi where other means are multi modal and not cost effective. ▪ Increase flight frequencies between Male and Trivandrum. ▪ Bangladesh may require either public or private investment to upgrade its fleet of aircraft.

9.0 DEVELOPMENT OF ROADMAP

The main goal of the SAARC Regional Multimodal Transport Study (SRMTS) is to enhance the regional transport connectivity among SAARC member States. To this end, the key corridors/gateways that are of prime importance to SAARC countries were identified in Chapter 3 of this report. Out of these corridors/gateways, it is important now to identify the particular corridors/gateways that are of specific interest to each member state of SAARC. For this purpose, it was necessary to develop a definitive approach that could be applied in identifying the corridors/gateways that are of specific interest to particular member States of SAARC.

9.1 The Approach and Modal Features

Before the creation of independent states from the British India in 1947, the transport system of South Asia, particularly of the mainland countries, was highly integrated. Following independence, the transport system got disrupted and border crossings became difficult, time consuming and costly. As a result, the transport system of the mainland countries of South Asia developed only in a national context, with little consideration given to cross border issues of compatibility, uniformity of standards in infrastructure and equipment design. Similar problems however, did not occur in island states. To achieve the long term objectives of SRMTS, the regional connectivity of the transport system of the mainland countries need to be re-established. Transport infrastructure and their capacities need to be augmented to cater to the increased traffic that is likely to move along intra-regional corridors. To be able to identify the specific corridors that are of interest to a particular country, it is necessary to take into account the sectoral developments that have taken place during the last decade in the transport system in the different modes, such as the following:

- *Road Transport*, particularly trucking, has become the most dominant mode of transport in the region catering to more than 65–70% of the movement in India, Bangladesh and Pakistan. In the case of Nepal and Bhutan the percentage is still higher. Due to the further development of door-to-door services and better availability of the road transport, its dominance is set to continue in the future;
- *Air Transport* had a phenomenal development serving a large number of origin and destination points. Given its superior nature of service in terms of speed and comfort, the rapid expansion is also expected to continue in the future;
- *Maritime Transport* continued to grow and has been catering to the movement of international trade, both bulk and containerized barges. Maritime transport usually caters to large shipments in order to benefit from the ‘economies of scale’, except in those cases where the geographical locations involve shorter distances, such as between India, Sri Lanka and Maldives. Continued growth in containerisation is expected with more through inland transport movements;
- *Rail Transport* has been facing a tough competition from various modes of transport, especially the road transport. Rail transport is considered cost effective, fuel efficient, and an environment friendly system for transportation of medium and long distance bulk and containerized cargo and/or containers. Post 1947, the British Railway system, which spread across South Asian mainland, got distributed in different railway networks disconnecting the regional linkages primarily in India, Pakistan and Bangladesh. The historical regional rail linkages gradually paved way to the growth of national railway systems and restoration of inter-country movements. As the intra-regional trade grows, the regional rail connectivity would assume greater importance

to tap the huge growth potential for movement of goods and passengers amongst the SAARC member state; and

- *Inland Water Transport (IWT)* has been facing an acute problem of heavy siltation and lack of regular dredging. As a result, IWT has been gradually losing its importance as a low-cost, bulk traffic carrier. However, IWT has great potential for carrying intra-country traffic that needs to be explored by removing all physical and non-physical barriers.

Another element that needs to be considered as part of the approach is the potential intra-regional traffic demand for both freight and passengers. Although in the SAARC region the intra-regional trade has been only about 5% of their total export traffic, there is great potential for its enhancement. With the political environment becoming more supportive, SAFTA on its way to getting implemented in full and the transport system becoming fully integrated for through-movement across the borders, intra-regional traffic is expected to grow faster. With regard to intra-regional passenger movement, there too exists a great potential that should be tapped.

Keeping in view the above developments taking place in the transport sector, as well as the potential intra-regional traffic that can be anticipated, an attempt has been made to establish the new regional connectivity by choosing the specific mode of transport, in accordance with the following guidelines/strategies:

- *Road Transport* services to be used primarily for short haul, particularly for bilateral trade;
- *Rail Transport* services to be used for medium to long haul services, including region-wide services;
- *IWT* for medium to long haul services, primarily providing low-cost services for bulk cargoes;
- *Maritime Transport* to be used for providing access to global markets, as well as to provide connectivity to island countries; and
- *Air Transport* shall continue to serve both business and tourist segments of the passenger markets, often for medium to long distance.

9.2 Regional Connectivity

All SAARC countries are supportive of regional connectivity, but the reasoning is different. These reasons can be grouped under the following three headings:

9.2.1 Meeting Trade and Mobility Requirements of Landlocked Countries

Nepal would benefit from:

- Access to appropriate gateways/sea ports such as Kolkata/Haldia for trading with North America and Asia; Mumbai for trading with Europe and Middle-east and access to Chittagong and Mongla ports as alternatives;
- Suitable corridors for bilateral trade with India; and
- Suitable corridors for trading with Bangladesh and other SAARC countries.

Bhutan would benefit from:

- Access to appropriate gateways/seaports, such as Kolkata/Haldia;
- Suitable corridors for bilateral trade with India; and
- Suitable corridors for trading with Bangladesh and other SAARC countries.

9.2.2 Meeting the Specific Trade and Mobility Requirements of the three larger Mainland Economies of South Asia

India would benefit from:

- Efficient road and rail freight corridors for bilateral trade with Pakistan and Bangladesh, as well as operationalisation of passenger rail corridors with Bangladesh;
- Further strengthening the existing corridors with the neighbouring countries; and
- Short-cut connectivity to North East States of India through/across other SAARC countries.

Pakistan would benefit from:

- Efficient corridors for bilateral trade with India; and
- Suitable corridors for bilateral trade with other SAARC countries.

Bangladesh would benefit from:

- Efficient corridors for bilateral trade with India;
- Suitable corridors to link landlocked countries and regions; and
- Suitable corridors for bilateral trade with other SAARC countries.

9.2.3 Meeting the Specific Requirements of SAARC Island Countries

Sri Lanka would benefit from:

- Suitable maritime and railway transport links with other SAARC countries for trade and supply of essential commodities; and
- Efficient air transport links to attract tourists from both SAARC countries, as well as the global market.

Maldives would benefit from:

- Suitable maritime transport links with other SAARC countries for seaborne trade and lifeline supply; and
- Efficient air transport links to attract tourists from both SAARC countries, as well as the global market.

A challenge facing the SRMTS is to select the corridors that would cater to the above specific requirements of each SAARC country, while contributing to the enhancement of overall connectivity of the region. The outcome of this exercise is presented at Table 24.

Table 24: List of Corridors/Gateways that could meet specific requirements of SAARC Member States

Corridors/Gateways		Particular Corridors/Gateways ** which are of specific interest to different SAARC States						
		Bangladesh	**Bhutan**	**India**	**Maldives**	**Nepal**	**Pakistan**	**Sri Lanka**
Road Corridors	Corridor Nos	1, 4, 5, 6, 8 and 9	3 and 8	1, 2, 3, 5, 6, 7, 9 and 10	—	1, 2, 7 and 10	1, 2, 3 and 7	2 and 3
	Reasons for selection of specific corridor	• Efficient bilateral trade corridor • Port access to landlocked States, regions • Shorter corridor for landlocked region	• Port access to landlocked States	• Efficient bilateral trade corridor • Port access to landlocked States, regions • Shorter corridor for landlocked region	—	• Efficient bilateral trade corridor • Port access to landlocked States, regions	• Efficient bilateral trade corridor • Port access to landlocked States, regions	• Port access to landlocked States, regions
Rail Corridors	Corridor Nos	1 and 4	—	1, 2, 3, 4, and 5	—	1, 3 and 4	1 and 2	5
	Reasons for selection of specific corridor	• Intra-regional connectivity - with Nepal, Pakistan and India • Shorter corridor to the landlocked countries/region. • Efficient bilateral trade and accessibility to additional ports and ICDs		• Efficient bilateral and intra-regional trade corridors • Accessibility to new ports – e.g. Karachi, Chittagong • Shorter transit time and distance for bulk and containerized cargo • Shorter access to it's North Eastern states • Restoration of ferry cum rail link with Sri Lanka		• Growth of bilateral and third country trade through these corridors • Access to additional ICDs and ports • Additional alternative rail corridor for intra-regional traffic • Shorter transit time and distance	• Efficient bilateral and intra-regional trade corridors • Reduction in transit time and distance • Possibility of transporting third country traffic • Accessibility to additional ICDs, markets and ports	• Growth of bilateral and intra-regional traffic • Restoration of historical rail cum ferry link • Access to major markets, ICDs and ports
IWT Corridors	Corridors Nos	1 and 2	—	1 and 2	—	—	—	—
	Reasons for selection of specific corridor	• Efficient bilateral and transit corridor • Provides low cost service for bulk cargo	—	• Efficient bilateral and transit corridor • Provides low cost service for bulk cargo.	—	—	—	—

Corridors/Gateways		Particular Corridors/Gateways ** which are of specific interest to different SAARC States						
		Bangladesh	**Bhutan**	**India**	**Maldives**	**Nepal**	**Pakistan**	**Sri Lanka**
Maritime Gateways	Gateways Nos	1 to 10	3 and 4	1 to 10	1, 3, 6, 7, 9 and 10	3 and 4	1 to 10	1 to 10
	Reasons for selection of specific gateway	Efficient Gateway for bilateral trade with SAARC countries	Access to appropriate Gateways	Efficient corridor entry/exit for bilateral trade and passenger traffic with neighbouring countries	Suitable maritime transport links with other SAARC countries	Access to appropriate Gateways	Efficient Gateways for bilateral trade with SAARC countries	• Efficient maritime links with other SAARC countries • Suitable corridor for passenger transport with India
Aviation Gateways	Gateways Nos	Dhaka	Paro	Delhi, Mumbai, Chennai, Kolkata, Trivandrum, Trichy, Bangalore, Cochin, Hydrabad	Male	Kathmandu	Karachi, Lahore	Colombo
	Reasons for selection of specific gateway	Scheduled services to other SAARC Gateways	Scheduled services to other SAARC Gateways	Scheduled services to other SAARC Gateways	Scheduled services to other SAARC Gateways	Scheduled services to other SAARC Gateways	Scheduled services to other SAARC Gateways	Scheduled services to other SAARC Gateways

** For details of the corridors/gateways, please see Chapter 3; Tables 4, 6, 8, 10 and 12

9.3 Road Map for Developing Regional Connectivity

The Corridors/Gateways listed in Table 24 were subjected to intensive scrutiny in Chapters 4 to 8 to identify the physical and non-physical barriers/choke points and the type of measures that could be adopted to address the choke points. In this section, an attempt was made to prioritize the barriers/choke points that need immediate action within a short time so that some visible improvements could be made at affordable costs. The next step was to suggest those actions which could make tangible impacts on the choke points. The outcome of this exercise is presented, corridor-by-corridor or Gateway by Gateway in Table 25.

Table 25: Roadmap for Developing Regional Corridors/Gateways

Sl No.	Corridors/Gateways	Barriers and Reasons for action	Actions needed	
			Short-term (2006-2010)	Medium term (2011-2015)
SHC 1	**Road Corridor No 1:** Lahore–Delhi–Kolkata–Dhaka–Agartala (2,453kms)	(i) Absence of an agreement for transport movement across Benapole/Petrapole makes the border crossing extremely costly requiring transhipment of goods;	(i) Within a Regional Framework, a bilateral agreement between India and Bangladesh is needed for allowing reciprocal movement of vehicles and goods across the border;	
		(ii) Border post at Benapole/Petrapole works for limited hours in a day and does not work over week-ends. This causes delay in cargo clearance and leads to congestion. Again, only 300 trucks are cleared per day while several hundreds continue waiting to deliver goods. Such a working system has adverse impacts on transport costs;	(ii) Provision of 24 hours and 7 days customs service, with built in transparent inspection procedures; and strengthened security measures at the border crossing needed;	
		(iii) Slow clearance of goods at border crossing points (Wagha, Petrapole/Benapole, Akhaura/Agartala) increases transport costs;	(iii) Introduction of EDI/IT system, simplification and harmonization of customs procedures, adoption of similar documentations at all border crossings, standardization of Indian Customs Declaration (CTD) and implementation of Automated Customs Clearance system essential;	
		(iv) Acute traffic congestion along Barasat-Petrapole section leads to slow down of vehicles and increases transport costs;	(iv) Infrastructure investment is needed to widen Barasat–Petrapole road to 2-4 lanes, and build by-passes around a number of towns located along Petrapole–Kolkata portion of the corridor;	
		(v) Poor road condition and narrow road along Brahmanbaria–Akhaura section, increase travel time and costs;	(v) Investment is needed to improve and widen to 2-lanes, the road section Brahmanbaria–Akhaura (Bangladesh);	
		(vi) Absence of facilities at Wagha (Pakistan) in terms of warehousing, loading/ unloading, and at Wagha border (India), in terms of parking and space for unloading of goods;	(vi) Physical facilities at border crossing on both sides of Wagha, in terms of warehousing, parking and space for loading/unloading to be built;	

Sl No.	Corridors/Gateways	Barriers and Reasons for action	Actions needed	
			Short-term (2006-2010)	Medium term (2011-2015)
		(vii) Roads in Bangladesh portion of the corridor have axle load limit of 8.2 tonnes;	(vii) Strict enforcement of restriction on overloading to be imposed when Bangladesh roads are opened to international traffic;	
SHC 2	**Road Corridor No 2:** Kathmandu–Birgunj–Kolkata/Haldia (1,323kms)	(i) About 180kms road in Bihar (India) is in poor condition, which reduces vehicles speed to 20kms/hours and increases transport costs;	(i) About 180kms of road section in Bihar (India) to be improved immediately to reduce operating costs of vehicles and travel time;	
		(ii) Kathmandu–Birgunj section is a long detour road (276kms) that adversely impacts on transportation costs;	(ii) A "Fast Track Road" (about 120kms) between Kathmandu and Birgunj should be built to reduce travel distance and transport costs;	
		(iii) Over 36kms of length along Pathalaiya–Hetauda road (Nepal), there are a number of single lane bridges, which are hazardous and adversely impact vehicle speeds;		(iii) Narrow bridges to be replaced by 2-lane wide bridges along Pathalaiya–Hetauda Road (Nepal);
		(iv) Customs yard at Birgunj is very small, as a result trucks are parked along main roads causing congestion;	(iv) A freight station at Birgunj (Nepal) to be built urgently under Indian Economic Cooperation Programme;	
		(v) Immigration office at Raxaul lacks in basic facilities and parking space for unloading, causing inconvenience to users;	(v) Infrastructure investment is needed to provide parking and other basic facilities at immigration office at Raxaul (India);	
		(vi) Slow clearance of goods at Raxaul border crossing increase costs;	(vi) Introduction of EDI/IT system, simplification and harmonization of customs procedures, adoption of similar documentations at all border crossing, standardization of Indian Customs Declaration (CTD) and implementation of Automated Customs Clearance system;	
		(vii) Lack of formal agreement for vehicular movement across Nepal/India border, which may create problems in the future;	(vii) Nepal and India should consider signing a formal agreement under which vehicles could move across the border and within each others territory;	

Sl No.	Corridors/Gateways	Barriers and Reasons for action	Actions needed	
			Short-term (2006-2010)	Medium term (2011-2015)
SHC 3	**Road Corridor No 3:** Thimphu–Phuentsholing/ Jaigon–Kolkata/Haldia (1,039kms)	(i) Physical facilities in terms of parking, cranes, and fork lift trucks are insufficient at Phuentsholing (Bhutan) and there is lack of adequate parking at Jaigon (India). These cause inconvenience to road users and increase congestion on roads;	(i) Physical facilities in term of cranes and forklifts at Phuentsholing and parking on both sides of the border need to be provided urgently;	
		(ii) Slow clearance of goods at border crossing in Bhutan increase transport costs;	(ii) Introduction of EDI/IT system, simplification and harmonization of customs procedures, adoption of similar documentations at all border crossing, standardization of Indian Customs Declaration (CTD) and implementation of Automated Customs Clearance system;	
		(iii) About 172kms road from Thimphu to Phuentsholing is a single lane, which results in slow down of vehicles and increases transport costs;		(iii) Infrastructure investment for widening 172kms of road from Thimphu to Phuentsholing to 2-lane is needed;
SHC 4	**Road Corridor No 4:** KTM–Phulbari–Banglabandha–Mongla/ Chittagong (1,362kms)	(i) Absence of an agreement for cross border movement of vehicles makes the border crossing extremely costly requiring transhipment of goods;	(i) Within a Regional Framework, a bilateral agreement between India and Bangladesh is needed for allowing reciprocal movement of vehicles and goods across the border;	
		(ii) Over 36kms of length along Pathalaiya–Hetauda roads, there are a number of single lane bridges that are hazardous and adversely impact vehicle speed;		(ii) Narrow bridges to be replaced by 2-lane wide bridges along Pathalaiya–Hetauda Road (Nepal);
		(iii) No permanent immigration and custom office at Phulbari and at Banglabadha, where telephone and postal facilities are also missing;	(iii) Permanent immigration and Customs offices need to be built at Phulbari (India) and Banglabandh (B'desh) together with support facilities;	
		(iv) 2.5kms road in India, close to Phulbari border point is in poor condition, and could be a bottleneck when traffic increases;		(iv) Infrastructure investment needed to improve 2.5kms road near Phulbari, when traffic increases;

Sl No.	Corridors/Gateways	Barriers and Reasons for action	Actions needed	
			Short-term (2006-2010)	Medium term (2011-2015)
		(v) Roads in Bangladesh portion of the corridor have axle load limit of 8.2 tonnes;	(v) Overloading restriction should be strictly enforced, when Bangladesh roads are opened to international/ regional traffic;	
SHC 5	**Road Corridor No 5:** Samdrup Jongkhar–Guwahati–Shillong–Sylhet–Dhaka–Kolkata (906kms)	(i) Absence of an agreement for cross-border movement of vehicles at Dawki/Tamabil makes the border crossing extremely costly requiring transhipment of goods;	(i) Within a Regional Framework, a bilateral agreement between India and Bangladesh is needed for allowing reciprocal movement of vehicles and goods across the border;	
		(ii) 74 years old bridge at Dawki has a load restriction of 6 tonnes, which adversely impacts transport cost;	(ii) Infrastructure investment is needed to build a new bridge at Dawki (India) to facilitate movement of intra-country traffic;	
		(iii) Lack of parking space at the Dawki border crossing point, causes inconvenience to users and create congestion on the road;	(iii) Investment is needed to provide parking space at Dawki (India) border post;	
SHC 6	**Road Corridor No 6:** Agartalla–Akhaura–Chittagong (227kms)	(i) Absence of an agreement for cross-border movement of vehicles makes border crossing costly requiring transhipment of goods;	(i) Within a Regional Framework, a bilateral agreement between India and Bangladesh is needed for allowing reciprocal movement of vehicles and goods across Akhaura border;	
		(ii) Narrow road along Akhaura–Dharkhar (15kms) and poor road condition along Dharkhar–Comilla (56kms) both in Bangladesh lead to slow down of vehicles and increase travel time and costs;	(ii) Infrastructure investment is needed for widening and improvement of two road sections, Akhaura–Dharkhar (15kms) and Dharkhar–Comilla (56kms) both in Bangladesh;	
		(iii) Lack of proper physical facilities at Akhaura border crossing causes inconvenience to road users;	(iii) Proper physical facilities at border crossing to be established at Akhaura;	
SHC 7	**Road Corridor No 7:** Kathmandu–Nepalganj–New Delhi–Lahore–Karachi (2,643kms)	(i) 2-road sections, Nepalganj–Baharaich and Bahraich – Rupaidiha are one-lane and in poor condition. These adversely impact vehicle speed and increase travel time and costs;	(i) Infrastructure investment is needed for widening and improving two road sections namely, Nepalganj–Baharaich and Babaraich–Rupaidiha, both in India;	

Sl No.	Corridors/Gateways	Barriers and Reasons for action	Actions needed	
			Short-term (2006-2010)	Medium term (2011-2015)
		(ii) Lack of a formal agreement between Nepal and India for vehicle movement across the border, may create problems in the future;	(ii) It is desirable to get a formal agreement signed between Nepal and India for smooth vehicles movement across the border and within each other's territories;	
SHC 8	**Road Corridor No 8:** Thimphu–Phuentsholing–Jaigon–Burimari–Chittagong (966kms) or (ii) Mongla (880kms)	(i) Lack of physical facilities at Phuentsholing and Jaigon, border crossing, in terms of parking, cranes, forklift trucks, etc cause inconvenience to road users and truckers leading to congestion on the road;	(i) Infrastructure investment is needed to provide vehicle parking at Jaigon (India) and both parking and goods handling equipments like cranes, forklift trucks, etc, at Phuentsholing (Bhutan);	
		(ii) Lack of warehousing, parking, open yard at Burimari (B' Desh), causes damage to goods and inconvenience to users;	(ii) Infrastructure investment is needed to provide warehousing, parking and open yard at Burimari (Bangladesh);	
		iii) Absence of an agreement for cross-border movement of vehicles, necessity for transhipment of goods at the border, which adversely impacts transport costs;	(iii) Within a Regional Framework, a bilateral agreement between India and Bangladesh is needed to facilitate smooth reciprocal movement of transport across Burimari border post;	
		(iv) About 172kms road between Thimphu and Phuentsholing is one-lane, which results in slow-down of vehicles and increases transport cost;		(iv) Infrastructure investment needed to widen 172kms of road between Thimphu–Phuentsholing (Bhutan) to 2-lanes;
		(v) Roads in Bangladesh portion of the corridor have axle load limit of 8.2 tonnes;	(v) Strict enforcement of restriction on overloading to be imposed when Bangladesh roads are opened to international traffic;	
SHC 9	**Road Corridor No 9:** Maldha–Shibganj–Jamuna Bridge (252kms)	(i) About 13.5kms road from Maldah–Mehdipur (India) and another 82kms from Sonamasjid to Rajshahi (B'desh) are narrow and in poor condition which cause slow down of vehicle speed and increase transport costs;	(i) Infrastructure investment is needed to widen to 2-lanes and improve riding condition of two road sections (a) Maldah–Mehdipur (13.5kms) in India and (b) Sonamasjid–Rajshahi (82kms) in Bangladesh;	

Sl No.	Corridors/Gateways	Barriers and Reasons for action	Actions needed	
			Short-term (2006-2010)	Medium term (2011-2015)
		(ii) Lack of an agreement for cross-border movement of vehicles between India and B'desh neccessitates transhipment of goods at border, which adversely impacts transport cost;	(ii) Within a Regional Framework, a bilateral agreement between India and Bangladesh is needed to facilitate smooth reciprocal movement of transport across Sonamasjid border post;	
		(iii) Roads in Bangladesh have axle load limit of 8.2 tonnes;	(iii) Strict enforcement of restriction on overloading to be imposed when Bangladesh roads are opened to international traffic;	
SHC 10	**Road Corridor No10:** Kathmandu–Bhairahawa–Sunauli–Lucknow (663kms)	(i) Lack of adequate physical facilities on Indian side at Sunauli border post in terms of parking, space for unloading of goods for checking and lack of baggage scanning and rest rooms at immigration office cause inconvenience to traders and passengers;	(i) Infrastructure investment is needed to provide parking, space for unloading of goods for inspection at Sunauli border post, and also the scanning facility and rest rooms at the immigration office;	
		(ii) The Indian immigration office at Sunauli is located in a busy market place, which causes traffic congestion and inconvenience to travellers;	(ii) Immigration office at Sunauli (India) to be shifted to a convenient place;	
		(iii) On Nepalese side, lack of banking facility at Sunauli border point compels the traders to take their customs payments to City Bank office at Bhairahawa, causing delays;	iii) HMGN needs to ensure that a banking facility is established at Sunauli border post;	
SRC 1	**Rail Corridor No 1:** Lahore–Delhi–Kolkata–Dhaka– Imphal (2,830kms)	(i) Non-utilization of the available capacity of Indian Railway freight wagons by Pakistan and Bangladesh—trade being largely one sided;	(i) Promotion and development of intra-regional railable traffic to utilize the existing capacity of Indian Railway wagons which are being returned in empty condition from Bangladesh, Nepal and Pakistan resulting in wastage of transport capacity;	

Sl No.	Corridors/Gateways	Barriers and Reasons for action	Actions needed	
			Short-term (2006-2010)	Medium term (2011-2015)
		(ii) Restriction on movement of commodity specific rolling stock including open freight wagons, oil tanks and containers between India and Pakistan and India and Bangladesh;	(ii) Existing bilateral agreements to be suitably modified;	(ii) A multilateral agreement permitting movement of commodity specific freight wagons between the SAARC member states is needed in order to meet the requirement of trade and industry be put in place;
		(iii) Sectional capacity constraints for increasing the throughput on the corridor in view of the growth potential;	(iii) Investments are required on priority to augment the sectional capacity in the saturated sections on the corridor, including improvement of the permanent way, signalling, additional lines and by-passes etc;	(iii) Identified major capacity augmentation /gauge conversion works to be completed;
		(iv) Inadequate capacity of the holding, yard and terminals causing marshalling of rakes and consequent detention to the rolling stock;	(iv) Inadequate capacity of holding lines, loops and terminals for Indian Railway rakes results in marshalling and consequent detentions to the rolling stock. Capacity augmentation is required on an urgent basis on Bangladesh Railway network;	
		(v) Axle load restriction on Jamuna bridge prohibiting any through movement of BG freight trains across Jamuna bridge (Bangladesh);	(v) Strengthening of the existing bridge to facilitate movement of through BG freight and container trains or provision of a transhipment hub at Ishurdi, purely as an interim measure;	(v) Reconstruction of Jamuna bridge to facilitate movement of broad gauge loaded freight and container trains;
		(vi) Different gauges on the corridor requiring transhipment of goods;	(vi) Dual gauging between Joydebpur–Dhaka to be provided on priority;	
		(vii) Kulaura–Shahbazpur rail section is out of commission (Bangladesh);	(vii) The section should be restored and opened for traffic with dual gauge/broad gauge to facilitate intra-regional movement of freight and passenger trains;	(vii) Metre gauge sections between Joydebpur–Akhaura–Shahbazpur (Bangladesh) and Mahishasan–Jiribam (India) to be undertaken and completed on priority;
		viii) Missing rail link between Jiribam–Tupul (Imphal);		(viii) The ongoing work of a new broad gauge line connecting Jiribam with Tupul (Imphal) in India to be completed;

Sl No.	Corridors/Gateways	Barriers and Reasons for action	Actions needed	
			Short-term (2006-2010)	Medium term (2011-2015)
		(ix) Restricted working hours, multiple customs clearances at inter-change points;	ix) Round the clock working hours at Wagha and Gede-Darshana interchange points with simplified single custom checks should be ensured;	
SRC 2	**Rail Corridor No 2:** Karachi–Khokhrapar–Munabao–Jodhpur (707kms)	(i) Restriction on movement of freight trains on this corridor;	(i) This being shorter route for bilateral traffic between central India and Pakistan, (currently opened only for passenger trains), should be opened for freight traffic also;	
		(ii) Absence of infrastructure for handling freight traffic at Munabao (India) and Khokhrapar/Zero Station (Pakistan);	(ii) Development of infrastructure for handling freight traffic including holding lines, yard lines with provisions of customs and rolling stock inspections should be taken up at Munabao and Khokhrapar/Zero Point station;	
		(iii) Single line sections and change of gauges;	(iii) Gauge conversion work of Bhildi–Samdari metre gauge line connecting ports of Gujarat from this corridor should be expedited;	(iii) Hyderabad–Khokhrapar and Munabao–Jodhpur is a BG, single line section and may require doubling in view of the projected growth of traffic from ports;
		(iv) Absence of bilateral agreement between India and Pakistan for running of freight trains;	(iv) Existing bilateral agreement should be expanded to incorporate movement of freight traffic via this corridor;	
SRC 3	**Rail Corridor No 3:** Birgunj–Raxaul–Kolkata Port/Haldia port (704/832kms)	(i) Inadequate sectional capacity in different sections on this corridor affecting movement of traffic;	(i) Birgunj–Barauni section is oversaturated requiring augmentation of the capacity to handle the projected growth of traffic;	
		(ii) Excessive transit time between Birgunj and Kolkata port;	(ii) The current transit time of over 72 hours should be brought down by minimizing en route detentions on account of change of traction and other capacity constraints in single line sections;	

Sl No.	Corridors/Gateways	Barriers and Reasons for action	Actions needed	
			Short-term (2006-2010)	**Medium term (2011-2015)**
		(iii) Lack of usage of through Bills of Lading and acceptance of a combined transport document cumbersome procedures and manual documentation at Kolkata port and Birgunj;	(iii) IT enabled customer facilitation services, streamlining of procedures and adoption of appropriate usage of through Bills of Lading should be undertaken on priority;	
SRC 4	**Rail Corridor No 4:** Birgunj–Katihar–Singhabad–Rohanpur–Chittagong with links to Jogbani (Nepal) and Agartala (India) (1,146kms)	(i) Capacity constraints due to single line sections and poor condition of track and signalling;	(i) The corridor is largely on single line broad gauge/ metre gauge network with severe capacity constraints in Mansi – Katihar (India), Tungi–Akhaura (Bangladesh) and poor condition of track between Rohanpur–Rajshahi and Azimnagar–Ishurdi (Bangladesh). Immediate steps are required towards augmenting the sectional capacity which adversely affects the freight traffic on this corridor;	
		(ii) Inadequate infrastructure including loops holding lines causing avoidable marshalling and detention to the rolling stock;	(ii) Inadequate holding capacity of lines in Rohanpur yard (Bangladesh) necessitates load shedding and detention of wagons at Singhabad (India). Holding capacity of lines should be increased as a priority;	
		(iii) Axle load restriction on Jamuna bridge prohibiting movement of loaded BG freight trains;	(iii) Strengthening of Jamuna Bridge to facilitate movement of broad gauge freight trains with higher axle loads;	(iii) Reconstruction of Jamuna Bridge;
		(iv) Metre gauge sections—Joydebpur–Chittagong (Bangladesh) and Katihar–Jogbani (India);	(iv) Dual gauging of Joydebpur–Dhaka to be completed on priority. Ongoing gauge conversion work on Katihar–Jogbani section be expedited;	(iv) Dual gauging of Joydebpur–Chittagong section or provision of broad gauge alongside metre gauge should be undertaken to enable running of trains without transhipment on this corridor;
		v) Missing link between Akhaura and Agartala;	(v) India and Bangladesh to undertake survey/feasibility study for construction of this short missing link connecting Akhaura with Agartala;	(v) Provision of broad gauge line connecting Akhaura with Agartala to facilitate through movement of intra-regional traffic;

Sl No.	Corridors/Gateways	Barriers and Reasons for action	Actions needed	
			Short-term (2006-2010)	Medium term (2011-2015)
		(vi) Capacity constraints at Chittagong port;	(vi) Dredging, remodelling of railway yard and adequate supply of freight wagons should be ensured;	
		(vii) Missing link between Jogbani (India) and Biratnagar (Nepal);	(vii) Jogbani–Biratnagar BG link be constructed to operationalise the corridor link from Katihar;	
		(viii) Restriction on movement of air-braked rolling stock and commodity specific freight wagons;	(viii) Bilateral agreement should be expanded to permit movement of commodity specific open, air-braked and oil tanks wagons between India and Bangladesh;	
		(ix) Restrictive bilateral rail transport agreement and absence of a multilateral transport agreement for third country and transit traffic;		(ix) To operationalise through movement of freight and passenger trains on this corridor with third country, transit and bilateral traffic, a multilateral transport agreement between the concerned SAARC member states needs to be put in place;
SRC 5	**Rail Corridor No 5:** Colombo–Talaimannar–Rameshwaram–Chennai (1,025kms)	(i) Medawachchiya–Talaimannar pier railway line is currently non operational;		(i) Restoration of Medawachchiya to Talaimannar pier is required to provide connectivity between Colombo and Talaimannar pier;
		(ii) Ferry link between Talaimannar and Rameshwaram is suspended for last more than 15 years;		(ii) Restoration of ferry link for transhipment of goods and passengers across the channel should be expedited;
		(iii) Metre gauge sections on Indian railways involving transhipment;	(iii) Rameshwaram–Madurai gauge conversion work should be completed on priority to enable through broad gauge connectivity on the corridor;	
		(iv) Capacity constraints on Madurai–Dindigul section on Indian Railways;	(iv) Madurai–Dindigul section should be taken up for doubling to minimize the capacity constraints;	
		v) Poor condition of permanent way and signalling in Medawachchiya–Polgahawela sections;	(v) Upgradation of permanent way and signalling should be taken up on priority on this section by Sri Lankan Railways;	

Sl No.	Corridors/Gateways	Barriers and Reasons for action	Actions needed	
			Short-term (2006-2010)	Medium term (2011-2015)
		(vi) Old bilateral agreement;	(vi) Old bilateral agreement for rail-cum-ferry link connecting the island country of Sri Lanka with India should be expanded to include other ferry links and movement of containerized cargo;	
SIWC 1	**Inland Waterways Corridor No 1:** Kolkata–Haldia–Raimongal–Mongla–Kaukhali–Barisal–Hizla–Chandpur–Nerayanganj–Aricha–Sirajganj–Bahadurabad–Chilmari–Pandu (1,439kms)	(i) Existing protocol between India and Bangladesh is currently being renewed only in a monthly basis;	(i) Existing protocol to be renewed for a longer period, say for a few years;	
		(ii) Lack of sufficient ports of call in Bangladesh for movement of inter-country trade;	(ii) Allow more ports of call within Bangladesh;	
		(iii) High rate of siltation in both Bangladesh and India;	(iii) Extensive and regular dredging needed to maintain safe navigability of the rivers;	
		(iv) Navigational hazards like shallow waters, narrow width of channels and inadequate navigational aids;	(iv) Investment would be needed to install more navigational aids;	
		(v) The vessels presently plying are old and unable to carry containers;	(v) Inland water transport operators to be encouraged to replace their vessels;	
		(vi) Poor condition of piers, jetties and other infrastructures;	(vi) Improvement of the condition of piers, as well as jetties and replacement of the old and obsolete cargo handling gear, support craft and cargo carrying vessels are needed;	
		(vii) Lack of storage facilities, cargo handling equipment, pilot boats, etc;	(vii) New storage facilities to be built at inland ports and cargo handling facilities to be enhanced;	
		viii) Shortage of skilled manpower;	(viii) Measures for human resource development to be undertaken;	
SIWC 2	**Inland Waterways Corridor No 2:** Kolkata–Haldia–Raimongal–Mongla–Kaukhali – Barisal–Hizla–Chandpur–Nerayangang–	Same as above for Corridor No 1;	Same as above for Corridor No 1;	

Sl No.	Corridors/Gateways	Barriers and Reasons for action	Actions needed	
			Short-term (2006-2010)	Medium term (2011-2015)
	Bhairabbazar–Anmirigang –Markulo–Sherpur– Fenchunganj–Zakiginj– Karimgang (1318kms)			
SMG 1	**Maritime Gateway No 1 Karachi (Pakistan)**	(i) No room for expansion of existing container terminals after doubling the capacity;	(i) In order to meet the container growth rate, other sites for the container terminals need to be planned;	(i) Development of third container terminal at Keamari Groyne to handle 4th generation container vessels, redevelopment of existing berths and increasing the depths alongside and increase the capacities of existing container terminals by raising performance per sqm;
		(ii) Dock labour problems of inefficiency and levies/ charges on each tonnage handled at the port;	(ii) Dock Labour Board needs to be dissolved and unions to be brought under Essential Services net;	
		(iii) Draft limitations that restricts size of the vessels;	(iii) High capacity dredgers to be procured to clear the arrears and maintain designed depths. There is a need for capital dredging to increase drafts for accommodating larger vessels. City refuse should be treated before it is discharged into adjacent creeks and back waters. The dredged material should be used for reclaiming land;	
		(iv) Non-responsive attitude of railway for clearing port cargo and slow delivery of goods at the destinations;	(iv) Railway tracks to be strengthened, more wagons to be procured and fast track system for goods trains to be programmed;	

Sl No.	Corridors/Gateways	Barriers and Reasons for action	Actions needed	
			Short-term (2006-2010)	Medium term (2011-2015)
		(v) Congestion in port area and high dwell time due to lack of coordination and facilitation;	v) In order to reduced dwell time and congestion of the port, port and custom clearance procedures to be simplified. Awareness of the customers for use of IT/EDI system is needed. Free storage for containers be reduced and customs should enlarge their CARE system to cover whole range of cargo not only containers;	
		(iv)Access roads are congested which has created bottleneck for the port performance;	(iv) Access roads needs to be widened, strengthened. Construct bypasses and overhead corridors for smooth and fast exit of the port traffic;	
SMG 2	**Maritime Gateway No 2 Port Bin Qasim (Pakistan**	(i) The leading channel and harbour basin are subjected to heavy siltation, especially during monsoon season. Accumulation of siltation compels the authority to reduce draft during monsoon period and carry on dredging rest of the period annually. The Port does not have its own dredging fleet, therefore, dredging is contracted out. The cost of dredging also very high, therefore, committed depths are difficult to maintain during non-monsoon period;	(i). The port should develop its own fleet to maintain committed depth and get away from annual decrease and increase of drafts. The trade feels that port must increase the draft so that large bulk carriers could be accommodated from economic operations perspective;	
		(ii) There is restriction on night navigation through the channel. Vessels waiting time is increased;	(ii) The channel should be properly marked. Instead of buoys, fixed beacons may be installed to prevent thefts and drafting. Night navigation must be started to save waiting time;	
		iii) Dwell time are high. Clearing system still tedious and time consuming;	(iii) EDI/IT system are needed to be installed and customs CARE system to be introduced for reducing dwell time. Container free storage period to be reduced;	

Sl No.	Corridors/Gateways	Barriers and Reasons for action	Actions needed	
			Short-term (2006-2010)	Medium term (2011-2015)
		(iv) Shortage of railway wagons. Traders suffer and storage time is increased;	(iv) Railway wagons to be increased for carriage of container and specialized cargo up country. The railway tracks to be replaced and strengthened to increase speed;	
		(v) Port needs further expansion as the estimated growth rate is higher in Pakistan;	v) New berths and terminals to be added to increase the capacity of the port to meet the anticipated growth;	(v) Construction of LPG, crude oil and products terminal, development of rice and other bulk cargo berths and later on development of more container terminals and a dedicated fertilizer berth;
SMG 3	**Maritime Gateway No 3 JNPT (India)**	(i) The port is working at its designed capacity, whereas anticipated growth of containers by the year 2014 is 5.5 million TEUs. Port is also expected with existing space;	(i) There is need for enhancement of port capacity by developing new terminals to alleviate current problem and meet the future developments;	(i) Area behind the service berth to be developed, reclamation of land for port expansion acquisition of super post Panamax RMQC and development of a tank farm;
		(ii) The road connectivity needs to be improved and there is congestion at Jawahar Customs point, waiting for export clearances;	(ii) Access roads need to be widened and repaired. There is a program underway to improve the connecting road network and this needs to be completed. A review should be undertaken of the export customs procedures to expedite their delivery into the port;	
		(iii) Railway has capacity problem on Mumbai–Delhi link which slows the speed of container trains;	(iii) Additional train paths need to be provided between Mumbai and Delhi. Existing developments by IR need to be completed urgently;	
		(iv) The port lacks the modern and high performance container handling equipment;	(iv) Container handling equipment to be replaced gradually with high performance equipments and also the port should adopt modern maintenance practices that would lead to reduced equipment down time;	
		(v) The approach channel and harbour basin is considered to be shallow and narrow for the latest large size vessels, thus effects economic scale in the maritime transport;	(v) Plan on deepening the JNP Channel to 14m depth;	(v) Complete deepening of the JNP Channel;

Sl No.	Corridors/Gateways	Barriers and Reasons for action	Actions needed	
			Short-term (2006-2010)	Medium term (2011-2015)
		(vi) High reliance on traditional paper work increases the dwell time and cost of the goods. There is lack of port facilitation, ICES automated clearance system at Jawaharlal Customs has not been reliable;	(vi) Efforts are needed to improve the trade facilitation by development of paperless system and adoption of revised Kyoto Convention;	
SMG 4	**Maritime Gateway No 4 Cochin (India)**	(i) Cochin port is operating close to its designed capacity. This needs further capacity enhancement in line with projected traffic;	(i) Plans to be made to improve the existing infrastructure and related facilities and to expand the port by means of reclamation and development of South end Willington Island and further development at Vallarpadam The port may adopt 'Landlord' Concept to attract investment;	(i) Develop exclusive economic zone, construct bunkering terminals and further develop port area land;
		(ii) The channel and basin are subject to heavy siltation due to long distance flow of river Periyar coupled with bank erosions. Round the clock dredging is needed to maintain committed depths;	(ii) Channels and harbour basins require continuous dredging. In order to reduce dredging expenditures, dredging should be contracted out on depth basis and not on dredged material basis;	(ii) Dredging for ICTT project at Vallarpadam;
		(iii) Progress made in computerisation in relations to customs, has not been matched by all other authorities, therefore, productivity is reduced and operational cost is increased;	(iii) Capacity building programme are required to be undertaken to improve the efficiency, operational profits and productivity as well;	
SMG 5	**Maritime Gateway No 5 Tuticorin Port (India)**	(i) Due to draft constraints only feeder vessels are calling this port. Containers are therefore transhipped through Colombo or Singapore;	(i) There is need to increase the depths of channel and harbour basin up to 14.6m so that main line vessels could call directly;	

Sl No.	Corridors/Gateways	Barriers and Reasons for action	Actions needed	
			Short-term (2006-2010)	Medium term (2011-2015)
		(ii) There is also need to expand the port capacity as its present designed capacity is 15.5 million whereas it handled 13.68 million tonnes in 2003-2004;		(ii) Berth No 9 to be constructed, the outer harbour and breakwater developed and an island breakwater constructed. With the projected traffic, there is need for development of 2nd container terminal. Later there will be a need for construction of Berth No 10 and further expansion of container terminal and further studies should be undertaken for expansion of the port and enhancing the facilities;
		(iii) Access road and service roads are weak and narrow, remain highly congested, it is effecting efficiency of the port and rendering difficulty to traffic;	(iii) Condition of the access road and service roads needs to be improved through repairs**.** In addition, the programme for widening and strengthening is also required to be expedited, preferably to provide 4-lanes for existing traffic;	
		(iv) Ships handling craft are insufficient and existing ones are old, therefore, berthing problems are encountered;	(iv) Replace two tugs;	
		(v) More berths are required;	(v) Construction of North Cargo Berth;	
SMG 6	**Maritime Gateway No 6 Kolkata/ Haldia (India)**	(i) The port has handled 9.95 million tones in the year 2004–2005 which is 14.4% growth. Whereas, rated capacity of the port is 9.8 million tones, this necessitates for further enhancement of the capacity of KDS. On the HDC side its rated capacity is 34.10 million tones whereas it handled 32.57 million tones in the year 2003–2004;	(i) There is need to enhance the port capacity by developing more berths which seems to be not possible due to limitation of space and drafts of approaching channel, therefore, HDS has to be developed for meeting the projected traffic of 7.43% annually. There is also need to develop more infrastructure to facilitate traffic and increase the throughput;	
		(ii) The container handling equipments are inadequate and old, that effects the performance of the port;	(ii) Both ports are required to replace certain amount of cargo handling equipment especially container handling cranes (RTGS);	
		(iii)Access road and service roads are congested which effects the flow of port traffic;	(iii) There is a need to develop road infrastructure inside and outside the docks and back up area;	

Sl No.	Corridors/Gateways	Barriers and Reasons for action	Actions needed	
			Short-term (2006-2010)	Medium term (2011-2015)
		(iv) Too much siltation is accumulated which creates difficulties for traffic, navigating through Hooghly River. Draft limitations restrict the entry of main line vessels into the ports. Therefore, the port is confined to serve only feeder vessels;	(iv) Although it is near to impossible to dredge the whole length of 226kms the channel used for navigation needs to be maintained at least for the committed depths. The accumulation of siltation is natural phenomena, but minimum dredging requires keeping the port's operational needs ensured;	(iv) Studies to be made for capacity enhancement and for improving the river passage drafts;
SMG 7	**Maritime Gateway No 7 Chittagong Port (Bangladesh)**	(i) The river Karnaphuli suffers from heavy siltation, which often change depths of navigation channel considerably, so at times it becomes difficult for the management to control the depths;	(i) The authorities are required to acquire high capacity dredgers to maintain committed depths;	
		(ii) No night navigation due to lack of pilotage services and marking of navigable channel. Vessels have to wait for day break;	(ii) Proper marking of the navigable channel is needed to commence night navigation and save time;	
		(iii) The port is working beyond its rated capacity and remains highly congested;	(iii) Port expansion programmes needs to be undertaken to increase capacity to cater for present and future projected traffic;	(iii) Construct another container terminal with storage area and high performance equipment, build CFS at Pangaon with capacity of 30,000 TEUs, construct LNG handling facilities in the port, enhance oil products and chemicals handling facilities;
		(iv) Cargo equipment is insufficient for both conventional and specialised cargo handling;	(iv) The port must acquire modern cargo handling equipments to improve its productivity. More container freight stations to be built to relieve congestion for the port area;	
		(v) Dwell time is too high due to poor trade and facilitation. Port and Customs procedures are manual with significant amounts of paper work;	(v) Customs reforms are essentially needed for better service, removal of congestion and reduction in dwell time. IT/EDI system to be installed to facilitate the port users and improve clearing system;	

Sl No.	Corridors/Gateways	Barriers and Reasons for action	Actions needed	
			Short-term (2006-2010)	Medium term (2011-2015)
		(vi) Hinterland connectivity is poor. Container movements are not properly developed by road. Railway is not fully equipped to handle the port traffic. Inland Water Transport is also not equipped for container transport;	(vi) Roads need to be improved. Access road to be strengthened, widened and low load bridges to be redesigned, Railway tracks to be strengthened and container carrier wagons and other specialized cargo wagons to be added in the fleet;	(vi) Railway link between Pubail and Dhrasram Railway Stations;
		(vii) Labour unrest, restrictive practices has resulted in poor productivity, congestion and high operational costs. Therefore, charges are high as compared to services provided;	(vii). Labour reforms are required by addressing their social and economic problems, developing human resources and capacity building programmes;	(vii) Deregularise the dock labour and create incentives to improve labour efficiency;
		(viii) Management also lacks the knowledge of modern port practices therefore it adds to problems, quality of services and port performance;	(viii) The port needs its operational efficiency for which experienced professional at top tiers need to be appointed. Port is needed to adopt privatization policy and landlord concept so that investment is encouraged and operational efficiency is achieved;	
SMG 8	**Maritime Gateway No 8 Mongla Port (Bangladesh)**	(i) The port is working under capacity about 50%. The port has high potential for growth, but due to many deficient constraints, it has not yet attracted traffic, particularly the container traffic. It is due to non-connectivity of railway and improper road net work and many more reasons;	(i) The Mongla Port Authority should launch marketing campaign together with improving the facilities and offer incentives for trade;	(i) Link the railway system with the port;
		(ii) The river Paussur and Mongla Canal are subject to heavy siltation therefore, depths are always unpredictable and so vessels are always put to risk while approaching this port;	(ii) River channel and Mongla channel require extensive dredging for which either acquire high capacity dredger or contract out dredging on depth basis to achieve better result with proper monitoring;	
		(iii) The port lacks proper infrastructure, including container handling facilities despite having ports of Kolkata/ Haldia and Chittagong in the vicinity;		(iii) Administrative and operational plans to be made for the port to compete with regional ports;

Sl No.	Corridors/Gateways	Barriers and Reasons for action	Actions needed	
			Short-term (2006-2010)	Medium term (2011-2015)
		(iv) Lighters and tug-boats used for midstream cargo operations are inadequate, old and uneconomical therefore, port becomes expensive and inefficient;	(iv) This is the era of container cargo, therefore, emphasis to be given to improve container handling facilities on the shore as well as midstream operations. Adequate equipments and container lightering barges to be acquired. The best approach should be to invite private investment if paucity of funds is felt. The port must gear up its resources to install modern facilities;	(iv) Tugs and lighters to be acquired, for which private sector should be encouraged. Acquire container inland vessel for carriage of container to inland water destinations;
		(v) Too much paperwork, exhaustive rules and regulations create difficulties for port users;	(v) Customs reforms are essential in this port. Installation of IT system would reduce paper work. The port needs to adopt trade and transport facilitation standards so that it attract traffic;	
		(vi) Labour unrest and poor management of port operation affects productivity performance;	(vi) Labour reforms are necessary for bringing improvement in the port. Experienced professionals to be appointed to manage the port on modern lines with market oriented methodology;	(vi) Deregularise labour and offer incentives to improve efficiency;
SMG 9	**Maritime Gateway No 9 Male Commercial Harbour**	(i) The port is handling traffic well in excess of its rated capacity whereas projected annual growth rate is 9.8%. It is impossible for the port in the existing conditions to match with its growth, due to limitation of land;	(i) There is a great need to expand the capacity on a priority basis for which additional land will be required by reclaiming land from the inner harbour of the west side of the terminal to cater to growing traffic. Until port expansion is undertaken under a Masterplan, in the meantime interim actions are necessary to improve the current situation;	
		(ii) Limitations of water depths, which restricts accommodating only small size vessels;		(ii) Extend the existing 101m berth to accommodate larger and more vessels calling at the port;
		(iii) Storage area is limited, therefore, port remains congested. Delays in berthing, high turn-around time and high berth occupancy are major factors affecting port users and with high operational cost;	(iii) Reducing free storage time on container cargo	

Sl No.	Corridors/Gateways	Barriers and Reasons for action	Actions needed	
			Short-term (2006-2010)	Medium term (2011-2015)
		(iv) Custom and port have all manual system of documentation and examination which results in port congestion and very high clearance time. Customs also examine the containers in the port open storage/stacking areas, which further adds to the congestion; Lack of adequately trained staff in all the areas of port operation further reduces the port efficiency;	iv) Modernise customs and port procedures so that congestion is reduced and dwell time is controlled. This should include installation of IT/EDI systems and a dedicated cargo clearance area, supplemented by implementation of a needs-based human resource plan;	
		(v) No container crane and inadequate handling equipment. Empties are returned, because there is no sufficient export. Therefore, Male is not ideal for containerisation;	(v) Acquire additional equipment to be able to introduce high density staking methods including a high capacity RTG for the container yard be procured and replace the old equipment;	
		(vi) Lack of coordination between port management and port users. Lack of proper laws to regulate, develop and operate the port. Lack of autonomy for the port management to run the port efficiently;	(iv) Port authority also addresses the issues of management deficiencies and non-cooperative status of the shipping lines and other agencies working in the port. Restructuring the port management so that it has more autonomy by further commercialization or privatization of the port operations;	(iv) Further review laws and regulations;
SMG 10	**Maritime Gateway No 10 Colombo Port** (Sri Lanka)	(i) The port is nearing its rated capacity, occupancy has reached 75-80% level therefore, at times berthing delays are encountered;	(i) There is immediate need for expansion of JCT and UCT to reduce congestion;	(i) Enhance capacity of JCT from 2 to 2.4 million TEUs;
		(ii) Area of harbour basin is limited, as such its is difficult to manoeuvre large size vessels;	(ii)Engineering solution to be sorted out for removing the limitations of harbour basin. Dredging is also essential for accommodating the new 5th generation vessels coming up on the high seas;	(ii) Harbour Basin to be dredged up to 15m;
		(iii) Having high throughput and limited yard area, there is significant congestion within the container terminals;	(iii) To meet the future demand of the trade and traffic plans to be made to develop south harbour;	(iii) Enhance yard capacity and create incentive schemes to improve port labour. Attract private sector to invest in port capacity and other facilities;

Sl No.	Corridors/Gateways	Barriers and Reasons for action	Actions needed	
			Short-term (2006-2010)	Medium term (2011-2015)
		(iv) Access roads are congested for inland transportation of domestic trade i.e. 30% of the total traffic handled;	(iv) Though the port is mainly used for transhipment cargo but still about 30% of the total handling is for domestic consumption, therefore, the roads and railway need to be efficient to carry cargo in and out of the port to reduce congestions. The port area should not be used by traders as godowns for direct sell of cargo to other parties;	
		(v) Frequent changes in management has an adverse effect on overall efficiency and continuity of policies;		(v) Consistency should be developed in decision making;
		(vi) The port suffers the same port and trade facilitation problem common in the region. It has significant effect on port traffic which leads to higher dwell times especially in relation to CFS activities;	(vi) There is major demand for development and implementation of trade and transport programme. This may be introduced based on automated customs clearance system with DTI capability. Linkage between port, custom and agents on the basis of community-type. IT system to eliminate paper work and manual work;	
SAG 1	**Aviation Gateway No 1: Dhaka (Bangladesh)**	(i) There is scope for expansion by means of another runway at Dhaka;	(i) Need to construct a 2nd runway at Dhaka;	
		(ii) The fleet of F-28 aircraft is old and spares are not available. Major complaints on flight delays and cancellations of intra-regional routes is due to this;	(ii) Need to upgrade the aircraft fleet, possibly by private sector investments;	
		(iii) No green channel for cargo inspection;	(iii) Investment in improved cargo facilities with improved facilitation measures;	
SAG 2	**Aviation Gateway No 2: Paro (Bhutan)**	(i) Since Paro Airport is located in a narrow valley surrounded by mountains, it can handle only smaller aircraft;		(i) To build an alternative airport with ILS facilities and provisions for landing during hours of darkness and to explore such locations in south central part of Bhutan;

Sl No.	Corridors/Gateways	Barriers and Reasons for action	Actions needed	
			Short-term (2006-2010)	Medium term (2011-2015)
		(ii) Due to the absence of ILS, airport operates only in daylight hours and during favourable weather conditions;	(ii) To improve technical capabilities for the short term at Paro airport;	
		(iii) Terminal passenger handling and baggage services capacity needs enhancement;	(iii) To improve passenger handling capacities in the short term;	
		(iv) Difficulties for passengers to purchase Druk Air tickets in other SAARC countries, except in India and Nepal;	(iv) Need to enhance ticketing arrangements;	
SAG 3-11	**Aviation Gateways No 3 - 11: (India)**	(i) Shortage of pilots and flight engineers to keep pace with the anticipated growth;	(i) Additional training capacity required and approaches to ensure that pilots and engineers stay in India;	
		(ii) The airport charges are high compared to nearby regions, especially for low-cost airlines;	(ii) Consider review of charges to promote sector and attract low cost carriers;	
		(iii) High import dwell time on international traffic with no green channel;	(iii) Improve trade facilitation measures with green channelling of known shippers;	

Sl No.	Corridors/Gateways	Barriers and Reasons for action	Actions needed	
			Short-term (2006-2010)	Medium term (2011-2015)
		(iv) Shortage of capacity terminals, runways etc to handle future demand;	*Delhi* (i) New International Terminal Complex Phase II needs to be completed; (ii) Installation of automatic storage and retrieval systems for import handling required; (iii) New conveyor belt for cargo handling; *Mumbai* (i) International courier terminal required; (ii) New automatic storage and retrieval system for import handling required; (iii) Completion of 7 new parking stands; *Chennai* (i) New International Terminal Complex Phase II to be completed; (ii) Integrated Cargo terminal Phase III for imports required; (iii) Construction of a common user cargo terminal for domestic required; (iv) Completion of 3 parking stands; *Kolkota* (i) New International Departure building is required; (ii) Apron extension; (iii) Metro link over head corridor is to be constructed; (iv) New Integrated Cargo Terminal - Phase I under construction to be completed; (v) Perishable cargo centre to be constructed; (vi) New automatic storage and retrieval system for import handling; *Trivandrum* (i) New International building is required; *Bangalore* (i) Completion of expansion and modification of terminal building; *Hyderabad* (i) Extension of apron required; (ii) I n of arrival terminal required; *Cochin* (i) New airport to be built by private sector;	

Sl No.	Corridors/Gateways	Barriers and Reasons for action	Actions needed	
			Short-term (2006-2010)	Medium term (2011-2015)
SAG 12	**Aviation Gateway No 12: Male (Maldives)**	(i) Passenger processing facilities at the present airport need to be expanded and the staff need to be trained in all the areas;	(i) Additional passenger processing facilities required and an effective human resource development programne needs to be implemented;	
		(ii) Cargo handling area needs to be expanded with additional infrastructure as insufficient processing areas and cold store needed;	(ii) Additional cargo processing facilities required;	
		(iii) Service between Trivandrum and Male' needs an increase in the capacity flights;	(iii) ASA to be expanded to cover requirements for higher frequencies;	
SAG 13	**Aviation Gateway No 13: Kathmandu (Nepal)**	(i) Constraints in handling passengers and baggage;	(i) Improvements to baggage handling and passenger processing required;	
		(ii) Inadequate passenger facilities;	(ii) Improved layout and facilities in passenger departure area;	
SAG 14 -15	**Aviation Gateway No 14 & 15: (Pakistan)**	(i) Air terminal complex at both Karachi and Lahore lack cargo centres and modern cargo handling equipment;	(i) Cargo facilities should be upgraded as required;	
		(ii) Modernization of security systems all airports with the state of the art equipment to ensure safety and security;	(ii) Improvements made in security systems;	
		(iii) The Civil Aviation Authority of Pakistan has assumed a dual role being both service provider as well as regulator;	(iii) Regulator roles should be separated from operations;	
SAG 16	**Aviation Gateway No 16: Colombo (Sri Lanka)**	(i) The facilities that will be inadequate by around 2010 especially the passenger terminal (building and apron), car parks, air navigation systems and utilities;	(i) Supporting infrastructure facilities required especially to promote BIA as a transit hub;	
		(ii) Sri Lanka requires a 2nd international airport. Locations have been identified, but studies have not been finalized. BIA is 32kms from Colombo and not in close proximity to any centre of tourist attraction limits transit potential;	ii) Selection of second international airport required;	

Sl No.	Corridors/Gateways	Barriers and Reasons for action	Actions needed	
			Short-term (2006-2010)	Medium term (2011-2015)
		(iii) Problems in attracting major airlines due to lack of infrastructure and inadequate ancillary services, such as high cost bunkering services, poor road transportation and insufficient accommodation;	(iii) Passenger facilities need enhancement;	

10.0 CONCLUSIONS AND PLAN OF ACTION

In Chapter 9 of this report, various actions needed over the short and medium term to address the major barriers were indicated by corridor or gateway. However, it is considered necessary to prioritize the issues that SAARC should be promoting in order to meet their stated objective of enhancing regional connectivity. To assist the SAARC member states in taking concerted action from a regional perspective, a few core issues were identified for implementation on a priority basis over the short and medium term periods. The criteria or the logic applied in selection of these priority actions include the following:

- Those actions/measures that would have an immediate impact on reducing the time, and consequent cost of transportation;
- Those actions/measures that need to be undertaken bilaterally/sub-regionally by two or more member states, but that would have an immediate impact on reducing both the time and cost of transportation; and
- Those actions/measures that are required to be taken at the regional/multilateral level by all the SAARC member states or a majority of them, and which could have significant impact on facilitating the movement of goods and people across the region, thereby reducing the time and cost of transportation;

The end result of this selection process is presented below. The SAARC member states may like to consider implementing these actions on a 3 level basis:

- At the national level by individual countries;
- Bilaterally/sub-regionally by 2 or more countries; or
- Regionally by the entire group of SAARC member states.

The recommended actions and reasons for their inclusion are indicated in the following sections.

10.1 National Level Actions

10.1.1 Road Corridors

- Construction of a road freight station at Birgunj (Nepal) to enhance security and facilitate both bilateral and third country trade to and from Nepal and eliminate the current delays at the border on Corridor 2;
- Construction of a bridge at Dawki (India) to enable fully loaded transport to use Corridor 5 to improve connectivity for the North Eastern States of India;
- A “Fast Track” road between Kathmandu and Birgunj to drastically reduce transit distances, travel times and costs within Nepal and enable larger vehicles to reach Kathmandu; and
- Strict enforcement of restrictions on overloading of vehicles in each of the SAARC member states in order to reduce road damage and ensure compliance.

10.1.2 Rail Corridors

- Augmentation of sectional capacity along the identified corridors in India and Bangladesh to handle the projected and potential growth of intra-regional traffic, especially between Delhi–Mughalsarai on Corridor 1 and between Sugauli and Muzaffarpur, Mausi and Katihar and between Tungi and Akhaura on Corridors 3 and 4 to enable more international trains to be handled;
- Development of physical infrastructure including the holding capacity of loop lines, yard lines and terminals on Bangladesh Railways to handle full train loads from India without marshalling a process that results in delays, extra costs and increased transhipment;
- Improved marketing of rail traffic from Bangladesh and Pakistan to India so as to better utilize the transport capacity of Indian Railway wagons, which are at present being returned in empty condition;
- Reduction in running time of container trains between Kolkata port and Birgunj on Corridor 3 to make services more competitive and reduce inventory costs for Nepalese traders;
- Reduction in turnaround time of Indian Railway wagons by Bangladesh Railways to enable quicker availability of the rolling stock for back loading and improve the overall availability generally of rolling stock for international movements;
- Introduction of air braked rolling stock by Bangladesh and Pakistan to facilitate movement of specialized bulk and container traffic that presently has to travel by road with higher costs; and
- Development of a transhipment hub serving Corridors 1 and 4 as an interim strategy at Ishurdi in Bangladesh to handle the intra-regional traffic currently restricted by the load restrictions on the Jamuna Bridge. This could improve the movement and viability of rail freight between India and Bangladesh, as well as between Nepal and Bangladesh.

10.1.3 IWT Corridors

- The existing inland waterways protocol between Bangladesh and India should be renewed, each time, for longer periods, say up to 5 years. This would provide some temporary stability to the sector and enable longer term planning to be undertaken by both Governments and operators.

10.1.4 Maritime Gateways

- Port capacity needs to be expanded, especially container terminals, to be able to handle more container traffic (including intra-regional cargo), particularly at Colombo (as the regional hub), as well as at Chittagong, Kolkata, Haldia, Karachi and Male;
- Planning and augmentation of the rail and road connectivity together with adequate supply of suitable rolling stocks and availability of trucks is needed at all ports at the ends of the SAARC road and rail corridors, especially those serving the landlocked countries to improve their accessibility to their key ports;
- Undertaking of adequate dredging to maintain water depths, as well as sustainable channel markings, especially at Chittagong, Mongla, Colombo, Kolkata/Haldia Port Qasim, Karachi and Cochin. This will enable improved access for larger vessels that

are able to offer lower unit transport costs and thus help support regional trade growth;

- Strengthen the professional management capability and encourage private sector involvement in port development and operations at Chittagong to enable it to be an effective gateway, not only for Bangladesh but also for the North Eastern States of India, Bhutan and Nepal;
- Procure modern container handling and other cargo handling equipments to replace old ones at JNPT, Haldia, Kolkata, Chittagong, Mongla and Male to reduce congestion and handling delays within the terminals and to expedite traffic access along the land corridors.

10.1.5 Aviation Gateways

- Development and redesign of international terminal complex, especially at Kathmandu, Thimphu and some Indian airports to make more effective use of existing resources to improve passenger and freight processing levels;
- Improvements in radar systems/ILS in many of the major airports of the region to increase runway capacity to international maximums so as to reduce the pressure for additional runways and to the incidence of 'stacking' delays at peak operating periods;
- Need to assess the adequacy of facility layout, staffing levels and IT aids for immigration, customs, security and handling facilities at all airports for passengers, baggage and cargoes so that airports in the region can achieve the processing performance of world-class airports in adjacent regions;
- Undertake feasibility studies for new airports, especially in Bhutan, and a second airport in Sri Lanka so as to commence detailed planning for future requirements before the existing airports become too congested;
- Introduction of commercial practices in airport management in Paro and encourage private sector involvement in development and management of airports, as being undertaken by India. This is all with the objective of improving both the image and efficiency of the SAARC airports;
- Encourage investment in developing private airlines in Bangladesh, Bhutan, Pakistan and Nepal to introduce more competition to reduce fares, freight rates and airport charges to lower air transport costs in inter-regional routes;
- Improvements in cargo handling facilities, together with efficient facilitation measures at Dhaka, Indian and Pakistani airports and Male to upgrade services levels and reduce unit handling costs to promote air cargo traffic;
- Reduce inspection procedures and install green channels for cargo at Dhaka and Indian airports to lower dwell times within the cargo terminals and resultant high costs to importers;
- Expand the number of airports serving domestic and regional travel to both widen travel choices and reduce the pressures in the congested major airports by disseminating the demand; and
- Promote the low cost carrier concept by each country to make air travel more accessible to SAARC citizens.

10.2 Bilateral/Sub-regional Level Actions

10.2.1 Road Corridors

- Develop and adopt bilateral transport agreements between Bangladesh and India, as well as India and Pakistan, to enable through transport to travel directly between the countries, thus eliminating the costly and time-consuming process of transhipment at the borders on all of the SAARC road corridors;
- Improvement to the roads in Bihar, West Bengal and Bangladesh to assist Nepal, Bhutan, India and Bangladesh in reducing transit and transport costs caused by delayed movements along Corridors 2, 3, 4, 6, 8 and 9;
- Reclassify the last few kms of all road corridors up to the international borders so they are treated as part of National Highways, thus promoting upgrades to these often minor roads and thereby improving access to the border posts, as well as reduce transport costs;
- Develop or construct modern border crossings facilities (on both sides), including immigration, parking and cargo handling facilities, between India and its neighbours in order to facilitate the smooth movement of both passengers and freight across these borders. This would improve not only the processing times but also reduce the delays at these facilities, enhance safety and remove inconvenience;
- Adoption of modern trade facilitation measures, including simplified customs and transparent inspection procedures for efficient clearance of goods across the border points, so as to eliminate the bureaucratic processes and resultant delays;
- Provision of 24 hours and 7 days customs services at all major border crossing points on the SAARC corridors to eliminate overnight and holiday queuing that result in congestion and delays and compromises customs compliance. For other border crossing points, a mutually agreed but syncronized timing could be adopted to reduce inconvenience to traders and transporters.

10.2.2 Rail Corridors

- Standardization of technologies, including track, signalling and rolling stock, in order to introduce commodity specific freight wagons capable of hauling longer and heavier axle load freight trains, thus eliminating avoidable marshalling, lower speeds and longer transit times;
- Development of additional container terminals connecting major commercial centres and ports along the corridors to enable movement of containerized cargo via the shorter routes in the region compared to the much longer road/rail/sea routes at present and thereby bringing down the unit transport costs;
- Coordination of the standardization/rationalization of the gauge conversion programmes of Indian and Bangladesh Railways so as to achieve seamless operations of intra-regional freight and passenger trains without the need for transhipment due to gauge differences;
- Strengthening of the Jamuna Bridge or construction of a new Jamuna Bridge to facilitate through movement of fully loaded broad gauge freight trains on Corridors 1 and 4 thus avoiding the need to tranship and providing the necessary economies of scale to contain inherent freight rate increases;
- Construction of the identified missing links between Jogbani–Biratnagar, Akhaura–Agartala, Jiribam–Tupul and restoration of rail sections between Kulaura–

Shahbazpur and Medawachchiya–Talaimannar to make the respective corridors operational for improved connectivity;
- Provision of required infrastructure to deal with potential freight traffic at Munabao and Khokhrapar by India and Pakistan to enable Corridor 2 to become a freight rather than solely a passenger corridor; and
- Uniformity of prevailing systems and procedures at interchange points, simplification of documentation, elimination of double customs checks, introduction of IT enabled data transfer facilities and introduction of round-the-clock working for trade facilitation so as to enhance the performance of the international rail freight services throughout the SAARC region.

10.2.3 IWT Corridors

- Joint assessment should be made by Bangladesh and India on the future role that inland waterways can play in regional connectivity and whether this would justify investment in dredging and vessels replacement so as to determine its prioritization in the context of regional transport development;
- To make inter-country traffic movement by IWT attractive, more ports of call in Bangladesh should be allowed under the bilateral agreement, thus improving accessibility;
- Extensive and regular dredging to be carried out to maintain navigable depth along both IWT corridors in order to promote use of the mode and investment in vessels and infrastructure;
- Install and maintain navigational aids to provide 24 hour travel so as to enhance transit times and attract new traffic; and
- Upgrade jetties and replace old cargo handling equipment and craft such that traders who wish to use water transport can do so.

10.2.4 Maritime Gateways

- Improve port and trade facilitation measures though simplification of procedures and introduce more EDI/IT to reduce dwell times at all ports; and
- Permit off-dock CFS to handle import cargoes at Chittagong to reduce container yard congestion.

10.2.5 Aviation Gateways

- Establish more bilateral agreements with emphasis on direct capital-to-capital air connections to enhance connectivity and promote intergovernmental development; and
- Develop low cost carrier operations to actually reduce the cost of air transport for those unable to afford the benefits of schedules services.

10.3 Regional/Multilateral Level Actions

10.3.1 Road Corridors

- Development and adoption of transport and transit agreement between SAARC member states to allow through movement of vehicles, goods and passengers across the region in a door-to-door basis thus reducing delays and costs at the borders.

10.3.2 Rail Corridors

- Development and adoption of a multilateral agreement by SAARC member states to facilitate barrier free movement across the region to be able to develop seamless rail services.

10.3.3 Aviation Gateways

- Widen existing SAARC visa exemption scheme to promote regional travel by citizens of the SAARC member states;
- Undertake a regional study to identify gateways that have potential to become regional aviation hubs to reduce the need to travel to hub airports outside the region to obtain the necessary level of inter-regional connectivity; and
- Move towards a regional aviation agreement for open skies for passengers and freight transport to promote more air services.

10.4 General View

Finally, what is required is the coordinated and focused commitment of SAARC member states to resolve the identified physical and non-physical barriers in order to put in place a SAARC Regional Multimodal Transport System that requires only nominal investments to achieve substantial improvements in regional transport connectivity. Many of the ‘building blocks’ are in place and SAARC can assist in promoting an environment where these blocks can be combined to support the SAFTA agreement and its expected generation on trade and passenger growth.

BIBLIOGRAPHY

A Multilateral Approach to Trade Facilitation in South Asia – SAWTEE Publication, 2004;
ADB, Regional Cooperation Strategy and Program 2004-2007 South Asia, Second Draft Report, August, 2004;
ADB Study on Identification and Prioritization of Sub-Regional Projects in South Asia, March 2002;
ADB Sub-Regional Corridor Operational Efficiency Study, May 2005, Vol. I, II, III & IV;
Bangladesh Railway Year Book, 2003;
Development of the Trans-Asian Railway – Southern Corridor – UNESCAP, 1999;
Eurasian Global Rail Freight Corridors – Traffic Study – UIC, 2005;
Forging Sub-Regional Links in Transportation and Logistics in South Asia – World Bank Study, January 2001;
Indian Railways Year Book, 2004-05;
Integration of Transport and Trade Facilitation, Selected Regional Case Studies – World Bank Study, 2001;
Review of Development in Transport in Asia and the Pacific, UN-ESCAP, Bangkok, 2005
RIS, The South Asia Development and Cooperation Report – 2004, RIS, New Delhi, 2004, p. 47, 64 and 66;
SAARC *Regional Poverty Profile 2004, Changing Face of Poverty in South Asia*, SAARC Secretariat, 2004;
SAARC Regional Transport Connectivity Review (Draft Report), Prepared for ADB by Staff Consultants, September, 2004;
SAARC Study on Customs and Freight, 2004;
SRMTS Country Report – Bangladesh 2006 (SAARC);
SRMTS Country Report – Bhutan 2006 (SAARC);
SRMTS Country Report – India 2006 (SAARC);
SRMTS Country Report – Maldives 2006 (SAARC);
SRMTS Country Report – Nepal 2006 (SAARC);
SRMTS Country Report – Pakistan 2006 (SAARC);
SRMTS Country Report – Sri Lanka 2006 (SAARC);
Trade Facilitation and Regional Integration: Accelerating the Gains to Trade and Capacity Building, World Bank Study, 2004;
Trade Facilitation and Regional Integration: Accelerating the Gains to Trade with Capacity Building, South Asia Regional Integration, World Bank/International Monetary Fund, Washington, D.C. 2004;
"What Does Regional Trade in South Asia Reveal about Future Trade Integration", World Bank Policy Research Working Paper 3497, Washington DC, February 2005, (PP 1-2);
2006 South Asia Transport and Trade Facilitation Conference – Briefing Book of Country and Sector Analysis by USTDA, 2005.

SAARC Secretariat
P.O. Box: 4222
Kathmandu, Nepal
Tel: (977-1) 4221785, 4226350, 4231334
Fax: (977-1) 4227033, 4223991
Email: saarc@saarc-sec.org
Web-site: www.saarc-sec.org