

Chapter 3

ASEAN-India Connectivity: An Indian Perspective

Prabir De

Research and Information System for Developing Countries (RIS), India.

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CHAPTER 3.

ASEAN-INDIA CONNECTIVITY: AN INDIAN PERSPECTIVE¹

PRABIR DE

Abstract

Effective and efficient infrastructure is essential for industrial and services competitiveness. Improved connectivity lowers costs and increases reliability. This is of great importance for industrial transport and thus for production, cost effectiveness and reliability of supply. In absence of adequate connectivity, enormous opportunities generated by the dynamic growth centres of Asia may stop at their international borders. This study discusses challenges and opportunities in physical connectivity between ASEAN and India. It makes some important recommendations for enhancing physical connectivity between them. The study suggests that for the creation of a functional single market in Asia it is necessary to overcome missing links in transport corridors, lack of inter-operability and infrastructure gaps reducing the efficiency and weakening the global competitiveness of the Asian industry.

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1. WHY IS ASEAN-INDIA CONNECTIVITY SO IMPORTANT?

Connectivity promotes trade, brings people closer, and integrates the economies. We dream for a cherished world in which countries exchange goods, factors and ideas without barriers. Openness or globalization is potentially beneficial to all but requires appropriate policy designs to realize it. Improving connectivity is essential for the region's prosperity, continued growth and, most importantly, poverty reduction.²

Effective and efficient infrastructure is essential for industrial and services competitiveness. Improved connectivity lowers costs and increases reliability. This is of great importance for industrial transport and thus for production, cost effectiveness and reliability of supply. Undoubtedly, distance is exogenous, and it is a major determinant of a region's trade prospects. In absence of adequate connectivity, enormous opportunities generated by the dynamic growth centres of Asia may stop at their international borders. Trade and connectivity between India and ASEAN may be seen in this perspective.

In 2010, the East Asia Summit (EAS) countries adopted a comprehensive strategy for smart, sustainable and inclusive growth.³ At the 17th ASEAN Summit in 2010, the leaders adopted the *Master Plan on ASEAN Connectivity*, which identifies key strategies and actions to enhance the region's connectivity in three dimensions: physical, institutional, and "people-to-people".⁴ It shows the way ahead for Asia in regional integration. The Asia's aim to single market would depend on the existence of a seamless, flexible and efficient logistics and transportation system. Today, it is fragmented, and often it is an obstacle to free flow of goods and services, because of the administrative or technical barriers resulting in expensive mobility within Asia.

In the rail sector, track gauges, voltage and signaling systems differ from one country to another. Similarly, in the road sector, highway lanes, lighting system and quality of roads differ across countries in Asia. The port facilities in some countries are well equipped with technical and electronic equipment, whereas ports in many

² There are both short run and long run benefits of better connectivity. The literature confirms that the long-term impacts of connectivity are several times greater than those in the short-run. In the short-run, the benefits of regional connectivity emanate from reductions in transport cost and time, and increases in trade volumes. However, in the long-run, regional connectivity helps to unlock the tremendous potential of the region by removing constraints and bottlenecks to growth.

³ Refer, Comprehensive Asia Development Plan (CADP), prepared by ERIA, August 2010.

⁴ Refer, ASEAN Summit Declaration, October 2010.

countries in the region still belong to the ancient period and are far away from automation and modernization. While runways in some airports accommodate bigger airplanes, most of the Asian airports lack basic aviation infrastructure. For creation of a functional single market in Asia, it is necessary to overcome the missing links in transportation, the lack of inter-operability and infrastructure gaps reducing the efficiency and weakening the global competitiveness of the Asian industry.

The strong growth of the Indian economy has already made a significant impact on the Asian economy. A considerable part of Asia's supply of primary goods originates from India. India sources intermediate goods and natural resources from Asia. Therefore, growth is strong, and the net export values are very important for Indian as well as Asian economy. Asia's supply of strategic resources and goods is a vital issue and, therefore, should be given greater attention.

India's trade, primarily due to FTAs, is expected to increase manifold in the coming years. ASEAN-India FTA is central to India's growing engagement with her eastern neighbours. Accompanying this growth will be an increase in the demand of both national and international infrastructure, for both production and consumption, and international trade purposes. Undoubtedly, failure to respond to this demand will slow down India's trade and hamper the growth process. Therefore, infrastructure challenges, both hardware and software, require a better understanding and adequate support.

In order to deepen economic integration among East Asian countries, the Economic Research Institute of ASEAN and East Asia (ERIA) conducted a series of research projects in 2009 to develop a Comprehensive Asia Development Plan (CADP) in response to the request from the East Asia Summit (EAS)⁵. The CADP provides (i) a grand spatial design for infrastructure development in East Asia armed with a consistent conceptual framework based on new waves of international trade theory such as the fragmentation theory and new economic geography, (ii) simulation analyses on the impacts of logistic enhancement to the region, using the Geographical Simulation Model (ERIA/IDE-GSM), and (iii) a list of prospective infrastructure projects in consistence with the aforementioned conceptual framework.

Although the CADP has successfully fulfilled the initial mission, there still

⁵ The final report of CADP was submitted to the East Asia Summit in October 2010. The report is available at ERIA, www.eria.org. Refer, ERIA research project report 2009, No. 7-1, October 2010.

remain a number of issues which require further studies. Out of these outstanding issues, a study to develop a basic strategy to enhance the ASEAN-India connectivity is selected as one of the sub-project under phase 2 of the CADP. As explicitly stated in the Master Plan on ASEAN Connectivity⁶, ASEAN put an emphasis on connectivity with the neighboring countries, including China, India, and other EAS countries. While both China and India are the emerging economic superpowers in the region and the immediate neighbors to ASEAN, the extents of the connectivity with ASEAN differ significantly.

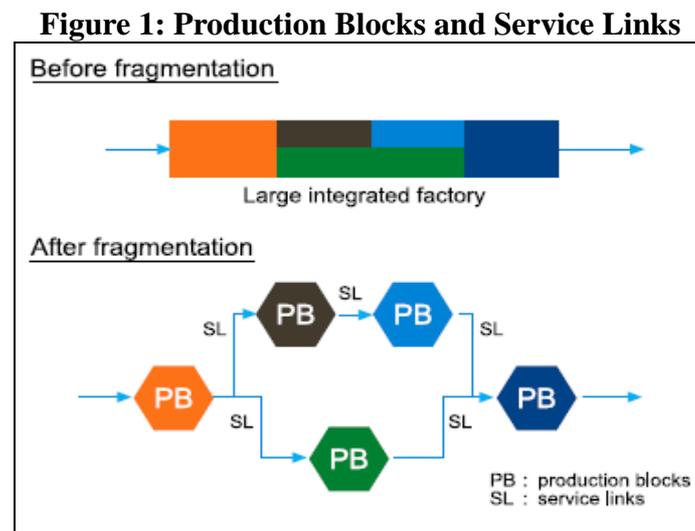
The benefits of better connectivity are plenty for both India and ASEAN. For example, with better connectivity, both India and ASEAN can infuse new dynamism in the regional production network. Stronger production network would enhance the trade and investment, and thereby deepen the East Asian integration process. To sustain the regional production network, we need to improve the trade costs and country's comparative advantage in trade. The catalyst to regional production network is the lowering trade costs. In the long-run, ASEAN-India connectivity would help to unlock the tremendous potential of the region by removing constraints and bottlenecks to growth.

How do we then intensify production network (vertical intra-industry type) between India and ASEAN? By driving down real trade costs and trade and transport logistics barriers, India and ASEAN may realize the potential of higher production-sharing arrangements. The drivers of such trade go beyond relative factor endowments, to factors such as complementary use of information and communication technologies and natural geographies (clustering, agglomeration, and scale effects).⁷ According to Kimura and Kobayashi (2009), the fragmentation theory argues that the key to attract fragmented production blocks is to (i) improve locational advantages by, for example, developing special economic zones (SEZs) coupled with improving local level investment climate; and (ii) reduce the cost of service links that connect remotely located production blocs by improving trade and transport facilitation. Figure 1 presents a graphical links between production blocks. Nonetheless, this exhibit shows why the improved service links between India and ASEAN is important to strengthen the production networks. In fragmentation of

⁶ Refer, for example, ASEAN Secretariat, Master Plan on ASEAN Connectivity, December 2010, available at www.asean.org.

⁷ Refer, for example, Kimura and Obashi (2007).

production, the improved service links, for example, an improved connectivity, is important for expansion of production networks across a region. However, there are many challenges to it. As noted in literature, the institutional cost (due to high tariffs) and the physical cost (due to inadequate physical connectivity) are the barriers to greater economic interactions between India and ASEAN.



Source: ERIA based on Kimura and Kobayashi (2009).

An improved infrastructure between India and ASEAN will be insufficient to foster the regional integration until and unless it is widely complemented by the appropriate policies and regulations, and participation of the private sector.⁸ At the same time, we need policies and regulations to foster an effective cross-border movement of goods, services, and people. Harmonizing and simplifying the customs procedures, information sharing, customs modernization, establishing transparent transit rules, and improving logistics in general are also critical to infrastructure expansion.

At this very initial stage, the emerging regional physical connectivity architecture between India and ASEAN is showing two important features – first, the national connectivity having regional implications such as Delhi–Mumbai Industrial Corridor (DMIC), and second, the regional connectivity showing regional (or international)

⁸ De *et al.* (2010) indicates that given the huge infrastructure investment needs of the region and insufficient government resources, the role of the private sector and public-private partnerships in enhancing regional and national infrastructure facilities in Asia is very crucial. A review of select case studies of cross-border infrastructure projects clearly indicates that the major reasons for slow progress of regional infrastructure development by private sector stem from both economic to non-economic issues that need to be addressed in order to promote seamless Asia.

implications such as Mekong–India Economic Corridor (MIEC), Trilateral Highway (TH) between India, Myanmar, and Thailand along the Asian Highway (AH) No. 1, and Kaladan Multimodal Transit Transport Project (KMTTP), to mention a few.

In view of the potential benefits for both ASEAN and India, it is highly important to develop an appropriate strategy to enhance the connectivity between them. At the same time, enhancing connectivity requires strong regional institutions to build and manage the cross-border infrastructure. This study considers these issues starting with assessments of connectivity in trade and transportation between India and ASEAN. This chapter also discusses the national and regional policies, and their potential for promoting connectivity between India and ASEAN.

2. RISING ASEAN - INDIA TRADE

ASEAN has become India's one of the largest trading partners in recent years. India's trade with ASEAN has increased from US\$ 7.13 billion in 2000 to US\$ 41.32 billion in 2009 (Table 1). Grown at 22 percent in the last decade, India's trade with ASEAN presently shares about 10 percent of India's global trade, compared to 8 percent of 2000. India's trade with ASEAN+3 countries is the most documented development that the world has witnessed in the contemporary period. Trade between India and ASEAN+3 countries increased from less than US\$ 20 billion in 2000 to over US\$ 110 billion in 2009, grown at a CAGR of about 23 percent in the last decade—perhaps the fastest trade growth ever witnessed by India with any economic bloc in the world in the last one decade. Today, ASEAN+3 countries contribute 1/4th of India's global trade, thus emerging as India's largest trading partner in the world. However, this growth in trade varies across countries within ASEAN.

India's export to ASEAN has been growing faster than her imports from ASEAN. In 2009, India's import from ASEAN was US\$ 24 billion and the export to the region was US\$ 17 billion (Table 2(a), (b)). Except 2005, India had net trade deficit with ASEAN in the last decade. India's trade with China has witnessed a phenomenal rise in the last decade. India's export to China mainland increased from about US\$ 1.5 billion in 2001 to US\$ 10 billion in 2009, witnessing a CAGR of 27 percent per annum. In contrast, India's import from China expanded sharply. In 2009, India's import from China mainland touched US\$ 29 billion, which was a mere US\$ 2 billion

in 2001, increasing with a CAGR of 39 percent since 2001. With a share of 6 percent in India's global export and 11 percent in India's global import, China has become India's largest trading partner. At the same time, India's trade with Indonesia, Malaysia, Singapore, Japan and Korea have also grown rapidly. Vietnam comes next. Today, ASEAN shares about 11 percent in India's global exports (which was 7 percent in 2001), and 9 percent of India's global imports (which was 11 percent in 2001). Compared to China and ASEAN, India's trade with CLMV countries has not yet picked-up the momentum. It also suggests further scope for trade expansion with CLMV countries in coming years. This is also not to deny that India's trade with ASEAN and ASEAN+3 countries would be driven by the short run trend. However, the structure of exports may change when the countries witness favorable trading environment such as improved and enabling trade costs. The current trends of ASEAN-India trade suggest that India could become an increasingly important market for ASEAN's exports and vice versa.

Table 1: Trends in India's Trade (Export+Import) with ASEAN and ASEAN+3

Year	ASEAN		ASEAN+3		World
	Value	Share*	Value	Share*	Value
	(US\$ billion)	(%)	(US\$ billion)	(%)	(US\$ billion)
2000	7.13	7.67	18.02	19.38	92.96
2001	10.04	9.60	23.79	22.75	104.58
2002	9.29	8.49	22.81	20.84	109.43
2003	12.38	9.16	30.75	22.74	135.21
2004	15.91	9.08	40.23	22.96	175.22
2005	20.36	8.55	55.30	23.23	238.10
2006	28.36	9.54	73.45	24.71	297.23
2007	36.96	9.51	98.39	25.31	388.80
2008	43.26	9.42	117.42	25.57	459.17
2009	41.32	9.77	113.42	26.82	422.87
CAGR (%)	21.56		22.68		18.33

*Share in the world

Source: Calculated based on Direction of Trade Statistics Online Database, IMF

Table 2(a): India's Export to ASEAN+3

Country	2001		2005		2009		CAGR
	Value	Share*	Value	Share*	Value	Share*	(2001-2009)
	(US\$ million)	(%)	(US\$ million)	(%)	(US\$ million)	(%)	(%)
Brunei	3.09	0.007	33.47	0.034	24.42	0.015	29.49
Cambodia	2.59	0.006	22.68	0.023	41.39	0.025	41.40
Indonesia	442.05	0.973	1368.30	1.393	2872.53	1.739	26.36
Lao PDR	5.52	0.012	4.77	0.005	20.65	0.013	17.93
Malaysia	702.19	1.546	1142.41	1.163	3463.78	2.097	22.08
Myanmar	53.05	0.117	111.32	0.113	209.78	0.127	18.75
Philippines	225.67	0.497	474.06	0.483	699.84	0.424	15.20
Singapore	1016.69	2.238	5069.12	5.161	6721.49	4.069	26.63
Thailand	611.72	1.346	1031.83	1.051	1592.29	0.964	12.70
Vietnam	207.26	0.456	657.00	0.669	1722.47	1.043	30.30
ASEAN	3269.84	7.197	9914.95	10.095	17368.64	10.513	23.21
China, <i>of which</i>	3635.33	8.002	10752.12	10.948	17134.27	10.372	21.39
China, Mainland	1545.20	3.401	6473.30	6.591	10155.00	6.147	26.54
China, Hong Kong	2087.54	4.595	4276.45	4.354	6938.38	4.200	16.20
China, Macao	2.59	0.006	2.37	0.002	40.85	0.025	41.17
Japan	2010.95	4.426	2392.92	2.436	3186.04	1.929	5.92
Korea	1005.12	2.212	1630.83	1.661	3732.14	2.259	17.82

Table 2(b): India's Import from ASEAN+3

Country	2001		2005		2009		CAGR
	Value	Share*	Value	Share*	Value	Share*	(2001-2009)
	(US\$ million)	(%)	(US\$ million)	(%)	(US\$ million)	(%)	(%)
Brunei	0.19	0.00	0.79	0.00	486.16	0.19	166.69
Cambodia	0.11	0.00	0.64	0.00	3.72	0.00	55.29
Indonesia	1159.33	1.96	2910.52	2.08	7863.91	3.05	27.04
Lao PDR	0.01	0.00	0.09	0.00	0.20	0.00	45.42
Malaysia	1734.76	2.93	2386.46	1.71	4923.03	1.91	13.93
Myanmar	197.81	0.33	495.95	0.36	1195.26	0.46	25.21
Philippines	78.26	0.13	223.47	0.16	316.88	0.12	19.10
Singapore	3017.86	5.10	3178.18	2.27	6047.47	2.35	9.08
Thailand	530.08	0.90	1125.16	0.80	2683.95	1.04	22.48
Vietnam	49.90	0.08	120.16	0.09	426.97	0.17	30.78
ASEAN	6768.31	11.44	10441.43	7.46	23947.55	9.29	17.11
China, <i>of which</i>	3415.92	5.78	12013.42	8.59	33810.66	13.12	33.18
China, Mainland	2093.51	3.54	9925.53	7.10	28839.60	11.19	38.80
China, Hong Kong	1322.15	2.24	2087.77	1.49	4970.76	1.93	18.00
China, Macao	0.26	0.00	0.12	0.00	0.30	0.00	1.80
Japan	2133.59	3.61	3854.61	2.76	6385.90	2.48	14.69
Korea	1548.50	2.62	4300.08	3.07	7856.36	3.05	22.51

*Share in the world

Source: Calculated based on Direction of Trade Statistics Online Database, IMF

Table 3(a): India's Trade with ASEAN+3: Product Compositions

Flow	Product	Year: 2003		
		ASEAN	World	ASEAN's Share* (%)
		Value (US\$ billion)	Value (US\$ billion)	
Export	Capital goods	0.68	5.05	13.37
	Consumer goods	2.42	23.83	10.17
	Intermediate goods	4.77	24.10	19.78
	Raw materials	1.97	5.33	37.04
Import	Capital goods	6.13	14.63	41.92
	Consumer goods	1.89	6.82	27.68
	Intermediate goods	5.63	21.60	26.05
	Raw materials	1.21	28.60	4.24
Flow	Product	Year: 2009		
		ASEAN	World	ASEAN's Share* (%)
		Value (US\$ billion)	Value (US\$ billion)	
Export	Capital goods	6.10	22.68	26.89
	Consumer goods	8.85	76.74	11.53
	Intermediate goods	10.81	53.44	20.23
	Raw materials	8.18	15.55	52.62
Import	Capital goods	28.27	56.60	49.94
	Consumer goods	9.86	25.28	39.00
	Intermediate goods	21.17	88.30	23.97
	Raw materials	7.49	90.35	8.28

*Products are grouped according to WTO classification (WTO SoP1 to SoP4)

Source: WITS based on UN COMTRADE

**Table 3(b): India's Export to ASEAN+3 in 2009:
Commodity Compositions (Top 20Products)**

HS Code	Product	Export (million US\$)	Share* (%)
2710	Petroleum oils and oils obtained from.	6028.95	3.41
2601	Iron ores and concentrates, including	4885.28	2.76
7102	Diamonds, whether or not worked, but	1787.18	1.01
8901	Cruise ships, excursion boats, ferry	1418.65	0.80
8525	Transmission apparatus for radio-tel	972.84	0.55
2304	Oil-cake and other solid residues,	936.62	0.53
5201	Cotton, not carded or combed.	633.60	0.36
7403	Refined copper and copper alloys,	632.10	0.36
7113	Articles of jewellery and parts the	618.36	0.35
8905	Light-vessels, fire-floats, dredger	576.04	0.33
2902	Cyclic hydrocarbons.	504.56	0.29
7202	Ferro-alloys.	494.47	0.28
0202	Meat of bovine animals, frozen.	478.85	0.27
7601	Unwrought aluminium.	439.35	0.25
8904	Tugs and pusher craft.	374.38	0.21
5205	Cotton yarn (other than sewing thread	333.19	0.19
3004	Medicaments (excluding goods	276.21	0.16
1005	Maize (corn).	264.86	0.15
2942	Other organic compounds.	244.15	0.14
1515	Other fixed vegetable fats and oils	237.29	0.13

*Share in India's world export

Source: WITS based on UN COMTRADE

**Table 3(c): India's Import from ASEAN+3 in 2009:
Commodity Composition (Top 20Products)**

HS Code	Product	Import (million US\$)	Share* (%)
8517	Electrical apparatus for line telephone	3627.19	1.36
1511	Palm oil and its fractions, whether	3497.26	1.31
8525	Transmission apparatus for radio-tel.	3224.59	1.21
2701	Coal; briquettes, ovoids and similar	2494.42	0.94
2709	Petroleum oils and oils obtained from	2245.77	0.84
2710	Petroleum oils and oils obtained from	2061.34	0.77
8471	Automatic data processing machines	1898.12	0.71
8708	Parts and accessories of the motor	1452.38	0.55
8542	Electronic integrated circuits and	1279.47	0.48
8901	Cruise ships, excursion boats, ferry	991.27	0.37
0713	Dried leguminous vegetables, shell.	984.35	0.37
8473	Parts and accessories (other than	977.36	0.37
8523	Prepared unrecorded media for sound	975.15	0.37
7208	Flat-rolled products of iron or non	964.48	0.36
2603	Copper ores and concentrates.	836.87	0.31
7102	Diamonds, whether or not worked	793.82	0.30
4403	Wood in the rough, whether or not	722.97	0.27
8529	Parts suitable for use solely or pr.	582.36	0.22
2941	Antibiotics.	550.46	0.21
8504	Electrical transformers, static con	537.16	0.20

*Share in India's global imports

Source: WITS based on UN COMTRADE

India's trade with ASEAN+3 countries has been witnessing a compositional shift. Traditionally, India's export and import with ASEAN+3 countries are driven by intermediate and capital goods respectively, in absolute term. However, over time, ASEAN+3 countries have appeared as a major supplier of capital goods to India. Today, ASEAN supplies half of India's global imports in capital goods, the share increased from about 42 percent in 2003 (Table 3(a)). Although India is a major exporter of raw materials to ASEAN+3 countries (read, driven by China's huge import demand), India's major achievement is export of capital goods to ASEAN, which has increased from less than a billion in 2003 to over US\$ 6 billion in 2009, thereby contributing 1/4th of India's global exports. ASEAN is also a bulk supplier of intermediate goods to India. To a great extent, intermediate and capital goods are driving the trade between India and ASEAN.⁹ Barring minerals and gems and jewelry, commodities such as electrical machinery, transmission apparatus, cotton yarn, etc. have emerged as important Indian exports to ASEAN (Table 3(b)). On the other, India's imports from ASEAN are primarily driven by electrical machinery, palm oil, mineral fuels, etc. (Table 3(c)).

Unlike the European Union, East Asian integration has been market driven and has followed a 'hub and spoke' process. With regional and bilateral FTAs, Asia has now been witnessing an enlarged market. When trade barriers between countries have been disappearing with varied pace, we expect a bigger market size in horizon. ASEAN is a major trading partner for India and accounts for about 10 percent of its global trade. With India-ASEAN FTA in goods in operation since January 2010¹⁰, expansion of market size may be achieved provided the trade liberalization is complemented by effective trade facilitation on time.

Finally, regional cooperation has been in the forefront of India's foreign policy. India has signed FTAs with Korea, Japan, Malaysia, Singapore and Thailand in East

⁹ The usual disclaimer is that this may be subject to aggregation bias.

¹⁰ Under the ASEAN-India FTA, the ASEAN member countries and India have agreed to lift import tariffs on more than 80 percent of traded products between 2013 and 2016, starting from January 1, 2010. Also, tariffs on sensitive goods will be reduced to 5 percent in 2016, while tariffs will be maintained on up to 489 items of very sensitive products. The agreement has provided flexibilities to India and ASEAN countries to exclude some of the products from tariff concessions or eliminations to address their respective domestic sensitivity. India, on its part, has excluded 489 items from the list of tariff concessions and 590 items from the list of tariff elimination to address sensitivities in agriculture, textiles, auto, chemicals, crude and refined palm oil, coffee, tea, pepper etc. ASEAN countries have also maintained similar exclusion list from the proposed tariff concessions or eliminations.

Asia. India's several FTAs with some other countries are in the advanced stages of negotiation. The signing and negotiating of these agreements with Asian countries signal India's firm commitment to its 'Look East' policy of building upon its historical links with the countries of the East Asian region and further deepening and widening the partnership. While India's engagement with ASEAN is getting deeper, its two regions occupy the prime axis, viz. India's Southern and Northeastern regions. This study discusses physical connectivity projects in these two regions in later part of the study.

2-1. International Trade of Southern India

Southern India comprises four major states, namely, Andhra Pradesh, Karnataka, Kerala and Tamil Nadu. All of them together present about 30 percent of India's GDP, 40 percent of population and 30 percent of India's surface area¹¹. These states have been playing an important role in India's growth and development, of which Tamil Nadu needs a special mention for its trade links with ASEAN.

The state of Tamil Nadu has an area of 130,058 sq. km and population of 72.13 million¹² (2011 census, provisional numbers), recording population density of 555 per sq. km. (against national average of 382). The decadal growth rate of the state is 15.6 percent (against 17.64 percent for the country). The state ranks 7th in terms of population size. It is the most urbanized state in the country, with over 44 percent population living in urban areas (2001 census).

Tamil Nadu is also one of the fastest growing states in India. In the last decade, the state has grown at 13.2 percent per annum.¹³ It is one of the major industrialized states in India, having three major seaports and one international airport. Along its about 1000 km. coastline, there are 18 seaports, of which 3 are major and 15 are non-major ports.¹⁴ In terms of the total value of foreign trade of Tamil Nadu, sea ports contribute more than 90 percent of the total value of exports in 2008-09.

¹¹ Calculated based on CSO's National Accounts 2011, Population Census 2011 and Statistical Abstract of Government of India, 2008, respectively.

¹² Annual population growth for Tamil Nadu over 2001-2011 is 1.46 percent per annum (1.64 percent per annum for the country)

¹³ Measured in terms of average GSDP (Gross State Domestic Product) growth rate from 2001-02 to 2008-09; data taken from CSO.

¹⁴ The three major ports are Ennore, Chennai and Tuticorin and 15 non-major (minor) ports at Cuddalore, Nagapattinam, Pamban, Rameswaram, Valinokkam, Kanyakumari, Colachel, Kattupalli, Ennore, Thiruchopuram, PY-03 Oil Field, Thirukkadaiyur, Punnakkayal, Koodankulam and Manappad.

Table 4: Tamil Nadu's Trade

Year	Exports	Imports
(US\$ million)		
1991-92	220.23	218.98
1992-93	224.62	238.53
1993-94	289.67	258.62
1994-95	396.84	399.43
1995-96	473.33	520.68
1996-97	495.67	421.59
1997-98	444.77	992.28
1998-99	446.19	558.18
1999-00	622.71	590.78
2000-01	256.91	411.99
2001-02	264.85	390.59
2002-03	517.38	737.61
2003-04	719.63	953.13
2004-05	774.11	1752.45
2005-06	1158.66	2551.93
2006-07	1496.28	3511.88
2007-08	2280.31	4725.55
2008-09	1973.19	5030.53
CAGR (%)	13.77	20.25

Source: Statistical Handbook, (various issues),
Department of Economics and Statistics, Tamil Nadu

Tamil Nadu's exports have exhibited remarkable resilience and dynamism in recent years. As shown in Table 4, Tamil Nadu's exports reached a level of US\$ 1973.19 million in 2008-09. The exports recorded a CAGR of 13.77 percent during the period from 1991-92 to 2008-09. Imports in 2008-09 were US\$ 5030.53 million as against US\$ 4725.55 million in 2007-08 registering a positive annual growth of 6.45 percent. The compounded growth of Tamil Nadu imports during 1991-92 to 2008-09 was 20.25 percent (Table 4).

As given in Table 5 (a, b), the value of Tamil Nadu's exports and imports through seaports with ASEAN+3 countries picked-up momentum since the late 1990s. Among the ASEAN countries, Tamil Nadu has active trade links with Malaysia, Singapore, Philippines, Indonesia, Thailand and Vietnam. The active foreign trade link with Malaysia and Singapore can be traced to the presence of substantial presence of Tamil Diaspora in these countries. The value of exports to ASEAN+3 countries through airports of Tamil Nadu is less compared to the same using the sea ports. On the other, imports through seaports are mainly from China, Korea, Japan, Indonesia

and Malaysia (Tables (5b) and 6(b)). Similar trend is observed in the case of imports through airport from China. The growth rate of the value of imports through seaports has been fluctuating in most of the years.

Table5(a):Exports through Tamil Nadu Seaports to ASEAN+3Countries

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam	China	Korea	Japan
(US\$ million)									
2000-01	12.79	20.36	1.18	6.56	4.18	2.95	43.26	0.52	36.68
2005-06	-	11.97	14.91	9.49	58.05	29.14	140.49	95.54	61.21
2006-07	8.61	24.73	31.36	54.99	54.76	28.04	149.72	116.37	70.88
2007-08	39.26	38.52	51.44	63.62	75.30	59.89	132.95	113.57	46.97
2008-09	100.62	50.96	85.59	106.50	83.19	72.74	164.21	207.98	43.77

Source: Statistical Handbook, (various issues), Department of Economics and Statistics, Tamil Nadu

Table 5(b): Imports through Tamil Nadu Seaports from ASEAN+3 Countries

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam	China	Korea	Japan
(US\$ million)									
2000-01	22.24	61.00	-	35.43	4.74	-	60.76	79.53	118.54
2005-06	376.75	129.20	-	277.59	244.84	-	728.65	601.04	270.59
2006-07	496.63	734.90	16.56	375.40	151.49	-	636.19	558.91	246.44
2007-08	791.48	829.75	14.91	468.18	174.20	-	2224.10	575.04	281.80
2008-09	679.92	644.64	52.27	543.15	153.32	2.61	1960.93	953.24	251.32

Source: Statistical Handbook (various issues), Department of Economics and Statistics, Tamil Nadu

Table 6(a): Exports through TamilNaduAirports to ASEAN+3 Countries

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam	China	Korea	Japan
(US\$ million)									
2000-01	-	1.64	0.03	9.77	1.41	-	0.44	11.10	6.06
2005-06	3.84	2.48	-	7.23	-	10.16	16.94	18.30	4.97
2006-07	1.99	-	-	1.77	2.65	9.50	11.26	14.80	6.85
2007-08	1.99	-	-	17.40	8.45	15.66	32.31	18.89	3.48
2008-09	4.14	-	-	9.36	5.44	14.59	26.57	11.98	4.79

Source: Statistical Handbook, (various issues), Department of Economics and Statistics, Tamil Nadu

Table 6(b): Imports through TamilNaduAirports from ASEAN+3 Countries

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand	China	Korea	Japan
(US\$ million)								
2000-01	-	0.10	-	57.68	53.58	3.48	1.15	17.43
2005-06	2.71	13.10	-	260.87	-	217.51	210.73	35.91
2006-07	9.49	45.05	-	172.02	-	378.71	68.45	36.87
2007-08	4.72	72.07	-	368.28	10.18	808.37	62.37	48.45
2008-09	3.92	47.04	-	325.80	-	781.19	108.02	59.01

Source: Statistical Handbook (various issues), Department of Economics and Statistics, Tamil Nadu

Table 6: Export Intensity of Selected Products of Tamil Nadu (2007-08)

Products	Share of Tamil Nadu in India (%)
Electronic hardware and IT software	10.64
Engineering goods	11.05
Textile and garments	18.30
Leather and leather goods	33.00
Agro and processed goods	5.52
Chemical and allied products	10.95
Ores and minerals	18.30
Marine products	21.15

Source: Tamil Nadu Guidance Bureau Statistics

Exports from Tamil Nadu consists of both labour-intensive and technology-intensive goods. The main items of export through seaports are food products, tobacco and beverages, metals, minerals and fuel, leather, pharmaceutical products, chemicals, rubber and plastic, non-metallic mineral products, basic metals and alloys, transport equipment, textile products, wood and paper products, and cotton. In case of export, the major commodity exported through seaport is the transport equipment. This is not surprising, since Tamil Nadu is the fast becoming the major destination of automobile and components manufacturers of the world. The major items of labour intensive exports are textiles and leather. On the international textile sector, Tamil Nadu has gained a prominent place. In contrast, the value of exports through airports of Tamil Nadu is much less. Among the commodities, exports of leather ranks first, followed by textiles. The same trend was visible earlier that exports through seaports dominate the trading activities from Tamil Nadu. The estimated export intensity indices in Table 6 suggest Tamil Nadu is one of the leading exporters of textiles, leather and marine products from India.

Tamil Nadu has recorded a healthy growth in both exports and imports. Besides Chennai seaport, other ports like Tuticorin and Ennore are emerging as key facilitators of trading activities in Tamil Nadu. Tamil Nadu has also established strong trade links with some of the ASEAN countries like Singapore, Malaysia, and Indonesia. The key challenge in Tamil Nadu's trade is to increase its exports. To address this challenge, Tamil Nadu has to improve its trading infrastructure, both hardware and software. It, therefore, provides a lot of scope for setting up infrastructure facilities in the state such as special economic zone (SEZ).

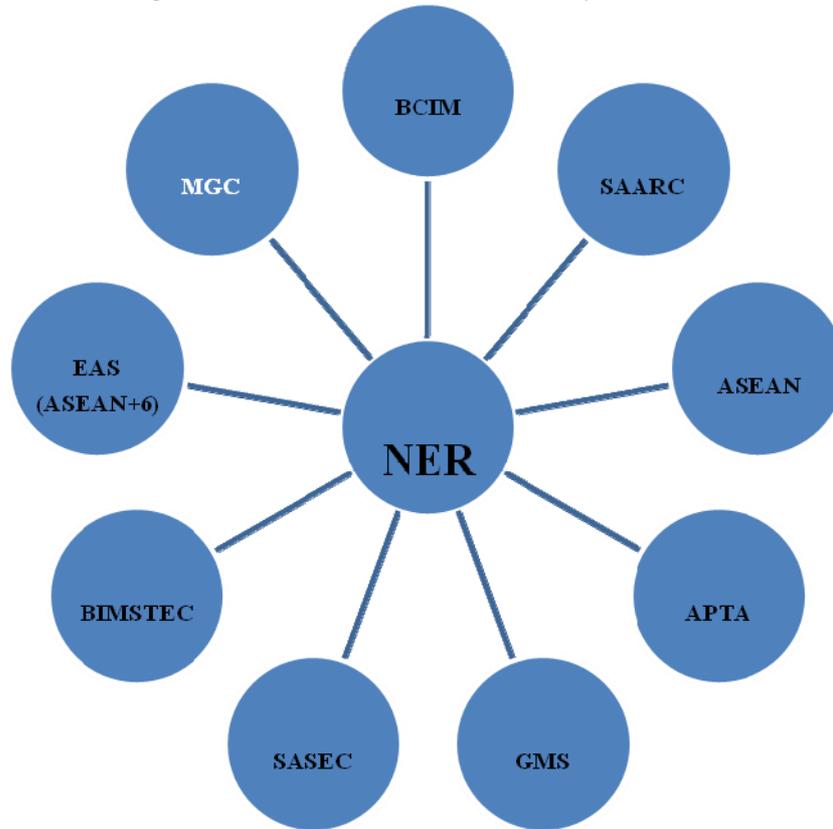
2-2. International Trade of Northeastern India

India's North Eastern Region (NER) and West Bengal state links India's eastern neighbours such as Bangladesh, China and Myanmar with rest part of India. The NER comprises of eight states, namely, Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura. Before the partition of the Indian subcontinent in 1947, the NER was linked with the rest part of India through present day Bangladesh. The multimodal communication channels between the NER and rest of India used to run through Bangladesh plain. Following the partition, these traditional channels of communication got disrupted making the NER a land-locked territory in India. In post-partition India, the NER is connected with the rest of India through the narrow "Chicken's Neck" (popularly known as Siliguri Corridor) which has widened the geographical distance between the NER and eastern entry port of India - Kolkata. Although the NER is rich in resources like hydrocarbons, forest, hydro-electricity, and other minerals, high transportation cost did not allow her to grow according to her comparative advantages. The connectivity bottlenecks have made the region perpetually underdeveloped and hence politically volatile.¹⁵

Barring Sikkim, per capita income of most of the NER states is lower than that of national average. The slow progress of NER's economy is reflected in the low growth in income. However, the NER is unique in terms of opportunities. While it is an industrial desert where almost all immediate consumables are imported from outside the region, it is the focal point of trade within a vast area. About 98 percent of this region's borders form India's international boundaries; it shares borders with the China in the north, Bangladesh in the southwest, Bhutan in the northwest, and Myanmar in the east. NER's locational advantage and rich natural resources provide a backdrop to its development as a base for cooperation not only with ASEAN, but also with neighboring countries such as Bangladesh, Bhutan, and Nepal. And through Myanmar, regional cooperation centering the NER can be extended to Mekong region, comprising Cambodia, Lao PDR, Thailand, and Viet Nam.

¹⁵ Refer, for example, Bhattacharya and De (2006), and De (2008).

Figure 2: NER as India's Gateway to East

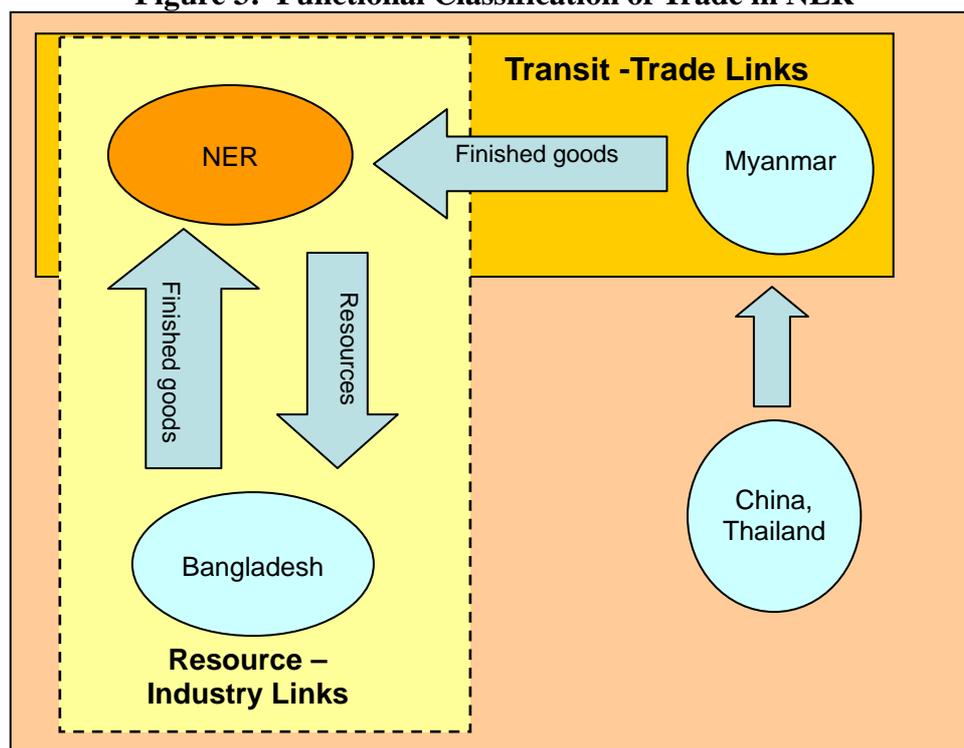


Source: RIS (2011)

Since early 1990s, with the adoption of Look East Policy (LEP), India-Myanmar engagement has been growing on substantive ground and is increasingly being structured. Myanmar is the land-bridge that connects world's two largest markets – South and Southeast Asia. Figure 2 presents the region's strategic location in the backdrop of India's growing engagement with her eastern neighbors. NER is, therefore, an important region that geographically links India with ASEAN.

India's change in policy towards Myanmar has paid a rich dividend. Trade between the two countries increased heavily in last decade, allowing Myanmar to get higher market access in India. Figure 3 shows an overview of the region's trade linkages with neighbouring Myanmar and Bangladesh. However, composition of Indian imports from Myanmar has not changed much over time. India's trade with Myanmar witnessed a higher growth in the last decade, which indirectly suggests existence of a large trade potential between the two countries.

Figure 3: Functional Classification of Trade in NER



Source: RIS (2011)

2-2-1. Trade Flows between NER and Bangladesh

India and Bangladesh share about 4091 km long international borders. Out of which the NER shares almost 1880 km border with Bangladesh (wherein 1434 km is land border and 446 km is riverine tract). Four states of the NER, namely, Assam, Meghalaya, Tripura, and Mizoram, share international borders with Bangladesh. However, a large part of this international border with Bangladesh is porous.

The first Trade Agreement between India and Bangladesh was signed in 1972. The India-Bangladesh Trade Agreement (IBTA) has been renewed for a period of three years up to March 31, 2012. It governs the present trading arrangements between the two countries. To facilitate the NER-Bangladesh border trade in goods and services, the Government of India through the Office of the Commissioner of Customs in Shillong has setup 26 Land Customs Stations (LCS) along the NER-Bangladesh borders, of which, 20 are functional and remaining 6 are non-functional LCSs.

Out of the four NER states having international borders with Bangladesh, except Mizoram, the NER-Bangladesh trade mainly flows through Assam, Meghalaya and Tripura. A 2-year average (2006-08) of the NER-Bangladesh trade shows that the

share of Meghalaya in the NER-Bangladesh trade is the highest (Table 7). The contribution of Meghalaya to the total volume of the NER-Bangladesh trade stands at 63.83 percent; the same for Tripura and Assam are 18.26 and 17.91 percent respectively. While both Assam-Bangladesh and Meghalaya-Bangladesh trade are characterized by higher export and negligible import, Tripura-Bangladesh trade exhibits just opposite trends, i.e., higher import and lower export.

Table 7: NER-Bangladesh Border Trade Volume

States	Volume (2-years Average, 2006-08) (US\$ million)	Share in Total Trade (%)
Assam	15.66	17.91
Meghalaya	55.82	63.83
Tripura	15.97	18.26
NER total	87.46	100.00

Source: RIS based on Office of the Commissioners of Customs, Shillong

Trade between NER and Bangladesh is uneven and not diversified. The official trade between NER and Bangladesh is concentrated in agricultural commodities, processed foods, minerals and garments. While the NER's export to Bangladesh is dominated by raw materials like coal, limestone, boulders and agro-horticultural products like ginger and citrus fruits, import from Bangladesh is mostly finished goods like cement, synthetic fabric, readymade garments, and processed food. The NER's export products to Bangladesh are distinctly different from major export lines from the rest part of India to Bangladesh. A quick look at the product-wise trade between the NER and Bangladesh indicates complementarities between the resource structure of the NER and demand structure of Bangladesh (Figure 3).¹⁶ Bangladesh lacks in mineral resources like coal and limestone which the country imports from the NER. Due to weak resource industry-linkages, manufacturing base of the NER remained underdeveloped and hence in return the NER imports manufacturing goods from Bangladesh. This provides a firm basis for trade expansion between the two regions.¹⁷

¹⁶ This was also widely discussed in Das and Thomas (2008).

¹⁷ According to Brunner (2010), export potential lies in food or fruit processing, bamboo and cane products, jute, floriculture, aromatic plants, aromatic and medicinal herbs, spices, rubber, forest products, natural resource products, tea and other plantation crops, inland freshwater fishing, among others.

2-2-2. Trade Flows between NER and Myanmar

India and Myanmar share a common border of 1,643 km. Four states of the NER, namely, Arunachal Pradesh, Manipur, Mizoram, and Nagaland, shares international borders with Myanmar. However, a large part of this international border with Myanmar is porous, mountainous and inhabited. Till date, four LCSs are in operation, serving the trade between the two countries, of which Moreh in Manipur is the busiest LCS, handling almost 99 percent of the NER's trade with Myanmar.

In general, India-Myanmar border trade mainly flows through Moreh in Manipur state. In the last decade, NER's average annual export to Myanmar was about US\$ 2.36 million, whereas the average annual import from Myanmar was US\$ 1.88 million. It contributed a miniscule 2.08 percent and 0.49 percent in country's total export to and import from Myanmar respectively in the last decade (Table 8). In US\$ term, while Indian export and import with Myanmar witnessed a massive 76 percent and 116 percent, respectively in the last decade, the same from the NER faced consistently negative growth in the same period.¹⁸ Unlike the NER-Bangladesh trade, the NER's trade with Myanmar has always remained less than a percent of India's total trade with Myanmar since opening of LCS at Moreh in 1995. Moreh in Manipur is the largest LCS handling about US\$ 3.59 million India-Myanmar merchandise trade, of which export and import contribute 41 percent and 59 percent respectively. Therefore, border trade potential between India and Myanmar is yet to be realized.

¹⁸ However, in Indian rupee term, NER's export to Myanmar witnessed positive growth, but the NER's import from Myanmar couldn't escape negative growth rate in the last decade.

Table 8: NER's Trade with Myanmar⁺

Year#	Indian export to Myanmar	Indian import from Myanmar	NER export to Myanmar	NER import from Myanmar	NER Share* (%)	
					Export	Import
(US\$ million)						
2000	48.05	179.18	1.23	2.75	2.56	1.53
2001	53.05	197.81	0.26	1.61	0.49	0.81
2002	71.53	345.64	1.03	2.43	1.44	0.70
2003	86.00	390.77	2.02	1.90	2.35	0.49
2004	104.71	400.05	1.43	1.19	1.37	0.30
2005	111.32	495.95	0.88	1.18	0.79	0.24
2006	132.72	718.40	13.52	0.59	10.18	0.08
2007	174.02	802.79	0.75	3.26	0.43	0.41
2008	212.23	893.92	1.06	1.79	0.50	0.20
2009	209.78	1195.26	1.47	2.12	0.70	0.18
Average**	120.34	561.98	2.36	1.88	2.08	0.49
CAGR (%)	75.96	115.83	-14.51	-194.96		

*Share in India. **Average for the period 2000-2009. +NER export and import consider trade through Moreh only. #Trade data for India counts calendar year while the same for NER consider financial year. Sources: IMF for India's trade with Myanmar, and Indian Customs for NER's trade with Myanmar.

Table 9: Facilities at the Moreh LCS*

Facility	Available (Y)	Not Available (N)
Food testing laboratory		N
Availability of electricity		N
Telephone	Y	
Internet		N
EDI (Icegate)		N
Weighbridge		N
Warehouse		N
Cold storage		N
Parking place	Y	
Transshipment platform / Transit sheds		N
Secretarial assistance (fax, photocopy etc.)		N
Drinking water		N
Drivers' rest room	Y	
Health centre		N
Hotels and restaurants		N
Separate entry and exit gates		N
Banks	Y	N
Courier / Post Office		N
Servicing centre / Vehicle repair shops		N

Source: RIS (2011).

There are a lot of differences in the commodity compositions of trade in the Moreh LCS. Important commodities being imported from Myanmar consist of betel nuts, dry ginger, pulses, whereas Soya bari, Cumin seed, Soya grid and skimmed milk powder are some major exported items.¹⁹ The formal trade volume at Moreh is appeared to be less than the informal trade volume.²⁰ With the change in demand pattern in both sides of the border, trade at Moreh LCS is carried out more in negative list items than the positive list items. While a formal trade at Moreh shows trade in traditional primary goods, informal trade, if factored in, indicates a compositional change in border trade that has undergone between the two countries. Barter trade of 22 agreed items has lost its relevance while the normal or regular trade has gained the popularity over time. One of the primary reasons for a low level of border trade at Moreh LCS is perhaps the unfavourable trading environment. Trade at Moreh LCS suffers not only due to lack in modern trade infrastructure, both hardware and software, but also due to the absence of adequate security, thus making the entire trade very unsecured. Table 9 provides a list of infrastructure facilities available at Moreh LCS. On top, the unfriendly exchange rate between India and Myanmar prohibits the formal trade to grow, resulting which governments in both sides are losing revenue.

2-2-3. Trade Flows between NER and China

The re-opening of the border trade with China at Nathu La in Sikkim state of India is a significant achievement in strengthening the relationship between the two countries. Nathu La is historically a very important border in respect of trade with Tibet Autonomous Region of China.²¹ Border trade through Nathu La formally resumed on 6th July 2006.²²

Trade at Nathu La is carried out in liberal terms. For example, Import-Export

¹⁹ In terms of value also the trade at the LCS is a miniscule of the estimated value of informal trade occurring at Gate No. 2 connecting Moreh to Namphalong in Myanmar.

²⁰ The total volume of trade at Moreh is certainly more than official trade of Rs. 150 million. A quick estimate shows total trade including informal volume is about Rs. 2800 million (Source: RIS). This does not include the clandestine trade in drugs and small arms whose value also would be substantive.

²¹ Border trades have been started more than one decade back at Sipkila in Himachal Pradesh and Gunji in Uttaranchal with a restricted list of items.

²² The corresponding Chinese site is Renqinggang. Border trade markets remain open from Monday to Thursday every week from 7:30 am to 3:30 pm in Indian time and 10 am to 6 pm in Chinese time.

Code (IEC) is not required for the border trade because persons importing or exporting from/to China are authorized to trade in Indian currency value of Rs. 100,000 per day per trader. The issue is the list of permissible items of trade. The permissible list is comprised of 29 export items from India to China and 15 export items of China to India. It is clear to us that the list of permissible items is driven purely by the local need. As a result, the volume of trade has been small. In 2009, about US\$ 9000 was the total trade at Nathu La between India and China (Table 10). Therefore, border trade is yet to take a good shape between India and China.

Table 10: NER-China Border Trade at Nathu La

Period	Export from India to China	Import from China to India	Visit of Indian traders to trade mart at Renqingang (China)	Visit of Chinese Traders to trade mark at Sherathang (India)
	(US\$)			
7th July to 29th September 2006	19,567.62	23,891.46	696	1253
1st May to 29th November 2007	67,498.18	16,662.63	2117	3701
19th May to 27th November 2008	21,8793.2	3,109.166	1034	3948
1st May to 30th November 2009	2,791.563	6,120.761	Data not available	

Source: RIS based on Department of Industries, Sikkim Government

To conclude, the pattern of India-Bangladesh border trade that flows through the NER-Bangladesh sector is characterized by resource-industry linkages. The rationale of the trade lies in free trade principle. Some critical minerals which are available in the NER but not available in Bangladesh provide the basis of the NER-Bangladesh trade. What follows is that NER's export products to Bangladesh are distinctly different from major export lines from the rest of India to Bangladesh. The product-wise trade between the NER and Bangladesh indicates complementarities between the resource structure of the NER and demand structure of Bangladesh. Bangladesh lacks in mineral resources like coal and limestone which the country imports from the NER. Due to weak resource industry-linkages, manufacturing base of the NER remained underdeveloped and hence in return the NER imports manufacturing goods from Bangladesh. This provides a firm basis for trade expansion between the two regions.

Border trade between India and Myanmar has not progressed further since

opening of the Moreh LCS in 1995. Trading environment between India and Myanmar is unfavorable and not supporting the border trade. Unlike the NER-Bangladesh trade, the NER's trade with Myanmar has always remained less than a percent of India's total trade with Myanmar. Barter trade of 22 agreed items has lost its relevance while the normal or regular trade has gained popularity over time. One of the primary reasons for low level of border trade at Moreh LCS is perhaps the unfavourable trading environment in general and unfriendly currency arrangement in particular. Trade at Moreh LCS suffers not only due to lack in modern trade infrastructure, both hardware and software, but also absence of adequate security, thus making the entire trade very unsecured. On top, the unfriendly exchange rate between India and Myanmar prohibits the formal trade to grow, resulting which government is losing revenue. In a sense, the border trade potential between India and Myanmar is yet to be realized.

The re-opening of border trade with China at Nathu La in Sikkim state of India is a significant achievement in recent years. Contrary to popular belief, border trade with China is carried out on limited items only which are purely driven by the local need. As a result, volume of trade between India and China at Nathu La has not been grown much since reopening of the border trade in 2006.

3. CONNECTIVITY AND INDUSTRIAL CLUSTERS IN TAMIL NADU

Tamil Nadu is one of the industrialized states in India. The state has a well-developed network of roads, railways and air services, and is an important maritime state of the country. Chennai is considered as the gateway to southern India.

Tamil Nadu has a road network covering about 153 km per 100 sq.km. area, significantly higher than the country's average road network coverage of 103 km per 100 sq.km. area²³. It has 4,873 km of the National Highways, 9,384 km of the state highways, 11,288 km of the major district roads, 61,641 km of the other district roads, and 137,399 of rural roads. Tamil Nadu has 27 National Highways and is an important terminus on the Golden Quadrilateral project of the National Highway Authority of India (NHAI).

²³ Demand No-21, Policy Note on Roads, Bridges (2010-2011), Highways and Minor Ports Department, Government of Tamil Nadu.

Tamil Nadu also has a well-developed railway network with 541 railway stations and the same falls under the jurisdiction of Southern Railways. The state has a total of 4,106 route km of railway network, out of which nearly 1,235 route km is electrified as on December 2009.²⁴ Out of the total, nearly 78.5 percent network is broad gauge and the balance meter gauge. The railway network connects the state with most of the major cities in India. Main rail junctions in the state include Chennai, Coimbatore, Madurai, Tiruchirapalli (Trichy) and Salem.

Table 11: Commodity-wise Port Traffic of Major Ports of Tamil Nadu

Major Ports	Period	POL Crude & Product	IronOre	Fertilizer	Coal	Container	Others	Total
(million tonnes)								
Ennore	2009-10	0.39	0.94	0.00	9.28	0.00	0.09	10.70
	2008-09	0.36	1.11	0.00	9.71	0.00	0.32	11.50
Chennai	2009-10	13.32	8.03	0.61	3.06	23.48	12.56	61.06
	2008-09	13.13	8.36	0.78	4.10	20.58	10.54	57.49
Tuticorin	2009-10	0.51	0.04	2.08	5.60	6.60	8.96	23.79
	2008-09	0.50	0.00	1.83	5.71	5.48	8.49	22.01
All Indian	2009-10	175.08	100.33	17.72	71.71	101.24	95.01	561.09
Major ports	2008-09	176.14	94.04	18.22	70.40	93.14	78.59	530.53

Source: Ministry of Shipping, Government of India

Along its coastline of 1,076 km, Tamil Nadu has three major ports (Chennai, Ennore and Tuticorin) and 20 minor (non-major) ports.²⁵ All minor ports in the state are anchorage ports without berthing facilities. Thus, cargo is transhipped from the vessels at mid-stream to the shore and vice-versa through barges. Considering the high growth expected in the future, major capacity up gradation works are being implemented or are being planned at both, major and minor ports in the state. The current commodity-wise traffic handled at these ports is given in Table 11.

In the year 2010-11, the three major ports in Tamil Nadu handled about 98.2 million tonnes (MT) of cargo, which is about 17.2 percent of the total traffic of all major ports in India. While total cargo at all Indian ports together witnessed a meager growth of 1.57 percent over the period 2009-10 to 2010-11, the ports of Chennai, Ennore and Tuticorin registered the cargo growth of 2.86 percent, 0.66 percent and

²⁴ Ministry of Railways (Railway Board), Government of India

²⁵ **Government Ports:** Cuddalore, Nagapattinam, Pamban, Rameswaram, Valinokkam, Kanyakumari, Colachel. **Captive Ports:** Kattupalli, Ennore (Minor), Mugaiyur, Thiruchopuram, Silambimangalam, Shipyard port, P Y-03 Oil Field, Kaveri Port, Vanagiri Port, Thirukkadaiyur, Thirukkudal, Punnakkayal, Manappad, Koodankulam. **Ports under consideration:** Cheyyur (Panaiyur), Parangipettai, Udangudi

8.16 percent respectively. Chennai port was the busiest amongst the major ports in Tamil Nadu, and in the year 2009-10, catered to nearly 10.9 percent of the total cargo handled by all Indian ports together. According to the Ministry of Shipping, the capacity of Chennai, Ennore and Tuticorin ports as on March 2010 was 71.32 million tonnes, 16 million tonnes and 23.72 million tonnes respectively, indicating fairly high utilization rates, whereas the current capacity of all Indian ports together is 628.03 million tonnes.²⁶ The share of traffic catered by non-major ports in the state of Tamil Nadu is low in comparison to traffic catered by all non-major ports in India. In 2009-10, non-major ports in the state catered to 1.17 million tonnes (0.4 percent of all non-major ports traffic).

Table 12: Trade links with EAS Countries through Chennai Seaport in 2010

Country	Export		Import	
	No. of	Share	No. of	Share
Singapore	11858	7.159	516061	24.775
Malaysia	7830	4.727	15263	0.733
Australia	5921	3.575	2991	0.144
China	4111	2.482	232753	11.174
Japan	3604	2.176	315715	15.157
Thailand	1808	1.092	122739	5.892
Hong Kong, China	1696	1.024	76717	3.683
Taiwan, China	1228	0.741	39512	1.897
South Korea	1081	0.653	307738	14.774
Indonesia	1052	0.635	8997	0.432
Vietnam	632	0.382	1744	0.084
Philippines	455	0.275	1298	0.062
Myanmar	359	0.217	5	0.000
Cambodia	48	0.029	0	0.000
New Zealand	21	0.013	2	0.000
EAS total	41704	25.178	1641535	78.81
Rest of World	123931	74.822	441450	21.19
Total through Chennai seaport	165635	100.000	2082985	100.000

Source: RIS based on Chennai Customs

In terms of shipping linkages with India's partner countries, Chennai seaport has truly emerged as India's gateway port to ASEAN and East Asia. This port handled about 79 percent of import vessels in 2010 which originated in the EAS region (Table 12). In export, about 25 percent of the cargo vessels originated at this port for the EAS region.

²⁶ Transport Research Wing, Ministry of Shipping, Government of India.

The state has five airports at Chennai, Trichy (Tiruchirapalli), Madurai, Coimbatore and Tutocorin. Chennai Airport is a major hub airport in Southern India and caters to both domestic and international traffic through the Kamaraj domestic terminal and Anna international terminal, located at Meenambakkam. During 2009-10, this airport handled about 10.53 million passengers and 323 thousand tonnes of cargo. It was the third busiest airport in the country, catering to nearly 8.5 percent of the total passenger traffic in India, after Delhi and Mumbai airports.²⁷

The manufacturing sector in Tamil Nadu grew at an average rate of 8.4 percent from 2006-2007 to 2009-2010.²⁸ The growth of industries in manufacturing sector in Tamil Nadu over the past five years has been impressive. Tamil Nadu has attracted several industrial sectors and has become one of the most industrialized states in India. The state has attracted cumulative FDI inflows of US\$ 5.7 billion between April 2000 and May 2010 and is amongst the highest FDI attracting states.²⁹ FDI inflows have helped achieve greater technological advancement and more exportable products. With increasing competitiveness among states to attract investments, the state has initiated a strategy that includes key thrust areas like focusing on core infrastructure sector, targeting strategic industries, developing knowledge/technology driven industries and encouraging private sector initiative and participation in infrastructure projects.³⁰

Around 3,000 foreign companies have set up their facilities in the state so far, out of which 34 are Fortune 500 companies.³¹ There are around 26,000 factories in manufacturing sector in the state.³² The state has rich pool of labour with average wages lower than similar in most developed countries. Figure 4 presents the location of industries in Tamil Nadu.

²⁷ According to the Ministry of Civil Aviation, the Chennai airport is projected to handle about 11.9 million passengers in 2010-11 and 27.6 million passengers by the year 2020.

²⁸ Source: Statistical Handbook of Tamil Nadu, 2010

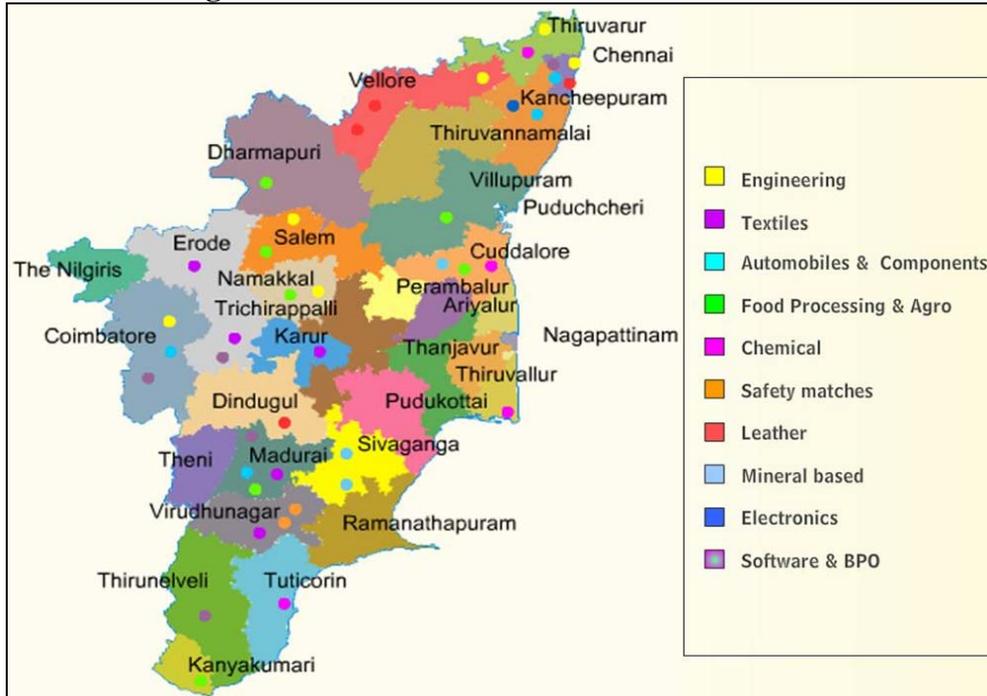
²⁹ Total investments in pipeline as of March 2009 in the state were of the order of Rs.5.79 trillion, according to Ministry of Commerce and Industry, Government of India.

³⁰ Tamil Nadu Industrial Development Corporation Limited (TIDCO), State Industries Promotion Corporation of Tamil Nadu (SIPCOT) and Tamil Nadu Small Industries Development Corporation Limited (SIDCO) are jointly responsible for developing industrial infrastructure in the state. Tamil Nadu Industrial Guidance & Export Promotion Bureau has been constituted with the objective of attracting major investment proposals into the state.

³¹ Source: TIDCO

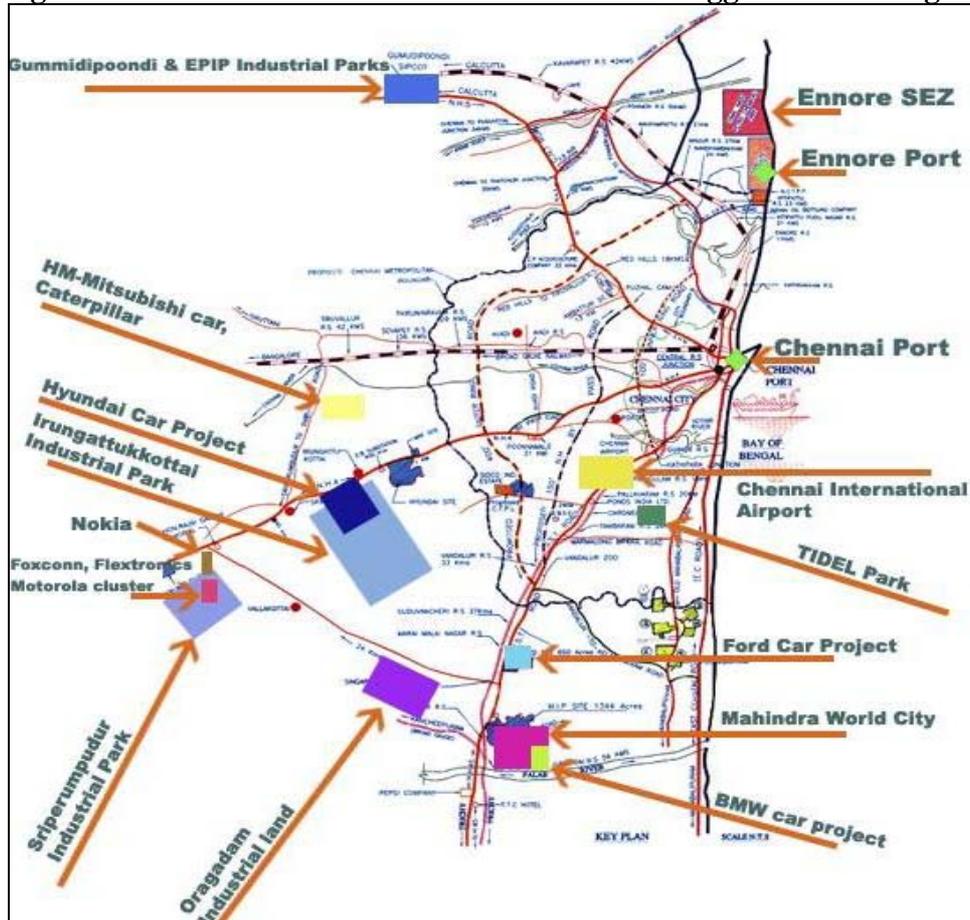
³² Ibid.

Figure 4: Location of Industries in Tamil Nadu



Source: RIS based on TIDCO

Figure 5: Location of Industrial Parks in Chennai Agglomerated Region



Source: RIS based on TIDCO

Tamil Nadu is also an important IT hub. It is the second-largest software exporters by value in India, after Karnataka. The software exports from Tamil Nadu have increased from US\$ 3 billion in 2005-06 to US\$ 8.9 billion in 2009-2010 (CAGR of 31.2 percent).³³ Figure 5 presents location of industrial parks and SEZs in Chennai agglomerated region. In the last two decades, Tamil Nadu has attracted significant investments in the automotive industry, particularly in cars, railway coaches, tractors, motorcycles, automobile spare parts and accessories, tires and heavy vehicles. The automotive industry has a capacity to produce 1.5 million cars and 360,000 commercial vehicles, and it contributes nearly 8 percent to the GSDP, providing direct employment opportunities to about 300,000 people.³⁴ Tamil Nadu has a 30 percent share in the Indian automotive industry³⁵.

Table 13: List of Operational SEZs in Tamil Nadu

Industry	Location	Number
IT, hardware & bio-informatics	Chennai, Kancheepuram, Chengalpet, Coimbatore	10
Automotive	Chennai	1
Apparel and fashion accessories	Chennai, Cheyyar	2
Telecom equipments, R&D	Sriperumbudur	1
Electronics hardware	Sriperumbudur, Oragadam	3
Hi-tech engineering	Coimbatore	1

Source: RIS based on TIDCO

The state is also attracting several new emerging industries like mineral based industries, engineering, leather, pharmaceuticals, cotton textiles and hosiery, ready-made garment industries, wood-products, agro-based industries, chemical based industries, electronics, software, consumer durable, biotech products, food processing, rubber and plastic products, tourism, hotels and financial services. Minerals like limestone, lignite, granite, clay, gypsum, feldspar and graphite are found abundantly in the state. Many industrial units have been set up for optimum utilization of these mineral resources. As shown in Table 13, out of the total 130 operational SEZs in the country, nearly 18 are located in Tamil Nadu. Further, formal approval for setting up 71 SEZs and in-principle approval for 19 SEZs has been accorded.³⁶ A multi-product SEZs is being developed at Nanguneri in Tirunelveli district and one in Perambalur district. In addition, new industrial parks are proposed to be developed in Madurai

³³ Source: NASSCOM

³⁴ Source: SIAM, New Delhi.

³⁵ Ibid.

³⁶ Source: Ministry of Commerce and Industry, Department of Commerce, Government of India.

district, Perundurai in Erode district and Cheyyar in Tiruvannamalai district. In January 2011, the Government of Tamil Nadu signed a Letter of Intent (LoI) with the Japanese government to facilitate more investments from the latter into the state. As of now, about 725 Japanese companies are present in India, and out of this more than 240 are located in Tamil Nadu.

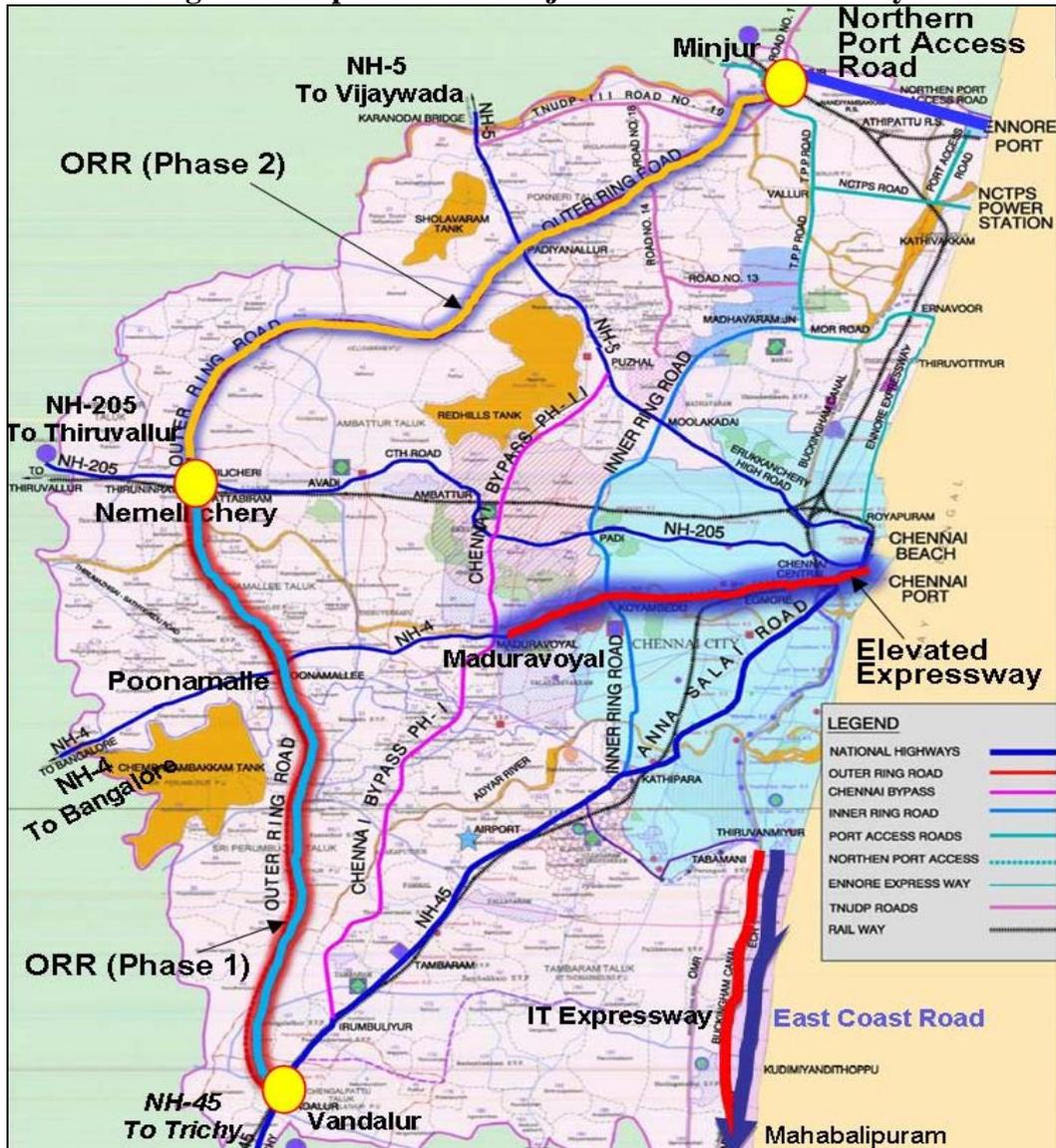
4. PHYSICAL INFRASTRUCTURE PROJECTS SUPPORTING ASEAN-INDIA CONNECTIVITY

4-1. Road/Highway Projects in Tamil Nadu

Efficient road network connectivity for dispersal of traffic from the Chennai and Ennore ports is imperative for ASEAN-India connectivity. Widening and improvement of NH 4 and NH46 on Chennai-Mumbai section and NH 5 on the Chennai-Kolkata section of Golden Quadrilateral of the NHDP program has been completed. Further, most of the 4-laning work related to North-South corridor of the NHDP linking Chennai to the south and northern parts of the country has also been completed (balance work on few sections is expected to be soon completed). Thus, a 4-lane connectivity for movement of traffic from Chennai area to the rest of the country is available. However, dispersal of traffic from the seaports of Chennai/Ennore and the rest of the NH network is not efficient since freight traffic has to traverse the urban limits of Chennai city. Further, the road network in the immediate surrounding areas of the ports is not adequate. Figure 6 provides a schematic overview of important road projects in and around Chennai. Several road connectivity projects are being implemented in Tamil Nadu³⁷, of which Chennai-Ennore Port Road Connectivity Project (formerly EMRIP) needs a special mention.

³⁷ The important ones are Dedicated Elevated Expressway Connecting Chennai Port to Maduravoyal Junction, NCTPS (North Chennai Thermal Power Station) Road, Northern Port Access Road, Chennai Outer Ring Road, Rajiv Gandhi Salai (IT Corridor) - Phase II, and Tamil Nadu Road Sector Project (TNRSP).

Figure 6: Proposed Road Projects around Chennai City



Source: RIS based on TNRDC

4-1-1. Chennai-Ennore Port Road Connectivity Project (formerly EMRIP)

This project (30 km in length) is included under the Port Connectivity Scheme of NHDP. For project execution, the Government of Tamil Nadu, Chennai Port Trust, EnnorePort and NHAI have jointly established an SPV called Chennai Ennore Port Road Company. The project was formulated with an objective to provide seamless connectivity from Chennai and Ennore ports and Ennore SEZ to the NH system.³⁸ Estimated cost for the project is Rs.6 billion. Land acquisition process is currently in

³⁸ A multi-product SEZ at Ennore on 3,185 acres area is coming-up. It is located next to Ennore Port and shores with Chennai Port as well (source: TIDCO).

progress. The project cost is being shared by Government of Tamil Nadu, Chennai and Ennore Port Trusts and NHAI. As of date, shore protection work has been completed. Contract for road works has been recently awarded. The project is expected to be completed by 2012. The project is vital for the future development of Chennai and Ennore ports as it would provide smooth connectivity to the hinterland and improve the efficiency of cargo evacuation.

4-2. National Highway Development Programme (NHDP), Phase VI

Under the NHDP VI, about 1,000 km of the greenfield expressways are planned to be developed through the PPP route on BOT (Toll) mode following DBFOT pattern with the maximum Viability Gap Funding (VGF) of 40 percent. The indicative cost is about Rs.166.8 billion. These expressways would be constructed on new alignments. Besides Vadodara (Gujarat)-Mumbai (Maharashtra) section (400 km), expressway corridors linking Chennai with Bangalore (Karnataka) (334 km), Dhanbad (Jharkhand) with Kolkata (West Bengal) (277 km) and Delhi-Meerut (Uttar Pradesh) (66 km) are planned.

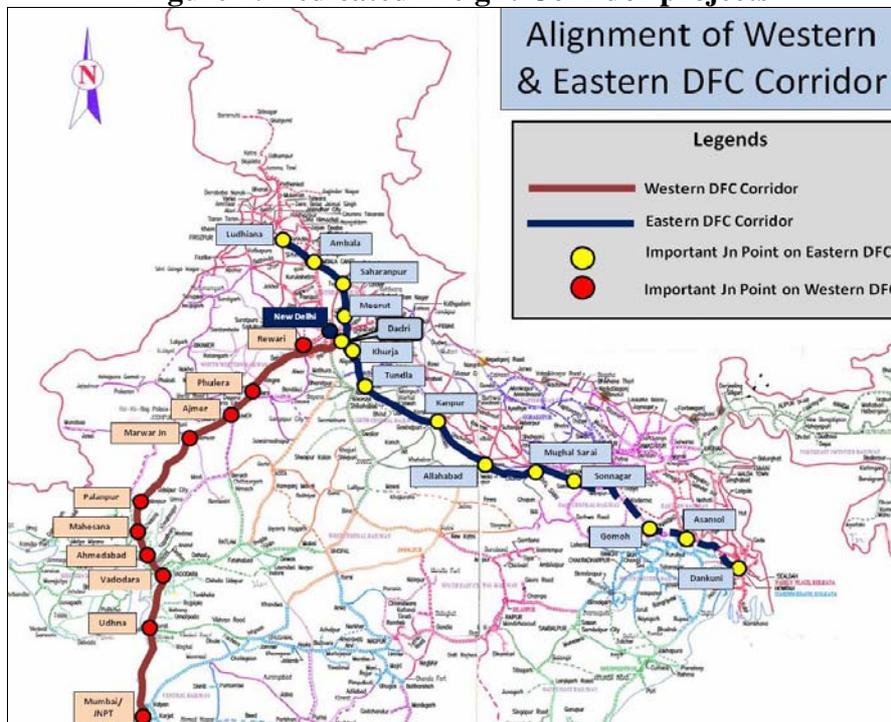
The Ministry of Road Transport and Highways, Government of India prepared a project report for the formulation of the Master Plan for expressway network in India. The Final Report submitted by the Consultant in November 2009 identified a list of 60 projects totaling about 18,637 km. The report recommended a three phase plan for development of the expressway network. This includes Phase I (upto 2012), Phase II (by 2017) and Phase III (by 2022). The following corridors were recommended for the state of Tamil Nadu: (i) Trichur-anyakumari (400 km): Phase I, (ii) Coimbatore-Erode-Salem (175 km): Phase I, (iii) Salem-Cuddalore (190 km): Phase III, and (iv) Kanyakumari-Tirunelveli-Pondi-Chennai (700 km): Phase III.

4-3. Dedicated Freight Corridors (DFC)

At present, both passengers and freight trains move on the same tracks. With preference to movement of passenger trains, freight traffic gets delayed. Further, important trunk routes of the Indian railway networks observe serious capacity constraints. The Golden Quadrilateral and the North-South-East-West corridors of the rail system that constitute about 16 percent of the total railway network, caters to

nearly 58 percent of freight and 52 percent of passenger traffic respectively. The Western (Delhi-Mumbai) and Eastern (Delhi-Howrah) corridors of the Indian Railway are highly saturated in terms of line capacity utilization. Accelerated economic growth is further expected to congest these routes. With an objective to meet the burgeoning freight demand, the Government of India has initiated the Dedicated Freight Corridor (DFC) Project (Figure 7). This is one of the most ambitious projects taken up in modern times and once completed would meet the transport requirements of the two busy trunk routes for the next 15-20 years. The DFC project would also help segregating passenger and freight traffic on these routes.

Figure 7: Dedicated Freight Corridor projects



Source: RIS based on DFCCIL

A Special Purpose Vehicle (SPV) by the name of Dedicated Freight Corridor Corporation of India Limited (DFCCIL) was set up in October 2006 under the administrative control of the Ministry of Railways, Government of India to undertake planning and development, mobilization of financial resources and construction, maintenance and operation of the DFCs. Planning, construction and maintenance of the freight corridors is the responsibility of DFCCIL. On the other hand, development of the feeder routes along with train operations on the DFC would be handled by the Indian Railways. Both Indian Railways and DFCCIL would pay access charges to

each other for the traffic carried on each other's tracks. DFCCIL would be responsible for movement of trains on the DFCs.

The Phase I stretch between Rewari to Vadodara of Western corridor is 920 km long. The Phase I is expected to be completed by 2016. The Phase II project comprises the stretch between Rewari to Dadri (127 km), with a spur from Pirthala to Tughlakabad (32 km), and Vadodara to Jawaharlal Nehru Port (426 km) section. The Phase II project is expected to be completed by 2017. The Eastern corridor (1839 km) would run between Ludhiana in Punjab to Dankuni near Kolkata, to be extended in future to serve the new deep sea port proposed in Southern Bengal, and would cater to the coal and steel traffic. The corridor would run through six states of Punjab, Haryana, Uttar Pradesh, Bihar, Jharkhand and West Bengal. It will be an electrified single line on the Ludhiana–Khurja section (397 km) and electrified double line on the balance portion. The Eastern corridor is targeted for completion by 2016–17. Besides the Western and Eastern Freight corridors as above, the Vision 2020 for Indian Railways recommended (also announced in the Railway Budget 2010) to develop DFCs along four new corridors totaling about 6,163 km. These comprise the North-South corridor (Delhi to Chennai – 2,173 km), East-West corridor (Howrah to Mumbai – 2,000 km), Southern corridor (Chennai to Goa – 890 km) and East-Coast corridor (Kharagpur to Vijaywada – 1,100 km).

4-4. Capacity Augmentation of Airports in Tamil Nadu

Traffic at Chennai airport, both domestic and international, has been growing significantly. In order to meet the future demand, modernization and expansion of the international and domestic terminal has been taken up by the Airports Authority of India (AAI) at an estimated cost of Rs. 18.08 billion. The project includes construction of the Kamraj Domestic Terminal Phase II, expansion of the international terminal and associated facilities, extension of the airport's second runway, new and upgraded taxiways, additional parking bays, construction of a flyover connecting domestic and international terminals, multi-level car park, etc. The construction activities are in the final stages of completion. After its completion, the passenger capacity of the international and domestic terminals at Chennai would increase to 14 million and 10 million respectively. The proposed Chennai Metro Rail Project would connect the Chennai International Airport with various parts of the city.

The domestic terminal is expected to reach its maximum handling capacity or saturation by the year 2019 and the international terminal by 2015. Thus, with an objective to cater to the future traffic demand, the state government is planning to establish a greenfield airport at Sriperumbudur, an important industrial hub in the state. The same is currently in initial formulation stages. The improvement of Trichy, Madurai and Coimbatore Airports is being taken up under the modernization of 35 non-metro airports project. While upgradation work at Trichy and Madurai has been completed, the work at Coimbatore airport is soon expected to be completed.

4-5. Capacity Augmentation at Ports in Tamil Nadu

The Chennai and Ennore ports would form the gateway for transport linkage with ASEAN. This, in addition to the natural growth, is expected to increase the traffic to be handled by these ports significantly in years to come. The Chennai and Ennore ports handled 61.46 million tonnes and 11.01 million tonnes of the cargo in the year 2010-11, respectively. The existing capacity at these ports is 71.32 million tonnes and 16 million tonnes respectively. Thus, utilization of these ports is in the range of 70-85 percent. The commodity-wise capacity estimated for the coming years at Chennai and Ennore ports is given in Table 14.

Table 14: Commodity-wise capacity estimated for Chennai and Ennore ports

Port	Year	POL	Iron Ore	Coal		Containers		General/Break Bulk	Total
				Thermal	Coking	Tonnage	TEUs		
(million tonnes)									
Chennai	2011-12	11.80	-	-	-	33.60	2.68	22.92	68.32
	2015-16	12.80	-	-	-	53.60	4.29	26.42	92.82
	2019-20	12.80	-	-	-	99.60	7.97	27.92	140.32
Ennore	2011-12	3.00	12.00	16.00	8.00	-	-	0.50	39.50
	2015-16	8.50	12.00	26.00	8.00	18.00	1.44	0.50	73.00
	2019-20	8.50	12.00	26.00	8.00	18.00	1.44	0.50	73.00

Source: Maritime Agenda 2020, Government of India

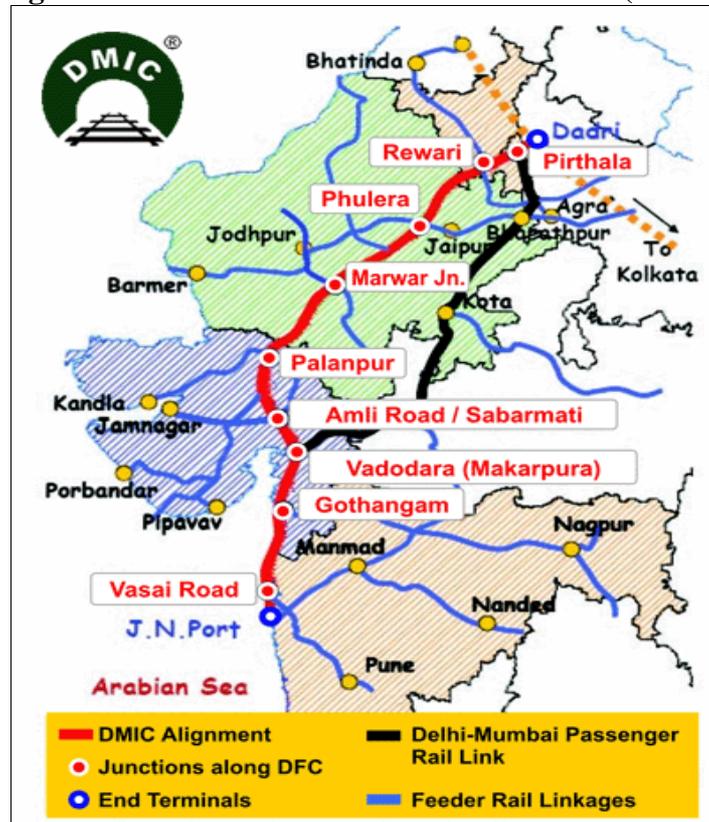
4-6. Delhi-Mumbai Industrial Corridor (DMIC)

The Delhi-Mumbai Industrial Corridor (DMIC) is a mega infrastructure project of US\$ 90 billion that has been initiated by the Government of India to leverage the economic benefits arising from the Western DFC project. The project being

developed with financial & technical aid from Japan, envisages developing an industrial belt between Delhi and Mumbai, along 150 to 200 km (Influence region) on either sides of the alignment of Western DFC. The project Influence area of DMIC comprises 436,486 sq. km. area, constituting about 13.8 percent of the geographical area of India. The project covers seven states (Delhi, Uttar Pradesh, Haryana, Rajasthan, Gujarat, Madhya Pradesh and Maharashtra).

An SPV called Delhi-Mumbai Industrial Corridor Development Corporation (DMICDC) was incorporated in January 2008 as the project development agency. The Government of India holds 49 percent equity, the Infrastructure Leasing & Financial Services Limited (IL&FS) about 41 percent, and the remaining is held by Infrastructure Development Finance Company Limited (IDFC). The DMICDC is mainly responsible for facilitating, promoting and establishing industrial, investments and allied regions, project development services and raising financial instruments. In addition, the DMIC would also include development of requisite feeder rail/road connectivity to hinterland/markets and select ports along the western coast.

Figure 8: Delhi-Mumbai Industrial Corridor (DMIC)



Source: RIS based on DMICDC

The DMIC is conceived to be developed as a model industrial corridor of international standards with emphasis on expanding the manufacturing and services base and develop DMIC as the 'Global Manufacturing and Trading Hub' supported by the world class infrastructure and enabling policy framework. The vision for DMIC is to create strong economic base in this band with globally competitive environment and state-of-the-art infrastructure to activate local commerce, enhance foreign investments and attain sustainable development.

The project is planned to be developed in two phases, Phase I is likely to be implemented over 2008-12 and Phase II over 2013-18. However, project activities have been delayed considerably and as per current plan, the Phase I is expected to be completed by 2017. The project incorporates 9 mega industrial zones of about 200-250 sq.km., high speed freight line, 3 ports and 6 airports; a 6-lane intersection-free expressway between Delhi and Mumbai and a 4,000 MW power plant. Several industrial estates and clusters, industrial hubs, with top-of-the-line infrastructure would be developed along this corridor to attract foreign investment.

Out of the total project cost, the Government of India would finance 35 percent, while the rest is expected to be drawn from the private sector. A provision of Rs. 3.3 billion was made during the Twelfth Five Year Plan towards Project Development Fund (PDF) of DMIC. Besides, the Japan Bank for International Cooperation (JBIC) has also provided a commercial loan of US\$ 75 million for the project.

In April 2010, MoUs were signed by DMICDC and the state governments of Haryana, Gujarat and Maharashtra with Japanese companies for development of smart communities or eco-friendly townships (townships with optimized energy supplies, 24-hour drinking water supply, bicycle and walking tracks and waste and water recycling system). As per the agreement, Japanese consultants will prepare feasibility studies for development of these townships in Manesar-Bawal region of Haryana, Dahej and Chandogar in Gujarat and Shendra Industrial region in Maharashtra.

Further, MoUs have been signed with all the states. Early Bird projects from the Indian side have been finalized for the DMIC states. Also, six early bird projects have been announced by the Japanese side. Master planning consultants for these areas/projects have been appointed. Aiming to achieve double employment potential, triple industrial output and quadruple exports from the region in five years, the DMIC would provide substantial boost to the economy.

4-7. Chennai-Bangalore-Mumbai Industrial Corridor(CBMIC)

On similar lines to the DMIC, an industrial corridor is proposed between Chennai to Bangalore (Karnataka). The proposal is to develop the project in two phases. The first phase would include Chennai-Sriperumbudur–Ranipet section, while the second phase would include Ranipet-Hosur-Bangalore section. Industrial parks, Special Economic Zones, information technology parks and integrated townships are expected to come along the corridor. The Chennai-Bangalore section of the industrial corridor is also called as Industrial Corridor of Excellence and is the same for the PRIDE corridor described later. The Indian Railways have a long term plan to construct High Speed Railway, while the NHDP VI proposes a 6-lane greenfield expressway between Chennai and Bangalore. Further, extension of metro rail between Chennai and Bangalore are also being discussed. A feasibility study for the Chennai-Bangalore Industrial Corridor project has also been initiated. Based on request from the Government of Karnataka, the Government of India has agreed in-principally for extending the industrial corridor beyond Bangalore up to Mumbai, passing through Davangere and Hubli-Dharward regions of Karnataka.

Development of the Chennai-Bangalore-Mumbai Industrial corridor and integrating it with the Delhi-Mumbai Industrial Corridor, currently under implementation, would provide significant boost to the industrial and economic growth, not only for these regions, but for the country as a whole. Further, construction of the Chennai-Bangalore-Mumbai Dedicated Freight corridor and its integration with the Western DFC between Delhi and Mumbai would provide seamless connectivity for movement of cargo between the Chennai/Ennore ports and Jawaharlal Nehru port through the railway network. Efficient connectivity between manufacturing hubs along the Chennai-Bangalore- Mumbai region, on the one side, and the East Asian countries, on the other, would considerably boost trade potential between India and ASEAN.

4-8. PRIDE (Peninsular Region Industrial Development) Corridor

The PRIDE (Peninsular Region Industrial Development) Corridor project has been conceived on similar lines of the DMIC and covers industrialized as well as backward areas of Andhra Pradesh, Tamil Nadu, Karnataka and Maharashtra states to

invite investments and generate employment with the development of extensive infrastructure including hard transportation, soft logistics and business environment improvements. The targeted core nodal areas are Chennai and Bangalore and 250 km intra city corridor is identified as the potential region by effectively leveraging the existing strengths of the IT, electronics, and automobile industries of the region. A number of industrial zones like Tumkur, Hosur, Sriperumbudur, Krishnapatnam and the Chennai and Ennore ports are located along this corridor.

Development of PRIDe corridor is divided into two phases. The Phase I shall include; (a) development of focused project along Chennai-Sriperumbudur-Ranipet-Hosur (along NHs 4, 46 and 7), also called as Industrial Corridor of Excellence, that aims to accommodate IPs, SEZs, IT parks, integrated townships, etc; (b) Bangalore-Chitradurga (NH 4); and (c) Nellore-Chennai (NH 5) connecting 3 eastern ports. While Phase II shall include (a) Nellore-Cuddapah-Kadri-Bangalore (SHs and NH 7); (b) Chitradurga-Kolhapur-Pune-Mumbai (NH 4); and (c) Chennai-Cuddalore (NH 45). Industrial nodes along the corridor are classified into Industrial Project Zones (size more than 100 sq km) and Industrial Areas (size 50-100 sq km).

5. DEVELOPMENT OF NATIONAL CONNECTIVITY IN INDIA: INSTITUTIONAL INITIATIVES

The provision of quality and efficient infrastructure services is essential to realize the full potential of the growth impulses surging through the economy. The efforts towards infrastructure development is continued to focus on the key areas of physical and social infrastructure. India, while stepping up public investment in infrastructure, has been actively engaged in involving private sector to meet the growing demand. As shown in Table 15, the demand for infrastructure investment during the 11th Five Year Plan (2007-2011) was about US\$ 514 billion (Planning Commission, 2010), a large portion of which is sourced from the private sector (Table 15).

According to the Planning Commission (Planning Commission, 2011), the economy will enter the Twelfth Plan (2012-17) in a much stronger position as far as infrastructure is concerned than existed at the start of the Eleventh Plan. Investment in infrastructure will be around 8.37 percent of GDP in the base year of the Twelfth Plan (2011-12). If GDP in the Twelfth Plan period grows at a rate above 9 percent, it

should be possible to increase the rate of investment in infrastructure to around 10.70 percent in the terminal year of the Twelfth Plan period as indicated in Table 16. These projections imply that the investment in the infrastructure sector during the Twelfth Plan would be of the order of US\$ 1,024.81 billion. At least 50 percent of this should come from the private sector. This would imply that public sector investment in infrastructure would increase from in the Twelfth Plan at 2006-07 prices. This requires an annual increase of about 9.34 percent in real terms.

Table 15: Investment in Infrastructure in 11th Five Year Plan (2007-2011)

Sector	Tenth Plan (2002-2006)		Eleventh Plan (2007-2011)	
	US\$ billion	Shares (%)	US\$ billion	Shares (%)
Electricity	72.960	33.490	166.630	32.420
Roads and Bridges	36.220	16.630	78.540	15.280
Telecommunication	25.840	11.860	64.610	12.570
Railways	29.910	13.730	65.450	12.730
Irrigation	27.880	12.800	63.320	12.320
Water Supply and Sanitation	16.200	7.440	35.930	6.990
Ports	3.520	1.610	22.000	4.280
Airports	1.690	0.780	7.740	1.510
Storage	1.200	0.550	5.590	1.090
Gas	2.430	1.110	4.210	0.820
Total	217.860	100.000	514.040	100.000

Source: Planning Commission

Table 16: Projected investment in infrastructure in the 12th Five Year Plan

Year	GDP Growth (%)	Infrastructure Investment (as % of GDP)	Infrastructure investment (US\$ billion)
2011-12 (Base year)	9.00	8.37	132.08
2012-13	9.00	9.00	154.86
2013-14	9.00	9.50	178.17
2014-15	9.00	9.90	202.38
2015-16	9.00	10.30	229.51
2016-17	9.00	10.70	259.88
12th Plan Total	9.00	9.95	1,024.81

Note: Taken at 2006-07 prices.

Source: RIS based on Planning Commission

5-1. Public Private Partnership (PPPs) in infrastructure: Policy initiatives to Promote Private Participation in Infrastructure³⁹

Government is actively pursuing PPPs to bridge the infrastructure deficit in the country. Several initiatives have been taken during the last three years to promote

³⁹ Adapted from Planning Commission (2011)

PPPs in sectors like power, ports, highways, airports, tourism and urban infrastructure. Under the overall guidance of the Committee of Infrastructure headed by the Prime Minister, the PPP programme has been finalized and the implementation of the various schemes is being closely monitored by the constituent Ministries/Departments under this programme. A number of initiatives were taken in the course of the Eleventh Five Year Plan to accelerate the pace of investment in infrastructure. In particular, the government has taken several initiatives for standardizing the documents and processes for structuring and award of PPP projects in a transparent and competitive manner.⁴⁰

(i) Committee on Infrastructure (COI)

The Committee on Infrastructure (COI) was constituted on 31 August, 2004 under the chairmanship of the Prime Minister. Its members included the Finance Minister, the Deputy Chairman, Planning Commission and the Ministers-in-charge of infrastructure ministries. The objective of COI was to initiate policies that would ensure time-bound creation of world class infrastructure, develop structures that maximise the role of PPPs, and monitor the progress of key infrastructure projects to ensure that established targets are realized.

(ii) Cabinet Committee on Infrastructure (CCI)

In July 2009 the COI was replaced by a Cabinet Committee on Infrastructure chaired by the Prime Minister to give further impetus to initiatives for development of infrastructure. CCI approves and reviews policies and projects across infrastructure sectors. It considers and decides financial, institutional and legal measures required to enhance investment in infrastructure sectors.

(iii) Public-Private Partnership Appraisal Committee (PPPAC)

With a view to streamlining and simplifying the appraisal and approval process for PPP projects, a Public Private Partnership Appraisal Committee (PPPAC) had been constituted under the chairmanship of Secretary, Department of Economic Affairs with Secretary, Planning Commission as one of the members. PPP proposals are

⁴⁰ A website on the PPPs in India has been set up by the Department of Economic Affairs in the Ministry of Finance. The updated status of the above programmes is available on the website www.pppinindia.com. A database on PPP projects in India is also being developed and the task has been outsourced to a private firm that will be responsible for collection, compilation and maintenance of the database.

appraised by the Planning Commission and approved by the PPPAC. The PPPAC conducts a thorough scrutiny and due diligence in the formulation, appraisal and approval of PPP projects. It has approved 192 projects with estimated project cost of Rs. 1.63 trillion by May 2010.

(iv) Empowered Committee/ Institution (EC/EI)

An institutional framework comprising an inter-ministerial Empowered Committee has been established for the purpose of appraising and approving projects for availing the Viability Gap Funding (VGF) grant of up to 20 percent of the cost of infrastructure projects undertaken through PPP. Until May 2010, it has approved 63 projects in the State sector involving a total capital investment of Rs. 414.22 billion.

(v) Viability Gap Funding (VGF)

Recognizing that the externalities engendered by infrastructure projects cannot always be captured by project sponsors, a VGF Scheme was notified in 2006 to enhance the financial viability of competitively bid infrastructure projects. Under the scheme, grant assistance of up to 20 percent of capital cost is provided by the Central Government to PPP projects undertaken by any Central Ministry, State Government, statutory entity or local body. An additional grant of up to 20 percent of project costs can be provided by the sponsoring Ministry, State Government or project authority. Up to May 2010, 255 projects had been approved by the PPPAC and EC/EI with a capital investment of Rs. 2.04 trillion.

(vi) India Infrastructure Finance Company Ltd (IIFCL)

IIFCL, was established by the Central Government for providing long-term loans for financing infrastructure projects that typically involve long gestation periods, provides financial assistance of up to 20 percent of the project costs, both through direct lending to project companies and by refinancing banks and financial institutions. It has raised Rs. 205.69 billion and approved 139 projects involving total investment of Rs. 2.01 trillion by May 2010. Out of these 139 projects, financial closure has been achieved in 126 projects with investment of Rs. 1.75 trillion.

(vii) Model Documents

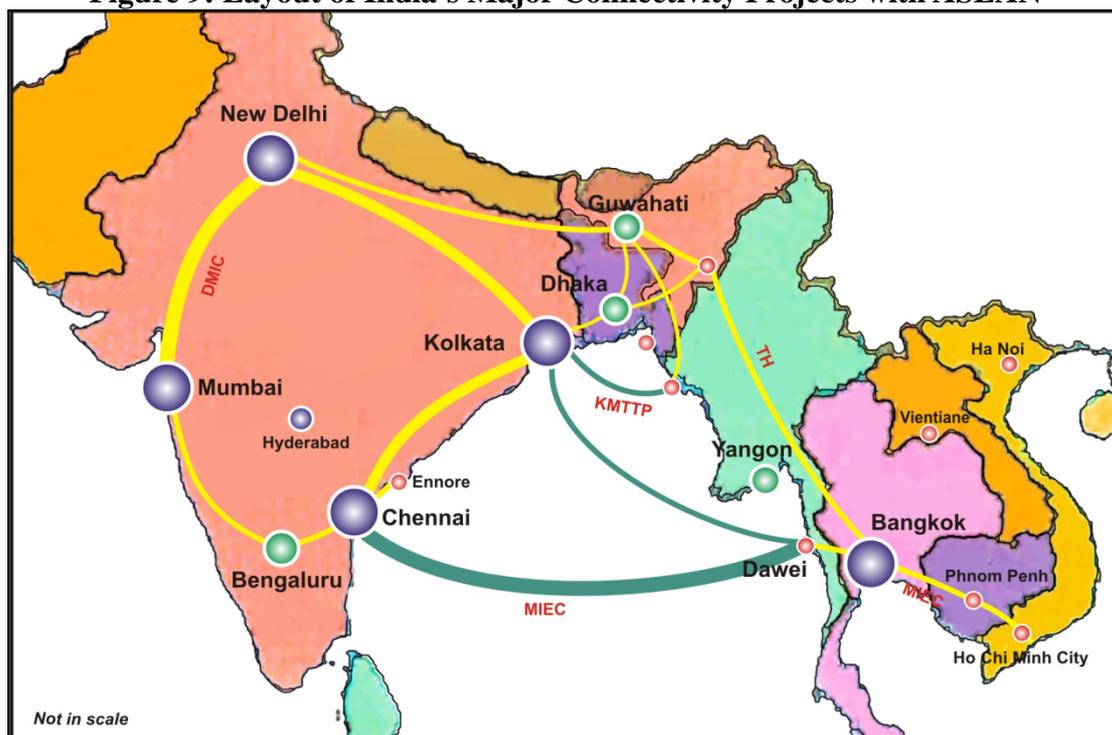
Recognizing the need for a standardized framework for PPPs, the COI

encouraged the creation of standard documents for bidding and also for award of concessions. Creation of a standardized framework ensures transparency in the allocation of risk, clarity in the obligation of the concessionaire and minimization of possibilities of disputes arising from the agreement. It enables robust competitive bidding for individual projects with a reasonable commonality in approach across projects, which is an important aspect of good governance.

6. INDIA'S REGIONAL CONNECTIVITY PROJECTS WITH ASEAN

Trade between India and ASEAN depends on effective transportation links. India and ASEAN have initiated some important transportation projects to link each other's markets (Figure 9). Some of the challenges to ASEAN-India physical connectivity are as follows: (i) absence of harmonization of railway networks, (ii) lack in standardization of all-weather paved roads, (iii) inefficient and underdeveloped border (land) customs stations, (iv) absence of enabling software such as transit, (v) inadequate security, (vi) cumbersome trade documentations, to mention a few. The approach we have been following in planning ASEAN-India connectivity is the development of transport corridors. The corridors have the advantage of combining infrastructure investments with activities to streamline cross-border trade and transit procedures. Some of the prominent physical connectivity projects linking ASEAN and Indian markets are briefed below.

Figure 9: Layout of India's Major Connectivity Projects with ASEAN



Source: RIS

6-1. India–Myanmar–Thailand Trilateral Highway (IMTTH)

India–Myanmar–Thailand Trilateral Highway (IMTTH) is a cross-border transportation network being financed by the Governments of India, Myanmar and Thailand.⁴¹ This highway links Moreh (in India) with Mae Sot (in Thailand) through Bagan (in Myanmar), which is often termed as land bridge between South with Southeast Asia. The alignment of this trilateral highway falls within the Asian Highway 1, being pursued by UNESCAP. The agreed route of IMTTH (1360 km) is identified as follows: Moreh (India)–Tamu–Kalewa–Chaungma–Yinmabin–Pale–Kyadat–Lingadow–Pakokku–Bagan–Kyaukpadaung–Meiktilabypass–Taungoo–Oktwin – Payagyi – Theinzayat – Thaton–Hypaan– Kawkareik–Myawaddy–Mae Sot (Thailand).

The IMTTH is divided into three phases; the first phase includes 78 km of new roads, upgradation of about 400 km of roads, construction of all-weather approach lanes, rehabilitation/reconstruction of weak or distressed bridges and a detailed examination of a project on the Ayeyarwaddy river as well as a causeway. The entire project is being funded through government resources. Phase-I of the IMTTA was

⁴¹ Refer, De (2005) for further details.

taken up in early 2005. India assumes responsibility of 78 km. of missing links and 58 km. of upgradation as part of Phase-I. India may also take up additional 132 km of upgradation. Thailand would take up upgradation of 136 km. and 62 km. sectors of Phase-I and another 100 km as part of Phase-II. Myanmar has indicated willingness to take up intermediary approach roads, reconstruction/ rehabilitation of weak bridges.

India has agreed to offer credit at concessional terms to Myanmar for financing new constructions of Chaungma – Yinmabin (30 km) and Lingadaw – Letsegan – Pakokku (48 km) highways. India has also agreed to consider similar financing for upgradation to two-lane standard of the Yinmabin – Pale – Lingadaw (50 km) road section inside Myanmar. Further, India has agreed to consider, financing of the upgradation of the Bagan – Meiktila (132 km) segment in Myanmar. India has also undertaken the preparation of a Detailed Project Report (DPR) for construction of a bridge on the Ayeyarwaddy river and for the causeways near Kyadet. Thailand has agreed to extend concessional loans for financing the upgradation to two-lane standard of the Thaton – Hpa-an – Kawkareik section (136 km) and Kawkareik – Myawaddy section (62 km). These sections are part of the western side of the East West Economic Corridor in GMS between Myanmar and Thailand. The Thailand government has agreed to assist Myanmar in financing of the route Thaton – Mawlamyine – Mudon – Kawkareik as a second phase of the project. Myanmar has agreed to finance construction of all-weather intermediate lane approach roads at both ends from Pakokku to Bagan up to the existing ferry crossing and the rehabilitation/ reconstruction of distressed and weak bridges. Myanmar has decided to explore the possibility of important commercial segments of the highway being constructed, operated and maintained by operators on a commercial basis.

Indian government-owned Border Roads Organisation (BRO) had upgraded the Tamu – Kalewa – Kalemmyo (TKK) road (160 km) in Myanmar from the Indian northeastern border at a cost of Rs. 1.20 billion (about US\$ 27.28 million). The Government of India is also responsible for upkeep of the TKK road in Myanmar. Taking up of construction of 30 km. stretch of road is under consideration. The Government of India has taken initiatives to prepare the DPR for following sections of the road:

- construction Chaungma – Yinmabin section (30 km)
- construction of Lingadaw – Letsegan – Pakokku section (48 km)

- upgradation from single lane to double lane of Yinmabin– Pale – Lingadaw section (50 km)
- upgradation from single lane to double lane of Bagan – Meiktila section (132 km)
- construction of Ayeyarwaddy bridge near Pokokku and causeways near Kyadet

Lack of essential institutional support and government commitments are some of the reasons for slowing down the development of this trilateral highway. It has been argued that deeper regional cooperation among the three countries would help restart the development of the trilateral highway.

6-2. Delhi–Hanoi Railway Link (DHRL)

Railways can play a positive role in integrating India with ASEAN, which will promote bulk trans-national movement amongst the neighbouring countries. Needs are two folds – (a) to link India’s Manipur with India’s main railway corridor, and (b) to re-establish and renovate railway networks in Myanmar. Harmonisation of railway track in the region is very much essential. Without having a compatible and strong railway system inside Myanmar and Bangladesh, closer communication between India and its immediate neighbours will be unfulfilled. Indian consulting engineering company, RITES, has already completed a preliminary study to establish Delhi–Hanoi railway link in 2006. Indian Railways is engaged in harmonization of railway tracks in the northeastern India and also construction of new lines. Indian government has come forward and extended US\$ 56 million credit line to the Myanmar government for upgradation of 640 km railway system between Mandalay and Yangon section. Similar initiative should be taken up for up-gradation of railway network system in southern (Yangon to Dawei) and northern (Mandalay to Kalay) Myanmar. A possible connection between Myanmar and Thailand could be via Thanbyuzayat and Three Pagoda Pass, and between India and Myanmar could be by constructing new railway line between Tamu and Kalay. Considering the projects already sanctioned and under construction, Diphu – Karong – Imphal – Moreh rail link is identified for development, which will link India with ASEAN. Although at present construction work is being carried out in Diphu – Karong section, linking Karong with Morea via

Imphal would link India with ASEAN provided railway system in other side (Myanmar) is also developed simultaneously. Considering a rather short distance, Imphal – Moreh link could be undertaken on a priority basis in the short-term. On completion of these projects there could be possibilities for (i) India – Myanmar – Thailand – Malaysia - Singapore rail link, and (ii) India – Myanmar – Thailand – Ha Noi rail link.

6-3. Kaladan Multimodal Transit Transport Project (KMTTP)

The Kaladan Multimodal Transit Transport Project (KMTTP) in Myanmar envisages connectivity between Indian ports and Sittwe port in Myanmar, and road and inland waterway links from Sittwe to India's NEER (Figure 10). The Kaladan project would provide an alternate route for transportation of goods to NEER through Myanmar. The Agreement and the Protocols were signed between India and Myanmar in 2008. The Ministry of External Affairs of Government of India and the Foreign Affairs Ministry of Government of Myanmar are the nodal agencies. Indian public sector company, IWAI, is the project development consultant of this project. The entire project is funded by the Government of India. The approximate cost of the project is expected to be Rs. 5.45 billion. The timeframe for the project is five years from the date of actual commencement of the project.

It has two major components: (i) port and IWT development between Sittwe and Kaletwa in Myanmar along Kaladan river, (ii) highway (129 km) from Kaletwa to India – Myanmar border in Mizoram. The Government of Myanmar has provided land for setting up contractor's camp, and land for construction of Sittwe in September 2010. Clearances of permissions and approvals of import of construction equipment and materials and opening of bank account were received by the Indian contractor. Construction work has been started in December 2010.⁴² On Indian side, construction of 100 km new road from Lawngtlai on NH 54 to India-Myanmar border is taken-up under SARDP-NE Phase A, which is likely to be completed by September 2014.

⁴² Based on personal discussion with IWAI, New Delhi. Also refer, BIMSTEC Newsletter, January 2011, available at <http://www.bimstec.org>.

Figure 10: Kaladan Multimodal Transit Transport project



Source: RIS based on IWAI, New Delhi

6-4. Mekong–India Economic Corridor (MIEC)

MIEC involves integrating the four Mekong countries, namely, Myanmar, Thailand, Cambodia and Vietnam with India. It connects Ho Chi Minh City (Vietnam) with Dawei (Myanmar) via Bangkok (Thailand) and Phnom Penh (Cambodia) and further linking to Chennai in India. MIEC corridor is conceptualized to be the region around the main highway connecting Vung Tau in Vietnam to Dawei in Myanmar passing through Ho Chi Minh City, Phnom Penh and Bangkok. The highway passes through three borders of (i) Moc Bai – Bavet (Cambodia – Vietnam); (ii) Poipet – Aranyaprathet border (Cambodia – Thailand); and (iii) Sai Yok – Bong Tee (Thailand – Myanmar). There is an existing road from Vung Tau to Bong Tee on Thailand – Myanmar border, after which there is only an unpaved path till Dawei. In addition to several major cities it covers key towns - such as of Bien Hoa (in Vietnam), Battambang, Sisophon (in Cambodia), Chachoengsao, Prachinburi and Kanchanaburi (in Thailand).

Figure 17: Mekong – India Economic Corridor (MIEC)



Source: ERIA

This corridor, when completed, is expected to augment trade with India by reducing travel distance between India and MIEC countries and removing supply side bottlenecks. As noted by ERIA, the corridor would provide opportunities to individual countries of Myanmar, Thailand, Cambodia and Vietnam to build a strong economic and industrial base and a world-class infrastructure. The emphasis of the corridor is on expanding the manufacturing base and trade with rest of the world, particularly with India. The corridor will enable these economies to further integrate and collectively emerge as a globally competitive economic bloc.

7. CONCLUSIONS

One of the major obstacles to the expansion of trade between India and ASEAN is the high cost of moving goods across the borders. Improved connectivity would lead to reduce trade costs, raise country's comparative advantage and trade flows, expand markets, reduced poverty, and increase country's welfare and quality of life of its citizens. Multiple effective cross-border and national transport projects mean stronger ASEAN-India connectivity. An integrated connectivity would also provide substantial benefits to landlocked and small island countries in the region as well as

poor, small countries by giving them access to world market at lower costs.

The study suggests that ASEAN and India are becoming more economically integrated and there is ample scope for deepening this integration process. The experiences of Europe and Latin America, where the presence of cross-border infrastructure is comparatively high, and to a lesser extent, Africa, where the development of cross-border infrastructure has taken a new shape, suggest that regional cooperation promotes greater prosperity and stability for participating countries. A major success factor is their ability to build regional initiatives that are based on shared strategic vision, as captured in the Initiative for the Integration of Regional Infrastructure in South America (IIRSA).⁴³ Thus, India – ASEAN regional cooperation programmes have to be much stronger to address the regional infrastructure needs and enabling institutions and policies.

Given India's diversity and geographical contrasts, an integrated regional transport network with ASEAN in particular would yield much larger economic benefits, while minimizing risks. Asia-wide connectivity projects like the AH and TAR should be complemented by cross-border transport projects linking India with ASEAN. Intermodality in transportation is essential in many of the transportation chains between India and ASEAN. At the same time, it is important to exploit synergies across various types of cross-border infrastructure.

ASEAN countries and India have to identify the missing links and investment needs from a region-wide perspective. To a great extent, missing rail and roadways in Myanmar is hindering the overland connectivity between India and ASEAN. Therefore, average road condition and railway system inside Myanmar needs to be rebuilt. Roads leading from Myanmar to India and Thailand require widening and better maintenance to allow efficient movement of larger vehicles. Development of economic corridors taking countries in the region will facilitate investments as well as spur economic growth in India's Southern and Northeastern regions as well as in Myanmar and Mekong countries.

⁴³ The Initiative for the Integration of Regional Infrastructure in South America is a dialog forum among South American countries, which seeks to promote the development of transport, energy, and telecommunication infrastructure from a regional viewpoint, aimed at physical integration of the 12 South American countries and the achievement of an equitable and sustainable territorial development pattern. About US\$68.27 billion, comprised of 508 infrastructure projects having direct or indirect cross-border implications, have been identified for investments across 12 Latin American countries, of which 12 projects are being executed under public-private partnerships (IIRSA 2010).

The proposed connectivity between ASEAN and India would throw many challenges for its development. Further, during and after its implementation, the link would open considerable avenues and opportunities to manufacturing and trade between these regions. Indian ports are heading for a better future with growing international trade. Thus, operational efficiency of the ports have to be competitive and on par with the best ports in the world. Modern cargo handling techniques must be introduced to improve port performance. Efforts must be made to enhance the quality of service and productivity levels. While upgradation of the Chennai and Kolkata airports (both domestic and international terminals) is in progress, it is essential for the second airport in these cities. In the context of Indian Railways, technological upgradation and modernization for the current assets is essential for realizing maximum benefits. Completion of the Western and Eastern DFCs in a timely manner would provide significant boost to economic development in the region and bring confidence for planning of other DFCs along the trunk routes. Plans for Chennai – Bangalore – Mumbai Industrial Corridor must be evolved by closely studying best practices from DMIC project and similar projects developed elsewhere in the world. Funding requirement for infrastructure is huge and a considerable amount of future investment is expected to come from the private sector. So far, response from the private sector has been good. However, efforts to enable level playing field to the private entrepreneur by fair allocation of risks is highly essential. In this connection, greater economic and/or commercial cooperation is desired from developed and developing countries which have technological expertise on transport and communications.

To sum up, trade liberalization is important, but sometimes it is not adequate enough to enhance country's trade. Improved connectivity and trade facilitation can complement that effort. It is the way forward for regional trade and economic partnership between India and ASEAN.

In order to fund the large infrastructure investments required to boost ASEAN – India connectivity, the region needs to further develop mechanisms for the financial intermediation between its large savings and its equally large investment needs. The region should support expanding the use of public-private partnerships (PPPs) for investment in infrastructure and creation of a large regional infrastructure development fund to channel the region's foreign exchange reserves into much needed infrastructure investments.

Enhancing connectivity between India and ASEAN is a multi faceted task that will require the implementation of strong policy initiatives. Development of the ASEAN - India connectivity would throw up significant opportunities to industrial development in India and its trade potential with South and East Asian countries. Chennai has already established itself as a gateway to Southern India. The ASEAN connectivity would link the Chennai region to the rest of the world through its maritime infrastructure. Thus, Chennai has a great potential for becoming the greater gateway for India and function as a core node providing as centre of business activities with industrial clusters, and work as engine to promote regional economic growth.

**APPENDIX. ONGOING AND PROSPECTIVE INFRASTRUCTURE PROJECTS
FOR ASEAN-INDIA CONNECTIVITY: INDIA**

Tier	Type	Sector	Sub-Sector	Project Name	Cost (US\$ mil)	Status
1	Public	Logistics	Railway	Chennai Metro rail project	4,500.0	Ongoing
1	Public	Logistics	Port / Maritime	Chennai Port : Creation of additional open storage yards by reclamation	45.0	Ongoing
1	Public	Logistics	Port / Maritime	Chennai Port : Deepening of channels, basin and berths	32.0	Ongoing
1	PPP	Logistics	Port / Maritime	Chennai Port : Development of Mega Container Terminal	695.0	Ongoing
1	Public	Logistics	Port / Maritime	Chennai Port : Modernization	45.0	Ongoing
1	Public	Logistics	Road/ Bridge	Chennai-Ennore Port road connectivity project (formerly EMRIP)	135.0	Ongoing
1	Public	Logistics	Railway	Construction of new railway line between Chennai-Mahabalipuram-Cuddalore	116.0	Ongoing
1	PPP	Logistics	Road/ Bridge	Dedicated elevated expressway connecting Chennai Port to Maduravoyal Junction	370.0	Ongoing
1	Public	Logistics	Railway	Dedicated Freight Corridors (Western & Eastern corridors)	10,350.0	Ongoing
1	Public	Logistics	Port / Maritime	Ennore Port : Development of coal berth III	44.5	Ongoing
1	PPP	Logistics	Port / Maritime	Ennore Port : Development of container terminal, phase 1	312.7	Ongoing
1	PPP	Logistics	Port / Maritime	Ennore Port : Development of iron ore terminal	106.7	Ongoing
1	Public	Logistics	Railway	Ennore Port : New chord line linking Puttur - Attipattu	99.1	Ongoing
1	Public	Logistics	Railway	Ennore Port : Rail connectivity	19.6	Ongoing
1	Public/PPP	Logistics	Airport	Green field airport - Navi Mumbai	890.0	ongoing
1	Public	Logistics	Airport	Modernization of Chennai Airport	400.0	Ongoing
1	Public	Logistics	Road/ Bridge	Tamil Nadu road sector project (TNRSP)	542.0	Ongoing
1	Public	Logistics	Other Logistics	Transport sector improvement program in Chennai Metropolitan Development Area	16,120.0	Ongoing
1	Public	Logistics	Road/ Bridge	Chennai Outer Ring Road (Phase 2)	240.0	Prospective
1	PPP	Logistics	Port / Maritime	Chennai Port : Construction of new Berth	11.1	Prospective
1	PPP	Logistics	Port / Maritime	Chennai Port : Construction of new Jetty	11.1	Prospective
1	Public	Logistics	Port / Maritime	Chennai Port : Construction of roads inside port Area	50.0	Prospective
1	PPP	Logistics	Port / Maritime	Chennai Port : Construction of Ro-Ro Berth and Multi-level Car parking	21.0	Prospective
1	PPP	Logistics	Port / Maritime	Chennai Port : Development of 3rd Container Terminal	166.7	Prospective
1	PPP	Logistics	Port / Maritime	Chennai Port : Development of Barge handling facilities	8.9	Prospective
1	PPP	Logistics	Port / Maritime	Chennai Port : Development of container terminal	111.1	Prospective
1	PPP	Logistics	Port / Maritime	Chennai Port : Development of Integrated Dry Port and Multi Model Logistics Hub near Sriperumbudur	86.1	Prospective
1	Public	Logistics	Port / Maritime	Chennai Port : Dredging related to Mega Container Terminal	125.0	Prospective
1	PPP	Logistics	Port / Maritime	Chennai Port : Others (fishing harbour, EPZ, trade convention centre, etc)	88.9	Prospective

Tier	Type	Sector	Sub-Sector	Project Name	Cost (US\$ mil)	Status
1	PPP	Logistics	Road/ Bridge	Chennai-Bangalore Expressway	NA	Prospective
1	Public/PPP	Economic	Industrial Estate / SEZ	Chennai-Bangalore-Mumbai Industrial Corridor	NA	Prospective
1	Public	Logistics	Railway	Dedicated Freight Corridors (Chennai-Goa, Chennai-Delhi, Kolkata-Vijaywada)	NA	Prospective
1	Public	Logistics	Port / Maritime	Ennore Port : Capital Dredging Phase III	48.7	Prospective
1	Public	Logistics	Port / Maritime	Ennore Port : Capital dredging, phase 2	49.1	Prospective
1	Public	Logistics	Port / Maritime	Ennore Port : Construction of 2nd marine liquid terminal	44.5	Prospective
1	PPP	Logistics	Port / Maritime	Ennore Port : Development of LNG terminal	22.2	Prospective
1	Public	Logistics	Port / Maritime	Ennore Port : Upgradation of coal handling facility	12.7	Prospective
1	Public	Logistics	Railway	High Speed Rail (HSR) system between Chennai-Bangalore-Coimbatore-Ernakulam	NA	Prospective
1	Public	Logistics	Railway	High Speed Rail (HSR) system between Hyderabad-Dornakal-Vijayawada-Chennai	NA	Prospective
1	NA	Logistics	Road/ Bridge	Kanyakumari-Tirunelveli-Pondi-Chennai Expressway	NA	Prospective
1	Public/PPP	Logistics	Airport	New International Airport at Sriperumbedur	NA	Prospective
1	Public	Logistics	Road/ Bridge	North Chennai Thermal Power Station (NCTPS) Road	18.5	Prospective
1	PPP	Logistics	Road/ Bridge	Northern Port Access Road	100.0	Prospective
1	PPP	Logistics	Road/ Bridge	Rajiv Gandhi Salai (IT Corridor), phase II	122.0	Prospective
1	Public	Logistics	Railway	Upgradation of passenger railway system along Chennai-Bangalore truck route	NA	Prospective
2	Public/PPP	Logistics	Port / Maritime	Conversion /development of 7th berth into coal terminal at Mormugao Port	63.1	ongoing
2	Public/PPP	Economic	Industrial Estate / SEZ	Delhi-Mumbai Industrial Corridor	90,000.0	Ongoing
2	Public/PPP	Logistics	Port / Maritime	Development of deep draught coal berth at Paradip Port	119.8	ongoing
2	Public/PPP	Logistics	Port / Maritime	Development of deep draught iron ore berth at Paradip Port	129.8	ongoing
2	Public/PPP	Logistics	Airport	Green field airport - Bijapur	50.0	ongoing
2	Public/PPP	Logistics	Airport	Green field airport - Durgapur	150.0	ongoing
2	PPP	Logistics	Airport	Green field airport - Kannaur	232.5	ongoing
2	Public/PPP	Logistics	Airport	Green field airport - Pakyong	77.4	ongoing
2	Public/PPP	Logistics	Airport	Green field airport - Sindhudurg	43.8	ongoing
2	Public/PPP	Logistics	Port / Maritime	Haldia Port Development	NA	ongoing
2	Public/PPP	Logistics	Port / Maritime	International container trans-shipment terminal (ICTT) at Cochin Port	296.0	ongoing
2	Public/PPP	Logistics	Port / Maritime	Mechanization of iron ore handling facility as a backup requirement at deep draught berth No. 14 at New Mangalore Port	74.0	ongoing
2	Public/PPP	Logistics	Road/ Bridge	National Highway Development Plan (NHDP), phase 1 & 2	16,159.8	Ongoing
2	Public/PPP	Logistics	Road/ Bridge	NHDP, phase 3	20,156.5	Ongoing
2	PPP	Logistics	Road/ Bridge	NHDP, phase 5	10,302.5	Ongoing
2	PPP	Logistics	Road/ Bridge	NHDP, phase 6	4,170.0	Ongoing
2	Public/PPP	Logistics	Road/ Bridge	NHDP, phase 7	4,170.0	Ongoing
2	Public/PPP	Logistics	Port / Maritime	The Vishakapatnam Port	28.6	ongoing

Tier	Type	Sector	Sub-Sector	Project Name	Cost (US\$ mil)	Status
2	NA	Logistics	Road/ Bridge	Coimbatore-Erode-Salem Expressway	NA	Prospective
2	Public/PPP	Logistics	Airport	Green field airport - Dabra	525.0	Prospective
2	Public/PPP	Logistics	Airport	Green field airport - Gulbarga	19.1	Prospective
2	Public/PPP	Logistics	Airport	Green field airport - Hassan	NA	Prospective
2	Public/PPP	Logistics	Airport	Green field airport - Kushi Nagar	NA	Prospective
2	Public/PPP	Logistics	Airport	Green field airport - Palladi	NA	Prospective
2	Public/PPP	Logistics	Airport	Green field airport - Shimoga	NA	Prospective
2	Public/PPP	Logistics	Airport	Green field airport - Mopa (Goa)	400.0	Prospective
2	PPP	Logistics	Road/ Bridge	NHDP, phase 4	6,950.0	Prospective
2	NA	Logistics	Road/ Bridge	Salem-Cuddalore Expressway	NA	Prospective
2	Public	Logistics	Port / Maritime	Sethusamundram project	1,213.5	Prospective
2	NA	Logistics	Road/ Bridge	Trichur – Kanyakumari Expressway	NA	Prospective
3	Public	Logistics	Road	Construction of 100 km road connecting Lawngtlai on NH 54 to India-Myanmar border in Mizoram	128.0	Ongoing
3	Public	Logistics	Dry port	Integrated check-post (ICP) at Akhaura, Tripura	1.1	Ongoing
3	Public	Logistics	Dry port	Integrated check-post (ICP) at Dawki, Meghalaya	1.1	Ongoing
3	Public	Logistics	Dry port	Integrated check-post (ICP) at Moreah, Manipur	30.2	Ongoing
3	Public	Logistics	Railways	New railway line between Jiribum and Imphal, Manipur	554.0	Ongoing
3	Public	Logistics	Road	Upgradation 110 km of Imphal - Moreh connectivity on NH 39	NA	Ongoing
3	Public/PPP	Logistics	Road/ Bridge	Accelerated road development programme for the North East Region	3,030.8	Prospective

REFERENCES

- Bhattacharya, Biswa and Prabir De (2006) “Promotion of Trade and Investment between People’s Republic of China and India: Toward a Regional Perspective”, *Asian Development Review*, Vol. 22, No. 1, pp. 45-70.
- Brunner, Hans-Peter W. (ed.) (2010) *North East India – Local Economic Development and Global Markets*, Sage Publications, New Delhi.
- Das, Gurudas and C. Joshua Thomas (2008) *Indo - Bangladesh Border Trade*, Akansha Publishing House, New Delhi.
- De, Prabir (2005) *Transport Cooperation in BIMSTEC: Issues and Way Forward*, Discussion Paper # 75, Research and Information System for Developing Countries (RIS), New Delhi.
- De, Prabir (2008) “Trade Transportation Costs in South Asia: An Empirical Investigation” in D. Brooks and D. Hummels (eds.) *Infrastructure’s Role in Lowering Asia’s Trade Costs: Building for Trade*, Edward Elgar, Cheltenham.
- De, Prabir, Muthi Samudram, and Sanjeev Moholkar (2010) *Trends in National and Regional Investors Financing Cross-border Infrastructure Projects in Asia*, ADBI Working Paper 245, Asian Development Bank Institute (ADBI), Tokyo.
- Hummels, David (2007), “Transportation Costs and International Trade in the Second Era of Globalization”, *Journal of Economic Perspectives*, Vol. 21, No. 3, pp. 131-154.
- IIRSA (2010) *Notes on Infrastructure and Integration in South America*, Initiative for the Integration of Regional Infrastructure in South America (IIRSA), available at www.iirsa.org.
- Kimura, Fukunari and Ayako Obashi (2007) *International Production Networks in Machinery: Structure and Its Evolution*, ERIA Discussion Paper 2010-09, Economic Research Institute for ASEAN and East Asia (ERIA), Jakarta
- Kimura, Fukunari and Izuru Kobayashi (2009) *Why is the East Asia Industrial Corridor Needed?* ERIA Policy Brief No. 2009-01, Economic Research Institute for ASEAN and East Asia (ERIA), Jakarta.
- Planning Commission (2011) *A New Approach to the Twelfth Five Year Plan 2012-17*, Government of India, New Delhi.
- RIS (2011) *India-ASEAN Connectivity Report: India Country Study*, Report Prepared for ERIA, Research and Information System for Developing Countries (RIS), New Delhi.