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M. Vivekvaraya Industrial Research and Development Centre

A Report
on
Infrastructure Development
in
MAHARASHTRA





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(15 September, 1860 - 14 April, 1962)

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M. Visvesvaraya Industrial Research and Development Centre

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India, which is the fastest growing economy in the world, is witnessing an unprecedented need to upgrade infrastructure to support the growing economic activity and meet the ever rising aspirations of the population. This is more so in Maharashtra, which is the largest contributor to India's GDP. The state rightly emphasises the need for investment in infrastructure to sustain its lead in industrial development in the country.

Government of Maharashtra is targeting to grow the size of its economy to USD 1 trillion by 2025 from the present level of USD 400 billion. Such an ambitious growth target has a significant impact on inflow of migrant population, urbanisation and per capita income of the state. In this context, demand for infrastructure services is set to expand significantly in the near future and government must proactively expedite urban projects such as metro rail, monorail, airport development, water, sanitation etc to meet this demand.

In this regard, it is worth mentioning the Government of Maharashtra's initiative to build a 701 km eight-lane expressway connecting Mumbai to Nagpur. This Rs. 46,000 crore project, which commenced in 2016-17, will pass through 10 districts and 390 villages across the state. The state needs such mega infrastructure projects to support the ever growing vehicular traffic. Maharashtra witnessed 7.2 per cent growth in goods vehicles (including trucks, lorries, delivery vans etc.) and 17 per cent increase in trailers during 2017.

It is equally important to enhance rural infrastructure in the state at a time when the agrarian sector is facing tremendous stress. Agriculture sector in Maharashtra is estimated to have contracted eight per cent during 2017-18 after growing 22 per cent in the previous year. The Government must partner with farmer producer companies and other community based organisations to promote participatory irrigation systems, agri-marketing infrastructure, rural road connectivity, among others.

This report carries meticulous analysis of Maharashtra's performance vis-à-vis other states in key infrastructure sectors such as roads, railway, ports, airports, electricity and irrigation. The report also features insightful perspectives from government organisations, project implementing agencies, financial institutions, consultancy organisations and industry chambers on the imperatives of infrastructure development in Maharashtra. We gratefully acknowledge the efforts of experts from IDFC Infrastructure Finance, Smart Cities Council India, Maharashtra Metro Rail Corporation, KPMG Advisory Services, Maharashtra Economic Development Council and Maharashtra State Agricultural Marketing Board for contributing their valuable perspectives in this report.

We hope the report will serve as a useful guide to policymakers, academic institutions, independent researchers, consultancy organisations, infrastructure companies and others.

Mr. Kamal Morarka
Chairman, MVIRDC World Trade Centre Mumbai

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Overview

Globalisation is the reality of new era and to make progress quality infrastructure is inevitable. Resilient infrastructure is the basic requirement to achieve balanced, inclusive and sustained economic growth.¹

Maharashtra is a leading state in India in terms of infrastructure development. The table below highlights infrastructure project statistics of the top ten states in India as on February 28, 2018 where Maharashtra leads with a share of 11.3 per cent in the total project cost of India.

Top Ten States in Infrastructure Projects As on February 28, 2018			
	Number Of Projects	Total Project Cost (Rs Million)	Share in Total Project Cost (%)
India	9068	54,651,172	100.0
Maharashtra	1144	6,196,819	11.3
Uttar Pradesh	537	3,416,059	6.3
Goa	42	3,230,755	5.9
Tamil Nadu	449	3,135,199	5.7
Arunachal Pradesh	180	3,053,687	5.6
Andhra Pradesh	476	3,032,259	5.5
Karnataka	692	2,990,590	5.5
Gujarat	526	2,835,109	5.2
Madhya Pradesh	835	2,709,269	5.0
Telangana	219	2,378,099	4.4

Source: Infrastructureindia.gov.in

Notes:

Total number of projects includes PPP projects, traditional government projects and private projects

Government Infrastructure Projects (PPP): Project Cost >INR 5 crore

Government Infrastructure Projects (Traditional Procurement): Project Cost >INR 50 crore

Private Sector Infrastructure Projects: Project Cost >INR 50 crore

Projects belonging to multi-states have been excluded from the analysis

¹Economic Survey of Maharashtra 2017-18

Road Transport Infrastructure Services Industry

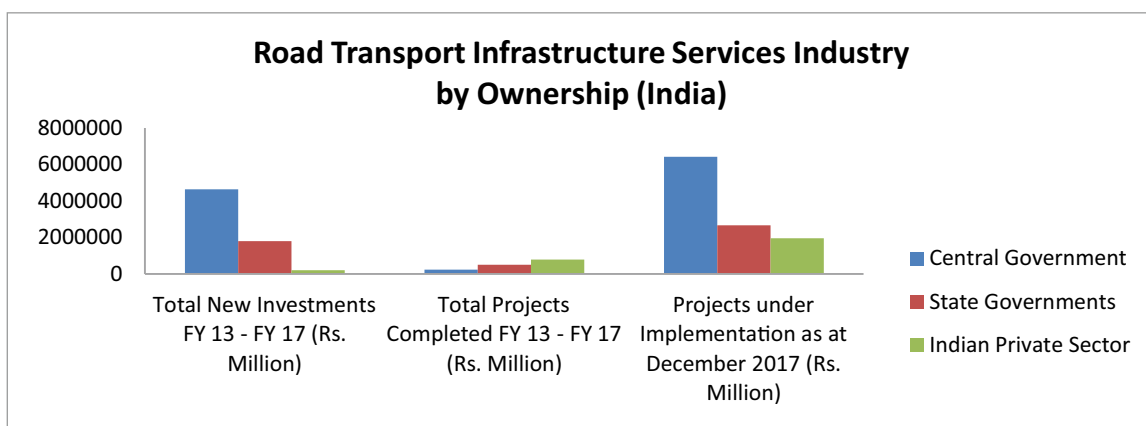
Top Ten States in Road Transport Infrastructure Services Industry					
FY 13 - FY 17	New Investments (Rs. Million)	FY 13 - FY 17	Projects Completed (Rs. Million)	As at Dec '17	Projects under Implementation (Rs. Million)
India	6,846,696	India	1,540,120	India	11,493,488
Assam	585,357	Uttar Pradesh	380,464	Maharashtra	1,562,687
Arunachal Pradesh	565,311	Maharashtra	139,632	Assam	964,709
Andhra Pradesh	404,963	Rajasthan	130,127	Uttar Pradesh	669,270
Uttar Pradesh	383,667	Madhya Pradesh	104,243	Andhra Pradesh	546,590
Karnataka	361,214	Tamil Nadu	89,325	Jammu & Kashmir	532,420
Jammu & Kashmir	340,582	Karnataka	76,083	Karnataka	427,874
Maharashtra	311,086	Gujarat	62,586	Bihar	403,498
Rajasthan	125,868	Bihar	61,303	Gujarat	327,367
Tamil Nadu	120,284	Punjab	50,187	Rajasthan	291,559
Bihar	118,009	Haryana	37,788	West Bengal	234,972

Source: Centre for Monitoring Indian Economy

Note: Projects belonging to multi-states have been excluded from the analysis

Maharashtra ranked seventh in India in new investments between FY 13 and FY 17 in the Road Transport Infrastructure Services Industry. However, it ranked second in terms of projects completed between FY 13 and FY 17 and first in projects under implementation as at December 2017.

Overview of the Road Transport Infrastructure Services Industry in India by Ownership



Source: Centre for Monitoring Indian Economy

Railway Transport Infrastructure Services Industry

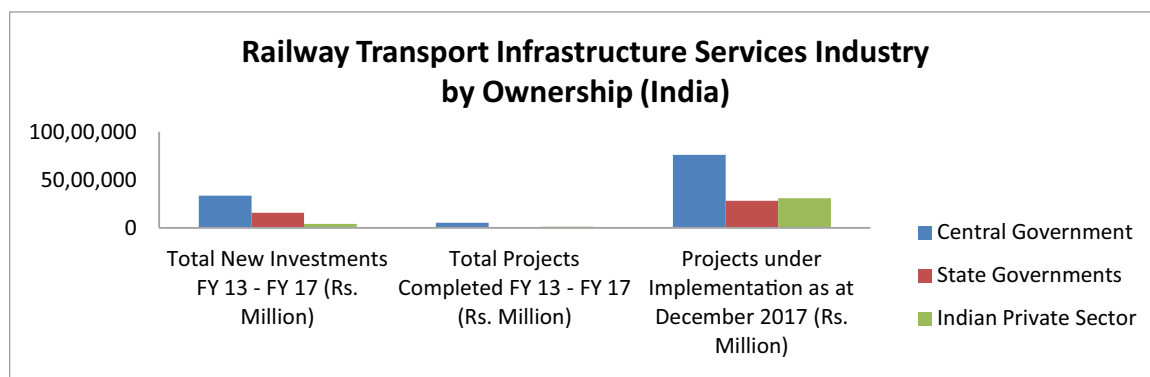
Top Ten States in Railway Transport Infrastructure Services Industry					
FY 13 - FY 17	New Investments (Rs. Million)	FY 13 - FY 17	Projects Completed (Rs. Million)	As at Dec '17	Projects under Implementation (Rs. Million)
India	5,552,795	India	622,313	India	13,626,909
Maharashtra	728,091	Bihar	114,521	Maharashtra	1,645,722
Uttarakhand	682,920	Maharashtra	63,925	Uttar Pradesh	1,023,101
Uttar Pradesh	637,840	Haryana	55,781	Uttarakhand	612,060
Gujarat	355,197	Assam	51,860	NCT of Delhi	563,934
Orissa	314,189	Uttar Pradesh	49,674	Gujarat	540,070
Assam	225,429	Rajasthan	33,775	Andhra Pradesh	420,136
Andhra Pradesh	179,456	Tamil Nadu	25,160	Karnataka	394,587
Jammu & Kashmir	158,810	Karnataka	24,688	Bihar	381,174
Kerala	158,770	Andhra Pradesh	19,707	West Bengal	361,613
Madhya Pradesh	158,139	West Bengal	18,142	Tamil Nadu	348,641

Source: Centre for Monitoring Indian Economy

Note: Projects belonging to multi-states have been excluded from the analysis

Maharashtra scored highest in terms of new investments between FY 13 and FY 17 in the Railway Transport Infrastructure Services Industry. It stood second, only next to Bihar, in projects completed between FY 13 and FY 17 and also stood first in projects under implementation as at December 2017.

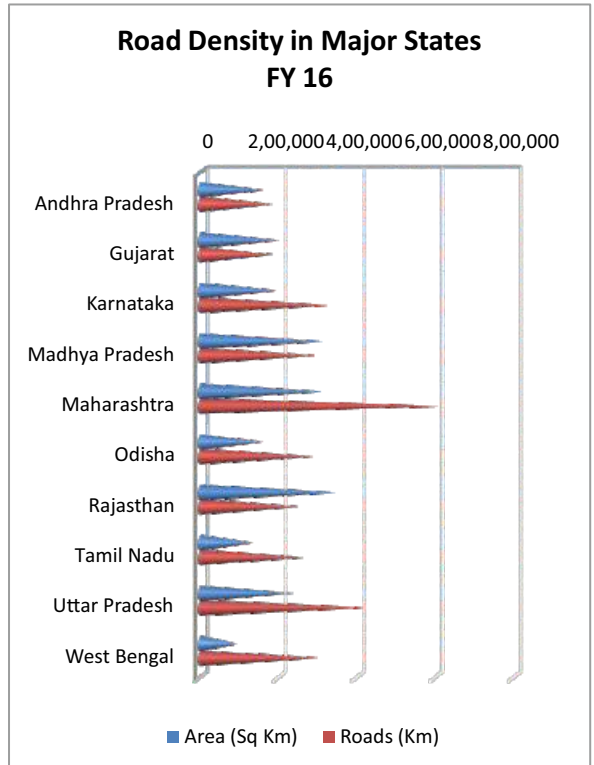
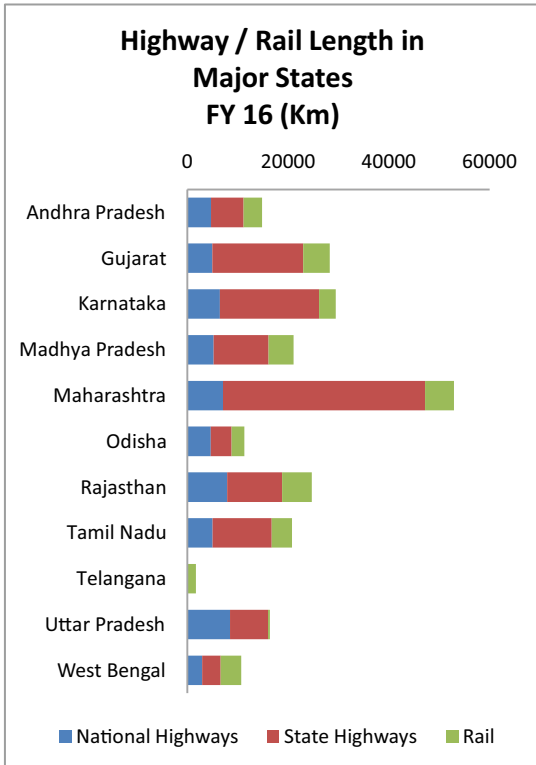
Overview of the Railway Transport Infrastructure Services Industry in India by Ownership



Source: Centre for Monitoring Indian Economy

Road / Rail Network

Among the major states in India, while Uttar Pradesh and Rajasthan had higher national highway length than Maharashtra in FY 16, Maharashtra had the highest state highway and road length network. It also had the second-highest rail network, following only Rajasthan. In terms of road density too, Maharashtra seconded only West Bengal and was close to Tamil Nadu, in FY 16, among the major states. It was followed by Odisha, Uttar Pradesh and Karnataka (Road Density is calculated as the proportion of Length of Roads (Km) in the Area (Sq Km) of the state).



Source: RBI Handbook of Statistics on Indian States, State Government Websites

Note: Data on national highway, state highway and road length for Telangana was not available



Air Transport Infrastructure Services Industry

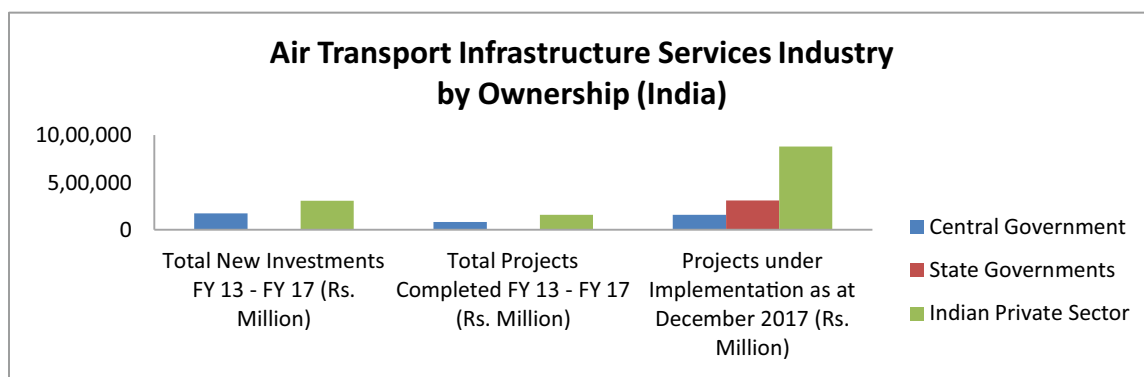
Top Ten States in Air Transport Infrastructure Services Industry					
FY 13 - FY 17	New Investments (Rs. Million)	FY 13 - FY 17	Projects Completed (Rs. Million)	As at Dec '17	Projects under Implementation (Rs. Million)
India	482,616	India	237,529	India	1,348,455
Delhi	160,000	Maharashtra	130,250	Maharashtra	326,699
Andhra Pradesh	59,109	West Bengal	33,250	Punjab	175,000
Maharashtra	41,300	Tamil Nadu	22,750	Karnataka	171,712
Uttar Pradesh	31,975	Kerala	12,554	NCT of Delhi	163,500
Telangana	28,221	Karnataka	10,532	Uttar Pradesh	119,587
Kerala	26,310	Punjab	9,640	Gujarat	89,406
Madhya Pradesh	25,561	Andhra Pradesh	4,293	Goa	58,534
Assam	24,880	Arunachal Pradesh	2,480	Andhra Pradesh	34,792
Tamil Nadu	13,335	Gujarat	1,870	Telangana	29,721
Karnataka	10,760	Uttar Pradesh	1,760	Tamil Nadu	27,873

Source: Centre for Monitoring Indian Economy

Note: Projects belonging to multi-states have been excluded from the analysis

Maharashtra was among the top three states in terms of new investments between FY 13 and FY 17 in the Air Transport Infrastructure Services Industry, and also stood first in terms of projects completed between FY 13 and FY 17 and projects under implementation as at December 2017.

Overview of the Air Transport Infrastructure Services Industry in India by Ownership



Source: Centre for Monitoring Indian Economy

Shipping Transport Infrastructure Services Industry

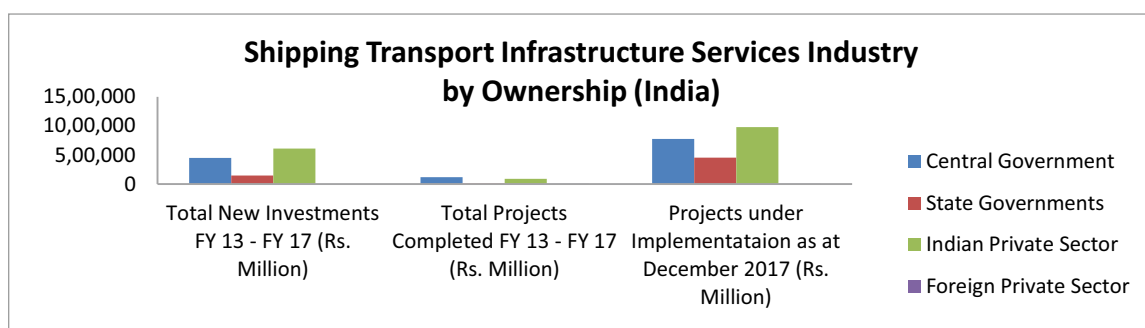
Top Ten States in Shipping Transport Infrastructure Services Industry					
FY 13 - FY 17	New Investments (Rs. Million)	FY 13 - FY 17	Projects Completed (Rs. Million)	As at Dec '17	Projects under Implementation (Rs. Million)
India	1,198,180	India	216,321	India	2,204,143
Gujarat	416,827	Gujarat	73,154	Maharashtra	566,032
Tamil Nadu	153,892	Maharashtra	38,691	Tamil Nadu	434,983
Andhra Pradesh	153,794	Andhra Pradesh	31,677	Gujarat	312,479
Odisha	131,972	Kerala	24,040	Andhra Pradesh	211,940
Rajasthan	80,000	Odisha	22,034	Kerala	178,749
West Bengal	50,623	Karnataka	11,230	Odisha	169,387
Goa	48,781	Tamil Nadu	6,753	West Bengal	85,480
Maharashtra	41,313	Goa	5,543	Karnataka	35,674
Andaman & Nicobar Islands	38,450	West Bengal	2,684	Puducherry	14,293
Kerala	20,859	Assam	467	Goa	13,154

Source: Centre for Monitoring Indian Economy

Note: Projects belonging to multi-states have been excluded from the analysis

Although Maharashtra stood eighth in terms of new investments between FY 13 and FY 17 in the Shipping Transport Infrastructure Services Industry, it stood second, only next to Gujarat in terms of projects completed between FY 13 and FY 17 and ranked highest in terms of projects under implementation as at December 2017.

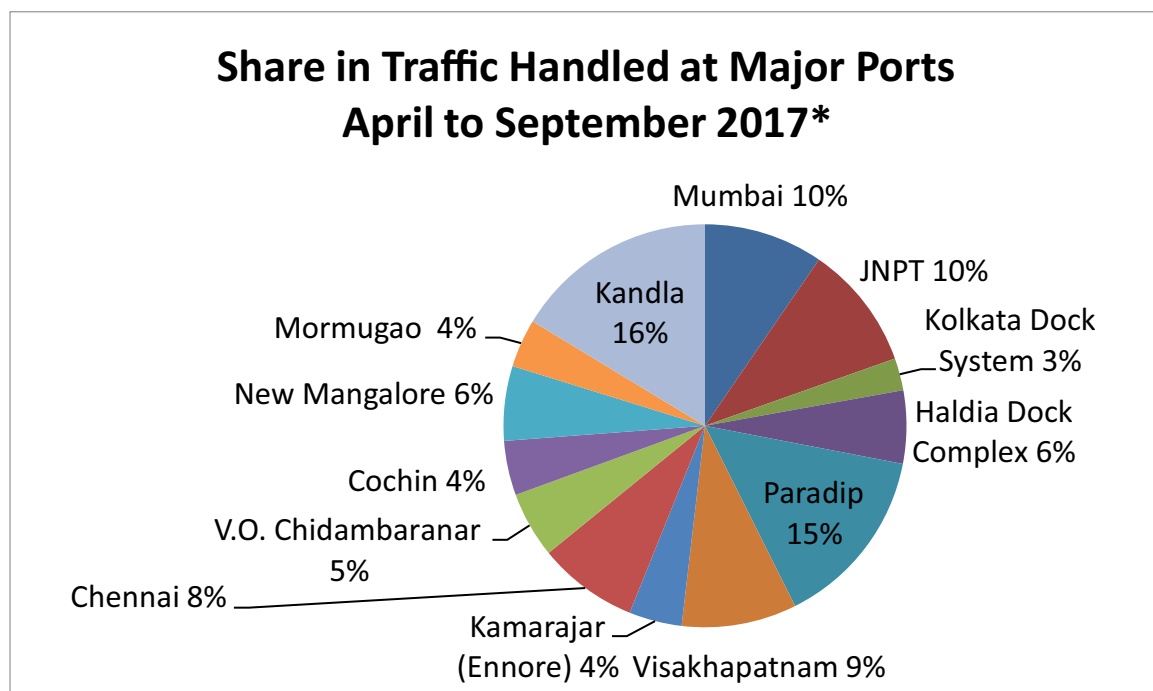
Overview of the Shipping Transport Infrastructure Services Industry in India by Ownership



Source: Centre for Monitoring Indian Economy

Major Ports

Availability of port infrastructure is a key enabler for exports. Maharashtra has a coastline of around 653 km, which is the third largest after Gujarat (1215 km) and Tamil Nadu (906 km). Maharashtra has two two major ports viz. Mumbai Port Trust and Jawaharlal Nehru Port Trust (JNPT) and 48 non-major ports. Mumbai Port Trust and JNPT are the leading major ports in India as they together handle almost 20 per cent of the total cargo (both container and non-containerised cargoes) handled by all the major ports in the country. JNPT is a leading container port in India as it handles 53 per cent of container cargoes (in terms of twenty foot equivalent unit) of all the major ports.



***Provisional**

Source: Indian Ports Association

Non-Major Ports

There are 205 non-major ports across the country, of which Maharashtra has 48 non-major ports, which come under the purview of Maharashtra Maritime Board, Government of Maharashtra. Out of these 48 non-major ports, only 14 ports are active in handling cargo. Non-major ports in Maharashtra handle only seven per cent of the total cargo handled by all the 205 non-major ports in the country. On the other hand, Gujarat, with 46 non-major ports, handles 72 per cent of the total cargo of non-major ports in the country. This suggests that there is tremendous scope to improve the performance of non-major ports in Maharashtra. Maharashtra Maritime Board must improve infrastructure in these non-major ports by focusing on - increasing the draft in these ports to enable berthing of large ships, improve cargo handling infrastructure, strengthening rail and road linkages to these ports, promoting coastal shipping to connect these non-major ports to JNPT and Mumbai Port etc.²

²Update on Indian Port Sector - 31/03/2017, Ministry of Shipping, Government of India

Export infrastructure such as Inland Container Depots, Container Freight Stations, Special Economic Zones and Export Oriented Units are key to enhancing exports from a state, in addition to logistic connectivity.

As at November 2016, Maharashtra had seven functioning Inland Container Depots (ICDs), equaling Gujarat, Madhya Pradesh and Rajasthan, the highest being with Tamil Nadu (nine) and Uttar Pradesh (eight). It also had the highest number of ICDs under implementation (four). As against this, Andhra Pradesh, Karnataka, Odisha, Telangana and West Bengal scored low in terms of functional and under implementation ICDs.

Maharashtra had the second-highest number of functional Container Freight Stations (CFSs) (40), as at November 2016, seconding only Tamil Nadu (48), and was followed by Gujarat (23). Other states under consideration scored relatively low in this regard. Andhra Pradesh had the highest number of CFSs under implementation at eight, followed by Gujarat and Tamil Nadu at five, and Maharashtra at three.

Inland Container Depots and Container Freight Stations As at November 2016				
	Inland Container Depots		Container Freight Stations	
	Functional	Under Implementation	Functional	Under Implementation
Andhra Pradesh	2	0	5	8
Gujarat	7	1	23	5
Karnataka	0	2	7	0
Madhya Pradesh	7	0	0	0
Maharashtra	7	4	40	3
Odisha	2	1	0	0
Rajasthan	7	1	2	0
Tamil Nadu	9	1	48	5
Telangana	1	1	2	1
Uttar Pradesh	8	2	9	0
West Bengal	1	0	10	2

Source: Ministry of Commerce & Industry Annual Report 2016-17

Note: Karnataka also has an air-freight station under implementation

Maharashtra had the second-highest number of formal approvals for Special Economic Zones (SEZs) at November 2016 (55), following only Karnataka (62), and was followed by Telangana (52) and Tamil Nadu (48). Maharashtra also had the highest in-principle approvals for SEZs at nine. It topped the number of notified SEZs (50), and had the third-largest number of Exporting SEZs (26), following Tamil Nadu (36) and Telangana (27).

**Distribution of approved Special Economic Zones
As at November 2016**

	Formal Approvals	In-principle Approvals	Notified SEZs	Exporting SEZs
Andhra Pradesh	29	4	24	19
Gujarat	28	4	24	18
Karnataka	62	0	41	25
Madhya Pradesh	9	1	5	2
Maharashtra	55	9	50	26
Odisha	7	0	5	3
Rajasthan	9	1	8	4
Tamil Nadu	48	4	46	36
Telangana	52	0	44	27
Uttar Pradesh	24	1	19	11
West Bengal	7	2	5	7

Source: Ministry of Commerce & Industry Annual Report 2016-17



Electricity Generation Industry

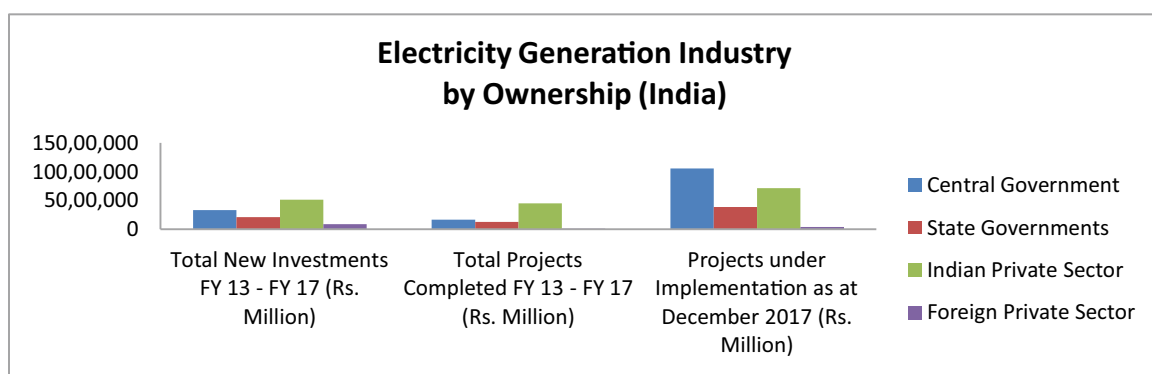
Top Ten States in Electricity Generation Industry					
FY 13 - FY 17	New Investments (Rs. Million)	FY 13 - FY 17	Projects Completed (Rs. Million)	As at Dec. '17	Projects under Implementation (Rs. Million)
India	11,553,922	India	7,569,270	India	22,144,575
Tamil Nadu	1,249,295	Maharashtra	829,985	Tamil Nadu	2,795,943
Gujarat	1,021,949	Madhya Pradesh	827,168	Odisha	2,146,885
Andhra Pradesh	1,004,998	Tamil Nadu	827,090	Andhra Pradesh	1,890,021
Rajasthan	727,568	Andhra Pradesh	707,688	Uttar Pradesh	1,585,242
Karnataka	686,523	Chhattisgarh	641,015	Maharashtra	1,499,314
Maharashtra	531,196	Gujarat	601,813	Madhya Pradesh	1,466,698
Jharkhand	510,691	Uttar Pradesh	554,665	Arunachal Pradesh	1,170,767
Madhya Pradesh	479,104	Rajasthan	483,078	Bihar	1,125,568
Jammu & Kashmir	432,681	Punjab	302,868	Rajasthan	1,033,792
Uttar Pradesh	382,407	Karnataka	295,371	Jharkhand	1,000,117

Source: Centre for Monitoring Indian Economy

Note: Projects belonging to multi-states have been excluded from the analysis

Maharashtra ranked sixth in new investments in the Electricity Generation Industry between FY 13 and FY 17; however in terms of projects completed, it ranked first during the same period. Still, in terms of projects under implementation as at December 2017, it stood fifth, emphasizing the need for increasing investments in the sector in the state.

Overview of the Electricity Generation Industry in India by Ownership



Source: Centre for Monitoring Indian Economy

Electricity Transmission & Distribution Industry

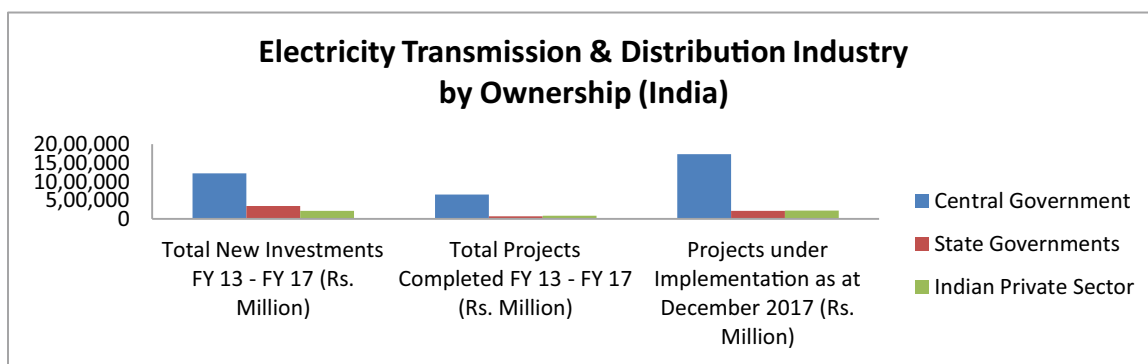
Top Ten States in Electricity Transmission & Distribution Industry					
FY 13 - FY 17	New Investments (Rs. Million)	FY 13 - FY 17	Projects Completed (Rs. Million)	As at Dec '17	Projects under Implementation (Rs. Million)
India	1,860,776	India	799,887	India	2,178,302
Tamil Nadu	109,960	Maharashtra	36,765	Tamil Nadu	124,383
Gujarat	84,514	Tamil Nadu	13,789	Bihar	47,592
Bihar	45,259	West Bengal	12,643	Gujarat	37,671
Jharkhand	41,869	Andhra Pradesh	11,744	Chhattisgarh	37,482
Uttar Pradesh	39,261	Bihar	10,565	Uttar Pradesh	36,069
Madhya Pradesh	27,324	Telangana	7,876	Rajasthan	33,577
Rajasthan	24,059	Haryana	7,252	Madhya Pradesh	29,556
Chhattisgarh	18,910	Himachal Pradesh	6,886	Mizoram	29,329
Karnataka	18,631	Madhya Pradesh	6,698	Jammu & Kashmir	26,839
West Bengal	14,692	Karnataka	5,800	West Bengal	17,411

Source: Centre for Monitoring Indian Economy

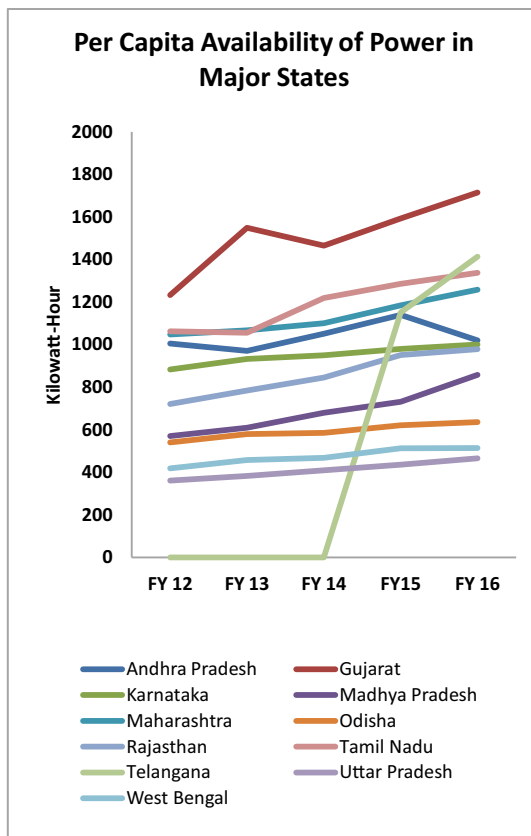
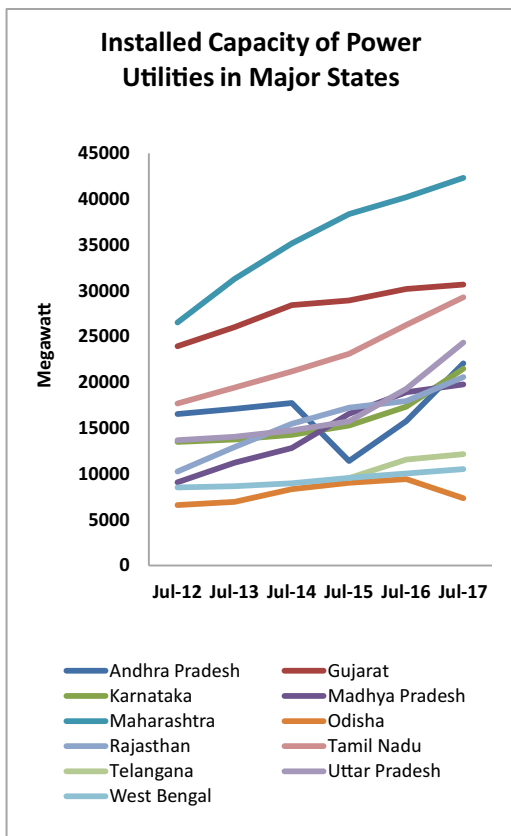
Note: Projects belonging to multi-states have been excluded from the analysis

Maharashtra neither figured among the top 10 states in new investments between FY 13 and FY 17 in the Electricity Transmission & Distribution Industry, nor in projects under implementation as at December 2017. However, it ranked highest in terms of projects completed between FY 13 and FY 17, thereby suggesting the scope for enhanced investments in the sector by the state.

Overview of the Electricity Transmission & Distribution Industry in India by Ownership



Source: Centre for Monitoring Indian Economy

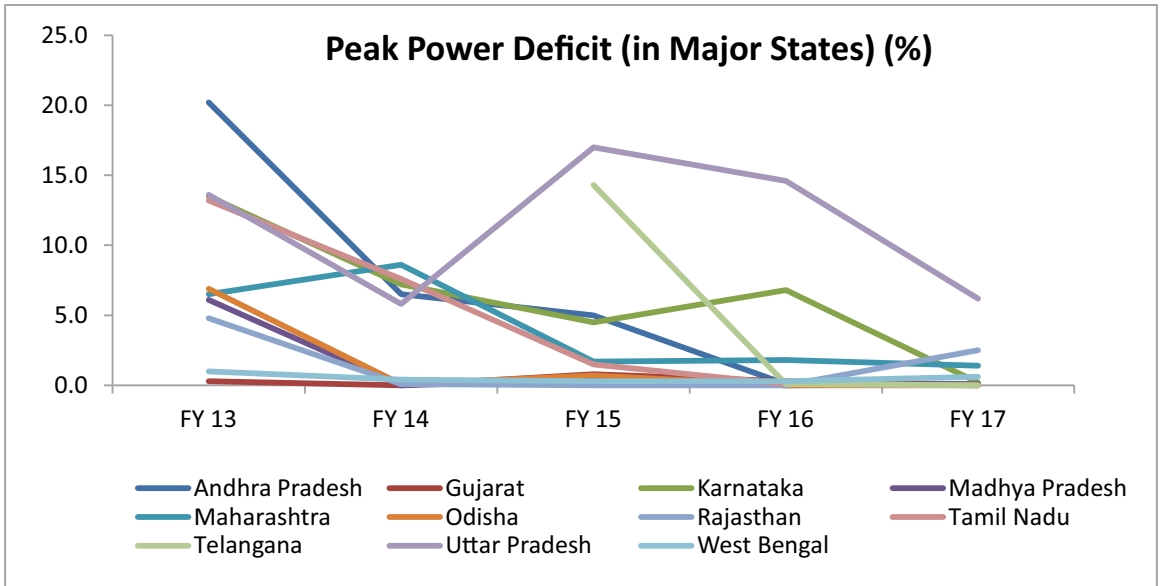


Source: Central Electricity Authority, RBI Handbook of Statistics on Indian States

Note: Data for Telangana is available FY 15 onwards as it was formed only in June 2014

Among the major states in India, Maharashtra had the highest installed power capacity in India at 42329 MW as at July 2017, but Madhya Pradesh, Rajasthan and Uttar Pradesh showed the highest growth in capacity addition between July 2012 and July 2017. While low in terms of capacity addition, Gujarat (between FY 12 and FY 16) and Telangana (in FY 16) outpaced Maharashtra in terms of per capita availability of power. Tamil Nadu also outperformed Maharashtra in terms of per capita availability of power between FY 12 and FY 16, whereas Uttar Pradesh scored the least on this parameter. Odisha and West Bengal were among the lowest in terms of both, capacity addition as well as per capita availability of power during this period.

Almost all major states eliminated power deficit during peak hours (18:00 to 22:00) by FY 17 (Peak Power Deficit is measured as percentage of unmet power demand during peak hours). States such as Andhra Pradesh, Karnataka and Tamil Nadu, which had power deficit in double digits, could eliminate the same by FY 17 through growth in the installed capacity and distribution of power between FY 13 and FY 17 in these states. Maharashtra continues to face power deficit during peak hours, although it has declined considerably from 6.5 per cent in FY 13 to 1.4 per cent in FY 17. Uttar Pradesh, however, has had persistent power deficit during peak hours throughout FY 13 to FY 17, while Gujarat has had negligible peak power deficit throughout the period. Rajasthan faced a deficit of 2.5 per cent in FY 17, although it could eliminate it between FY 14 and FY 16.



Source: Central Electricity Authority

Note: Data for Telangana is available FY 15 onwards as it was formed only in June 2014

Cost of electricity is one of the key operational expenditures of any manufacturing or service enterprise. Thus, cost of power affects the competitiveness of commercial enterprises. Power distribution in India is largely dominated by distribution companies of the state governments.

There is a tendency among power distribution companies across states to subsidize power for residential consumers by offering them power at a subsidized tariff and recovering the cost by charging higher tariff from industrial consumers.

In Maharashtra, the state-owned Maharashtra State Distribution Company (MSEDCL) supplies power to most of the industrial and residential consumers in the state. According to the revised applicable tariff for FY 17, MSEDCL charges Rs. 4.29 per kwh (unit) for residential consumers, while industrial consumers pay around Rs. 7.13 per unit. Thus, cost of power for industries in Maharashtra is one of the highest among the major states in India.



Irrigation

Top Ten States in Irrigation

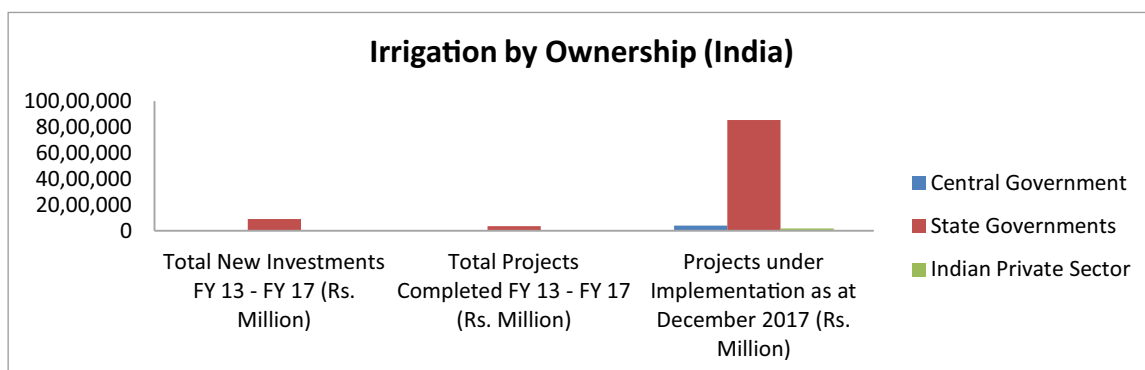
FY 13 - FY 17	New Investments (Rs. Million)	FY 13 - FY 17	Projects Completed (Rs. Million)	As at Dec '17	Projects under Implementation (Rs. Million)
India	936,364	India	358,153	India	9,130,744
Rajasthan	391,306	Karnataka	115,140	Telangana	1,694,313
Madhya Pradesh	251,618	Andhra Pradesh	99,050	Andhra Pradesh	1,098,260
Karnataka	39,135	Gujarat	62,370	Gujarat	1,055,159
Uttar Pradesh	32,164	Madhya Pradesh	22,702	Maharashtra	987,603
Telangana	29,572	Odisha	14,187	Karnataka	916,043
Andhra Pradesh	22,450	Bihar	7,500	Madhya Pradesh	432,069
Himachal Pradesh	15,839	Himachal Pradesh	7,237	Uttar Pradesh	238,855
Jharkhand	12,230	West Bengal	6,503	Odisha	227,298
Tamil Nadu	5,641	Tamil Nadu	6,182	Rajasthan	154,778
Kerala	1,450	Jharkhand	3,518	Chhattisgarh	125,986

Source: Centre for Monitoring Indian Economy

Note: Projects belonging to multi-states have been excluded from the analysis

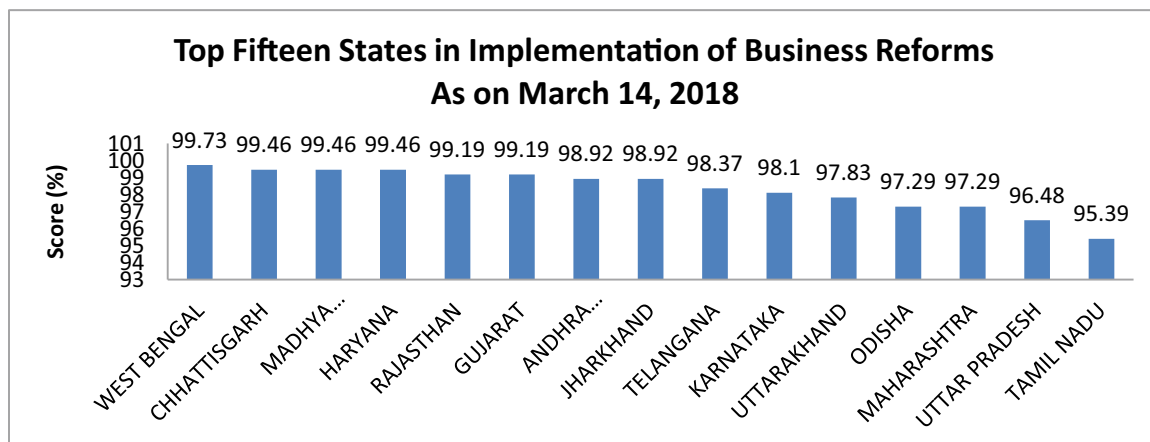
Maharashtra did not find place in the top 10 states in India in new investments between FY 13 and FY 17 and projects completed during the period in Irrigation. However, it figured at the fourth place in terms of projects under implementation as at December 2017 which prompts the need for improvement in the pace of project completion as also enhancing fresh investments in the sector.

Overview of Irrigation in India by Ownership



Source: Centre for Monitoring Indian Economy

Ease of Doing Business



Source: Department of Industrial Policy & Promotion

Maharashtra scored 97.29 per cent in Implementation of Business Reforms as per Department of Industrial Policy & Promotion, Ministry of Commerce & Industry, Government of India on March 14, 2018.

The following are the top five reforms implemented by Maharashtra as on March 14, 2018:

Top Five Reforms Implemented by Maharashtra As on March 14, 2018
Construction Permit Enablers
Access to Information and Transparency Enablers
Environmental Registration Enablers
Availability of Land
Single Window

Source: Department of Industrial Policy & Promotion

Recommendations

Maharashtra, which contributes 15 per cent to the GDP of India, is a frontrunner in terms of infrastructure creation. The state accounts for 13 per cent of India's national highways¹, 15 per cent of major port capacity², 26 per cent of under-implementation metro rail projects (of central government)³ and 12.7 per cent of total installed power capacity⁴ in the country.

Government of Maharashtra aims to grow the size of its economy to USD 1 trillion by 2025 from the present level of USD 400 billion. To attain this target, the state economy has to grow at an annual rate of 15 per cent, more than double the current rate of 7.3 per cent (in 2017-18). Such an ambitious growth target calls for massive upgradation of infrastructure to support industrial growth and accommodate inflow of migrant population.

While Maharashtra is more developed compared to other states in terms of infrastructure, it has to ride on the next wave of smart infrastructure development to attain this target. Smart infrastructure development hinges on optimal utilisation of digital infrastructure to provide basic infrastructure services to citizens and industry.

Agriculture

The state government must provide renewed thrust to the agriculture sector, which employs 46.1 per cent of the labour force in the state and which contributes more than 11 per cent to the state GDP⁵. In the agriculture sector, the state government must focus on upgrading irrigation facilities, promoting agriculture marketing infrastructure, cold storage and warehousing facilities, to name a few.

Irrigation: It is noteworthy that only 18.6 per cent of the foodgrain area in Maharashtra is covered by any form of irrigation compared to 66 per cent in Andhra Pradesh, 65 per cent in Telangana, 56 per cent in Tamil Nadu, 46 per cent in Gujarat and 26 per cent in Karnataka. The coverage of irrigation in some north Indian states is far more impressive at 78 per cent in

Uttar Pradesh, 98 per cent in Punjab and 92 per cent in Haryana. In recent years, Maharashtra has made sound progress in promoting microirrigation such as drip and sprinkler irrigation. Maharashtra ranks third after Rajasthan and Andhra Pradesh in terms of area under microirrigation. The state accounts for 15 per cent of the country's total area under microirrigation⁶.

In this regard, it is worth noting that the state government has launched Mukhyamantri Sour Krishi Vahini Yojana to provide solar power to farmers for irrigation. In future, the state government can also promote the formation of farmers' co-operative to set up and operate solar pump irrigation facilities. Under this initiative, the state government must offer capital subsidy to farmers for setting up irrigation facility based on solar pumps. Farmers can use the solar energy for irrigation purpose and sell surplus solar power generated from this facility to the government and earn additional income out of it. The state government can consider the successful model of the Solar Pump Irrigators' Cooperative Enterprise (SPICE), which is a farmers' co-operative in Kheda district of Gujarat, in this regard.

Power Sector

Reduce AT&C Losses: One of the major issues facing the power distribution sector in India is the high aggregate technical and commercial (AT&C) losses. High AT&C losses deteriorate the financial position of power distribution companies. This has a cascading effect on other players in the power sector and other sectors of the economy. Weak financial position of power distribution companies affects their ability to pay their dues to power generating companies and enter into fresh power purchase agreements. Consequently, many new power projects have not started generating power because of lack of power offtake agreements with distribution companies. This has crippled the ability of power generating companies to service their bank loans, thereby increasing the non performing assets in the banking sector.

¹Ministry of Road Transport & Highways, Press Release Dated 20-July, 2017

²Indian Ports Association

³Ministry of Urban Development, Annual Report 2016-17

⁴Central Electricity Authority, ALL INDIA INSTALLED CAPACITY (IN MW) OF POWER STATIONS (As on 28.02.2018)

⁵Economic Survey of Maharashtra 2017-18

⁶Agricultural Statistics at a Glance 2016, Ministry of Agriculture & Farmers Welfare, Government of India

Power distribution companies in Maharashtra suffer from AT&C losses to the extent of 20.15 per cent compared to 11.8 per cent in Gujarat, 9.7 per cent in Andhra Pradesh, 14 per cent in Tamil Nadu, 13 per cent in Telangana and so on⁷. Maharashtra has made remarkable improvement in metering of feeders in rural and urban areas, under the Central Government's UDAY scheme (since it was launched in 2016). However, its progress in metering distribution transformers is tardy. The state government must provide renewed thrust to smart metering to identify loss of power or theft of power and thereby arrest the ensuing losses to distribution companies.

Smart Cities and Digital Infrastructure

Maharashtra, being the leading industrial state in India, must demonstrate its leadership in leveraging digital technologies for smart urban management. Ten cities (such as Pune, Thane, Nagpur, Solapur etc.) from the state have been chosen for development as smart cities under Government of India's Smart Cities Mission. These cities must emulate the success story of Surat in building an Integrated Command and Control Centre (ICCC) for efficient delivery of various civic services such as traffic management, sewage treatment, policing, property tax collection and so on.

Digitisation is already bringing about the next wave of transformation in infrastructure sector. Traffic congestion at toll plazas affects timely movement of freight and people on state and national highways across the country. This can be addressed by enabling digital collection of toll using radio-frequency identification (RFID) tags. India's National Highway Authority of India (NHAI) is collaborating with the National Payment Council of India (NPCI) for electronic collection of toll from vehicles by popularising RFID tags, known as FASTags.

Similarly, Government of Maharashtra must collaborate with various municipal bodies in the state to adopt similar measures to address traffic congestion on state highways and city toll nakas. Government of Karnataka has taken this initiative to promote sale of RFID tags to vehicle owners to enable them to make electronic payment of toll when they pass toll plazas.

Healthcare Infrastructure

A robust healthcare system is a pre-requisite for human resource development and sustainable economic growth. The health of the population positively impacts the productivity of workforce and hence economic progress. Therefore, Government of Maharashtra must upgrade its healthcare infrastructure through innovative public private partnership models.

The Annual Health Index developed by NITI Aayog for the year 2015-16 shows key areas of improvement for all the states in the country. The index ranked Maharashtra at number sixth in the overall performance of healthcare system after Kerala, Punjab, Tamil Nadu, Gujarat and Himachal Pradesh. According to the index, Maharashtra must improve on key areas such as infant mortality (under 5 years of age), enhancing the number of functional primary healthcare centres, filling up vacancies of medical professionals and staffs and so on.

More specifically, the report pointed out that only 23 per cent of districts in Maharashtra had functional cardiac care units, compared to 91 per cent in Himachal Pradesh, 77 per cent in West Bengal and 70 per cent in Rajasthan. The state did not fill 17 per cent of medical officers' posts at Primary Healthcare Centres, 30 per cent of specialist healthcare providers at district hospitals in 2016. Lack of availability of sufficient medical professionals could be a reason for the failure to fill vacancies in healthcare centres. Adoption of information technology, especially telemedicine, should be promoted for optimal use of medical professionals in the state. The state government must use information and communication technologies so that the medical officers can use telemedicine to reach patients in remote areas.

Government of Maharashtra must learn from the best practices of the Tripura Vision Center (Tele-ophthalmology) programme, which was launched in 2007. The programme aimed to offer eye care services to patients in remote villages of Tripura with the limited number of ophthalmologists available in the state. Under this programme, ophthalmologists located in the state capital of Tripura tele-consult patients in remote rural areas.

⁷ www.uday.gov.in

Infrastructure Sector in Maharashtra - Policy Measures

Mr. Sadashiv S. Rao

CEO, IDFC Infrastructure Finance Limited (IDFC IFL)



“If Maharashtra has to grow to a \$1 trillion economy over the next few years from \$400 billion now, the state will need to grow at 10% over the medium term. For that, we need to improve our infrastructure. So, we are building more rail networks, ports, airports and investing hugely in agriculture too.” Said Chief Minister Devendra Fadnavis, at the World Economic Forum 2017.

Maharashtra accounts for 15 per cent of the national GDP¹. The state attracted 53 per cent of the foreign direct investment (FDI) in FY17². The state has a well-developed social, physical and industrial infrastructure. Apart from three international and seven domestic airports, the state has 6,026 km of national highway projects, 2 major and 53 minor ports along its 720 km long coastline. A report by Deutsche Bank has said Maharashtra now accounts for over 50 per cent of the large infrastructure projects now under way in the country.

Maharashtra tops in investment made by domestic firms and government entities in infrastructure projects in the country, according to a report published by NITI Aayog in 2017. Out of total investment in infrastructure project worth Rs 50.58 lakh crore, Rs 5.97 lakh crore has been invested in the state. NITI Aayog’s report is based on investments made till April 30, 2017. The report stated that Maharashtra is ahead of all other states in the country with 11

per cent of share in total expenditure in infrastructure projects.

The Government of Maharashtra has given top priority for developing infrastructure in the state and has recently announced some large ticket projects that are being implemented in a focused and time bound manner. It is also keenly attracting private sector investments. Refer to Box for salient points that would assist Maharashtra’s journey towards becoming a trillion dollar economy.

Maharashtra: Journey to a Trillion Dollar Economy

FDI in Maharashtra has increased from US\$ 8.7 billion in FY 2012-13 to US\$ 29 billion in FY 2016-17.

Maharashtra accounts for 51% of the total proposed investments (US\$ 20 billion) in mega projects that are were in the bidding stage during FY 2017-18.

Plan for Metro Projects in Maharashtra:

- Total metro network: 345 km
- Mumbai and Navi Mumbai: 253 km
- Pune and Nagpur: 92 km
- Daily commuters: 11.1 million
- Total cost: US\$ 21.8 billion
- Under operation: 10%
- Under construction: 40%

¹<http://www.financialexpress.com/economy/global-investment-policy-maharashtra-unveils-future-strategy/1004854/>

²<https://www.thehindubusinessline.com/news/national/maharashtra-set-to-be-1trillion-economy-says-fadnavis/article9864065.ece>

The state government plans to construct a new proposed 8-lane highway, between Mumbai & Nagpur. The project is worth US\$ 6.84 billion and would be requiring 10,000 hectares of land.

Construction of Mumbai Trans Link Harbour that would connect Sewri in Mumbai to Nhava Sheva in Navi Mumbai. The 22 km sea link has a project cost of US\$ 2.77 billion and is expected to be completed by June 2022.

Construction of Maharashtra Prosperity Corridor at a project cost of US\$ 7 billion. This proposed 700 km (4+4 lane) greenfield expressway would connect Mumbai and Nagpur and pass through 10 districts in the state.

Other significant projects approved include:

- Versova-Bandra Sea Link - estimated project cost of US\$ 1.12 billion
- Thane creek bridge-3 - estimated project cost of US\$ 115.36 million
- Widening of the Mumbai-Pune Expressway to 8 lanes from the existing 6 lanes between Lonavala & Khalapur – estimated project cost US\$ 713.61 million

Below are few policy measures that Maharashtra State could focus on in its endeavor to build world class infrastructure that would accelerate growth.

Implementing a state-wide coordinating unit for infrastructure projects

Developing vital infrastructure that is effective in supplementing sustainable economic growth hinges on whether infrastructure projects are properly planned, financed and delivered. It is observed that more than planning and financing, the biggest hurdle is timely delivery of infrastructure projects. Delivery is slowed

downed considerably when large number of authorities/agencies (central, state, local government) are involved. Each authority/agency operates in their own silo and there is no central coordinating unit to fast track decision making and resolve pending issues in a time bound manner.

To overcome this bottleneck, the step taken by Mr. Devendra Fadnavis to set up Chief Minister's 'war room' that reviews all infrastructure projects once every two months is a step in the right direction.

The 'war room' also gets all authorities (central, state and local) together to streamline decision making and ensure accountability for timely execution. The 'war room' approach has been instrumental in fast-tracking many key projects including the Mumbai Metro projects.

Going forward, Maharashtra should leverage on the initial success of 'war room' approach and institutionalize it as coordinating department. It could be entrusted with following key tasks:

- Improving efficiencies in project delivery (cost, safety, schedule, etc.)
- Improving quality standards with a focus on disaster resilience
- Recognizing and promoting industry best practices. For example, case studies could be prepared on successful execution of infrastructure projects so that key learnings are shared widely. It would also contribute in building institutional memory within the government
- Contributing in developing long term strategic plan for infrastructure roll-out with the state

Financial discipline while dealing with PPP/Private financed infrastructure projects

There are broadly three major sources of

developing infrastructure projects: Public finance, Public Private Partnerships (PPPs) and Private finance. To supplement budgetary resources, the government may opt for developing infrastructure projects on PPP or Private finance basis. In such cases, timely payment for off-take of services becomes paramount and is key in attracting investors in infrastructure sector.

Wind projects have in the past been developed by private sector developers under the Feed-in-Tariff (FiT) regime.



Maharashtra is among the key states where large number of wind projects were developed under FiT regime. Private Developers had entered into fixed tenor Power Purchase Agreements (PPAs) with Maharashtra State Electricity Distribution Company Limited (MSEDCL) and invested huge amount of equity and raised debt to execute wind projects.

However, since the past couple of years, MSEDCL has been delaying making timely payments as per PPA terms. Payment delays have been stretched for over a year or so and this has seriously jeopardized the financial viability of wind projects in the state of Maharashtra.

Such events seriously damage investor confidence and if the government is keen on attracting private sector investors in building infrastructure, it must take concrete steps to resolve such issues in a proactive manner. Like a

‘war room’ formed for reviewing implementation of under-construction infrastructure projects, the government should similarly form a ‘war room’ to speedily resolve contract/payment issues between private developers of operating projects and state owned utilities/agencies.

Capacity Building

As Maharashtra moves towards becoming a trillion dollar economy, it will need to manage rapid urbanization. Focus should therefore be on capacity building among all key stakeholders. Specialist skills in the area of urban planning, infrastructure management, contract negotiations, etc. would be immediately required.

Hence apart from planning and executing mega infrastructure projects, the Government of Maharashtra should also focus on developing institutes to train stakeholders in these skills.

Funding unviable infrastructure

Smaller towns would require infrastructure in the form of street lights, bus stands (revamp), etc. Funding such infrastructure on PPP basis would not be feasible since such projects would be financially unviable.

To supplement state funding of such infrastructure, the Government of Maharashtra could explore other options such as tapping into Corporate Social Responsibility (CSR) funds. The Government of Maharashtra should actively use their SAHABHAG social responsibility cell in encouraging corporates to use their CSR funds in this regard.

The Rs 50 Trillion Infrastructure Calling



Mr. Pratap Padode
Founder & Director, Smart Cities Council India

India's infrastructure requirement is slated to be in excess of Rs 50 trillion or Rs 30 billion a day, for the next five years. Denying this spend will result in the economy underperforming and also letting the country slip into chaos. So there is a compulsion for India to perform on the basis of a strong infrastructure. Let us take a look why we have reached this point of unease.

While the UPA second term was mired in controversies and inaction, the sector ground to a rumbling halt and took down several large companies and projects under its weight. Several firms are under insolvency code and many others have been running a fire sale. Corruption led to allocation of natural resources on ad hoc basis and inadequate vigilance led to companies outbidding each other at unrealistic levels for projects that did not have enough of a margin for sustenance. The outcome was a mountain of debt, failed businesses and pile up of court cases.

All said and done the National Highways Authority of India ran the world's largest PPP program and a lot of the road network under the Golden Quadrilateral and the NSEW corridor was financed by the private sector. Airports, metro rail, ports followed suit and we have some successful models and some models which evolved by necessity. The NDA government have completed over 36 months in power and have tried to create an atmosphere for interest in infrastructure to revive. Some notable steps include; insolvency & bankruptcy code, HAM models for road sector, ease in take over of infrastructure projects, rehaul of the environment ministry, reduction in number of permits, RERA act, changes in procedure for releasing funds in case of disputes, UDAN for regional air connectivity, smart cities mission, recapitalization of public sector banks, to name a few. Recently, legal issues too have been addressed.

These include the proposed amendments to the Specific Relief Act, 1963, (SRA) where there has been a provision to ensure injunctions are not granted for infrastructure projects that could delay their execution, special courts are set up for such cases, suits are expeditiously disposed of within a specific time frame and substitution is allowed in performance of contracts. It limits the time for disposal of a suit to 12 months "from the date of service of summons to the defendant" and says that any extension to this can be only for a maximum period of six months "after recording reasons in writing for such extension". Another very significant amendment relates to the "substituted performance of a contract" under which if a contract is broken, the party who suffers would be entitled to get the contract performed by a third party, or by his own agency, and to recover expenses and costs, including compensation from the party who failed to perform his part of the contract. A new Section 20A has been introduced in the amendment to the act relating specifically to infrastructure projects.

With over Rs 11 trillion debt, project investments worth Rs 32.7 trillion and cost overrun of Rs 14.35 trillion at stake, the Insolvency and Bankruptcy Code 2016 has come at an opportune time. Already deals involving nearly Rs 1.25 trillion are in various stages of being effected and would have the outcome of reducing the NPA by that amount. Further the debt after 'hair-cuts' would become income yielding for the lenders. The journey over the year has turned the mood from that of trepidation to one driven with a sense of hope.

Global pension funds like Canada Pension Plan have realized the potential in these infrastructure projects and have begun investing. The UAE government too has operationalised a USD 75 billion sovereign fund for India of which USD one billion has already been transferred. The ownership pattern of the "infra developers" is undergoing a change and new

companies like Adani Group, Ajay PIRAMAL Group, JSW Group etc are making their moves into this space.

The ground has been laid well with several initiatives which can propel this sector in the coming years. Mega projects have been announced with metro projects taking the lead followed by Bharatmala, Sagarmala, and so on and with some finally getting awarded like the Mumbai Trans-harbour link awarded to L&T and Tata Projects. These are some of the firsts with many to come. The year 2018 surely promises to be exciting for this sector where powerful moves will be made.

Last year, UAE investors announced nearly \$2.5 billion worth of investments in India, including a \$1 billion investment by Abu Dhabi Investment Authority (ADIA), a \$1 billion investment by NRI-Emirati Investor's Group, and a further \$460 million investment by Lulu Group in Andhra Pradesh.

The two countries have set up a multi-billion dollar fund—under the National Investment and Infrastructure Fund (NIIF)—to tap into investment opportunities in India's infrastructure sector. The fund plans to raise up to \$75 billion to support investment in railways, ports, roads, airports, industrial corridors and parks.

ADIA has deployed its funds in real estate, private equity, and has backed two of the largest renewable energy companies in India, investing over \$400 million in ReNew Power and Greenko. DP World, the Dubai-based port operator, and NIIF plan to jointly invest up to \$3 billion on ports, terminals, transportation and logistics businesses in India.

Getting FDI to build infrastructure is the wisest way forward for India as its infrastructure sector, groaning under debt and policy paralysis for a few years, has just managed to revive. We need more deals of this kind. Korea too has pledged around \$10 billion for South Korea's decision to extend \$9 billion in credit and \$1 billion for three mega projects — Nagpur-Mumbai Super communication Expressway (NMSE), Kalyan-Dombivili Smart City and Bandra Government Colony Redevelopment. The Japan International Cooperation Agency (JICA) has extended a total soft loan support amount of approximately

Finance Minister Arun Jaitley, during his budget speech, outlined India's requirement to be in excess of Rs 50 trillion. He enhanced the budgetary

expenditure on infrastructure for 2018-19 by Rs 1 trillion to Rs 5.97 trillion against an estimated expenditure of Rs 4.94 trillion in 2017-18. The budget has provided for plans to complete national highways exceeding 9,000 km length during 2017-18. This will mean about 25 km per day of construction.

Railways' capex is taking a huge leap, which has been pegged at Rs 1.49 trillion. A total of 4,000 km of electrification commissioning of the rail network has been targeted and 600 stations are being developed. Elevators are being provided to all stations with over 25,000 footfalls.

On Smart Cities Mission, 99 cities have been selected with an outlay of Rs 2.04 trillion of which projects worth Rs 23.50 billion have been completed and Rs 208.52 billion are in progress. State-level plans of Rs 776.40 billion for 500 cities have been approved. Water supply contracts for 494 projects worth Rs 194.28 billion and sewerage work contract for 272 projects costing Rs 124.29 billion has been awarded.

Expectedly, rural focus drew funds too in gigantic proportions and a collective amount of Rs 14.34 trillion has been provided for. The NamamiGange programme is on track, with 187 projects sanctioned for river surface cleaning, rural sanitation and other interventions at a cost of Rs 167.13 billion.

The seriousness of the exercise of actually envisioning an inclusive society seems to grow from the budget as the intent gets laid out by putting 'money where its mouth is'. The government has identified 115 aspirational districts for improvement in social services like health, education, nutrition, skill upgradation, financial inclusion, and infrastructures like irrigation, rural electrification, potable drinking water and access to toilets at an accelerated pace and in a time-bound manner. So, infrastructure continues to occupy as the means of providing the growth that India needs to sustain its demographic dividend.

Improved GST collections, fruitful divestment and a lower steady oil price scenario can keep the above plan on track. However, global economy and oil price volatility can play spoilers. Infrastructure momentum needs to be kept up and must not get derailed by the din of State elections. We have the mass now; we just need the velocity to get this momentum going.



Significance of Metro Rail in Transforming Urban Infrastructure in Maharashtra

Dr. Brijesh Dixit

Managing Director, Maharashtra Metro Rail Corporation Ltd

Transportation is often referred to as the 'lifeline' of a nation. It has been proven by so many instances how transport infrastructure has added speed and efficiency to a country's progress. Good physical connectivity in the urban and rural areas is essential for economic growth. India, the seventh largest nation with over a billion population, has one of the largest transport sectors.

Maharashtra is the most developed, urbanized, and industrialized state in India. The state is referred to as commercial, financial, and industrial capital of India. Presently more than 50% of the country's infrastructure projects are underway in Maharashtra and it is the state in which the highest number of metro projects are being executed in Mumbai, Nagpur, Pune and Navi Mumbai.

The rate of urbanization in Maharashtra is high with 45.2 per cent of population residing in urban areas. Maharashtra with a growth rate of 9.42%, is second most populous state in India and has one of the highest rates of rural to urban migration.

To address these concerns, an economical and sustainable form of public transport should be a part of the urban infrastructure so that the people have an option of shifting to this form of transport and it can meet tomorrow's demand.

Metro Rail Projects are a vital part in the movement of people, functioning of a city and also to improve the overall quality of life of an average Indian citizen - through investment in next-gen science and technology.



About Maha Metro

Nagpur Metro Rail Corporation Limited (NMRCL) was reconstituted as Maharashtra Metro Rail Corporation Limited (MAHA-METRO) for the implementation of all metro rail projects in the State of Maharashtra outside Mumbai Metropolitan Region. Presently, Maha Metro is executing Metro Rail Projects in two cities in the state of Maharashtra at Nagpur & Pune.

Nagpur Metro Rail Project consists of 38.215 Km elevated Metro Corridor which includes 40 stations and 2 train maintenance Depots, the Alignment is divided into two corridors i.e. North-South (19.658 Km) & East-West (18.557 Km). The estimated completion Cost is Rs. 8680 crores. The total physical progress achieved is 55% and the financial progress is 35%.

The route length of Pune Metro Rail Project is 31.25 km (26.23 km elevated & 5.02 km underground) divided into two corridors i.e. from Pimpri Chinchwad Municipal Corporation (PCMC) to

Swargate (16.59 Km) and from Vanaz to Ramwadi (14.66 km) with 30 stations and two Car Maintenance Depots. The approved completion cost is Rs. 11,420 crores. The total physical progress achieved is 12% and the financial progress is 08%.

Trial run of the very first section of 5.4 km of Nagpur Metro Rail Project was flagged off on 30th September 2017. The CMRS inspection will be done soon.

Multi modal integration, efficient & high-quality feeder service to provide first and last mile connectivity:

To augment the ridership of the metro services in the city, Maha Metro is working on providing multi modal integration on all the stations. With the initiative of 'Multi-Modal Integration', Maha Metro envisages fusion of road, metro, rail network, city bus, taxi and even auto-rickshaws and cycles plying on city roads.

Maha Metro has identified influence zones around stations and will work to integrate all metro stations with the various modes of transport. Multi Modal Components will include Pedestrian Subway Construction for Metro station access, creating multi modal hubs at several key locations in the city, Provision of parking services for private 2 wheelers and 4 wheelers, pick and drop within metro site boundaries, Provision of bicycle docking stations within metro site boundaries, feeder pick and drop in front of metro stations.

Maha Metro is also working to improve the first and last mile connectivity, which will basically help transfer passengers to the nearest Transit point which facilitates them for an onward journey. This will help in creating an efficient feeder system. Currently the feeder services will consist of Shuttle Buses, Mini Vans, Battery Operated Vehicles, Mahindra eSUPRO and Mobike.

Keeping the vision statement in mind, Maha Metro is creating an ecosystem which will focus on the use of Non-Motorized Transport and green, eco-friendly vehicles which help will in creating a sustainable ecosystem.

Common Mobility Card or Travel Card:

While making travelling easier in Orange City through its multiple initiatives, Maha Metro Nagpur has also taken a unique step to simplify the very process of travelling. Maha Metro Nagpur has adopted the EMV (Euro Master Visa) smart card



based Open Loop Automatic Fare Collection (AFC) system which will be implemented across all metro stations in Nagpur. This system will enable smart card as additional fare media for commuters to pay for the intended travel in any modes of transport. This has been implemented on a PPP basis with State Bank of India as the head of the consortium.

Transit Oriented Development:

Transit Oriented Development brings the people close to the metro services. Maha Metro envisaged integration of Metro stations along with the land parcels for property development right from inception stage. Exploitation of the land parcels given to Maha Metro shall help in ensuring sustainability of the operation and maintenance expenditure. This alternate Property development revenue will help in repayment of the loan taken and will bring down the fare for the commuting public.

Maha Metro has contemplated at least 50% of the revenue generation from commercial development of the land parcels whereas Delhi Metro could achieve 20% of the revenue from similar initiatives. Internationally, best revenue generation is from Hongkong Metro where only 40% of the revenue is generated by commercial development of the land parcels.

All land parcels and stations are being developed by

internationally renowned Architects and all stations are aimed to be green and environment friendly. Uses of natural light, solar energy and air ventilation have been blended in designing of the stations and commercial properties. Metro city is being developed as a modern habited with the facilities and services similar to available in a smart city.

Integrating Solar Energy from Inception:

Maha-Metro is integrating solar energy generation right from the project planning and design stage to meet 65% of its energy requirements making it one of the “Greenest Metro’s”.

Superior Project Management Through Digital Project Management Platform:

In Maha Metro, we have implemented 5D BIM to automate its project management processes by integrating four major software’s (Bentley, Oracle, SAP and RIB). With this platform, we are able to get insights into various intricacies in design, construction and handing over stage which is enabling us to take right decisions on time which otherwise wouldn’t have been possible. These inputs are helping us to progress at a much faster pace and we have been able to achieve nearly 60% overall progress and nearing the commissioning of the first section of 5.4 km length.

Setting Up of State of The Art Quality Labs at Works Site:

We have drastically improved our construction material testing setup as it is very critical to ensure overall quality of construction. Maha-Metro has setup a well-equipped ultra-modern with Bureau Veritas (A global leader in Testing, Inspection and Certification) to test the quality of materials used in the construction works. This facility is also used for training purpose, to disseminate technical knowledge to the staff of Maha Metro as well as contractors and consultants. This facility will also will also provide testing services to other Government agencies based at Nagpur and Central India. We are in a position to ensure some revenue form this tie-up. This is a path breaking initiative of Maha Metro.

Most of the innovations of Nagpur Metro have been carried over to Pune Metro as well.

State of the Art Station Development:

Prominent stations are being designed as Multi Storied World Class ‘Green-Buildings’ Stations suitably integrating commercial development, 100 % waste water recycling, human waste treatment through anaerobic bacteria-based bio-digesters in collaboration with DRDO, using eco-friendly methods and materials etc.

A particularly noteworthy thing is about station development of Pune. A very distinct station architecture is being developed there fully reflecting the rich history, heritage, art, and culture of the great city if Pune. The stations near industrial area will reflect industrial themes. Those near historical monuments will include their theme. Stations by the riverfront will have a reflection of that in such a way that they become the modern identity of the city and are ready to complete the rejuvenation of the surrounding areas. Rich musical heritage of the city will also be suitably included in the station design.

MoU with DRDO for anaerobic bio digester to ensure 100% water recycling and smart sewage treatment:

MoU has been signed between Maha-Metro and Defense Research and Development Organization (DRDO) for propagation and installation of “Bio Digester Technology”.Maha-Metro will be the first in India to adopt this technology with an objective of keeping eco-friendly clean environment and make use of organic waste & waste water.

Globally smart cities are classified as one where more than 60 to 70 percent of the population use public transportation networks. Enhancing the ease of traveling for the citizens of cities with metro networks is another step forward as India moves towards its target of building smarter and more inclusive cities. Urban Transport like Metro Rail Systems and Urban Planning should go hand in hand. The existing transport facilities should be modified and the new metro rail projects which will be implemented should complement each other so that it deters passengers from using private transport.

Water Sector: Challenges and Way Forward



Mr. Sumouleendra Ghosh

Director

KPMG Advisory Services Private Limited

Introduction

India is home to 16 per cent of the world's population but is endowed with only 4 per cent of the available water resources. A low per capita availability of water, which is forecast to decline further due to increase in population, makes India vulnerable to water stress in the form of frequent droughts and other natural and man-made calamities. Maharashtra is one of the largest states and exemplifies the water crisis faced across the country. Marathwada and Vidarbha, two important regions of Maharashtra that together constitute more than 50 per cent of its area, face frequent droughts. The underlying reasons for this situation can be attributed to natural and man-made causes.

Water crisis in Maharashtra

More than 30 per cent of the state falls under a rain shadow region created by the Western Ghats. There are large variations in the amount of rainfall received across the state. For example, Marathwada receives significantly less rainfall than the state average.

This region does not have any river with a high flow resulting, in dry river beds for many summer months. Given the terrain and geology of this region, there is poor water percolation into the ground, and therefore opportunities for extraction and use of groundwater is severely constrained. Nevertheless, in the absence of alternative water sources, extraction of groundwater does take place and, in fact, far exceeds recharge flows leading to drying up of many aquifers.

Marathwada does not have well developed irrigation networks. Significant portions of the land is under

Region	% of total rainfall received by the state
Konkan	56%
Madhya Maharashtra	14%
Marathwada	9%
Vidarbha	15%

Source: Indian Meteorological Department

sugarcane cultivation, a water intensive crop that requires around five to six times the quantity of water per kg than compared to other crops. Further, the downstream sugar factories that process cane into sugar, are water intensive too. Another similar example is the cultivation of cotton, which is a water intensive crop; with the introduction of the GM variety of cotton, water consumption per yield has gone up further.

During periods of water scarcity, priority is rightly accorded to drinking water – resulting in unavailability of water for irrigation causing crops to wither. Water scarcity has played a large part in the agrarian crisis and farmer suicides have been frequent and widespread in Maharashtra for the last few years.

In addition, there is rampant wastage of water in agriculture. Free or subsidised power provides no incentive to the farmer to conserve water.

The water crisis affects urban areas as well. For



be credited to the timely policy measures and technology interventions.

Way forward

Maharashtra drafted a State Water Policy in 2003. Though progressive in its outlook for its time, the policy needs to be revised to bring it in line with the National Water Policy 2012 and to address the distinct challenges that have emerged in the last decade and a half. There should be a strategy to address challenges posed by climate change,

encourage water conservation through 'reduce, reuse and recycle' measures that can be adopted by industries and households, introduction of water pricing and cost recovery, and encouraging private sector participation in service provision.

Metering of water consumption is an important step to understand consumption trends and encourage conservation. Volume based water tariffs need to be introduced in a phased manner. As indicated in the National Water Policy, minimum per capita water should be provided free of charge. Consumption beyond the set threshold needs to be priced appropriately to encourage conservation.

Water misuse can be indirectly reduced through the separation of IP feeders from village feeders and

example, it is not uncommon to find water tankers meeting the daily needs of people especially in the suburbs or the outskirts of Mumbai and Pune. The situation is not confined to Maharashtra alone but can be seen across the country. Unfortunately, this has given rise to a market that is served by unauthorised private water suppliers who compound the problem by exploiting natural water sources like lakes, reservoirs and groundwater reserves. The water being supplied by tankers is not tested for quality and may contain higher than permissible amounts of arsenic, fluoride and heavy metals like mercury and cadmium endangering the health and well-being of the people and livestock.

There is an urgent need to develop a policy that will address the multi-faceted challenges of the sector in an integrated manner. There is a need to have processes that will ensure faster and better identification and execution of projects. In parallel, sectoral and organisational capacity needs to be enhanced rapidly to meet the new challenges. The example of Israel is extremely relevant in this context. Israel is widely regarded by experts as a pioneer in water conservation and management. It has successfully transformed a semi-arid land into an economy that exports both surplus water and related technologies. This can



gradual tapering of power subsidy being provided to the agricultural sector. Feeder separation has been undertaken and is likely to continue in the near future across various states including Maharashtra.

One of the key initiatives that the Government of Maharashtra has undertaken is the development of a state-wide water grid around five major river basins in the state. The water grid is being planned on the lines of the one in the Narmada Basin in Gujarat, which has alleviated the drought and water supply problem in Gujarat to a large extent.

This philosophy of transportation of water from water-surplus to water-scarce regions is also being undertaken nationally through the River Interlinking project. Technically, the idea seems sound and may be useful in alleviating the simultaneous existence of floods and droughts; however, the serious downside of this option needs to be carefully evaluated as well. The Water Grid is expected to be both a capital as well as energy intensive project. Therefore, the key issue in making such a huge investment is the issue of sustainability and associated costs of undertaking the project. Further, traditional practices followed in villages and operational strategies for water resources conservation and rejuvenation should be taken up in parallel. Involvement and empowerment of local communities is important.

Some of the other interventions that can help in sustainable management of water resources in Maharashtra are:

- Crop planning; shift in cropping pattern towards less water-intensive crops
- Mandatory water table and rainwater conservation projects at district/taluka level with involvement of local communities, especially in water-stressed/water-scarce regions like Marathwada



- Evaluation of desalination projects to increase supply of water in cities and urban centres, especially along the coastal region/rain shadow region of the state. The cost of water produced by desalination is quite high compared to conventional technology. However, desalination cost may be expected to decrease over a period of time with reduction in the cost of membranes and improvement in technology resulting in lower power cost. Further, it is envisaged that urban areas may be able to bear some portion of the cost given their higher paying capacity
- Greater focus on waste water recycling and reuse and incorporation of these concepts while designing of new STPs, CETPs, etc. Tertiary treatment of treated waste water can make it suitable for use in industrial processes thus reducing the overall water demand

All such interventions may not be possible in short or medium term. Therefore, a sustained focus is required to undertake some of these initiatives to preserve and manage our water resources better.

(The views and opinions expressed herein are those of the author and do not necessarily represent the views and opinions of KPMG in India.)

Development of Growth Enabling Industrial Zone



Mr. Mukund A. Kulkarni

Vice President

Maharashtra Economic Development Council

Past President, Chamber of Marathwada Industries & Agriculture (CMIA)

A statement of a very top management member of a world renowned Company at CEO Conference of Chamber of Marathwada Industries & Agriculture (CMIA) is an eye opener. He said, “At Aurangabad, you have a challenge to bring your customer to your factory because looking at road connection, traffic challenges and poor garbage management will make customer run away from your city & Industrial area. However, if you somehow manage to take him till your plant, than you will come-out as a winner because you are world class inside your factories”.

If India dreams to be world class, we need to be world class both “Inside the factory & outside the factory”. It must be firmly noted that, even SME segment has implemented world class systems & practice like ISO, TPM, Lean & so on and thanks to MSME ministry of India to support such initiatives. However, there are no such initiatives to improve supporting infrastructure from governance.

It is a desperate need to upgrade prominent MIDC estate in Maharashtra with special focus on Marathwada and Vidharbh in a definite time period of three years. The plan should include following;

1. Internal Road: State of the art roads should be built considering heavy duty truck load and traffic in Industrial Area.

2. Truck terminus: Parking of trucks

on road hinders the traffic hence in each sector of MIDC a truck terminus with well prepare surface & washroom arrangement should be provided.

3. Shops and small business establishments: Roadside shops (tapries & thelas) are another reason for hindrance for traffic hence along with the truck terminals & washroom, service places for such shops and small business establishment should be provided in each sector.





- a. Collection & disposal of non-hazardous solid waste
- b. Collection & disposal of hazardous waste
- c. Treatment of domestic effluent
- d. Treatment of industrial effluent

While establishing effluent treatment facilities, size of Industrial Area, number of

Industries, topography of the area, type of the effluents generated, etc must be taken into consideration & accordingly multiple effluent treatment plants must be established.

4. Industrial material market: Industrial traders & suppliers are a key element of Industrial eco-system. Normally such suppliers mushroom at the entry point of industrial area and it has its challenges. Hence looking at small size of the suppliers and their importance in eco-system, a centrally located place which is close-by truck terminal should be provided for Industrial support suppliers at concessional rate.

5. Central administrative building: MIDC should build central administrative building which should have either full-fledged office or liaising centre of;

- MIDC
- MSEDCL
- MPCB
- Labour Office
- Factory Inspector
- Fire & safety Officer
- PF
- GST
- Police
- Weights & Measures
- Food & drug inspector
- ESIC Hospital



7. Tree plantation and rainwater harvesting: It must be made mandatory and must be enforced by MIDC to plant trees & make beautification of open space in front of each unit & to do ‘ Rain water harvesting’ in its premise.

6. Environmental Protection: NGT is very active, strict action and decisions are being taken to protect the “Environment”. Industry welcomes such action however government should note that, SME are not capable of compliance with such Environmental protection steps and if decisions are forced than SME businesses will not be viable. Hence Government Intervention is must be to take care of following;

8. Green zone and recreation: Focus efforts should be taken to develop, maintain & improve green Zone and quality Restaurants should be permitted near these green zones so as to have effective recreations.

If above measures are taken then “World class businesses, Make in India and Make in Maharashtra” will be a reality by spirit and actions.

Filling Gap in Infrastructure to Boost Agro-Export: Maharashtra's Perspective



Mr. Sunil Pawar, Managing Director, Maharashtra State Agricultural Marketing Board (MSAMB), Pune

Many developing countries are ill equipped to take advantage of the opportunities provided by trade. Weak infrastructure, lack of capacity and the inability to meet technical product specifications and stringent requirements in terms of quality, safety and health impede their integration into global markets. They need to enhance compliance with technical standards to heighten consumer confidence and gain access to regional and global value chains, especially those of transnational corporations. In the rules-based trading system, the agro-food sector provides immediate opportunities as many developing countries have good climatic conditions, available arable land and a sufficient pool of labour to expand agricultural production.

With the globalization of production, and supply and retailer chains, ensuring the safety and quality of products is vital. Developing countries like India must be able to prove to establish conformity to international standards and/or those applied in importing countries and reliability to maintain high-quality certification and inspection procedures. Need of the infrastructures in agriculture exports are the pre-requisites for inspection and certifications.

Notwithstanding the advantage of primary production, India lags behind in the export of agricultural products due to various reasons including inadequacy of general infrastructure, post-harvest infrastructure, scale of operation, high freight cost, price fluctuations, predominance of unorganized sector, lack of implementation of quality and food safety management systems (e.g. HACCP, GAP, GMP, etc), absence of adequate backward linkages and low technology of processing facilities. Efforts are being made in all directions to improve the situation, but this likely to

take some time. In the meantime, competing countries are progressing on all these fronts at a rapid pace. India, despite being one of the largest producers of agriculture products, has merely about 2.5% share of the world food trade. Emerging demand for food offers a great opportunity for export in international market. However, the country today is facing stiff competition from other countries in terms of agricultural export. Exporting competitors in the world are adapting to the latest technology for horticulture and processed food products which may become a decisive factor for the future competition. Further, in recent years the demand for quality processed food; organic food and health food along with attractive packaging has increased significantly. Therefore, for India the interventions are required in the not only in the production sector, but also in the related sub-sectors of agriculture like, infrastructure, quality, logistics, packaging, marketing, etc. Presently in India nearly one third of the primary produce like fruits and vegetables etc are wasted before it reaches to the market due to lack of proper post-harvest infrastructure and processing. An efficient agriculture infrastructure not only reduces the wastage, but also enhances the quality of produce and agricultural exports from India. In recent years, government has offered various schemes and policies which could provide impetus to these initiatives, but special importance is given to the agro-infrastructure sector in India.

The originations at APEDA, at Central level and Maharashtra State Agricultural Marketing Board (MSAMB), at state level has been actively involved in creation of infrastructure for horticulture produce to improve quality and value addition of produce and to achieve optimum shelf life resulting into increased quality exports of Indian agriculture produce.

Recently, major focus has been laid to encompass setting up of processing units for horticulture and agriculture produce and also strengthen the infrastructure at seaports. Under the XII Plan Scheme APEDA provides 90 per cent grant-in-aid and 10 per cent from other Government or public sector agency other than land. Assistance to private exporters is also provided for purchase of specialized transport units; setting up of intermediate storage; setting up of mechanized handling facilities such as sorting, grading, washing, waxing, ripening, packing, palletization, pre cooling, cold storage, pre-shipment treatment such as fumigation, x-ray screening, hot water dip, vapor heat treatment, Irradiation etc., cable cars for banana, Vapor Heat Treatment, specialized storage facilities such as CA, MA, etc.

MSAMB has done pioneering work in erecting Scientific Storages for onion at farm level to ensure the consistent supply of onion to exporter and to mitigate the demand of onion in off-season. Around 8 Lakh MTs of storage capacity at farm level has been created in Maharashtra.

In-spite of the initiations at various levels, following gaps need to be addressed to increase agri-export from Maharashtra.

Packhouses to monitor export consignments to ensure pests & diseases and pesticides residues: Horticulture items for exports are facing serious challenges due to imposition of stringent conditions of the importing countries. Two kinds of difficulties are being faced for export of horticulture items, one is related to pests and diseases and second with regard to higher amount of pesticide residues. Many horticulture products like mangoes and vegetables have faced bans from countries like EU, Saudi Arabia, and UAE in the last 3-4 years. These restrictions create negative publicity among all the importing countries and the image of the country is affected. Whenever a ban is imposed, it takes a lot of time to get the ban lifted as necessary corrective measures by all concerned stakeholders have to be taken and during the interregnum, the importers switch over to other competing countries. The problem related to pests and diseases and pesticide residues can be addressed if the backward linkages is strengthened by carrying



out necessary extension work at the field. This task has to be carried out by the respective agencies of all the state governments who generally do not give priority to exports affecting export of fresh fruits and vegetables and floriculture. Maharashtra, Gujarat, Karnataka and Tamil Nadu are the state who are always proactive in line with the central government guidelines for boosting agri-exports. The centre has to take the lead and persuade the states to accord the highest priority to strengthen the backward linkages needed for exports of these items. MSAMB realized the need of time and proactively created the export-oriented infrastructure in the state of Maharashtra as per the requirements of the importing countries.

Government of India is planning to make the packhouse compulsory for all the states for fresh fruits and vegetables in the nearest future. Therefore such well-equipped pack houses will be required on large scale.

Cold Chain: As is the case for all biological processes, the higher the temperature the faster these natural degradation processes will occur, leading to loss of color, flavor, nutrients and texture changes. In fact, as a general rule, most of these degradation processes double their rate for each increase of 10°C. Cold Chain is essential in qualitative post-harvest management and farm to fork food security and food quality by efficiently handling agricultural products upstream & downstream. Maharashtra State Agricultural Marketing Board has created state-of-the-art infrastructure including Cold chain and boosted the export from Maharashtra. 45 Export-oriented facilities has been created in Maharashtra by MSAMB having total capacity of 2700+ MTs of

Cold storage, 600+ MTs of Precooling, Ripening chambers of 150+ MTs and other High Technology profiles facilities like vapor heat treatment, Irradiation, Hot Water Treatment etc. Still there are huge gaps in the cold chain demand and requirements.

Green channel at Airport/Seaports: At all the exit points, airports and seaports, difficulties are being faced by the exporters in sending their perishable cargo in the general line. Since horticulture items are perishable, there is a need for providing a dedicated channel for them. This will enable the produce to be loaded at the vessel or aircraft in the shortest possible time and save the produce from being spoilt.

Development of Sea Protocol: The volume of exports of fresh fruits and vegetables can be increased to long distance markets such as USA, EU countries, Russia, China etc., if the produce is exported by sea.

A sea protocol will indicate at what maturity level harvesting can be done for transport by sea. In the absence of a sea protocol, the exporters will not be able to export the produce by sea. Philippines and Ecuador have developed such protocols for export of banana for avoyage time of 40 and 24 days respectively. In India, National Research Centers/ Research Institutes of respective products i.e. pomegranates, mangoes, banana, mandarins, potato, vegetables, etc. need to work for development of such protocols. The infrastructure that may be aroused in developing the protocols may need to be setup in Maharashtra state.

Additional Air Cargo Space for Perishables: Airlines have continued to add to their technological strengths. The terminals are also definitely improving. The cargo service center at Mumbai is a big step up, but challenge is cargo capacity constraints of airlines. It has been observed that due to lack of the air cargo space in International flights, the trade is getting hampered.

For example, in mango season, there is very limited cargo space available as compared to the demand of the trade. It's important that we understand that

perishables is as attractive for airlines as any other cargo segment. It is very high density, high loads and with lots of consistency as a cargo.

Export Infrastructure and Logistics for

Sea-ports: India has made great progress in building airport related infrastructure, but is lagging behind in sea-port related infrastructure. Therefore, export infrastructure, particularly ports-related infrastructure, which affects trade, needs immediate attention. Infrastructure particularly near ports viz. JNPT, Navha Sheva, have to be improved and last mile connectivity provided by improving road connectivity.

Testing Labs: Additional testing labs could be set up to test and issue quality certificates. Considering the rapid growth of fresh fruits, vegetables and spices exports from India and also the strict regulatory requirements of importing countries, there is a need to consider extending accreditation of private laboratory facilities for effective coverage of spices exports without compromising on the accuracy and reliability of results and with adequate safeguards.

Reforms related to Digital

Infrastructure: Digital Infrastructure is as important as physical infrastructure for growth of industrial and trade sectors. To scale up the linkages, besides physical connectivity, virtual connectivity inside India's vast market as well as to external markets, needs to be improved. E-commerce and E-payments will be greatly facilitated by a well-developed broadband infrastructure. If this is spread all over the country including villages it can lead to a virtual revolution. Maintaining traceability is the prime demand of the importing countries, hence for the effective and efficient implementation, the use of IT needs to be promoted from grass-root level.

With all above efforts, if Indian exporters are able to demonstrate and prove that they comply with the standards, they can enter the global value chain, gain consumer confidence and trust and benefit from access to a larger market which will ultimately lead to growth, wealth creation and poverty reduction.

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